

BALANCING PETROLEUM POLICY

**TOWARD VALUE,
SUSTAINABILITY,
AND SECURITY**

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Alexander Hurdeman and
Anastasiya Rozhkova, Editors

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CONTENTS

Preface and Acknowledgments	xiii
Contributors	xv
Abbreviations	xxi
Introduction	xxv
CHAPTER 1. The Petroleum Value Chain and Governmental Policies: An Overview	1
<i>Armand Holle, Alexander Huurdeman, and Anastasiya Rozhkova</i>	
The Petroleum Value Chain	2
Measuring Value Creation	7
Creating Value	8
Sector-Specific Policies	9
Cross-Sector Policies	18
Conclusion	22
Notes	23
References	23
Other Resources	24
CHAPTER 2. Planning for the Development of a Petroleum Sector	27
<i>Ananth P. Chikkatur</i>	
Introduction	27
Creating a Petroleum Master Plan: An Overview	28
The Petroleum Master Plan Process	31
Content of a Petroleum Master Plan	32
Decision Making and the Petroleum Master Plan Roadmap	39
Conclusion	41
Notes	41
References	41

CHAPTER 3. Petroleum Legislative Frameworks and Contracts in a Federation: Issues for Constitutions, Petroleum Laws, Regulations, and Contracts	43
<i>John J. Beardsworth Jr. and Matthew A. Stuart</i>	
Introduction	43
Legislative Frameworks for Petroleum in a Federation	44
Petroleum Agreements and Fiscal Regimes	53
Summary and Conclusions	60
Notes	61
Reference	62
Other Resources	62
CHAPTER 4. Petroleum Fiscal Regimes in Developing Countries	65
<i>Charles P. McPherson</i>	
Introduction	65
Special Characteristics of Petroleum Exploration and Exploitation	66
Fiscal Regime Objectives	67
Fiscal Instruments	70
Fiscal Packages	79
Fiscal Regime Evaluations	80
Special Fiscal Topics	82
Fiscal Stabilization	85
Summary and Conclusions	86
Notes	87
References	87
Other Resource	88
CHAPTER 5. Petroleum Fiscal Administration in Developing Countries	89
<i>Charles P. McPherson</i>	
Introduction	89
Relevance and Challenges	90
Routine Functions	91
Nonroutine Functions	92
Informational Requirements	94
Fiscal Regime Design and Administration	95
Institutional Issues	95
Building Capacity	97
Summary and Conclusions	98
Notes	98
References	99
Other Resources	99

CHAPTER 6. Key Aspects of Fiscal Management in Resource-Rich Countries **101**

Rolando Ossowski and Håvard Halland

Introduction	101
Complications of Fiscal Management in Resource-Rich Countries	102
Fiscal Policy and Short-Run Stabilization	103
Managing Fiscal Risks and Vulnerabilities	107
Promoting Sustainability	112
Public Financial Management, Public Investment Management, and Fiscal Transparency	115
Medium-Term Expenditure Frameworks	119
Fiscal Rules	123
Resource Funds	130
Summary and Conclusions	140
Notes	142
References	144
Other Resources	149

CHAPTER 7. Transparency in the Petroleum Sector: The Importance of Information and Clear Processes for Effective Development in Fragile Contexts **151**

Michael Jarvis

Introduction	151
Transparency: What Is It and Why Is It Important?	152
Transparency across the Value Chain	155
The Global Transparency Movement and the Extractive Industries Transparency Initiative	162
Potential Limitations or Unintended Consequences of Transparency	164
Conclusion	165
Notes	165
References	166
Other Resources	167

CHAPTER 8. Managing Environmental and Social Impacts of the Petroleum Sector: Using Environmental and Social Assessment toward More Sustainable Development **169**

Fernando D. Rodriguez

Introduction	169
Typical Environmental and Social Impacts of Oil and Gas Development	170
Environmental and Social Impact Assessment: Core Components	172

Strategic Environmental and Social Assessment: An Opportunity	175	
Key Institutional, Legislative, and Contractual Requirements		176
Public Participation, Transparency, Mutual Accountability, and Data	178	
Summary and Key Recommendations	178	
Notes	180	
References	180	
Other Resources	181	
CHAPTER 9. Understanding Commodities, Linkages, and Industrial Development in Africa: Developing a Conceptual Framework		183
<i>Mike Morris and Masuma Farooki</i>		
Introduction	183	
The Conventional Wisdom	184	
Commodities, Global Value Chains, and Outsourcing		186
An Overview of Linkage Development	189	
The Role of Government and Local Productive Policy		192
Conclusion	195	
References	196	
Other Resources	197	
CHAPTER 10. Ownership, Management, and Revenue Sharing of Petroleum Resources in Federal and Devolved Regimes		199
<i>George R. M. Anderson</i>		
Introduction	199	
Ownership	200	
Management	205	
Petroleum Revenue Sharing and the Fiscal Architecture of Federations	215	
Good Governance and Fiscal Probity	227	
Summary Observations and Some Recommendations		230
Notes	231	
References	231	
Other Resources	233	
CHAPTER 11. Petroleum Development and Conflict Prevention Strategies		235
<i>David Nyheim</i>		
Introduction	235	
Governance, Context, and Corporate-Driven Vulnerabilities to Petroleum-Related Violent Conflict	236	
The Resource Curse and Rentier State	236	
Contextual Vulnerabilities	239	

Corporate-Driven Vulnerabilities	243
Implications for Conflict Prevention	245
Strategies for Preventing Petroleum-Related Violent Conflict	246
Evidencing and Framing a Preventive Strategy	247
Getting the Politics and Policy Right	248
The Toolbox for Prevention	250
The Role of Oil and Gas Companies in Preventing Violent Conflict	257
Summary and Conclusions	259
Notes	260
References	261
Other Resource	263

Boxes

1.1 The Ten Oil Commandments for the Norwegian Upstream Petroleum Industry	11
4.1 Nigeria's Proposed Petroleum Industry Bill (2010): Bells and Whistles	77
6.1 Fiscal Risk Analysis in Resource-Rich Countries	110
6.2 The Sustainable Investment Approach	118
7.1 The Petroleum Fund of Timor-Leste	160
8.1 The Somali Peninsula: Examples of Existing Environmental and Social Challenges	179
11.1 Efforts to Prevent an Escalation of Violent Conflict in the Niger Delta	248

Figures

1.1 The Oil and Gas Value Chain	3
3.1 Using a Reserve Fund for PSC Decommissioning Obligations	50
3.2 Overview of EITI Standard	51
3.3 Flow of Revenues under a PSC—Overview	57
3.4 Flow of Revenues under a PSC—Detail	58
3.5 Illustration of Volume-Based Sharing	59
3.6 Illustration of Rate of Return Sharing	59
3.7 Illustration of R-Factor Sharing	60
4.1 Efficient Field Production	68
4.2 Broad-Based Development	68
4.3 Progressive State Capture of Rents	69
4.4 Profits, Taxes, and Efficient Field Production	71
4.5 Profits, Taxes, and Broad-Based Development	71
4.6 Royalties and Efficient Field Production	72
4.7 Royalties and Broad-Based Development	73
4.8 Production-Sharing Schematic: Base Case	74
4.9 Competing Budgetary Allocations in Nigeria	78

4.10	Production-Sharing Schematic with Royalty and Income Tax	80
5.1	Extractives Revenues as a Percentage of Total Government Revenues, Selected Countries, 2000-11	90
5.2	Possible Institutional Structure	96
6.1	Developments in Global Oil and Copper Prices, 2002-18	103
6.2	Oil Price Forecasts and Actual Prices, 2002-23	104
6.3	Emerging Market and Developing Economy Oil Exporters: Oil Prices and Median Annual Change of General Government Expenditure in Real Terms, 2004-17	106
6.4	Emerging Market and Developing Economy Oil Exporters: Median General Government Balances and Oil Prices, 2004-17	109
6.5	Diagnostic Framework for Assessing Public Investment Management	118
6.6	Norway: Net Cash Flow from the Petroleum Sector and Pension Expenditures, 2001 Projections	122
7.1	The Extractive Industries Value Chain and Types of Information To Be Disclosed	156
B7.1.1	The Petroleum Revenues and Government Expenditures of Timor-Leste, 2015	160
7.2	EITI along the Extractive Industries Value Chain	163
8.1	Typical ESIA Steps	173
9.1	Commodity Imports for China and India and Prices, 2000-17	185
9.2	Market-Driven Linkages over Time	191
9.3	The Trajectory of Local Supply	194
11.1	Contextual Vulnerabilities	240
11.2	Theory of Change: Preventing Petroleum-Related Violent Conflicts	246

Map

3.1	EITI Countries	52
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Tables

2.1	Sample of Recent Petroleum Master Plans	29
4.1	Royalties Are Regressive	73
4.2	Responsiveness of Rent-Capture Mechanisms to Determinants of Profitability	77
4.3	Fiscal Packages: Indicative Practice	80
8.1	ESIA versus SESA	177
10.1	Petroleum Revenue Determination and Allocation in Federal Systems	222
11.1	Risk Assessment for Petroleum-Related Violent Conflict	247

11.2	Political Leadership and Technical Measures Required to Address Vulnerability to Petroleum-Related Violent Conflict	251
11.3	National Policy, International Measures, and External Support Activities to Tackle Natural Resource Conflicts	253
11.4	Corporate Preventive Measures	258

PREFACE AND ACKNOWLEDGMENTS

The material for this publication was originally developed as part of the World Bank assistance to Somalia to address the political challenges of managing petroleum resources in that postconflict country as a prerequisite to peace, security, and equitable economic growth. The ultimate objective of this assistance was to level the playing field with respect to knowledge regarding all aspects of petroleum sector development in an emerging federal setting affected by recent conflict and to support a collaborative dialogue among different factions and levels of government.

As the project progressed and two workshops with representatives from all Somali regions and the federal government took place, multiple requests were received to put together a single publication that would summarize the key insights of an extensive body of literature on petroleum policy design and condense these insights into an easily readable format. These requests were echoed by policy makers and stakeholders in other developing countries where oil or gas resources are present. To meet these demands, a publication has emerged that outlines the basic knowledge necessary to embark on the task of finding the right balance of national petroleum development objectives and to make the right policy choices to achieve these objectives that will translate into poverty reduction and equitable and sustainable economic development. As such, this publication does not intend to present original research, although some is present, nor to represent an official World Bank position.

No publication of this magnitude can be produced without the hard work and dedication of many people. We would like to thank our coauthors for the time, effort, and quality knowledge and research they have invested into this project and their chapters and, in particular, for making the content relevant and accessible to those who are new to the task of shaping a policy for their country's petroleum sector. We are privileged to have brought together these authors, all of whom are globally recognized experts in their fields. We would like to express our gratitude to all the World Bank clients around the globe that we were privileged to work with on petroleum policy design, as this work allowed us to fully grasp and appreciate the hard choices they grapple with. We are especially

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ABBREVIATIONS

API	American Petroleum Institute
ARPEL	Regional Association of Oil, Gas and Biofuels Sector Companies in Latin America and the Caribbean
CCI	Council of Common Interests (Pakistan)
CMG	Companhia Moçambicana de Gasoduto
COMESA	Common Market for Eastern and Southern Africa
CPA	Comprehensive Peace Agreement
DDR	disarmament, demobilization, and reintegration
DFA	domestic financial asset
DROP	daily rate of production
DSA	debt sustainability analysis
E&P	exploration and production
EBN	Energie Beheer Nederland B.V.
EI	extractive industries
EITI	Extractive Industries Transparency Initiative
ENH	Empresa Nacional de Hidrocarbonetos (Mozambique)
ESIA	environmental and social impact assessment
EU	European Union
FFDC	fossil fuel–dependent countries
FPIC	free, prior, informed consent
GAAP	generally accepted accounting principles
GDP	gross domestic product

GGFR	Global Gas Flaring Reduction Partnership
GVC	global value chain
IAS	International Accounting Standards
IFC	International Finance Corporation
IMF	International Monetary Fund
IOC	international oil company
IOGP	International Association of Oil and Gas Producers
IPIECA	Global Oil and Gas Industry Association for Environmental and Social Issues
IT	information technology
IUCN	International Union for the Conservation of Nature and Natural Resources
KPCS	Kimberley Process Certification Scheme
KRG	Kurdish Regional Government
LNG	liquefied natural gas
MTBF	medium-term budget framework
MTEF	medium-term expenditure framework
MTFF	medium-term fiscal framework
MTPF	medium-term performance framework
NCS	Norwegian continental shelf
NEP	National Energy Program (Canada)
NNPC	Nigerian National Petroleum Corporation
NOC	national oil company
NRB	nonresource balance
NRPB	nonresource primary balance
NRT	natural resource tax
NTD	Natural Resource Tax Division
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
PASS	peace and security strategy
PEMEX	Petróleos Mexicanos
PFM	public financial management
PIH	permanent income hypothesis

PIM	public investment management
PMP	petroleum master plan
PPP	public-private partnership
PSA	production-sharing agreement
PSC	production-sharing contract
ROR	rate of return
RRC	resource-rich country
SALWs	small arms and light weapons
SB	structural balance
SESA	strategic environmental and social assessment
SIA	sustainable investing approach
SIF	strategic investment fund
SME	small or medium enterprise
SOE	state-owned enterprise
SPDC	Shell Petroleum Development Company
SWF	sovereign wealth fund
TAN	total acid number
ToR	terms of reference
UN	United Nations
UNCAC	United Nations Convention Against Corruption
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VaR	value at risk
VAT	value added tax
VPSHR	Voluntary Principles on Security and Human Rights
WBG	World Bank Group
WEO	<i>World Economic Outlook</i>
WTI	West Texas Intermediate
YPF	Yacimientos Petrolíferos Fiscales

INTRODUCTION

Alexander Huurdeman and Anastasiya Rozhkova

When petroleum is discovered in a country, policy makers and other stakeholders face the challenging and complex task of establishing a petroleum sector and developing their country's newfound resources. This publication provides the basic sector-related knowledge they need to embark on this task. While much of the material presented here is relevant to designing policies for the development of the petroleum sector in general, special focus is given to the contexts of developing countries, countries in a federal or devolved setting, and countries that have experienced or are still experiencing civil conflict. Petroleum policies tend to vary significantly from country to country, as do the objectives that such policies aim to achieve in the country's context. Although there is no one-size-fits-all policy and there are no clear-cut answers to all potential policy dilemmas, this publication may help policy makers find the right balance of objectives—and the right policy choices to achieve these objectives.

Petroleum Policy Considerations

The overall objective of a country's petroleum policy should be to create a framework for the profitable production of oil and gas that will result in transformation of natural capital in the ground into intangible capital (human and institutional) and produced physical capital that in turn will generate benefits for the entire society over the long term. Implicit in this assertion is that petroleum development encompasses more than the petroleum sector alone. Oil and gas resources should be developed in a manner that maximizes benefits to the country by supporting equitable and sustainable growth in domestic businesses across different sectors, employment, infrastructure, institutional competencies, access to training, education, and health services, all while minimizing adverse social, environmental, and health impacts.

Governments around the world have faced many different challenges in the quest to translate extractives production into equitable and sustainable economic growth. Ideally, these challenges should be identified upfront and addressed in a holistic way. Unfortunately, a country usually has a limited window of time after petroleum resources are discovered in which to make the decisions that will shape the sector for decades to come. A clear vision of how

the petroleum sector should contribute to the broader economic and social development of the country is an important first step toward making policy and investment decisions.

Because multiple sectors can affect and be affected by petroleum development, the number of relevant policy objectives can be large; on occasion, some may compete or be inconsistent with others. In such cases, priorities and sequences must be established. For ease of discussion, policy objectives can be categorized into three interlinked groups: value, security, and sustainability.

The “value” group may include attracting the most qualified investors for the long run; designing the optimal fiscal regimes; developing domestic and export markets; optimizing resource exploitation (operations and contracts) and infrastructure use; facilitating efficient collection of taxes and other revenues; establishing clarity of goals, roles, and responsibilities; and building institutional capacity among state actors, including the national oil company, if there is to be one.

The “security” group of objectives may comprise satisfying internal market demand for gas and petroleum products, including buffers; increasing society’s access to affordable energy; maintaining national operational security; retaining public trust and managing public expectations; avoiding civil conflict; controlling foreign input and influence; and managing international relations.

The “sustainability” group includes minimizing negative environmental and social impact; practicing sound land use; building human capacity; creating employment and benefits for the broader economy, including promoting local content linkages; and maintaining occupational safety and health. Increasingly, the climate change mitigation and adaptation that requires, and will result over time in, the transition of many countries to low-carbon-intensity economies needs to be taken into account if sustainability is to be achieved in the long run.

Trade-offs between the three groups of objectives are inevitable. And some objectives—such as accountability, transparency, and the equitable distribution of value—transcend this grouping and are universally important.

How objectives are prioritized and sequenced depends to a large extent on the relative value of petroleum resources within a country’s economy. The economies of Iraq, Nigeria, and the República Bolivariana de Venezuela are dominated by petroleum’s contribution to gross domestic product (GDP) and state revenues. In Bolivia, Malaysia, Mexico, and the Russian Federation, the petroleum sector’s contribution is significant but not fully dominant. In Brazil, Canada, and Indonesia, petroleum is an important but small part of the economy. And in Argentina, Australia, India, Kenya, Pakistan, and the United States, petroleum is of limited national significance, although it is still regionally important.

The more vital the petroleum industry is to the country’s economy, the greater the likelihood that it will be under state control. Resource-rich countries should, however, establish a clear division of roles and responsibilities between the state and the private sector, as well as among different state entities, to provide a sound basis for achieving policy objectives. In order to attract the most qualified investors while maximizing government take and meeting other national objectives, the regulatory framework for petroleum activities should be designed to achieve the best possible balance between national and

corporate interests. That balance can be achieved through fiscal policy, a legal and contractual framework, and the authorities' oversight of resource management, among other factors.

Although it is natural that petroleum policies should vary from country to country, all countries can benefit from certain universal policy principles that apply regardless of context. Effective policy in the petroleum sector is underpinned by five basic principles.

First, from a larger perspective, petroleum sector development should be integrated in the country's strategic vision of its overall economic and social development in the medium and long term. This integration will help clarify the key objectives and underlying principles of the petroleum sector's development; inform the sector's design, including formulation of relevant macroeconomic, fiscal, legal, and contractual policies; and determine the rate of production. When faced with the inevitable dilemmas that policy makers will confront, this integrated vision will serve as a basis for choosing between petroleum revenue consumption and savings or investments, including intergenerational distribution of potential revenues.

Second, petroleum policies should promote technical and commercial efficiency across the petroleum value chain. For example, reservoir-management policies and the relevant laws and regulations should maximize the recovery of petroleum resources. Operational policies should encourage timely decision making and cost minimization while meeting operational, environmental, and safety standards. Available infrastructure capacity should be used optimally. Petroleum products' allocation to consumer sectors should promote efficient consumption and maximize added value to the economy as a whole.

Third, policies and the resulting regulatory, fiscal, and institutional frameworks should be transparent. Transparency of information on concessions, revenues, capacity, prices, roles and responsibilities, and processes and procedures will contribute to efficiency in the sector, build trust between stakeholders, and reduce opportunities for corruption.

Fourth, policies should be grounded in the principles of social and environmental stewardship. Exploitation of petroleum resources should contribute to peace, stability, shared prosperity, and sustainable development. Petroleum sector development should adhere to the principles of inclusiveness, equal opportunity, transparency, accountability, and minimization of negative environmental and social impacts. Domestic environmental policies should consider strategies for cooperation with international climate initiatives, recognizing the challenges that climate change, in itself, and related global initiatives pose for lower-income and conflict-affected countries.

Fifth, policies should allow market forces to signal supply, demand, and pricing information to investors and consumers. Government control may be retained as long as the opportunity costs of petroleum development and use are made explicit and policy choices are guided by cost-benefit analysis.

The uncertainty and unpredictability of the petroleum sector are the constant companions of policy makers. In the initial phases of petroleum sector development, the potential impact of the sector on a country's overall economy is not fully known and is hard to assess, yet a policy must be formulated. Even as further discoveries are made and the country's resource base grows, this

uncertainty remains. In later phases, as production declines and demand can no longer be met, and as oil and gas fields are eventually depleted, policy making must keep pace.

Some circumstances lie wholly outside of government control. The size, productivity, and geographic distribution of oil and gas fields, as well as the resource's vicinity to markets, are determined by nature. Neither the level nor the volatility of international oil and gas prices and global market demand can be controlled by a government.

However, other factors over which governments *can* exert control can spell the difference between inclusive economic development, on one hand, and corruption, economic regression, or even conflict, on the other. In particular, strong institutional capacity for good governance within the sector and within cross-sectoral institutions has a positive correlation with the growth of resource-rich countries. Many other factors that the government can and should influence are explored in the chapters that follow.

Despite the importance of getting them right, policy design and implementation often stall at the government level due to lack of capacity or consensus between different agencies or levels of government. States organized on a federal model tend to face distinctive challenges in this respect, as ownership, management, and revenue sharing of their petroleum resources is often a subject of contention between federal and regional governments. In federal countries with limited economic diversification, the spatial concentration of oil and gas deposits heightens issues of equitable economic growth and regional balance; in some cases, those issues may affect national integrity and political stability. The same issues arise in countries that have taken steps toward decentralization.

Federations have dealt with these contentious issues in highly diverse ways. Although there are natural reasons for centralized management of the petroleum sector, as well as certain valid arguments for at least partial decentralization (all of which are explored in chapter 10), politicians need to find a workable and reasonable balance, grounded in economic efficiency and equity, that reflects the country's broader political context and history and discourages different orders of government from using their power for narrow partisan or personal gain. Arriving at this balance in a transparent and accountable manner through an open public debate and consensus building will enormously benefit the efficiency, public acceptance, and stability of the chosen arrangements around petroleum resource ownership, management, and revenue, as well as the peace and stability of the country. This is especially true for countries coming out of civil strife or where the risk of violent conflict is high. These states in fragile situations also require from all stakeholders involved in petroleum sector design and development—public and private alike—additional carefully-thought-through measures to address specific conflict vulnerabilities.

Structure of the Publication

Chapter 1 explains the petroleum value chain and reviews the main factors along the chain that affect value creation. The driving objectives and key roles of both the petroleum industry and government agencies, and how these objectives influence

the value creation process, are discussed, with a focus on the upstream sector, social value, and the major implications of government policies. The chapter starts by detailing the typical stages of upstream oil and gas projects and their distinctive technical, financial, and project-management characteristics. Although the emphasis of the chapter and the overall publication is on upstream activities, midstream and downstream activities are briefly outlined in order to give a more complete picture of the sector's complexities. The next section spells out the specific factors influencing value creation; these factors are grouped into (i) exogenous factors; (ii) those related to petroleum sector policies; and (iii) those related to cross-sector policies.

Chapter 2 presents a general overview of the key design principles, components, and execution recommendations for a national petroleum master plan—an important country-level comprehensive policy document that sets out a country's vision, objectives, strategic plans, and policies for petroleum sector development and lays out a priority-based action plan for the government to attain the outlined vision and objectives.

As **Chapter 3** explains, a country's legal framework is instrumental in striking the right balance between attracting the best-qualified investors and delivering the maximum benefit to society in line with a country's specific priorities and circumstances. This chapter looks at the key principles of structuring a clear and effective legal, regulatory, and contractual framework that will form a crucial foundation for transforming a country's resource wealth into equitable and sustainable economic and social benefits. The major considerations and important features of each of the principal components of a petroleum sector's legal and regulatory framework—a constitution, a petroleum law and regulations, and model petroleum agreements—are outlined.

Chapter 4 focuses on the specifics of petroleum fiscal regimes by first examining a range of sector characteristics that bear on the fiscal design of a regime and then reviewing common objectives for any regime against which its performance might be assessed. It catalogs the instruments available to meet fiscal objectives and discusses their individual pros and cons. The chapter then looks at how countries have combined fiscal instruments in packages in order to meet multiple fiscal objectives. It underscores the importance of economic evaluations of existing or planned fiscal regimes and introduces the main parameters and methodologies applied in performing such evaluations. It then addresses a number of critical fiscal topics for more detailed consideration.

Chapter 5 underscores the critical role of fiscal administration for effective collection of petroleum revenues and flags key challenges to performance. It reviews a spectrum of routine administrative functions that ought to be straightforward but have in practice proved difficult and suggests possible remedies to them before looking at a range of more demanding administrative functions. The chapter continues by setting out the minimum informational requirements for both authorities and operators, as credible, timely information is essential to successful completion of both routine and nonroutine functions. It then addresses the tension that often arises between fiscal regime design and the practicalities of its administration. The chapter concludes by looking at institutional issues and ways to enhance institutional capacity and by emphasizing a fundamental dimension of good governance, namely transparency, of fiscal administration.

Chapter 6 focuses on fiscal management in resource-rich countries. It sets out general principles of good fiscal management and suggests paths forward for countries where fiscal management is in need of improvement and sound fiscal principles for new producers. The chapter summarizes why resource revenue can complicate fiscal management. It continues with four sections on fiscal policy and short-run stabilization; fiscal risks; and the promotion of sustainability and public financial management, public investment management, and fiscal transparency. These sections discuss ways in which fiscal policy can address the challenges posed by resource revenue and foster sustainable growth. The chapter then examines special mechanisms and institutions that some resource-rich countries have added to their fiscal frameworks to help with fiscal management, namely medium-term expenditure frameworks, fiscal rules, and resource funds.

Chapter 7 explores the special significance of transparency for effective petroleum management in fragile contexts. It starts by formulating the meaning of transparency and clarifying its importance for different stakeholders, including investors, governments, and civil society. The chapter proceeds by examining transparency along the petroleum value chain, a useful systematic approach that allows one to scrutinize the transparency both of individual institutions and of transactions corresponding to the specific stages of the value chain, as well as of the value chain as a whole. The chapter's next section is dedicated to the global transparency movement, and the Extractive Industries Transparency Initiative (EITI) specifically. The chapter closes by looking at potential limitations and unintended consequences of transparency, if imposed without a well-thought implementation plan or in isolation from other necessary measures, and by offering practical remedies that can correct these shortcomings and bring about the desired improvement in petroleum governance.

Chapter 8 focuses on the tools that can be instrumental in reducing the footprint that hydrocarbon development can have on both the environment and the social landscape and in promoting positive outcomes from this development. The chapter starts by outlining common negative impacts on people and the environment associated with petroleum exploration and production. It then describes typical components of and recommended processes for two exercises that, if conducted right, can play a vital role in mitigating negative and promoting positive outcomes. These exercises are *strategic environmental and social assessments*, usually conducted at a national or regional level and meant to proactively inform policies and strategies on hydrocarbon development with respect to environmental and social aspects, and *environmental and social impact assessments*, conducted at the individual project level and aimed at identifying, quantifying, assessing the degree of importance of, and mitigating the potential negative impacts of a proposed oil and gas project; enhancing its positive outcomes; and contributing to the effective and efficient environmental and social management of the project. The chapter then examines key institutional, legislative, and contractual requirements in the context of environmental and social regulation. Its final section addresses the importance of public participation, transparency, mutual accountability, and timely and adequate data for effective environmental and social management.

Chapter 9 argues that developing resource-rich countries on the African continent have and should use opportunities to diversify their economies on the basis of local production linkages with the extractives sector. It disputes the conventional economic wisdom that tends to discourage using commodity linkage development as the basis for industrialization. As part of the argument, successful country examples of synergistic development of manufacturing and service sectors and extractives are presented. Four factors enhancing the prospects for diversification in commodity-producing economies in the context of global value chains are outlined, and then types of production local linkages—backward, forward, and horizontal—are reviewed in more detail. The importance of depth of local production linkages is explored, and a general model of linkage development aimed at resource-based industrialization is presented and explained. Finally, the government’s critical role in setting and implementing the local productive policy and its vital impact on resource-based industrialization is examined, and the importance of a clear government strategy not distorted by personal interests is stressed.

Chapter 10 presents a comprehensive overview of several pivotal principles that are at the core of petroleum sector arrangements in federal systems, along with the actual experience of a number of federations and quasi-federations that have significant petroleum resources. It addresses the questions of ownership, management, and revenue sharing of petroleum resources, which are central to petroleum policy in any federal or devolved state. For each question, consideration is given to the normative principles and other factors that might guide the choice of arrangements within a federation. The petroleum ownership section reviews the variations in and the importance of constitutional language on the subject, offshore ownership, and federal lands; explains the limited significance of ownership for management and revenue sharing arrangements; and looks at how ownership is addressed in concessions and contracts. The section on management examines the main management instruments for the petroleum sector, which include management of exploration and production rights, taxation and revenue-raising powers, regulatory powers over the environment, petroleum marketing, and transportation. A variety of existing arrangements for the distribution of management powers between federal and constituent governments is presented, and their consequences are discussed. The section on revenue sharing and fiscal architecture in federations reviews different revenue allocation principles and methods, provisions, and mechanisms, as well as the argument for special treatment of natural resource revenues. The chapter then provides a comparative analysis of countries’ experiences in the allocation of resource revenues in federations. This section is followed by a section devoted to the special importance of good governance and fiscal probity in federal and devolved settings with substantial petroleum endowment. The chapter ends with a summary of key observations and recommendations for policy makers.

Chapter 11 offers perspectives on how to prevent petroleum-related violent conflicts by reducing (i) governance-based risks through addressing the resource curse and rentier state behavior; (ii) contextual vulnerabilities such as an existing infrastructure of violence, state fragility, suboptimal legal frameworks, and petroleum operational issues through a number of political decisions and technical measures; and (iii) corporate-driven vulnerabilities through

the focus of petroleum companies on responsible, “do no harm” operations. The three sections of the chapter elaborate on (i) key governance, contextual, and corporate-driven vulnerabilities that set the stage for petroleum-related violent conflict; (ii) the respective implications, strategies, and implementation processes for tackling these vulnerabilities; and (iii) specific measures that might be considered by governments, development organizations, and petroleum companies when addressing these three sets of vulnerabilities.

The Petroleum Value Chain and Governmental Policies: An Overview

Armand Holle, Alexander Huurdeman, and Anastasiya Rozhkova

The primary hydrocarbon resources are crude oil and natural gas, which are located deep within the earth's crust. To find, extract, process, and transport these resources to the markets requires exceptionally large investments and extensive, highly specialized expertise. The risks inherent in the process are high but, if commercially viable petroleum is discovered and successfully developed, so is the reward. Governments of low-income countries that lack the required capital, as well as the technical and project management expertise, to tap their natural resources often grant the rights to develop resources to private petroleum companies. To find and produce its resources, a host government may offer companies a share of potential net revenues, referred to in economic literature as resource rent. The government thus faces a dual challenge of negotiating a maximum share of rent (government take) while attracting the most qualified company for the task. If negotiated, collected, and managed well, the government take can boost the country's overall development, leading to increased prosperity for its citizens.

Unfortunately, however, resource extraction is too rarely accompanied by economic growth. In almost 80 percent of resource-rich countries, per capita income is below the global average (Dobbs and others 2013). The vast majority of resource-driven economies also fall short on human development

indicators. Many of these countries lack strong governments at the national, regional, and local levels. Inefficient use of extractive revenues often hampers economic development. In addition, growth in the petroleum sector can have negative consequences for other sectors of the economy, as inflows of foreign investment strengthen the local currency and make other sectors less competitive, resulting in the economic phenomenon known as “Dutch disease.” A perceived unfairness of revenue distribution often ignites social instability or even conflict within a country, particularly when resources are misappropriated by a ruling elite. In brief, experience indicates that if a country is to succeed in translating the rent from developing its hydrocarbon resources into equitable and sustainable economic growth, it must be prepared for a complex, long-term path involving significant challenges. How successful the host government is in defining and implementing its sector policies, institutional framework, legal and regulatory framework, contractual and fiscal regime, and revenue sharing will determine how successfully these resources will be turned into improvements in social welfare. Transparency, good governance, accountability, and an active civil society all play crucial roles in this process.

To understand the key options and challenges of the petroleum sector’s design, it is crucial to understand the petroleum industry’s distinctive characteristics and its value creation process. This chapter will explain the petroleum value chain and review the main factors that affect value creation. It will discuss the driving key objectives and roles of both the petroleum industry and government agencies and how these objectives influence the value creation process, with a focus on the upstream segment and social value.

The Petroleum Value Chain

Crude oil’s physical appearance varies from a light, almost colorless liquid to a heavy, viscous, black sludge. These variations are due to differences in chemical and physical properties that define crude’s quality from a refining perspective, as they influence the refining process, its cost, and the spectrum and number of refined products produced. This is one reason why crudes from different origins may be priced unequally. Specific gravity (lightness) measured in degrees API—a scale developed by the American Petroleum Institute—and sulfur content are two of the key properties that affect the price of crude. Another important property influencing the quality and price of crude is acidity, measured by the total acid number (TAN).

Lighter crudes with a higher degree API sell at a premium relative to heavier ones because they produce a larger number of lighter products, such as gasoline, which have higher resale values. High-sulfur (sour) crudes sell at a discount relative to low-sulfur (sweet) crudes because higher sulfur content requires specific processing and maintenance and thus raises operating costs for refineries. Acidity above a certain threshold also adversely affects price, because acidity has a corrosive effect on refining equipment.¹

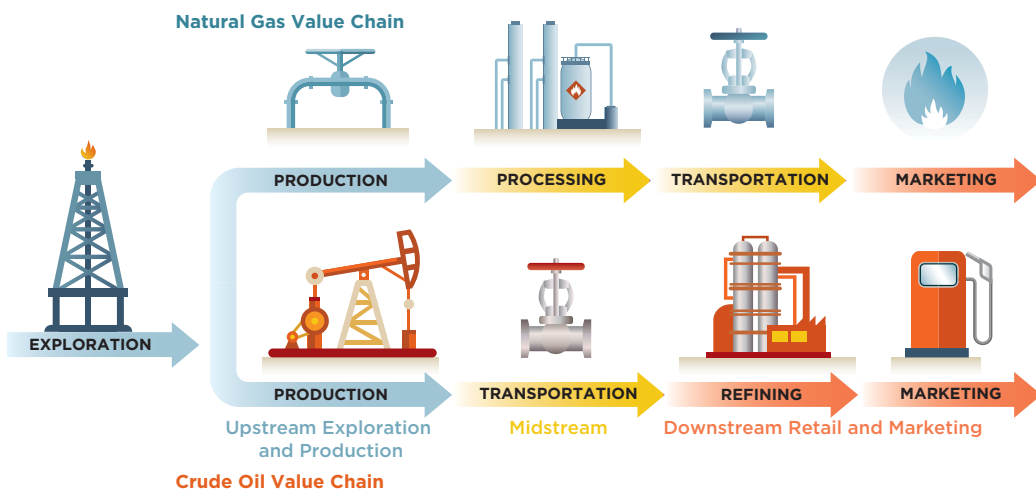
Natural gas can be found either in combination with or dissolved in crude oil (where it is referred to as associated gas) or in separate accumulations (nonassociated gas). The composition of gas produced at the wellhead varies widely, but

in most cases it contains pure natural gas (also known as methane), which is colorless and odorless, and natural gas liquids such as ethane, butane, propane, and natural gasoline, as well as a number of impurities, including carbon dioxide and water. Gas is described as either wet or dry, depending on its natural gas liquid content.

Transportation costs to markets are significantly higher for gas than for crude oil, as moving gas requires either a dedicated pipeline network for transportation across land or complex infrastructure to liquefy gas for transportation by sea. Transporting gas by land requires a complex pipeline system and a secured end market before the project is initiated. Transportation options for crude oil are more diverse and flexible, allowing crude to be more easily redirected toward other markets if needed. In addition, the value of crude oil on a calorific basis—that is, its heating value—is higher than that of gas. All these factors make the launch of a gas project much more complicated than that of an oil project. Some gas reserves are found accidentally by prospectors exploring for oil and cannot be commercially developed. This means there is a large amount of stranded gas worldwide—that is, gas with little or no commercial value because it has no identifiable market. Only over the past two decades have efforts to find gas been considerably stepped up.

The petroleum value chain starts with the activities of exploration, development, and production (often abbreviated as E&P), together referred to as the “upstream” segment. The “midstream” segment encompasses the transportation of produced petroleum to processing facilities. In the “downstream” segment, crude oil is refined and liquefied natural gas (LNG) is regasified—that is, the extracted hydrocarbons are turned into usable products for distribution to wholesale, industrial clients, or retail clients (figure 1.1).

FIGURE 1.1 The Oil and Gas Value Chain



Source: Adapted from <http://www.petrostrategies.org/oil-and-gas-value-chains>; clip art based on Shutterstock images.

The Upstream Segment

The hydrocarbon upstream segment is characterized by high risk, high capital intensity, captive investment, and long time spans for projects. The identification of prospective areas to explore for oil or gas sets off the petroleum value chain. Identification is usually done through the use of aerial and satellite photography as well as magnetic surveys. If results are promising, exploration rights are secured by applying to and negotiating with the national authorities. Detailed information on a particular area is then obtained through seismic surveys, which are considerably more expensive than the initial surveys. Through complex computer analysis, the data are interpreted to create an image of geological structures below the earth's surface that may contain deposits of hydrocarbons.

If a suitable geological structure is identified, the only way to find out whether hydrocarbons are indeed present is by drilling an exploration well using drilling rigs suitable for the type of area concerned: land, shallow water, or deep water. Drilling involves much ancillary equipment as well as various products and services, and petroleum companies typically contract a services company for the task. On average, only one in five exploration wells is successful. The cost of drilling such wells varies; it can run from several million U.S. dollars to US\$150 million if it is an offshore deep-sea well—reaching as much as US\$7 billion, as in the case of an Arctic exploration well paid for by Royal Dutch Shell before the company decided, in 2015, to cease drilling in the Arctic entirely. As exploration costs cannot be recovered if a well is not successful, drilling reflects the specific characteristics of the upstream segment listed above.

If an exploration well demonstrates the presence of hydrocarbons in sufficient quantities, the process continues with the drilling of one or several appraisal wells to better assess the size and quality of the reservoir and thus the commerciality of the discovery. If successful, the appraisal phase is followed by the development phase: the building of facilities for full-scale production and infrastructure to connect the wells to local processing facilities or to oil or gas evacuation routes. Onshore infrastructure tends to be less complex and much cheaper than offshore infrastructure.

It is not unusual for even a standard upstream project to take five years to get from its initial exploration stage to full-scale commercial operation. For projects that involve geographic or geologic challenges or have major infrastructure requirements, the time horizons can be even longer. Once in production, depending on the size of the reservoir, the time until the decommissioning of a field can last anywhere from 10 to 50 years, sometimes longer.

The speed at which the pressure in a reservoir forces the petroleum upwards is known as the flow rate. This rate depends on the properties of the reservoir rock, the reservoir pressure, and, in the case of crude oil, the viscosity of the material—in short, the reservoir's characteristics. Primary recovery methods, using existing natural pressure, typically recover less than 50 percent of the oil and 75 percent of the gas in a given reserve. In the face of an inevitable decline in natural production rates, various methods can be used to boost flow rates and the overall volume of hydrocarbons that can be recovered commercially. Secondary recovery methods include the injection of water or gas into the reservoir and the installation of surface-mounted or submersible pumps. Tertiary methods, or enhanced oil recovery methods, involve the use of sophisticated

techniques that alter the original properties of the oil. Decisions as to whether secondary or tertiary methods are appropriate for a certain reservoir often involve trade-offs between short-term considerations (production costs will be significantly higher, but output will be accelerated) and long-term ones (very aggressive production can damage a reservoir and lead to lower overall recovery rates). Such decisions are of major importance, both for the operator and for the host country. Sudden changes in well flow rates can damage reservoirs and result in substantial reduction of overall recovered volumes of crude oil.

The long lead times in project development and the risks of sudden changes in flow rates result in structural rigidities in petroleum supply: once in production, oil wells are costly and risky to shut down. Given the volatility of oil price swings, such rigidities can in turn have a negative effect on project economics.

Upstream activities include a number of auxiliary services, such as geological and geophysical surveys, drilling, equipment supply, and engineering projects—all of which require highly skilled personnel. A typical upstream operation involves a combination of staff from an international oil company (IOC) and its service contractors, since many of the project activities are contracted out to petroleum service companies. The IOC, as the operator, is responsible for overall project results and therefore bears a major share of the project risk. The IOC's role thus is primarily one of project management and funding, while specialized service contractors implement much of the work, accounting for up to 80 percent of total project costs.

The risk profile and capital structure of the upstream segment differs from those of other segments in the petroleum value chain. In addition to typical project risks, E&P carries significant geological risks: wells may be dry, for example, or extracting petroleum from a particular reservoir may not make economic sense if production and transportation costs are high relative to the volumes that can be produced. Indeed, there is a significant chance that the investments made will yield no return at all. Meanwhile, and in large part to compensate for such risks, returns required by an investor on successful upstream investments are high. Given its risk profile, upstream exploration is normally funded by equity capital—that is, money invested by a company's shareholders, which, unlike debt capital, does not require regular payments to the investors.

If the project is successful and hydrocarbons are produced and sold, compensation to the investor includes the recovery of the initial investment and a relatively high rate of return on the investment, justifying the substantial risk undertaken. These factors underscore the significance for the investor of political, legal, and fiscal stability in the host country. Any instability will increase the risk and thus the rate of return that the investor will demand on its investments; and instability might deter it completely from investing in a certain country.

In summary, the upstream segment is characterized by (i) large, up-front, capital investments with long payback periods, (ii) high risks and high rewards, and (iii) a high prevalence of joint ventures between several oil companies, to spread both the risk and the high capital requirements of these ventures.

The Midstream Segment

The parts of the value chain referred to as “midstream” concern transportation and encompass infrastructure, such as pipelines and access to roads, rail,

ports, and storage. Transportation is critical at various stages in the value chain; it provides the links between the production and processing facilities as well as between the processing facilities and the final customer. Transportation infrastructure is also capital intensive and requires a number of important policy and regulatory decisions by the state. For a pipeline, the relevant authorities must decide who will finance it and how, what entity will operate it, and what government agency will regulate transportation tariffs and access policy. Inadequate regulation of the midstream segment or weak enforcement of transportation tariffs or policies on equal rights access will affect the supply of petroleum products and result in serious inefficiencies for the whole sector.

Storage facilities for crude and gas are also critical in avoiding the negative consequences of supply disruptions and demand variations. For example, severe inclement weather might require the shutoff of offshore facilities. Demand might vary because of seasonal fluctuations in consumption, unusual weather (too cold or too hot a winter, for example), changes in the domestic or global economy, or changes in a geopolitical situation.

The Downstream Segment

Refining and marketing compose the “downstream” oil segment. Oil refining turns the extracted crude oil into usable products. As noted above, a specific crude oil’s composition and properties determine the mix of products that can be obtained by refining it, as well as the complexity and cost of the refining process. The market value of the different refined products depends on the overall supply and demand and is highly volatile. Refineries have some flexibility to change their product mix to optimize the overall value of their products, but the stock of the refineries and the complexity of the processes limit their capacity to adapt to changing market circumstances. Those crude oils that yield a large proportion of more valuable products or that can be treated in most of the world’s refineries command a premium over those used for lower-value products and those that can be processed in only a small number of dedicated refineries.

Following the refining, the processed products are marketed and distributed to wholesale, retail, or industrial clients. Certain oil and gas products are the principal input for the petrochemicals industry, which explains the close historical and geographical links this industry has with petroleum refineries and gas processing plants.

Mid- and downstream projects are generally far less prone to risk than are upstream projects, primarily because these projects do not advance unless the potential source of crude oil supply is clear and the market outlook well defined. Furthermore, refineries can diversify their supply. In addition, debt can be attracted to such projects, thereby reducing direct financial costs. These factors all lead to considerably lower returns on investment. Prices on mid- and downstream products are often regulated, which has an important effect on both the overall sector and the relevant institutional framework, as discussed later.

Sometimes one company (or group of companies) undertakes activities in various segments along the value chain, most often in the E&P phases and downstream. This practice, known as vertical integration, can help create value by securing sources of supply or offtake markets, eliminating the profit margin of

intermediaries, facilitating logistical operations (such as storage), and most important, spreading risks along the value chain. However, the government must beware of transfer pricing practices that vertically integrated companies might engage in to reduce the government's take. To prevent such practices, the government must address them up front in relevant laws, regulations, and monitoring practices.

The Natural Gas Value Chain

The segments of the value chain are divided somewhat differently in the case of natural gas. Gas transported to its intended market by pipeline must meet strict specification requirements to prevent pipeline corrosion. It is cleaned in a gas processing plant, where it is stripped of impurities, water, and natural gas liquids, which are sold separately. If gas is to be moved by vessel rather than pipeline, it is sent to a gas purification and liquefaction plant (LNG train), where it is cleaned of impurities and substantially condensed by refrigeration. Gas processing plants and LNG trains are sometimes considered part of the gas upstream chain but more often considered part of the midstream. In the midstream segment, the products are transported and, in the case of LNG, regasified. In the downstream segment, the products are distributed to consumers.

Measuring Value Creation

The ultimate objective of a host government in developing its natural resources is to translate them into the maximum social welfare. Deriving the maximum social benefits from petroleum extraction should define the government's policy toward the sector. Different countries may have different perceptions of what constitutes social welfare and therefore pursue a different combination of sector policies. However, it is common to assume that one of the key drivers of government policy is to maximize the economic value created by the sector or, as it is often called in the economic literature on petroleum, resource rent: revenues from petroleum production in excess of production costs, which include a company's minimum required return on its high-risk investments. The rent is divided between the government (in the form of taxes, often referred to as the government take) and the company (in the form of net profit).

The economic rent generated in the petroleum value chain can be estimated roughly using the income statements published by oil and gas companies. The statements show (i) realized oil and gas sales prices, (ii) various costs, (iii) taxes, and (iv) net profits to the companies. The sum of taxes (the host government's take) and net profits (the companies' take) can serve as a proxy for the resource rent.

The realized oil and gas sales prices are a primary driver of both profits and taxes payable, and thus of value creation. As prices are determined on the international market, they are typically beyond the influence of companies and governments.

The costs of petroleum operations are substantial and affect the ultimate size of the resource rent. These costs include up-front capital expenditures, operational expenditures, and debt-servicing cost if the project is financed by borrowed capital. Although some of a project's costs are determined by the specific properties of the reservoir, its geology, and its location, both the company's

operational policies and practices and the host government's sector policies also have a bearing on the costs. Several implications follow:

- Oil companies typically have different levels of technical and project management expertise and experience, often resulting in different levels of cost. Ideally, government policy should encourage the most efficient companies to apply for and win exploration and production rights. Poorly designed or deliberately nontransparent policies for allocating exploration and production rights may translate into reduced fiscal revenues. Government fiscal regimes should be designed to encourage oil companies to contain costs.
- To support national economic development, governments should encourage growth in the supply of domestic goods and services as inputs to the petroleum sector (also referred to as backward linkages). However, such “local content” policies may be at odds with the efficient management of costs, including truly competitive tendering.
- The large, up-front capital costs and long lead times for E&P projects often call for joint ventures between several petroleum companies to share cost exposure and risks.

The upstream petroleum segment is one of the most heavily taxed segments in the economy. The total government fiscal take from the upstream segment—that is, the government share of the available cash flow from petroleum projects—typically varies widely, from about 40 percent to well over 90 percent. In some countries, it is the single most important contributor to gross domestic product. A petroleum fiscal regime should be designed to maximize the fiscal revenue for the country while still being able to attract investments and to provide incentives for efficient operations. A competent tax revenue administration and collection system should be in place.

In most countries, regular corporate tax rates apply in the downstream petroleum segment. In addition, various consumer taxes can be levied on petroleum products.

Creating Value

The factors affecting value creation in the petroleum sector can be grouped into (i) exogenous factors, (ii) factors linked to petroleum sector policies, and (iii) factors linked to cross-sector policies. Exogenous factors are essentially beyond government control. Among the most important are the following:

- The quality and quantity of the hydrocarbon resources and the geological properties of the reservoir; all these factors will affect the technical complexity and cost of supply
- The geographic location of the hydrocarbon resources and the resulting cost of transporting the resources to domestic or international markets
- Global oil prices and factors affecting their volatility

At best, a host government may adopt policies to minimize the volatility of these exogenous factors. In contrast, other policies are fully under the government's control and determine to a large extent the value that is created

from natural resources. These policies include sector-specific policies under the exclusive jurisdiction of the ministry responsible for the petroleum sector and cross-sector policies under the jurisdiction of other sectoral ministries or under shared responsibility.

Sector-Specific Policies

Sector-specific policies determine the design of a country's petroleum sector. This section discusses decisions about the following principal policies: (i) the rate of depletion of hydrocarbon resources, (ii) the award and administration of E&P licenses, (iii) the terms of licensing and petroleum agreements, (iv) the design of legislative and regulatory frameworks, (v) the design of the institutional framework, (vi) the operation of a national oil company, and (vii) international obligations.

Rate of Depletion of Petroleum Resources

Governments must decide whether to explore for or produce petroleum, at what pace, and which company should undertake the necessary work. To maximize social value, an optimal production pattern should be carefully planned.

Managing depletion may be done at the level of individual petroleum reservoirs, connected areas of production, or the country overall. It can be directly imposed by the government, guided by instruments such as licenses and taxes, or developed through the choices of individual project operators. Establishing an appropriate depletion policy may involve the following considerations:

- *Good oil field practices.* Deviations from such practices may permanently damage a reservoir.
- *International politics.* States may have entered into international commitments on productive capacity and output that limit their discretionary decision making (consider the Organization of the Petroleum Exporting Countries, OPEC).
- *Macroeconomic policy.* Better knowledge and control of production rates helps inform the design of sustainable macroeconomic policies to address Dutch disease and other adverse effects of large and volatile revenues.
- *Absorption capacity of the domestic economy.* Suitable investment opportunities for petroleum revenues may encourage accelerated production schedules. In contrast, limits on such investment opportunities, upward pressure on inflation, appreciation of the foreign exchange rate (Dutch disease), or a lack of potential production links to the rest of the domestic economy may discourage aggressive depletion policies.
- *Public pressure on spending.* Public anticipation of increased country revenues may result in political pressure to spend more, irrespective of the availability of suitable investment opportunities.
- *Intergenerational equity.* A government's decision about the pace of production may be influenced by intergenerational equity considerations. Developing countries that have an urgent need to build infrastructure and invest in social services such as health and education might choose to spend more immediately, leaving fewer resources in the ground for future generations.

- *Price expectations.* Variations in the prices of oil and gas affect the value of resources and hence the economics of projects, which can lead to changes in depletion policy.
- *Cost expectations.* When the costs of the development and production of oil and gas fields are high and the profit margins low, governments should consider waiting for the development of technology that lowers production costs.
- *(Cross-border) unitization.* Unitization involves the joint development of a common petroleum reservoir that extends across the boundaries of adjacent blocks, states, or national territories. Governments should prevent wasteful competitive drilling by rights holders and ensure that in the interests of economy, efficiency, and resource conservation, common deposits are developed as single units on a noncompetitive basis by the entitled rights holders. If a reservoir extends into a neighboring state, the countries involved should negotiate an arrangement by which resource holders on both sides of the border may join forces. If the border is in dispute, a joint development zone may be agreed on, pending the determination of the border location.

Legal and Regulatory Framework

In most countries, natural resources are owned by the state, and the state has the right and the consequent responsibility to set and enforce principles, rules, and procedures for exploiting resources. In other words, the state must design and enforce the legal and regulatory regime for petroleum exploration, development, and production.

A consistent, transparent, and stable legal and regulatory framework that reflects a government's key objectives and principles in developing its hydrocarbon resources and that is enforced transparently and effectively is crucial to a sustainable and efficient petroleum sector. Its structure is typically hierarchal. Fundamental principles related to ownership of resources, vesting of authority to grant petroleum rights, vesting of authority to regulate specific matters, and revenue allocation are often laid out in a country's constitution. Countries with decentralized or federal government models, as well as fragile countries, tend to capture more principles in their constitutions than stable countries with unitary systems.

The main principles relevant to petroleum activities are typically outlined in a petroleum (or hydrocarbon) law ratified by the national legislature. A well-defined petroleum law usually addresses the following elements: the role of the state, security of title, freedom to operate on a commercial basis, access to resources, environmental protection requirements, and a framework for contractual and fiscal terms. The spelling out of these elements in the law should reflect the country's vision of its petroleum sector: what strategic objectives are to be achieved as a result of hydrocarbon development and by what means. It is crucial for a country's overall stability and the petroleum sector's successful development that such a vision be the outcome of an open public debate and be supported by all key stakeholders. For example, Norway's petroleum vision and policy were agreed upon at the birth of the industry. The Norwegian *Storting* (Parliament) summarized them in its "Ten Oil Commandments" for the upstream petroleum segment, which later served as the foundation of the Petroleum Activities Act (box 1.1).

BOX 1.1

The Ten Oil Commandments for the Norwegian Upstream Petroleum Industry

- Ensure national governance and control of the entire activity on the Norwegian continental shelf (NCS).
- Exploit the petroleum deposits in such a manner that Norway minimizes its dependency on crude oil imports.
- Develop new industrial activities based on the petroleum sector.
- The development of the oil and gas industry must take necessary account of existing industry and of the environment.
- Flaring valuable natural gas is not accepted on the NCS, except for short test periods.
- Petroleum from the NCS shall as a main rule be shipped to Norway unless societal impact considerations require other alternatives.
- The state shall be involved at all appropriate levels, contribute to the coordination of Norwegian interests within the Norwegian petroleum industry, and develop an integrated Norwegian petroleum policy with both national and international goals.
- A state-owned oil company shall be established to secure the state's economic interests, and to have a positive cooperation with national and foreign interests.
- The activity north of 62 degrees shall satisfy the special societal impact conditions tied to this part of the country.
- Future Norwegian petroleum discoveries may expose Norwegian foreign policy to new challenges.

More detailed provisions pertaining to the specific petroleum activities that need periodic adjustments, such as technical and reporting requirements, administrative procedures, and fees, should be set in regulations issued by the relevant government ministries or agencies. Such regulations could, for instance, include a model petroleum agreement setting out applicable standardized terms for production-sharing contracts (PSCs). In accordance with the sector law and regulations, specific ministerial decisions may be issued, typically applying to individual cases such as the granting of an authorization, be it a license or a contract, or the approval of a work program or of a transfer of assets. Finally, the ministries' departments or agencies might issue guidelines that recommend certain methodologies or clarify certain procedures. These are typically not legally binding.

It is of vital importance that the petroleum law and the underlying regulations are consistent with each other and with the constitution. The fact that most field development investments are made before oil production starts, as well as the long-term and capital-intensive nature of the petroleum business, makes investors particularly averse to legal uncertainties and instability. An unclear legal framework could result either in no investment or in investors requiring a higher share of the resource rent as compensation for the perceived risk. In addition to consistency in legal documents, easy access to them, for example on a dedicated website, is important for fostering compliance.

Award and Administration of E&P Licenses

In all countries, resources in the subsoil either belong to the state or are subject to state veto on their use (except in some jurisdictions in the United States and Canada).² However, for the development of these resources, governments in most cases rely on private companies. Governments grant rights to petroleum exploration, development, and production in particular areas or blocks by means of concessions or contracts.

The host government is faced with the task of designing an effective selection system for choosing investors that are most likely to meet all the selection criteria. This task in turn requires a decision about what criteria are most important to the host country. Among the key criteria is that a qualified investor or group of investors possesses an adequate degree of the technical, project management, and financial capabilities required to carry out exploration, development, and production activities in the most cost-efficient way. In other words, the government may want to choose a company that will maximize the economic rent from resource extraction. Governments may also want investors to fulfill other requirements, such as training and building the capacity of the local labor force or maximizing the use of local suppliers.

Systems for allocating petroleum E&P rights differ among countries. They can be divided into two main groups: open-door systems and licensing rounds. In open-door systems, licenses are awarded as a result of negotiations between the host government and interested investors; often the criteria for selection are not known to the investors. The absence of announced criteria gives the government considerable discretion in selecting a winner. For this reason, direct negotiations are often criticized as nontransparent and prone to corruption. However, because projects in risky or newly opened areas often attract a limited number of potential investors, direct one-to-one negotiations between government and potential investors may be the only allocation option the government has in such cases.

Licensing rounds include two subcategories: administrative procedures and auctions. In administrative procedures, licenses are awarded through an administrative process on the basis of a defined set of criteria: for example, on the basis of a seismic or exploration drilling work program. Such an approach allows the government to pursue multiple policy objectives, but in return it demands a fair degree of technical expertise on the part of the government agency—which might not be available in a developing country with no history of petroleum development.

In auctions, licenses are allocated to the highest bidder. The bidding parameters can be single or multiple and typically include bonus payments, royalties, or various forms of profit sharing. Auctions are considered to be the most transparent method of allocating rights and the most effective in maximizing economic rent capture, but they have their drawbacks in the context of petroleum exploration. Given the inherent uncertainty about exploration outcomes, the most optimistic bidder might overestimate the value of an acreage, which could result in the project being uneconomic under the proposed terms. Also, if the government wants to pursue multiple objectives, the design of the project becomes more complex.

In practice, countries often use a combination of systems. Competent, effective, and transparent management of licenses and contracts by the government is key to efficient translation of resources into national wealth. Reliable and

up-to-date geological information must be maintained, including a regional assessment of oil and gas resources. These data are important to provide a better understanding of the country's petroleum potential and to help define sector policies, attract more investors, design bidding processes, and manage access to resources. A public register or petroleum cadaster should be established to collect and conserve geological, technical, and administrative data related to the licenses. Together with a clear and consistent procedural system, such a register can increase transparency in the allocation of petroleum rights and facilitate the management of competing land uses, including in protected areas. The ministry with jurisdiction over petroleum normally houses the petroleum cadaster as well as a hydrocarbon license management unit; in some cases, the national oil company (NOC) is entrusted with the management of the petroleum data register.

Petroleum License and Agreement Terms

The design of petroleum licenses and agreements determines at what stage a country starts receiving its share of revenues, how much revenue it can anticipate, what role—if any—the NOC will play in the petroleum development, whether there are incentives for cost containment and limiting the environmental footprint, and many other important factors that will affect the pace of E&P, the size of the government take at a particular time, and the industry's impact on the country's growth. For petroleum companies, licenses and agreements are a key consideration in their commercial and technical decisions on whether to invest in a particular country at all, and if so, how much. The state can thus use its licensing system to shape the industry. For example, it can decide on the frequency and area coverage of licensing allocations, provide economic incentives for participation, or impose conditions such as mandatory state involvement.

Worldwide, there are three key types of licensing arrangements: most belong to one of two categories, concessions and production-sharing contracts, which can be made fiscally equivalent.

The tax/royalty or concession system. Under this arrangement, the licensee obtains a license from the government for a fixed period of time that grants it an exclusive right to explore for and produce oil and gas within a specific area (called the license area, block, or tract). The licensed company is responsible for all investments and owns all E&P equipment and installations permanently affixed to the ground until expiry or termination of the concession. The investor takes full title to the produced hydrocarbons at the wellhead, net of any physical royalties. In addition to physical or cash royalties, taxation typically includes a general corporate tax as well as a specific petroleum tax. Upon expiry of the concession, the installations and equipment permanently affixed to the ground usually pass to the state, but the investor is typically liable for abandonment. The concession system was the only arrangement available until the late 1960s. It is still used in about half of the petroleum-producing countries and may be considered the most liberal system.

Production-sharing contract or agreement (PSC or PSA). Under this regime, a contract is signed between one or more private companies (typically foreign ones) and a state, represented either by the government, a government ministry or agency, or an NOC. There are many different forms of PSCs around the world. One common feature of PSCs is that the title to the production remains with the

state or with its NOC, which is often a partner in the PSC. The contractor funds the entire development, subject to government approval of the development plans, and puts its own capital at risk. Ownership of the installations often passes immediately to the state. The contractor is reimbursed through a specified part of the production called “cost oil.” The remainder of the production, the “profit oil,” is shared between the contractor and the state according to the formula specified in the agreement. Usually, corporate tax rates for profits apply to the profit oil captured by the contractor. Some PSCs involve an additional up-front royalty payment in cash or in kind.

Service contract. The contractor is usually paid a cash fee for providing the service of producing petroleum on behalf of the host country: a fixed fee per barrel produced as a percentage of costs or a variable fee as a percentage of gross revenues. The contractor provides all capital associated with exploration and development but has no title to production. The sales revenue is used to reimburse the contractor’s costs and to pay its fee, which is often taxable. IOCs do not favor this type of contract because it does not expose the contractors to upside (positive) risks such as increases in oil prices, only to downside risks such as cost or time overruns. In addition, this type of contract does not allow the contractor to book reserves.

Institutional Framework

A well-defined institutional framework is instrumental for developing and enforcing the legal and regulatory framework for the petroleum sector; thus, it contributes to an effective and efficient national petroleum management system. Institutional roles, mandates, and responsibilities should be clearly spelled out, and overlaps between different institutions should be avoided as much as possible. Institutional roles are a reflection of the policies to be implemented. Fundamental differences exist between the upstream segment and the midstream and downstream segments.

Upstream

In the upstream petroleum segment, the state has three distinct roles. In some countries, these roles are carried out by separate institutions, which is considered best practice, but for a variety of reasons this is not always the case, and combinations of roles can be observed in many countries. For high-level policy principles governing the sector, approval by the legislative branch is often required.

1. Vision, policy, and strategy development

The mandate for this role includes developing the set of key sector objectives, strategic plans, and laws that govern oil and gas exploration, production, and import/export, as well as policies on ownership, management, investment, and product and benefit distribution. Reflective of these key objectives and policies are the rules on agreed depletion rate, security of supply, and allocation that the state must adopt. Typically, this mandate requires the responsible institution(s) to carry out the following tasks:

- Develop a national vision and strategy for the sector that is integrated into the country’s overall vision of economic and social development.
- Define key sector policies that will be instrumental for implementing the country’s vision and strategy for the sector.

- Design the legislative and fiscal regime in line with the defined key sector objectives and policies.
- Set the pricing regime for the domestic market.
- Establish and maintain a sector structure reflective of national priorities, objectives, and policies.
- Maintain engagement with other government policy-making institutions and with public and private stakeholders at the national level.
- Ensure the attractiveness and competitiveness of the sector in the international context.

2. Regulation and enforcement

The mandate of the regulatory authority includes sector oversight. The entity in charge must ensure the effective implementation of the sector policies and legal framework, including the enforcement of compliance by private and state-owned oil companies and service providers through the sector policies, laws, contracts, and regulations. This mandate encompasses the following matters:

- Issuing licenses and conducting tenders
- Enforcing laws, regulations, and contract terms through administrative and financial controls to ensure compliance
- Advising policy makers on policies' effectiveness and improvements that could be made
- Issuing regulations and guidelines to detail and clarify policies and laws
- In some countries, monitoring environmental, labor, and safety issues

3. Petroleum operations

The mandate for this role may include managing the state's participation and leading operational activities in exploration, development, production, and processing, in addition to infrastructure investment and operation. This role requires corporate and project management capacity, as it may involve the following tasks:

- Designing corporate governance structures and rules
- Making decisions on and monitoring development plans, investments, and budgets
- Running day-to-day operations and managing performance
- Managing talent

In Norway, for example, the Ministry of Petroleum and Energy has the overall responsibility for managing and controlling the petroleum activities on the Norwegian continental shelf in accordance with the Petroleum Act and key guiding principles adopted by the Parliament. It issues petroleum regulations and makes decisions on regulatory matters, including licensing and the approval of plans for development and operation of deposits and for installation and operation of transport facilities. The National Petroleum Directorate, which is administratively subject to the Ministry of Petroleum and Energy, plays an advisory role to

the Ministry on petroleum resources management matters. In that capacity, it collects, stores, and analyses data related to petroleum sector activity and evaluates applications and plans. The Directorate can make recommendations to the Ministry on regulations. Other governmental ministries are responsible for health, safety, the environment, and oil-spill preparedness. State participation in oil and gas exploration, development, and production through holdings in priority licenses or through the state's direct financial interest is handled by the state-owned company Petoro AS.³

In the Netherlands, where the relative importance of the petroleum sector is lower, the Ministry of Economic Affairs is responsible for licensing, license administration, and management. The State Supervisor of Mines is an executive agency of the Ministry of Economic Affairs tasked with oversight of and compliance in the upstream segment, including issues of health, safety, and the environment. EBN (Energie Beheer Nederland B.V.), solely owned by the Dutch state, manages the state participation or direct financial interest in oil and gas exploration, production, and storage on behalf of the government.⁴ The Netherlands does not have an NOC.

In Mozambique, the Ministry of Mineral Resources is in charge of granting concessions, but responsibility for ensuring that petroleum operations are conducted in accordance with applicable laws and contractual commitments is delegated to the National Petroleum Institute. The national oil company, Empresa Nacional de Hidrocarbonetos (ENH), is mandated to manage state participation in exploration, production, and processing and to lead logistical operations.

Some countries have independent upstream regulatory entities, rather than agencies reporting to the relevant petroleum ministry. Regardless of whether upstream roles are assigned entirely to the relevant ministry, to a separate statutory authority, to the NOC, or to a combination of the three, the assignment of rights and responsibilities must be clear and without unnecessary overlap. All stakeholders should have a clear understanding of the division of roles between state institutions. The institutional entities concerned should have sufficient authority and financial, technical, and personnel resources to perform their responsibilities successfully.

Midstream and Downstream

In the midstream and downstream gas distribution segments, which are often natural monopolies, tariffs, returns on investment, and access to infrastructure are often regulated. This is more often the case in the gas sector than in the oil sector, as gas is harder to move to the market and end consumers. As in the upstream segment, the roles of policy making, regulation, and operations can be distinguished in the mid- and downstream segments as well. Experience around the world strongly indicates that it is vital to clearly separate regulator and operator functions pertaining to infrastructure between different entities. Independence of the regulatory entity and its lack of conflict of interest are essential to prevent undue influence by political or special interests and to guarantee equal access rights for all production companies. Key regulatory tasks may include the following:

- Granting licenses and permits for oil and gas midstream and downstream activities
- Defining rules about access to infrastructure (oil and gas pipelines and storage facilities, gas processing plants) by oil and gas producers

- Setting tariffs for oil and gas pipeline use and for the use of gas transfer/distribution grids
- Technical and health, safety, and environmental regulation and compliance oversight over midstream and downstream activities, including processing, transmission, storage, and distribution
- Settling disputes that may arise between parties

National Oil Companies

The key value determinants in oil and gas operations are cost efficiency, technical excellence, strong project management skills, and appropriate strategic choices. Governments should therefore focus on value creation in the sector through the promotion of increased efficiency and effectiveness in operating companies, agile decision making, and financial and human resource allocation and use across the sector.

Both IOCs and NOCs can participate in the oil and gas operations in a country. IOCs typically add value through their superior financial capabilities, operational and technical expertise, and capabilities to manage complex projects and risks. An NOC can have several roles. As a nonoperating upstream company, an NOC can hold an ownership stake on behalf of the government in joint ventures with IOCs in upstream operations, gas processing, and LNG. An NOC provides planning and oversight with respect to reserves management, capital allocation, cash-flow planning, and staff deployment. It coordinates efforts across joint ventures by sharing best practices, setting safety and environmental standards, and benchmarking performance to ensure that maximum value is captured for shareholders. Over time, there is opportunity for the NOC to develop national operating capability and get involved in exploration, development, and production activities, if its financial, technical, skill, and managerial capabilities have become strong enough to be competitive in the sector and create additional value for the government. In several countries, NOCs have evolved into full-fledged operating companies.

There are two principal considerations for a government to participate in oil and gas operations through an NOC. First, there is an economic consideration. In many jurisdictions, the state has the right to take a stake, ranging from a minority stake to full ownership, in the development and production of oil and gas fields. If well managed, this state participation can generate additional revenue streams over and above the fiscal revenue stream that comes from royalties, production sharing, and other fiscal instruments. Although proposition appears attractive to most governments, it is advisable to carefully weigh the benefits and the risks. Revenue streams from minority participations are often no more than a fraction of fiscal revenue streams. In case of full ownership, the total revenue stream can even be negatively affected when the financial, technical, and managerial capabilities of the NOC are not yet competitive. In addition, the capital investments required by the NOC can weigh heavily on the budget of a country. Finally, through its NOC the government will be exposed to significant risk without having an IOC's ability to spread risks globally.

The second consideration is strategic. The fiscal significance of petroleum revenues can vary from overwhelming (as in Iraq, Nigeria, and República Bolivariana de Venezuela) to marginal (as in India, Pakistan, and the United States). The more important the oil and gas sector is in terms of contribution

to gross domestic product, the greater the national interest and the requirement to share in decision making in the sector, in particular in development planning and in investments. When the petroleum resource base in a country is large enough to span several decades of oil and gas production (as in Brazil, Malaysia, and Norway), an NOC would have the time to develop the necessary financial, technical, and managerial capabilities to become an efficient operator. The time and the costs to develop these capabilities cannot be justified in all cases, so governments should focus on identifying the size of the national resource base before deciding to develop an operational role for an NOC. In several countries, the mandate of the NOC includes operationalization of the national content policy. In some cases, security or national interests drive the requirement for a strong NOC. Finally, state participation may be required in the event that IOCs are not commercially interested in exploiting a resource but the state deems such activity to be in the public interest.

A government may conclude on balance that, in addition to a policy-setting and regulatory role, having an NOC adds value. In that case, it should carefully choose the role for the NOC within any joint venture on the basis of the NOC's capability relative to that of the IOC partner and relative to the strategic importance to the country of the joint venture's assets. Both NOCs and IOCs must be subject to oversight by national regulators.

International Obligations

A legal regime for the petroleum sector within a state's jurisdiction necessitates attention to quite a few aspects of international law. The state may become a party to (i) global or regional treaties regulating offshore petroleum operations or various conventions on the protection of the environment and the prevention of pollution; (ii) bilateral, interstate agreements or treaties concerning the joint exploitation of an oil or gas field straddling a boundary (unitization); (iii) bilateral agreements on the reciprocal protection of investments or the avoidance of double taxation with an IOC's base country; and (iv) regional multilateral treaties for economic cooperation or a mutual disaster support treaty.⁵

Cross-Sector Policies

Cross-sector policies are instrumental in establishing a national petroleum sector as an integral part of the broader national policy framework. Many policies that are not exclusively governed by the ministry responsible for petroleum may still have direct implications for the organization and governance of the petroleum sector and thus affect the value created in the sector and the distribution of revenue between the government and investors. Some important cross-sector policy aspects are (i) the fiscal regime, (ii) tax collection and administration, (iii) revenue sharing, (iv) revenue management, (v) social and environmental safeguards, (vi) local content, (vii) corporate governance of public and state-owned enterprises, (viii) climate change mitigation and adaptation, and (ix) gender policies. These aspects are discussed in more detail in subsequent chapters and have therefore been omitted here, except for climate change and gender policies, which are addressed in the next sections.

Gender Equality in Oil and Gas

Women have the same right as men to benefit from economic growth, including from petroleum projects.⁶ The realization of this right matters not only for women but also for their families and for communities as a whole. Owing to their traditional caregiving roles, women often are the main strong advocates for and consistent investors in health, nutrition, education, environmental preservation, and security, and they promote these values not only within their families but also within the entire community.

Yet much research suggests that in reality, women frequently have lesser access to economic benefits from extractive industries, including those in the petroleum sector, and lesser power to influence decisions on family and community matters while being more severely affected by harmful social, economic, and environmental consequences of extractives development. Individuals can be positively or negatively affected by extractives development through three main aspects of life:

- *Employment and income.* “While extractive industries often create jobs, there are significant gender disparities in access to—and types of—jobs” (Eftimie, Heller, and Strongman 2009) in developing countries, with women being limited to a small number of low-paying job options. Evidence suggests that men and women typically prioritize how to spend their income quite differently, with women tending to spend more on health, nutrition, and education while also being more frugal. The lack of equal opportunities for earning income thus has negative implications for households’ investment strategies and family members’ well-being. Although this factor may not be the only one affecting women’s ability to influence decisions made within their families, it is certainly an important one.
- *Environment and livelihoods.* Petroleum operations often have interconnected environmental and economic implications, including conversion of land away from traditional uses, as well as changes and degradation. These changes can affect or reduce the land available for agriculture or pasture; they can also reduce, destroy, or contaminate nearby vegetation and forestland where water, firewood, and food have traditionally been collected—tasks often performed by women. Being traditionally responsible for providing food, women attach higher value to productive land, forests, and clean water and therefore may negotiate a fairer price and terms in case of resettlement or land conversion and may make wiser investments, in the interests of the whole family and community, with the compensation received for such actions.
- *Communitywide consultations and decisions.* In many societies, women are still underrepresented or completely left out of community consultations and decision-making processes, reducing their ability to affect the community footprint of the project, including resettlement terms, social programs, environmental management, revenue distribution, and spending. Yet evidence indicates that women’s involvement in negotiating community requirements and setting investment priorities results in more sustainable positive outcomes.

This incomplete list of the consequences of gender inequality strongly suggests that to foster positive conditions for poverty reduction and truly equitable and sustainable development, all stakeholders in the extractive industries must

actively work toward reducing gender inequality by giving women voice, leverage, and economic opportunities. Although there is no one-size-fits-all solution and each case requires a thorough understanding of the community's historic, cultural, and social setting and dynamics, a number of best practices have emerged, the majority of which are listed and elaborated on in Eftimie, Heller, and Strongman (2009):

- Governments and extractive companies should promote and conduct gender-sensitive social baseline assessments and social mapping to determine the potential impacts of extractive industry operations on specific gender groups in the communities affected.
- Governments and extractive companies should make sure that the views of all gender groups are equally solicited and represented when important family or community decisions are made. If required, special arrangements should be made in line with culture-specific circumstances and traditions to ensure that women are truly able to express their views freely and that these views are reflected in the final decisions. In some cases, establishing new grievance mechanisms administered by community outsiders may be more effective than relying on traditional resolution mechanisms.
- Governments and extractive companies can invest in social programs to alleviate some of the traditional burdens on women and offset some of the impacts of extractive industries.
- All stakeholders should support women's employment in extractive industry operations as well as in support industries. As part of this support, governments and extractive companies should create capacity-building programs for women that will enable them to take full advantage of business and employment opportunities related to extractive industries.
- Stakeholders should also focus on promoting women's economic and social empowerment through improved economic and financial opportunities, such as targeted microcredit programs.

International Climate Change Initiatives

Many fossil fuel–dependent countries (FFDCs) are facing a new risk with potentially adverse implications for their economies: international initiatives and policy measures that other countries implement in response to climate change. The FFDCs' special circumstances were recognized in the United Nations Framework Convention on Climate Change (UNFCCC 1992), the Kyoto Protocol (Barnetta and Dessaib 2002), and the Paris Agreement. These countries developed a comparative economic advantage in fossil fuel–intensive sectors (such as the extractives, energy, and manufacturing sectors) in the period when climate change was not yet recognized as a global risk. For FFDCs, these sectors are the engines of growth and welfare. Moreover, several low-income countries in Africa, Latin America, and South Asia that have discovered but not yet tapped large underground reserves of fossil fuels hope that these reserves will drive future prosperity for their citizens. Yet the current and future FFDCs are often the least prepared to manage the potential impacts of measures to mitigate and adapt to climate change.

The latest international initiative on climate change—the Paris Agreement—is seen by most stakeholders as the starting point toward a low-carbon future and a driving force for fossil fuel divestment. The Agreement, adopted on December 12, 2015, unites most of the world’s countries in a single agreement on tackling climate change through greenhouse gas emissions mitigation, adaptation, and finance. As of May 2018, some 195 members of the UNFCCC had signed the Agreement and 177 had become party to it. However, in June 2017, the United States announced the intention to exit the Agreement; under the Agreement, the withdrawal cannot come into effect before November 4, 2020. The Agreement aims to keep the increase in global average temperatures well below 2.0°C above preindustrial levels and endeavors to limit it even more, to 1.5°C. Doing so entails limiting the amount of greenhouse gases emitted by human activity to the levels that trees, soil, and oceans can absorb naturally, beginning at some point between 2050 and 2100. Each country that is party to the Agreement voluntarily determines, plans, and executes its own contribution to cutting emissions, with the requirement that new targets must exceed previous ones. Countries must report and register their contributions with the UNFCCC Secretariat every five years. In the Agreement, the developed countries reaffirmed their commitment to providing climate finance aid to developing countries for climate change adaptation and mitigation measures, including switching to renewable energy.

There is a growing recognition and concern among experts that the implications of a global transition to low-carbon economies for FFDCs, especially the developing countries among them, have so far received insufficient attention (Manley, Cust, and Cecchinato 2017). As early as 2012, Cramton and Stoft warned that countries that export a significant amount of fossil fuels would be negatively affected by any global climate agreement. Moreover, without additional incentives, these countries would be unlikely to join a global climate agreement on a voluntary basis. The transition to low carbon can affect FFDCs through different but interconnected developments—such as the spread of clean technologies, the emergence of networks that “lock in” these clean technologies, shifts in consumer and investor preferences, changes in policies and institutions of other countries, and the growth of influential new business lobbies (Arbib and Seba 2017; Financial Times 2017). The impact of the transition could be very different in scale and nature from the familiar cyclical volatility of commodity markets. It could lead to a structural decline in fossil fuel-based industries, with associated systemic risks to the countries and communities that depend on them. When considering the risks and opportunities of the transition to low carbon, an FFDC needs to decide how to diversify its economy, and whether and how to cooperate on global efforts to stabilize the climate.

Coming to these decisions is made more difficult by the uncertainty about how and how fast the structural transformation to low carbon will take place. Many experts note that the aspirational objectives of the Paris Agreement contrast with the current trajectory of global emissions and the aspirations of an emerging global middle class (IEA 2016, Dale and Fattouh 2017, Exxon Mobil 2018). The combination of sunk investments, entrenched institutions and policies, old networks, and opposition from vested interests could slow the pace of transition (Peszko and others 2018). That said, the transition could also gather momentum rapidly, catching FFDCs off guard. The effects of a transition are likely to spill across borders, as decarbonization policies in other countries are bound to affect global markets (Cherif, Hasanov, and Pande 2017), particularly if

other countries apply “carrots” and “sticks” to encourage the formation of a large coalition toward climate action. Importantly, a combination of falling technology costs, more supportive low-carbon policies, and investments in enabling infrastructure could create positive feedback loops such as the ones seen in many past structural transformations. Examples from history show how change can happen quickly (Wilson 2011): from the reduced acceptability of smoking to the rapid emergence of mobile phones, which have largely displaced (or even leapfrogged, in many developing countries) fixed-line phones.

Whatever the pace, policy makers in FFDCs can no longer ignore the inevitable transition of many countries to economies with low-carbon intensity and the impact of this transition on the three groups of policy objectives (value, security, and sustainability) in the context of their countries. The FFDCs that successfully navigate the transition will be those that acknowledge the challenge head-on and start planning now for how best to respond. The World Bank is preparing a report that will include recommendations on strategies to manage the risks and harness the opportunities of the global transition to low carbon through economic diversification and international cooperation. In a nutshell, successful economic strategies in FFDCs will have to strike a balance between (i) managing traditional carbon-intensive assets to maintain revenues and mitigate the social costs of transition and (ii) preparing for a transition to new asset classes and a knowledge-based growth model while recognizing the uncertainties surrounding the pace and depth of a potential transition. These decisions will affect the pace of fossil fuel production in such countries and their revenue management strategies.

Conclusion

The upstream segment in the petroleum value chain generates the most value for both governments and investors by transforming resources in the ground into economic rent that is shared between the investors and the government. A government’s ability to attract the best investors and to negotiate and collect the maximum share of the economic rent generated, as well as to use it effectively and fairly, determines how successfully petroleum development translates into positive, sustainable, and equitable economic growth for the country.

In considering hydrocarbon development, governments must keep in mind the differences between the oil value chain and the gas value chain. However, in both the oil and the gas sector, two sets of factors have a fundamental influence on value creation:

- Exogenous factors such as the quality and quantity of the hydrocarbon resources and their geographic location, the geological properties of the reservoir, changes in global oil and gas prices, global demand, and technological advances
- Host-government policies, both sector-specific and cross-sector; whereas exogenous conditions are beyond government control, domestic policy formulation is not

Although there is no one-size-fits-all approach to designing sector policies that will shape the sector and affect its value creation, experience from around the world provides abundant examples of strategies both successful and unsuccessful—each instructive in its own way—to guide governments.

The upstream segment has distinctive characteristics: high risk and high return; large, up-front, captive investments; technological intensity; and long time spans for projects. It requires highly skilled personnel and special project management skills. These characteristics and country-specific circumstances must be kept in mind when formulating sector policies. Taking these factors into consideration is particularly important when designing procedures for investor selection (awarding licenses) and contractual and fiscal frameworks and when making decisions on the creation and role of a NOC.

A consistent, transparent, and stable legal and regulatory framework that reflects a government's key objectives and principles in developing hydrocarbon resources and that is transparently and effectively enforced is crucial for a sustainable and efficient petroleum sector and, therefore, for maximum value creation. A well-defined institutional framework is instrumental in developing and enforcing the legal and regulatory framework and thus contributes to an effective and efficient national petroleum management system. Institutional roles, mandates, and responsibilities should thus be spelled out clearly, and overlaps between institutions should be avoided as much as possible.

Notes

1. For more information on crude oil properties and their effect on prices, see Bacon and Tordo (2004, 2005).
2. For more information on the allocation of exploration and production rights, refer to Tordo, Johnston, and Johnston (2010).
3. For more information on Petoro's objectives and responsibilities, visit <https://www.petoro.no>.
4. For more information on EBN, visit <https://www.ebn.nl/en>.
5. An example of the first type of treaty is the 1982 Convention on the Law of the Sea; an example of the fourth type is the Common Market for Eastern and Southern Africa (COMESA).
6. The content of this section is primarily based on Eftimie, Heller, and Strongman (2009), as well as on materials presented at the World Bank conference "Gender in Oil, Gas, and Mining: New Frontiers of Progress, Challenges, and Solutions," held in Washington, DC, on June 26–27, 2018.

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CHAPTER 2

Planning for the Development of a Petroleum Sector

Ananth P. Chikkatur

Introduction

Planning for the best use of a country's nonrenewable natural resources is a challenge that requires governments to make serious commitments across a broad range of actions:

- Developing an understanding of the distinct characteristics of the resources and the potential cost and time frame involved in developing and producing them
- Understanding the value of the resources in international and domestic markets and the factors that determine and change their value
- Providing incentives to public and private sector enterprises to make the investments required to develop the resources
- Integrating hydrocarbon development into a broader picture of the country's medium and long-term economic and social development
- Coordinating policies, laws, and regulations across government ministries and agencies in order to promote resource development in a manner that maximizes the benefits that accrue to the country

- Bringing together various stakeholders to foster societal consensus and support for extracting and using the resources for the country's development

Petroleum resources have long been extracted and used around the globe, with both positive and negative impacts on societies, governments, and the environment. Past experience offers an important lesson: when a country discovers large petroleum resources, it needs to plan well and implement those plans to ensure that those resources will actually enhance the development of the entire country.

A petroleum master plan (PMP) is a useful guide to this end. This chapter will present a general overview of the principles and key components of such a plan before concluding with several recommendations for policy makers. The overview is intended to be general enough for use by any country or region that hopes to initiate and implement the master planning process and coordinate relevant policies, laws, and regulations.

Although this chapter focuses on international best practices, it should be noted that the development of any specific PMP for a country or a region is necessarily “path dependent”; that is, the PMP must be tailored to the legal, economic, and historical specifics of the country concerned.

Creating a Petroleum Master Plan: An Overview

Developing countries with abundant hydrocarbon resources (that is, oil and natural gas) typically lack the technical, financial, and project management capacities and experience to develop those resources. Many have a relatively small domestic market for oil and gas and inadequate infrastructure to support this market's development. Hydrocarbon discoveries in these countries are usually made by international oil companies (IOCs) operating under exploration and production (E&P) concession contracts with the countries' governments. IOCs typically aim to develop oil and natural gas for export or for use at large industrial facilities producing exportable products.

Ideally, the governments of these countries not only should receive a share of the IOCs' revenues but also should benefit from the infrastructure developed as part of the oil and gas development. The countries can also benefit from the creation of local employment and business opportunities that allow for technology and skills transfer. Furthermore, the domestically produced natural gas or oil products and other derivatives might be made available to citizens below global or regional market prices.

When negotiated carefully and with a long-term view in mind, a country can ensure that IOC operations further a nation's economic development, both today and for future generations.

Unfortunately, in too many cases, revenues from oil and gas development have been siphoned off to increase the wealth of a privileged few rather than equitably distributed to benefit the entire country. This outcome has inevitably prompted discord and, in many cases, conflict.

It is in this context that international development organizations such as the World Bank have encouraged countries to produce PMPs¹ to guide public policy

and investment to enable the efficient production and domestic use of oil and gas while promoting equitable and sustainable economic development. A PMP sets out a country's vision, objectives, strategic plans, policies, and implementation plans for petroleum sector development. In general, a PMP should serve as a road map for (i) the development of oil and gas production, (ii) the transportation of oil and gas (for example, crude oil exports or liquefied natural gas [LNG] exports) within and outside the country, and (iii) the use of oil and gas in various domestic markets. Table 2.1 lists several examples of recent PMPs.

TABLE 2.1 Sample of Recent Petroleum Master Plans

Country	Title	Date	Access
Albania	Gas Master Plan	In progress	http://www.balkaneu.com/albania-starts-prepare-gas-master-plan/
Ghana	Gas Master Plan	2016	https://www.thegasconsortium.com/documents/GMP-Final-Jun16.pdf
Kenya	Towards a Petroleum Sector Master Plan for Kenya	2015	http://ices.or.ke/wp-content/uploads/2015/12/Towards-a-Petroleum-Sector-Master-Plan-for-Kenya_Final_With-WB-Cover..pdf
Mozambique	The Future of Gas in Mozambique: Towards a Gas Master Plan	2012	http://documents.worldbank.org/curated/en/2012/12/18146603/future-natural-gas-mozambique-towards-gas-master-plan-executive-summary
Nigeria	Gas Master Plan	2008	http://pppra.gov.ng/wp-content/uploads/2014/11/New-Nigeria-gas-master-plan.pdf
	Strategic Gas Plan for Nigeria	2004	https://esmap.org/sites/default/files/esmap-files/FR58200861713_Nigeria_strategicgasplanforigeria.pdf
Philippines	Natural Gas Master Plan, Phase 1 and Phase 2 Reports	2013 – Phase 1 2014 – Phase 2	https://www.doe.gov.ph/sites/default/files/pdf/downstream_natgas/first_report_naturalgasmasterplan.pdf and https://www.doe.gov.ph/sites/default/files/pdf/downstream_natgas/wb_phase2.pdf
Southern Africa Development Community Secretariat	Regional Infrastructure Development Master Plan, Energy Sector Plan	2012	http://www.sadc.int/files/5413/5293/3528/Regional_Infrastructure_Development_Master_Plan_Energy_Sector_Plan.pdf
Trinidad and Tobago	Gas Master Plan	2015	http://www.energy.gov.tt/wp-content/uploads/2018/10/Trinidad-and-Tobago-Gas-Master-Plan_2014-2024.pdf
Vietnam	Master Plan for Gas Development in Vietnam	2007	http://documents.worldbank.org/curated/en/2007/06/16362615/vietnam-review-gas-master-plan-workshop-version-report-review-master-plan-gas-development-southern-vietnam

Sources: See the Access column of the table.

The essential characteristics of a PMP are that it

- Takes a long view of the development of oil and natural gas supply, demand, and infrastructure, typically over a 20- to 30-year time horizon
- Is a consensus-driven document, laying out a vision for the development of the sector within the context of a national vision for a country's overall economic development
- Considers technical, economic, environmental, and social issues relevant to resource development under various scenarios
- Evaluates export drivers and domestic demand growth under alternative development scenarios
- Reviews the infrastructure needed to meet the supply requirements for export or import facilities, as the case may be, and for the domestic consumption of oil and gas
- Reviews and recommends legal and regulatory arrangements and proposes institutional structures that are necessary for supporting oil and gas development
- Presents a road map and a timeline for the decisions a government must make to implement the PMP
- Is continually evolving and updated as more information is obtained over time

As a strategic policy document, a PMP needs to consider various options for the development of the country's hydrocarbon sector and place this development in the context of the country's broader economic development. To this end, a PMP needs to consider the country's long-term vision, even though policy interest may focus on near-term recommendations and options.

To be useful as a policy guide, a PMP must be consensus driven, addressing the concerns of civil society and broader economic development objectives. At minimum, it should signal an awareness of issues related to social equity and environmental impact. However, it must at the same time acknowledge the economic and financial drivers of the IOCs that will develop the resources.

A PMP must be based on a solid foundation of technical analyses, including analyses of the supply and demand for oil and gas as well as for subsequent products. Details of those technical studies will be discussed later in this chapter. Scenario analysis is particularly important, as a PMP is expected to address long-term issues and a number of development alternatives. A PMP will need to consider how infrastructure for oil and gas production and delivery within the country will be developed over time. This matter is particularly important, because it will influence the level of investment that is needed in the sector.

Other factors to be taken into account are the policy, legislative, and institutional arrangements needed to properly regulate and oversee petroleum development. Where local institutions are inadequate, a PMP can incorporate a gap analysis that identifies the needs of the larger polity in order to develop the hydrocarbon resources for the benefit of the country.

A PMP is almost always compiled in a state of incomplete information; many relevant public institutions and policies will be nonexistent, weak, or under development. Thus, a PMP must outline a staged process, with clearly identified priorities, of gathering additional information, fostering institutional development, and building capacity. Government decisions required to implement the plan should be laid out as clearly and explicitly as possible. A PMP should also identify potential “decision trees” dependent on additional information that may be gathered and analyzed over time. Such information may be necessary to fine-tune plans or make key decisions. Thus, a PMP is anchored in a specific knowledge base; as this knowledge improves, the PMP needs to be revisited and updated.

The Petroleum Master Plan Process

How a PMP is developed is as important as *what* it contains. If done correctly, the PMP creation process can, by itself, benefit a government’s planning and policy-development processes.

Before undertaking the PMP process, a government must review and assess its reasons for doing so: in other words, it should formulate the key objectives of the process. As noted earlier, countries are often encouraged by international development organizations, such as the World Bank, to develop a PMP to guide policy and investment in their oil and gas sectors. One of the key reasons and objectives for developing such a plan is to help a country to define a unified vision of petroleum sector development and its benefits and to set realistic expectations, which will be crucial for preventing future conflicts among stakeholders.

Oil and gas development has led to discord in a number of countries (including Bolivia, Indonesia, and Nigeria).² The process of developing a PMP provides an opportunity for stakeholders to come together to discuss and create a consensus-based vision and to agree on transparent policies for the just and equitable sharing of the benefits of development. Extensive consultations with existing ministries and departments and with public and private stakeholders at the national, regional, and local levels may be necessary to obtain buy-in to the PMP process. The process can also be highly educational for all stakeholders and can support the government in laying out a path through the complexities of international oil and gas markets and build up internal institutional capacity, technical analyses, and approaches to timely decision making.

Creating a PMP involves a coordinated initiative led by the government, typically represented by an energy or resource ministry. International organizations, such as the World Bank, the International Finance Corporation, or regional development banks, may provide both technical and financial assistance in the process. Usually, independent experts and consultants with expertise in the petroleum sector are hired to undertake the necessary technical analyses. These consultants often work under the guidance of a steering committee made up of government representatives from the relevant ministries, with a chairperson who is selected from the sponsoring ministry. The work of the consultants is reviewed by this committee and, where applicable, by a staff member of the international organization that is supporting the PMP analysis and development.

PMP development requires consensus across the relevant government ministries as well as among other stakeholders. Three main sets of stakeholders are advised to engage in, and will benefit from, a PMP development process:

- *Investors*, for whom a PMP can serve as an assurance that future policies and regulations will provide the conditions for a viable investment in the country.
- *Local populations and civil society organizations*, for whom a PMP lays out how the government plans to use its revenues from oil and gas to further economic development throughout the country and to mitigate potential adverse social or environmental effects of resource development. At the same time, a PMP must help manage the expectations of these stakeholders regarding the timeline and benefits of the process.
- *Government institutions and regional governments*, for which a PMP lays out the institutional framework that will be used in developing consensus for new policies and regulations and, ideally, outlines the roles, mandates, and responsibilities of these entities.

Hence, extensive interviews with stakeholders across different levels of government, industries, civil society organizations, directly affected communities, and other interested parties are necessary. On the basis of those interviews, an *inception report* is developed, which is a very rough first draft of a PMP—one that lays out the structure of the potential PMP, key issues identified through the interviews, areas where additional information or analysis is required, and future steps and schedules.

On the basis of the various technical analyses conducted independently by technical experts and in collaboration with government agencies, a draft PMP will then be prepared for circulation among reviewers and stakeholders. This draft PMP will need to be shared with stakeholders both within and outside the government, and it can form the basis for public stakeholder conferences. At these conferences, the government and consultants will present their findings to the public. Such public engagement is critical to the success of a PMP and to encourage the buy-in of all stakeholders before its eventual implementation. Following the stakeholder conferences, changes are made to the draft document, and a final PMP is issued. This final PMP may be presented in another stakeholder conference. The PMP then passes into the hands of the policy makers and government agencies that will begin the official implementation process.

Content of a Petroleum Master Plan

A number of technical studies must be completed as part of the PMP. As noted earlier, in developing countries with nascent oil and gas sectors, the level of technical knowledge available within the country may be limited. As such, international experts can be engaged to provide advisory support in key areas:

- Oil and gas commercial and technical expertise
- Financial and fiscal matters
- Negotiation with IOCs

- Economic development
- Institutional capacity building relevant to the legal framework, energy development, and regulation of the oil and gas industry (including environmental, health and safety, and economic regulation)

This section describes the specific contents of technical studies and the overall contents of a PMP.

Petroleum Master Plan Vision and Objectives

A PMP must provide a concise statement of its specific objectives. This “vision statement” sets out the government’s purpose in developing a PMP. The statement must be relatively short and succinct and must explain the “what” and “why” of the master plan. It should be consistent with the current objectives of the government and offer guiding principles for the petroleum sector. At the same time, elements of the statement should be linked to specific actions outlined in the plan. The statement should be based on sufficient consultation with all relevant stakeholders. Finally, the statement might highlight specific focus areas for the PMP’s technical analysis, as well as expected outcomes of the PMP.

As an example, the vision statement from the Mozambique Gas Master Plan is as follows:

Develop natural gas resources in a way that maximizes benefits to Mozambique society by supporting:

- growth in domestic public and private sector institutional competences;
- growth in domestic industry and businesses, especially small- and medium-scale industries;
- increased employment across the country, especially in the less-developed provinces;
- infrastructure to support expanded economic activities, especially in less-developed provinces; and
- expanded access to training and education

in order to improve the quality of life for the people of Mozambique, while minimizing adverse social and environmental impacts. (World Bank 2012, ES-5)

This vision highlights the goals and concerns of various parts of the Mozambican government, as well as those of other stakeholders. It was presented to stakeholder groups to build consensus and was connected to specific technical analyses. For example, the mention of increased employment led to a detailed estimate of the employment gains to be expected from several gas development scenarios.

Contextual Background

A background section should review the current situation of energy development in a country, including information on the domestic energy market, energy consumption by type, sources of hydrocarbons, existing pricing regimes, and key

companies and institutions. It may note relevant planning documents or initiatives. Specifically, this review of the country's economic baseline should focus on metrics such as energy use by sector (power, industrial, commercial, transportation, and domestic), gross domestic product (GDP), employment rates, education rates, and other socioeconomic factors identified by stakeholders as important for planning. The background section also needs to consider the specific sociopolitical issues associated with oil and gas development. For example, in Somalia, oil and gas development is affected by past and potential future tensions between regions and the national government. In Mozambique, the lack of economic development in the northern areas of the country, where large quantities of gas were discovered, prompted a focus on using the gas development to spur broader economic development in those areas.

Resource Supply Assessment

A hydrocarbon supply assessment and production forecast over a specified period (10 to 20 years, for example) is a basic requirement of a PMP. If exploration has already occurred, then the technical team can work with the government's energy or gas ministry, exploration companies, and relevant government agencies to compile and evaluate available geologic and engineering data on discovered and potential oil and gas resources in the country. On the basis of the geologic data, estimates and uncertainty ranges for the oil and gas resource base and the technically recoverable oil and natural gas volumes can be developed. The resource base, along with E&P costs and processing and transportation issues, will be useful in identifying how oil and gas can be produced using current technology and the prevailing economics for oil and gas production. As necessary, oil and gas supply curves for the cost of production can be produced to show the amount of oil and gas that can be developed in which basins and at what cost. These supply curves should also take into account potential royalty and tax regimes.

Demand Forecast

The demand for the oil and gas produced in a country can be split into two types: global and domestic. When assembling a PMP, it is important to consider both global/regional and domestic demand forecasts. In many cases, domestic demand may be limited by a small domestic market for petroleum products.

There are also key differences between how oil and gas are typically used in a country. For example, the sale of crude oil to refineries around the globe is relatively straightforward. Even small amounts of oil can, in most cases, be exported to the world market. The barriers to export are small. Therefore, oil production is primarily dependent on world oil prices and potential technological advances. If there are no refineries in a country, the investment that can be attracted to build a new refinery depends on the size and economics of the expected production. In general, it is unlikely that a new refinery will be built in the short to medium term; therefore, oil production in that country will likely focus at first on global or regional oil markets. Domestic consumption of refined oil products (gasoline, diesel, and fuel oil) will also generally be based on world prices for these products plus transportation costs, provided that there are no subsidies that reduce domestic prices for oil products relative to international prices.

Natural gas has two main types of demand: that for gas exported as LNG or through pipelines and that for gas in domestic markets. Exporting LNG is very expensive, but the expected profits are also high if oil-to-gas price ratios are sufficiently high—that is, if oil prices are high while gas-production costs are low. Domestic gas consumption depends on the development of infrastructure to supply gas to large industrial facilities or power plants, which can serve as anchor loads for domestic gas use. Such pipeline infrastructure can then provide a foundation for wider access to the gas supply across the economy. Anchor “megaprojects” can also support employment in the country, although their direct employment needs tend to be small and front-loaded in the construction phase.

Electric power generation in a country or in nearby countries is often the most critical market for natural gas, yet it is also the sector most sensitive to gas prices. Future demand for gas in the power sector can be estimated using existing power-planning scenarios. Additional analysis supported by the government, such as a quantitative assessment of demand-supply balance in the power sector, will also inform gas demand scenarios. Often, however, there is little information or resources to support a full power system assessment, despite its importance.

In many developing countries, there is little to no indigenous gas use; forecasting the natural gas demand from small and medium enterprises (SMEs), commercial establishments, the transportation sector, and residential consumers is difficult at best. Furthermore, domestic gas consumption is highly contingent on successful implementation of government policies regarding economic development, access to energy, pricing, the business environment, and socioeconomic matters. For example, policies on business formation (permitting, taxes, and so on) may hinder the development of SMEs, which are more likely to sustain employment derived from greater access to power or gas than are megaprojects. Moreover, institutional bottlenecks and corruption may inhibit the implementation of policies meant to promote SMEs, thus choking potential domestic gas demand.

Impact of Petroleum Development on the Economy

A principal objective of most PMPs is to identify how hydrocarbon resource production can promote economic development in a country without jeopardizing its macroeconomic and fiscal stability, as well as how to mitigate harm to other sectors of the economy caused by real exchange rate appreciation. To this end, the technical analysis in a PMP will need to include estimates of the economic impacts of petroleum development in terms of contributions to GDP, government revenues, and employment. The economic assessment will need to consider the direct and indirect economic effects of infrastructure development, taxes, and the revenues from petroleum sales.³

Depending on the current state of an economy’s industrialization, a framework for evaluating alternative industrial development schemes linked to petroleum development might also be considered, so as to set the stage for economic diversification. In less developed economies, the plan must evaluate which existing local businesses could expand to support petroleum development and which potential local businesses could emerge on the basis of growth in the petroleum sector.⁴

Oil and Gas Infrastructure Assessment

Infrastructure requirements, costs, and ownership are major issues to be addressed in a PMP. The infrastructure needed for petroleum production depends on what type of hydrocarbon resource is available—oil, gas, or both—and whether production is on- or offshore.

In the case of offshore oil production, the export of crude oil is relatively easy; the crude can usually be exported after minimal initial processing. Onshore oil can be transported by truck or pipeline to a port for export to refineries. The cost of building and operating a pipeline can vary substantially depending on the distance and terrain it crosses, the local cost of land, and geopolitics.

To export natural gas produced offshore, a country will have to decide whether the gas will be brought onshore for processing and liquefaction or whether it will be processed and liquefied on offshore platforms or special ships and then exported directly. Although offshore processing does not preclude making gas available to the local economy, most of the associated technical development would occur at the offshore sites. Bringing the gas onshore would involve additional infrastructure costs but would provide benefits in terms of employment and economic development. Furthermore, any gas that is brought onshore can be used for domestic purposes. If gas is produced onshore, then it will need to be transported to industrial centers via pipelines. Overall, there are typically more infrastructure needs associated with developing natural gas resources than with developing oil resources.

A PMP will need to assess the optimal configuration, size of investment, and operating costs of processing, transmission, and distribution facilities for the volumes of oil and gas that might be produced. The analysis may include various scenarios.

As an example, the Mozambique Gas Master Plan uses an economic model to estimate the value of potential infrastructure and gas development. The objective of this model was to provide a tool for public servants to assess proposals made by various sponsors of megaprojects and estimate infrastructure needs and costs.

Who owns and operates a country's oil and gas infrastructure is a critical question. In many developing countries, state-owned enterprises (SOEs) are in charge of many aspects of the petroleum industry and its associated infrastructure development. Although E&P activities are most often done directly by the private sector, an SOE can be involved in these activities through joint ventures or partnerships, and its involvement is often mandatory. With regards to refining and processing petroleum, as well as to transporting and distributing oil and gas, most developing countries tend to have one or more SOEs fully or partially responsible for infrastructure development. In countries where SOEs are not involved, the regulation of petroleum extraction, transport, and distribution is important to ensure that private sector actions are in keeping with the public interest.

In developing countries, SOEs often do not have the full technical or financial capabilities to develop capital-intensive pipelines and ancillary infrastructure. To attract capital and expertise to develop the necessary facilities, these SOEs may enter into joint ventures with private companies. For example, a government may issue a request for proposals to construct and operate facilities in

which one requirement for the IOCs is to partner with the SOE. How these joint ventures will be executed is important for PMPs to consider.

Petroleum Pricing and Market Structure

Oil and gas pricing in the domestic market is another major issue that needs to be addressed by a PMP. Market design (that is, how gas and petroleum product prices in general are formed), ownership of facilities, the underlying contract law, and other legal and regulatory frameworks may encourage or discourage gas use in the local economy. Market design will also form the basis for how oil and gas can be used for the development of the local industrial and power sectors. This public policy issue can be sensitive, and how best to handle it depends to a large extent on the government's broad objectives.

Several specific short- and long-term factors influence how the prices of gas and petroleum products for both export and local markets will be determined (in terms of both value and transportation tariffs). Determining the price of gas and oil products for the domestic market is particularly challenging.

It is expected that the resource developers targeting international export markets will accept global market prices for crude oil, LNG, and derived products. For natural gas, this expectation implies that the price of gas at the wellhead and at the intake to an LNG export plant is a "netback" from the market price—that is, the market value less all the costs of getting the gas to market. The netback value has a direct bearing on the size of the government's revenue take (that is, for royalty payments from the producers) or the government's profit share, as applicable.⁵ Typically, exports guarantee the producer the highest price for its gas and therefore the highest revenue take for the government. However, selling the gas in the domestic market at a price equivalent to its netback value is often not feasible, since export netbacks are typically higher than the prices local markets can tolerate. Thus, the government must decide whether to export all gas and receive higher revenues or to sell a portion of products domestically at a discount to promote domestic gas market growth and thus collect less revenue. A PMP must lay out the costs and benefits of these choices.

Similar pricing questions surround oil production. However, because oil prices are globally determined, the price of petroleum products in the domestic market could depend on whether or not the country has domestic refineries.

Financial and Fiscal Analysis

An analysis of the financial needs and impacts of oil and gas development in a country is a critical part of a PMP. This analysis should include an assessment of the investments required from the government and SOEs and the associated macroeconomic impacts of expected oil and gas revenues.

A PMP must lay out the full extent of the capital required for the planned petroleum infrastructure development. Options for how this capital will be raised through both equity and debt need to be evaluated. A critical issue to consider is the extent to which the borrowing capacity of the country as a whole will be affected by the capitalization of the petroleum sector. Borrowing for the petroleum sector should not adversely affect the country's ability to borrow for nonenergy programs (such as health and education).

Questions of financing are often interlinked with questions of ownership, and these questions have critical implications for the speed and efficiency of infrastructure development. Private debt and equity can play important roles in financing oil and gas development, but the private sector may be stymied in its efforts to bring in project financing and move projects to closure if there is significant SOE or government involvement or if the project's ownership structure is uncertain. This is particularly true when the SOE in question lacks the financial resources to contribute its agreed-upon share to the project, thus delaying its implementation.

The PMP also needs to forecast the revenue expected from resource development. This forecast requires some understanding of the underlying concession agreements. Many concession agreements are difficult to interpret, leading to uncertainty in both the government sector and the private sector and to possible disappointment and disapproval on both sides. It is thus important for the forecasts to be supported by legal analysis.

How petroleum revenues can be used to further economic development should also be addressed. There are many uses for petroleum revenue, including directing the revenue to the current budget, channeling part of the revenue into a sovereign wealth fund (SWF), and using the revenues to fund a public-private development institution for short- and medium-term infrastructure and economic investments. A PMP can evaluate these options for the country and provide recommendations as to the best way forward.⁶

Socioeconomic and Environmental Issues

The PMP must address socioeconomic and environmental issues associated with development of the oil and gas sector.

Employment is a major concern of governments, but increasing employment in the oil and gas sector is challenging in developing countries, where there is little skilled labor to construct and operate sophisticated energy facilities. Governments are often concerned about how to develop a skilled labor pool through energy development. Education and training is necessary to provide an adequate workforce. A PMP may address these issues in more or less detail, depending on the needs and priorities of the country.

Hydrocarbon production can lead to a displacement of local population, and environmental degradation resulting from production can negatively affect their quality of life, devastate their livelihoods, or undermine their economic activities, such as farming or fishing. These critical issues must be recognized and addressed up front by a PMP.

Considering the expected environmental footprint of oil and gas development is especially significant where there are large offshore facilities in need of staging areas and supply bases or large onshore facilities such as pipelines, LNG terminals, and processing facilities. Oil and gas transport via pipelines, in particular, requires adequate environmental regulations to ensure that safety and environmental implications in case of leakages are minimized and addressed in accordance with best international practice. These considerations and required mitigation measures must be reflected in a PMP.

Environmental degradation has a major impact not only on local populations, but also on tourism, farming, fishing, and other resource-based activities that

can have a regional or even national significance. Therefore, it is vital to consider the potential environmental impact of oil and gas production. A PMP normally includes some initial assessment of the environmental impacts of development options, but this assessment is rarely detailed, as the configuration of facilities is not yet certain. Usually, detailed assessments are done during the construction phase.

Socioeconomic concerns related to infrastructure include the capacity of existing transportation networks—roads, airports, and port facilities—and whether these networks are sufficient to support oil and gas development and subsequent transportation of the produced oil or gas. It may be necessary to enlarge these facilities and extend the electricity system to support the new development. Addressing maintenance mechanisms for existing infrastructure that will be more heavily used following the development is also important.

Institutions and Governance

An analysis of institutional arrangements and governance is another important element of a PMP. It is important, going forward, to have a clear understanding and agreement within the society and the government as to which legislative and executive (government) institutions are involved in petroleum development and the specific roles, mandates, and responsibilities allotted to each of them. Outlining the issues that require a joint decision of several government entities and developing a mechanism for making such joint decisions is also helpful.

A robust, well-functioning institutional framework is key to effective design, implementation, and enforcement of the petroleum sector's policies and regulations, which, in turn, determine the success of petroleum development and the attendant economic benefits of petroleum production. As development proceeds, there will be significant vested interests within and outside the government aiming to capture the benefits and economic rents for personal gain. Therefore, transparency and a sensitivity to civil society's concerns about corruption is critical to the long-term success of relevant policies.

Developing countries often start with incipient regulatory bodies placed within energy or minerals management ministries. In light of this, their PMPs should rely on a review and analysis of how other countries have dealt with similar issues and what lessons can be learned from their experience (both positive and negative). Such PMPs will need to be embedded in local governance structures; sectoral reforms in both the petroleum sector and the power sector are often necessary early steps.

In sum, the technical analysis for a PMP needs to be an objective assessment of a country's current situation and needs to provide scenario-based prospects for the future of oil and gas development in the country. It should lay out what is known and what requires further study and information.

Decision Making and the Petroleum Master Plan Roadmap

A principal goal of a PMP is to present a proposed course of action, consistent with the information gathered in the technical analyses, to implement the government's vision for petroleum development. Thus, a PMP should lay out a number of decisions and recommendations for the government to address. Ultimately, how to

implement a PMP is up to the government: for example, the government might direct particular actions through legislation or policy statements on the basis of the PMP's recommendations.

A hierarchy of decisions arises out of the PMP's recommendations. These decisions relate to matters that must be settled within particular time frames (for example, to allow development to proceed or to finalize terms for additional studies). The hierarchy arises from the fact that out of the many decisions to be made, some decisions are urgent and need to be made in the short term. Other decisions may depend on previous decisions or require additional studies to be conducted. Three types of decisions may be categorized as follows:

- *Critical decisions.* These decisions must be made immediately to further the development of the petroleum sector. Depending on the specific country's context, such high-priority, critical decisions may include finalizing hydrocarbon legislation that sets out the institutional and legal/regulatory framework for petroleum development, setting up revenue-sharing arrangements with regional governments, concluding negotiations with concessionaires, and identifying additional studies and mechanisms to fund them.
- *Important decisions.* These short-term decisions are needed to lay the groundwork for future development. They may involve matters such as capacity building in legal and regulatory institutions, setting prices for petroleum and gas products, establishing institutional structures for revenue collection and management, determining plans for fulfilling the equity and debt requirements of SOEs involved in petroleum production, and so on.
- *Other decisions.* Decisions required to support economic development over time often depend on the results of other decisions and must be made over several months or years. Such decisions include ensuring ongoing coordination in resource development between ministries, setting up training programs to ensure local labor integration, streamlining regulations for SMEs in the petroleum sector, finalizing institutional structures, and revising the PMP on the basis of inputs from additional studies.

Recommendations for action on the basis of the conducted technical analysis may be broader than the decision hierarchy itself. They may cover revenue and fiscal policies, or the appropriate roles and relationships between government, SOEs, and the private sector. In general, the recommendations should include specific actions and decisions, determined on the basis of the local social and institutional context, that the government can take over time; best practices; and lessons learned from other countries.

It is advisable to lay out the advantages and disadvantages for each recommendation and to explain their significance. Recommendations must include a list of additional studies to further enhance the government's understanding and decision making over time. Mechanisms for monitoring progress should also be specified.

Managing public expectations is a major element of the PMP decision hierarchy and roadmap. Local communities may perceive major resource discoveries and their development as a source of immediate riches. Such unrealistic perceptions need to be addressed head-on by government agencies. Disappointment

and unrest can arise amid the planned (and slow) development and perceived unequal distribution of opportunities. Thus, a public education program that is aligned with transparent and trustworthy planning is an important element in the successful implementation of a PMP.

Conclusion

A PMP can be an invaluable tool in the development of a country's oil and gas sector. The process of developing a PMP, in and of itself, offers an important way to bring stakeholders together with a common purpose.

To summarize this chapter, a PMP should start with a focused vision statement and lay out the foundation of several technical analyses. This information will help guide what follows. Key components of a PMP include a decision hierarchy and a set of recommendations on how to most effectively develop a country's oil and gas sector for the nation's benefit. A PMP should be considered a living document—it guides government action at present but must evolve over time as conditions change and more information becomes available.

Notes

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1. PMPs in some countries are referred to as *gas master plans* or *oil master plans*. In this chapter, the author uses the term *PMP* to refer to both.
2. USAID and FESS 2006. See also Global Policy Forum: <https://www.globalpolicy.org/the-dark-side-of-natural-resources-st/oil-and-natural-gas-in-conflict.html>.
3. Please refer to chapter 6 for a more detailed analysis of fiscal stability measures and management options to increase revenues.
4. Please refer to chapter 9 for more information on promoting industrial linkages to the petroleum sector.
5. The structure of the production contracts determines the amount and value of the royalty and profit share between the government and the developers. Some concession agreements also require that gas be supplied for local use beyond the royalties and profits.
6. Chapter 6 covers the topic of petroleum revenue management in more detail.

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Petroleum Legislative Frameworks and Contracts in a Federation: Issues for Constitutions, Petroleum Laws, Regulations, and Contracts

John J. Beardsworth Jr. and Matthew A. Stuart

Introduction

Significant petroleum revenue streams are potentially transformative. But navigating the road from initial discovery to a flourishing, well-managed oil and gas sector is challenging, and many countries have, for various reasons, failed to successfully realize the promises of petroleum's potential. Indeed, without adequate foresight and planning, countries seeking to capitalize on resource wealth instead frequently find themselves less developed and less prosperous than similar countries that have not discovered natural resources.

A number of best-practice principles exist that can help countries avoid the “resource curse” phenomenon. The linchpin of each of these principles is the adoption of a transparent and robust legal, regulatory, and fiscal framework that optimizes the exploitation of oil and gas in light of a country's particular circumstances.

This chapter will discuss two fundamental issues for the petroleum sector: (i) legislative frameworks in a federation and (ii) petroleum agreements and associated fiscal regimes. Properly structuring both the legislative framework that will govern a country's petroleum sector and the agreements and fiscal regime that will establish the parameters for particular investments is essential to attracting foreign investment while ensuring that the host country maximizes the benefits it receives from the extraction of its natural resources. The following sections will discuss the key characteristics of successful petroleum sector legal and regulatory frameworks, petroleum agreements, and fiscal regimes, including issues of particular importance in federal systems.

Legislative Frameworks for Petroleum in a Federation

All countries with petroleum resources face the challenge of establishing a clear, robust, and effective legal and regulatory framework for petroleum. But meeting this challenge is essential to ensuring that a particular country and its citizens reap appropriate rewards from those resources. Legal and regulatory frameworks that clearly address the key issues that arise in connection with the development of petroleum resources help to reduce the potential for disagreements and conflicts, both with foreign investors and within the country itself. Foreign investors in particular will require assurance that each of these key issues is adequately addressed. To the extent a country's framework lacks clarity or is substantially inconsistent with international best practices, foreign investors will likely require higher risk premiums on any investments in that country.

Beyond the general need for clarity in the legal and regulatory framework for petroleum, countries with federal systems face an additional layer of complexity—namely, balancing subnational rights and autonomy with the need for national development, policy coordination, and regional equity. Setting aside the need for clarity to attract investment in the petroleum sector, this additional complexity requires careful analysis and negotiation among national and subnational stakeholders to ensure that all stakeholders agree on how the petroleum framework should be structured.

A clear, well-thought-out petroleum sector framework supported by all stakeholders can form the foundation for equitable distribution of the many benefits that can flow from the development of petroleum resources. In contrast, petroleum frameworks that lack clarity or support from key stakeholders risk creating or exacerbating conflict among interested parties.

The first step is for each stakeholder to have a common understanding of how successful legal and regulatory frameworks for petroleum are structured. No one right way exists to create these frameworks, but a number of general principles will help to ensure that a framework provides sufficient clarity, both for domestic stakeholders (to reduce the potential for internal conflict once petroleum revenues begin to flow) and for foreign investors (to attract investment so that petroleum revenues will begin flowing in the first place).

The key considerations for each of the principal components of a legal and regulatory framework for the petroleum sector—typically, constitutions, petroleum laws and regulations, and model petroleum agreements—are discussed below.

Key Constitutional Issues

A country's constitution typically establishes fundamental, bedrock principles and other high-level considerations that are likely to stay in place once enshrined. The key to ensuring an equitable and stable petroleum sector is to set up a clear and robust regime for allocating petroleum revenue. This approach is particularly important in federations, which have potentially conflicting local and national interests.

The question of how to allocate petroleum revenue presents a number of tensions that are often difficult to resolve. These tensions—often addressed at the constitutional level—range in character from geographic (allocation between central, regional, and local bodies) to temporal (allocation between spending in the present for development and poverty reduction and preserving funds for use by future generations) to other policy-based objectives (allocation to general budgets or to a revenue management fund, such as a stabilization, development, or sovereign wealth fund).

Geographic Considerations

Petroleum resources are often unevenly distributed across a given area, which raises the question of how to determine an equitable allocation of petroleum revenue among subnational entities and between national and subnational interests. One approach to balancing national interests and the need for national development with subnational interests is to establish fixed percentages of petroleum revenue that will accrue to the various national and subnational stakeholders. This approach, seen in Indonesia, has the virtue of clarity, but it is also inflexible—particularly if the percentages are prescribed in the constitution and the constitution is difficult to amend. Other countries, such as Nigeria, call for sharing on the basis of a formula to be determined by the legislature.

With regard to allocation between subnational entities, many states, such as Sudan, allocate revenues to regional governments in part on the basis of whether or not the region produces petroleum. Some regimes call for distribution only to producing regions to compensate them for environmental and social impacts of production; others may consider additional factors, such as equality, density of population, land mass, or level of economic development of the regions.¹

An issue associated with geographical allocation is the capacity of subnational bodies to appropriately handle the extremely large cash inflows that can result from a fixed-percentage or similar allocation in the event of large petroleum finds. If a fixed-percentage allocation (or, indeed, any allocation that may result in unprecedented cash flows to subnational bodies) is selected, measures should be taken to ensure that such funds are managed properly. Such measures could include building subnational capacity to manage sums at the scale anticipated and requiring subnational bodies to identify appropriate uses of funds before allocation. In other words, the capacity to manage funds should be taken into account early on.

Temporal Considerations

With regard to temporal allocation, countries face a choice: should petroleum revenues be used to address the needs of the present, or should some or all of those revenues be saved for future generations? Developing countries often face urgent needs, including needs for infrastructure development, poverty

reduction, and education. Such countries may elect to invest petroleum revenues in these areas immediately to improve the lives of citizens rather than diverting revenues into a savings fund for future use—according to the theory that improvements in these areas benefit not only the current generation but also future generations.

In contrast, developed countries might not have significant, immediate domestic needs that can be addressed by petroleum revenues. Such countries may be more inclined to invest a substantial portion of their petroleum revenues in a sovereign wealth fund (SWF) that can be designed to preserve revenues for the benefit of future generations.

Other Policy Considerations in Revenue Allocation

Petroleum revenues can also be allocated and managed through the use of various types of funds that aim to achieve specific policy objectives. Aside from the geographic and temporal allocation considerations described above, there are a number of other objectives that countries may target through the use of management funds. These objectives include (i) smoothing the effects of revenue volatility that may arise from fluctuating oil prices via oil revenue stabilization accounts; (ii) mitigating exchange-rate pressures to avoid the so-called Dutch disease; (iii) diversifying industry; and (iv) earmarking funds for specific objectives. In some cases, a single fund is used to address multiple objectives. Norway's SWF, for example, combines a temporal allocation (to preserve oil revenues for use by future generations) with stabilization and exchange-rate mitigation objectives.

Regardless of how they are allocated, the secure collection of petroleum revenues is essential. Petroleum revenues will often first be collected and accounted for at the central level before being allocated according to a given plan.

It is critical to involve all key stakeholders and achieve consensus on the allocation plan appropriate to a country's particular circumstances. Ideally, this consensus would be achieved before petroleum revenues begin flowing.

Ownership of Petroleum and Other Issues

Beside revenue allocation, constitutions frequently address other petroleum-related issues, such as defining the ownership structure of petroleum resources and ensuring transparency. Most countries' constitutions provide that ownership of petroleum resources vests in the state, whether at the federal level, the regional level, or some combination thereof. In Nigeria, the federal government holds the title to the country's natural resources. In Canada, the provinces where the deposits are located have ownership. Several countries (for example, the United States) grant ownership to the individual or company that holds the surface rights over the petroleum deposit.

The question of ownership is distinct from the control of revenues—for example, North Sudan and South Sudan agreed on a revenue allocation mechanism but not on ownership in their 2005 Comprehensive Peace Agreement. In federal systems, an ambiguous ownership structure—or a lack of any structure at all—can be a source of dispute between national and subnational governments and of significant political risk for investors (which, in turn, could adversely affect the petroleum revenues realized by the country). Accordingly, it is important that these issues—whether enshrined in the constitution or addressed elsewhere

within a country's legal and regulatory framework for petroleum—are clearly addressed to avoid potential confusion and conflict.

Constitutions may also include specific transparency requirements to help ensure appropriate levels of accountability in the petroleum sector. Kenya's constitution, for example, requires the legislature to ratify petroleum agreements before the agreements take effect. Under this approach, the terms of petroleum agreements are made public (at least to some extent), limiting the potential for corruption.

Key Considerations for Petroleum Laws and Regulations

In addition to the petroleum-related provisions in a constitution, legal and regulatory frameworks for petroleum typically consist of several components: (i) a petroleum law, which is broad legislation that establishes the general rules for participation in the sector; (ii) petroleum regulations, which set out the detailed mechanisms for implementing the rules established in the petroleum law; and (iii) related legislation that is not petroleum specific but nonetheless affects petroleum-related issues. These other pieces of legislation frequently include overarching energy sector laws, which can outline institutional arrangements by assigning many of the sector-governing roles and responsibilities (to the extent such roles and responsibilities are not assigned in the petroleum law or in the constitution), as well as other laws of general application (for example, laws that govern acquisition of and compensation for land required for petroleum development).

Institutional Roles and Responsibilities

Governments need to ensure that their legislative frameworks clearly assign institutional responsibility for each petroleum sector function (policy making and upstream, midstream, and downstream regulation, each of which is discussed below). Delineating institutional roles within a government avoids inefficient overlaps of responsibility and inconsistencies in the treatment of similar issues. Lack of clarity in this regard could result in, among other things, conflicts of interest, reduced accountability, costly delays in decision making, and perceived higher investor risk—all of which put the government in a weaker bargaining position and, likely, will decrease its returns.

Policy making. In many countries, petroleum policy is set by an energy ministry, such as Ghana's Ministry of Energy, Indonesia's Ministry of Energy and Mineral Resources, Mozambique's Ministry of Mineral Resources, Norway's Ministry of Petroleum and Energy, and Tanzania's Ministry of Energy and Minerals, among many others. In a federal system, meanwhile, the legal and regulatory framework needs to establish the nature and extent of subnational input into the policy-making process. In Iraq, for example, the federal government and the relevant regional and provincial governments are constitutionally required to share responsibility for setting strategic policy for developing petroleum resources “in a way that achieves the highest benefit to the Iraqi people”²—although, as chapter 10 discusses in more detail, the joint policy formation envisioned in the constitution poses its own set of challenges.

As with the allocation of revenues, the crucial lesson from international experience is that governments must clearly assign the policy-making role so that all parties (including domestic stakeholders and foreign investors) definitively

understand what entity or entities are in charge of the country's petroleum sector policy and whom to refer to for clarification and in case of disputes.

Upstream roles. Upstream roles include (i) the issue of public tenders for awarding petroleum agreements, (ii) the negotiation of petroleum agreements, (iii) contract compliance and administration (including ensuring compliance with commercial, technical, health, safety, and environmental aspects of petroleum agreements and applicable laws), and (iv) state participation (whether as an operator or as a government representative in commercial ventures).

Governments often divide these roles in some fashion between the relevant ministry (potentially a statutory authority reporting to the ministry) and the state-owned oil company. In the Netherlands, for example, the State Supervision of Mines, an executive agency of the Ministry of Economic Affairs, is tasked with upstream petroleum oversight responsibility (including health, safety, and environmental oversight). The Ministry of Economic Affairs, meanwhile, is responsible for petroleum licensing.

In Mozambique, the Ministry of Mineral Resources is tasked with granting concessions, but responsibility for ensuring that petroleum operations are conducted according to applicable laws and contractual commitments is delegated to the National Petroleum Institute.

On the other hand, Ghana's Petroleum Regulatory Authority (responsible for regulation, oversight, and the monitoring of activities in the petroleum upstream and midstream sectors) and Mexico's National Hydrocarbons Commission (which regulates and supervises exploration and production of hydrocarbons, as well as hydrocarbon storage, transportation, and processing activities) are independent upstream regulatory entities rather than agencies reporting to the relevant petroleum ministry.

Once again, countries with federal systems need to consider whether these roles will be filled entirely by federal entities, by regional or local entities, or by some combination of the two. Often, these decisions turn on a number of considerations, such as (i) what level or levels of government have (or can be built to have) the capacity to carry out the relevant functions; (ii) what level of consistency across the country is desired with respect to rules, regulations, contract terms, and so on; and (iii) what level or levels of government can most effectively be held accountable for their management of upstream petroleum responsibilities.

Whichever approach a country adopts, the framework again needs to be clear—for example, investors will be much more likely to invest on reasonable terms when they have certainty as to which entity has the authority to conduct tenders and enter into petroleum agreements.

Midstream and downstream roles. Countries typically assign key midstream and downstream roles in petroleum frameworks, including the regulation of tariffs for midstream assets such as pipelines and liquefied natural gas (LNG) facilities in ways that ensure (i) the efficient use of midstream transportation and downstream distribution capacity, (ii) pipeline and LNG safety, (iii) environmental oversight, and (iv) state participation in midstream and downstream infrastructure. The regulator and operator functions of public entities must be clearly separated, as per global best practices. Where the regulation of prices is involved (such as in the midstream and downstream context), independence of

the entity regulating those prices is essential to prevent undue political influence on market mechanisms.

Tanzania's independent Energy and Water Utilities Regulatory Authority, for example, regulates rates and charges, but its oversight of the petroleum sector is limited to transportation and distribution. Indonesia's regulator is responsible for the mid- and downstream aspects of the petroleum sector and for setting transportation tariffs and prices of natural gas for households and small customers.

With regard to state participation in pipelines, Mozambique's CMG (Companhia Moçambicana de Gasoduto)—which is an 80-percent subsidiary of the state-owned ENH (Empresa Nacional de Hidrocarbonetos), Mozambique's national hydrocarbon company, with the other 20 percent owned by the state itself—participates in natural gas pipelines. Similarly, the Tanzania Petroleum Development Corporation is involved in various pipeline projects. Such projects are also frequently developed as public-private partnerships throughout the world.

Other Key Structural Aspects of Petroleum Legislative Frameworks

In addition to assigning institutional roles and responsibilities within the petroleum sector, petroleum laws and regulations also establish key structural aspects of the sector, ranging from licensing and contract awards to environmental matters and to local content and transparency requirements.

Licensing and contract awards. In countries without any previous petroleum discoveries, petroleum legal frameworks often provide for the award of petroleum licenses or contracts without using competitive bidding processes. Given that comparatively fewer contractors are interested in exploration in a country without prior discoveries, there is unlikely to be sufficient competition for exploration licenses to warrant the institution of such a process.

As more petroleum discoveries take place in a country, however, more contractors become interested in exploring in that country. Higher interest in exploration yields a more competitive environment, which implies that the government can likely secure more favorable terms by introducing a competitive contract award process. Such a process typically involves awarding contracts on the basis of public tenders (except under specific circumstances).

Angola and Mozambique, for example, conduct public tenders for awarding contracts but permit other methods in particular circumstances, such as direct or simultaneous negotiations following a public tender that failed because of a lack of bids.

Public tenders for petroleum licenses or contracts are conducted using a variety of parameters, but there is no one "best" solution. Common approaches involve bidding profit-sharing rates, exploration work programs, and signature bonuses. For example, Suriname's January 2013 round of bidding was based on phase 1 exploration work program obligations and fixed minimum R-factor sharing percentages, for which contractors bid an additional percentage for each such minimum rate. (The R-factor sharing mechanism is discussed later in this chapter.)

Environmental issues. Most petroleum sector legislation will at minimum require contractors to fulfill their obligations according to industry-accepted

notions of environmental responsibility, frequently referred to as “good oil field practices.” How such practices are defined varies considerably.

It is also fairly common for sector legislation to require contractors to comply with generally applicable domestic environmental laws and regulation. More comprehensive regimes also require contractors to submit environmental and social impact assessments and environmental management plans for avoiding environmental damage and remediation plans for addressing any environmental incidents that occur (which sometimes require prefunding an environmental remediation fund).

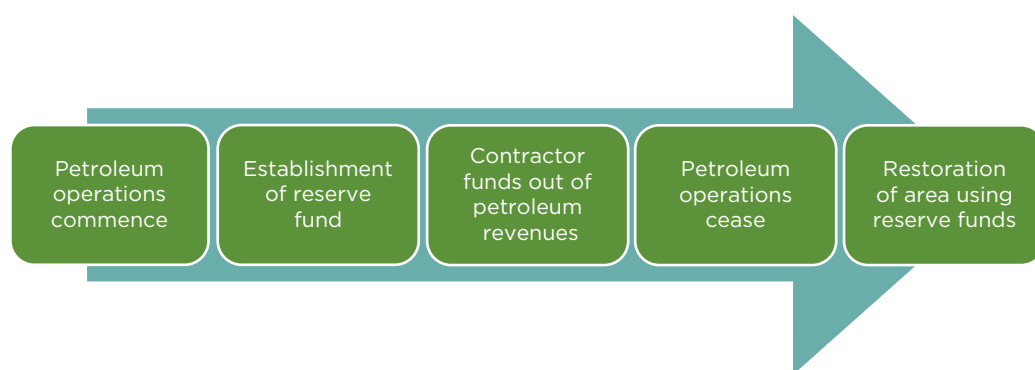
Many regimes specifically assign responsibility for payment for environmental damage arising from petroleum operations to the contractor or require the contractor to carry insurance to cover such damage.

Modern petroleum legal frameworks also require the contractor to restore an area to its original state once petroleum operations there cease. Doing so can be a costly process, and there is a risk that contractors will avoid carrying out appropriate decommissioning at the end of their license term. To address this risk, some jurisdictions call for the establishment of reserve funds (figure 3.1).

Natural gas flaring poses significant environmental concerns often accounted for in petroleum legislative frameworks. International best practice is to ban and fine gas flaring except in specific circumstances, such as facility or well testing or for safety reasons, and to carefully regulate and monitor such flaring. Angola, Ghana, Mozambique, Nigeria, Tanzania, and Uganda are among the countries that have adopted this approach.

In addition, the World Bank leads the Global Gas Flaring Reduction Partnership (GGFR), which aims to reduce the flaring of associated natural gas worldwide. The GGFR (2009) recommends clear, comprehensive, and unambiguous legislative treatment of the flaring issue, including regulation, monitoring, and fiscal terms to provide incentives to use associated gas, to impose penalties for gas flaring, or both. The GGFR also recommends, among other things, that access to gas infrastructure—pipelines and processing facilities—be open and nondiscriminatory to enable associated gas usage.

FIGURE 3.1 Using a Reserve Fund for PSC Decommissioning Obligations



Note: PSC = production-sharing contract.

Local content. The successful implementation of local content requirements—those that ultimately result in substantial technology and knowledge transfer, local employment opportunities, and the strengthening of local industries—is difficult to achieve amid the many variables at play. Experiences around the world have shown that balancing local content requirements with current and projected domestic institutional capacity is essential, as is unified stakeholder support.

Perhaps the best way to ensure that local content requirements imposed on contractors are balanced, take into account all relevant factors, and are capable of evolving as institutional capacity increases is for the petroleum legislation to be less prescriptive (at least initially) and provide for oversight by stakeholders of local content progress. For example, Nigeria has established a separate board to monitor and implement its local content provision (although, given the long history of Nigeria’s petroleum sector, it also has rather prescriptive local content legislation). Nigeria’s recent legislation also includes a clear definition (which is widely accepted in the industry) of what constitutes local content: “the quantum of composite value added to or created in the Nigerian economy by a systematic development of capacity and capabilities through the deliberate utilization of Nigerian human, material resources and services in the Nigerian oil and gas industry.”³

The successful implementation of local content—which creates opportunities for entrepreneurship, uses and expands on existing capacity and capabilities, and both adds value now and creates an environment for sustained value additions—is almost always a gradual process. The key concept in any legislation on this topic is flexibility. Contractors often agree to contribute to specialized training funds in the amounts specified in their petroleum agreements.

Transparency requirements. International consensus is growing on the importance of transparency in promoting good governance in the petroleum sector. Improving transparency and accountability requires multiple measures, both voluntary, multistakeholder efforts—such as implementation of the Extractive Industries Transparency Initiative (EITI),⁴ which requires extractive industry companies to publish their payments to governments and governments to publish the amounts they receive through up-to-date government and corporate reporting systems—and mandatory, regulatory measures spelled out in the petroleum legal and regulatory framework (figure 3.2).

FIGURE 3.2 Overview of EITI Standard



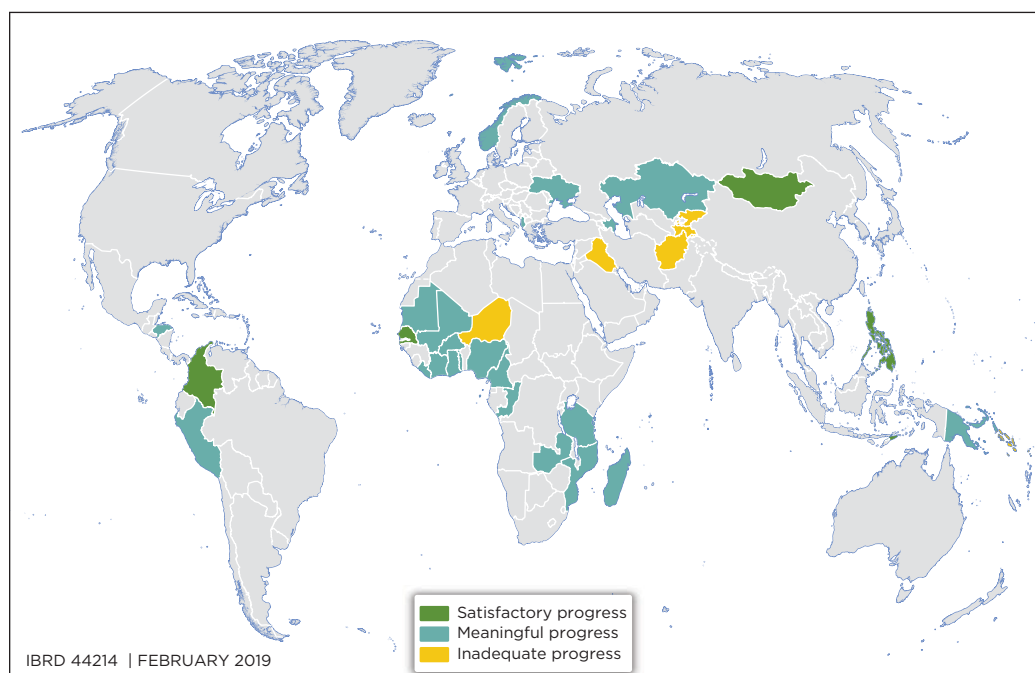
Source: eiti.org.

Note: EITI = Extractive Industries Transparency Initiative.

In 2016, the EITI transitioned from the 2013 EITI Rules (which categorized countries as either compliant with the rules or not) to the 2016 EITI Standard (which measures countries' progress toward meeting the EITI's requirements). As of early 2016, 31 countries were "compliant" with the 2013 EITI Rules; currently, 25 countries (including Ghana, Mozambique, Nigeria, Tanzania, and Zambia) have made either "satisfactory progress" or "meaningful progress" toward meeting the 2016 EITI Standard, while 21 additional implementing countries have yet to be assessed against the 2016 Standard (map 3.1).

As part of the need to ensure transparency and accountability across the petroleum value chain, legal and regulatory frameworks for petroleum can (i) impose transparent and competitive procedures for issuing licenses and exploration and production rights for petroleum; (ii) establish competent and noncorrupt institutions with clear and nonoverlapping mandates in the regulation and monitoring of operations; (iii) require publicly reported, equitable, and progressive fiscal regimes that avoid unpublished special deals and minimize tax avoidance and evasion; and (iv) prescribe transparent revenue management. A lack of transparency at any one point in the petroleum value chain may result in a spread of misinformation and growing mistrust. Appropriate legal provisions can help ensure that this does not occur. When countries increase transparency in the petroleum sector, particularly by making progress toward the EITI Standard, they signal to investors that they have a sound business climate.

MAP 3.1 EITI Countries



Source: eiti.org (as of February 8, 2019).

Note: EITI = Extractive Industries Transparency Initiative.

Structure and Use of Model Petroleum Agreements

Petroleum agreements are an important component of a government's efforts to maximize the benefits from its natural resources. Because of their important role in regulating petroleum production, governments frequently seek to standardize certain terms for contractors investing in the petroleum sector through the use of model petroleum agreements. This approach can be used under various fiscal regimes (for example, model service contracts under a service contract regime, or model concession agreements under a tax and royalty approach). Production-sharing contracts (PSCs) are the most common form of petroleum agreements; thus, this section will focus on model PSCs. However, the general principles of this section apply to the other forms of model agreements used under other fiscal regimes as well.

One key to successful use of model PSCs is ensuring that the host country has the requisite resources to enforce contractors' legal and contractual obligations—contract compliance is always important, but it is particularly so under certain petroleum-sharing mechanisms. Using model PSCs that standardize most contractual obligations can go a long way toward achieving this goal.

Model PSCs work hand in hand with the mechanism for awarding contracts. The PSC sets out all the common terms applicable to petroleum contractors, such as the following:

- General standards of conduct
- Contract area relinquishment obligations
- Ring fencing (the extent to which contractors are permitted to offset costs from one exploration or contract area against revenues from another)
- Production-sharing mechanisms
- Environmental obligations
- Stabilization clauses (the extent to which contractors will be protected against changes in the law or taxes during the term of the contract)
- Dispute resolution and arbitration provisions

The model agreement will typically leave placeholders for the bid parameters specified in the contract award procedures established under the petroleum law and regulations. The winning bidder's petroleum contract will then reflect the common terms from the model PSC and the bid parameters from the contractor's bid, together with any other negotiable items (which are typically limited in scope).

Petroleum Agreements and Fiscal Regimes

Countries with petroleum resources—particularly those without a long history of petroleum development—typically seek to engage foreign companies to develop those resources. These countries face an inherent tension between, on one hand, the desire to establish a fiscal regime that will provide the maximum revenue to the country and its citizens and, on the other, a fiscal regime that will attract investors to develop those resources.

Resolving this tension requires striking a balance between attracting investment and maximizing revenue. Fiscal terms that are nominally very favorable to governments can have a chilling effect on investment. In the most extreme case, fiscal terms that provide for 100 percent of petroleum revenues flowing to the government may sound favorable, but no contractors would invest on those terms. Meanwhile, fiscal terms that are overly generous to contractors would likely yield vast investment but would limit the benefits flowing to the host country. Both extremes are unsustainable; hence, in the end, they do not benefit either of the parties involved.

The key to striking an appropriate balance between these two extremes is for governments to adhere to a few basic principles for designing fiscal regimes and to choose the appropriate type of petroleum agreement to implement that fiscal regime.

Fundamental Principles of Petroleum Fiscal Regimes

The three most important principles of a successful petroleum fiscal regime are (i) the sanctity of its contracts, (ii) its attractiveness to both investors and government, and (iii) the manageability of contracts, backed by robust enforcement mechanisms.

Sanctity of Contract

Respecting the sanctity of a contract is essential to attracting foreign investment. Developing petroleum resources is by nature a long-term business: significant revenues might not begin flowing until 5–10 years after an agreement is signed, and only some time after that will the investor's costs be recovered. Hence, contractors are far more likely to invest in a country with a stable contractual and fiscal regime.

Contract terms should therefore not be altered without agreement by all parties to the contract. Committing to this principle implies that host countries should exercise diligence and care in designing and executing petroleum agreements that will remain acceptable over the long run.

Attractiveness to Investors and Government

In addition to the principle of sanctity of contract—which provides comfort that a contract will not be disturbed without the agreement of all parties involved—each party must be satisfied that the petroleum contract they have entered into is fundamentally fair in the first place. This feature implies that a petroleum fiscal regime needs to simultaneously be attractive to investors and clearly beneficial to the host government.

From the investor's perspective, progressive fiscal regimes are generally more attractive than other approaches. A fiscal regime is “progressive” if the government's share of revenue increases in proportion to the profits—that is, the greater a contractor's profits, the larger the government share of the petroleum revenues derived under that contractor's petroleum agreement. This characteristic ensures that the fiscal regime is responsive to windfall situations in which either the volumes of oil or gas or the realized oil or gas prices are greater than expected.

Fiscal regimes should also be competitive with alternative investment decisions. Each country with petroleum reserves presents investors with a

risk–reward calculation (essentially, weighing the prospectivity of the country—or the relevant block within the country—against the contractor’s proposed share of petroleum revenues). Investors will not view a country’s fiscal regime in isolation but will instead compare it with the risk–reward propositions of other countries. This practice requires governments to analyze the risks of investing in comparable countries and the rewards offered by those countries, and to structure their fiscal regimes accordingly.

From the government’s perspective, the fiscal regime must be structured so that the government receives a fair share of the revenues derived from petroleum contracts. As noted above, a petroleum fiscal regime can be structured in a way that is highly attractive to investors precisely because it does not provide a fair return to the host government. Such one-sidedness is ultimately detrimental to all parties involved—once it becomes evident within a host country that the government is not reaping rewards commensurate with the resources being extracted, the government becomes incentivized to alter the terms of the contract. Such a change would put the government in a difficult position if the investor does not agree to a contract amendment, in which case the government would need to choose between proceeding with a contract that is one-sided in favor of the investor or unilaterally changing the contract, contravening the principle of sanctity of contract (which, in turn, is associated with the negative consequences described above).

In other words, an ideal fiscal regime is one that provides a platform for sustainability and stability by offering terms attractive enough to investors to encourage investment but also attractive enough to government to minimize potential incentives to modify the terms of petroleum contracts later on.⁵

Contract Compliance

Contract compliance is of utmost importance in ensuring that governments receive the benefits to which they are entitled and that petroleum operations are conducted properly and according to the petroleum agreement and to the broader legal and regulatory framework for petroleum. This factor includes compliance with all of the commercial, technical, health, safety, and environmental aspects of petroleum agreements and applicable laws.

Petroleum agreements are usually high-value contracts that create strong incentives on both sides—contractors will seek to maximize the value of a contract for their shareholders, while governments have a responsibility to their citizens to ensure that the government’s rights under the contract are being upheld.

Some types of petroleum agreements are easier to administer than others. Countries with developing petroleum sectors often have scarce resources to oversee contract compliance and limited tools to consistently enforce it. Thus, the easier a fiscal regime is to administer and audit, the easier it is to ensure that contractors are operating within the rules of the agreement.

Common Types of Petroleum Agreements

Petroleum agreements determine the manner in which a country’s petroleum resources will be developed, including how the revenues from the development of those resources will be shared between the investor and the government and

when the revenues will start flowing. The three most common types of petroleum agreements are (i) tax and royalty, (ii) service contracts, and (iii) production sharing. Tax and royalty and production-sharing agreements are by far the most common. A brief overview of the benefits and drawbacks of these approaches follows.

Tax and Royalty

Under the tax and royalty approach, contractors pay royalties to the government in the form of a payment per unit of production (or, more commonly, a percentage of gross revenues) and taxes on their remaining income. The primary advantages of a tax and royalty approach are that (i) it applies universally, eliminating the need to negotiate profit splits on a case-by-case basis; (ii) it ensures early and dependable revenues to government; and (iii) it is a relatively easy regime to administer.

Although a number of jurisdictions apply a tax and royalty scheme in the petroleum sector (for example, Brazil, Norway, and the United Kingdom), this structure is more commonly used in the mining sector, primarily because of its significant drawbacks in the petroleum context. First, royalties on gross revenues constitute an addition to the contractor's costs and may cause the contractor to not develop certain fields that might otherwise be viable or to prematurely abandon production at a field if costs rise and profits fall in that field. Second, royalties do not factor in costs and are thus regressive. This factor may cause a politically problematic situation in relation to highly profitable fields, in which the contractor may be viewed as obtaining windfall profits from the development. Such situations frequently require the implementation of "additional profits taxes" to attempt to capture the windfall profits, which make the overall regimes more complex. Brazil, Norway, and the United Kingdom, for example, pair their tax and royalty systems with some form of additional profits or windfall profits tax.

Furthermore, significant royalties deter contractors, since they cannot be used as foreign tax credits in many jurisdictions. The U.S. Internal Revenue Code, for example, allows U.S. entities to claim a credit for income taxes paid to foreign governments on income earned outside the United States, but it does not permit such a credit for royalty payments.

Service Contracts

Service contracts involve the government's paying contractors an agreed-upon fee for the service of extracting petroleum and are generally used in countries where a state oil company fully controls petroleum rights and production, or in countries where nationalization of the petroleum sector is a priority. The fee may be a fixed amount (that is, a pure service contract, in which the contractor does not assume exploration risk) or a fixed return on investment (that is, a risk service contract, in which the contractor assumes some measure of exploration risk).

Countries that use service contracts to some extent include Mexico, Peru, the Philippines, Senegal, and Thailand. In certain circumstances, particularly in countries with extremely low technical risk, service contracts may result in high returns to the government. However, the project risk under such contracts falls primarily on the government, especially in the case of pure service contracts, and service contracts may offer insufficient performance incentives to adequately promote efficient resource extraction. Service contracts, especially pure

service contracts, also severely limit the potential return to investors and thus are not attractive in cases where the size of available reserves is particularly uncertain or geological risk is substantial.

Production Sharing

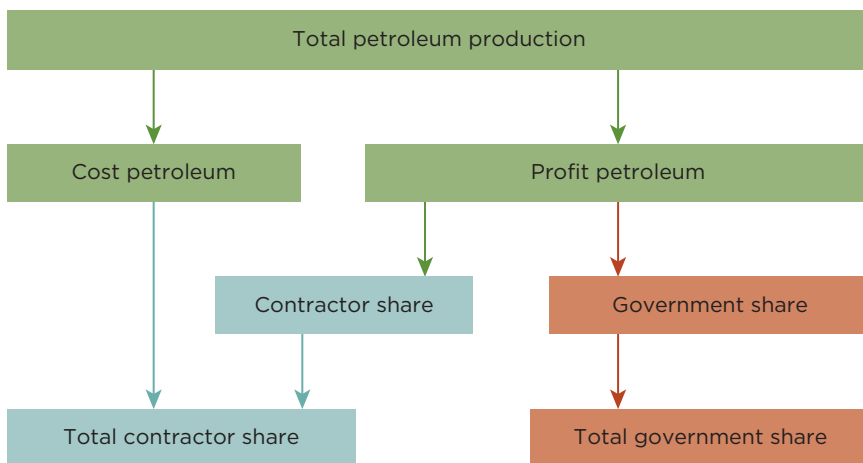
Production-sharing mechanisms are widely used in the petroleum sector. Countries using PSCs include, among many others, Algeria, Azerbaijan, Brazil, Cameroon, Chad, Colombia, the Democratic Republic of Congo, the Kurdistan region of Iraq, Kazakhstan, Libya, Malaysia, Mozambique, Nigeria, Qatar, Tanzania, and Trinidad and Tobago. Under a production-sharing approach, contractors (rather than the government, as in a service contract) bear the risk of exploration. Once production begins, the contractor retains a certain percentage of the revenues until its capital expenditures are recovered, and then the remaining profits are shared between the contractor and the government (figure 3.3).

Production-sharing mechanisms take a number of forms; most are progressive—that is, the government’s share of profits increases as profitability increases—and thus are generally more attractive to investors than a tax and royalty or service contract approach. Furthermore, provided that the “cost oil” allotment is less than 100 percent, the production-sharing approach offers an advantage shared by the royalty approach—early cash flows to the government upon the commencement of production. Indeed, such a cost oil limit effectively functions as a royalty flowing to the government. Some PSC mechanisms are fairly easy to administer, and some are difficult (figure 3.4).

Production-Sharing Mechanisms

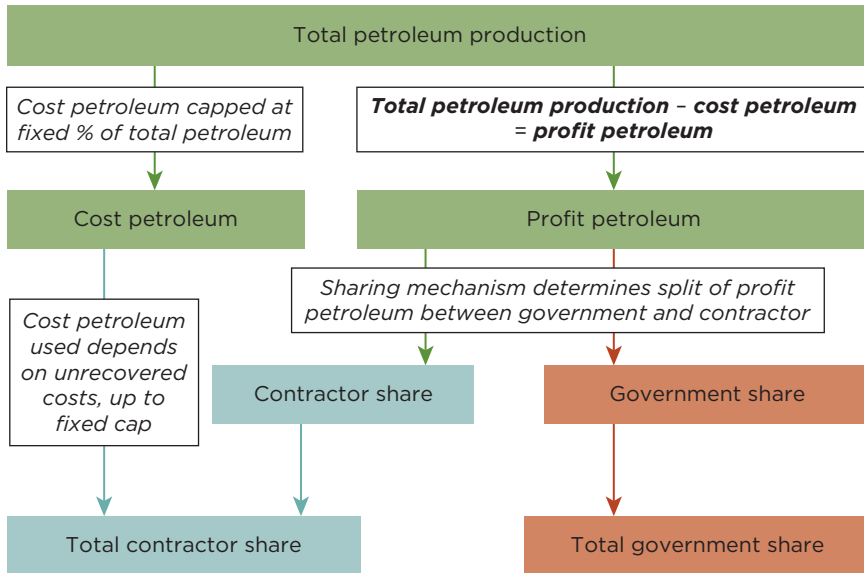
Within the most common type of petroleum agreement—the PSC—are a number of mechanisms for determining how the revenues from petroleum production are shared between the government and contractors. These mechanisms include the daily rate of production (DROP), cumulative production, rate of return (ROR), and the R-factor.

FIGURE 3.3 Flow of Revenues under a PSC—Overview



Note: PSC = production-sharing contract.

FIGURE 3.4 Flow of Revenues under a PSC—Detail



Note: PSC = production-sharing contract.

Daily Rate of Production

Under a DROP approach, the government’s share of profit on petroleum increases as the daily rate of production from a contract area increases (figure 3.5). This approach does not directly take into account either the price of petroleum or the costs of production from a given contract area, and thus it acts to curb progressivity. Some countries use a variation of this approach to determine the respective contractor and government shares based on the rate of production of profit oil rather than total volume. This subgenre, used in the Arab Republic of Egypt and Kenya, is somewhat more progressive than the standard DROP mechanism based on total volume. Some form of the DROP mechanism is also used in Equatorial Guinea, Ethiopia, Tanzania, and Uganda.

Cumulative Production

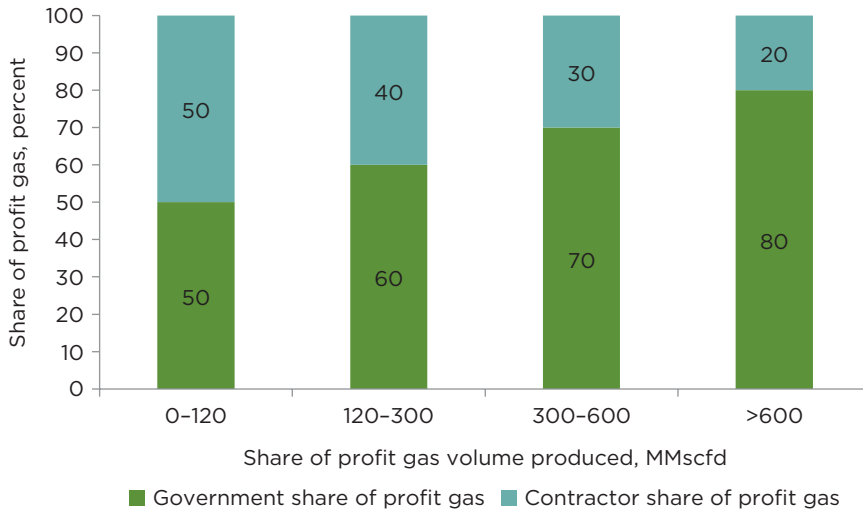
Another potential approach is “cumulative production,” whereby the government’s share of profit on petroleum increases as the total cumulative production increases. As with the DROP approach, cumulative production attempts to serve as a proxy for profitability, but again, it does not account for commodity price or production costs.

Rate of Return and R-Factor

Two further approaches track profitability more accurately and thus produce progressive results.

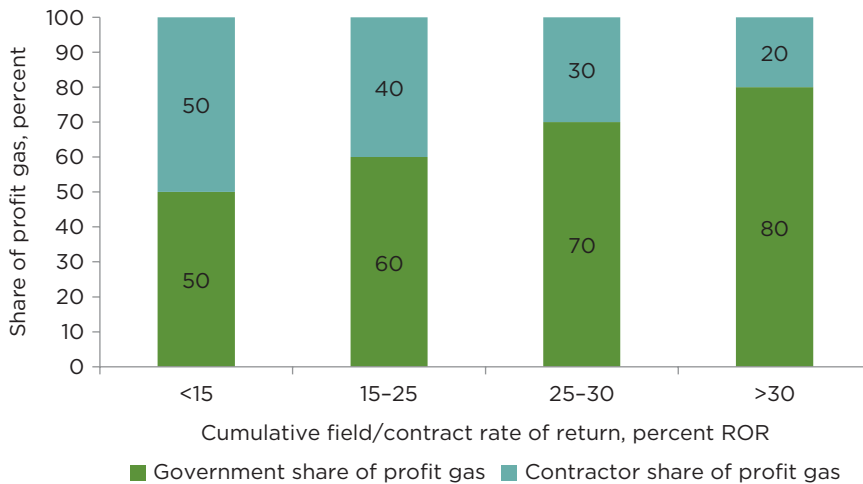
The first of these more progressive approaches is rate of return–based (ROR–based) sharing, which is essentially a resource rent tax—that is, a tax on the portion of the value of the petroleum extracted over the life of the project

FIGURE 3.5 Illustration of Volume-Based Sharing



Note: MMscfd = million standard cubic feet of gas per day.

FIGURE 3.6 Illustration of Rate of Return Sharing

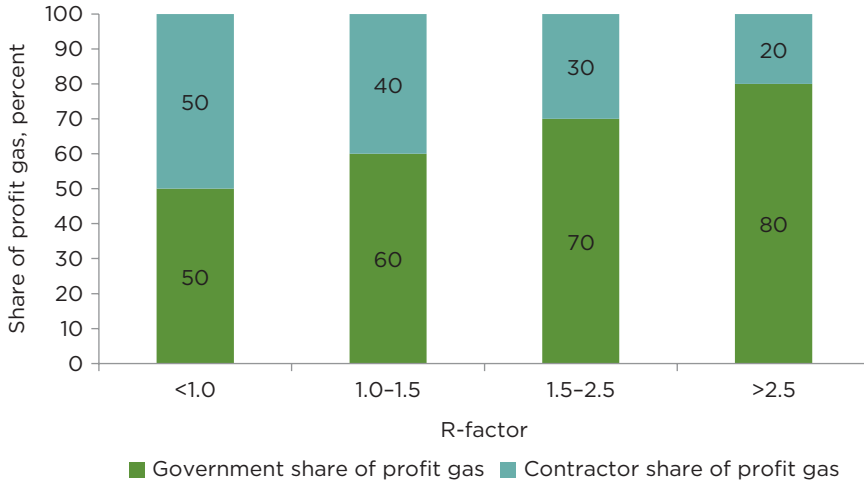


Note: ROR = rate of return.

that exceeds the contractor’s costs plus a minimum return. This approach calculates the contractor’s ROR using discounted cash flows, and the government’s share increases as the contractor’s ROR increases (figure 3.6). Angola, the Russian Federation, Tanzania (for its additional profits tax), and Uzbekistan are among the countries that use the ROR method.

Similarly, the so-called R-factor approach to production sharing determines the government’s share of production according to the ratio of the contractor’s cumulative revenues to cumulative expenditures. As the ratio (and therefore

FIGURE 3.7 Illustration of R-Factor Sharing



Note: R-factor = cumulative revenues divided by cumulative costs.

the profitability of a contract area) increases, so does the government’s share (figure 3.7).

Thus, both the ROR and the R-factor approaches are highly progressive, provided that appropriate parameters are selected. In addition to inherent progressivity, these regimes eliminate the need to establish different DROP tables applicable to oil and gas. Because these regimes are determined on the basis of positive and negative cash flows (in the ROR case) or of revenues and costs (in the R-factor case), the same regime can be applied to both oil and gas. Furthermore, either of these approaches would eliminate the need for an additional profits tax to address potential windfalls.

The ROR approach has the advantage of taking into account the time value of money, whereas an R-factor approach is conceptually simpler and less sensitive to the timing of cash flows or issues such as the “gold-plating” of costs.⁶ In either case, however, strong contract compliance is important. The R-factor does not require a rate of return to be explicitly factored into the contract’s terms, which reduces the risk of setting parameters that are unacceptable to investors or that could complicate licensing negotiations.

Summary and Conclusions

As highlighted by the discussion above, governments should keep in mind a few key considerations for properly structuring both the legislative framework that will govern their countries’ petroleum sectors and the petroleum agreements and fiscal regime that will establish the parameters for particular investments. Each is essential to attracting foreign petroleum investment while ensuring that the host country maximizes its return on its natural resources.

Well-structured legal and regulatory frameworks for petroleum feature a number of key components. First among them is a constitution that addresses

fundamental principles such as revenue allocation and ownership of petroleum resources—both of critical importance in federal systems. Reaching agreement on these bedrock principles and enshrining them in a constitution helps to establish a common understanding among stakeholders and to reduce the potential for disagreements and conflicts, both with foreign investors and within the country itself.

Second, petroleum laws and petroleum regulations work together; the laws broadly sketch the rules of participation in the sector, and the regulations serve as flexible tools for filling in the details, many of which will need to evolve over time as the sector matures.

Third, model petroleum agreements set out standardized terms applicable to all contractors. This feature eases the administrative burdens on the government entity or entities responsible for contract compliance, which in turn helps to ensure that a country and its citizens receive the contractual benefits to which they are entitled from their petroleum resources.

In short, effective legal and regulatory frameworks for petroleum can be characterized by (i) a few fundamental constitutional principles; (ii) a broad, flexible petroleum law with enabling regulations; and (iii) a model petroleum agreement establishing standardized terms for petroleum sector contractors. Together, these principles provide clarity to potential investors on all of the important issues relevant to sector participation.

With regard to engaging contractors to develop petroleum resources, a government's establishment of an appropriate fiscal regime is essential to striking the proper balance between attracting investment and getting the best deal for the host country. Selecting the type of petroleum agreement appropriate to a country's particular circumstances is a key aspect of implementing the fiscal regime. PSCs are the most common form of petroleum agreement, especially in countries with developing petroleum sectors, as they allow for progressive revenue sharing and are relatively simple to administer. Such contracts can implement any of a number of sharing mechanisms, with ROR and R-factor sharing offering the most progressivity.

Notes

1. See "Revenue Management and Distribution," EI Source Book, http://www.eisourcebook.org/688_8RevenueManagementandDistribution.html.
2. Article 112 of the Iraqi constitution, the full text of which is available at https://www.constituteproject.org/constitution/Iraq_2005.pdf?lang=en.
3. The definition of *Nigerian Content* in Article 106 of the final text of the Nigerian Oil and Gas Industry Content Development Act, 2010, is available at <https://www.ncdmb.gov.ng/images/GUIDELINES/NCACT.pdf>.
4. See EITI website, <https://eiti.org>.
5. For more details on fiscal regimes that can balance both investors' and host governments' preferences, see chapter 4.
6. The ROR method takes into account the time value of money, which means the ROR calculation is more sensitive to the timing and size of initial investments relative to first production. The timing of preproduction expenditure has no impact on the calculation of the R-factor production shares.

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CHAPTER 4

Petroleum Fiscal Regimes in Developing Countries

Charles P. McPherson

Introduction

Among policy makers and practitioners, the design and performance of fiscal regimes attracts perhaps greater attention and greater controversy than any other aspect of a country's legal and contractual framework for petroleum operations. Before looking at the specifics of petroleum fiscal regimes, this chapter will examine a range of sector characteristics that have a bearing on fiscal design. It will then review common objectives for any oil and gas fiscal regime against which its performance might be assessed. The next section will catalog the instruments available to meet fiscal objectives and discuss their individual pros and cons. The chapter will then look at how countries have combined fiscal instruments in packages to meet multiple fiscal objectives. It will underscore the importance of economic evaluations of existing or planned fiscal regimes and introduce the main parameters and methodologies applied in performing such evaluations. It will then consider a number of critical fiscal topics in more detail. The final section will summarize key points and themes.

This chapter is concerned solely with upstream petroleum operations, that is, with the exploration for and discovery of oil and gas resources, their commercial development, and their sale, but not with the refining or marketing of these resources. Throughout, the term "fiscal" is used to denote all forms of levies on petroleum operations, whether derived from legislation or from contractual terms.

Special Characteristics of Petroleum Exploration and Exploitation

This short section provides an overview of special features of the petroleum sector that can be expected to shape fiscal objectives and the choice of fiscal instruments (see Boadway and Keen 2010).

Long and costly exploration periods. Petroleum exploration, especially in frontier or undeveloped areas, can take an extended period of time before the investor can reach a conclusion as to whether a commercial resource exists. Exploration is costly—sometimes extremely costly—and this cost has implications for the design of the fiscal regime. After a discovery is made, investors will want to see an early and adequate return to compensate for the long period of out-of-pocket expenditure. Whether such a return can be expected is important in attracting investor interest in the first place and will depend in good part on the design of the fiscal regime.

Exceptionally capital-intensive development. The typically very high costs of development bring additional investor pressure for fiscal regimes to provide early and appropriate financial returns. Governments may appreciate this investor concern but will not want fiscal terms that favor early returns to investors while unduly deferring revenues to the government.

Captive investments. Petroleum discoveries and development projects cannot be moved from one location to another. Investors may be apprehensive that a government, recognizing the captive nature of oil and gas investments once a commercial discovery has been made and successfully developed, will choose to revise fiscal terms in the government's favor. With this risk in mind, investors will seek fiscal terms that allow for the early recovery of costs and profits.

Significant geological, development, and political risks. Petroleum exploration and development operations come with significant risks—risks of not finding the oil or gas, risks associated with technical development of discoveries, risks of unanticipated delays, and risks of cost overruns. Investors can be expected to bear these risks, but they will expect fiscal incentives in return. Political risks—risks of political disruptions, civil unrest, unilateral revision of fiscal terms, and so on—may also represent a challenge to investors, who may look for additional incentives to counter such risks. These are risks, however, that the host government may be in a position to mitigate. To the extent that the government is successful in alleviating these risks, the terms it offers to investors may be more aggressive in the government's favor.

Volatile prices. Oil prices are notoriously uncertain and volatile, with major implications for fiscal design. The government will want to capture the lion's share of significant price-driven revenue increases, while investors will want some protection of their profitability when prices tumble.

Variable qualities, products, and prices. Crude oils may differ greatly in quality—specific gravity, sulfur content, waxiness—and in location relative to market. Crude oil operations also differ from natural gas operations in a number of important respects—elapsed time to commercial marketing, typical profit margins, and processing and infrastructure requirements. These differences ought to be recognized in the elaboration of any fiscal regime for petroleum.

Resource depletion. The inevitable exhaustion and eventual depletion of a petroleum resource raises a number of fiscal issues. For one, unit costs tend to

rise and margins fall as production declines. Fiscal terms must adapt to these changing circumstances if incentives to produce are to be maintained.

Environmental concerns. The costs of maintaining environmental safeguards during petroleum operations and of restoring the environment after operations are abandoned are significant. The fiscal regime should provide for recovery of these costs. This presents a particular challenge in the case of abandonment, when the revenue against which costs might have been recovered has ceased.

High political profile. Significant revenues (actual or anticipated) increase the risks of civil unrest and of political interference in the design of a petroleum fiscal regime.

Fiscal Regime Objectives

The design, assessment, or redesign of any oil and gas fiscal regime should begin with a discussion, ideally with multiple stakeholders, about desired regime “deliverables,” that is, regime objectives. The list in the following subsections is not exhaustive, but it does include the objectives most commonly identified by policy makers.

Efficient Production and Broad-Based Development

As nearly as possible, fiscal regimes should encourage the investor to produce a field or reservoir up to the point where “all-in” unit costs are just matched by the unit price. All-in costs include not only direct out-of-pocket costs but also external costs, such as those that might be inflicted on the environment, and the investor’s minimum return on capital. What is meant by efficient production at the field level is illustrated in figure 4.1. The vertical axis measures unit cost or price; the horizontal axis, production. The blue line shows unit costs rising with production; the red line shows the price level provided by the market. Field production is efficient at the level Q^* , where price just covers cost. Ideally the fiscal regime should encourage production up to that level.

The same argument can be made at the level of the sector overall. Broad-based development should see development of all existing or potential projects whose marginal cost is just covered or more than covered by the long-term expected price. In figure 4.2, projects A through E all meet this criterion and should be encouraged by the fiscal regime. They are all viable pretax and should ideally remain viable after tax. Project F does not meet the criterion: it is not viable pretax and should remain not viable after tax.

The fiscal outcomes illustrated here at the field (figure 4.1) and sector (figure 4.2) levels are generally referred to as socially optimal. Other things being equal, fiscal regimes should be designed to result in minimal distortions of these outcomes.

Progressive State Capture of Rents

The area between cost and price in figures 4.1 and 4.2 represents rents—that is, revenues in excess of what is required to recover cost, including the investor’s minimum required return. Rent is the “pie” to be shared by the government and the investor. An important objective for governments is to capture as much of this rent as possible and to capture an increasing share of it as it grows.

FIGURE 4.1 Efficient Field Production

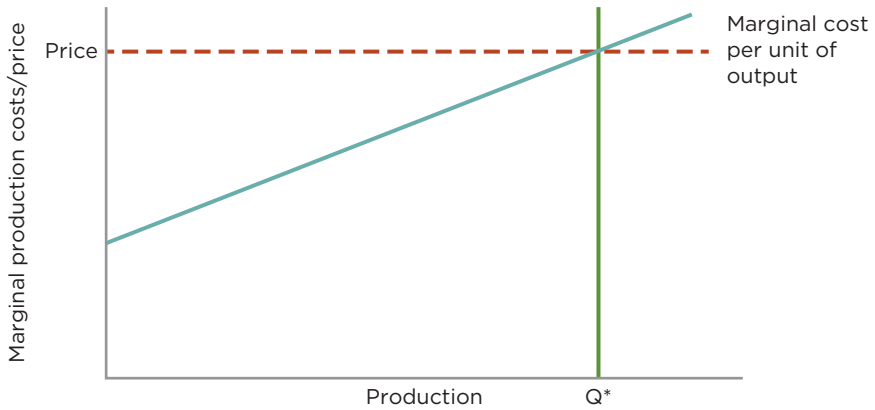
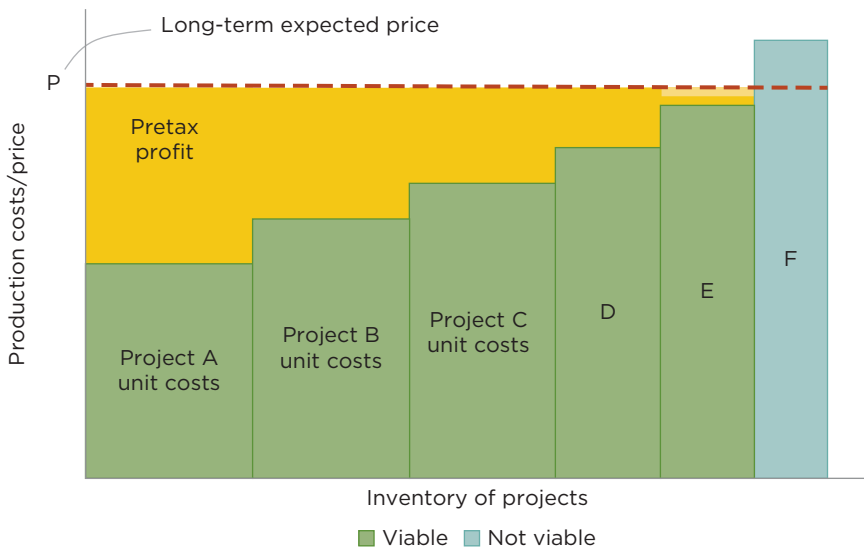


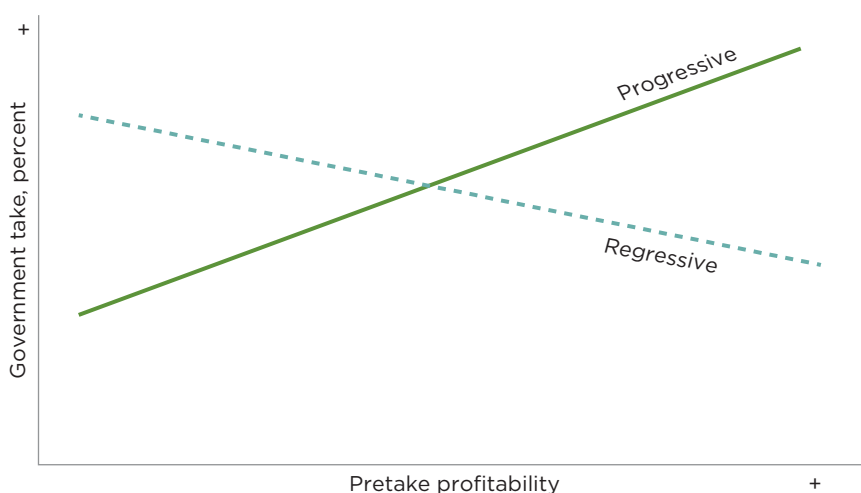
FIGURE 4.2 Broad-Based Development



A fiscal system that accomplishes this is known as progressive; a regime that produces the opposite or perverse results is known as regressive. Stylized versions of the two opposing outcomes are shown in figure 4.3. The government’s share of rents, typically referred to as its take, is measured along the vertical axis; pretake project profitability is measured along the horizontal axis, increasing from left to right.

The rising green line represents a progressive fiscal regime, the dotted teal line a regressive regime. The slope of the line for any fiscal regime will depend on the mix of fiscal instruments used in the regime and the progressive or regressive character of each component instrument.

FIGURE 4.3 Progressive State Capture of Rents



Cost Containment

The lower the costs, the larger the pie to be shared between the government and investors. Fiscal regimes ought therefore to encourage cost-efficiency.

Early Revenue

Investor interest in early revenue has already been noted. Governments share that interest, especially in low-income developing countries with urgent demands for funds to meet poverty alleviation needs and address underfunding of critical social and physical infrastructure. The timing of sector revenues will depend in good part on the specification of fiscal terms.

Dependable Revenue

Governments also place a premium on dependable revenue. It may be impossible to expect a steady revenue stream from a petroleum operation, but governments do want to see some revenue coming in under all circumstances once commercial development commences.

Risk Management

Geological, technical, and political risks; their implications for the level of fiscal incentives offered to investors; and the comparative advantages of investor and government in managing them were discussed earlier. Another risk to be managed relates to revenue volatility. Arguably, the investor, whose portfolio of projects is likely to be much more diversified than that of a new petroleum-producing country, should be well placed to accept this risk. In practice, however, political and budgetary pressures on governments to capture the upside of any boom-bust revenue cycles often lead them to accept a large part of the revenue-volatility risk.

International Competitiveness

Petroleum projects may be immovable once established, but prior to that moment, the capital required to support them is mobile, generating competition among

existing and potential petroleum-producing countries to attract that capital. Geological potential and the host country's fiscal regime are often central to determining the outcome of such competitions. The more prospective a country's geology, the more attractive it will be to investors, and the more aggressive it may be in setting fiscal terms for investors. Less promising geology will require more favorable, investor-friendly terms.

Simplicity of Administration

Weak institutional capacity is a major issue in many, if not most, developing countries. This can be an acute problem when it comes to administering petroleum fiscal regimes, leading countries to opt for simplicity in fiscal design at the expense of sophistication. Simple fiscal regimes can bring their own problems, however. They may distort incentives or fail to perform as hoped under changed circumstances, leading to tension between governments and investors and creating pressure to renegotiate terms.

Fiscal Instruments

Multiple fiscal objectives typically call for multiple instruments, each of which brings particular attributes, positive or negative, to the overall fiscal regime. This section reviews the fiscal instruments most commonly applied to petroleum operations and assesses their merits and drawbacks against the objectives set out earlier.¹

Profits Taxes

Profits taxes include generally applicable corporate income taxes, income taxes applied specifically to petroleum, and any other levies based strictly on profits. They are expressed as a percentage of revenues minus costs. Profits taxes are usually in the range of 35 to 50 percent.

The principal appeal of profits taxes lies in the fact that they have minimal distortionary impact on investors' decision making, at either the field level or the sector level. Production or investment decisions that are viable or attractive to the investor pretax will be viable posttax as well. This is because, by definition, the tax takes only a specified percentage of available, positive pretax profits of rents, always leaving something for the investor. This point is illustrated in figures 4.4 and 4.5, which overlay figures 4.1 and 4.2 with an assumed profits tax.

The shaded area in each figure—the space between price and cost—represents profits or rents. Deeper shading represents the profits tax. Because the investor continues to receive a share of positive income right up to the point where positive income ceases, the investor will be encouraged to take field production up to the optimal level, Q^* , in figure 4.4 and to pursue project development through to and inclusive of project E in figure 4.5.

When assessed against other fiscal objectives, profits taxes have mixed scores. Without modification (for example, by introducing tax rate scales), they are not progressive. The percentage they take of profits or rents is constant—it does not increase as profitability increases. They do encourage cost containment, because any increase in profits as a result of cost savings will be shared between the investor and the government. However, they do not score well against criteria for early and dependable revenue. To the extent that profits taxes allow early

FIGURE 4.4 Profits, Taxes, and Efficient Field Production

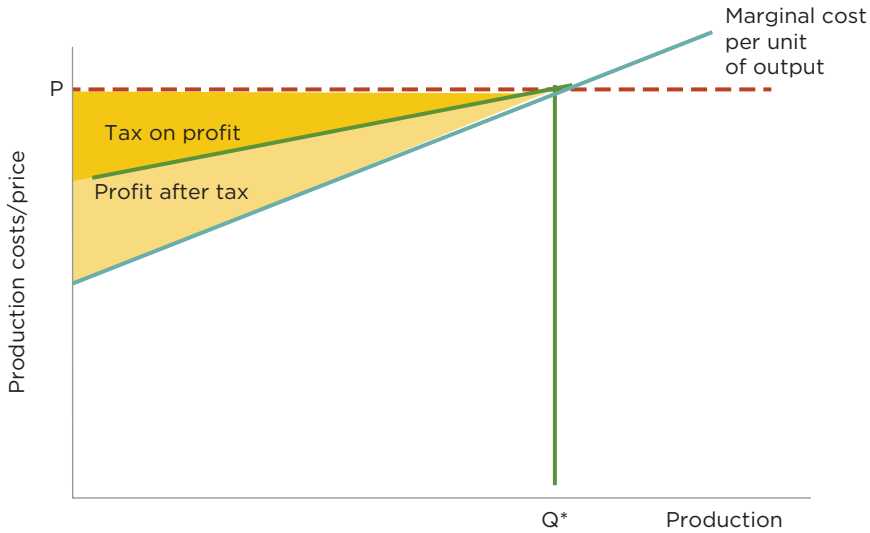
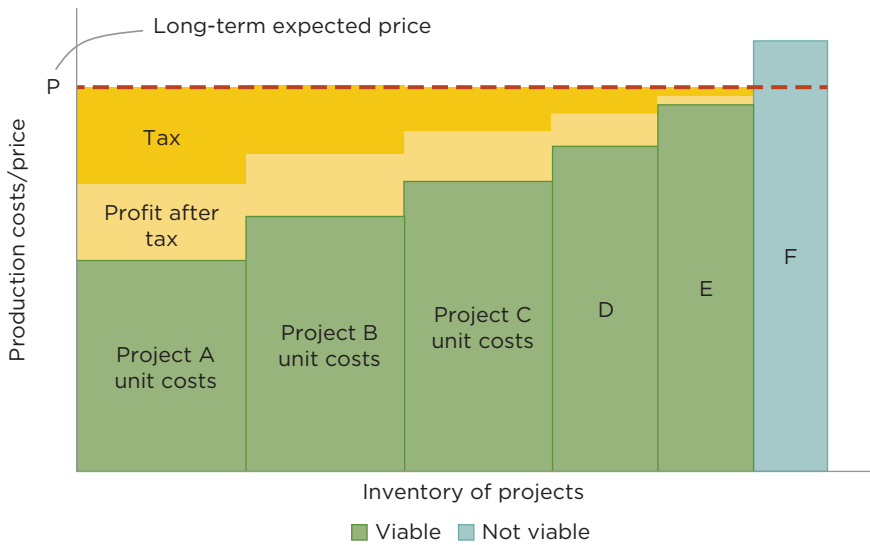


FIGURE 4.5 Profits, Taxes, and Broad-Based Development



recovery of costs by the investor, they will reduce government revenues at the beginning of a project, deferring them until later in the project's life. Furthermore, the timing and scale of government revenues in any single time period will be uncertain, as they depend on the time profiles and scale of revenues and costs.

In terms of investor perceptions, profits taxes are welcome for several reasons. Their efficiency and tendency to promote broad-based sector development is one. Second, until recently, international investors were unable to claim payments to the host country as credits against tax obligations in their home

countries unless they were subject to an income tax in the host country. Third, the optics of a profits tax, such as the generally applicable corporate income tax, are appealing insofar as they allay popular suspicion of favorable treatment of petroleum investors.

Complexity of administration is the most common argument against profits taxes. The perceived complexity relates primarily to accounting and audit procedures. Governments have expressed concerns that weak institutional capacity in these areas has led to significant revenue losses.²

Royalties

Royalties may be specified as a fixed charge per unit produced or ad valorem, as a percentage of revenue generated per unit. Rates in the latter case typically range between 10 and 12 percent.

The main drawback of royalties is the reverse of the principal advantage of profits taxes. Depending on their level, royalties can be highly distortionary of investor incentives and result in well-below-optimal levels of production or sector development. Figures 4.6 and 4.7 once again redraw figures 4.1 and 4.2, this time showing the impact of a royalty.

The royalty represented in the two figures is an ad valorem royalty. By taking a percentage of revenue off the top, it effectively reduces the price to the investor in the figures from P to R. In the individual field case, shown in figure 4.6, the consequence is a reduction in the level of production from the optimal Q^* to Q_1 . That reduced level Q_1 is the new level of production at which the price (as perceived by the investor) just covers the cost. The parallel result at the sector level, shown in figure 4.7, is a reduction in the number of commercially viable projects, from A through E before the royalty to A through C after the royalty. The severity of this negative effect will depend on the scale of the royalty and the cost profile of production—the slope of the blue line in figure 4.6 and the stacking of project costs in figure 4.7.

FIGURE 4.6 Royalties and Efficient Field Production

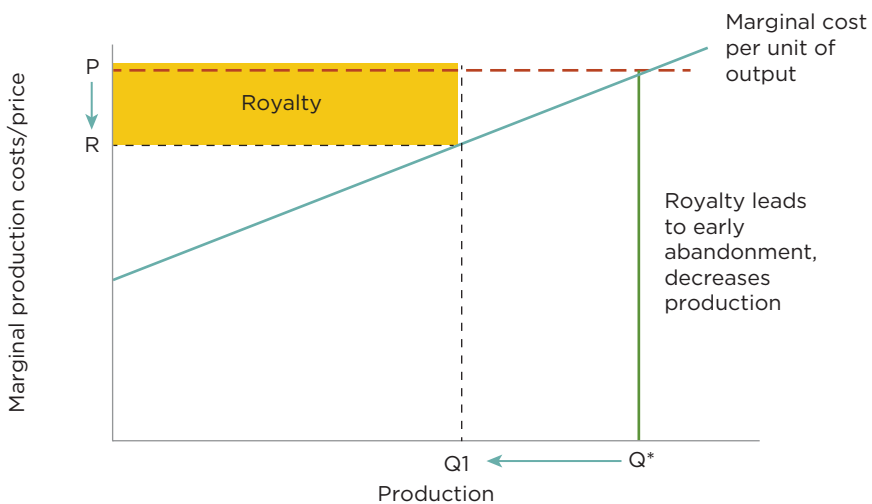


FIGURE 4.7 Royalties and Broad-Based Development

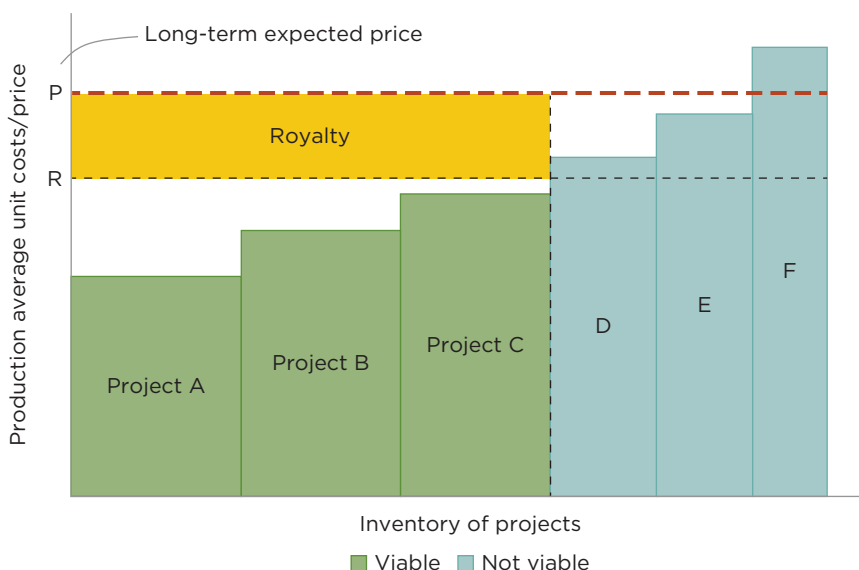


TABLE 4.1 Royalties Are Regressive

	Calculation	Low-Cost High-Profit	High-Cost Low-Profit
(1) Gross revenues		100	100
(2) Cost		40	60
(3) Pretax margin	(1) - (2)	60	40
(4) Royalty (10%)	0.10 × (1)	10	10
(5) Royalty as % of margin	(4) / (3)	16.7	25

A related serious drawback of royalties is that they are regressive, not progressive as desired. As a result of the royalty’s insensitivity to cost and profitability, the government’s royalty take decreases as cost decreases and profitability increases. Table 4.1 provides a numerical example.

Assuming revenue and cost numbers as shown in table 4.1, a 10 percent royalty results in a 16.7 percent take of the profit margin in the low-cost, high-profit case, while the same take in the high-cost, low-profit case is 25 percent. This kind of perverse behavior will lead to premature abandonment of fields as production costs rise and—at the sector level—to the neglect of marginal, higher-cost projects that might otherwise have been viable.

These reservations notwithstanding, royalties remain an important component of many fiscal regimes for a number of reasons, chief among them the two that follow.

First, in contrast to profits taxes, royalties provide revenue to the host government from day one of production, and the revenue is dependable as long as production lasts. Provided that royalties are set at reasonable levels, investors appreciate these features as much as host governments do. Being able to demonstrate early payments to the host government, even at relatively modest levels, is good for investors' public image.

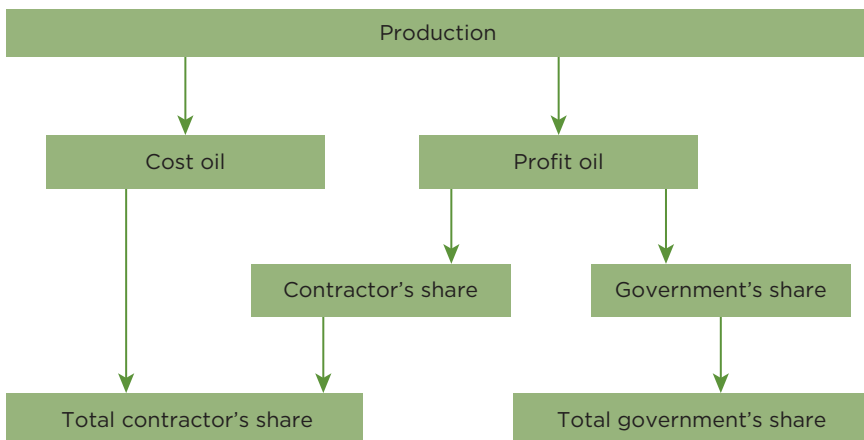
Second, again in contrast to profits taxes, royalties are seen as easy to administer and less demanding of the capacity of domestic revenue authorities. This may be partly true, but the negative efficiency and developmental consequences of a heavy reliance on royalties need also to be kept in mind. A compromise approach, commonly found, relies on profits taxes for their efficiency and a royalty element for its positive features. This approach would ideally be complemented by a program of capacity building in the revenue authority.

Production Sharing

Production sharing is a very popular contractual and fiscal framework for petroleum operations, particularly in developing countries. It is well understood and widely accepted by international investors. Its fiscal dimensions combine elements of both profits taxes and royalties.

Under production sharing, a fixed percentage of gross production is set aside for recovery of the investor's costs ("cost oil"). The remaining production ("profit oil") is shared between the government (or its agent) and the investor on a percentage basis as agreed between the government and the investor. The sharing of profit oil is akin to a profits tax. The fixed percentage limit on cost recovery in any one accounting period guarantees a minimum payment to the government regardless of actual costs or margins and is therefore akin to a royalty. Because of its hybrid nature, this scheme shares both the positives and the negatives of profits taxes and royalties. Figure 4.8 presents a simple schematic illustration of basic production sharing.

FIGURE 4.8 Production-Sharing Schematic: Base Case



Cost-Recovery Provisions

Although not generally thought of as fiscal instruments in the way that profits taxes, royalties, or production sharing are, the cost-recovery provisions of any petroleum fiscal regime can have major implications for fiscal outcomes and for the assessment of a regime against fiscal objectives. Critical provisions include the definition of allowable costs, the treatment of payments made to affiliates, rules for expensing and depreciation of costs, rules governing the consolidation of costs for recovery, and procedures for the recovery of abandonment costs. Several of these provisions are considered in more detail in the section, “Special Fiscal Topics.”

Bonuses

Bonuses are one-time payments by an investor tied to specific events or to the achievement of certain milestones such as license signature, declaration of a commercial discovery, or attainment of a certain level of production. Bonuses may be bid, negotiated, or fixed.

In recent years, bid signature bonuses have received the most attention. Under the right circumstances, these bonuses can reach substantial levels. Signature bonuses are incurred before operations begin. They are sunk costs and, as such, have no effect on the investor’s decision-making process going forward. They will not interfere with efficient production or distort the extent of project development at the sector level. Bid signature bonuses contribute to rent capture. The scale of the bid will depend on the investor’s expectation of project rents available in the event of success. In that sense, bid bonuses are also progressive—the greater the expected rent, the greater the bonus will be. The government’s share increases as profitability increases, only in this case the profitability in question is perceived profitability, not actual profitability. Clearly, signature bonuses meet the government’s early revenue criterion. Unfortunately, in cases when a government’s need for cash is acute, this attribute may drive the licensing process at the expense of attention to other features of the investment framework, fiscal or otherwise.

Investors are tolerant of signature bonuses if they are kept at reasonable levels. What constitutes a reasonable level will depend on geology, other elements of the legal and fiscal regime, and perceptions of political risk. Just as investors may be concerned about investing exploration and development monies up front when it is possible that a government will revise terms unilaterally, so they may be reluctant to bid an up-front bonus that reflects the true value of the resource. Bonuses are almost invariably only part of a fiscal regime; typically, they are paired with other fiscal instruments that link the government take to actual rather than expected outcomes.

Flexible Rent-Capture Mechanisms

Each of the fiscal instruments discussed above is intended to capture a significant portion of petroleum project rents for the government or state.³ Rents or profitability are going to vary, however, from project to project and from one time period to another, reflecting differing geological successes and price variability. Other factors include differing operating conditions and costs, differing times to commercial production, and differing production profiles. The challenge for the architects of a petroleum fiscal regime is to design a regime that will adjust automatically to

these variations. Absent an automatic adjustment mechanism of some sort, either the host government will call for revision of the regime or investors will press for renegotiation of terms to correct perceived inequities or distortions of incentives.

In practice, a number of mechanisms have been introduced in attempts to achieve fiscal flexibility. These mechanisms commonly involve linking one or more fiscal instruments (tax, royalty, production share, additional tax, and so on) to easily observed proxies for project profitability. Alternatively, the fiscal instrument may be linked to profitability itself. Examples of such mechanisms include the following:

- The government's production share is a function of cumulative or daily rates of production.
- Royalties escalate with price.
- The government take escalates after the investment or a multiple thereof has been recovered.
- The government take is tied to the location of production operations, the type of hydrocarbon, or the vintage of production.
- The government take escalates with a financial ratio such as taxable income to revenue or cumulative receipts to cumulative outlays (sometimes known as the "R factor").
- The government take varies as a function of achieved profitability measured by the investors' achieved rate of return (ROR).

The problem with using proxies for profitability to introduce fiscal flexibility is just that—they are proxies. They are partial, often inaccurate measures of profitability and are likely to become outdated quickly. Their apparent simplicity is often misleading. Their inaccuracies and lack of completeness often result in strains on the stability of the fiscal regime, changes in terms, heightened investor perceptions of risk and greater demand for fiscal stabilization, and greater complexity in the regime.

Box 4.1 summarizes the fiscal regime under consideration in one of the draft versions of a planned petroleum industry bill in Nigeria. An effort to make the regime responsive to different circumstances and, at the same time, recognition of the shortcomings of different proxies for profitability led to a highly complex proposal, which would almost certainly fall short of its goal and be an administrative nightmare.

Table 4.2 provides a tabular comparison of the effectiveness of various rent-capture mechanisms in producing a system of government take that is fully responsive to all of the critical determinants of project profitability. As the table illustrates, linking the government take to daily or cumulative levels of production responds to the influence of production on profitability, but it misses out on responsiveness to other influences, such as price and cost. Linking government take to price captures the influence of price on profitability but misses out on production and cost, and so on.

Only when the rent-capture mechanism is linked to profitability itself, measured by the ROR actually achieved by the investor, does it result in a system of government take that is fully responsive to all determinants of profitability. Focusing on this

BOX 4.1

Nigeria's Proposed Petroleum Industry Bill (2010): Bells and Whistles

Royalties are a function of the following:

- Price
- Production rate
- Type of hydrocarbons
- Location (water depth)

Production sharing is a function of the following:

- Production
- Location

Tax regime varies with the following:

- Location
- Type of hydrocarbons
- Field size

TABLE 4.2 Responsiveness of Rent-Capture Mechanisms to Determinants of Profitability

Government "take" linked to	Government "take" responsive to				
	Production	Price change	Costs	Timing of cash flow	Cost of capital
Production (daily or cumulative)	Yes	No	No	Partly	No
Price (price caps or base prices)	No	Yes	No	No	No
Cost recovery (uplifts and write-off rates)	No	No	Yes	Partly	Partly
Simple indicators (location, vintage, and so forth)	No	No	Partly	No	No
Financial ratios (such as taxable income to revenue)	Yes	Yes	Yes	No	No
Rate of return (ROR)	Yes	Yes	Yes	Yes	Yes

Source: McPherson and Palmer 1984.

one link has the additional advantage of obviating the need for numerous bells and whistles (as included in the Nigerian proposal summarized in box 4.1).

Arguments in favor of the ROR approach are powerful. It is squarely focused on excess profits or rents and, as such, does not distort the investor's decisions regarding optimal levels of production or project development. By definition, it is progressive. Since it is based on actually achieved profitability, the approach can potentially facilitate negotiations and reduce investor demands for fiscal stabilization.

The principal objection to the ROR approach is that in practice it will turn out to be too complex to administer. In fact, it is only marginally more complex than ordinary profits tax or production share calculations, and the data requirements for its implementation and administration are the same. Because additional charges under the ROR approach kick in only after a threshold return has been breached, government revenues are necessarily deferred. This can be compensated for by twinning the ROR instrument with a front-loaded fiscal instrument such as a royalty.

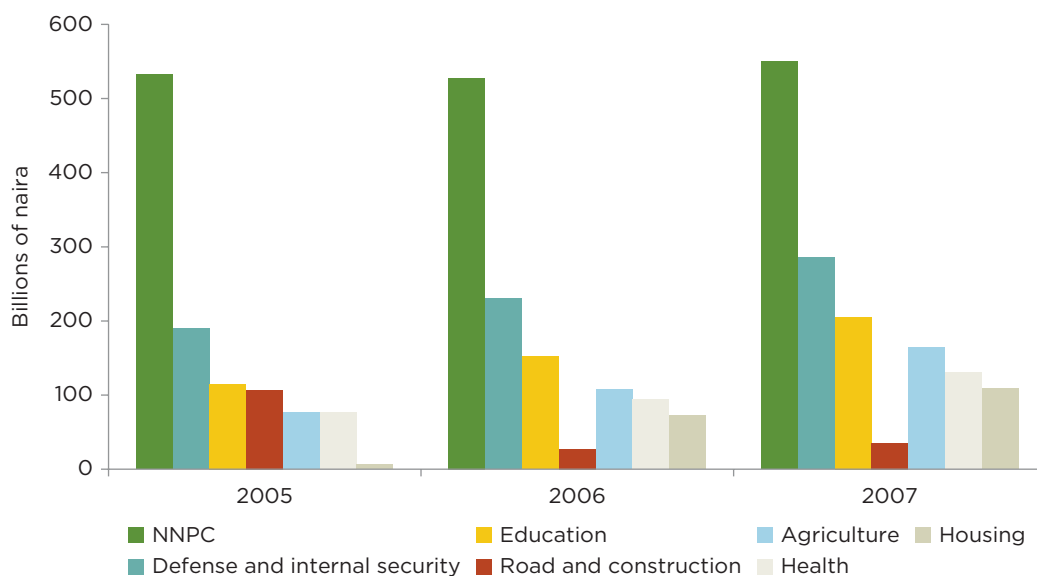
State Participation

Petroleum legal frameworks very commonly provide for state participation in petroleum operations.⁴ A number of options exist, all but one of which have fiscal connotations.

Full equity participation requires that the state participate on an equal footing with its private sector partners in all risks, costs, and revenues from the beginning. It has no fiscal connotations; however, it has serious implications for the state in terms of risk acceptance and funding obligations, which explains the relative rarity of this form of participation. It is practiced on a limited scale in Angola, Indonesia, and Nigeria.

Apart from noneconomic drivers (for example, creation of national capacity), an oft-encountered argument for full equity participation is that it enables the full capture of rent attributable to the government's participation share. However, full equity participation requires substantial funding and places at risk public funds that might be beneficially directed elsewhere (for example, to build physical and social infrastructure), and an efficient fiscal system can be nearly as effective in capturing rent. Figure 4.9 illustrates the first of these two points, showing

FIGURE 4.9 Competing Budgetary Allocations in Nigeria



Sources: IMF statistics, Nigerian government budgetary data.
 Note: NNPC = Nigerian National Petroleum Corporation.

for budget years 2005–07 the sharp contrast between the funding required to support Nigeria’s full equity participation in oil and gas activities through its national oil company—the Nigerian National Petroleum Corporation (NNPC)—and the country’s budgetary allocations to other critical economic and social sectors. The second point is based on the observation that the lion’s share of government receipts from petroleum projects typically comes from the tax regime, with only a small amount gained through full equity participation.

Much more common than full equity participation is the so-called “carried interest” approach to participation, in which the investor funds the government’s share of costs and is repaid with interest out of the government’s participation share in profits. The “carry” may extend only to exploration and appraisal costs, or it may extend through development costs. The fiscal equivalent of this approach is the ROR-based rent tax: the investor puts up all the funds and is allowed to recover an agreed return before the government begins to collect its fiscal share.

A third option is free equity participation. The government is assigned a free share in project cash flow, which is equivalent to a cash flow or dividend tax. Production sharing is a form of free equity. It assigns a free share in project cash flow but also adds a role in project management, which other forms of free equity participation may not do.

To the extent that the participation formula adopted by the host country has a fiscal dimension, potential investors will take this into account, possibly demanding terms less favorable to the government in other fiscal areas to offset the impact of participation.

Fiscal Packages

Multiple fiscal objectives require multiple instruments. As a consequence, petroleum fiscal regimes invariably consist of packages of instruments. The most common packages are the tax-royalty and the production-sharing regimes.

The tax-royalty regime typically comprises a base income tax (generally the corporate tax of general application in the host country), a modest ad valorem royalty, and an additional profits tax to serve as a progressive rent-capture mechanism. It may or may not include a mechanism for state participation. Although traditionally associated with developed-country regimes, the tax-royalty formula is found in a number of developing countries as well.

Production-sharing regimes comprise standard cost-recovery and base production-sharing terms along with, in pursuit of fiscal progressivity, an escalation of shares in the government’s favor as a function of production. A royalty may or may not be explicitly added, and state participation is optional. In addition to the production share, the investor will be liable for payment of corporate income tax on the basis of revenues received from cost recovery and production shares under the production-sharing contract, less cost deductions as allowed under the general corporate income tax or a separately specified petroleum income tax. Figure 4.10 adds a royalty and income tax to figure 4.8. Developing countries have shown a preference for production sharing, largely attributable to sovereignty and noneconomic issues.

Table 4.3 indicates the range of fiscal packages adopted in a selection of petroleum-producing countries. Some countries may have more than one fiscal regime operating at the same time, for example, tax-royalty and production

FIGURE 4.10 Production-Sharing Schematic with Royalty and Income Tax

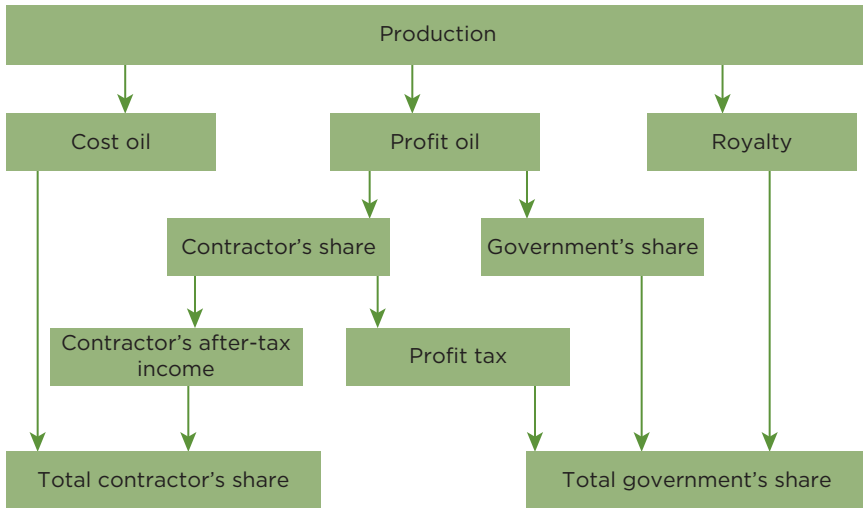


TABLE 4.3 Fiscal Packages: Indicative Practice

Country	Tax/Royalty	PSC	Participation
Algeria	X	X	X
Angola	X	X	X
Egypt, Arab Rep.		X	
Indonesia		X	X
Libya	X	X	X
Norway	X		X
Sudan		X	
Tunisia	X	X	

Note: PSC = production-sharing contract.

sharing, and applied to different vintages of contract award. It is fundamentally important to recognize that at the fiscal level, all of these approaches can be made equivalent. What is essential in designing or comparing fiscal regimes is to go past the label and look at the detailed specification of the package in terms of structure and numerical parameters.

Fiscal Regime Evaluations

Initial and continuing evaluation of a petroleum fiscal regime is critical to its effectiveness and efficiency.⁵ Routine evaluations can serve a variety of important purposes.

The first of these applies to the initial design of a country's fiscal regime. The evaluation will help in the selection of a regime that best suits the country's needs or aspirations. Subsequent evaluations can identify the need, if any, to revise or update the regime in the light of changed circumstances. This exercise will be particularly appropriate going into the preparation of any new

licensing round. Once the round has been announced and prospective licensees have been identified, the ability to quickly assess proposals made during negotiations will depend on a working fiscal evaluation model.

Further down the road, once exploration and appraisal operations have identified a commercial discovery, the host government may rely on an evaluation model to determine whether to exercise an option to participate financially in the development and exploitation phases. With or without participation, simulations using such a model can be a significant help in economic planning at both the sector and the macroeconomic levels.

Finally, when evaluations are conducted at the project level, they may provide a useful check against fiscal audits. A large gap between audit findings on payments made and what the evaluation says should have been paid should raise a flag and suggest a need for further investigation.

What to Evaluate?

Fiscal regimes can be evaluated at a number of levels. Their impact can be assessed at the individual project level, on either a full-cycle basis (exploration through development and production) or a point-forward basis (for example, starting with development). Project-level results can be aggregated across projects to obtain results at a sectorwide level.

One of the most useful evaluation exercises is scenario building. Critical assumptions on price, production, costs, or timing can be changed to “shock” the assessment and produce “what-if” results for different scenarios. Sensitivity analysis of this kind is vital for responsible economic planning. Government and contractor cash-flow streams produced by an evaluation model can inform policy makers on the likely timing of cash flows and the sharing of cash-flow volatility risk.

Evaluation Criteria and Indicators

The starting point in any evaluation exercise is agreement on evaluation criteria. These may be many, but the list of fiscal regime objectives discussed in the preceding subsections is representative. Can the regime be expected to encourage efficient, broad-based development? Will it prove effective in capturing rents? Is it progressive? Will it promote cost containment and early and dependable revenues? What does it imply for risk sharing between the investor and government? Is it internationally competitive?

Each of the evaluation criteria should be matched with an indicator or indicators to help measure performance. The investor’s simulated project ROR and the percent government take are widely used to assess regime performance against objectives. Investor ROR is the internal ROR realized by the investor after the government take. A number of measures of government take can be found in practice, but the correct measure is the present value of all payments to the government divided by the pretake net present value of project cash flow.

These two indicators are frequently used to assess the likely impact of a fiscal regime on production efficiency and the margin of development. The same two indicators can also test for progressivity when calculated for a range of project profitabilities. If the regime is progressive, the investor’s ROR should rise as project profitability rises, but at a decreasing rate. The government’s rate of take

should also rise as profitability increases. Calculated across the fiscal regimes of different countries, the government's rate of take can help in answering the question of the international competitiveness of the host-country regime.

Evaluation Model Requirements

Successful evaluation modeling depends critically on credible input data: prices (past and future scenario assumptions), production, and cost (both capital and operating costs). The data should be made available by license or by field. Fiscal terms (both those provided by legislation and those contained in the contract or license) should also be available by contract or license area. These will allow specification of the model and, when combined with data inputs, the looked-for evaluation outputs.

To be useful, the model should be updated regularly. Effective modeling will require interagency coordination, specifically among the sector ministry, the regulatory agency, and the national oil company, if there is one. Close cooperation with users of model outputs—for example, the finance ministry, revenue administration authorities, and the planning ministry—will be important in realizing the full potential value of the model. Finally, it is essential to ensure that the requisite institutional capacity, in terms of both skills and resources, is in place and maintained.

Special Fiscal Topics

This section addresses several special topics that commonly arise in the context of petroleum taxation: fiscal prices, cost-recovery issues, withholding taxes and double taxation treaties, taxes on transfers of interests, and fiscal stabilization.

Fiscal Prices

Fiscal prices are the prices used to determine the investor's payment obligations, that is, for income taxes, royalties, and production sharing. Governments are understandably reluctant to simply accept the price the investor suggests should apply, particularly when the transaction in question is between affiliated parties.

Where oil prices are concerned, governments may accept the price provided by the investor if it can be satisfactorily demonstrated that the sale was between nonaffiliated parties. More commonly, governments now use international reference prices. These are well-established market-based prices continuously quoted and published for particular widely traded crude oils. The prices of North Sea Brent, Nigeria Bonny Light, West Texas Intermediate, and Indonesia Minas are classic reference prices. Once a reference price is selected and agreed upon, it is adjusted for differences in the costs of transport to market between the reference crude oil and the host-country crude oil and for any differences in the quality of the two crude oils (such as specific gravity, waxiness, and sulfur content) that may have a bearing on value. As with the reference price itself, adjustment factors are regularly published and readily available. This widely accepted approach minimizes possible revenue loss and avoids disputes with investors.

Arriving at a fiscal price for natural gas is more difficult. This is because, in contrast to markets for oil, markets for gas are not well developed—with the exception of the United States and, increasingly, European countries—and price

quotes are not continuously or readily available. Furthermore, natural gas is often commercialized through an integrated system involving field development, local processing, transport by pipeline or ship (in the case of liquefied natural gas, or LNG), and further processing (for example, LNG regasification) at the final destination. Pricing arrangements under such circumstances are typically confidential. To set a fiscal price for natural gas, governments have three options: (i) estimate the price required to recover costs and an acceptable investor return at the wellhead or field exit point; (ii) calculate a netback price that is based on observation of prices at the final end-use market point and deduction of costs to get to the market; or (iii) refer to the price of principal alternative fuels, such as heavy fuel oil in the power market.

Cost-Recovery Issues

The design and implementation of rules for the investor's recovery of costs can have very substantial consequences for the bottom-line impact of a fiscal regime on government revenues. Unfortunately, these topics attract far too little attention compared with the attention paid to rates of taxation or production-sharing or royalty levels. The relevance of policy decisions about which costs can be expensed and which must be depreciated and at what rate is well understood, but the importance of other cost-recovery issues is less appreciated. Three of these issues are discussed below: transfer pricing, ring-fencing, and the treatment of abandonment costs.

Transfer pricing involves investor allocation of revenues and costs across countries or even across fiscal boundaries within the host country with the specific purpose of lowering income subject to tax or sharing. Inattention to potential transfer-pricing abuse can be very costly in terms of lost revenues to the government. Investors may seek to lower revenues, and thereby taxable income, by selling to affiliates at below-market prices. They may artificially inflate cost deductions, and so again lower taxable income, by excessive use of debt finance at above-market interest rates (almost all fiscal regimes allow interest as a deductible cost), by charging excessive management and headquarters fees, or by above-market-cost provision of consultancy fees or goods from affiliates. Host governments can and should protect themselves against transfer-pricing abuse by taking a number of steps, notably by introducing legislation or regulations providing for adjustments to ensure arms-length pricing, adoption of guidelines on transfer pricing from the Organisation for Economic Co-operation and Development (OECD), mandatory disclosure of related-party transactions, and investor documentation on the determination of transfer prices.⁶

Ring-fencing relates to the tax treatment of costs from more than one project within a license area. It requires that costs be separated for tax or cost-recovery purposes; that is, that costs from one project cannot be consolidated with income from another project. This treatment has several advantages. Perhaps most important, it avoids the deferral of tax payments that would result if consolidation were permitted. It also avoids administrative complexity where multiple tax regimes exist within the host country. Finally, it levels the playing field for newcomers, who will not be disadvantaged relative to investors that have established income-producing operations. Although ring-fencing is an increasingly popular feature of petroleum fiscal regimes, some countries still choose to allow consolidation of projects for tax purposes, typically where the host country is anxious to see

exploration and development move quickly. Consolidation of projects would encourage this acceleration, albeit at the cost of deferred government revenues.

Legislative requirements for environmentally sound cleanup and site restoration operations at the end of an oil field's productive life have become almost universal. By definition, however, at that point no further income is available for the recovery of such *abandonment costs*. Since the costs are liable to prove considerable, investors will want to see up front what provisions have been made to allow the recovery of abandonment costs. Evolving practice has produced two solutions. The first allows current payments for approved anticipated costs to be placed in an escrow account, to be drawn down on field abandonment. The payments would be deductible, thus providing for cost recovery. The second solution also allows for current deduction of anticipated future abandonment costs, but instead of making payments into an escrow account, the investor provides the host government with credible security that future abandonment costs will be met.

Withholding Taxes and Double Taxation Agreements

Withholding taxes apply to income generated in the host country but paid to nonresidents.⁷ The taxes are expressed as a simple percentage of the payment made and are in lieu of an actual income tax assessment, which might be difficult to achieve due to the nonresident status of the taxpayer. Withholding taxes may be levied on payments to subcontractors, foreign loan interest payments, or the remittance abroad of dividends. Withholding taxes are often reduced, sometimes significantly, under the terms of host-country double taxation agreements with countries where recipients of the payments or dividends reside. This is important, as withholding taxes are generally seen by petroleum investors as part of the overall tax burden on their operations. If the withholding tax is reduced at some point through a double taxation agreement, consideration should be given to making offsetting adjustments to other fiscal terms. At a minimum, this calls for close communication between those responsible for the petroleum fiscal regime and those responsible for negotiating double taxation agreements.

Taxes on Transfers of Interests

Transfers or sales of license interests can encourage efficient development by placing operations into the hands of those best qualified to finance and conduct them. However, gains realized by the seller in times of high petroleum prices may be very large and are often perceived negatively by host-country authorities and the public. Under such circumstances, provisions for taxing those gains become important.⁸

Several types of license transfer exist. Where there is a direct transfer for cash, the purchaser replaces the seller in the license to the extent of the interest transferred. Where the transfer of interest takes place offshore, the purchaser buys shares in the offshore company that owns the license interest in the host country. Unless purchase of 100 percent of the shares is involved, this will not result in the buyer being listed as a license holder. A third type of transfer takes place when the buyer acquires an interest in the license through disproportionate spending or work in the license area on behalf of the seller. The tax implications for each type of transfer are different.

Several options exist to tax these transfers. One is not to tax them. This is the case in Norway, where the government values the potential efficiency gains from

allowing interest transfers more highly than the possible revenue gains from taxing such transfers. A second option is to tax the seller on the gain but allow the purchaser to deduct the purchase price for tax purposes. This type of symmetrical treatment, practiced in Angola, has the same results as no taxation, except that tax revenues are accelerated as the capital gains tax is received at the time of the transaction, but the offsetting tax deduction is deferred through depreciation. A third option is to tax the seller but disallow deduction of the purchase price by the seller. This acts as a significant disincentive to efficient transfers. Uganda has adopted this approach.

While taxing direct transfers, a government may decide not to tax offshore share transactions in recognition of the likely legal challenges and difficulties of both detection and assessment of the gain. Alternatively, it may decide to deem gains on offshore transactions as earned by the local entity and tax accordingly. This option is under consideration in several countries but has yet to be implemented.

Where a transfer is made through a farmout,² a government might consider the disproportionate spending as a taxable gain, but this has never been practiced.

As to the tax rate to be applied, it should be noted that capital gains are frequently taxed at less than the general corporate income tax rate in recognition of (i) the likely impact of inflation on the taxable gain, causing the nominal gain to appear much greater than the real gain; and (ii) the perceived benefits of transfers. Compliance with capital gains taxation has sometimes proved a problem. A number of countries have addressed this problem by conditioning government approval of the transfer (a standard provision in petroleum laws and contracts) on payment of the tax by the seller.

Fiscal Stabilization

Contractual provisions stabilizing agreed fiscal terms are justified in the eyes of investors by the large up-front investments, long payback periods, and political risks associated with petroleum exploration and development.¹⁰

Stabilizing provisions are of two types. The “frozen law” approach fixes the investment framework in place at the time of contract or license award for X years. The compensatory approach calls for any changes adversely affecting the investor to be offset by new incentives.

A number of issues arise from both types of provisions. The original framework may have provided for investor benefits that are clearly no longer sustainable. After a number of years, it may be hard to determine or agree as to what the original framework comprised. If the compensatory approach applies, it is likely to prove very difficult to agree on appropriate offsets. Where stabilization is accepted, should it apply only where the investor is adversely affected? Should this asymmetry be corrected to rule out benefits to the investor when changes are favorable?

Some countries provide for stabilization as an option, with a price. For example, if an investor insists on having the option, the applicable royalty will be X percentage points higher. Peru’s mining investment framework offers this option. Other countries, recognizing the arguments for stabilization but also the strain that changed circumstances can place on an

agreement, provide for periodic reviews of terms with the investor. A robust fiscal regime that produces a reasonable sharing of risks and economic rents and adjusts automatically to changed circumstances will increase the probability of fiscal stability, with or without an actual stabilization provision, and reduce the pressure to renegotiate agreements. The ROR approach to rent capture discussed in the section of this chapter on fiscal instruments is a good example of such a regime.

Recent dramatic cycles in the petroleum industry have increased the focus on stability clauses. Emerging good practice makes a number of recommendations for situations where stability provisions should be adopted. Assurances of stability should be time limited. They should also be limited in terms of coverage: for example, they should cover only such items as capital recovery rules, income and withholding tax rates, royalty rates, and a maximum rate on import duties. They should not include changes in tax law that affect businesses generally, that is, that do not discriminate against petroleum. Changes in environmental or health and safety regulations are examples.

Summary and Conclusions

Fiscal regimes are of central concern to host governments and investors alike in both prospective and active petroleum-producing countries. The petroleum industry has a number of special features that need to be considered when putting in place a fiscal regime. These features include the considerable investments required to enter the industry, the typically long payback periods, and significant political risks.

The initial design of a fiscal regime or any major revisions to it should be conducted using an agreed-upon list of objectives for the regime. From the host country's perspective, important objectives include the promotion of efficient production and of broadly scaled sector development, substantial and progressive capture of petroleum rents for the state, incentives for cost containment, early and dependable revenue, reasonable management of risks, international competitiveness, and ease of administration. Government and investor objectives are not always aligned, but a well-designed regime can go a long way toward balancing their interests.

Multiple fiscal objectives require multiple instruments. Profits-based instruments are effective in promoting efficiency and broad-based development, but they have perceived drawbacks in the timing of revenues and their ease of administration. Royalties provide early revenue and are perceived as easy to administer (although this perception is subject to challenge). However, they are inefficient, and their impact is regressive rather than progressive. Flexible rent-capture mechanisms are now widely found, but they vary greatly in effectiveness. Regimes that link the government take to an investor's actual ROR are being adopted more and more often and look the most promising. State participation in petroleum operations is common. In most cases, this participation has fiscal connotations that need to be recognized.

No country relies exclusively on one fiscal instrument; fiscal packages are the norm. The two most popular packages are the tax-royalty and production-sharing regimes. Either of these regimes may include some form of state participation. It is

not the package label that counts, however: tax-royalty and production sharing can be designed to produce equivalent fiscal results. It is the detailed content of the package and the particular parameter values chosen that will determine whether or not the package performs well against fiscal objectives.

Prospective and active petroleum-producing countries require the institutional capacity to evaluate fiscal regimes. This capacity will prove valuable in a number of areas: initial fiscal regime design, license rounds and negotiations, audit cross-checks, and sector and macroeconomic planning. Such capacity may be acquired through technical assistance and consultancies or developed internally. In all cases, interagency cooperation and timely access to credible data are essential to success.

In practice, the business of designing and maintaining a fiscal regime for petroleum is complex. This chapter gives a broad-brush idea of what is involved. The immediately preceding sections give a highly selective taste of the complexities arising at a more detailed level of examination: fiscal price determination, cost-recovery issues (transfer pricing, ring-fencing, treatment of abandonment costs), withholding taxes and double taxation treaties, taxes on transfers of interests, and fiscal stabilization.

Notes

1. Baunsgaard (2001), Johnston (1994), and Tordo (2007) provide excellent overviews of the various fiscal instruments applied to petroleum operations. See also Nakhle (2010).
2. See chapter 5 for a discussion of these concerns.
3. This subsection derives from the work of Land (2010), McPherson and Palmer (1984), and others.
4. This subsection derives from the work of McPherson (2003, 2010).
5. This section draws heavily on Daniel and others (2010). See also Luca and Mesa Puyo (2015).
6. See Calder (2017).
7. See Mullins (2010) for further discussion.
8. See Burns, LeLeuch, and Sunley (2017).
9. A farmout is the transfer or assignment of part of a petroleum license interest to a third party (“farmer”) in exchange for spending on behalf of the assignor, or “farmor.”
10. This section is based on Daniel and Sunley (2010).

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CHAPTER 5

Petroleum Fiscal Administration in Developing Countries

Charles P. McPherson

Introduction

For the purposes of this chapter, “petroleum fiscal administration” refers to the oversight and collection of all forms of government levies on petroleum operations, whether derived from legislation or from contractual terms. This function is surely one of the most important of a government’s management of petroleum wealth. Until recently, however, this administrative function attracted surprisingly little attention, especially relative to the attention paid to fiscal regime design.

This chapter will underscore the critical role of fiscal administration and indicate key challenges to performance. It will then review a spectrum of routine administrative functions that ought to be straightforward but have in practice proven difficult, suggest possible remedies, and then look at a range of more demanding administrative functions. The chapter will continue by setting out minimum information required by both authorities and operators, since credible and timely information is essential to successful completion of both routine and nonroutine functions. It will then address the tension that often arises between the design of fiscal regimes and the practicalities of their administration. The chapter will conclude by looking at institutional issues and ways to enhance institutional capacity, and by emphasizing a fundamental dimension of good governance, namely, transparency of fiscal administration.¹

Relevance and Challenges

Oil and gas revenues are of central importance to a large and growing number of developing countries, as suggested in figure 5.1. The International Monetary Fund (IMF) has estimated that extractive industry revenues (primarily petroleum revenues) are macrocritical to one-third of its member countries.

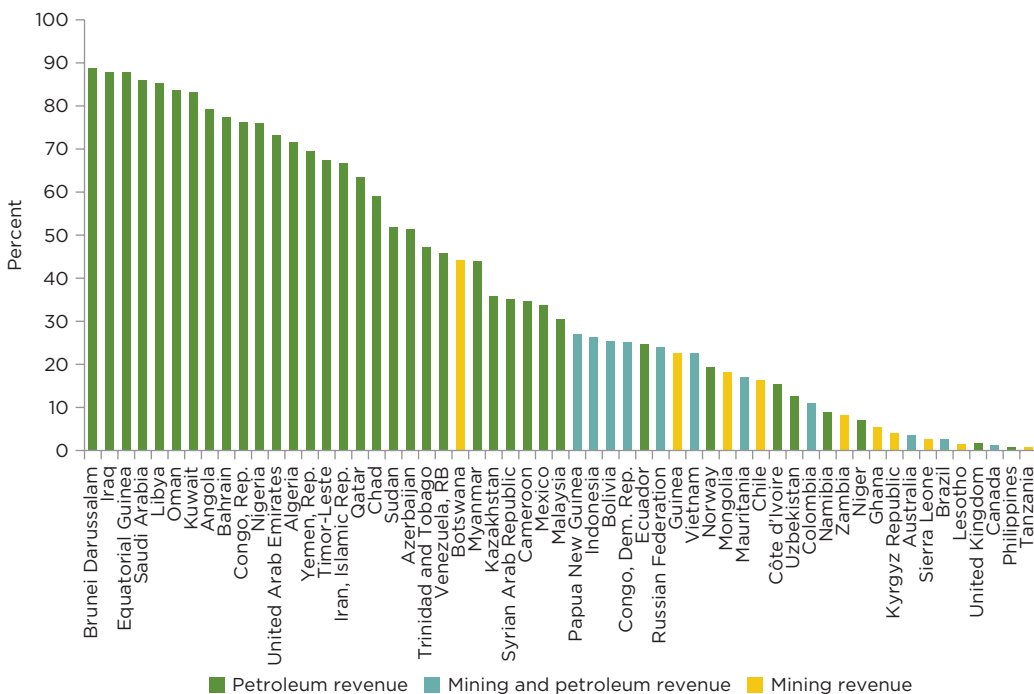
Revenues on this scale clearly have the potential to foster economic and social development. Before the revenues are put to use, however, they must be collected—and collection depends critically on the strength of a country’s fiscal administration. Unfortunately, fiscal administration is too often the weak link in the chain of converting oil wealth into national wealth.

Why should this be the case? One part of the answer lies in the special characteristics of the petroleum sector and the resulting complexity of fiscal regimes governing it, which can be challenging to administer under any circumstances. And the other part relates, importantly, to weaknesses in institutional capacity that are endemic in many developing countries.

Fiscal Regime Complexity

Chapter 4 of this book reviews petroleum sector attributes, fiscal objectives and their implications for fiscal regime design, and a selection of fiscal instruments.² Even the best-designed petroleum fiscal regimes involve a degree of complexity

FIGURE 5.1 Extractives Revenues as a Percentage of Total Government Revenues, Selected Countries, 2000–11



Source: Daniel and others 2017.

that can be avoided in other sectors. The multiple fiscal objectives associated with petroleum operations call for multiple instruments: royalties, profit taxes, rent taxes,³ and cost-recovery provisions tailored to the needs of the sector. State participation, as typically structured, has fiscal features requiring administrative oversight (McPherson 2010).

These core features of a petroleum fiscal regime are difficult enough to administer, but they are rarely the end of the story. Additional special fiscal features address, among other things, the ring-fencing of petroleum operations for tax purposes, the treatment of environmental costs incurred upon the abandonment of operations, protection against the abuse of transfer pricing, and the tax treatment of gains on the transfer of license interests. Many of these features are not unique to petroleum, but the challenges they represent are often more severe where petroleum operations are involved.

Finally, petroleum fiscal regimes are seldom stable over time or across contracts. Their structures or parameters⁴ may change, adding to administrative complexity.

Institutional Capacity

A second contributing factor to underperformance in fiscal administration is weak institutional capacity. This weakness may relate to institutional design or to individual skills. There is a well-established positive correlation between income levels and institutional capacity. Developing countries with oil prospects thus have a strike against them from the beginning. This handicap may be compounded by a lack of interest from leaders in building the requisite capacity when oil revenues start to flow and can be tapped with little effort. Losses due to lack of attention to the collection function, large as they might be, may appear inconsequential when compared with total revenue flows. Or national elites may have no interest in creating fiscal administration structures that could undermine their own personal or political agendas for the management of oil revenues.

These themes—fiscal complexity and institutional capacity—will be returned to in the sections that follow.

Routine Functions

Challenges to Routine Administration

Some generic functions of fiscal administration ought to be fairly straightforward, such as registering taxpayers, processing returns, assessing taxes or payments due, collecting taxes, applying accounting standards (International Accounting Standards [IAS] or generally accepted accounting principles [GAAP]), and establishing the currency of account. Several of these functions should be relatively easy to perform in the petroleum sector, where the number of major taxpayers is often smaller than in other sectors. In practice, however, performance of routine fiscal functions has proven difficult in the petroleum sector.

One reason for this difficulty has already been alluded to—the complexity of the sector’s fiscal regimes. This inherent complexity is often compounded by a multiplicity of unnecessary taxes or levies—unnecessary in the sense that the same level of government revenues could be achieved with fewer taxes by adjusting rates.

If the number of applicable taxes tends to multiply over time, so does the number of agencies involved. Coordination among agencies then represents an additional challenge. A classic illustration of this phenomenon can be found in the oil sector, in which the revenue authority in the ministry of finance is made responsible for corporate profit taxes; the sector regulatory agency for royalties, fees, and fines; and the national oil company (NOC) for payments required by contractual provisions such as production shares.

Capacity weaknesses of administrators account for much of their underperformance at routine functions. Procedures for filing and payment may lack clarity and result in inconsistent application. Accounting systems are often weak, and administrators may lack requisite training or experience. Information technology (IT) systems may be weak or absent altogether.

Where multiple payments and multiple agencies are involved, desirable reconciliation of payment flows is complicated. Issues that must be reconciled include direct payments to subnational governments, U.S.-dollar versus local-currency accounting, the timing of payments in the context of currency depreciation and inflation, the choice of accounting method (cash versus accrual), and the tax-accounting treatment of quasi-fiscal activities (whether they are allowed to offset tax liabilities).

Lapses in routine petroleum fiscal administration matter on a number of levels. The first, of course, is their potential to cause serious revenue loss by creating opportunities for internal corruption or for tax management or evasion by oil companies. More generally, weak routine administration is bad for governance and undermines both the effectiveness of sector economic management and the government's reputation.

Improving Routine Administration

The difficulties identified in the previous section suggest the steps that can be taken to improve routine administration. Introducing self-assessment would relieve the burden on administration. Minimizing the number of taxes and agencies would simplify administration. Using established industry concepts and accounting standards would reduce confusion and room for error. Finally, harmonizing rules for assessment and payment of various taxes through introduction of consolidated returns, common accounting periods, and payment procedures would help to streamline administration.

Nonroutine Functions

A number of other administrative functions—nonroutine functions—are by their nature more demanding. Large amounts of money are at stake in their performance.

Specifically, volume, price, and cost determination—the three variables involved in the calculation of pretax gross and net revenues—are critical to arriving at most payments due to government.

Volume Determination

Determining the volume of oil involves careful measurement at several points using expensive and sophisticated metering equipment. Measurement usually occurs at the wellhead, the field gathering point, the separation plant

(which removes water and sand from the oil), and the point of export. It includes quality analysis to establish characteristics of the oil such as sulfur and wax content and specific gravity, which are key determinants of the oil's value. Given the sums of money at stake, appropriate monitoring at each measurement point is standard, to guard against theft or misrepresentation.

Volume determination for natural gas is similarly rigorous. Measurement at the processing plant where valuable liquids are stripped from the gas is particularly important.

Price Determination

The objective in determining a fiscal price for oil or gas is to come as close as possible to a market price. When sales are made at arm's length—that is, between unaffiliated parties—the prices recorded may be accepted as market prices for fiscal purposes. Alternatively, and in the case of sales between affiliated parties, reference may be made to a regional benchmark price.⁵ Regional benchmarks, which are based on collections of prices that are determined in international markets, are widely accepted as the best approximations of a market price. Several benchmark prices, for various regions and various qualities of crude oil, are continuously published.⁶ Once a benchmark price for crude oil has been selected, it is then adjusted for quality differentials and the distance to market of the crude oil in question. Quality premiums and transportation tariffs, like benchmark prices, are regularly published and available for use in these calculations. The resulting price is the one used for fiscal calculations.

Approximating a market price for natural gas is more difficult. The United States and Europe are the only markets in which gas is actively and continuously traded. In other markets, approaches include pricing gas (i) at the level required to recover costs and a reasonable return; (ii) at a level competitive with alternative fuels, such as heating oil; or (iii) on a net-back basis. Pricing on a net-back basis involves looking at gas prices at the point of ultimate consumption and then deducting or “netting out” all the intermediate costs incurred to get the gas to that point. This process results in a wellhead or point-of-origin price.⁷ Where operations are fully integrated all the way from the point of production to the point of final sale, intermediate costs may have to be inferred.⁸

Fiscal regimes at times envisage selected payments in kind, in which case the fiscal administration must establish a price using one of the approaches described above.

Cost Determination

Prices and volumes provide gross revenue figures. Deducting costs provides net revenue, the starting point for all profit-based fiscal levies.² The cost-accounting procedures applicable to the production of oil and gas are often quite complex, and fiscal administrations have not given them the attention they deserve. This is a mistake. The determination of costs is as important as the determination of gross revenue and the selection of tax rates in its impact on government net revenues.

From a fiscal administration viewpoint, cost determination involves two questions: (i) whether the costs declared for deduction were actually incurred and (ii) whether they were allowable costs. The answer to the first question depends on audits, and to the second, on interpretation of the applicable tax law

or contract. Again, both tax complexity and administrative capacity come into play. The interpretation of ring-fencing and abandonment cost rules and the flagging of abuse in the transfer pricing of interest and service costs can prove complex, which places sophisticated demands on administrative capacity.

Two additional administrative functions fall under the heading of “nonroutine”: audits and appeals.

Audits

The right to audit and the implementation of effective audits are critical to fiscal administration. The most important audits are physical audits (of production or volume), cost audits, and fiscal or tax audits. These audits should be conducted regularly. They may be comprehensive (covering all operations) or selective (more appropriate, given the demands that audits place on administrative capacity).

Ideally, audits should be conducted in-house—that is, by the authorities named in legislation as responsible for particular fiscal levies. These authorities may include the ministry of finance or revenue authority (for profit taxes), the regulatory agency (for royalties), or the NOC (for production sharing). Consolidation of the audit functions under one or a very small number of agencies is desirable but often difficult amid interagency rivalries. Where capacity is a major issue, outsourcing the audit function to experienced international firms might be considered.

The NOC should always be subject to the same stringent audits as may apply to international oil company investors. Weak governance at many NOCs has been a major source of revenue leakage.

In awarding licenses, the government should consider the benefits of partner audits under industry joint venture agreements. Where licenses are awarded to two or more licensees, partners of the license operator typically conduct their own audits of operations. These audits provide an additional check on performance and should be made available to government authorities.

Appeals

Disputes over fiscal assessments are inevitable, and fiscal administrations should be prepared to deal with them. Training staff in the interpretation of the relevant laws and contracts and preparing and using explanatory tax manuals can eliminate or reduce the incidence of disputes. When disputes do occur, there must be clear procedures for handling them. The preferred and least costly approach to settling disputes is informal settlement between the disputing parties. If recourse is taken to more formal channels, IOCs in developing countries often prefer tax tribunals to tax courts, in large part because of concerns regarding the courts’ impartiality. If in-house legal expertise is not available to the fiscal administrators, they can engage international legal expertise on a retainer basis.

Informational Requirements

Access to relevant information is at the heart of fiscal administration. It is essential to administrators, but it is equally important to the investor/taxpayer.

Investors value clear, accessible fiscal legislation and regulations. Transparent and predictable administrative procedures are similarly appreciated, as are any explanatory or advisory materials published by the authorities.

Information provided to administrators should be credible, comprehensive, and submitted on a timely basis, with penalties for late submission. Beyond the volume, price, and cost information needed to assess payment liability, administrators should have access to all contractual agreements, partner joint operating agreements, and operator and partner audits. Information should be submitted in a standard format and, where IT systems for data management have been set up, electronically.

Fiscal Regime Design and Administration

Objectives in designing a fiscal regime include the promotion of efficient operations and investment decisions and the capture for the state of a substantial amount of economic rents—at a rate that increases alongside the underlying profitability of a project.¹⁰ Acting in response to perceived weaknesses in administrative capacity, administrators may put a premium on simplicity, as exemplified by simple procedures and those involving a minimal number of variables or parameters. They may also seek to link assessment to easily monitored and verifiable indicators. Those favoring efficiency may promote the so-called “R-factor” or “rate-of-return” (ROR) approach to fiscal design; those opting for simplicity are likely to favor royalties. The challenge is to find a workable balance between the two. This balance might involve, rather than accepting a weak and oversimplified design, addressing the capacity issue directly, through capacity-building programs, while preserving an emphasis on efficiency.

Institutional Issues

Fragmentation versus Centralization

Fragmented fiscal administration is common but brings with it a number of disadvantages. It results in duplication of work and increases the burden on taxpayers. It leads to a lack of clarity regarding responsibilities and a consequent lack of accountability. It is also likely to result in poor coordination of management, systems procedures, and compliance strategies. Finally, and importantly, fragmented administration dissipates efforts to build capacity and good governance. A common example of fragmentation occurs when the revenue authority takes responsibility for income taxation, a regulatory agency is put in charge of royalties, and the NOC oversees the fiscal dimensions, such as assessment and compliance, of production sharing (calculating of cost oil and profit oil).

For the aforementioned reasons, centralization is preferable, but it is not always possible. One objection to centralization that carries some weight is that different fiscal agencies, with different training and experience, may be more effective at regulating various types of taxes. In the example just given, a regulatory agency may be better placed to administer royalties than an agency under the ministry of finance, given the regulatory agency’s closeness to production operations. By the same token, an NOC might argue on the grounds of proximity

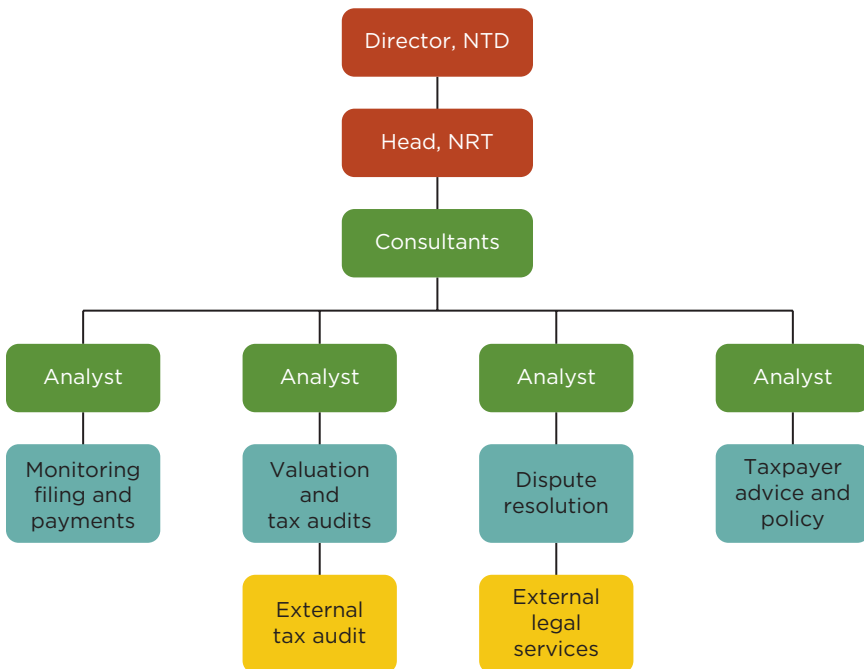
that it has a comparative advantage in administering the fiscal provisions of the production-sharing agreement under which it operates. If, for whatever reason, centralization proves difficult to achieve, it is important to have maximum clarity on roles and responsibilities and maximum emphasis on coordination. The latter is likely to be a serious challenge in instances where fragmentation is a result of agency rivalries (“turf wars”).

Internal Organization

The internal organization of a fiscal administration agency may be broken down by administrative function, by taxpayer, or by major industry group(s). In countries where oil taxes are the dominant or even a major revenue contributor, it probably merits separation into its own division. Figure 5.2 is a schematic illustration of what a natural resource tax division (or an oil tax division) might look like.

Reporting to the overall director of taxation, the head of the natural resource tax (NRT) division has four units under his or her direction. The monitoring, filing, and payments unit deals primarily with processes and filing. The valuation and tax audits unit addresses fiscal prices and the conduct of audits, including the possible outsourcing of the audit function to external experts under its supervision. A third unit handles dispute resolution and relationships with external legal services. A fourth unit is responsible for tax policy and instruction to taxpayers. This function is too often overlooked. Given its front-line

FIGURE 5.2 Possible Institutional Structure



Sources: Calder 2010a, 2010b.

Note: NRT = natural resource tax; NTD = Natural Resource Tax Division.

relationship with taxpayers, fiscal administration is well placed to offer comments and advice on tax policy and tax design issues. That same “hands-on” experience suggests that close cooperation between the fiscal administration and the parts of government responsible for tax modeling and revenue forecasting would be beneficial.

Building Capacity

Weak capacity, as emphasized earlier, is one of the key factors that limit the effectiveness of petroleum fiscal administration. Building the requisite capacity in this area should be a prioritized concern in any oil-revenue-dependent state. As demonstrated by international experience, an effective capacity-building program will have several components, as follows:¹¹

Staffing/Skills Mix

Staffing should seek out personnel with experience in accounting, auditing, petroleum operations, and economics. Appointments should be merit based.

Training

Training should upgrade the acquired skills of staff and fill any gaps. It should include the legal, contractual, and fiscal arrangements specific to the industry. Staff should be made familiar with industry activities and processes, accounting practices, and vocabulary. The development and use of tax manuals can provide valuable training.

Funding for training is available from development institutions and is also a standard provision under petroleum exploration and production (E&P) contracts. Although such funding is typically focused on technical training, its use for fiscal and financial training should be considered as well.

Compensation

Given competition from the private sector, compensation can be a major issue in attracting and retaining competent staff. Special salary structures outside regular civil service scales should be considered, justified by the importance of the sector and the revenue it generates to the overall economy.

Resources

Adequate offices and IT facilities and support are critical to performance.

Consultancies

A retainer with a small industry consultancy able to provide advice as required on a wide range of fiscally relevant topics can prove very beneficial. Where a decision is made to outsource audits, consultancy contracts should ideally include twinning arrangements that provide on-the-job training for inside employees in auditing techniques.

Funding

Secure budget support for the administrative function is essential to the function's effectiveness and sustainability.

Clarity

Capacity building will be more effective when it takes place in the context of clear laws, organization, institutional arrangements, and procedures.

Transparency

Transparency should pervade all aspects of petroleum fiscal administration. Adherence to transparent practices will significantly increase public confidence in the resource revenue collection process. Critical dimensions of transparency comprise all applicable laws, regulations, and contracts; administrative procedures; taxpayer manuals; regular public reporting on administrative revenues and costs; publication of a code of ethics; and adherence to international transparency initiatives such as the Extractive Industries Transparency Initiative (EITI)¹² and the IMF's fiscal transparency pillar for extractive industries.¹³

Summary and Conclusions

Fiscal administration is a critical component of the overall management of petroleum revenues. In practice, however, it is often the weak link in the conversion of oil wealth to national wealth. The complexity of fiscal regimes surrounding oil products and, especially, the institutional capacity weaknesses encountered in developing countries are the principal obstacles to an effective administrative function.

Routine administrative functions are often obstructed by a proliferation of agencies and nonessential levies. Poor performance of routine functions jeopardizes a country's revenue collection, governance, and reputation. Reducing the number of agencies and taxes and harmonizing assessment and payment procedures can improve performance.

Nonroutine functions, such as price, volume, and cost determination; audits; and the handling of appeals, are more demanding and require special skills. Capacity building, through training and technical assistance, deserves priority attention. The outsourcing of selected functions (for example, audits) also merits attention.

Where possible, a centralized administration is preferable to a fragmented one. Centralization avoids duplication, confusion, and the risk of diluting capacity building and good governance initiatives.

Transparency in all aspects of administration is strongly recommended, as it enhances performance and promotes public trust in the administration of revenue.

Notes

1. This chapter draws heavily on Jack Calder's (2010a, 2010b) "Resource Tax Administration: The Implications of Alternative Policy Choices" and "Resource Tax Administration: Functions, Procedures and Institutions."
2. See Charles McPherson, "Petroleum Fiscal Regimes in Developing Countries," chapter 4 of this volume.
3. Levies designed to capture excess profits may take the form of escalating royalties, additional profit taxes, or sliding-scale production sharing.

4. Such parameters include royalty rates, tax rates, production-sharing splits, or cost-recovery limits.
5. At issue here is the avoidance of possible transfer-pricing abuse, which would occur when sales are made to an affiliated party at below-market prices to transfer taxable profits from the country of origin (typically the higher-tax environment) to the country of destination (typically a lower-tax environment).
6. Examples include Brent in the North Sea area and Europe, Bonny in West Africa, West Texas Intermediate in the Gulf region, and Minas in Southeast Asia.
7. Intermediate costs would include pipeline tariffs or, in the case of liquid natural gas (LNG), all gasification and regasification costs.
8. This integration is most likely to occur where large-scale LNG plants are involved.
9. These levies would include corporate income taxes, petroleum profit taxes, and, in the context of production sharing, profit oil.
10. See chapter 4 for further discussion of fiscal regime design and administration and for a discussion of fiscal design options and the trade-offs identified here.
11. These components are of general relevance and are not uniquely relevant to capacity building in petroleum fiscal administration.
12. For more information on EITI, see their website: <http://www.eiti.org>.
13. For more information on this pillar, see “IMF Fiscal Transparency Code: Resource Revenue Management Pillar” at www.imf.org/external/np/fad/trans.

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Key Aspects of Fiscal Management in Resource-Rich Countries

Rolando Ossowski and Håvard Halland

Introduction

Countries with large nonrenewable resources can reap substantial benefits from them, and many countries have done so. Reliance on resource revenue, however, poses challenges to policy makers, and governments have an important role to play in how resource revenues are used.

This chapter focuses on fiscal management in resource-rich countries (RRCs). It sets out general principles of good fiscal management and suggests paths forward for RRCs in need of improving their fiscal management and sound fiscal principles for new resource producers.

This chapter is structured as follows. The next section will briefly review why resource revenue can complicate fiscal management. The third through sixth sections, “Fiscal Policy and Short-Run Stabilization,” “Managing Fiscal Risks and Vulnerabilities,” “Promoting Sustainability,” and “Public Financial Management, Public Investment Management, and Fiscal Transparency,” will discuss ways in which fiscal policy can address the challenges posed by resource revenue and can foster sustainable growth. The seventh through ninth sections will examine special mechanisms and fiscal institutions that some RRCs have established as part of their fiscal frameworks to help with fiscal management, namely medium-term expenditure frameworks, fiscal rules, and resource funds. The final section will provide a summary and conclude.

In this chapter, readers are advised to bear in mind the diversity of RRCs. Many topics discussed in this chapter will be more relevant to some countries than to others. Among the country-specific factors that vary widely are (i) the type of nonrenewable resources exploited, (ii) the extent of fiscal dependence on resource revenue, (iii) the magnitude of reserves in the ground, (iv) the level of development, (v) the degree of capital scarcity, (vi) fiscal and financial positions, (vii) institutional capacity, (viii) the strength of public financial management (PFM) systems, (ix) intergovernment relations, and (x) fiscal transparency, governance, and accountability. Fiscal frameworks should be adapted to the circumstances of each country.

Complications of Fiscal Management in Resource-Rich Countries

Resource revenue poses challenges to the formulation and implementation of fiscal policies and public financial management in RRCs. What are the main challenges?

Resource revenue is volatile and uncertain. Resource prices are volatile (figure 6.1) and highly unpredictable, as shown by the prevalence of large ex post projection errors (figure 6.2). Other sources of uncertainty include the magnitude of resource reserves, future production volumes and costs, possible changes in fiscal regimes, and the volatility of the real exchange rate. The uncertainty of resource revenue leads to uncertainty about government cash flow and government net worth. Such uncertainties complicate budget planning, fiscal management, and the efficient use of public resources, particularly when resource revenue makes up a large share of government revenue.

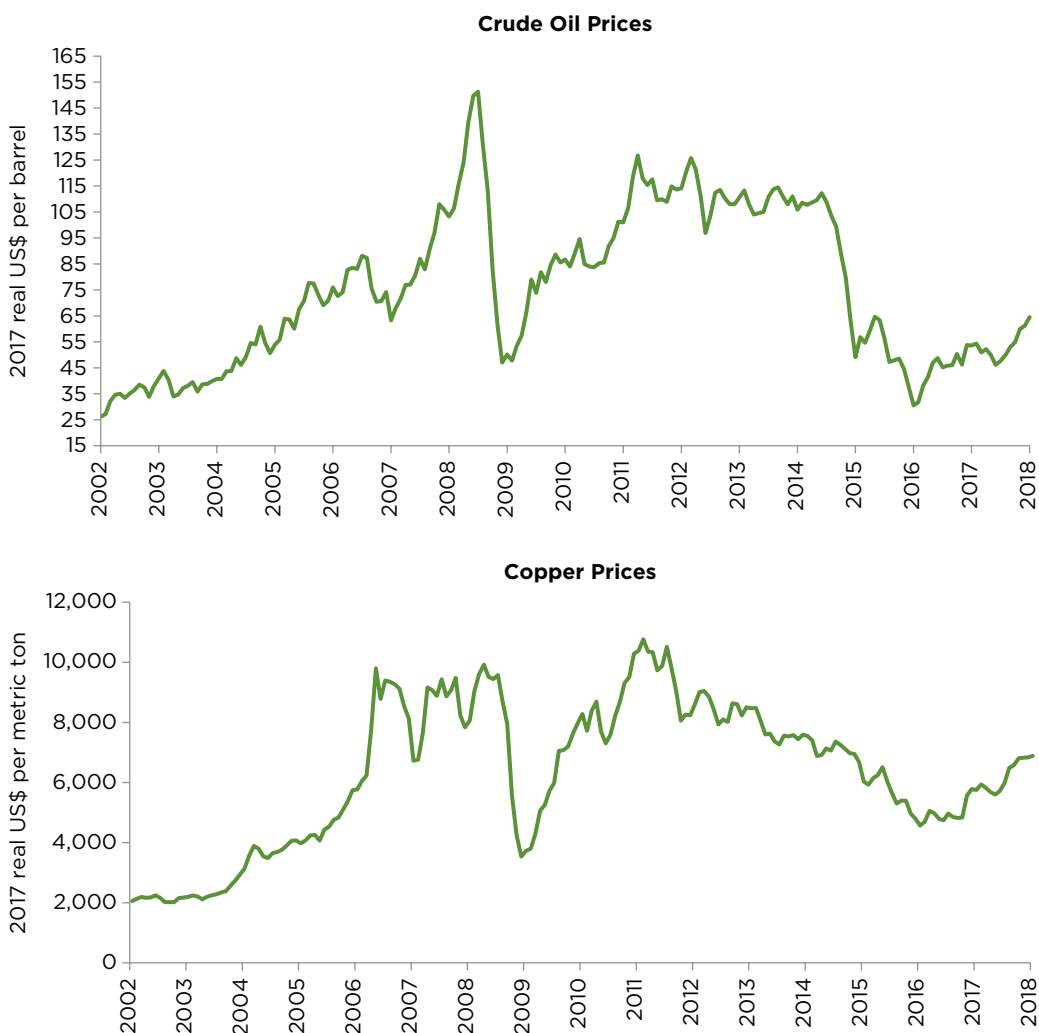
As an example, during the global financial crisis, fiscal oil revenue in the Republic of Congo fell by over half in real terms between 2008 and 2009 as oil revenues declined from 40 percent of gross domestic product (GDP) to 21 percent.

Resource revenue largely originates from abroad. Hence, its fiscal use can have implications for the domestic economy, the country's competitiveness, and macroeconomic stabilization. For example, in resource-exporting countries, the effects of an external resource price boom are typically transmitted through fiscal policy. Spending the windfall domestically can add to the appreciation of the currency in real terms, thereby leading to reduced nonresource exports and lower profits in the nonresource tradable sector.

Resource revenue arises from the exploitation of resources that are exhaustible and that risk technological obsolescence. These characteristics raise complex questions regarding intergenerational equity, long-term fiscal sustainability, and asset allocation. For example, a number of oil producers heavily dependent on oil revenues have estimated proven oil reserves equivalent to only 10–20 years of production at current output levels, including countries such as Angola, Republic of Congo, Equatorial Guinea, Mexico, Oman, and Trinidad and Tobago.

The exploitation of nonrenewable resources can give rise to large rents, with associated political economy complications. In many countries, resource revenue has been associated with rent seeking and poor-quality spending, with low indexes of government effectiveness and poor public investment efficiency indicators.

FIGURE 6.1 Developments in Global Oil and Copper Prices, 2002–18



Source: IMF (World Economic Outlook Database).

Fiscal Policy and Short-Run Stabilization

Fiscal policy in RRCs has the same broad objectives as fiscal policy in other countries. It should contribute to the achievement of macroeconomic stability, sustainable and inclusive growth, and poverty reduction within a framework of fiscal sustainability.

Cyclicality of Fiscal Policy and Macroeconomic Stability

A recurrent challenge for RRCs is managing the effect of volatile and uncertain resource revenues on macroeconomic and financial stability. This issue is key to development, because macroeconomic stability helps countries to achieve high

FIGURE 6.2 Oil Price Forecasts and Actual Prices, 2002–23



Source: IMF (World Economic Outlook Database).

and sustainable rates of economic growth. Macroeconomic volatility and uncertainty have adverse effects on long-term growth, poverty reduction, and income distribution (Aghion and Banerjee 2005; Auty 2001; Auty and Mikesell 1998; Devlin and Lewin 2005; Gelb 2002; Hnatkowska and Loayza 2005; Loayza and others 2007; Pinto 1987; Ramey and Ramey 1995).

Macroeconomic volatility in RRCs often—although not exclusively—reflects resource revenue volatility and a high frequency of resource price shocks in a context of significant export concentration. In RRCs, volatility is one of the main ways in which negative economic effects from the exploitation of natural resources spread. According to van der Ploeg (2011), volatility may be the main determinant of the resource curse.

Private investment is a key channel for the negative effect of volatility on growth. Volatility and uncertainty have adverse effects on private investment. As they increase, so do the risks faced by investors, who may have to reallocate resources to accommodate sudden, large changes in demand and relative prices and cope with a volatile real exchange rate (including episodes of Dutch disease during booms).¹

Volatility can increase income inequality, and high income inequality is detrimental to long-term growth. Channels through which macroeconomic volatility affects income inequality include inflation (a regressive tax that hurts the poor in particular), fluctuations in public social spending, and increased vulnerability of households with limited or no access to credit.

Persistent instability often acts as a barrier to the diversification and deepening of financial systems. Macroeconomic stability is important for financial sector development.

Exogenous shocks are only part of the story—fiscal policy can magnify the impact of these shocks, and it often does. Fiscal policy injects part of the revenue from resources into the domestic economy. It is therefore a particularly important tool for short-term macroeconomic management. Fiscal volatility, sudden changes in public spending and the nonresource balance (NRB),² and procyclicality in fiscal policy contribute to macroeconomic volatility and uncertainty. Fiscal policy is procyclical when it is expansionary (through expenditure increases or tax reductions) in booms (good times) and contractionary (through expenditure cuts or tax increases) in recessions (bad times).

In RRCs, private sector demand is often correlated with resource prices. When prices are elevated, the private sector is confident and increases its spending. Credit can also become abundant. But domestic supply constraints—for example, in the construction sector—in a context of domestic demand pressures may cause the economy to overheat. Such overheating can contribute to inflating asset bubbles, and upward pressures on the exchange rate. If the government raises public spending at the same time, which may be tempting when resource prices are high, its actions will then contribute to the overheating.

In developing countries, fiscal policy has generally been procyclical. Policy procyclicality has been particularly prevalent in RRCs, with implications for volatility and uncertainty (Frankel 2011; Kraay and Servén 2013; Talvi and Végh 2005).³ During recent oil price cycles, government expenditures in many oil-exporting emerging markets and developing economies followed oil prices closely (figure 6.3).

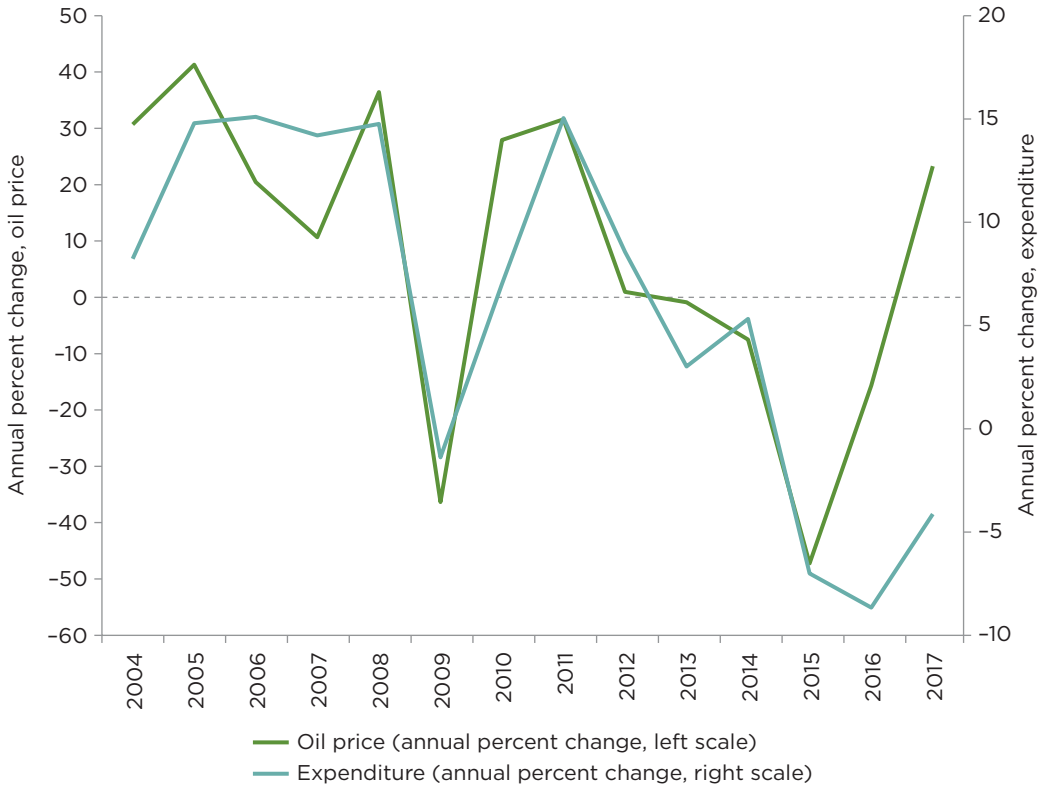
Evidence from Latin America, for example, suggests that the RRCs that had the most procyclical fiscal responses during the resource price boom of 2003–08 were, by the time of the 2009–10 slump, the most vulnerable to resource shocks. Conversely, the countries with the most prudent fiscal policies during the boom could implement more expansionary (countercyclical) policies during the 2009–10 crisis, thereby supporting output and employment (Villafuerte, López-Murphy, and Ossowski 2010).⁴

The procyclicality of credit markets can exacerbate fiscal procyclicality. Easy credit conditions during upswings may provide incentives for procyclical external borrowing. During downturns, credit availability is often reduced—when external financing may be most urgently needed.

There are several reasons why fiscal policy is frequently procyclical in RRCs. A frequent temptation among these countries is to view positive resource shocks, such as oil price increases, as permanent. Political pressures to spend resource revenue windfalls often prove irresistible. Budget planning horizons have often been short term, and looming fiscal risks are rarely fully understood. Then, when resource prices fall, governments are often unable to sustain the ensuing fiscal deficits.

Procyclical responses have exacerbated the effect of resource price volatility on the economy and may have hampered long-term growth. Where fiscal policies have been procyclical, they have contributed to macroeconomic instability, volatility, and damaging boom–bust episodes.⁵ They have also put pressure on

FIGURE 6.3 Emerging Market and Developing Economy Oil Exporters: Oil Prices and Median Annual Change of General Government Expenditure in Real Terms, 2004-17



Source: Calculations based on data from the IMF’s World Economic Outlook Database as of April 2018.
 Note: Government expenditure is deflated by the consumer price index (CPI). Oil-exporting countries included in the sample are Algeria, Angola, Azerbaijan, Bahrain, Bolivia, Brunei Darussalam, Cameroon, Chad, Colombia, the Republic of Congo, Ecuador, Equatorial Guinea, Gabon, the Islamic Republic of Iran, Kazakhstan, Kuwait, Libya, Nigeria, Oman, Qatar, the Russian Federation, Saudi Arabia, Timor-Leste, Trinidad and Tobago, Turkmenistan, the United Arab Emirates, República Bolivariana de Venezuela, and the Republic of Yemen.

PFM systems, reduced the quality of spending (including in the execution of public investment plans), and increased long-term uncertainties, as discussed below.

Consequently, a strong macroeconomic case exists for smoothing public expenditures and the NRB and avoiding procyclical responses in the face of resource revenue fluctuations. Reducing policy-induced volatility lessens macroeconomic volatility and hence fosters growth and development.

For a countercyclical policy to be effective and credible, or even feasible during downturns, public net debt needs to be low. Countries with high debts are often unable to accommodate revenue downturns because of financing constraints arising from insufficient liquidity, fiscal sustainability, and other policy concerns—or because countercyclical policies would generate sovereign risk concerns.

These countries would do well to pursue fiscal strategies to set the conditions for breaking the procyclical response of spending to volatile resource prices. Strategies to moderate expansionary fiscal policy biases during resource booms,

and to reduce the nonresource deficit over time, would create fiscal room that might be needed when a transitory resource boom ends.

A strong fiscal position is also essential to allow for an orderly adjustment to catastrophic resource shocks that turn out to be long-lasting. Persistent declines in resource prices, such as the oil market collapses of 1986 and 2014–15, may prompt major reassessments of solvency and require adjustment to restore sustainability. Countries with a strong financial position can afford to adjust the nonresource deficit in a gradual, orderly fashion.

The political economy of government spending in some RRCs often conspires against making fiscal policy less procyclical. In countries with weak legal and political institutions, and multiple powerful groups that interact dynamically via the fiscal process, positive revenue shocks can generate large increases in government expenditures relative to the windfalls as the budget process succumbs to pressures (Tornell and Lane 1999).

Efforts to strengthen fiscal transparency and accountability can help mitigate the political economy problems often associated with managing resource rents. These efforts could include, as needed, (i) disclosing analyses of fiscal risk, (ii) setting up medium-term expenditure frameworks (MTEFs), (iii) building constituencies in favor of prudent fiscal policies (including through public information and education programs), (iv) extending the time horizon of public debates, and (v) strengthening institutions in general.

Stabilization of Expenditures and Public Financial Management

PFM arguments exist for stabilizing public expenditures. Large and sudden fluctuations in spending can be costly in terms of its quality and efficiency. The level of spending needs to be determined in light of its likely quality and the capacity of the government to execute it efficiently. The sudden creation or expansion of spending programs—including public investment—in a context of rising resource prices or volumes can overwhelm the public administration’s capacity to design, manage, and execute expenditures efficiently.

If the private sector is booming when resource prices are rising, the costs faced by the public sector may increase amid supply bottlenecks. In particular, large public investment programs can overwhelm capacity in the construction sector and put upward pressure on the prices of construction services as well as other services and nontradable goods.

Conversely, sudden fiscal adjustments, prompted by falls in resource prices and lack of access to financing, have often led to sudden and inefficient public spending cuts. Such abrupt reductions have frequently concentrated on investment, with damaging effects on long-term growth.⁶

Managing Fiscal Risks and Vulnerabilities

Risk refers to uncertainty about future events and outcomes. In a risk management context, when actions and future states of nature have more than one possible outcome, risk refers to the effect of uncertainty on objectives.

In public finance, *fiscal risk* has been defined as the possibility of short- to medium-term deviations in fiscal variables (such as revenues, expenditures, fiscal balances, assets and liabilities, and off-balance-sheet items such

as guarantees) from what was expected at the time of the budget or other forecast (Allen and Vani 2013; Cebotari and others 2009; Petrie 2013). Government and business plans often focus on a particular outcome (the plan, or central scenario), and other possible outcomes are “deviations” from that scenario.

General fiscal risks arise from the volatility of macroeconomic variables—such as the growth rate, inflation, the exchange rate, interest rates, and (notably in RRCs) resource revenues—and other large exogenous events. For example, the growth rate may affect revenues and expenditures; the public debt may be affected by the depreciation of the currency or by increases in interest rates.

Specific risks are narrower and bear on public finance through more specific channels. For example, debt guarantees may require the government to pay if specific events occur.

Resource Revenue Dependence and General Fiscal Risks

Fiscal policy in RRCs must consider the enormous volatility and uncertainty of resource revenue. These factors are a key fiscal risk affecting public finances in countries dependent on resource revenues. Yet in many countries, the short-term horizons of annual budgets do not give adequate weight to resource revenue risks in the medium term and sometimes even in the short term. This factor contributes to the procyclical expenditure patterns described in the previous section, which in turn exacerbate fiscal vulnerabilities to downturns, that is, to the risk of a fiscal crisis.

During booms, spending often adjusts to available current revenue without a full understanding of the risks generated. In particular, some expenditure programs, once created or increased, are difficult to reverse (hysteresis). These programs include entitlement programs, public sector wages and employment, and multiyear capital projects that give rise to future recurrent expenditures.

As spending grows, the probability of large and costly fiscal adjustments in the future increases. This is because the nonresource fiscal position becomes more exposed to shocks as a result of both the increase in spending *during the boom* and the *future* increases in spending needed to operate the new investments. Annual budgets that ignore risk and uncertainty—and that are not linked to medium- and long-term policies and plans—can create additional spending hysteresis and new multiyear spending commitments. These factors can entrench rigidities, exacerbate fiscal risks, and ultimately undermine fiscal discipline.

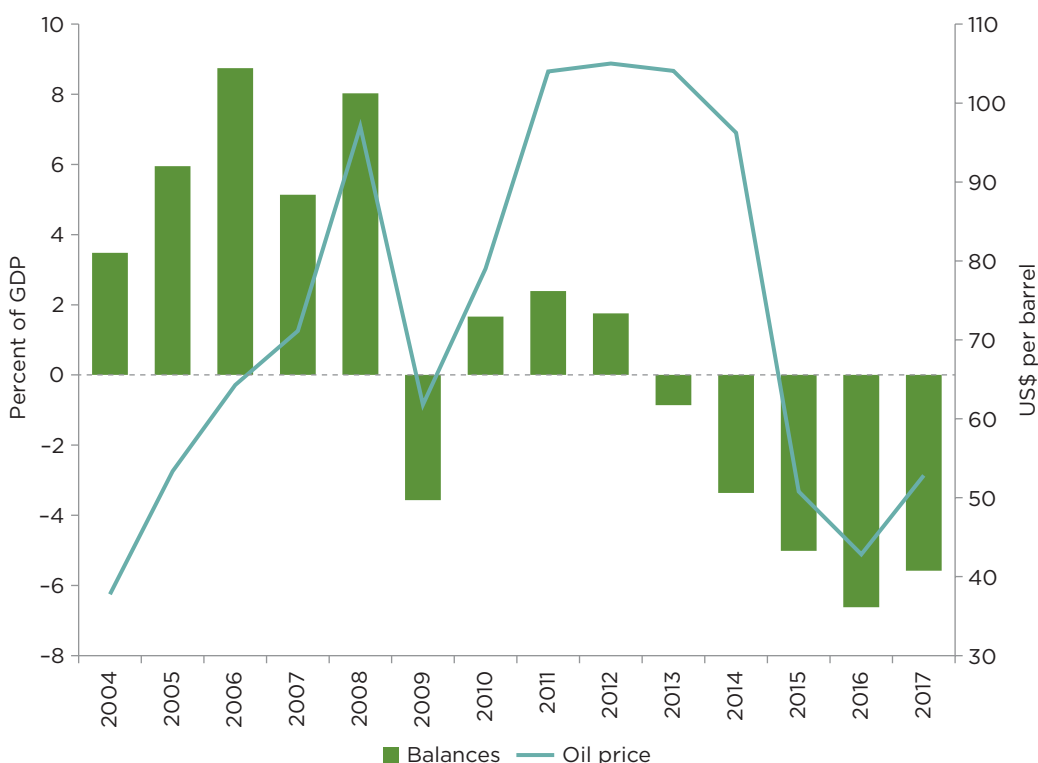
As a practical matter, fiscal vulnerability to resource shocks *increased* during the long resource price boom of 2004–14 in a number of RRCs, despite the surge in resource prices. This increase was mainly due to large expenditure increases. Additional factors that may have played a role, depending on the country, include the appreciation of the currency in real terms, which reduced the domestic purchasing power of resource revenue, and a low responsiveness of nonresource revenue to rising nonresource GDP, which would contribute to the deterioration of NRBS.

Between 2004 and 2014, the fiscal positions of many countries became more exposed to oil price downturns, and a number of countries were ill prepared to withstand the oil price shock of 2014–15. By 2014, many oil-exporting countries were running fiscal deficits despite elevated oil prices. Specifically, the median

general government fiscal balance of oil-exporting emerging markets and developing economies deteriorated by 7 percentage points of GDP in 2014 compared with 2004 (figure 6.4). That result happened in spite of a 155 percent nominal increase in oil prices over the same period. And although the average nominal oil price in 2015 was similar to the price 10 years earlier, the median fiscal deficit among these countries was worse by 11 percentage points of GDP, notwithstanding fiscal adjustment measures in a number of these countries.

Against this background, a sound assessment of the risks posed by resource revenues, and the establishment of risk management strategies, could help frame fiscal policies in a number of RRCs. To do so, it is necessary to use risk analysis to evaluate proposed spending paths in the medium term—how resilient are they to shocks? Scenario or stress tests examining the impact of potential negative resource and other shocks on the budget balance and on financing should be regularly conducted, particularly in light of asymmetric costs of adjustment.

FIGURE 6.4 Emerging Market and Developing Economy Oil Exporters: Median General Government Balances and Oil Prices, 2004-17



Source: Calculations based on data from the IMF’s World Economic Outlook Database as of April 2018.

Note: Median general government balances are shown as a percentage of GDP. Oil prices are the simple average of spot prices according to the Dated Brent, West Texas Intermediate, and Dubai Fateh benchmarks, as reported in the IMF’s *World Economic Outlook*. Oil-exporting countries included in the sample are Algeria, Angola, Azerbaijan, Bahrain, Bolivia, Brunei Darussalam, Cameroon, Chad, Colombia, the Republic of Congo, Ecuador, Equatorial Guinea, Gabon, the Islamic Republic of Iran, Kazakhstan, Kuwait, Libya, Nigeria, Oman, Qatar, the Russian Federation, Saudi Arabia, Timor-Leste, Trinidad and Tobago, Turkmenistan, the United Arab Emirates, República Bolivariana de Venezuela, and the Republic of Yemen. GDP = gross domestic product.

Liquidity buffers can protect spending in the event of adverse resource revenue shocks. Their optimal size will depend on the degree of resource dependence, policy objectives, and risk tolerance (box 6.1).

Exogenous general fiscal risks can sometimes be mitigated through the use of financial instruments. In the case of resource-exporting countries, resource price risks could be hedged by the government (to hedge resource-related budget revenue) or by the national resource companies (if relevant). Hedging transfers risk, at a cost, to financial markets that may be better able to bear it.

For example, the budget in Mexico is vulnerable to oil price uncertainty and volatility, as taxes and levies paid by PEMEX (the national oil company) have typically contributed over one-third of the federal revenue. The ministry of finance operates a hedging program on the basis of put options that set a minimum oil strike price to be received. This approach, underpinned by strong institutional arrangements, limits downward oil price risks. It has helped moderate the effects of oil price volatility on the federal budget.

The use of market instruments to reduce risk requires considerable technical capacity and strong governance; it is best not attempted if those elements are not in place. Risk management programs involving the use of derivatives

BOX 6.1

Fiscal Risk Analysis in Resource-Rich Countries

Probabilistic analyses—using historical parameters of the stochastic process driving resource prices—can be used to determine the optimal size of financial assets to stabilize spending in the face of shocks.

Value-at-risk (VaR) analysis is an example of this approach. It can be used by resource-rich countries to assess the optimal size of a liquidity pool, given the stochastic process driving resource revenue. The resulting buffer would be used to absorb resource revenue volatility. How much liquidity is needed to ensure, with a given degree of confidence, that the buffer is unlikely to be depleted over a specific time horizon, given a fiscal policy as embodied in the nonresource balance (NRB)? Fan charts that show a projected baseline for the liquidity buffer and ranges for possible deviations with their estimated probabilities can be used.

The VaR results would be used to help calibrate country-specific target levels for the NRB, contingency reserves, and liquidity cushions from a fiscal vulnerability perspective.

A simulation for Nigeria, for example, suggested that the country would need to have a precautionary buffer stock of about 60 percent of annual oil revenue in order to be reasonably confident that a smooth government spending path can be maintained over three years (Baunsgaard and others 2012; see also Bartsch 2006).

Simulations for Gabon made several years ago indicated that a minimum buffer equivalent to about 30 percent of annual oil revenue in 2012 would be needed to ensure, with a probability of 85 percent, that the buffer would not be fully depleted over a three-year period (IMF 2013).

Model-based approaches also seek to determine the likelihood that an NRB path can be maintained given resource revenue volatility. These approaches are more complex and require more information than VaR approaches because they link fiscal policy to the macroeconomy and take macroeconomic feedbacks into account. See IMF (2012c) for operational details regarding the practical implementation of the VaR and model-based approaches.

require a deep understanding of risk, volatility, and financial instruments; expertise; and a strong institutional framework to ensure internal risk control procedures, monitoring, reporting, and evaluation. These mechanisms are needed to limit the risk of strategic and execution errors and to forestall speculation.

Prudent Fiscal Policies as a Pro-Poor Strategy

A clarification of the trade-offs between spending and precautionary savings is in order. Many developing RRCs have widespread poverty and urgent developmental needs. This situation would naturally suggest that—consistent with macroeconomic stability, and if an appropriate capacity exists to implement productive spending programs, including investment—spending fiscal resources would be better than accumulating financial assets. It may be appropriate to increase public consumption, if this increase reduces poverty and inequality, or to boost investment to accelerate economic development. It may seem paradoxical for lower-income RRCs to finance richer countries by accumulating foreign assets.

What is perhaps less widely recognized is that, given that these countries' access to credit is often procyclical, having precautionary financial assets is also a strong pro-poor and developmental strategy. These assets facilitate counter-cyclical fiscal policy when such policy is needed. Reducing the volatility of household incomes and raising the income of the most vulnerable during recessions and downturns is a pro-poor strategy. But to accomplish that strategy, governments must have precautionary financial assets at their disposal (Laursen and Mahajan 2005).

Botswana, Chile, and Peru are examples of RRCs that were able to undertake countercyclical fiscal policies in the downturn of 2009–10 because of the solid fiscal positions they had built over the previous years. These countries used accumulated fiscal savings to finance significant fiscal stimulus packages that helped support activity, sustain employment, mitigate the impact on vulnerable social groups, and avoid a credit crunch.

For example, Botswana was able to accommodate a swing of 17 percentage points of GDP in the central government's overall balance, from a surplus of 5 percent of GDP in fiscal 2007/08 to a deficit of 12 percent of GDP in fiscal 2009/10. This sharp deterioration reflected two things: the fiscal impact of the collapse in the demand for diamonds during the global financial crisis, which severely eroded fiscal revenues, and a substantial countercyclical easing of fiscal policy (including measures such as a public works program) to cushion the impact of difficulties in the diamond sector on the rest of the economy. This outcome contributed to a healthy growth of nonmining GDP of close to 5 percent in 2009, despite the crisis.

Resource Dependence and Specific Fiscal Risks

New or prospective resource producers that have been financially constrained may suddenly obtain access to a much larger resource envelope to meet their development needs. Sometimes, the availability of large amounts of resources facilitates access to international capital markets. The government may finance investment through instruments such as public–private partnerships (PPPs), in

which the private sector supplies assets and services traditionally provided by the government. It may also grant guarantees to state-owned enterprises (SOEs), the private sector, or the banking system, backed by its stronger fiscal position.

However, PPPs and government guarantees can easily bypass expenditure controls, move costly public investment off budget, shift debt off the government balance sheet, and hide the high cost of contractual arrangements that may have had to be granted to obtain private financing. If so, fiscal risks rise because of the accumulation of contingent liabilities.

A number of mechanisms exist to manage specific fiscal risks. In the case of PPPs, projects need to be considered and prioritized in the context of the government's overall investment strategy. The distribution of risks between the government and the private sector has to be carefully considered (some risks are better managed by contractors, others by the government). The government should not take on excessive risks, and the PPP process requires a strong legal framework.

More broadly, the management of specific risks involves their effective identification, which in turn requires public entities to assess and report fiscal risks to the ministry of finance, and comprehensive disclosure of fiscal risks in budget documents. Defining regulations that limit aggregate government exposure to guarantees and PPP-related risks can be helpful. It is also important for the ministry of finance to have the power to veto projects that entail excessive fiscal risks.

Promoting Sustainability

Nonrenewable resources are exhaustible and risk obsolescence. Therefore, countries must consider how to allocate finite resource wealth to both the current generation and future generations. This factor has important implications for the decision of how much to consume and how much to save during the period of resource production and for how to allocate savings to different forms of assets. Furthermore, in some countries the need for fiscal saving also arises from long-term pressures on public finances, such as those generated by aging populations and growing health care costs.

Fiscal Sustainability Analysis in Resource-Rich Countries

Analyses of fiscal sustainability in developed and emerging countries are usually based on medium-term projections of the public debt ratio to GDP, given certain macroeconomic projections and fiscal policy assumptions. A typical debt-sustainability analysis (DSA) involves examining the expected trajectory of the debt ratio in the medium term to assess whether the underlying fiscal policies can be sustained under plausible macroeconomic conditions without jeopardizing public sector solvency.

Debt-related vulnerabilities are analyzed using indicative policy-dependent thresholds against which projections of external public debt are compared to assess the risk of debt distress. Vulnerability to shocks is explored in alternative scenarios and standardized bound tests.

In RRCs, particularly those with limited reserve production horizons, the sustainability analysis should include the exhaustibility of nonrenewable resources. This special treatment is necessary, given the importance of the associated fiscal revenues to public finances. The projection period should be

extended into the long term, because nonrenewable resources give rise to important intergenerational allocation issues that require the use of long-term intertemporal models. These exercises force the choice of explicit intertemporal welfare criteria regarding how much resource revenue to consume now versus how much to save for future generations.⁷

A number of fiscal sustainability exercises for RRCs have been based on the permanent income hypothesis (PIH). These models provide a benchmark for the nonresource primary balance (NRPB, defined as nonresource revenue minus nonresource expenditure excluding interest receipts and payments) that can be financed indefinitely. Under this approach, the level of government spending would be guided by the return on net government wealth, which includes the expected present value of projected future fiscal oil revenues and the value of net government financial assets.⁸

Long-term PIH fiscal sustainability models—in which no distinction is made between the consumption and investment components of the NRPB—have been hotly debated. It has been noted that the fiscal benchmarks these models prescribe are too tight for low-income RRCs because they ignore the longer-term developmental needs in capital-scarce, credit-constrained countries and the potential role of productive public investment in that context (Collier and others 2009; van der Ploeg 2011, 2012; van der Ploeg and Venables 2008). In particular, if the economy is capital scarce, the rate of return on domestic capital is likely to be high, and it may well be above world interest rates.⁹ Thus, to promote growth, it is important how policy makers allocate public savings during the production period—into net accumulation of foreign financial assets—and invest in domestic physical and human capital.

In low-income RRCs, investing resource revenues domestically could relieve large deficits in infrastructure and human capital. Investment could relieve capital scarcity, raise potential nonresource growth, and increase fiscal revenues. In these circumstances, the optimal NRPB will be lower than the benchmark NRPB suggested by PIH models as productive public investment is scaled up—provided that the government can realize the fiscal dividends of the additional growth.

Modified versions of the PIH model can be designed to incorporate the scaling up of public investment and to allow a more front-loaded spending path financed by resource revenue. Models may assume, as a “worst-case scenario,” that the scaling up of public investment does not have a positive impact on growth. Or they may assume that higher public investment has a favorable effect on growth, which would generate higher nonresource revenues but also higher operations and maintenance costs for the additional public capital.¹⁰

Estimates of public sector net worth and sustainability in RRCs can be very volatile because of the volatility of key parameters such as resource and input prices. For example, for a number of countries, estimated government net worth was revised sharply down in 2015 as oil prices plunged and the value of oil reserves fell. Given the magnitude of the risks and uncertainties surrounding net worth and sustainability projections, probabilistic approaches to sustainability analyses would be appropriate, if the government has or can acquire the capacity to perform them.

Finally, uncertainty increases with the length of the projection period, and the uncertainties surrounding sustainability exercises are enormous. Estimates of wealth from future resource revenue are subject to uncertainty about many factors, including future resource prices and production costs, resource reserves in

the ground, the fiscal regime applied to the resource sector, and interest rates. Given these uncertainties and the asymmetric penalty function mentioned above, long-term sustainability exercises should include an element of caution and prudence.

Public Investment, Growth, Taxation, and Sustainability

Some RRCs rapidly scaled up their public investment during the resource boom. This strategy raises the question: will scaled-up public investment generate fiscal revenues and preserve fiscal sustainability?

If the net fiscal return to the public investment is higher than the forgone return on net financial assets, then net government worth after the scaling up of investment could be higher than it would have been in the absence of such investment. But this outcome will depend on two things: whether the investment has a positive impact on *growth*, and whether the government can reap *fiscal dividends* from that growth. Fiscal dividends include tax revenue from greater economic activity and higher user fees, if applicable.

Sustained benefits from growth will come about if public investment is productive. Factors such as poor governance, defective public investment systems, and supply bottlenecks may impair the productivity of investment. This topic is discussed in the next section.

Growth, in turn, will lead to higher fiscal revenues if the higher potential revenue base is taxed and the revenues are collected, and if the financial returns from the growth cover the future running costs of the projects. The government must be able to capture sufficient returns on investment to fund the future costs of the operation, maintenance, and depreciation associated with the completed projects. The financial returns must cover these additional recurrent costs to have a positive impact on the government's cash flow and, therefore, on sustainability.

If the higher revenue base is given away (through tax holidays, tax incentives, exemptions, tax-free zones, and the like), is not taxed appropriately (as in the case of the weak nonresource tax systems seen in many low-income RRCs), or is not collected because of weaknesses in revenue administration agencies, growth may not generate fiscal dividends. In such cases, the higher public investment expenditure could affect fiscal sustainability.

Adjusted Net Saving Models

Under the “wealth of nations” approach, a country's total wealth—including produced, natural, and intangible (human and institutional) capital—is estimated. The change in wealth is tracked as a key indicator of sustainability. Empirical wealth estimates produced by the World Bank suggest that the preponderant form of wealth worldwide is intangible capital, that is, human capital and the quality of formal and informal institutions (World Bank 2006b, 2011). The share of natural capital in total wealth tends to fall with income, while the share of intangible capital rises. In low-income countries, natural capital (including nonrenewable resources) is a significant portion of total wealth and is on average a greater share than produced capital.

Natural capital can be transformed into other forms of capital, provided that resource rents are effectively and efficiently invested.¹¹ Natural rents can be an important source of development, and some countries have successfully used natural resources in this way, including by diversifying their economies away

from heavy dependence on resources or by preparing for the eventual depletion of those resources.

A key concept relevant to the preservation of wealth is adjusted net savings. In RRCs, resource dependence complicates the measurement of savings and consumption, because the depletion of natural resources is not visible in the standard national or fiscal accounts. Adjusted net savings, or *genuine savings*, are a measure of the true level of savings in a country after taking into account the depletion of minerals, energy, and forests; the depreciation of produced capital; investment in human capital (as measured by education expenditure); and environmental damage. Sustained negative adjusted savings are associated with lower national wealth and diminished social welfare.

World Bank research suggests that many RRCs, especially in Sub-Saharan Africa, display very low or negative adjusted net savings, including in recent boom times. In 2008, a group of 21 oil- and gas-exporting countries were estimated to have had, on average, negative adjusted net savings (Ross, Kaiser, and Mazaheri 2011). But this state need not be the norm. For example, an earlier study found that Botswana managed to use its natural capital to build national wealth (Lange 2004).

Appropriate policies are needed to revert negative trends in adjusted net savings. In particular, RRCs will benefit from macroeconomic policies that encourage saving, resource policies that lead to dynamically efficient rates of extraction, fiscal regimes that capture resource rents, and public investment programs that put resource revenues to their best use, including investment in human capital (Hamilton and Ley 2010).

Public Financial Management, Public Investment Management, and Fiscal Transparency

Public Financial Management Systems and Governance

The effectiveness and efficiency of public expenditure is particularly important for RRCs, where spending is partly financed by temporary revenues from exhaustible resources, which puts a premium on their good and careful use. Effective and efficient public spending is also critical for sustainable and inclusive growth and poverty reduction (World Bank 2006a).

A number of RRCs have upgraded the quality of their institutions and budget management significantly, including their capacity to manage the planning, allocation, and effective control of budgetary resources. These countries have improved their institutional ratings (as measured by World Bank governance indicators) in the past decade. In other RRCs, however, progress has been mixed. In some of these countries, budget systems suffer from important weaknesses, and the quality and efficiency of spending need substantive enhancement. And in many of these countries, large increases in expenditure facilitated by the resource price boom have put additional pressures on PFM systems.

Governance problems can be an important factor in preventing the improvement of budgetary institutions, which in turn hampers the ability to turn resource wealth into sustainable development. The availability of resource revenue can reduce pressures for accountability. It can also provide incentives to use resources inappropriately, which is helped by deficient fiscal reporting and insufficient transparency. These problems can in turn discourage the drive for

improvements in PFM and fiscal transparency (Barma and others 2012; Collier and others 2009; Isham and others 2005; Mehlum, Moene, and Torvik 2006).

Large increases in spending in RRCs can be associated with political economy and governance issues. Politicians may raise public spending and employment excessively and too rapidly, aiming to increase their patronage networks and improve their chances of staying in power. In the process, resources shift from productive activity into unproductive rent-seeking activity (Brahmbhatt and Canuto 2010; Mehlum, Moene, and Torvik 2006).

Resource exporters tend to have weaker budget institutions than other countries at similar levels of development, as shown by indicators of governance and quality of expenditure. For example, low-income oil exporters have the weakest budget institutions across all dimensions (Dabla-Norris and others 2010; World Bank 2010). This weakness has major implications for the effectiveness and efficiency of spending and the ability of public investment to contribute to sustainable growth.

During the resource boom, the rapid growth of public spending in many RRCs (figure 6.3) increased the urgency of strengthening PFM systems and fiscal transparency to put time-bound resources to good use. There is also a need for intensified scrutiny of the quality of expenditure and its efficiency. To ensure efficiency and value for money, governments must undertake and report periodic reviews of the quality of stepped-up spending.

Depending on specific country circumstances, desirable PFM reforms may be required in areas such as the fiscal legal framework, budget formulation, budget presentation, medium- and long-term fiscal planning, budget execution, and audit and reporting.¹²

Public Investment Management Systems

RRCs face the challenge of turning resource wealth in the ground into productive assets. Public investment is key to realizing the potential developmental contribution of extractive industries to broad-based growth and improved social welfare (Rajaram and others 2014).

The quality of public investment is important for growth. Econometric evidence suggests that the quality of public investment, as measured by variables capturing the adequacy of project selection and implementation, is statistically significant in explaining variations in growth, a result driven mainly by low-income countries (Gupta and others 2014).

Public investment weaknesses can undermine one of the main arguments for higher investment: that it can enhance future economic prospects. Developing RRCs tend to have weaker public investment management (PIM) systems than other countries at similar levels of development (Albino-War and others 2014; Dabla-Norris and others 2011; Rajaram and others 2014).

The quality of public investment can be affected by upturns and downturns. In a number of RRCs, procyclical fiscal policies have affected public investment through “stop-and-go” dynamics.

Rising resource prices can lead to booms in public investment that place pressure on PIM. Ramping up public investment in these circumstances could run into inefficiencies, hamper the transformation of natural resources into productive public capital, and, rather than contributing to sustained growth, result in a waste of resources. Specific indicators may signal deteriorating investment quality. For example, the criteria for the selection and prioritization of projects

may become lax; implementation bottlenecks and delays may arise as capacity in the construction sector and other nontraded sectors is stretched; or the costs faced by the public sector may increase when supply bottlenecks occur while the private sector is booming.

More broadly, fast increases in investment during resource booms can also increase macroeconomic instability, increase vulnerability to shocks, and generate Dutch disease effects. These factors, in turn, can hamper long-term growth.

Conversely, when resource prices fall and fiscal positions come under pressure, public investment often suffers. Public investment is a discretionary form of spending, and thus it is typically more prone to cuts than current expenditures, such as wages or transfer programs—areas where cuts often meet with strong popular and political opposition (Barma and others 2012). International evidence suggests that reductions in infrastructure spending have often accounted for a large share of fiscal deficit reductions and have contributed to declines in economic growth. From an intertemporal perspective, this approach may have been a suboptimal design of fiscal policy (Easterly, Irwin, and Servén 2008; Rajaram and others 2014).

Because of these poor investment approaches, projects slow down or are paralyzed, and sometimes the operating costs of completed projects cannot be met. The volatility of capital expenditure creates uncertainty among contractors and suppliers. Fluctuations in public investment make cash flows to contractors volatile and unpredictable and disrupt regular maintenance, which contributes to inefficiency. Volatile capital budgets also create problems of credibility when negotiating public contracts: contractors looking at past government practices may seek “insurance” in the form of higher prices charged to the public sector.

The World Bank has recommended protecting public investment in the context of fiscal adjustments. Reductions in public consumption and reallocations of resources from less productive to more productive uses are generally preferable to cuts in public investment (World Bank 2007).

Frameworks have been developed to calibrate the optimal speed of scaling up investment, taking macroeconomic and capacity constraints into account. One such framework is the “sustainable investing approach” (SIA; see Berg and others 2012). This framework can help determine how much and how fast public investment can be scaled up to transform part of resource wealth into public capital that can increase the productivity of private activities while maintaining economic stability. It explicitly takes into account the investment inefficiency and absorptive capacity constraints often found in developing RRCs (box 6.2).

Attention to the processes that govern public investment is critical. Rajaram (2012) and Rajaram and others (2010, 2014) provide a pragmatic and objective diagnostic approach to the assessment of PIM systems for governments (figure 6.5). The framework identifies eight key *must have* stages of a well-functioning public investment system and proposes practical diagnostics (not reported here) to assess them.

Capacity Issues in New and Prospective Resource Producers

New and prospective resource producers face the problem that resource revenues can increase much faster than the government’s ability to spend them effectively and efficiently. It takes time to build government absorptive capacity. In addition the public sector in these countries often competes with large private oil or mining companies for scarce human skills.

BOX 6.2

The Sustainable Investment Approach

The sustainable investment approach (SIA) to investment planning takes into account important features common in developing countries, including inefficient public investment, institutional and absorptive capacity constraints, weak tax systems, and Dutch disease. It proposes raising public investment gradually in line with institutional and absorptive capacity constraints and saving some of the country's resource wealth.

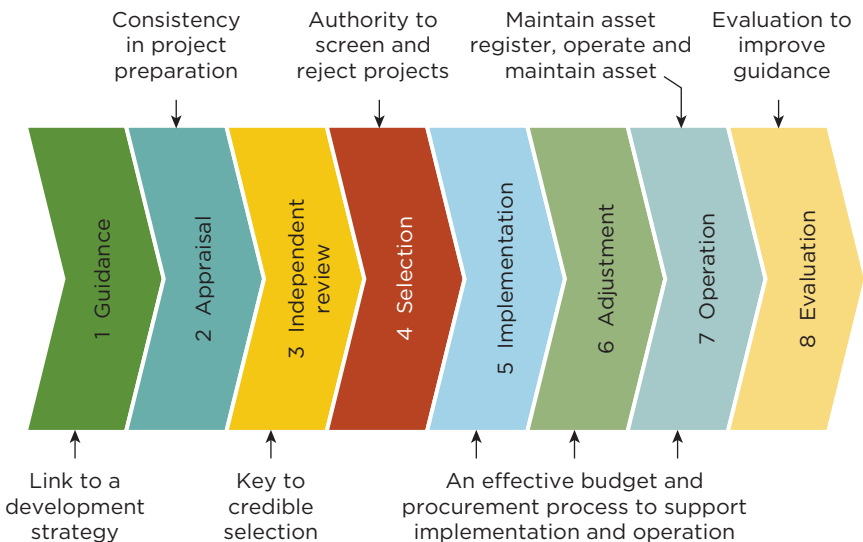
The SIA incorporates quantitative measures of investment efficiency explicitly into the framework. It includes the feature observed in developing countries that if public investment is scaled up quickly (as is often observed in resource windfalls), capacity constraints caused by factors such as supply bottlenecks or poor planning can drive up investment costs. Indeed,

indirect evidence suggests a declining return on investment as the investment accelerates. The SIA also accounts for the fiscal costs of operating and preserving public capital.

The gradual scaling up of public investment gives governments time to improve public investment efficiency. It also allows for building buffers to prevent damaging disruptions to public investment in the event of negative resource shocks. The authors stress the importance of assessing the rate of return of public investment projects and absorptive capacity constraints. They also emphasize that the financing of the projects' recurrent costs should be accounted for in order to sustain the growth benefits of the investment.

Source: Berg and others (2012).

FIGURE 6.5 Diagnostic Framework for Assessing Public Investment Management



Source: Rajaram 2012.

Some low-income prospective producers face the challenge of transitioning from reliance on foreign aid to reliance—or greater reliance—on resource revenues. In some of these countries, PIM capacity may be limited because much of past public investment has been concessionally financed by multilateral institutions or bilateral agencies that have their own appraisal and evaluation mechanisms and that supported the projects' implementation. As the prospect of resource revenues materializes, such support may decrease—faster than the government can set up or improve the institutions to design, appraise, select, implement, and evaluate public investment projects.

In these countries, therefore, saving part of the early resource revenues is advisable not only because of the macroeconomic stability and fiscal risk considerations discussed above but also because of the government's possible inability, in the short run, to use the additional resources effectively because of institutional and capacity constraints. A critical stage before increasing domestic investment is building the capacity to manage it—“investing in investing” (Collier 2012). Technical assistance can help low-income countries gradually lift their capacity constraints to investing efficiently.

Fiscal Transparency

A substantial empirical literature supports the proposition that fiscal transparency is beneficial according to several different criteria (de Renzio and Wehner 2015; Heald 2013). Transparency and accountability—that is, the obligation or willingness to accept responsibility and to account for one's actions—are vital for the efficient functioning of the economy and for the fostering of growth and social inclusion. They are also critical in establishing and preserving credibility in the management of resource revenue (Barma and others 2012).

The presence of large rents and revenues that do not arise from domestic taxation make RRCs especially prone to problems in these areas. Empirical evidence suggests that lack of transparency and lack of institutional controls—for instance, in public investment and procurement—are the main factors behind corruption in expenditure. Although weak transparency and governance are not circumscribed to RRCs, the potential costs of opaque practices are substantial in these countries.

Poor economic management and rent seeking can be viewed as an agency problem. The principal (representing the public interest) and the public agency may have diverging interests and asymmetric information.

Strengthening institutions to improve transparency promises ample rewards. Transparency can reduce the agency problem. Spreading information can contribute to reduced rent capture and to higher public output and productivity, as the availability of information about the agent makes the agent more accountable to the principal. Transparency also strengthens decision making. It ensures that information is available to identify weaknesses, to define policy responses, to measure the government's performance, and to guard against possible misuse of power. This information, in turn, furthers accountability.

Medium-Term Expenditure Frameworks

A medium-term perspective on annual budgeting is essential. It is vitally important to introduce an awareness of the future beyond the budget year into the

budgeting system and to provide for a more informed and systematic discussion of fiscal and public spending strategies.

The specific characteristics of RRCs underscore the importance of developing comprehensive fiscal policy frameworks adapted to the challenges these countries face. Enhancing the links between annual budgets and medium- and long-term fiscal objectives and introducing assessments of fiscal risks can help address the short-term policy biases and tendencies toward procyclicality that increase fiscal vulnerabilities and contribute to improving fiscal management and the allocation of public resources in many RRCs.

A medium-term expenditure framework is a key component of a comprehensive fiscal framework. A well-developed MTEF addresses what the World Bank long ago identified as the single most important cause of poor budgeting outcomes in developing countries: the failure to link policy, planning, and budgeting.

The World Bank identifies three main forms of MTEFs, involving increasing levels of complexity and demands on capacity:

- The simplest MTEF is a medium-term fiscal framework (MTFF). It entails (i) a statement of fiscal policy objectives; (ii) a macrofiscal strategy; (iii) integrated medium-term macroeconomic projections within which the annual budget and multiyear budget estimates can be presented and discussed; (iv) fiscal targets, rolling aggregate revenue, expenditure, and other fiscal forecasts; and (v) fiscal risk and sustainability analysis.
- A medium-term budget framework (MTBF) includes, in addition, the bottom-up determination of the spending agencies' resource needs and the reconciliation of those needs with the resource envelope.
- A medium-term performance framework (MTPF) includes sector objectives and strategies, including specific agency or program output or outcome targets, with an emphasis on the measurement and evaluation of performance.

In RRCs in particular, an MTEF can help link annual budgets to longer-term policies and fiscal sustainability objectives, enhance fiscal risk analysis in the face of revenue volatility, and provide an institutional framework for addressing medium- and long-term resource allocation issues in the presence of resource revenue.

MTEFs in RRCs help meet objectives that traditional one-year incremental budgeting does not reliably meet, such as the following:

- Promoting fiscal discipline so that spending is sustainable, is limited by resource availability, and does not generate excessive fiscal vulnerabilities going forward
- Ensuring that budget allocations reflect expenditure priorities as set out in medium-term policies
- Providing an institutional framework to assess fiscal sustainability issues and take them into account in the framing of fiscal strategies
- Promoting transparency, a more informed public discussion, governance, and accountability

A comprehensive study by the World Bank (2012) finds evidence of the positive impact of MTEFs. The evidence indicates that MTEFs improve fiscal discipline and allocative efficiency. The results on technical efficiency are more mixed. Even so, MTEFs often make budgeting more strategic, improve recognition of resource constraints, and foster cooperation among government agencies.

MTEFs are not multiyear budgets and do not introduce rigidity. At first glance, it might seem that MTEFs would be at odds with the budget flexibility that RRCs need in the face of substantial revenue volatility. The expenditure ceilings for the years beyond the initial annual budget, however, tend to be indicative. Unanticipated developments and large deviations from MTEF projections in later years can be assessed and addressed through adjustments to the MTEF when circumstances warrant it.

Medium-Term Expenditure Frameworks and Fiscal Risks

MTEFs can be specifically designed to help quantify and address fiscal risks. In RRCs where fiscal policies continue to focus on one-year budgets with little reference to fiscal risks and vulnerabilities, an MTEF can help sharpen the focus on resource revenue volatility and uncertainty in the medium term.

The provision of information and discussion on medium-term resource revenue-related risks, and the enhancement of transparency that a sound MTEF can help bring about, promotes informed analysis and scrutiny of multiyear fiscal strategies and their implications for risk. From a political economy viewpoint, this approach can build support for prudent and less procyclical fiscal policies in the face of resource revenue volatility. The public scrutiny that comes with quantification and disclosure can create pressure to ensure that risks are contained and appropriately managed. Politicians and legislatures may be less enthusiastic about supporting reckless spending increases during booms if they and the public are provided with a clear statement of the implications of such increases in terms of fiscal vulnerability to resource price downturns and the kind of fiscal adjustments that may ensue.

Medium-Term Expenditure Frameworks and Long-Term Perspectives for Fiscal Policy

Many RRCs need to extend their technical analysis, and their wider political debate, to span longer horizons. In countries where fiscal discussion is excessively or exclusively focused on the short term, the development of institutions that promote a long-term perspective can help moderate procyclicality and focus public attention on strategic issues relevant to resource use. This approach is also warranted by the inability of future generations to voice preferences on the issues.

Acknowledgment of the finite nature of natural resources can help countries focus more pointedly on looming fiscal pressures. In some RRCs with large non-resource deficits and public debt, the expected resource production horizon at current output rates is relatively short (10–20 years), but policies continue to be carried out as if those resources were endless. Comparing temporary resource rents with long-run pressures on public finances—such as future increases in age- and health-related spending, social spending, environmental costs, debt service, and contingent liabilities—would contribute to an informed political

discussion of the budget with a longer-term perspective, dampen resource euphoria, and promote fiscal prudence.

In Norway, a simple graph showing declining net cash flow from the oil sector and mounting pension pressures in the long term was widely used (figure 6.6). It helped build broad political and social support for a prudent and sustainable fiscal policy and for the institutional frameworks supporting it. In the years after its development, it became a standard feature of fiscal policy documents in Norway and was widely understood by the population (Skancke 2003).

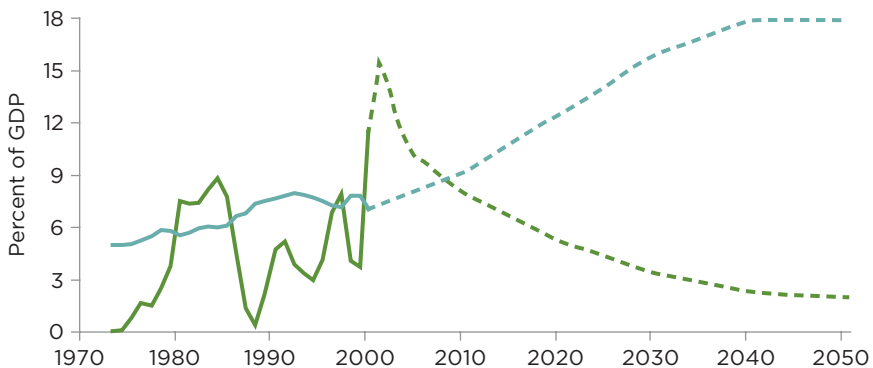
A well-designed MTEF with long-run sustainability assessments, including resources in the ground and long-run risk analyses, forces an intertemporal assessment of fiscal policies. It can help foresee and quantify long-term challenges and ease the political economy of starting to prepare for them. It can foster the creation of constituencies for the prudent use of the resources. And, more broadly, it can provide both a framework to set fiscal policy objectives in the face of significant uncertainties and the policies to achieve those objectives.

MTEFs with extensive risk and long-term analyses also bring out acute policy trade-offs that are seldom considered explicitly, including the following:

- In the face of an increase in resource prices, what is the short-run trade-off between increasing expenditure and increasing fiscal risks?
- What are the long-run trade-offs between more physical capital and net financial assets?
- What are the trade-offs between increasing public consumption against the lower expected value of future net assets when the resource runs out?

MTEFs should be adapted to planning uncertainty. Long-term planning is subject to considerable uncertainty: measures of sustainable public spending may vary over time, and estimates of long-term spending pressures may change as circumstances change. A rolling MTEF that is updated as new information comes in would help clarify policy choices against immediate and longer-term objectives and their likely consequences.

FIGURE 6.6 Norway: Net Cash Flow from the Petroleum Sector and Pension Expenditures, 2001 Projections



Source: Skancke 2003.

Note: GDP = gross domestic product.

The implementation of MTEFs must be gradual and consistent with capacity. For example, in Uganda an MTBF was implemented years after the introduction of an MTFF. Several RRCs have implemented or are moving toward adopting at least basic forms of MTEFs that include fiscal risk and long-term analyses (Brumby and Hemming 2013).¹³

Factors Influencing the Success of Medium-Term Expenditure Frameworks

Experience with MTEFs around the world is varied, and general lessons are hard to draw. That said, the evidence suggests that some factors can contribute to the success of MTEFs in RRCs, including the following:

- *Political commitment at high levels and buy-in from the ministry of finance to a comprehensive and realistic budget process.* In some RRCs, the political economy of spending resource rents will conflict with the introduction or strengthening of an MTEF because of vested interests and powerful constituencies that might be harmed by greater transparency in policy choices and budget processes. In such cases, support from the top is key.
- *Ability to realistically forecast key fiscal aggregates,* so that a country can clearly articulate fiscal policy objectives and targets. Resource revenue poses a particularly difficult challenge, which can be addressed with strategies discussed elsewhere in this volume and the risk analysis mechanisms noted earlier in this chapter.
- *Integration of the MTEF with the budget process and national and sectorial strategies.* This factor is particularly important in RRCs that retain separate fiscal institutions that plan and execute investment, often not fully coordinated with the budget, as well as extrabudgetary funds and resource funds with authority to spend.
- *A strong coordinating agency,* typically the ministry of finance, with inclusive participation of other agencies.
- *Accountability for budget discipline,* with robust systems of budget execution and reporting.
- *A commitment to publicity and dissemination,* to strengthen political and public support for the MTEF.
- *Precise sequencing.* It is important to avoid moving too fast. Countries can start with the basics, such as a simple aggregate MTFF, and gradually move on to more demanding MTBFs and MTPFs—but incorporate the specificity of resource revenue into the analysis from the very beginning.

Fiscal Rules

Fiscal rules are standing commitments to specified numerical ceilings or targets for key budget aggregates. Fiscal guidelines, unlike fiscal rules, are not legally binding.¹⁴

The motivations for, and objectives of, fiscal rules differ. Fiscal rules or guidelines have often been adopted to reduce the procyclicality of fiscal policy, to

promote precautionary savings in contexts of highly volatile and uncertain revenue, and to prevent the unsustainable consumption of resource revenues, so as to preserve or achieve fiscal sustainability. Fiscal rules have often been motivated by political economy factors—they have been viewed as useful instruments to help address spending pressures and to enhance the credibility of the budget.

In RRCs, fiscal rules are less common than resource funds. However, they can play a more critical role in fiscal policy because, unlike resource funds, they are intended to constrain the policy directly.

In RRCs, the design and implementation of appropriate fiscal rules is more challenging than it is in other countries. The characteristics of resource revenue—highly volatile and uncertain, dependent on exhaustible resources, largely originating from abroad, and giving rise to large rents leading to acute political economy difficulties—complicate fiscal rules. Other factors, such as revenue sharing in federal states and revenue earmarking, can also pose complications.

The use of fiscal rules and guidelines in RRCs has been relatively limited. Their design has varied greatly. Some countries have targeted only a single fiscal indicator, whereas others have targeted two or more. Some countries have implemented fiscal rules in conjunction with resource funds.

The following fiscal indicators have been targeted in the past or currently: (i) overall balance (for example, in the Canadian province of Alberta, Indonesia, Mexico, Nigeria, and Peru); (ii) current balance (República Bolivariana de Venezuela); (iii) structural balance (SB), with estimated “structural” resource revenue (Chile, Colombia, Peru); (iv) overall balance adjusted by resource price rule (Mongolia); (v) NRB (Ecuador, the Russian Federation, Timor-Leste); (vi) nonresource current balance (Ecuador, Equatorial Guinea); (vii) structural NRB (Norway); (viii) rate of growth or level of expenditure or of components of expenditure (Botswana, Chad, Ecuador, Mexico, Mongolia, Peru, Russia, República Bolivariana de Venezuela); and (ix) the ratio of public debt to GDP (Alberta, Ecuador, Mongolia, República Bolivariana de Venezuela).

Typology of Fiscal Rules in Resource-Rich Countries

Fiscal rules can be distinguished by their targets. The most common targets are listed below, with brief assessments of their pros, cons, and capacity requirements.

Overall or primary budget balance rules target the balance between total (or primary) revenues and total (or primary) expenditures. They are not advisable in RRCs. Although they are transparent and linked to debt objectives, budget balance rules are procyclical everywhere; in RRCs, this factor is exacerbated by the transmission of resource revenue volatility onto fiscal policy. These rules hold spending hostage to the unpredictable fluctuations of resource revenue.

Current balance rules (golden rules) target the balance between current revenues and current expenditures. Public investment is not covered by the rules. These rules are not recommended in RRCs. In addition to the problems of budget balance rules, current balance rules lack an effective fiscal anchor and are not linked to sustainability, since investment is not constrained. Furthermore, parts of current spending, such as health and education, represent investment in human capital. The rules can provide incentives to choose projects with

poor benefits. Unless accounting and transparency systems are strong, these rules can also create incentives for creative accounting (the misclassification of current spending as capital spending).

Nonresource current balance rules (nonresource golden rules) target the balance between nonresource current revenues and nonresource current expenditures. They also allow public investment to fluctuate with the resource revenue flow. This characteristic instills volatility and procyclicality in capital spending and the budget and could ignore macroeconomic absorption and institutional capacity constraints.

Structural balance rules target the overall or primary balance, excluding the estimated cyclical component of resource revenues, adjusting for the estimated cyclical position of the economy, and excluding one-off fiscal events. These rules assume that resource revenues can be decomposed into a “structural” or long-run component and a cyclical component. This assumption poses significant challenges, because resource price shocks are highly persistent; in the case of oil, prices behave like a random walk without drift, and shocks are permanent (Hamilton 2008).

These rules are also potentially procyclical. If the estimates of the long-term resource prices are correlated with actual prices, the targeted fiscal balance is not fully decoupled from resource prices. In addition, the economic, institutional, and statistical preconditions for adopting SB rules are very demanding and include adequate capacity to estimate the economic cycle.

Nonresource primary balance rules target the balance between nonresource revenues and nonresource expenditures, excluding interest receipts and payments. They may be considered by RRCs heavily dependent on resource revenues, without liquidity constraints, and with sustainable fiscal positions. These rules’ focus on the NRPB helps governments assess the stance and direction of fiscal policy and decouple it in the short run from the vagaries and uncertainties of resource prices and resource price forecasts. On the other hand, these rules do not allow the operation of nonresource automatic stabilizers.⁴⁵ Experience also suggests that from a political economy viewpoint, they can come under pressure when resource prices increase on a sustained basis.

NRPB rules supplemented with additional feedback mechanisms may be considered by RRCs with liquidity constraints or with concerns regarding fiscal sustainability and vulnerability. In these cases, feedback loops from the net debt or overall balance to the fiscal rule would be incorporated to provide assurances of fiscal sustainability without losing sight of debt and financing issues.

Structural NRPB rules target the NRPB adjusted for the estimated cyclical position of the nonresource economy and one-off fiscal events. They are an option for RRCs with adequate technical capacity to produce timely and reliable estimates of the nonresource output gap, the cyclical position of the nonresource economy, nonoil automatic stabilizers, and the chosen fiscal target. The structural NRPB is preferable to an SB. It is a better indicator of the stance and direction of fiscal policy, and of its economic effects, than the SB. It also better decouples fiscal policy from the vagaries of resource prices and forecasts. On the other hand, the computation of the nonresource cycle and of automatic stabilizers is complex and requires timely data and very strong capacities and could lead to unreliable results and reduced transparency.

Expenditure rules can target the rate of increase of expenditure in nominal or real terms or the ratio of expenditure to nonresource GDP (targeting the ratio to total GDP would be very procyclical). They share some of the characteristics of NRPB rules. They address spending pressures directly and reduce expenditure volatility. These rules are simpler and easier to monitor and implement than NRPB or other fiscal balance rules, as only expenditure is targeted, which may be helpful in cases of severe capacity constraints. They accommodate revenue shortfalls, which allows a stabilization role for fiscal policy. If nonresource revenues are very small, as in some oil-exporting countries heavily dependent on oil revenues, an expenditure rule would be akin to a rule targeting the NRB or the NRPB. By constraining the rate of increase or the level of government spending, these rules can also support efforts to limit the size of the government, should that be a policy objective.

However, expenditure rules can provide incentives for the use of tax expenditures and preferential tax treatments instead of transfers and subsidies to achieve policy objectives. Tax expenditures are subsidies delivered through the tax code in the form of lower tax rates for some sectors, deductions, exemptions, exclusions, tax holidays, special economic zones, and other tax preferences. Moreover, these rules do not prevent tax reductions that could weaken the NRPB over time. Policy makers may try to comply with the rules by squeezing productive but politically unpopular expenditures, including public investment. A very tight expenditure growth rule could become technically or politically unsustainable over time. Also, as discussed below, these rules could provide incentives to shift government expenditure off budget or to shift some areas of expenditure to accounting on a net basis.

Debt rules set a limit or target for the debt-to-GDP ratio. On their own, they are of limited use in RRCs heavily dependent on resource revenue, although they could be used to supplement NRB rules. As discussed earlier, in countries with relatively short production horizons, a wider approach to fiscal sustainability, including the depletion of resource wealth in the ground, is necessary. A partial focus on gross debt falls short of that objective. In addition, ceilings on the ratio of debt to GDP would be particularly procyclical in RRCs.

If the fiscal rule targets the NRB or the NRPB, the target must consider long-term fiscal sustainability estimates and vulnerability to resource shocks. These factors would be reviewed as circumstances change. However, frequently revising the targets—because of changes in sustainability assessments arising from movements in resource prices or resource revenue—would reintroduce procyclicality into the rule “through the back door.” Hence, targets should be revised only from time to time—for example, every few years.

Rigidity versus Flexibility

In RRCs, it is advisable to implement fiscal rules that have elements of flexibility. Complex trade-offs exist between rigidity, flexibility, robustness of the rule, and credibility. However, on balance, and taking into account the uncertainties and recurrent exogenous shocks facing RRCs, fiscal rules in these countries need to incorporate ample flexibility and escape clauses. These features are necessary to enhance the robustness of the rules to unpredictable events and shocks, which in RRCs are a fact of life. They help reduce the likelihood of ad hoc modifications to

the rules, or outright suspension of them, as seen in a number of countries, which can damage the credibility of the entire fiscal framework.

Regarding flexibility, Ter-Minassian (2010) suggests various options:

- Targets can be specified for periods of a few years, with periodic revisions based on medium- and long-term reassessments.
- Temporary deviations from the targets can be allowed, with procedures for a timely return to the targets.
- Revision clauses can be introduced, specifying the conditions under which the targets may be revised.
- Rolling targets can be used—though they may weaken discipline and carry credibility costs if used inappropriately.

It is important to specify escape clauses. In all cases, transparent, clear, and specific escape clauses—referring to the circumstances that would merit temporary suspension of the fiscal rule—need to be put in place, as well as mechanisms to return to the ceilings or targets. Doing so will help address unpredictable major shocks.

Public Financial Management and Capacity Prerequisites

Adequate PFM capacity and fiscal transparency are key requirements for a fiscal rule, given the credibility and reputational costs associated with ambiguity or noncompliance. Corbacho and Ter-Minassian (2013) and Ter-Minassian (2010) provide comprehensive overviews of PFM preconditions for fiscal rules. They emphasize that PFM requirements for the effective implementation of fiscal rules should not be an afterthought. If PFM institutions are not up to the task, it is better to delay the introduction of fiscal rules until PFM has been upgraded. Key PFM requirements, which range across the budget process, include the following:

- Elaboration of annual budgets and, preferably, MTEFs consistent with the rule, including a strong role for the ministry of finance
- Capacity to forecast revenues and the endogenous component of expenditures and to prepare a realistic financing plan
- A parliamentary approval process that prevents the introduction of amendments inconsistent with the fiscal rule
- Capacity to ensure an appropriate execution of the budget, including effective expenditure control mechanisms and the ability to introduce intrayear corrections if needed—which requires the timely availability of reliable information on budget developments
- Comprehensive and firmly enforced chart of accounts, accounting and budget classification systems, and reporting requirements to forestall the use of accounting manipulation that would threaten and undermine the effective operation of the fiscal rule
- Budget information systems capable of generating timely and reliable statistics and reports

- Effective independent external scrutiny, including external audit to ensure that the use of public resources is fully accounted for
- Enforcement and correction mechanisms

In a number of countries, the performance of fiscal rules was affected by PFM-related issues. For example, compliance with fiscal rules in Ecuador in the 2000s was complicated by the extensive revenue earmarking and budget rigidities then in place; the rules were subsequently simplified and most earmarking was eliminated in 2008. In Equatorial Guinea, a nonoil golden rule was in place in the context of uncertainties regarding the proper classification of expenditures in the budget as current or capital.

Fiscal rules may provide incentives to resort to extrabudgetary and quasi-fiscal operations and accounting stratagems, which would undermine the integrity and credibility of the budget, and of the rule itself. Narrow coverage of the fiscal rule can be bypassed through shifting public spending off budget. Rules can be bypassed by (i) providing uncompensated subsidies through SOEs, (ii) transferring public investment to SOEs, (iii) transferring spending responsibilities to subnational governments without making adequate financing provisions, (iv) mandating spending by government-owned development banks, and (v) providing guarantees instead of explicit subsidies or transfers to enterprises and other entities. For example, in Mongolia the SB and expenditure rules established in 2010 were bypassed through large spending by the government-owned development bank, whose activities were initially not covered by the rule. Irwin (2012) reviews accounting devices that have been used to hide deficits or “comply” with fiscal rules.

To reduce incentives for expenditure shifting, the government should provide detailed and transparent information on SOE and extrabudgetary operations and on contingent liabilities to the legislature and the public. Doing so will help increase transparency, foster a proper evaluation of compliance with the fiscal rule in letter and in spirit, and establish accountability.

In addition to the general PFM preconditions for fiscal rules indicated above, the following preconditions are important in RRCs:

- A clear fiscal accounting distinction between resource-related and non-resource-related revenues and expenditures and the capacity to monitor these revenues and expenditures with assurances of integrity to avoid ambiguities and prevent misclassification.
- Significant budget flexibility and limited revenue earmarking or statutory minimum spending requirements. These budget rigidities can be inconsistent with the fiscal rule to a greater degree than in other countries, because revenue earmarking and spending requirements can transmit significant resource revenue volatility and procyclicality to spending.
- Fiscal transparency in the provision of information on resource revenue developments.

The issue of capacity constraints can raise acute country-specific trade-offs for fiscal rules. Some fiscal rules may be superior to other rules in some dimensions—such as comprehensiveness of coverage or providing scope to conduct countercyclical fiscal policies—but more difficult to implement and monitor. Simple, easily

monitorable rules such as expenditure rules or NRB rules are more transparent and easily understood by the public, but they may fall short of fully supporting stabilization objectives.

International Experience with Fiscal Rules in Resource-Rich Countries

RRCs have a mixed record of implementing fiscal rules. In some countries, fiscal rules or guidelines have contributed to sound fiscal management, at least during certain periods. Examples include Botswana, Chile, Norway, and Peru. Compliance seems to have been better in countries that already had strong institutions and a commitment to fiscal discipline (Sharma and Strauss 2013). For example, the success of Chile's fiscal rule is viewed as being mainly due to policy credibility, political commitment, and consensus—themselves the result of past prudent policies and sound institutions.

On the other hand, a number of countries have faced difficulties in designing and implementing successful fiscal rules, and the effects of their rules remain uncertain.¹⁶ Often, in the context of changing circumstances, policy objectives, or political commitment, rules were not complied with, were bypassed, were frequently modified, or were eventually abolished. In some cases, these failures also reflected design flaws that undermined the implementability of the rules. To a greater or lesser extent, depending on the country, the ineffectiveness of rules has been primarily due to one or more of the following factors:

- The technical difficulty of designing effective and robust rules that can withstand the uncertainty and volatility of resource revenue, rapidly changing economic environments, and structural changes in the economy
- Complications arising from the political economy of spending resource rents, evident in the many difficulties faced by countries seeking to secure and then maintain political consensus and commitment around a fiscal rule
- The need to meet demanding technical and institutional PFM, fiscal transparency, and robust monitoring prerequisites

Fiscal rules have been associated with a broad range of fiscal responses to resource price cycles, including highly procyclical responses. In part, those responses are the result of the many modifications that countries introduced to their rules as circumstances and policy objectives changed, sometimes dramatically. The econometric evidence on the effectiveness of fiscal rules in RRCs is mixed.

The country experience of the past 15 years suggests that rules targeting NRBs and expenditure tend to come under pressure during resource booms. Under conditions of abundant liquidity, these rules are put to the test by mounting expenditure pressures, as the increases in resource prices are increasingly viewed as “permanent.” During the long resource price boom of 2004–14, a number of rules were relaxed (sometimes several times), not complied with, not implemented, or abolished. Fiscal rules targeting budget balances tend to achieve a greater degree of compliance than other types of rules during upswings. However, they provide room for expenditure increases that, though consistent with the rules, result in highly procyclical fiscal policies as resource revenue surges.

How do fiscal rules perform in downturns and recessions? Rules targeting budget balances, NRBs, and expenditure tend to be tested in these situations. Falls in revenue often require large fiscal adjustments to ensure compliance while economic activity is weakening. In countries with rules targeting the structural NRB without provisions for temporary deviations, the rules can stand in the way of implementing countercyclical fiscal policies. In countries with NRB rules, such rules do not even allow nonresource automatic stabilizers to work. As a result, rules often tend to be modified or suspended.

The establishment of rigid fiscal rules would seem to be particularly problematic in postconflict RRCs, in countries undergoing substantial structural change in the short and medium run, and in new producers with significant future revenue uncertainties. Reform processes—such as postconflict rebuilding of the economy and institutions, SOE restructuring, significant reallocation of productive resources and factors of production, substantial changes in relative prices (as subsidies are reformed and price controls removed), and rapid technological change—are likely to entail major uncertainties for macroeconomic forecasts and fiscal projections. Such uncertainties complicate fiscal rule design and implementation. Significant structural change superimposed on resource revenue volatility requires ample flexibility in fiscal policy.

The difficulties that many RRCs have faced in designing and implementing rules suggest the need for a careful assessment of the potential benefits and costs of a fiscal rule, given country circumstances and attention to the rule's design. The frequent changes to rules, and compliance problems seen in many RRCs, highlight the challenges that the volatility and unpredictability of resource revenue pose to the design and implementation of rules. They also point to the difficult trade-offs between rigidity, flexibility, and credibility in their design. Rigid rules can easily be overcome by events, undermining their credibility, while excessive flexibility can increase uncertainty about the direction of fiscal policy.

International experience suggests key conditions for the success of fiscal rules. Among them are (i) strong consensus and political commitment to the rules, (ii) rule design that takes into account the particular circumstances of the country, (iii) appropriate flexibility, (iv) PFM systems that are up to the task, and (v) strong fiscal transparency and effective communication.

Resource Funds

Many RRCs have established resource funds to help fiscal and asset management in the face of the complications posed by resource revenue. In some of these countries, the fund is part of a fiscal framework that includes a fiscal rule or guideline.¹⁷

Resource funds form part of a wider set of funds known as sovereign wealth funds (SWFs). SWFs make up a heterogeneous group of funds, with various objectives, asset accumulation and withdrawal mechanisms, and institutional features (Das, Mazarei, and van der Hoorn 2010).

Resource funds can be broadly classified into three main types: stabilization funds, savings funds, and financing funds. Stabilization funds and savings funds have rigid accumulation and withdrawal rules. The rules can be contingent (stabilization funds) or noncontingent (savings funds). A number of these funds

also have separate spending authority from the budget. Financing funds, in contrast, have flexible operational principles and no spending authority.

Stabilization Funds and Savings Funds: Design and International Experience

Stabilization funds have three policy objectives: (i) to help ensure macroeconomic and fiscal stabilization, (ii) to reduce the short-term impact of resource revenue on the budget and the economy, and (iii) to support fiscal discipline. The funds' operational objective is to reduce the volatility and uncertainty of resource revenue flows to the budget. Achieving this objective would reduce procyclicality by facilitating the decoupling of budget expenditure from changes in revenue flows. Self-insurance buffers would be created by putting aside resources in good times that can be used in bad times.

When resource prices are “high,” the expectation is that making deposits into the fund—and therefore making those resources unavailable to the budget—will help “discipline the budget,” contain spending, and put resources aside for when they may be needed. When resource prices are “low,” the fund is expected to act as a damper or buffer (through the transfer of funds to the budget) to prevent unpredictable fiscal adjustments.

Stabilization funds typically have rigid price- or revenue-contingent operational deposit and withdrawal rules. The fund receives transfers from the budget if the actual resource price or revenue during budget execution is higher than a specified trigger reference price or revenue; if it is lower, the fund transfers resources to the budget. The trigger reference price or revenue may be fixed or set through a formula.

If the fund is to function as a stabilization mechanism and financial buffer, its assets cannot be held domestically. If the fund were to invest domestically during a boom or to liquidate domestic assets during a slump, it would exacerbate macroeconomic volatility. Fund assets should also be sufficiently liquid to enable their use at short notice if needed.

Savings funds have the policy objective of fostering fiscal savings and creating a store of wealth for future generations. The operational objective is to remove some revenues from the budget.

Savings funds typically have rigid noncontingent operational rules. The rules require the deposit of a specified share of resource revenue, or of total revenues, into the fund, regardless of fiscal conditions. Rules for the withdrawal of resources from these funds vary and in some cases are not clearly specified. The scope for withdrawals from the fund to finance the budget adds a stabilization element beyond the main savings objective.

The implementation of stabilization and savings funds with rigid rules has often been based at least in part on political economy considerations. It is often expected that the removal of “high” resource revenue relative to some benchmark, or of a share of such revenue, from the budget will stabilize or moderate public expenditure, encourage savings, and create financial buffers.

The effectiveness of rigid resource fund rules to decouple budget spending from resource prices during booms (stabilization funds) or to ensure savings (savings funds) is in principle uncertain, because money is fungible and because funds do not affect public spending directly, except in very specific circumstances.¹⁸

Funds do not place formal restrictions on fiscal policy and are therefore different from fiscal rules. The technical and political economy aspects of this feature of funds are often confused, and it is useful to clarify them as follows:

- At a *technical level*, the requirement to place assets in the fund will force spending reductions or tax increases compared with the alternative situation without a fund only if strong liquidity constraints exist and if the fund rules are binding and are observed. If the government is running surpluses, however, removing some resources from the budget does not necessarily entail a need to reduce expenditures, even if there are liquidity constraints.
- In the absence of liquidity constraints, the government can borrow or run down other financial assets to increase spending and still make the required deposits in the fund. Sometimes, money that is parked in a fund is thought to be “safeguarded” from improper use and saved. But this is not necessarily the case, because the government can simultaneously borrow and make transfers to the fund, as money is fungible.
- These conclusions would still leave open possible *political economy* arguments for rigid fund rules: even if the government is running a surplus or has no liquidity constraints, rules that mandate deposits into a fund can influence the political process toward moderating spending. The evidence reviewed below suggests, however, that the political economy advantages of removing resources from the budget are often unclear; that when pressures are brought to bear, the funds’ rules can be changed, bypassed, temporarily suspended, or ignored; and that the results seem to be very country specific.

With regard to the management of liquidity buffers, the rigid contingent inflow and outflow rules in many stabilization funds are not related to optimal risk and liquidity management. They are unlikely to generate optimal stabilization buffers linked to resource dependence, the cost of liquidity, policy objectives, and tolerance to risk (as recommended in the section of this chapter on the management of fiscal risks and vulnerabilities). Excess revenues could perhaps be better used to pay off expensive public debt if liquidity is adequate. Moreover, persistent shocks can lead to the unsustainability of the fund.

Rigid fund rules can be costly. They can lead to tensions and policy dilemmas and suboptimal asset and liability management. These problems are likely to happen, especially in situations with significant exogenous shocks, changes in policy priorities, mounting spending pressures, and conflicting objectives between the fund, fiscal policy, and asset management.

The rules may not be right for the specific circumstances, because circumstances change in unpredictable ways. For example, the fund’s accumulation rules may require that deposits be made to the fund; but if the budget is in deficit, the government will need to borrow or run down other assets, cut spending, or increase taxes to make the deposits, which may not be the best course of action. Accumulating assets in a resource fund to comply with fund rule requirements while simultaneously adding to the public debt is a costly strategy, especially if the spread between the rates of return on fund assets and the cost of borrowing is significant. Or if the budget needs resources but fund rules prevent withdrawals, the government may be forced into costly borrowing.

The evidence shows that complications have often resulted from requirements that deposits be made into the fund without regard to the overall fiscal position. In some cases, governments complied with fund rules that turned out to be ill-suited to the particular circumstances at the cost of inefficiencies and suboptimal results. In other cases, the rules were changed, sometimes frequently, because of the tensions that arose between fund rules and fiscal policy in contexts of changes in international prices, expenditure pressures, or shifting policy priorities. Often, when significant conflicts among policy objectives arose, rigid rules were suspended or ignored—or, in some cases, the fund was abolished.

Specific country experience can illustrate these issues in more detail:

- República Bolivariana de Venezuela could only deposit the resources required by its stabilization fund rule in certain years in the early 2000s by issuing debt at higher interest rates than the returns on the fund's assets, given the overall stance of fiscal policies. This problem led to frequent changes in fund rules and temporary suspensions of the operations of the fund.
- In some years during the 2000s, Algeria and Ecuador made deposits into their funds while issuing debt that was serviced by the fund itself.
- Gabon sometimes made deposits into its savings fund with low returns, while paying significantly higher interest rates on its high public external debt and incurring debt service arrears.
- In Chad and Ecuador in the 2000s, in contexts of extensive revenue earmarking and fragmentation of cash flow management, compliance with fund deposit rules sometimes took place while the central government was experiencing liquidity problems and payment arrears were being incurred. Both funds were eliminated.
- In the U.S. state of Alaska, deposits were sometimes made into the fund, and dividends were paid from the fund to the population (which over time came to be considered entitlements), while the state budget operated at a substantial deficit.

Resource funds with rigid operational rules in conjunction with fiscal rules can make the fiscal framework overdetermined and compound policy dilemmas. The fiscal rules and the fund's operational rules may be mutually inconsistent in certain circumstances, leading to difficult choices between compliance and avoiding inefficiency and fiscal costs. More important, when a fiscal rule exists, the rationale for a resource fund with rigid operational rules is unclear. What would such a fund add to the fiscal rule?

Evidence from a number of countries shows that setting trigger resource prices or revenues in contingent stabilization funds has been difficult. This problem is mainly due to the nature of the stochastic process that generates those prices. It is very difficult to set average long-term prices as triggers with any degree of confidence, or to determine early on whether a given price shock is transitory or long-lasting. A shock that turns out to be long-lasting could lead to the unsustainability of the fund.

Some countries have set long, backward-looking moving average formulas to define the triggers for deposits and withdrawals. Given shock persistence, such

triggers have sometimes deviated markedly and during long periods from actual prices, testing the liquidity and robustness of the fund to changing environments.

The empirical evidence (case studies and econometric evidence) on the effectiveness of stabilization and savings funds is mixed. A few studies show some limited effects in reducing procyclicality. More often, studies show no statistically significant evidence of funds (or fiscal rules) dampening procyclicality or moderating public spending. Often, the existence of a resource fund (even in countries that also have fiscal rules) appears not to have had a positive impact on macroeconomic and fiscal outcomes, or on government saving. Accumulation of gross assets in a resource fund has not necessarily represented genuine financial saving and wealth accumulation (Bova, Medas, and Poghosyan 2016; Heuty and Aristi 2010; IMF 2015; Natural Resource Governance Institute 2014; Villafuerte, López-Murphy, and Ossowski 2010).

Finally, if annual budget expenditures are prudently determined within an MTEF and reasonable liquidity cushions that can be used flexibly in case of downturns are maintained (as suggested earlier in this chapter), it would be redundant to have an arbitrary and mechanistic arrangement that shifts money away from the budget when resource revenue is higher than budgeted or that provides money to the budget when it is lower.

On balance, therefore, funds with rigid operational rules are best avoided. The advantages of these funds in stabilizing expenditure and promoting saving are uncertain because money is fungible, they may hamper effective fiscal and asset management, and they often entail costs.

Financing Funds: Design and International Experience

Financing funds are fundamentally different from the funds just discussed. They have flexible operational mechanisms aligned with overall fiscal balances. Their operational objective is to finance the budget. Specifically, the fund accumulates budget surpluses and finances budget deficits. For example, in Norway, the fund receives all resource revenue and finances the budget's nonresource deficit by way of a reverse transfer.

Therefore, unlike the funds discussed above, these funds do not try to "discipline" expenditure by removing resources from the budget. The flows in and out of the fund depend on resource revenue, macroeconomic conditions, and policy decisions embodied in the nonresource budget. Thus, the focus of fiscal policy design and implementation is fully devolved to the budget.

These funds provide an explicit and transparent link between fiscal policy and asset accumulation. They have avoided the problems just discussed and addressed money fungibility issues. These funds do not impose rigidities and inefficiencies on fiscal policy and asset/liability management because the mechanism rules out financing the buildup of assets in the fund by borrowing or running down other assets.

Countries with financing funds have set fiscal policy objectives directly in fiscal rules or fiscal guidelines that have been broadly observed, underpinned by strong institutions. In these countries, the fund is merely a financing mechanism for the budget. Chile and Norway are notable successful examples of this setup.

Domestic Operations of Resource Funds

A number of resource funds, including many of recent vintage, are allowed to undertake domestic operations. For example, certain funds in Algeria, Angola, Azerbaijan, Gabon, the Islamic Republic of Iran, Kuwait, Qatar, Russia, and the United Arab Emirates have invested abroad and have also carried out operations at home. Several countries have established or are establishing sovereign development funds that only invest domestically—the strategic investment funds (SIFs).

The use of resource funds for domestic investment has become increasingly popular in recent years, predominantly in emerging markets and developing economies. This tendency is likely to have been at least partly related to abundant inflows of resource-related revenues during the commodity boom that led to public spending euphoria and the creation of funds in a number of countries, exceptionally low yields on foreign assets that lowered the perceived opportunity cost of domestic investment (including financial investment), and political economy considerations.

Should resource funds undertake domestic investment and spending? It is necessary to distinguish different cases: (i) domestic investment or spending only for *public policy purposes*, (ii) funds that have a “double bottom line” investment criterion of a *commercial financial return and an economic impact*, and (iii) funds that hold domestic financial assets purely on a *commercial basis* as part of their portfolio management.

Funds That Undertake Spending for Public Policy Purposes

Domestic investment and other spending that resource funds undertake only for public policy purposes are noncommercial activities that could be replicated through the government budget’s tax and expenditure policies. Various reasons have been put forth for policy-based spending by resource funds: (i) to get around weak PFM systems and ineffective, inefficient, or corrupt budget systems; (ii) to support development by undertaking public investment projects in infrastructure or social infrastructure, by delivering public services, or by financing the private sector on the basis of public policy objectives; or (iii) to prevent potential over-spending or rent capture by keeping resources off budget and managed by a separate entity.

Resource fund spending raises some fundamental macroeconomic and PFM questions:

- Investing or spending domestically could transmit resource revenue volatility to the economy and be procyclical. What will ensure that resource fund expenditures do not undermine macroeconomic stability or contribute to Dutch disease?
- How will fund spending be protected from revenue volatility?
- How will overall spending priorities be set? Which expenditures will be financed by the budget and which by the fund, and why? How will coordination with the budget be ensured to prevent fiscal fragmentation and dual budget problems? How will the standing of the standard budget as the main fiscal management tool be preserved?

- Will fund investment pass the tests of evaluation, contestability, and prioritization?
- What expenditure commitment and procurement systems will be used?
- Will the expenditures by the fund be subject to adequate control, accounting, reporting, audit, ex post evaluation, and disclosure mechanisms?
- How will fund performance be assessed and managerial accountability maintained if fund managers can claim that domestic public investment requirements stand in the way of achieving satisfactory rates of return on fund assets?
- How will political capture of the fund by special interests be prevented and governance concerns addressed?

In practice, the evidence does not support claims that noncommercial public investment by resource funds is superior to budget spending in RRCs. Indeed, in a number of cases, lack of transparency in fund expenditure and other operations has hampered legitimacy and has, over time, undermined public support for the fiscal policy objectives related to the fund's operations.

A number of funds have come under pressure to capture their expenditures, to finance politically motivated projects, and to increase government spending outside the budget. In some cases, the limited expertise of resource funds with public service delivery, and the funds' limited accountability, have raised serious concerns about the effectiveness, prioritization, and probity of such spending (Shields 2013). For example, funds with spending authority in the Canadian province of Alberta, the Islamic Republic of Iran, Nigeria, and República Bolivariana de Venezuela have encountered problems in the past.

The use of funds to bypass the budget can have a negative impact on the development of the PFM system: scarce resources are diverted to the fund, and the core budget may face less scrutiny.¹⁹ It is better to tackle PFM shortcomings directly rather than attempting to bypass them through a spending fund.

It is sometimes argued that it makes little sense for the funds of developing RRCs to place assets abroad, because the marginal productivity of domestic public capital is higher than the yield on foreign assets: the funds should foster development by undertaking domestic investment. These arguments arise from a partial and fragmented view of public finance and a misunderstanding of the fund's role. Decisions on the allocation of revenue for investment at home or abroad are independent of whether a resource fund is in place. The existence of a fund—an *institutional* issue—is irrelevant for the strategic *policy* issue of how to allocate scarce public resources. If public noncommercial domestic investment is a better use of public resources than foreign asset accumulation once all the multiple dimensions of this issue have been evaluated, then the investment should be undertaken, preferably by the budget (for the reasons discussed above), and the resource fund would simply receive fewer resources to place abroad.

In light of the previous discussion, public policy spending by resource funds is not recommended; the spending should be kept on budget. The fund should focus on maximizing financial returns subject to tolerable risk and desired liquidity restrictions. This approach then raises the issue of whether the fund's mandate may include the authority to undertake domestic *financial* investment as *part of its asset management*. This issue is discussed next.

Investment in Domestic Financial Assets for Commercial or Near-Commercial Purposes

Some SWFs, including a number of resource funds, invest in domestic financial assets (DFAs). Resource funds may invest in DFAs either on purely commercial grounds, as part of their asset management strategies, or in conjunction with other objectives, such as supporting private sector development, financing infrastructure by acting as a cornerstone investor in PPP projects, deepening undercapitalized domestic capital markets, and attracting foreign investment to strategic sectors, as in the case of SIFs.

The use of resource funds for domestic financial investment is hotly debated. On the one hand, it is argued that poor capital-scarce countries could reap potentially higher risk-adjusted returns from investing commercially at home than by investing in global financial markets. On the other hand, there are concerns about the potential quality and returns on DFAs because the owner of the fund—the government—may be the same entity promoting the financial investments, potentially generating conflicts of interest. Risks may also exist for political capture, poor investment decisions, and governance issues, as well as procyclicality and greater macroeconomic volatility.

The differences between resource funds and nonresource SWFs, SIFs, and other publicly owned investment funds, such as public pension funds, should be borne in mind. Several nonresource SWFs—including pension reserve funds, such as the New Zealand Superannuation Fund—have a significant share of domestic assets in their portfolios. These funds derive their funding from non-resource bases, such as fiscal transfers and pension contributions. Resource funds, however, are not accountable to a strong stakeholder group, such as pension contributors or taxpayers, and do not need to raise capital in financial markets. They are also likely to face stronger spending pressures than other publicly owned funds with clearly defined maximization of asset value objectives. They are therefore more vulnerable to political interference or elite capture.

The risk of policy amplifying booms and busts extends to domestic financial investment by resource funds. During resource revenue downturns, if the budget comes under pressure, the resource fund may not be de facto independent, as it may be called on to help finance the budget, forcing it to procyclically sell DFAs.

Therefore, although the domestic financial investment of resource funds may open up new possibilities, the approach also carries significant risks. Can they be mitigated and managed? Gelb, Tordo, and Halland (2014) and Halland and others (2016) provide the following suggestions:

- The fund should not invest in public policy–motivated projects justified primarily by their economic or social externalities. Those projects should be in the budget.
- Instead, domestic financial investments should be limited to commercial or quasi-commercial undertakings with market or near-market financial returns. Where the fund invests with strategic objectives, it needs to maintain a market-based discipline so that those objectives are subordinated to the maximization of risk-adjusted financial returns, commercially based hurdle rates of return, or both. This approach would preserve an

intergenerational wealth transfer function for the fund. Wherever subsidies would be needed to cover viability gaps, those subsidies would need to go through the budget.

- The fund should undertake direct or portfolio domestic investments only as a minority shareholder, leveraging private investment to bring in expertise and share project risk.
- The fund's investment in DFAs must be considered in the context of the overall macroeconomic framework and must be sustainably phased to avoid boom–bust episodes.
- The fund's management responsible for the investment portfolio should have legal and functional independence—to enable it to operate as a professional investment entity within its government-defined mandate.
- Strong external and internal governance and transparent reporting, as well as an independent and qualified audit function are crucial prerequisites. The fund's governance needs to be based on a clear separation of responsibilities between the ownership role of the government, usually represented by the ministry of finance; the supervisory role of the fund's board; and the operational role of the fund's management.

Institutional Arrangements for Funds

The establishment of a fund entails decisions about how it is going to be integrated with the fiscal framework, the budget process, and asset and liability management. These decisions in turn have implications for institutional arrangements.

The existence of a stabilization or savings fund need not imply the creation of a new institutional mechanism. A “fund” may be a fund in name only. This accounting-only design is referred to as a “virtual” fund, because there is no separate institutional structure for the management of the fund. Certain resources would be identified as belonging to the fund and could be held in the government's main account, or in a separate government account with the central bank.

Alternatively, resource funds may be extrabudgetary funds with their own management, specific procedures, and accounts. Good PFM practice principles for all extrabudgetary funds, including resource funds, include the following (Allen 2013; Shields 2013):

- Detailed accounts and other information on fund operations should be included in budget documentation to foster fiscal transparency. The requirements for the classification of fund revenue and expenditure, accounting, reporting, control, and audit should be established using either the budget system or comparable parallel procedures.
- Data on the fund should be consolidated with other government financial information for the purposes of fiscal analysis and should be presented in fiscal reports.
- Projections for the fund should be presented to the legislature as part of the budget process.

Funds that spend or invest domestically for public policy purposes should be distinguished from funds that invest in DFAs for commercial and asset management reasons. This matter concerns, in particular, independence of fund management and the degree of budget integration.

Resource funds that invest or spend domestically to carry out public policies require close integration with the budget. This practice is key to maintaining overall coherence and integrity of public spending and fiscal policy. Given the quasi-fiscal nature of the operations of these funds, close integration with the budget process is required to avoid expenditure fragmentation, to preserve unified fiscal control, and to ensure consistent prioritization across government operations. In addition to the points above, this procedure would involve, at least, the following:

- Budget formulation, MTEFs, and fiscal reporting should focus on a consolidated presentation (including the operations of the fund) to provide an accurate and comprehensive picture of public finances for fiscal policy formulation and assessment.
- All fund spending is best executed by the treasury to avoid duplicate processes.

Resource funds managed on a statutory and demonstrated commercial basis may be granted greater independence, subject to strong reporting and audit requirements. The management entities of funds that invest part of their financial assets domestically on purely commercial grounds would exercise independence of investment decisions, free from political interference, under the mandate provided by the government. In these cases, only the overall domestic financial investment envelope would be coordinated with the budget, for macroeconomic management purposes.

The fund would need to provide transparent and independent reporting of results, with internal and external audits. Similar considerations apply for funds with a “double-trigger” investment criterion, but checks and balances may need to be even stronger for this category—particularly in weak governance contexts where political interference with investment decisions is otherwise likely.

The differentiation between commercially oriented resource funds and other funds can be complex (Shields and Villafuerte 2010). A key issue is the ability to assess the purpose and nature of fund operations. Moreover, the character of those operations or of fund orientation may evolve with time as circumstances or politics change.

For example, some financial investments that turn out to be profitable may have been initially undertaken because of policy motives. Conversely, funds initially set to be managed on commercial principles may subsequently succumb to political pressures for directed financial investment, public spending, or lending for noncommercial purposes.

A resource fund can hold a significant share of the public sector’s financial resources and be an important element of the government’s overall asset and liability management structure. Readers interested in resource fund asset management issues are referred to Al-Hassan and others (2013); Das, Mazarei, and van der Hoorn (2010); IMF (2012b, 2014); Megginson and Fotak (2016); and Shields (2013).

Governance, Transparency, and Accountability

Lessons from experience and best practice suggest that good governance of a fund and strong transparency are important for the achievement of its objectives. Good governance and transparency are key to the following:

- *Garnering public support for the fund and its objectives.* Society is more likely to support arrangements for the accumulation of potentially significant country assets when it receives reliable information about the management and evolution of those assets and when it can exert pressure for good asset management. Lack of transparency can hamper legitimacy and fetter public support for the fund.
- *Enhancing fund performance.* Transparency fosters accountability to the public, thereby providing incentives for the fund's management to maximize returns subject to their mandate and to run the fund with integrity.
- *Helping prevent political capture, mismanagement, corruption, and abuse.* This objective is particularly important, given the magnitude of the public resources that may be at stake.

Against this background, stringent mechanisms to ensure transparency, governance, and accountability are key requirements. Rigorous procedures must be in place to help prevent misuse of public resources and to ensure that government assets are properly and prudently managed. In particular,

- The framework for the resource fund should be set up and supported by legislation.
- Clear lines of responsibility and accountability should be established between the owner (usually represented by the ministry of finance) and the fund manager.
 - The owner of the fund should have overall responsibility, should set out strategic investment guidelines, and should evaluate operational management.
 - The manager should implement the investment strategy set out by the owner, should manage risk within the permitted parameters, and should ensure proper accounting and reporting according to the regulations.
- Openness is critical. It involves the public disclosure of fund objectives, regulations, investment strategies, and accountability structure, as well as periodic and timely public reports on fund performance and disclosure of fund assets.
- Control and evaluation mechanisms include parliamentary oversight, independent internal and external audits, and performance assessment.

Summary and Conclusions

Resource revenues pose challenges to fiscal management in RRCs. These revenues are volatile and uncertain; they are largely injected into the domestic economy through fiscal policy; they are time-bound; and they give rise to rents that can cause political economy complications and public spending of poor quality.

These challenges are significant, but they are not insurmountable, as the experience of a number of RRCs shows. Fiscal policy can address them and help turn nonrenewable resources into a blessing rather than a curse.

A recurrent challenge for RRCs has been how to manage the impact of volatile and uncertain resource revenues on macroeconomic and financial stability. This issue is key to development because macroeconomic stability is important for sustainable growth and poverty reduction. Volatility in these countries is often exacerbated by procyclical fiscal policies. Strong arguments exist for smoothing public expenditure and avoiding procyclicality and boom–bust cycles. Efforts to strengthen fiscal transparency and accountability can help mitigate the political economy problems often associated with managing resource rents.

Expansionary fiscal policies are often undertaken during booms without a full understanding of the fiscal risks they entail. Excessive risk taking is often at the root of policy procyclicality and the costly fiscal adjustments that have proved so damaging in many countries. Fiscal policy must take fiscal risks into account, especially revenue volatility and uncertainty. Fiscal risk analysis—including assessment of the impact of potential exogenous shocks on fiscal outcomes—should be used to evaluate the risks associated with proposed spending paths. This analysis would help set overall expenditure envelopes. Disclosure of fiscal risks can dampen resource euphoria, help address spending pressures, and build legislative and public support for prudent policies.

Nonrenewable resources are exhaustible and risk obsolescence. Countries must consider how to allocate finite resource wealth to the current generation and to future generations. Fiscal sustainability analyses should include the exhaustibility of the resources and should be extended into the long term. Scaled-up public investment to relieve pressing infrastructure and human capital deficits can be consistent with the preservation of fiscal sustainability. This approach will depend on whether the investment has a positive impact on growth and whether the government can reap fiscal dividends from that growth.

The quality of public expenditure and, in particular, the productivity of public investment are key determinants of the extent to which resource wealth can be turned into other productive assets that foster sustainable growth, development, and poverty reduction. Depending on specific country circumstances, PFM reforms in areas such as legal framework, strategic planning, annual budgeting, budget execution, audit, and reporting may be needed to put time-bound resources to good use. If the PIM system (including project appraisal, selection, execution, operation, and evaluation) is weak, upgrading it (investing in investing) promises ample rewards in terms of productive and efficient use of public resources.

A number of RRCs have put in place special mechanisms and institutions as part of their fiscal frameworks to help fiscal management. These mechanisms include MTEFs, fiscal rules, and resource funds.

MTEFs can help provide badly needed longer-term perspectives on annual budgeting. They can (i) promote fiscal discipline, (ii) sharpen the focus on medium-term resource availability, (iii) help limit fiscal risks, (iv) encourage the framing of policies in a longer-term framework, (v) bring out acute policy trade-offs more clearly, (vi) get the political debate to span longer horizons, and

(vii) foster transparency, accountability, and informed public discussion. Successful MTEF implementation requires, among other things, strong political commitment, integration with the budget process, and the gradual movement from basic MTEFs toward more advanced frameworks.

Fiscal rules in RRCs are often motivated by the desire to lessen the procyclicality of fiscal policy and to promote savings and sustainability. But in these countries, the design and implementation of appropriate fiscal rules is more challenging than in other countries. Rule design matters—a number of fiscal rules seen in other countries are not appropriate for RRCs. Among the key factors for the success of fiscal rules are (i) strong consensus and political commitment, (ii) design of rules that takes into account the particular circumstances of the country, (iii) appropriate flexibility, (iv) PFM systems that are up to the task, and (v) strong fiscal transparency and effective communication.

Resource funds have been established in many RRCs. The rationale for a resource fund should be carefully considered—do the potential benefits outweigh the potential costs? Funds with rigid deposit and withdrawal rules are best avoided—their benefits are uncertain, but they can entail fiscal costs. Funds with flexible rules are preferable. The best approach is not to grant spending authority for public policy purposes to funds and to preserve the integrity of the budget. Funds that can spend off-budget should be closely integrated with the budget process to preserve unified fiscal control. Funds that can invest in DFAs on commercial or quasi-commercial principles should be free from political interference and subject to strong reporting requirements. Stringent transparency, governance, and accountability mechanisms are essential to ensure that public assets are properly managed.

Notes

This chapter is a heavily abridged version of chapters 1–8 in *Fiscal Management in Resource-Rich Countries: Essentials for Economists, Public Finance Professionals, and Policy Makers* (Ossowski and Halland 2016). The book provides a more comprehensive discussion of the relevant issues and recommended practices and illustrates many points with examples from country experience that could not be included in this chapter because of space constraints. The figures in the chapter have been updated.

1. *Dutch disease* is the tendency for large resource revenues to appreciate the currency in real terms, which then damages the nonresource tradable sector. Foreign revenue inflows that are spent (by the government or the private sector) lead to an increase in domestic demand relative to domestic supply, which can increase the prices of nontradable goods and services and cause an appreciation of the currency in real terms (Aizenman and Marion 1999; Aizenman and Pinto 2005).
2. The NRB is the difference between nonresource revenues and nonresource expenditures. It abstracts from revenue fluctuations arising from changes in international resource prices, from changes in resource production volumes and costs, and from other resource-related factors. Annex I in Ossowski and Halland (2016) provides a detailed discussion of indicators for fiscal analysis in RRCs.
3. For example, the volatility of central government spending among Sub-Saharan African oil-exporting countries from 2001 to 2013 was about one-third higher than that of Sub-Saharan African oil importers.

4. The assessment of the cyclical policy of fiscal policy in RRCs is more challenging than in other countries and raises a number of methodological issues. Annex 2 in Ossowski and Halland (2016) discusses the main approaches that have been used to estimate cyclically adjusted fiscal positions in RRCs.
5. Gelb and Garsmann (2010) argue that the loss from underspending during booms is modest, whereas the loss from overspending could be very large.
6. In RRCs with federal structures, the assignment of revenues and expenditure responsibilities to various levels of government, as well as intergovernmental relations and coordination, raises complex issues. Their discussion lies outside the scope of this chapter. Interested readers are referred to other chapters in this volume, in particular, to chapter 10. Discussions of fiscal federalism issues are provided in Ahmad and Brosio (2006, 2015) and Ter-Minassian (1997). Fiscal federalism in the specific RRC context is discussed in Ahmad and Mottu (2003); Anderson (2012), which covers the features of oil and gas revenue management in 12 federal RRCs; and Brosio (2003).
7. Traditional DSAs in other countries incorporate intertemporal welfare choices implicitly, for example, by recommending the stabilization of the debt-to-GDP ratio at a “prudent” level. This recommendation has fundamental implications for the assignment of debt repayment responsibilities between current and future generations—implications that are rarely made explicit.
8. For an in-depth discussion of the issues, see Baunsgaard and others (2012) and IMF (2012c).
9. It should be noted that the standard DSAs of emerging markets and developed economies also rely on the primary balance and also rarely distinguish between public consumption and investment.
10. Baunsgaard and others (2012) and the International Monetary Fund (IMF 2012c, 2015) discuss modified PIH approaches with scaled-up capital spending. They also provide practical examples of how such approaches can be implemented.
11. Hartwick’s rule proposes a concept of sustainability in RRCs: if the value of investment in productive capital offsets declining stocks of exhaustible resources, a constant level of consumption can be sustained.
12. Dabán and Héris (2010, 2013) offer suggestions for well-designed and sequenced PFM reforms.
13. Box 6.1 in Ossowski and Halland (2016) provides country examples.
14. See IMF (2009) and Schaechter and others (2012) for background and analysis of fiscal rules, including performance in the global financial crisis. Cordes and others (2015) discuss expenditure rules. See Corbacho and Ter-Minassian (2013) for PFM preconditions for introducing fiscal rules and Ter-Minassian (2010) for preconditions for structural fiscal rules.
15. Automatic stabilizers are the fiscal revenue and expenditure items that adjust automatically to cyclical changes in the economy. For example, as output falls in a recession, revenue collections will decline, whereas expenditure on unemployment benefits will increase as jobs are lost. Hence, in a recession and in the absence of discretionary fiscal policy measures, the fiscal position is typically expected to deteriorate. See Baunsgaard and Symansky (2009).
16. Ossowski and Halland (2016) provide examples.
17. RRCs that have, or have had, resource funds include the following (countries marked with an asterisk also have, or have had, a fiscal rule or guideline): Algeria, Angola, Azerbaijan,* Bahrain, Botswana, Brunei Darussalam, Chad,* Chile, Ecuador,* Equatorial Guinea,* Gabon, Ghana,* the Islamic Republic of Iran, Kazakhstan, Kuwait, Libya, Mexico,* Mongolia,* Nigeria,* Norway,*

- Oman, Papua New Guinea, Qatar, the Russian Federation,* Sudan, Timor-Leste,* Trinidad and Tobago, the United Arab Emirates, and the República Bolivariana de Venezuela.* The U.S. state of Alaska and the Canadian province of Alberta* also have funds. Bacon and Tordo (2006) offer a review of a number of resource funds.
18. Money is fungible because its individual units are equivalent and thus amenable to mutual substitution.
 19. Box 8.4 in Ossowski and Halland (2016) provides examples.

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Transparency in the Petroleum Sector: The Importance of Information and Clear Processes for Effective Development in Fragile Contexts

Michael Jarvis

Introduction

Oil, gas, and mining activities have the potential to stimulate vast improvement in the lives of citizens in resource-rich countries. If managed well, extractive industries can generate significant wealth that can serve present and future generations. However, in practice, it is often a challenge to realize this positive potential. This challenge stems from a range of factors specific to the extractives sector: (i) the stakes are high, (ii) significant power disparities exist among the actors involved, (iii) time horizons are long, and (iv) the impacts of extractive activities are often geographically concentrated (Bebbington and others 2008).

This specific combination of challenges places stress on the institutions that regulate the sector and on the systems that support good decision making. In fragile and conflict-affected states, where institutional capacity tends to be weak and power highly contested, these difficulties are further amplified.

How can countries make good policy and effectively implement it to deliver positive impacts on the ground? It is true that there is no standard formula for getting this policy right (Wall and Pelon 2011), but one often-suggested tool is transparency. Transparency is a valuable aid to ensure that sector development is effective and, in particular, that domestic revenues are effectively mobilized to finance development and boost shared prosperity.

The petroleum industry is, by nature, driven by “rents”—the profit margin on the extraction and use of hydrocarbons. This margin is, on average, much greater for hydrocarbons than for most other public assets. Because of this, information on the activities of petroleum companies is critical. But the industry is often characterized by ineffective and opaque management and, as a result, has rarely contributed as much as it could to the economies of resource-rich countries. Instead, mismanagement and limited scrutiny fuels economic inequality, which can in turn contribute to conflict.

In the 21st century, however, a shift in global practice has been seen. Transparency is increasingly the norm within the extractives sector. The initial emphasis was on increasing the transparency of payments made by investing companies to governments, but transparency practices have expanded to cover the entire extractive industries (EI) value chain—that is, the series of decisions that govern sector outcomes, from the decision to extract, to the awarding of licenses and contracts, through to the collection and spending of revenues for sustainable development. A growing amount of information on EI investments is available from both producing countries and the countries importing the resulting petroleum and minerals.

While not a universal remedy in and of itself, transparency plays an important part in ensuring effective use of natural resources to improve development outcomes and spur growth in resource-rich countries. This chapter will explore specific contributions that transparency can make toward effective management and beneficial outcomes of the extractives sector. It will include a detailed description of specific applications of transparency along the EI value chain as well as an explanation of relevant international initiatives that help drive increased transparency, such as the Extractive Industries Transparency Initiative (EITI). In a fragile context, information asymmetries can be exploited by certain players and may exacerbate tensions. Responsible and proactive transparency can increase the potential for good outcomes from petroleum development.

Transparency: What Is It and Why Is It Important?

Transparency is the quality of being clear, honest, and open; it is important in terms of not just information but also processes and decisions.

Transparency may help address a host of negative behaviors arising from the unique challenges posed by the extractives sector—including secrecy, corruption, conflict, and poor development planning (Desai and Jarvis 2012; Lahiri-Dutt 2006)—which may be particularly harmful in fragile states. Transparency can have a positive impact on each sector of society. For the government, transparency can inform effective policy making and implementation and help rebuild trust and public support in fragile contexts. For companies, transparency can contribute to securing the social license to operate, which is essential when a

project can entail a local presence for decades. In a resource-rich country, transparency of information regarding the extractives sector empowers citizens and civil society actors to hold both operating companies and the government to account for responsible extraction and the use of natural resource revenues toward positive and equitable development outcomes. As noted by Joseph Thogo of Deloitte East Africa, “An environment of transparency improves the business environment, enables citizens to participate in the sector from a position of knowledge, and ensures support for investments and investors” (Thogo 2015).

Effective management of the extractive sector relies on key components of good governance, essentially: (i) the governing authority’s capacity to set appropriate policy and rules, (ii) the capacity to ensure that policies are implemented and rules are followed, and (iii) the accountability of those setting and enforcing the rules. If effective rulemaking, implementation, and accountability make up the building blocks of good governance, then transparency provides the mortar to solidify each component. An effective commitment to the petroleum sector’s transparency should reinforce these three components of good governance. This commitment means ensuring that all stakeholders have access to the information needed to (i) develop policies, laws, and regulations that are adequate in coverage and appropriate in detail; (ii) track rule compliance and enforcement; and (iii) assess the adequacy of arrangements to hold decision makers at all levels responsible for outcomes.

Thus, transparency can be a particularly useful tool in reducing revenue mismanagement and corruption, in enhancing investor perception and credibility, and in managing public expectations of the sector and developing public trust—all of which gain added urgency in fragile and conflict-affected settings (IMF 2015). Transparency’s role in helping maximize revenues is discussed later in this chapter. It is worth noting that growing evidence suggests that improved governance and control of corruption—factors reinforced by greater transparency—correspond to a large increase in per capita income in the long term. This increase is shown to be even more substantial in resource-rich countries (Kaufmann 2015).

Investor Expectations of Transparency

Access to capital is critical for petroleum development. Investors are concerned about risks associated with the sector and are increasingly watching the level of transparency around a particular investment and its country context. They expect basic levels of transparency, such as the disclosure of revenues and of a project’s environmental and social assessments, on the part of both host governments and firms exploring and operating in the country. Financiers seek reassurance that their financing is generating value, and they want to avoid any reputational concerns. Accordingly, good governance around petroleum investments matters to investors.

The International Finance Corporation (IFC) is the private sector lending arm of the World Bank Group (WBG). It seeks to build sustainable businesses and deploys its own resources to coinvest in projects that should have a developmental as well as a commercial benefit. IFC’s investments are guided by the institution’s Performance Standards on Environmental and Social Sustainability, which “are designed to help [clients] avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder

engagement and disclosure obligations of the client in relation to project-level activities.” Disclosure of information is now included as an explicit requirement throughout the document (IFC 2012). In addition, IFC requires firms to disclose both revenues and contracts for extractives projects in which they invest.

IFC has an important market-leading effect for investors. Following its lead, 80 financial institutions from countries around the world have signed the Equator Principles, by which they commit to applying the IFC Performance Standards in their own investments. Hence, information disclosure and stakeholder engagement are key factors in investment decisions (Equator Principles Association 2013).

A key aspect of both the IFC Performance Standards and the Equator Principles is an emphasis on social and environmental considerations related to the extractives sector, which, unregulated, can be a key source of tension and even conflict at both the local and national levels. In terms of potential negative social impacts, key considerations may include cultural disconnect between communities and companies; community displacement; lack of local content provisions; arrival of external stakeholders, including workers, company executives, or security forces; and a perceived lack of information. In terms of potential negative environmental impacts, key considerations may include the depletion or pollution of water resources; degraded air quality from increased dust, erosion or land degradation; or general environmental degradation. To avoid the potential conflict arising from these issues, the United Nations (UN) notes that when “communities and stakeholders are alienated from the assessment process the chances of conflict and persistent social pathology are vastly increased.” Impact assessments should link to benefit sharing negotiations, but this link should be “supported by continuous, transparent, and effective engagement of communities and stakeholders” (UN Interagency Framework Team for Preventive Action 2012).

Managing Expectations and Building Trust

“Transparency is the key to informed debate. It creates a conversation informed by facts—rather than prejudice, dogma and myths. . . . Without trust there can be no reform. And in my view, without transparency there can be no trust” (Walsh 2015).

Developing petroleum resources is an inherently uncertain activity in terms of geology (whether commercially viable fields will be discovered), legal issues (such as maritime boundaries), operational issues (such as ability to contain costs), and profitability (as oil and gas prices are subject to large fluctuations). In addition, a substantial lag time exists between an oil or gas discovery and profits being realized, not least due to operators seeking to first recover their development costs. The time before significant revenues flow can vary significantly, depending on the fiscal regime and investment agreement terms. Such uncertainties make it difficult to accurately anticipate the benefits to a country, whether in jobs, revenues, or related infrastructure development and can lead to a significant mismatch between expectations—particularly on the part of those in government or society more broadly—and the eventual reality. Resulting disappointment can fuel conflict at both the local and national levels. Proactive dissemination of information—ideally part of a comprehensive communications plan on the part of the government—helps to guard against uncertainty and

provides countries with tools to plan sustainably for the future by exploring different scenarios.

Accordingly, in fragile and conflict-affected contexts, information—combined with honest public dialogue and consultation—can be an impetus for rebuilding trust between the government and citizens and establishing trust between the host country as a whole and the investors. Clarifying the decision-making processes for all interested parties can help lessen the potential for violent conflict. Similarly, it can reinforce trust between federal and subnational levels of government, helping level the playing field in terms of knowledge. If implemented effectively, then the availability of information will be an important input toward the greater accountability of decision makers and a cooperative rather than confrontational relationship between authorities, stakeholders, and investors.

Transparency across the Value Chain

The EI value chain is a useful concept for analysis of the sector (Alba 2009). Policy makers may use it to pinpoint exactly what change might need to occur and when. It breaks the extraction process into stages, helping us think through the relevant institutions and their functions—the definition of roles and responsibilities at each step. Each stage of the chain is inextricably linked, and transparency is most useful when viewed along the whole chain rather than at individual stages. The purpose of the chain is to provide a systematic framework for assessing potential gaps in transparency and to indicate where changes are most necessary.

Strengthening the transparency of data and processes along the value chain helps citizens assess whether natural resources are being managed in their interests. It can also greatly facilitate the flow of information across ministries and agencies of government, assisting in coordination. For example, an agency responsible for overseeing the implementation of certain contractual provisions may not have access to the contract in question. Disclosure of contract details eliminates the possibility of such a situation.

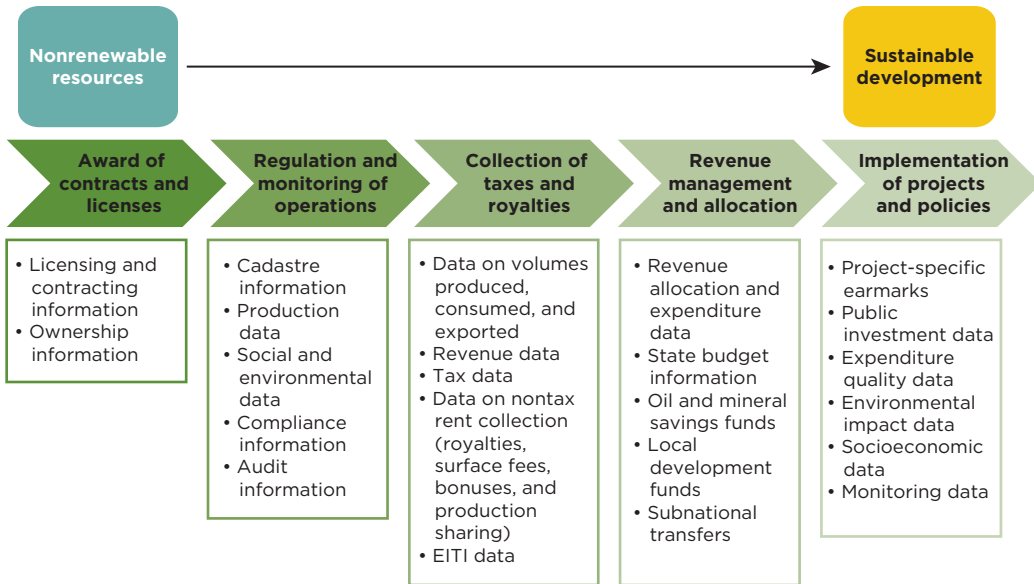
The list below provides examples of some global practices at each stage shown in figure 7.1. It is not comprehensive and recognizes that, to date, global efforts to promote EI transparency have focused on fiscal management. Important considerations—such as environmental and social implications—may not be sufficiently highlighted in the current iteration of the value chain.

Stage 1: Licensing and Contracting

The award of contracts and licenses is a critical step toward ensuring good value for money from natural resources. The terms laid out in these contracts and licenses—and the establishment of roles and responsibilities for awarding them—will continue to have an effect throughout a project's life cycle. The country's constitution, laws, regulations, and publicly available procedures should clearly establish what institutional entity and order of government has the power to grant rights to explore, produce, and sell resources.

A range of initiatives support transparency at this stage in the value chain and include the disclosure of information on the allocation of licenses for exploration or production, which should also be publicly accessible. Some countries

FIGURE 7.1 The Extractive Industries Value Chain and Types of Information To Be Disclosed



Source: Adapted from Alba 2009 (figure 1).

Note: EITI = Extractive Industries Transparency Initiative.

attempt to combine various data on extractives in a single publicly accessible portal such as a licensing portal in Sierra Leone, which combines mining license and revenue data.¹ The mineral rights data is published directly from the National Minerals Agency Mining License Administration System, where all licenses are managed. Ideally, information should be drawn from primary databases that governments actively manage, rather than to create duplicate reporting processes that increase potential for confusion and extra management burdens. At the same time, thought should also be given to the selection of an appropriate interface to display information that is fit for the purpose.

Contractual agreements between the government and petroleum investors should also be part of a transparency regime. A growing number of countries and regions—from Colombia to Ghana to the Kurdistan Region of Iraq to Peru to Timor-Leste—now publish contracts, although often the public has access only to the main text of the contract with annexes that typically contain many project specificities remaining confidential. A growing list of companies are also now championing contract disclosure. While mining companies were first to take this step, several petroleum companies now support this step. Total was the first major oil company to do so in 2018 (Lasalle 2018). Publishing contracts in full is the recommended good practice of both the International Monetary Fund (IMF) and the World Bank, as well as a requirement of companies involved in projects in which IFC invests. The Open Contracting Partnership, which promotes transparency and participation in public contracting, offers support to governments on contract publication and works with a range of organizations.²

Building on the transparency of licenses and contracts, there is growing attention on the disclosure of beneficial owners of companies with whom the

state is doing business. This issue is not unique to the EI. Most countries have public registries of corporate ownership, and it is becoming increasingly common for such registries to be available online, making it possible to quickly map the ownership of firms in any major company, including the oil and gas sectors. Information from registries can be combined with information available in public disclosures of publicly listed companies. However, there is still a lot of progress to be made in this area. The level of the disclosure differs across countries, with many not allowing disclosure of individual owners' data due to personal confidentiality and personal protection laws, while others (such as the United Kingdom) requiring disclosure only above certain ownership thresholds. Governments continue to experiment with what is an effective beneficial ownership policy and practice—not the least of which is a cohort of EITI-implementing countries who are committed to sharing their experiences.

The consultancy OpenOil has used such sources to demonstrate the potential to map the complex web of corporate ownership of the state-owned Nigerian National Petroleum Corporation, for example, and of the international oil company BP.³ Such information can be useful for new producers in assessing the firms with whom they are doing business. Requiring disclosure of beneficial ownership can reveal or limit potential for conflicts of interest. However, such data alone may produce limited results. It gains its relevance when combined with other data points. Even then, knowledge of a beneficial owner that reveals a conflict of interest may not halt a deal. Inadequate legal frameworks or weak enforcement are often to blame. Ownership disclosure needs to be reinforced by establishing clear enforceable rules that prevent the conflict of interest and by instituting a routine practice of robust verification of legitimacy and compliance with the laws of companies and individuals registering their business.

Stage 2: Regulation and Monitoring of Operations

The regulation and monitoring of the operations stage is equally critical to the good management of the petroleum sector. Legal and regulatory frameworks detail the resulting roles and responsibilities of the government—including between different ministries and layers of government—and investors.

In terms of transparency at this stage, the IMF's *Guide on Resource Revenue Transparency* (IMF 2007) recommends disclosure of all government involvement in the resource sector through equity participation, disclosure of ownership structures of national resource companies and their fiscal role, and public availability of environmental and social impact assessments.

For government and investors alike, transparency is increasingly recognized as important for the smooth progression of a project. It is often nontechnical problems—including objections from affected communities who lack reliable information—that result in a majority of cost overruns and project delays (Davis and Franks 2014). As a result, the importance of securing the social license to operate from these communities becomes key, and companies are increasingly seeing the value in transparency and community engagement.

Some of the key questions at this stage include establishing whether

- Laws give citizens—and where appropriate the private sector, especially the domestic private sector—opportunities to provide input on policies, laws, and regulations

- Requirements for meaningful consultation, including amendments to policy and legislation, are present
- Policy and legislation contain provisions on citizens' access to information
- Organizations and agencies have appropriate rules and standards for transparency and for ethical behavior
- Effective sanctions for noncompliance or systems to tackle corruption exist
- Relationships between national oil companies and the government are clarified

Both the IMF and the WBG have developed good practice guidance and performance standards to support countries in effectively and transparently managing these important first two stages of the value chain. For more information, see Alba (2009).

Stage 3: Collection of Taxes and Royalties

Transparency is particularly important for maximizing revenue collection. Most transparency regimes worldwide focus on the collection and redistribution of funds through fiscal management and reporting systems. It was the driving motivation for the creation of the EITI, which has been an important vehicle in making revenue transparency the global norm. Certainly, revenue transparency is recommended good practice by a host of expert organizations and lenders, notably the WBG and the IMF, as a means to ensure adequate information for fiscal policy formulation and risk management.

According to the IMF's *Guide on Resource Revenue Transparency*, to combat these negative trends

fiscal transparency . . . will foster the efficient use of public funds, reduce the risk of unstable macroeconomic policies, and improve confidence in the budget process. [Further,] Institutional strengthening to improve transparency in vulnerable resource-rich countries should provide an ample pay off for a relatively modest investment. In particular, transparency can help establish and maintain credibility in regard to the collection and distribution of resource revenue. [Finally,] transparency of current revenue transactions is a potential area in which many low- and middle-income countries can make immediate measurable progress. . . . Equally high priority should be given to establishing clear policies regarding the pace of extraction and the use of resource revenues (IMF 2007, 2, emphasis added).

The core recommendation is for full disclosure of all resource-related revenue, loan receipts and liabilities, and asset holdings. Reports on government receipts of revenue payments from resource companies should be made publicly available as part of the government budget and accounting process. These reports should be timely, comprehensive, and regular.

Countries are already seeing the positive impact of increasing transparency in the collection of natural resource revenues. Nigeria's implementation of EITI identified \$8.3 billion in missing oil and gas payments owed to the government, most of which were owed by the Nigerian National Petroleum Corporation. As of 2013, \$2 billion of the owed revenues have been recovered. In addition to the

recovery of the revenue, the availability of information empowered Nigerian citizens to be engaged in a debate over how natural resources in their country could be managed better (EITI 2013b).

The private sector is also increasingly proactive in disclosing revenue-related information. Individual companies are now beginning to voluntarily disclose their payments to governments through their own reporting. Major firms, such as Rio Tinto and BHP Billiton, are committing to disclose all payments made to governments worldwide regardless of whether those countries are members of EITI or require disclosure. Companies such as Tullow Oil are championing their commitment to disclosure—of contracts and of revenues—as part of their brand and competitive advantage. And while transparency in the oil sector has suffered some setbacks, such as delays in relevant rule writing under the U.S. Dodd-Frank Act propelled by lobbying of some major oil companies and the formal exit of the United States from EITI in 2017, European Union (EU) members and many other countries continue to require transparency as part of the license for these companies to operate in their territory.

Stage 4: Revenue Management and Allocation

International experience, such as in Nigeria, suggests that the revenue management and allocation information—whether stipulated in legislation, policy, or contractual agreements—should ideally be public. The budget framework might incorporate a clear policy statement on the rate at which natural resources are to be exploited and how resource revenues will be managed. This statement might refer to the government’s overall fiscal and economic objectives, including long-term fiscal sustainability. All transactions related to resource revenues, including through resource funds, should be clearly identified, described, and reported in the budget process and final accounts documents.

Given the growing trend to create sovereign wealth funds (SWFs) or investment funds using petroleum revenues, mechanisms for coordinating the operations of any such funds should be clearly specified, including operational rules and investment policies. See box 7.1, for example, for more information on the use of SWFs for resource-related revenues in Timor-Leste.

In the federal states, the sharing of resource revenues between central and subnational levels of government is subject to particular scrutiny as it can often be politicized and contested. The rules that govern these allocations often shape the nature of the federal state and its relationships with the regions and provinces. The clear agreement between the different levels of government—ideally achieved through an inclusive stakeholder consultation—and the availability and dissemination of information specifying the breakdown of revenue and the details of transfers are vital to maintain overall trust and peace.

Stage 5: Implementation of Sustainable Development Projects and Policies

It is increasingly common for a portion of profits or royalties to be directed back to affected communities through dedicated funds or for companies to create or contribute to funds specifically for community development. Transparency can be important in ensuring that such earmarked funds are duly received and effectively managed. This process provides reassurance to citizens, who are able to track payments received and to know how revenues are being invested or spent.

BOX 7.1

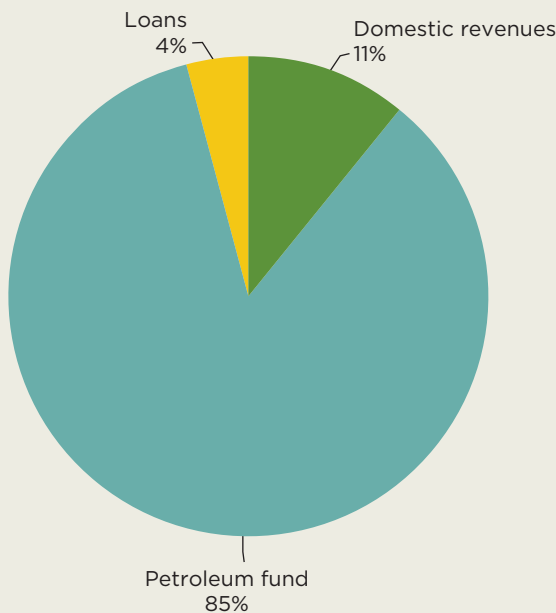
The Petroleum Fund of Timor-Leste

Timor-Leste—an Extractive Industries Transparency Initiative (EITI) member since 2007—is one of only five countries among the 51 implementing EITI member countries that made satisfactory progress toward achieving the requirements of the 2016 EITI Standard. In Timor-Leste, oil accounts for almost half of the country’s gross domestic product and 97% of exports (EITI 2015b, 19). (See figure B7.1.1.) Given the importance of oil to the economy, in 2005 the government established the Petroleum Fund of Timor-Leste, a sovereign wealth fund that constitutes the third pillar of the Timor-Leste Transparency Model. Unlike Ghana’s approach, Timor-Leste’s Petroleum Fund Law requires that all petroleum revenues be entirely transferred to the fund and invested

abroad in financial assets with an expected return target of 4.2 percent. The fund’s only transfers are made to the central government budget, which require parliamentary approval. As of December 2017, the balance of the petroleum fund stood at almost \$16.8 billion, including a \$4.8 billion return on investment since inception (Timor-Leste Ministry of Finance 2018).

The petroleum fund governance model is based on a high degree of transparency and disclosure of information to help build public support for responsible management of petroleum revenues and to reduce the risk of poor governance. The Petroleum Fund Law was designed to ensure that the government is held accountable to parliament through various reporting

FIGURE B7.1.1 The Petroleum Revenues and Government Expenditures of Timor-Leste, 2015



Source: Petroleum Fund Administration Unit, Ministry of Finance, Timor-Leste.

Note: Petroleum revenues support approximately 85 percent of government expenditures allocated in the 2015 budget of Timor-Leste.

box continues next page

BOX 7.1 continued

requirements. The Ministry of Finance is required to seek advice from the Investment Advisory Board before making decisions on any matter relating to the investment strategy or management of the Petroleum Fund.

The law is aimed to maintain Timor-Leste's oil wealth for future generations. Annual withdrawals from the Petroleum Fund are therefore subject to a ceiling based on estimated sustainable income, defined as 3 percent of the total petroleum wealth. Proposed withdrawals above this level must be justified before parliament. The government has enacted detailed legislation governing the extractive sector and publishes disaggregated reports on oil and gas revenues every three months, showing the types of payments made to the Petroleum Fund. To further promote transparency and accountability, the Petroleum Fund is overseen by the Petroleum Fund Consultative Council, consisting of the president; members of parliament; nongovernmental organizations; religious groups; and former presidents, prime ministers, and finance ministers. To make

information easily accessible, Timor-Leste implemented a Budget Transparency Portal website. The portal is updated daily and provides complete information on how public funds are being spent according to the budget and a historical record of data.

The system employed in Timor-Leste is meant to guard against the uncertainty inherent in the petroleum sector by ensuring the country's natural resource revenues benefit both current and future generations in an effective and transparent manner. However, despite the checks and balances previously described, the fund has lately been drawn down at a highly unsustainable rate. By some estimates, at the current rate of withdrawal the fund will be depleted in 10-15 years. Such practice puts prudent fiscal management into question and amplifies the risk of resource curse. It also serves as a reminder that even the best laws and rules put in place cannot guarantee the best outcome if the political will to enforce these rules is absent. However, transparency of the funds and their use can inform concerns and resulting debate.

Some countries, as in Colombia, allow petroleum revenues to be traced all the way down to spending on local schools and clinics, though such comprehensive disclosure remains the exception. This connection to spending and outcomes can be all the more important in a postconflict setting, where scrutiny of who is benefiting from use of public resources is likely an even more sensitive concern. In some cases, citizens can directly influence how funds might be best used. For example, mining communities in Madagascar have a say in how their share of mining royalties is spent (Linder 2015).

Project-level information is increasingly available from both companies and local governments. Corporate data are voluntarily disclosed, for example, in publicly available company-issued corporate responsibility reports. Some companies might be required to provide information under community development agreements negotiated directly between the operating company and affected communities. Disclosed information may range from water usage to jobs created to incidences of disease. Transparency can be an aid to communities in pushing for tangible local benefits from extraction and can be important for the mitigation of risks. As documented and supported by groups such as Integrity Action, local communities in fragile states have used published information to track

investment in local infrastructure to support key development targets in education, health, and other areas of socioeconomic development.

The Global Transparency Movement and the Extractive Industries Transparency Initiative

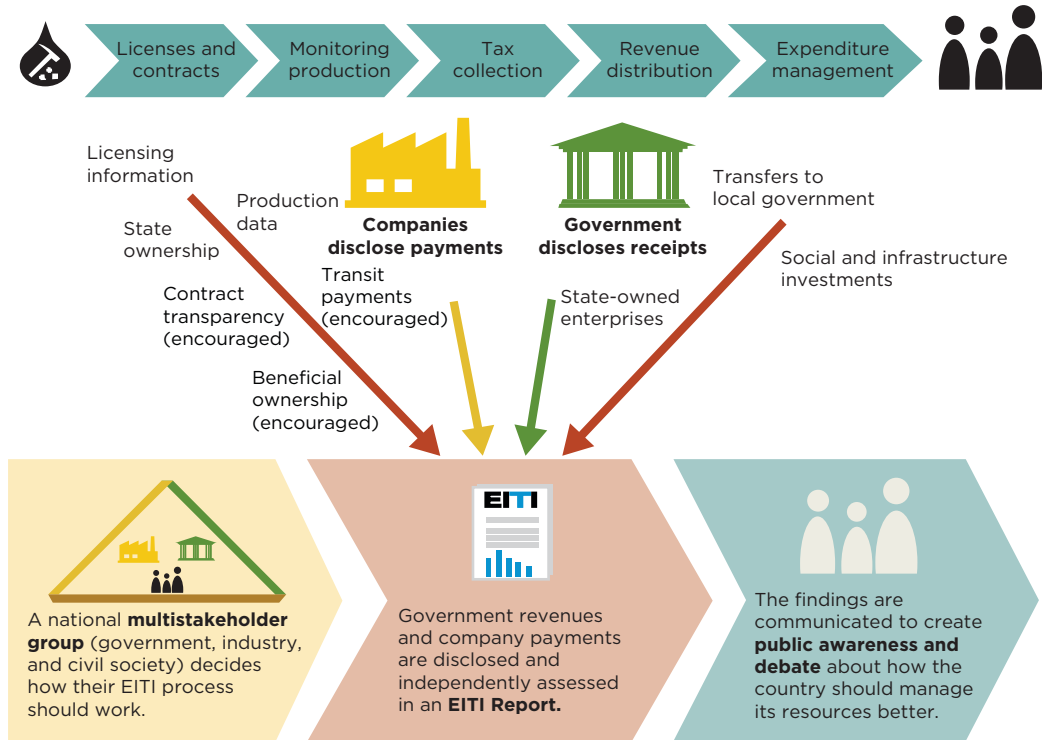
The past decade has seen increased attention to transparency and good-governance concerns as a whole. The extractives sector has been at the forefront of this trend. Numerous efforts exist to promote transparency in the EI at the global, regional, and national levels. Transparency is becoming the global norm, and new producer countries have an opportunity to embed transparency practices from the outset.

The *Publish What You Pay* campaign helped galvanize momentum behind the creation of the EITI, which has steadily expanded in membership and is now operational in up to 51 implementing countries. Since its establishment in late 2002, the EITI has worked to engage governments, companies, and civil society in a multilateral, multistakeholder initiative to improve transparency in the EI. The EITI reports contain the various taxes and contributions paid to the government by companies and the corresponding revenues the government receives from the companies. The tax payments are presented on a company-by-company basis as reported by these companies. These payments are checked and presented against corresponding revenue receipts of the government revealing any discrepancy between what a company reports as paid and what an agency of the government acknowledges as received. While countries make a voluntary commitment to the EITI, once a government signs up, the requirements are binding on all companies operating in that country and are often supported by an EITI law, as in Liberia and Nigeria, or by clauses on transparency within the sector laws, as in Mongolia and Mozambique.

Based in part on the recommendations of a 2011 report (Scanteam 2011) and a two-year strategy development process, the EITI board adopted a new EITI standard (figure 7.2) in 2013 with a wider scope encompassing the entire EI value chain and strengthening the rules for revenue reporting. This standard includes more stringent requirements to ensure data quality and reliability, new requirements for project-by-project reporting, and reports on social expenditures by companies in areas where they are legally or contractually obligated to make social contributions. The EITI offers a platform to discuss extractive policies and how to ensure effective mobilization and use of resources. Each resource-rich country has its challenges and requires its own model. While the EITI's standard is driven by international consensus, a national multistakeholder group designs the country's specific EITI process (Moberg and Rich 2012). The 2013 standard was further updated to EITI Standard 2016. The updated version provided a number of qualifications and explanations to the earlier version based on implementation experience and extends certain requirements. For example, by 2020, all EITI countries must ensure that companies that apply for or hold a participating interest in an oil, gas, or mining license or contract in their country disclose their beneficial owners. While the EITI provides an excellent opportunity to strengthen extractives sector design or reform process and tripartite dialogue, it will remain a challenge and work-in-progress as participating

FIGURE 7.2 EITI along the Extractive Industries Value Chain

The EITI Standard



Source: EITI 2015a. © Extractive Industries Transparency Initiative (EITI). Reproduced with permission from EITI; further permission required for reuse.
 Note: EITI = Extractive Industries Transparency Initiative.

countries deal with capacity constraints and many competing priorities that they need to balance.

Toward a Global Standard

“Transparency is no longer an aspiration, it is an expectation.” (EITI 2013a, 6)

The EITI and its related initiatives have paved the way for a progression from voluntary transparency initiatives to mandatory disclosure requirements through international laws that explicitly require transparency in the sector. In 2013, EU member states signed into law the Transparency and Accounting Directives, which are new payment disclosure requirements for the extractive and forestry industries.⁴ These new rules require oil, gas, mining, and logging companies to annually disclose the payments they make to governments on a country-by-country and project-by-project basis. Canada’s recent Extractive Industry Transparency Measures Act similarly requires project-level reporting for payments made to any government at any level.⁵ These requirements apply to all relevant companies listed on relevant stock exchanges or incorporated or doing business in a given country or region. They are complemented by transparency requirements of individual stock exchanges, such as the Hong Kong

Stock Exchange and the London Stock Exchange's Alternative Investments Market. In the United States, Section 1504 of the Dodd–Frank Act requires U.S.-registered companies to report payments to foreign governments for access to and development of oil, natural gas, or minerals. However, the rules are still being finalized following legal challenge.⁶

The adoption of increased transparency is reinforced by broader movements toward open government and open data that are not specific to the extractives sector but which nonetheless impact it. A key example is the Open Government Partnership, an initiative joined by more than 60 countries and listing more than 1,000 commitments to actions that would make their governments more open and accountable.⁷ A number of those commitments are related to opening the extractives sector, such as Tunisia's commitment to create an extractives open data portal or Kenya's efforts to create a special platform for public engagement and data disclosure on its extractives sector. In addition, corporate social responsibility programs, which include annual reports produced by individual companies disclosing financial contributions to communities impacted by their operations, as well as social and environmental reports, are both particularly relevant in the extractives sector.

Meanwhile, international transparency initiatives look beyond the scope of revenues and how they are used. The Kimberley Process Certification Scheme (KPCS) is a global, multistakeholder response to the role of diamonds in prolonging conflict in various African states.⁸ Established in 2003, the KPCS seeks to improve governance in the diamond sector specifically. The 2000 Voluntary Principles on Security and Human Rights, a set of human rights guidelines for governments, companies, and civil society designed specifically for the extractive sector, further encourage information disclosure and transparency as a means of promoting both human rights and security around extractive sites.² A set of implementation guidance tools released in 2011 supports companies in their implementation of the principles.

Potential Limitations or Unintended Consequences of Transparency

On its own, transparency is not enough to ensure the effective and responsible development and management of natural resources. Transparency does not guarantee accountability. Governments need to build the necessary institutional capacities to ensure rules are followed and that effective action is taken in cases of noncompliance. Individuals and institutions need to be held responsible for their decisions and actions. The gap between knowledge and enforcement remains one of the key limitations of transparency. Ultimately, if citizens have information but have no power to change the behaviors of the institutions responsible for rule setting and compliance, the information on its own will have limited impact. Similarly, access to information by both the government and its citizens is not sufficient to keep companies accountable if the enforcement mechanisms in cases of noncompliance are weak.

Simply sharing information publicly, without providing a platform for citizen consultation and debate in the collection and formulation of that information, limits the potential benefits of transparency. In this regard, participation by civil society is just as crucial for institutional effectiveness as is the

availability of and access to information. To encourage informed debate on the issues, there is typically a need to build capacity within the government and key stakeholders in society, including the broader business community, civil society groups, parliamentarians, and the media. The experience of EITI implementation has shown that it is important to find ways to make information truly accessible to audiences. Publishing lengthy technical reports is not enough. Graphics and other tools that help highlight the relevance of information and contextualize data are important. Greater understanding of the petroleum sector will support increased and more responsible use of disclosed information.

If not well managed, disclosure of information may lead to unintended and even negative consequences. There are particular vulnerabilities to consider in fragile country contexts. Transparency can lead to skepticism and cynicism if information prompts stakeholders to highlight concerns that are then not addressed. If the way information is generated and presented is not sufficiently inclusive or accessible to all stakeholders, it can reinforce, rather than reduce, tensions. Recognition of the stakes at play can exacerbate concerns about not getting a fair share of the anticipated rents from the petroleum sector. In the absence of trust, mismatched expectations can even exacerbate risk of conflict. To avoid potential detrimental effects, a country's transparency regime needs to be carefully designed, ideally instituted from the onset of sector development, and effectively implemented with the emphasis on inclusiveness in determining what information stakeholders want and need and creating a level playing field for sector knowledge.

Conclusion

Transparency is certainly not a miracle cure for the resource curse. However, it is a crucial early step necessary for the successful management of natural resources. Transparency should be an underlying principle for policy and practice across the entire extractives value chain. It is particularly important in fragile situations, where it can play a positive role in both revenue optimization and conflict mitigation and serve as a tool to help build trust across the federal and subnational governments and sections of society. It can also help to reassure investors who may otherwise be deterred about supporting investments in high-risk contexts.

To produce the benefits, however, information needs to be truly accessible, timely, and accurate. Disclosure must be accompanied by efforts to ensure that there is adequate capacity of stakeholders not only to access the information but to understand and use it. The careful management of transparency should foster greater accountability for responsible development of the petroleum sector, and ultimately to improve development outcomes for society as a whole, spurring growth from the country's natural resource wealth.

Notes

1. See the website of the GoSL Online Repository at <https://sierraleone.revenuedev.org>.
2. For more information on the Open Contracting Partnership and available support to countries, visit: <http://www.open-contracting.org/>.

3. See OpenOil's website at <http://openoil.net/corporate-networks/bp-corporate-network/> for the mapping of BP.
4. The full text of the directives is available at <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013L0050>.
5. For the text of the act, see <https://laws-lois.justice.gc.ca/eng/acts/E-22.7/page-1.html>.
6. For the text of the act, see <https://www.congress.gov/bill/111th-congress/house-bill/4173>.
7. For more information about the Open Government Partnership, see the organization's website at <http://www.opengovpartnership.org/about#sthash.3znyR8pr.dpuf>.
8. Information about the Kimberley Process is available on the organization's website at <http://www.kimberleyprocess.com>.
9. The full text of the principles is available at <http://www.voluntaryprinciples.org/what-are-the-voluntary-principles/>.

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Managing Environmental and Social Impacts of the Petroleum Sector: Using Environmental and Social Assessment toward More Sustainable Development

Fernando D. Rodriguez

Introduction

In the period 2014–19, several African countries were included on the annual Fund for Peace Fragile States Index (Fund for Peace 2014–2019). Many of these countries are resource rich, and a number of them (including Chad, the Democratic Republic of Congo, the Republic of Congo, Côte d’Ivoire, Guinea, Sierra Leone, South Sudan, Sudan, and Zimbabwe) count oil and gas among their key exports. In six more of the countries, there is ongoing exploration for new hydrocarbon reserves.

Poor natural resource management practices, weak governance, and trans-boundary issues can exacerbate tensions, deepen inequities, and contribute to conflict and fragility. In its 2014–19 Strategy, the African Development Bank (AfDB 2015) laid out a framework to contribute to building resilience in fragile states, including by supporting inclusive growth, strengthening state capacity,

promoting inclusiveness and good governance, and attending to gender inequities and food security.

The private sector can be a resilient and stabilizing force in fragile states, able to manage risks, take advantage of pockets of stability, and create jobs.

Governments that have the necessary vision, commitment, legal and institutional framework, and enforcement capacity to attract private sector investment to transform natural resources, including oil and gas reserves, into sustained and equitable economic growth, employment opportunities and local content, and improved livelihoods for their citizens can contribute to the cohesion and resilience of their states.

Strategic environmental and social assessments (SESAs), typically conducted at a national or regional level, are vital exercises that can proactively inform and optimize the opportunities afforded by developing the oil and gas sector, thereby laying the foundation for broad, sustainable, and inclusive development; peace; and state-building in fragile states. At the individual project level, the process of conducting an environmental and social impact assessment (ESIA) is instrumental in mitigating the potential negative impacts of a proposed oil and gas project, enhancing the positive outcomes, and contributing to the effective and efficient environmental and social management of the project. This chapter will examine the typical components and recommended processes of both SESAs and ESIA in more detail, but first, it will review the footprint that hydrocarbon development can have on both the environment and the social landscape.

Typical Environmental and Social Impacts of Oil and Gas Development

Individual oil and gas sector projects at various phases of the development cycle, and the synergistic or cumulative effects of such development, can cause direct and indirect, positive or negative changes to the physical and sociocultural landscape in which they take place. If these projects have adverse effects, they can increase a country's fragility by contributing to tensions between different stakeholders and levels of government. There have been significant technological advances in the oil and gas industry in recent decades, and best practices for alleviating negative social impacts have emerged. However, there is still a great deal of variation in the standards, including environmental and social ones, applied to similar activities and stages of exploration and development depending on the implementing company and the requirements of host governments.

What follows is an overview of selected stages of typical oil and gas sector projects, as well as the nature of their potential impacts.

Exploration (seismic surveys). These activities—which can last several months or more, depending on the type, extent, and location of the surveys—are designed to provide information and to develop a picture of geologic structures below the surface. This information helps identify the likelihood of an area's containing hydrocarbons. The information is also used to decide the location of prospective exploratory drilling targets. Depending on the specific location of the surveys (terrestrial or offshore) and its socioenvironmental context, seismic surveys have potential short-term negative effects such as the clearing of vegetation for roads and base camps; emissions from vehicles and machinery; increased use of existing infrastructure; the disturbance of local communities by noise, dust and

vehicular traffic; disturbance from vessel operations (or shore base establishment and operations); the communication of disease during interactions between outside workforces and local communities; and disruption of cultural or archeological resources. But given their short-term nature—and the fact that they are not necessarily followed by permanent infrastructure—seismic surveys can be completed in such a way as to minimize these negative effects and allow the explored areas to restore to presurvey conditions.

Exploration (drilling). Exploration wells are drilled to determine or confirm whether oil or gas is present. This phase is accompanied by a change in activity and visibility: drilling will involve rigs, supply trucks, or vessels, and it may involve vehicles and helicopters for transporting personnel. Exploration drilling may take a few months or longer (three-year contracts for exploration, which usually includes seismic surveys and drilling, are typical), and it requires the installation of some infrastructure (logistic bases, wells, and testing equipment) and the presence of a workforce (set up in base camps), supporting facilities, and logistics. In addition to the risks of seismic surveys, impacts during this phase depend on the choices made, such as the selection of sites for needed facilities, modes of access, proper storage and handling of waste, procedures for the disposal of drill cuttings and spent muds, and the use (or not) of gas flaring. Furthermore, there are socioeconomic impacts related to the supply chain, including interactions with nearby communities and effects on existing uses of land or marine space. In some cases, this phase does not result in reservoir development but rather in the decommissioning of temporary facilities, the abandoning of exploratory wells, and the restoration of sites.

Appraisal drilling. If promising amounts of oil and gas are confirmed during the exploration phase, a field appraisal is set up to establish the size and characteristics of the discovery and to provide technical and cost information to determine the optimum method for recovering the oil and gas. The potential social and environmental impacts associated with appraisal drilling are often of greater intensity but comparable to those of exploratory drilling.

Development and production. If appraisal wells and further evaluations determine technically and commercially viable quantities of oil and gas, a development plan is prepared and submitted to the relevant authorities for approval. A variety of options are available for the production of oil and gas. Depending on the size of the reservoir, this phase can last decades (20- to 30-year contracts for production sharing are typical), until the resource is depleted and the production areas decommissioned. Development and production require a longer-term, larger-scale, and more complex set of infrastructure; sophisticated systems; a permanent workforce; training; and programs. All potential effects related to the exploratory and appraisal drilling phases also apply in the development and production phase, but with additional implications, including the potential for more permanent changes and synergistic, cumulative impacts. Consequently, additional focus on alternative analysis, stakeholder engagement, issues such as waste and emissions management and reliance on existing infrastructure is needed. The potential social and cultural effects are also more significant during this phase, given the need to secure land or access to particular areas for longer periods of time. In some cases, the process involves land acquisition, involuntary resettlement, restricted access, or economic displacement. As nearby communities are exposed to operational activities and the establishment of a supply chain

and service industry around core project activities, there are potential pressures on previous land or marine use and sociocultural conditions. Furthermore, during operations, the risks of malfunctions (such as accidental spills, explosions, or safety incidents) can materialize and contribute to potential impacts. Finally, during this stage, revenues from resource development begin to cycle back into the country's economy and also contribute to changes, many of which can be positive, including economic growth and better social well-being. However, as discussed in other chapters, if not appropriately—and equitably—managed, these changes can result in economic distortion, inflation, and unimproved living standards.

Decommissioning and closure. Oil and gas reserves are nonrenewable, and their exploitation has a beginning and an end: over time, recovery becomes increasingly costly, which eventually results in the decision to cease operations. At the end of a field's life cycle, when hydrocarbons can no longer be extracted safely or economically, the decommissioning phase takes place. Decommissioning consists of closing operations with the objective to protect people and the environment and avoid unacceptable legacy issues for local stakeholders, governments, and companies. This phase can have significant impacts if provisions for decommissioning have not been specified at the outset of development. Provisions for decommissioning should be included in the contract and stipulated in the legislation and regulations.¹ Such provisions include a decommissioning and rehabilitation plan; financial assurance commensurate with the project's scale, anticipated impacts, and needs for rehabilitation; and socioeconomic measures to counter the economic downturns related to the end of production and revenue generation.

The impacts of individual oil and gas development projects will vary according to the specifics of a given project and its socioenvironmental context. Numerous best-practice guidelines and standards specific to hydrocarbon development have been put forward by industry associations such as the International Association of Oil and Gas Producers (IOGP),² the Global Oil and Gas Industry Association for Environmental and Social Issues (IPIECA),³ and the Regional Association of Oil, Gas, and Biofuels Sector Companies in Latin America and the Caribbean (ARPEL);⁴ donors such as the World Bank Group (WBG), the United Nations Environmental Programme (UNEP), and the International Union for the Conservation of Nature; and organizations such as the International Maritime Organization, the American Petroleum Institute,⁵ and the European Commission.⁶ Standards and guidelines endorsed by these organizations should be adopted by individual companies and enforced by host governments to avoid and control impacts.

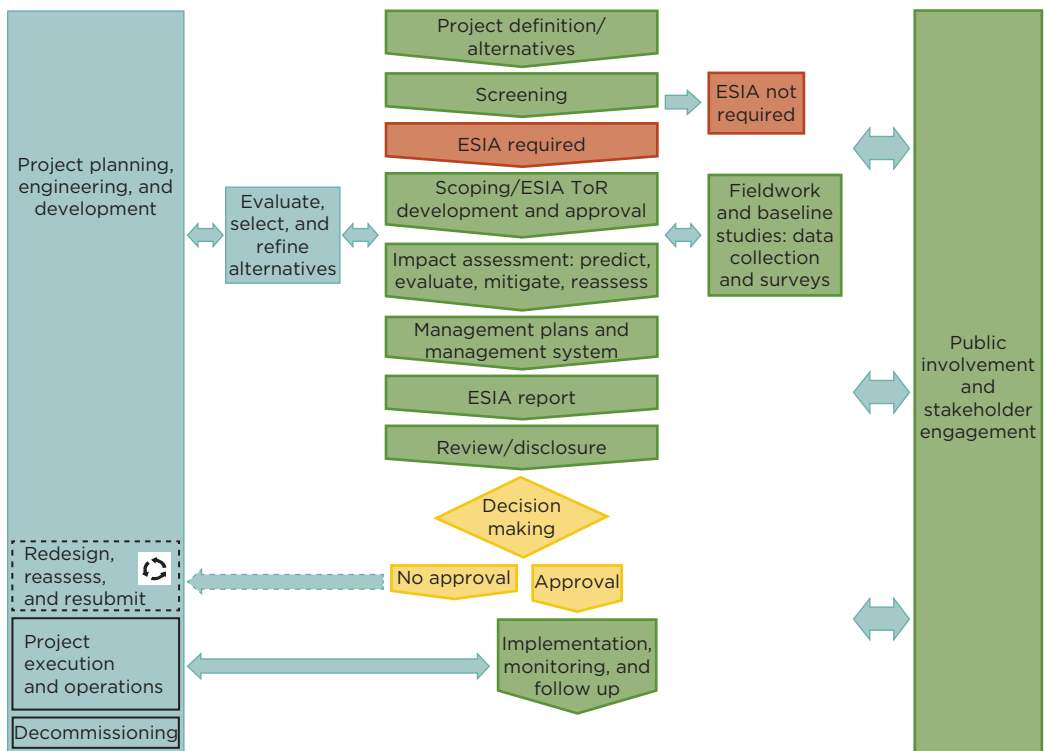
Environmental and Social Impact Assessment: Core Components

An impact assessment is a practical tool that is internationally accepted and is often required as part of the project preparation and approval process for identifying the future consequences of a proposed project. The ESIA is a formal, iterative, cross-cutting, and multidisciplinary process used to predict the impacts (positive or negative) of a proposed project or broader development prior to the decision to move forward with it and to optimize the project's design and

implementation. An impact assessment may propose location adjustments and technological solutions to avoid (or mitigate to acceptable levels) biophysical, social, health, safety, and economic impacts of a project, and it may include the provision of adequate compensation when appropriate. A company, often with the help of expert consultants, commonly conducts the ESIA process, and the resulting report is reviewed and approved by a regulatory authority. However, it is vital that the document is not used solely to obtain a permit; it must be implemented. Proper and rigorous implementation can enhance critical outcomes and result in more sustainable projects. The specific legislative, institutional, administrative, and permitting provisions for ESIA vary from country to country, but they generally consist of the steps shown in figure 8.1 and briefly outlined in this section.

Project/development definition. The ESIA process can begin when initial information is available on the nature, scale, and location of the proposed development (the conceptual or basic engineering stage); the alternatives and the key operational facts applicable to the phase(s) of the project have been considered; and the project’s schedule and timing have been decided. Best practice recommends that project definition consider (i) the entire project, including its ancillary components; (ii) the entire project cycle, including construction, operation, and decommissioning; and (iii) the up-front efforts

FIGURE 8.1 Typical ESIA Steps



Note: ESIA = environmental and social impact assessment; ToR = Terms of Reference.

to optimize the project (that is, any alternatives under consideration). It is especially important to note that the project definition should continue to evolve iteratively on the basis of the findings and recommendations of the ESIA process.

Initial screening. This step, which depends on in-country requirements but also on a company's own operating standards, involves determining the need for an ESIA process and the level process required. It may also involve checking the process against country-specific exclusions.

Scoping. This important step of the ESIA framework serves to focus subsequent efforts and studies on the areas of greatest importance. Scoping helps to preliminarily outline envisaged types of environmental, social, health, and safety impacts or risks; defines the geographic extent of the studies and methodologies; sometimes includes initial consultations with different categories of stakeholders to ensure that their input is incorporated into the design of the ESIA process; and results in the preparation of a terms of reference (ToR) document that outlines the process.

Baselines. As the name indicates, baselines provide a snapshot of conditions before the project was implemented and create a reference point by which to measure future project-induced changes. Baselines often involve studies to collect or complement data, which in many cases is incomplete or outdated. Best practice requires that baselines consider both environmental and social parameters; integrate (or create) updated information where relevant; and consider seasonality and quantify findings. Also important is the incorporation through participatory engagement of local knowledge that may not otherwise be considered in the baseline.

Impact assessment and mitigation. This step is the heart of the ESIA process. Baseline information is used to predict postproject (or post-particular project phase) conditions and to propose measures to reduce negative effects or enhance positive ones. This is the step of the ESIA management process that involves, for example, comparing anticipated emissions to particular standards, or potential land-use requirements to the land's present use, or the availability of land, and it helps decision makers to further optimize the project. For example, decision makers can choose to use a technology that lowers emissions and reduces the project's footprint or change the project's design to avoid particular areas of concern. The impact assessment step is iterative; it considers the magnitude of an impact, its extent, and its duration and seeks to quantify or visualize the impact to the extent that this is feasible. Fundamental principles of this step are that (i) impacts should be avoided where at all possible; (ii) if an impact cannot be avoided, it should be managed through mitigation measures; and (iii) if a decision is made to create an unavoidable impact, the impact should be compensated for.

During the impact assessment and mitigation process, project design engineers must interact with the impact assessment team and collaborate on a "project definition" that not just achieves business needs but does so in harmony with the socioenvironmental context. This collaboration is an exercise in costing, trade-off, and economic valuation, and it will involve considering the long-term cost of potential impacts. For example, the exercise might involve a comparison between increased operational costs and added pressure on external waste treatment systems and an up-front mitigation through providing improved waste-reduction technology that would marginally increase the project's capital cost.

Management plans and monitoring. Management plans are the operational outputs of the ESIA framework. They spell out the operational policies and the human, financial, and organizational requirements needed to implement recommended mitigation measures to comply with specific indicators, targets, or standards. Management plans should not be created in a vacuum; ideally, they should be integrated into the operating company's management systems, encompassing, among other elements, the proper internal incentives to achieve and maintain the required standards. Concurrently, plans should contemplate a monitoring and supervision program (often required by the host country's permits) that helps to verify that the project's impacts are, in fact, consistent with predictions and that the mitigation measures are effective in assuring compliance with agreed-upon standards. Best practice also encourages close coordination with nearby communities, who are often best placed to understand the degree to which plans are being adhered to.

Emergency response and contingency planning. The impact assessment and management plans outline anticipated conditions and management strategies associated with routine operations. However, in the oil and gas sector, as with any other development, there can be unanticipated events resulting from either a project failure or an event outside of the control of the company, operator, or even the host country's government. This consideration is particularly important in fragile states, where natural disaster response may be insufficient and exogenous factors can contribute to risks. The types of possible risks should be considered, plans should be proposed, and response drills should be tested. For example, a key measure pertains to the potential for oil spills. Processes and procedures should be put in place, and training provided, to ensure that the project has the capacity to rapidly control spills (and other unplanned events) and reduce their impact.

Public involvement. The ESIA is also an invaluable opportunity for participatory engagement, increased transparency, and the combining of local know-how with outside expertise, which augments buy-in and cohesion vis-à-vis potential development. Consulting with different categories of stakeholders, especially those whose lives and livelihoods are closest to the potential development, can contribute to establishing a positive relationship between those people and the development. Best practice calls for public involvement throughout the ESIA process and during operations, when environmental and social impacts are managed. However, this involvement is especially important during screening and scoping, once preliminary potential effects have been identified, and during implementation and monitoring, when, again, stakeholders are often the most aware of the degree to which performance is adhering to agreed-upon plans and standards.

As part of the process, it is important to consider vulnerable or nomadic groups, paying particular attention to integrating a gender perspective, because equality, and women's empowerment in particular, plays a strategic role in peace- and state-building processes.

Strategic Environmental and Social Assessment: An Opportunity

At the national or regional level, environmental and social concerns pertaining to hydrocarbon development can be addressed through SESAs, the objective of

which is to provide recommendations for policies, plans, and programs that will guide oil and gas sector development in the context of existing environmental and socioeconomic conditions and consistent with broader strategic plans and goals. When conducted in a timely and integrated way, SESAs help to account for externalities and to factor in costs associated with managing the interaction between hydrocarbon sector development and the social, environmental, and economic context in which it will occur.

SESAs are different from individual project ESIAAs in that specific project plans are not under consideration; rather, regional or national sector-development choices are made, and sector-wide, institutional, and policy-level management strategies are proposed as outcomes. In the case of fragile states, a SESA could, for example, seek to promote interdependency across regions, equitable and inclusive growth opportunities, investment in preserving natural capital and augmenting social capital, and transparency across the different areas within a federal state. In addition, SESAs can result in recommendations for specific environmental, social, and occupational health and safety requirements and standards that need to be included in the contracts between the country government and the oil and gas companies, thereby contributing to an overall enhancement of sector-wide performance. In other cases, SESAs will recommend institutional reform to strengthen the role of the environmental authority to enforce specific standards.

If applied correctly, SESAs can shape the growth trajectory of a particular country, to the point at which there is no additional pressure on resources and no increased fragility, through the adoption of international industry best practices (for example, IPIECA and WBG environmental, health, and safety guidelines and WBG performance standards) to reduce environmental releases and enhance social well-being throughout the different projects' life cycles. Table 8.1 highlights the key differences between individual project ESIAAs and SESAs as drivers of stronger socioenvironmental performance.

Key Institutional, Legislative, and Contractual Requirements

Fragile states are particularly vulnerable to poor environmental and social management practices—and, as noted previously, oil and gas development has the potential to aggravate these situations. The absence of specific environmental and social regulations, insufficient institutional capacity, and lack of authority to require specific contractual terms can contribute to poor contracts and decision making and other negative impacts. Inconsistency across federal regions can also contribute to conflicts over resources that span regional boundaries.

Yet fragile states cannot afford to leave environmental and social performance “up to the individual company.” They need to prioritize setting a robust and clear legal and regulatory framework that is consistent across their federal regions. Legislation governing hydrocarbon development (the petroleum law) needs to stipulate the need to safeguard natural—and social—capital. Specific standards of performance should be included in concession contracts. For example, fragile states should adopt the requirement that a social and environmental assessment or an impact study be carried out prior to the commencement of petroleum activities.

Fragile states also need to establish an independent, competent authority charged with approving and monitoring ESIAAs and operational management

TABLE 8.1 ESIA versus SESA

Environmental and Social Impact Assessment (ESIA)	Strategic Environmental and Social Assessment (SESA)
Is typically prepared by the project proponent and reviewed and approved by government authorities	Is typically led by the government and used to inform the process of national priority setting for institutional and policy reform needs
Is reactive to a development proposal	Is proactive and informs development proposals
Is used to assess the effect of a proposed development on the environment and socioeconomic conditions	Is used to assess the effect of the existing environmental and socioeconomic conditions on development opportunities and constraints
Relates to a specific program or project	Relates to areas, regions, or sectors of development
Enables the identification of program- or project-specific impacts	Enables the development of a broader framework against which typical positive and negative impacts can be managed across a region or sector
Has a well-defined beginning and end and focuses on informing a specific decision at a particular point in time	Is a process aimed at the development of a sustainability framework to inform continuous decision making over a period of time
Is focused on the mitigation of negative impacts and the enhancement of positive impacts	Is focused on maintaining a chosen level of environmental quality and socioeconomic conditions (for example, through the identification of sustainability objectives and limits of acceptable change)
Has a narrow perspective and includes a high level of detail	Has a wide perspective and includes a low level of detail to provide a vision and overall framework
Incorporates a limited review of cumulative impacts, often limited to phases of a specific program or project	Inherently incorporates consideration of synergistic and cumulative impacts

Source: Adapted from OECD 2006.

plans and enforcing compliance. Such an authority would grant permits, enforce regulations in coordination with other government authorities, facilitate resolution of conflicts and possible environmental or social impacts, and ensure that adequate provisions (financial and contractual) are in place for decommissioning and closure. Particular attention should be paid to elevating the importance of the ministries charged with environmental and social issues (that is, the ministries of the environment, social well-being, and labor and health) or creating an agency or agencies tasked with environmental, social, and health and safety matters for the hydrocarbon sector. These organizations have to be well resourced and staffed and remain truly independent (that is, not subservient to the petroleum sector ministry).

Finally, this ministry or agency not only should focus its efforts on responding to permit applications and managing the ESIA process but also should be supported by the completion of a SESA for oil and gas development across the federation and in partnership with regional authorities. This action will inform the federation's national strategy vis-à-vis oil and gas development, including its timing, priorities, and contribution to inclusive and sustainable growth.

Public Participation, Transparency, Mutual Accountability, and Data

Promoting accountable, transparent, and inclusive governance is fundamental to building stability and resilience. As noted earlier, participatory engagement and consultation is a crucial component of the ESIA framework from the earliest stages of a project. This process not only helps to minimize environmental and social impacts by incorporating local perceptions and knowledge but also contributes to a dialogue that helps focus the development in areas that contribute to enhanced livelihood. Communities' understanding of, support for, and sometimes participation in the project (for example, through employment) reduce conflicts and increase operational security. Public participation also contributes to greater transparency and mutual accountability.

The collection, management, and communication of natural-resource-related information is essential to resource governance in fragile states because these processes empower decision makers, stakeholders, and the public to make sound decisions on how best to leverage natural resources for resilience. However, in many fragile states, critical information is either nonexistent or out of date. As global digitalization continues, fragile states have the opportunity to harness technology and connectivity to leapfrog their next generation toward greater transparency regarding the use of their natural resources. For example, in the Somalia Peninsula, which has suffered from conflict for a prolonged time, is ranked as the second-most-fragile state (Fund for Peace 2014), and came in last on the 193-country 2014 UN Global E-Government survey (UNPAN 2014), about 18 percent of the population has cellular phones, and a fiber-optic cable installed in 2014 has established high-speed internet in Mogadishu. Therefore, the government has the potential to make significant strides toward greater transparency: for example, it could establish an open data portal and use this platform to drive consistency and transparency in oil and gas sector projects by regularly updating information on prospective bidding rounds and locations of proposed facilities and by providing more granular data relating to budget, revenue management, and regional budget allocations.

Strengthening fragile states' open data systems would also contribute to greater government accountability and dialogue with civil society about the use of oil revenues, which could help ensure good governance in the sector.

Summary and Key Recommendations

In summary, fragile states that are resource rich are at an important crossroads of their futures. With support and their own leadership and commitment, they can use the opportunity afforded by the oil and gas sector to lay the foundation for more sustainable resource management and inclusive development, peace, and state-building. To achieve this, the following actions will be important:

- Conduct a *SESA* to establish key parameters for sustained oil and gas sector development and inform policy formulation and needed sector and institution design or reforms, including eventual decommissioning and closure requirements and provisions.

BOX 8.1

The Somali Peninsula: Examples of Existing Environmental and Social Challenges

The Somali Peninsula's civil strife and unrest over the past 20 years has contributed to environmental degradation and significant social challenges. In addition, the absence of effective governance, of a regulatory and legislative framework and its enforcement, and of control over access to and use of natural and environmental resources have borne consequences. Below, in no particular order, are some of the social and environmental challenges that would need to be further assessed, considered, and actively managed in the context of potential investments in oil and gas development projects on the peninsula.

Socioeconomic

- More than 1 million refugees (about 10 percent of the population)
- Poor security, poor infrastructure, and limited financial resources
- An economy dependent on foreign aid and remittances
- Significant (>50 percent) youth unemployment
- Poor social services (education, health, and building sustainable livelihoods)
- Low capacities and skills
- A lack of legal clarity around rights to land and natural resources
- Recurrent acute malnutrition among hundreds of thousands of children in times of crises and shocks

Environmental

- Overexploitation of land and natural resources and lack of effective land- and resource-management institutions and regulations
- Expansion of cultivation into land inappropriate for that use
- Use of traditional agricultural practices such as slash and burn
- Uncontrolled use of pesticides and fertilizers
- Deforestation, desertification, and the disappearance of natural forests
- Soil erosion and potential for irreversible damage to ecosystems
- Wildlife migration and extinction
- No attempt to preserve and manage the natural habitat and native wildlife; biodiversity and conservation not seen as important
- Improper waste management (plastic, human sewage, industrial, and domestic)
- Air pollution through urban and energy emissions
- Marine life and coastal areas significantly adversely affected by human activity
- Significant damage from constant, uncontrolled, and unreported oil spills
- Oil-related damage to mangroves, sea grass beds, and coral reefs
- Illegal fishing activities by locals and international fleets, including artisanal-level operations
- Illegal dumping (oil and waste, some of which is toxic) by international fleets

- Establish *legally binding environmental and social standards* (an internationally accepted good practice) that carry over into contracts, licenses, and concessions.
- Establish a robust natural- and social-resource-management policy framework, including an *explicit requirement to conduct project-specific ESIA*s prior to the commencement of activities that must be approved by authorities.
- In the case of a federal state, ensure alignment and equivalency of environmental and social legislative requirements across all regions.

- *Establish an independent and capable regulator* (for example, a ministry of the environment or environmental protection agency) charged with safeguarding natural and social capital, promulgating standards, and regulatory enforcement, and ensure that it is properly staffed and resourced to fulfill its mission.
- *Leverage inclusive consultative processes* to design, evaluate, and revise social and environmental assessment processes and sector-specific laws and regulations governing extractive industries.
- Gradually incorporate *local content provisions into contracts* to ensure that companies and operators contribute to training and building workforce and supply-chain capacity.
- Establish a government *open data portal and actively focus on sharing information* pertaining to concession allocations, standards, government budgets, and eventually revenue management apportionments.
- Use revenue from sector development to build social capital through investments in services (such as education and health) and productive sectors that translate into employment creation and opportunities to improve livelihoods and to enable inclusive and equitable growth and gender equality.
- Explicitly connect national development strategies and donor support to achieve the above milestones, and *build resilience through progress on United Nations post-2015 sustainable development goals*.

Notes

1. See http://siteresources.worldbank.org/EXTOGMC/Resources/336929-1258667423902/decommission_toolkit3_full.pdf.
2. For more information on the International Association of Oil and Gas Producers, see its website: <http://www.iogp.org>.
3. For more information on IPIECA, see its website: <http://www.ipieca.org>.
4. For more information on ARPEL, see its website: <https://arpel.org>.
5. For more information on the American Petroleum Institute, see its website: <http://www.api.org>.
6. For more information on the European Commission's activities related to oil, gas, and coal, see its website: <http://ec.europa.eu/energy/en/topics/oil-gas-and-coal>.

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Understanding Commodities, Linkages, and Industrial Development in Africa: Developing a Conceptual Framework

Mike Morris and Masuma Farooki

Introduction

Strengthening the industrial sector lies at the heart of the development agenda, since there is a close association between incomes, employment, and industrialization. The success of Asian emerging economies in expanding their manufacturing sectors, raising incomes, and enhancing their economic growth rates over the past two decades is suggestive of the fruits to be obtained from this development path. However, the challenge facing many developing economies in promoting industrialization in the modern era is complex. Import-substituting industrialization is no longer an option, and following an export-intensive route is circumscribed for new entrants precisely because of the success of China and other successful Asian exporting economies. Global markets for manufactured goods are now intensely competitive, making it difficult for new entrants not only in external markets but also in competition with imports in their domestic markets. This raises a question: is there a resource-based industrialization path for African economies built on the continent's riches in commodities?

Between 2003 and 2011, commodity-exporting economies benefitted greatly from a sustained increase in the price of their exports. However, there are great dangers to relying on resource rents, because the capital-intensive nature of many commodities sectors limits distribution of rents and opportunities to increase employment. Moreover, the fall in commodity prices over the 2011–2016 period and the resultant decline in gross domestic product (GDP) growth rates emphasized that a diversified economy is more robust and less vulnerable to the shocks that confront monoculture economies. This is particularly true in the commodities sectors, which have experienced and will almost certainly continue to experience price volatility in the future. Moreover, a reliance on extractive activity alone is unlikely to provide an alternative resource-based industrialization path. Instead, a more reliable route to industrial development in such economies stems from the possibility of building and strengthening linkages related to commodity production.

The Conventional Wisdom

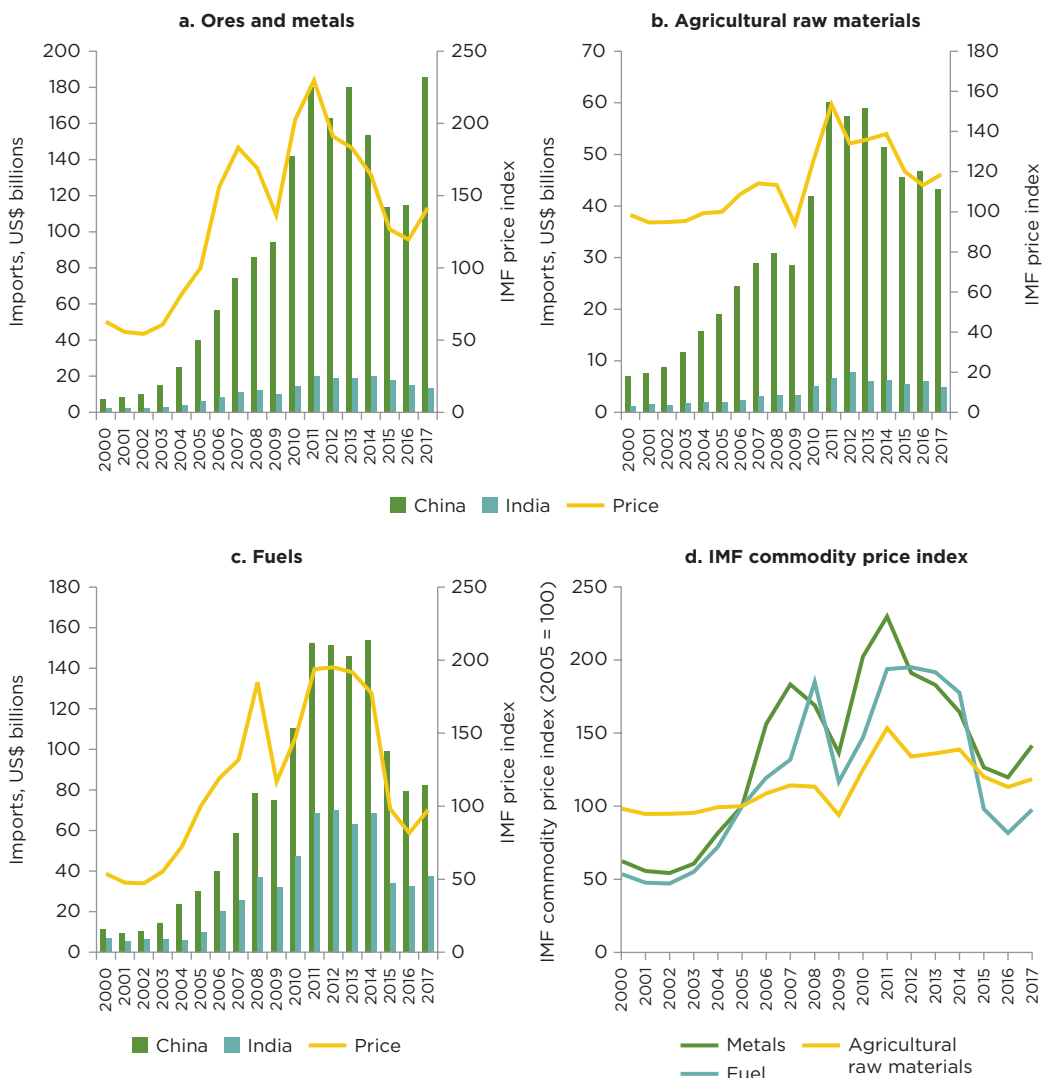
Prevailing economic theory discourages the use of commodity linkages as the basis for industrialization. Instead, the conventional wisdom (which is based on fears of the “resource curse”) has been that there are few synergies between the commodities and industrial sectors and that the exploitation of commodities undermines industrial development (Sachs and Warner 2001). This conclusion echoes a long-held opinion in development economics regarding the enclave nature of production in the commodities sector.

This inherited wisdom, however, is problematic. First, there is evidence of synergistic linkages between manufacturing and the resource sector in the histories of a number of industrialized countries—for example, Australia, Canada, Norway, Sweden, and the United States (Wright and Czelusta 2004). These histories involved a positive and interactive symbiosis in which industrial growth was stimulated by linkages with the commodities sectors. In turn, the capabilities developed in industry fed back into commodities production by reducing costs, which enabled the exploitation of less-endowed mineral seams, oil deposits, and agricultural land.

Moreover, at the empirical level, there have been a series of developments in the global economy over the past decade that have provided new opportunities for economies specializing in commodities (Lederman and Maloney 2007). Key among these developments has been the rapid rise of the Chinese economy. China’s resource-intensive GDP growth triggered the commodity price boom in 2003, but as Chinese mineral consumption rates have plateaued, metal price levels have also stabilized below their 2011 peak. Various drivers, both political and economic, have affected the metal price levels, and prices began to increase again, albeit at a slower rate, only in the latter half of 2017.

However, China’s slowing growth rates mask the country’s high demand for oil and minerals. Although the growth rate of mineral and oil consumption in China is decreasing, consumption is still on the rise. Figure 9.1 shows the imports of oil, minerals and metals, and agricultural raw materials (as an approximate value for consumption) for China and India over the past decade. Apart from a slight dip in 2014 for metals (related more to a change in value than to volume), the demand from China has been steady, even during the recent price decline.

FIGURE 9.1 Commodity Imports for China and India and Prices, 2000-17



Sources: Trade data from World Integrated Trade Solution (wits.worldbank.org); price data from imf.org, accessed in May 2018.
 Note: IMF = International Monetary Fund.

The commodity price peak of 2011 is not expected to occur again in the short term. However, in the medium-to-long term, the global economy will be increasingly driven by low- and middle-income economies focused on expanding infrastructure spending, where most minerals and energy commodities are consumed (Farooki and Kaplinsky 2012).

China has become a significant global importer of commodities, with India and Brazil closely following in a pattern of rapidly growing low-per-capita-income economies that will also be increasing their demand for commodities in the coming decades (Kharas 2009).

In light of the continued growth in demand for commodities, the upturn in prices that is expected in the future, the long gestation period in increasing the supply of many commodities, and the exhaustion of low-cost supplies, the case for commodities as a means to industrialization remains strong, despite the downturn in international prices seen in the 2011–2016 period (Farooki and Kaplinsky 2012).

Commodities, Global Value Chains, and Outsourcing

The prospects for diversification in commodity-producing economies have been enhanced by four factors. First, Africa is the new frontier for commodity production. As the chief executive officer of Glencore (the world's leading commodity-trader-producer) remarked prior to its public launch in 2011: “Unfortunately, God put the minerals in different parts of the world. We took the nice, simple, easy stuff first from Australia, we took it from the United States, we went to South America, and we dug it out of the ground there. Now we have to go to more remote [and unstable] places [in Africa].” (Farooki and Kaplinsky 2012). Second, a reconsideration of the relationships among commodities, industrialization, and growth does not support the inevitability of the resource curse that has often characterized the structural transformation in low-income economies. Third, after many decades of declining relative prices, it appears that higher commodity prices (relative to the 1990s) are here to stay. Fourth, as we shall see, many of the lead firms in commodity value chains do not seek to become enclave firms; instead, they are actively searching to reduce their costs and to outsource a range of activities that do not fall within their core competencies (Morris, Kaplinsky, and Kaplan 2012).

How can Africa act to ensure that the opportunities opened up by the boom in commodities prices are widely distributed in order to promote sustainable development for the population at large and to protect its economies from the volatility of commodity prices? One key objective is the promotion of industrial and service linkages from the commodities sector (Hirschman 1981). There are three categories of linkages. The first are fiscal linkages—that is, the resource rents that the government is able to harvest from the commodities sectors in the form of corporate taxes, royalties, and taxes on the incomes of employees and that can be used to promote industrial development in sectors unrelated to commodities. The second is consumption—the demand for the output of other sectors arising from the expenditures incurred by the commodities sector. The third category, production linkages, flow into, out of, and tangential to commodity extraction.

In line with the “resource curse” argument, there has been a widespread belief in policy circles that production linkages are weak and hold little potential, in part because of the enclave mentality of major resource-producing firms. The tendency of these firms to act in isolation from local economies may have been a historical reality. But the modern resource-based lead firm operates in a similar fashion to all large multinational corporations in the current era of globalization. The deepening of globalization after the 1970s led to intensified competition, as firms were subject to a larger pool of competitors (Gereffi, Sturgeon, and Humphrey 2005). One of their most important responses to this

competition was a drive to concentrate on their unique core competencies—that is, the activities that were difficult for other firms to replicate, had barriers to entry, and in which they had comparative advantage. These activities proved valuable in the marketplace and yielded the greatest rents (Kaplinsky and Morris 2001).

As a consequence, there was a growing global trend for noncore activities to be outsourced to low-cost suppliers and for firms and economies to specialize in capabilities rather than in wholly manufactured products. This trend gave rise to the fragmentation of production into myriad subprocesses that could be undertaken in parallel. Since there is little processing loss in production and no degradation of inputs, there is no intrinsic need for the various stages to be collated. The more complex and extended the value chain for a product—that is, the greater the number of stages in value addition it passes through—the more likely its production will be vertically specialized. In general, this specialization occurs in the manufacturing sector, in which final products are assembled using a variety of components (more than 3,000, in the case of an automobile) (Barnes and Kaplinsky 2000). Manufacturers therefore lend themselves to global dispersion. Thus emerged the dominance of global value chains (GVCs), the global dispersion of production, and the rise of Asian manufacturing suppliers able to take advantage of this opportunity (McKay and Song 2009).

Resource-based sectors are also dominated by GVCs and follow a similar process of outsourcing. There is an important difference, however, in how these commodity-producing sectors operate. As a result of their fixed locations, these sectors create the opportunity to sequentially add value to each stage of the chain within the same country. For example, raw materials such as minerals and agricultural produce can be processed in successive downstream stages before they are exported. Upstream inputs can more easily be sourced locally. Because of this opportunity to accumulate value within a given country, these GVCs are known as *additive value chains*.

The resource sectors tend to be dominated by additive value chains for a number of reasons. First, the options for adding value inside a country are bounded by the technical characteristics of the processing activities. Resource extraction is relatively immobile and determined by a gift of nature. In addition, it is often highly specific, since no two deposits or plots of land are identical. The various stages of production are additive by necessity—that is, they are sequential outcomes of previous stages of transformation. Second, in the case of almost all natural resources, there is extensive weight or volume loss in processing, or degradation in the quality of inputs if they are not processed soon after harvesting (although this is not always the case: for example, to preserve its flavor, coffee roasting and grinding have to happen close to the consumption stage). And third, when there are few rents in forward processing (because many producers are competing against one another), lead firms often encourage additive value chains in resource-producing economies.

Using input-output and trade data sets, it is estimated that 85 percent of GVC trade occurs within three trading regions—East Asia, North America, and Europe—and that three-quarters of this trade involves the use of imported components in final exports (Sturgeon and Memedovic 2010). In other words, most GVC trade is vertically specialized, or “backward specialized.” Such GVCs are

also growing more rapidly than are additive, forward-participation GVCs. However, the pattern of GVC extension in resource-intensive low- and middle-income economies is a mirror image of these global developments. For example, the structure of Africa's insertion into GVCs is very different from the global picture. Seventy-five percent of Africa's trade is in additive "forward specialization" value chains (that is, through increased processing at each stage), while most of the vertical "backward specialization" value chains (that is, provision of inputs) on the continent are in South Africa. This effect emerges because resource sector GVCs are predominantly additive in nature.

Lead resource-based multinational corporations in the global mining and oil and gas industries, although they joined the trend toward specialization and outsourcing relatively late, have come to operate in a manner similar to vertically specialized manufacturing value chains. They increasingly seek to concentrate on their core competencies and to outsource everything else to other firms. If supplier firms are located near resource extraction operations and can provide low-cost and quality inputs reliably or can process commodities effectively, then these firms serve the direct interest of the resource-extracting firm. Given the current investment climate, the global extractives sector is focusing more than ever on cost management, and the internal drive to outsource has become stronger. Thus, far from obstructing linkage development (as has been argued in the resource-curse literature mentioned earlier), furthering this trend of specialization and outsourcing is increasingly one of the primary objectives of the lead commodity firms.

Once the resource extraction lead firms decide, in principle, to outsource noncore activities, their first task is to find the lowest-cost suppliers able to produce the required quality and reliably meet delivery schedules. Suppliers able to offer unique technological competencies of their own are particularly attractive, especially in the first tier of suppliers, those who contract directly with lead firms. However, the logic is, wherever possible, to locate production and service delivery locally, rather than at a distance from the lead firm's activity. It follows that "local" is a relative concept: in some circumstances, "local" may be next to the extractive industry, and in others, it may mean in the same region, country, or continent. But in general, lead firms aim to minimize distance in the sourcing of inputs and the processing of outputs. An efficient local supplier provides the capacity for flexible responses tailored to the needs of the lead firm, reduces value-chain inventories, and removes uncertainties associated with extended logistics. Again, with the current pressures for cost reduction, the lead firm's interest in locating its suppliers nearby has increased.

An efficient local supplier is particularly attractive in Africa, because the continent's transport networks and logistics are poorly developed, goods brought in from outside may be subject to long and unpredictable delays, and government policies have often mandated the deepening of local added value. Supplier firms have responded to these opportunities to join the value chain. For example, Bell Equipment in South Africa built competencies in the domestic mining sector and then became a supplier of the machines it had developed to a number of global markets, including the mining, construction, sugar, and forestry sectors (Kaplan 2012).

The outsourcing of knowledge-intensive services has also grown, and this growth has led to the emergence of specialized knowledge-intensive mining

service providers. These providers offer both specialized services and other high-technology inputs. Companies such as SRK in South Africa, which started as a service provider to Anglo American, an older mining firm, have grown into global mining consulting firms in their own right. Anglo American runs a strong supplier development program in most of the countries where it operates, including the Zimele program in South Africa. The development of local suppliers is even more advanced in Chile, where global mining companies, such as BHP Billiton, are actively involved in building capabilities among their suppliers.

The extractives sector requires a wide range of provisions and intermediate goods in order to conduct its operations, from highly complex earth-moving equipment and the submanufacture and assembly of the cables linking subsea oil wells to surface vessels and land to much less technology-intensive inputs. These simpler inputs range from basic utilities (such as water and power) to food for the workforce and supply offices. In terms of soft commodities, the inputs required to facilitate production include seeds, fertilizer, packaging materials, and transportation.

In addition to these material inputs, ongoing production requires inputs from the service sector. Some such services may be technologically demanding. But even here, there are signs of backward linkages developing in African extractive economies. For example, in the Nigerian oil sector, there is evidence of considerable local provision of information technology services (Oyejide and Adewuyi 2012). In Zambia, engineering, repair, and maintenance services have played an important role in building industrial capabilities for the wider economy (Teka 2012). Similarly, Chinese-owned oil companies in the Sudan have encouraged substantial local supply: around 90 locally based Chinese-owned enterprises employing over 4,600 workers (Suliman and Badawi 2010). Other services, such as site security, transport and logistics, the maintenance of office equipment, and auditing services, have fewer technological and skill barriers to entry.

This range of backwardly sourced inputs, combined with lead firms' desire to outsource activities that are not in their core competencies, creates tremendous potential for backward linkages from the commodities sector. Although some operations in the commodities sector may be large-scale and technologically complex by nature, many of the intermediate goods, provisions, and services on which the sector depends are not. It is therefore not surprising that despite the widespread belief that commodities extraction is an enclave activity, in reality it forms many linkages with local economies. The extent of these linkages depends on logistics, infrastructure costs, and the capacities of local firms. But whatever the local level of capacity, there will be categories of inputs that can be supplied locally.

An Overview of Linkage Development

Developing a more complex and detailed understanding of production linkages in relation to value chains in the resource sectors is crucial to a more in-depth understanding of the potential resource-based industrialization path for Africa. Key to this path are production linkages that feed directly and indirectly into and out of the resource sector. There are three sets of production linkages:

- *Backward linkages* refer to suppliers who directly feed inputs into the resource sector. These inputs range from sophisticated technology to basic consumption goods for workers, and each input involves various barriers to entry. These backward linkages have played a crucial role in fostering industrialization in a number of countries, from the United States in the 19th century to South Africa in the 20th century.
- *Forward linkages* refer to the range of direct downstream activities that feed commodities into other sectors. These linkages range from simple processing (iron ore into steel or oil into gasoline) to the conversion of raw materials into manufactured products (fabricated metal into pots and pans, or timber into furniture).
- *Horizontal linkages* are less direct. They represent the ability of ancillary firms to extend capabilities originally developed in relation to and linked to the resource sector to applications in unrelated sectors.

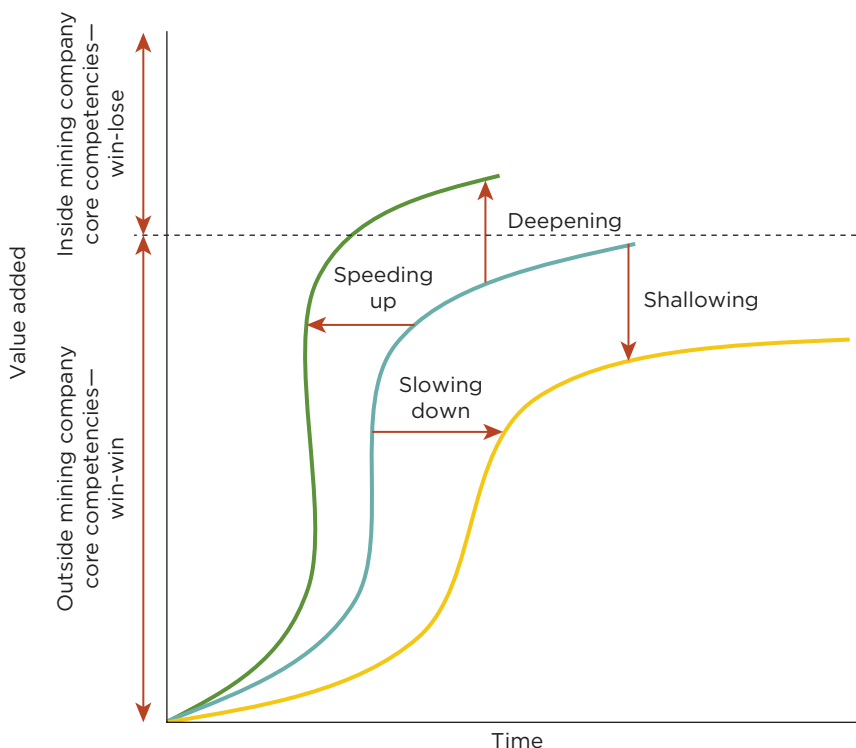
Distinction can also be made between the breadth and the depth of linkages. “Breadth” refers to the range of inputs that feed into and emerge from resource extraction. It is reflected, for example, in the share of locally sourced inputs in resource extraction. However, outsourcing means that these local supply linkages may be merely importers of inputs formerly acquired directly by the resource-extracting firm; they would therefore be of little additional value in the supply chain. Thus, the development of an industrialization path from resources is more concerned with the “depth” of linkages, which refers to the amount of value added locally.

Finally, one has to distinguish between local linkages and local (national) ownership. In terms of the promotion of industrialization, with its concomitant impacts on employment and incomes, deepening local value added through industrial and service development is a critical aspect of linkage development. Many African governments appear to misunderstand this distinction, assuming linkage development to encompass only an extension of local ownership rather than any activities that deepen local value added and local production sector development. However, ownership is still an important aspect of linkage development, because locally owned firms are more embedded in the fabric of local society and are more likely to develop innovative processes.

From the framework outlined above, on the basis of the localization of inputs that were previously imported and a growing trend toward outsourcing by lead commodity firms, it is possible to construct a general model of linkage development aimed at resource-based industrialization. Figure 9.2 illustrates the basic parameters of this model. The vertical axis represents the accretion of value added by the provision of inputs into the production of a commodity.

According to the core competencies framework, there are inputs which the lead commodity producers have no intrinsic interest in maintaining in-house, since these inputs do not reflect their core competencies. Linkages that supply these inputs are *win-win*, because both lead commodity-producing firms and local suppliers and customers have a common interest in developing them. However, there is also a range of productive activities that are central to a firm’s

FIGURE 9.2 Market-Driven Linkages over Time



Source: Morris, Kaplinsky, and Kaplan 2012.

competitiveness and that it would reluctantly relinquish to a competitor. These linkages are *win-lose*, and lead firms will only give up these productive spaces if forced to do so by effective policy or other contingent factors.

The horizontal axis of Figure 9.2 reflects the passage of time. The leftmost curve shows that, as a general consequence of the building of local competencies over time and the active search by lead commodity producers to outsource the production of backward and forward linkages (inputs and outputs) that are not within their core competencies, there is a market-driven process of linkage development. Over time, an increasing proportion of production is outsourced, or processed outside of the lead firm, to producers in the local economy. The pace of outsourcing is slow at first, then it speeds up and subsequently tails off as the easy hits are exhausted. The rate of change is lower, and linkage development is shallower, when countries have weakly developed industrial competencies, when commodity extraction is a recent phenomenon requiring relatively few inputs, or when a country's policy environment is poorly developed. The rate of change is higher, and linkage development is deeper, when the opposite factors prevail.

The trajectory of the deepening of local linkages will change over time as a consequence of five major interrelated factors. The first factor is the bundle of

critical success factors required by buyers, including price, quality, and reliability of delivery, which will vary with the nature of the inputs. The second is time—the market-led incorporation of inputs is a natural function of time as lead commodity firms and potential suppliers assess competitive costing profiles and develop the capacities to supply and buy effectively. The third factor is scale—the larger the commodity-extracting activity, the more likely that suppliers will be able to generate the economies of scale needed to achieve competitive production. The fourth factor is the complexity of the inputs required by the lead firm—the greater their complexity, the less likely it is that suppliers will be able to respond to the needs in the short to medium term. And finally, the capacity of local suppliers to competitively respond to buyers' needs will depend on the suppliers' dynamic capabilities. “Global competitiveness” is a moving frontier; domestic suppliers are challenged to keep up with this rate of improvement, at minimum, and ideally to exceed it.

The Role of Government and Local Productive Policy

Government capacity to effect policy change plays a crucial role in determining which direction the processes of linkage development will take. Governments often intervene in these processes to maximize the extent to which outsourced activities occur domestically (Morris, Kaplinsky, and Kaplan 2012). Government involvement may be effective, in that it acts to both deepen and speed up linkages (the curve in figure 9.2 shifts up and to the left); in contrast, where policy is focused or implemented badly, it may slow down linkages and leave them shallower (in which case the curve moves to the right and down).

Governments are interested in the promotion of linkages in the commodities sectors for five major reasons. First, most governments prioritize the promotion of growth and employment. In general, the employment potential arising from forward linkages to the hard and energy commodities sectors, which are characterized by capital-intensive processing technologies, is limited. Forward linkages involving the production of soft commodities, in contrast, are often labor intensive. However, backward linkages into all three families of commodities are generally labor intensive, particularly at the early stages of local supply development, and are thus an attractive source of economic diversification to governments. These forward and backward linkages may also increase GDP, although in cases where the profitability of producers and users is wholly dependent on extensive government intervention and support, this increase may be nominal rather than real.

Second, the promotion of linkages in the commodities sectors provides a major opportunity for economic diversification by generating multiple products and services within an economy. It provides a form of signposting for the development of the industrial and service sectors. But following a linkage thread from the commodities sector does not necessarily translate into the development of an efficient and competitive diversified economy.

Third, and related to the signposting involved in diversification, linkages allow for the development of dynamic capabilities over time. “Dynamic capabilities” refer to entrepreneurship and innovation skills development, as well as other competencies developed within the workforce as a result of economic

diversification. Although governments may know that in the short term there is little prospect of developing efficient linkage activities, they may have good reasons to believe that this problem will be solved, or at least diminished, over time. Hence, they may actively target linkages through their industrial policy in the belief that complementary development of the national systems of innovation may result in a competitive diversified economy in the future. Botswana has explicitly adopted this policy agenda in the promotion of forward linkages from its diamond-mining sector.

Fourth, linkages from the commodities sector may lead to the generation of external economies, such as in South Africa's hydraulic engineering industry, where indirect benefits result. On the less knowledge-intensive side of the linkage spectrum, in Angola, which is characterized by a particularly weak metallurgical sector, the stimulation of the basic metalworking capability required to manufacture and assemble control lines between the subsea and the surface is helping to create local demand for metalworking capabilities. This development will have wide-ranging implications both for Angola's other manufacturing sectors and for the country's construction and infrastructure sectors. In Nigeria, information technology skills gained from serving the needs of the oil sector are also being applied to other sectors. Another important avenue for the creation of external economies are the intra- and intersectoral linkages arising from the development of infrastructure to meet the needs of the commodities sector. For example, the improvement of the Central Corridor transport route linking the Tanzanian coast with its interior, the Democratic Republic of the Congo, and Rwanda shows how linkages developed in one country's mining sector can create economic opportunities in other sectors, such as agriculture, and in other countries.

Fifth, government intervention to foster the development of linkages can also follow from the failure of lead commodity producers to strategize effectively and implement the development of their supply base. They often fail to "walk the talk" and, hence, do not effectively mentor and guide potential local suppliers, even though most producers claim mentorship as a central concern.

Why does this happen when the development of local suppliers holds competitive advantages for these lead commodity producers, especially when many mining houses have formally committed to encouraging and supporting local development? The explanation lies in part in the culture of the firms and in the patterns and habits it cultivates. Even in manufacturing, the sector in which supply chain management is most developed, supply chain development is generally a commitment rather than a reality (outside of large Japanese firms and a few of their U.S. and European competitors). The commodities sector is a latecomer to supply chain development, which makes its implementation of supply chain development less likely and less effective due to lack of practical experience.

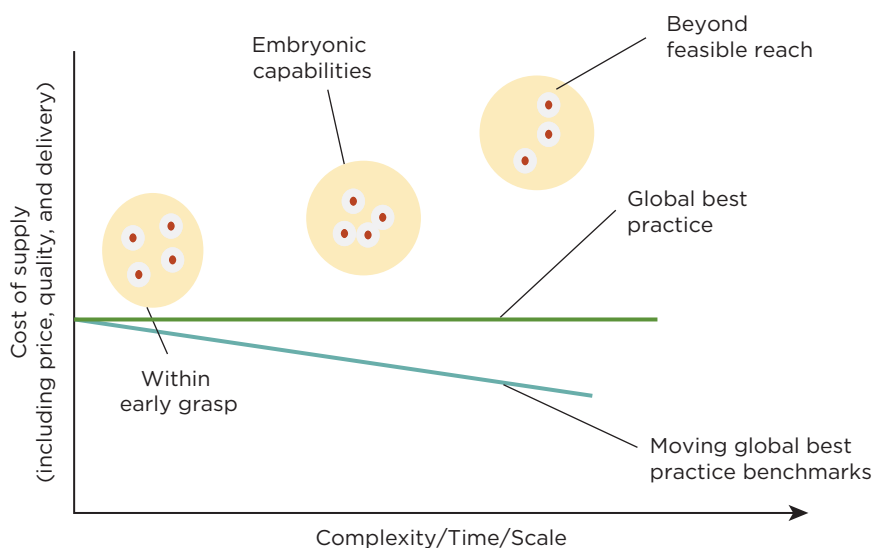
Another reason why lead firms in the commodities sector fail to effectively develop supply chains among local suppliers arises from the nature of the firms' contracts, which are executed when investments are committed to building new mines and oil wells. In general, mining firms and oil field operators subcontract mine building and well construction to specialized construction and installation firms. These contractors operate at a global level and have long-established

linkages with their own subcontractors. More importantly, the firms involved in construction do not manage the facilities they construct. Often, standards followed by the mine or oil-well builder discourage using local suppliers on an ongoing basis. For example, in Tanzania, the firm responsible for building a new gold mine was based in Australia. The specifications it used for plastic piping and electric fittings met Australian rather than Tanzanian standards, effectively excluding local subcontractors from the mine-building process.

A third reason why lead commodity producers might not make optimal use of local suppliers arises when the mine or well is located in foreign, isolated, or harsh conditions. In such conditions, the mining company staff in charge of purchasing and supply-chain management generally work short, intensive cycles, typically six weeks on and six weeks off. The resulting temporary residency, along with an inability to speak the local language, makes it difficult for them to build the long-term personal relationships with local suppliers that would be critical to extending local sourcing and developing supply chains.

From a government policy perspective, there are three sets of linkage opportunities that could generate productive policy outcomes (as shown in figure 9.3). The first set is the “low hanging fruit”—linkage opportunities available locally at lower than or close to the acquisition costs of imported supplies. These opportunities provide short-term returns to lead commodity firms and their suppliers and customers. The second set comprises local producers who have embryonic capacity to be competitive but need time and support to grow their capabilities before they can approach the global market. Finally, there are the ambitious and often high-profile linkages that are beyond realistic reach. It will be some time, if ever, before local producers can provide competitive inputs for those activities. The danger regarding this third set of opportunities lies in rent-seeking activities from stakeholders, often local ones, who promote unrealistic policies in

FIGURE 9.3 The Trajectory of Local Supply



Source: Morris, Kaplinsky, and Kaplan 2012. © Mike Morris. Reproduced with permission from Mike Morris; further permission required for reuse.

order to enrich themselves. Policy should be focused on blocking such political pressures.

These three categories of linkages are intrinsically contextual. How they are defined will depend on sector characteristics (for example, it is easier to link with local actors in agriculture than in deep-sea oil production), country capabilities (linkages will be deeper and broader in South Africa, for example, than in a less advanced country such as Tanzania), technological change (the frontier of global competitiveness will shift to varying degrees), time (capabilities take time to develop), and, critically, government policy.

Hence, if linkage development is to be enhanced, governments and firms need to develop a strategic focus for it. Strategy is central to this analysis of the attributes of successful policy design and implementation. This strategic focus will serve as a critical precursor, midwife, and parent to an effective program of linkage extension. It will affect both policies directed at the resource sector itself and those that have indirect impacts on linkage development, such as infrastructure and skill development. Guiding the process is the need for stakeholders to align their visions to take advantage of the significant scope for win-win linkages.

An important caveat to this model of the development of linkages over time, particularly when government has intervened to speed up and deepen linkage development, is that some of the outcomes of linkage development may not be “economically optimal.” That is, policies designed to increase local content in backward linkages or to promote forward linkages may be very costly, and inefficiencies in these linkage provisions may consume some of the resource rents generated in the commodities sector. Similarly, when government policies hold back the development of linkages that would have occurred as a natural consequence of market forces, there may also be opportunity costs associated with not encouraging linkage development, such as foregone benefits to local incomes, the development of local capabilities, and foreign exchange expenditures. It is difficult to argue a priori whether short-run inefficiencies are an optimal way of developing efficient long-run capabilities, since the truth of this statement will vary across sectors and countries and over time. The proposition is, however, a prime consideration in the policies adopted to increase the breadth and depth of linkages in the commodities sectors.

Conclusion

The growing obstacles to traditional drivers of industrialization—import substitution and export-oriented industrialization—make it imperative that all economies, including those that are commodity-exporting, develop effective strategies to promote their industrial sectors. As we have seen, a renewed opportunity for development has arisen for commodity-exporting low-income economies from a continuing, and probably prolonged, commodity boom and the development of corporate strategies designed to maximize the outsourcing of noncore activities. When handled effectively, this opportunity could allow them to foster economic diversification by building on forward and (especially) backward linkages to their commodities sectors. But this strategic path is littered with the corpses of failed attempts and is often undermined by a combination of weak and inappropriate policy support and grandiose, unrealistic expectations about the capacity of the economy to develop dynamic comparative advantages.

Thus, policy responses need to be evidence based and strategic, aligned with corporate visions and implementation plans, and complemented by policy instruments that provide appropriate incentives and sanctions. Moreover—and here it is important to learn a lesson from China’s recent development experience—one size does not fit all, and policy needs to be pragmatic and flexible. Context is important, because there are major differences between the three families of soft, hard, and energy commodities as well as important intrafamily differences. Moreover, each economy is unique and experiences a changing terrain of capabilities and political economic characteristics. It is also clear from international experience that effective policy is a process rather than a document and that it necessitates close interaction between public and private stakeholders and, in some cases, civil society stakeholders.

Perhaps the most important lesson to be learned from the development of outsourcing strategies by lead firms in GVCs is that the enclave mentality to diversification in low-income economies is an anachronism. There is extensive scope for governments and the private sector, including lead commodity producers and those firms with the potential to develop linkages in the commodities sector, to work together to identify the range of win-win outcomes available to promote diversification. A legacy of mistrust in many countries, the blinkered vision of firms—a form of pervasive market failure—and inappropriate and ineffective policies may have reduced the chances for linkages in the past. However, awareness of these failures can point toward a path of substantial opportunity in the future.

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Ownership, Management, and Revenue Sharing of Petroleum Resources in Federal and Devolved Regimes

George R. M. Anderson

Introduction

Petroleum is the most politicized of all natural resources, so it should come as no surprise that issues around the ownership, management, and benefit sharing of petroleum resources are contentious and complex in federations with significant endowments of petroleum. Experts in fiscal federalism have developed principles to address these issues; however, the practice across federations of handling them is highly varied and shows little adherence to any set of coherent principles. This chapter will present an overview of several principled arguments regarding the appropriate arrangements for petroleum in federal systems and the experiences of a number of federations and quasi-federations that have significant petroleum resources.

This chapter is divided into three major sections, corresponding to the three central questions of ownership, management, and revenue sharing. Each section will consider the normative principles and other factors that might guide a federation's choice of arrangements for petroleum. Although some "best practices" exist, there is no single best way to deal with petroleum in a federal or a devolved context. Much will depend on the nature of and the relative importance of the

resource as well as on the character of the political regime and society. In actual practice, a central theme is that ownership, management, and revenue-sharing arrangements within federations and devolved countries often relate to one another in surprising ways—the order of government that owns the resource may not necessarily manage the resource, and, similarly, the allocation of fiscal benefits may not necessarily follow from either ownership or management of the resource. Each of these dimensions has a good deal of potential autonomy, and therefore, each dimension merits careful consideration—as does the interrelation of the dimensions.

A federation is frequently defined as “a system of government in which there are two (sometimes three) constitutionally established orders of government, each of which acts directly on its citizens and has some genuine autonomy from the other.”¹ Historically, the older, “classic” federations were largely built around a dualist model in which the division of powers was characterized by a significant number of exclusive powers for each order of government and in which it was assumed that each order would operate independently of the other. This dualist model has been contrasted with what is sometimes called “integrated” (or even “administrative”) federalism, which features a good deal of sharing of powers, typically with the federal government allowed to impose its laws in areas of concurrency. Although there is some reality to the distinction between these two types of federations, we shall see that all federations have become integrated to a substantial extent.

It is also worth noting that there are nonfederal arrangements for the devolution of political powers. For example, in unitary regimes, devolution is normally carried out through legislation rather than through the constitution, leaving the legal autonomy of regional governments theoretically less guaranteed. In practice, some so-called unitary regimes devolve more authority than some federal regimes, and even though this devolution is enacted by simple legislation, the politics of the country might be very protective of regional prerogatives. There are also asymmetric regimes in which one region (or a few regions) have special devolutionary arrangements—and these arrangements may or may not be supported by constitutional language. Thus, it is reasonable to avoid too narrow an approach in this discussion and include some quasi-federal and asymmetric regimes when relevant.

This chapter will show that few federations have provisions for truly sharing the management of the petroleum sector—usually, one order of a government is clearly in the lead, although there may be arrangements for some “jointness” on certain aspects of petroleum policy or management. By contrast, arrangements for sharing petroleum revenues between the orders of a government and among the producing and nonproducing constituent units of the federation are common, although the manner, justification, and extent of this sharing varies greatly. It seems that money is easier to share than management.

Ownership

Although the *ownership* of petroleum resources can be a highly emotive political issue, the language associated with it and the practical significance of such language vary substantially across federations. Even where the constituent units of a federation have ownership of petroleum resources on land, the offshore resources

are under federal constitutional jurisdiction because the offshore (or almost all of it) is deemed to be outside the territory of the constituent units. The allocation of management and fiscal powers regarding petroleum resources are of fundamental importance, and so the technical ownership of petroleum resources can be of minor importance when management and fiscal powers are in the hands of another government. Even when governments issue rights of various kinds to oil companies, governments keep ownership of the subsurface resource. Private ownership of petroleum is most often tied to resources that have been produced (though in much of the United States and for some lands in Canada, private ownership of the surface lands extends to subterranean resources).

Because petroleum is such a valuable resource, there can be heated political and legal debates around the question of “Whose oil is it?” and what the answer signifies in practice. Some federal constitutions assign the ownership of petroleum to one or the other order of government (or to both orders jointly), but other constitutions never use the term *ownership* (or similar terms). Moreover, when it is used, the term has different meanings in different contexts, and the constitutional assignment of ownership can be contested politically. More fundamental than the use of the term *ownership*, however, are the rights and duties that a particular government, private individual, or collective has in relation to something, whether it is a resource, land, a building, a corporation, or intellectual property.

Constitutional Language Relating to Ownership

A number of federal constitutions are explicit regarding the ownership of petroleum resources:

- Canada: “owner rights to nonrenewable natural resources are vested with the provinces” (Art. 92a).
- India: “states own all the land and natural resources in their territory” (Art. 294).
- Iraq: “oil and gas are owned by all the people of Iraq in all the regions and governorates” (Art. 111).
- Mexico: “all natural resources in national territory are property of the nation” (Art. 27).
- Nigeria: “federal proprietorship” of minerals, mineral oil, and natural gas is affirmed (Sec. 44.3).
- República Bolivariana de Venezuela: all hydrocarbons “belong to the Republic” (Art. 12).

Other constitutions imply ownership without using the term, employing language such as *vesting*, *dominion*, *prerogative authorities*, and *powers*:

- Argentina: “provinces have the original dominion over the natural resources existing in their territory” (Art. 124).
- Bolivia: the central government has “prerogative authorities” in relation to hydrocarbons and land policy (Art. 298) and “control and direction over the exploration, exploitation, industrialization, transport, and commercialization of natural resources” (Art. 351).

- Indonesia: “the land, the water, and the natural resources . . . shall be under the powers of the State and shall be used to the greatest benefit of the people” (Art 33.3).
- Kenya: all minerals and mineral oils “vest in the national government” (Art. 62).
- Pakistan: oil and gas within a province or its adjacent territorial waters “vest equally in that province and the federal government,” while offshore they “vest in the federal government” (Art. 172.3).
- Russian Federation: natural resources may be subject to private, state, municipal, and other forms of ownership (Art. 9), and their use shall be a joint jurisdiction of the federal and constituent unit governments, subject to the supremacy of federal law (Arts. 72 and 76).

Still other constitutions have no language tied to ownership or property:

- The United States and the Australian constitutions make no direct reference to ownership or control of onshore resources. In both cases, these federations were formed from former colonies “coming together” into a federal union, and their constitutions assign any subjects not explicitly assigned to the federal government to the states through the “residual” power. In Australia, the states passed laws more than 100 years ago declaring their ownership of subsurface resources, and “the Australian constitution does not disturb this position” (Crommelin 2012), even though it is silent on the matter. In the United States, subsurface ownership follows surface ownership, whether private or public, and large parts of the western states are still federal lands (that were never transferred as new states were created) with federal ownership of the subsurface.
- Malaysia’s List 2 of state-exclusive competences includes licenses and leases for mines, which has always been interpreted to signify resource “ownership” by states (although this provision was circumvented in due course, as discussed in the following section).
- Natural resource ownership was a very contentious topic in the negotiations of the Comprehensive Peace Agreement (CPA) in Sudan in 2005. It was finally agreed that both the CPA and the interim constitution would be silent on the matter, with the provisions relating to petroleum being limited to management and revenue-sharing arrangements (Haysom and Kane 2009).

Offshore Ownership and Federal Lands

The distinction between onshore and offshore is important in most federations. Typically, the maritime boundaries of constituent units within federations are deemed to end at the low-water mark, and so their jurisdiction does not extend into the offshore zone, which falls under federal authority. (Constituent units’ territory extends partially into the offshore in Argentina, peninsular Malaysia, Pakistan, and the United States, where it is deemed to include all or part of the adjacent territorial sea, which may extend as far as 12 nautical miles.) The territory of constituent units or their jurisdiction always excludes the Exclusive Economic Zone that extends to 200 nautical miles, or the edge of the continental

shelf (with the sole exception of Malaysia, where the Borneo states of Sarawak and Sabah are considered to include their offshore zones because they joined the Malaysian federation after the Law of the Sea Treaty had established their zones).

Although all or almost all of the offshore zone is typically under federal jurisdiction, constitutions tend to be silent on the issue of ownership of the zone and rarely use the language of ownership in relation to the country's Exclusive Economic Zone.

In federations in which most onshore production is controlled by constituent units, a federal government can use its control over the offshore zone and federal lands as an instrument of a broader petroleum policy. Thus, in the United States, the federal government's policy objectives on petroleum supply and markets have influenced the rate at which it has promoted activity on federal lands in the western states, Alaska, and offshore. In Canada, the federal government made an ill-fated attempt through its National Energy Program in the early 1980s to steer exploration away from provincially controlled areas and toward the federally controlled northern territories and offshore, but this move largely foundered as petroleum prices declined, and the policy was withdrawn after a change in government.

The Limited Significance of Ownership Language

Regardless of the language used around ownership, more important is the allocation of powers or responsibilities regarding the management of petroleum and the allocation of petroleum revenues. Management responsibilities and the allocation of benefits from petroleum revenues do not necessarily follow from ownership. For onshore resources in countries such as India, Malaysia, Pakistan, and Russia, the primary management responsibility is with the federal government, even though the states own the resource in the first two cases and there is joint ownership in the latter two. Iraq's constitution of 2005 famously failed to resolve the fundamentals of oil management, despite the clause on ownership (Art. 111) cited above. As for revenue sharing, the major fiscal revenues flowing from petroleum resources go to the federal government in India, Malaysia, and Russia, despite constituent-unit or joint ownership. Meanwhile, in Brazil, most petroleum revenues flow to the states and municipalities despite federal ownership (although the share flowing to producing states relative to that of other states and municipalities has recently been reduced).

Constitutions establish a fundamental framework for petroleum arrangements in most federations, but they can be amended to reflect changing circumstances. For example, Pakistan in 2010 passed the 18th amendment to its constitution, which represented a potential empowerment of the provinces (though this is still contested) and included a new clause that established joint ownership of petroleum resources within provincial boundaries. Similarly, Canadian provinces' powers over natural resources were strengthened as part of the major constitutional reforms in 1982 (Howlett 1991). Perhaps the most extraordinary change was in Malaysia, where in 1974 the federal government introduced the *Petroleum Development Act*, which gave full ownership rights of petroleum resources in the country to the newly established state oil company, Petronas. The company was placed under the direct control of the prime

minister, even though the constitution stated (and still states) that petroleum resources within states “belong” to them. The implementation of this act required, in a politically controversial measure, that the states transfer ownership and all exploration and production rights to Petronas in exchange for a 5 percent royalty on production within their territory. Moreover, the act states that the ownership and the exclusive rights and powers of Petronas “shall be irrevocable” (Art. 2.3).

Australia’s, Canada’s, and Nigeria’s supreme courts all confirmed that the offshore zone lay beyond the boundaries of the constituent units and therefore was entirely within federal jurisdiction. But in each case, the federal government reached political compromises to accommodate constituent units adjacent to the offshore zone. In Australia, the states were ceded ownership and management of the “coastal waters” within three miles of the shore and given a subordinate role in joint management for the offshore zone. In Canada, the provinces were given equal powers within a joint management arrangement and were allowed to benefit from offshore petroleum revenues as if they were onshore. In Nigeria, the coastal states were able to win revenues from much of the offshore petroleum on the same “derivation” basis as operated onshore.

The United States has a particularly complex pattern of petroleum ownership, in that there are extensive federal lands onshore, notably in the western states and Alaska, while the territory of coastal states extends partway into the territorial sea. In most cases, subsurface rights in the United States belong to the owner of the surface land, which may be a government but is often a private individual or company (whereas private ownership of subsurface resources is relatively rare in other countries).² Over time, the federal government has made various arrangements with the states regarding management of petroleum and sharing of petroleum revenues from federal lands—50 percent of which now accrue directly to the producing state, while a further 40 percent accrues to a special reclamation fund for 17 western states—while maintaining federal ownership. Recently, the revenue-sharing terms for the offshore Gulf of Mexico petroleum were made substantially more generous for the adjacent states.

Ownership, Concession, and Contracts

Governments may transfer to corporations or other legal parties various rights and obligations regarding the exploration for and the potential development of petroleum resources. The legal instruments for these arrangements fall into two broad categories: concessionary systems and contractual systems. The fundamental difference between the two relates to the ownership of the natural resources:

- Under a concessionary system, the title to the hydrocarbons passes to the investor at the borehole. The state receives royalties and taxes in compensation for the use of the resource by the investor.
- Under a contractual system, the investor acquires the ownership of its share of production only at the delivery point (Tordo 2007, 7–8).

In both cases, the state does not transfer ownership of the subsurface resource; rather, it issues rights in relation to the management and development of the resource.

For the most part, issues around a government's technical ownership of the resource in the ground have not complicated relations with private investors. However, in Mexico, the former provisions of the constitution, which established the country's "direct ownership" of petroleum as "inalienable and essential," were deemed to preclude either concessionary or contractual arrangements whereby a company would have an eventual claim on a share of the petroleum that was produced. These provisions excluded international oil companies (IOCs) from acquiring concessions, risk, and incentive contracts, which over time had severe implications for the availability of investment capital and specialized technology for the development of Mexico's petroleum industry. In 2013, the constitution was amended to state that "All natural resources . . . are the property of the nation, and private exploitation may only be carried out through concessions" (Art. 27). This reform enabled a major opening of Mexico's petroleum sector, attracting many billions of dollars in planned investment. The language captures the general distinction between the ownership of the resource, which remains with the government, and the limited rights of concession holders.

Management

The key management instruments for the petroleum sector concern the issuance of rights and licenses to explore and develop the resource. While this authority may rest with the order of government in a federation that has ownership of the resource, this is frequently not the case. In general, the federal or central government has control of petroleum rights in developing-country federations, but in older federations, the constituent units have both ownership and rights management onshore. Federal governments typically manage the offshore zone, although there are some joint management arrangements. Several constitutional powers aside from rights management can also affect the management of the petroleum sector, including taxation and revenue-raising powers, as well as regulatory powers over the environment, petroleum marketing, and transportation. In federations with decentralized rights management, federal governments have sometimes used these other powers to exercise a substantial influence on the development of the sector. By contrast, in federations with centralized rights management, the constituent units typically have very limited powers of this type to influence management of the sector.

The petroleum industry's technical complexity, its potential environmental and social impacts, and its economic and political importance make it very challenging for governments to manage effectively, especially in developing countries, which may have limited technical capacity and a heavy reliance on the resource. Although significant petroleum resources can be a major asset for a country if they are managed well, too often oil wealth has led to corruption, divisive politics, and poor economic policies—the notorious "oil curse."

Managing oil within a federal context can be even more challenging than in unitary regimes because of the conflicts between governments over major decisions regarding exploration and development and over the distribution of benefits. Even though one order of government normally has the lead on petroleum policy and operations in a federal regime—there are relatively few instances

of truly “joint” management by federal and constituent unit governments—some federations give the constituent units a clear lead responsibility for managing the onshore operations of the industry but give the federal government important policy, fiscal, and regulatory powers as well. The opposite does not apply: constituent unit governments typically have very limited instruments for influencing the sector when it is under federal management. This section looks at the various legal authorities that governments and federal and constituent units use to influence the management of the petroleum industry.

The legal regime governing petroleum exploration and production normally deals with the following major issues:

- Hydrocarbon rights and their use
- Revenue matters, including taxation
- Environmental protection
- Petroleum transport and marketing

Although it is possible—and in some ways desirable—to have an integrated legal regime in which the hydrocarbon law deals with all of these issues or incorporates other laws by reference, this is frequently not practiced or possible within federations, mainly because both orders of government may have distinct powers relevant to hydrocarbons. Discussions of oil and gas management often focus on hydrocarbon rights and their use—with the government controlling these rights as the “manager”—but in practice, laws and regulations relating to all four of the above issues may affect the nature and pace of petroleum activity within a country. Therefore, it is useful to adopt a broader approach to management—one that includes all of the key instruments that may be used.

Much of the normative literature on petroleum management focuses on sector-specific objectives such as efficiency and effectiveness as well as on managing the fiscal impacts of petroleum revenues. However, the management of the petroleum sector must also be examined within the broader political and economic context of a federation. The objectives of the federal government and of the governments of both petroleum-producing and other constituent units may differ on a host of questions relating to economic management, industrial policy, environmental objectives, and the distribution of the petroleum sector’s fiscal and other material benefits. Thus, in a federation in which the constituent units play the lead role in managing oil and gas, the federal government may have important concerns about its access to petroleum revenues; the impact of oil price booms and busts on the economy; balanced regional and sectoral development, as well as horizontal fiscal balance between constituent units; “energy security”; and environmental protection. Where a federal government plays the lead role in managing oil and gas, the constituent units—producing and nonproducing—will still have concerns about the sharing of revenues, local job and industrial opportunities, and social and environmental impacts. Thus, there is a need, especially in federations, to take a broad view of oil and gas management as something that takes place in the context of multiple governments pursuing multiple and often conflicting objectives.

This section will review the four major issues with a focus on the role of each issue in petroleum management, especially within federal systems.

The Core of Petroleum Management: Rights and Their Use

The core of any oil and gas regime is the law, or set of laws, that establishes the principles and the approach to allocating exploration and development rights for the resource, including penalties and fines for mishandling this development, approvals needed for particular operations, the relevant administrative machinery, and economic and fiscal guidelines for investment activity (Ororato 1995). Although such laws are usually thought to be the prerogative of the government that “owns” the resource (Boadway and Shah 2009), in some federations, the federal government is given the constitutional authority to manage the resource and, hence, the legislative authority for oil and gas rights, even though it is not the owner or sole owner.

In most federations, the order of government responsible for legislating oil and gas rights—whether federal or constituent unit—does so without any involvement by the other order of government. Thus, for onshore resources in Argentina, Australia, Canada, and the United States, the constituent units pass and administer their petroleum laws independently of the federal government, while in Brazil, India, Malaysia, Mexico, Nigeria, Pakistan, Russia, and the República Bolivariana de Venezuela, the federal governments act autonomously from the constituent units in passing and administering their petroleum laws. The responsible government can administer its petroleum law through different structures. Frequently, this administration is done by a government department (such as an oil ministry), but another popular model is to have a separate regulator or agency engage in day-to-day administration while the ministry is responsible for overall policy and legislation. In a few countries, such as Malaysia, the management of the petroleum sector has been delegated to the national oil company (NOC), which combines the responsibilities of regulator and operator.

There are a few instances in federal regimes in which the government responsible for the petroleum law does involve the other order of government in the preparation of the law or in its administration, but the extent of such involvement tends to be limited.

- In India, the constitution provides that only the federal parliament may make laws relating to oil and gas. However, national legislation does permit the states, which constitutionally own the resource, to grant exploration licenses and development leases, so long as those leases strictly adhere to the central rules. Thus, the states have very limited decision making in this area.
- In Pakistan, the federal government has clear responsibility to control and manage the petroleum sector (even though petroleum is jointly owned with the provinces), but the federal powers fall under a section of the constitution that requires, since 2010, the federal government to involve the Council of Common Interests (CCI)—a forum of federal and provincial leaders—in the formulation of regulatory policies. This body tries to operate through consensus, but in the event of disagreement, an item can pass with the approval of the federal government and one provincial government. If no provincial government agrees with a federal proposal, the matter can be referred to a joint sitting of the two houses of the federal parliament, which are empowered to issue directives to the CCI. Since 2010, the CCI has been involved in approving petroleum policies as well as in the award of exploration blocks, but the

influence of the provinces has been limited (Ahmed 2012), and little new activity has been approved.

- In the United States, Congress has the right to regulate oil and gas activities on federal lands within the states, but the states assume concurrent jurisdiction, which means that they can also regulate in these cases so long as their regulations do not contravene federal law. In certain cases, the federal government can preempt state laws from applying. Congress may also deal with state or local regulations on a case-by-case basis, accepting or refusing them, and federal laws require that various federal regulatory provisions be consistent with the laws of a state and with state plans. Historically, the federal government has cooperated with states on issues such as well spacing and the rate of development and production. These accommodations have been reached politically and have not been imposed by the constitution (Mieszkowski and Soligo 2012).
- In Argentina, until 1992 the federal government administered oil and gas rights in the provinces that had been created from federal territories in the 1950s. In 1994, a constitutional amendment gave all provinces control of the oil and gas rights within their territory, but the federal government preserved a significant role in many operations because of its ownership of the NOC, Yacimientos Petrolíferos Fiscales (YPF), which held extensive rights granted to it by the federal government. These rights will expire over time.

In the first three of these cases, the federal government has primary control of onshore petroleum rights while the constituent units have a very limited role in determining and administering the petroleum law. In Argentina, the federal government has, for a transitional period, an indirect management role through its ownership of YPF in a regime in which the provinces control petroleum rights.

The most robust models of “joint administration” of petroleum rights between governments are found in the offshore regimes of Australia and Canada. In both cases, the countries’ supreme courts had ruled that the offshore zone fell under the jurisdiction of the federal government, but the federal governments chose to negotiate joint arrangements with the constituent units concerning this zone.

- In Australia, the commonwealth and state governments negotiated the Offshore Constitutional Settlement in 1979. Although the commonwealth government retained ultimate constitutional authority, it delegated legislative authority for the area within the three-mile limit of the territorial sea to the adjacent states, and it set up a joint regime for the rest of the offshore zone. For the larger offshore area, it passed legislation assigning day-to-day administration of each state’s offshore area to a “designated authority” (a state minister and officials). It also created a “joint authority” of the federal and state ministers for each area to be responsible for major decisions, such as which areas should be open for petroleum activity, the granting of exploration and production rights, and the determination of work and investment conditions. In situations in which the two ministers cannot agree, the federal minister has the ultimate power to decide (Commonwealth of Australia 1980).
- In Canada in the early 1980s, the federal government negotiated offshore agreements with Nova Scotia and Newfoundland. These agreements were

inspired by the Australian model, but had significant differences. The day-to-day administration of each offshore area is assigned to an arm's-length agency whose board is made up of equal numbers of federal and provincial nominees and a mutually agreed-upon chair. Certain decisions, similar to the major decisions in Australia, are deemed “fundamental” and require the agreement of both ministers, but there is no federal ability to override (Cairns 1992).

Neither of these models is fully joint, in the sense that all decisions are made jointly by the two relevant governments. In both cases, legislation is federal and day-to-day administration is delegated to a state minister (in Australia) and to an arm's-length agency (in Canada). For fundamental decisions, the Canadian model demonstrates joint decision making, while the Australian model preserves the ultimate right to decide of the federal minister (although consensus is the normal objective and practice). It is also worth noting that these models apply to the offshore zone, where the scale of individual operations is typically much larger, and thus the key decisions are fewer, than is usually the case onshore. Adapting such a model to an onshore context could pose distinct challenges.

There was some consideration of a joint regime in Iraq. The country's constitution stipulates that the federal government and the governments of the producing governorates and regions are “to undertake the management of oil and gas extracted from present fields” and that these governments “shall together formulate the necessary strategic policies to develop the oil and gas wealth” (Art. 112). In neither case, however, was the language clear. In December 2014, the two governments reached an agreement in which the Kurdish Regional Government (KRG), which has controlled petroleum activities in its area, committed to providing significant quantities of oil to the State Oil Marketing Organization of the federal government; in turn, the KRG received significant fiscal concessions and perhaps implicit recognition of its oil production exceeding the amounts to be delivered to the federal government (Knights 2014). However, in September 2017, the KRG held a referendum on independence, in which the vote was strongly in favor. This led to a crackdown on the KRG by Baghdad, which included the retaking of Kirkuk, a key oil producer, and a reduction in fiscal revenues for the KRG. In the spring of 2018, the Iraqi Parliament, after many years of fruitless debate over a new petroleum law, passed a law for the creation of the Iraq National Oil Company that would centralize petroleum management in the national oil company. Although this law was supported by Kurdish members of parliament, it leaves unresolved a number of major issues regarding the division of petroleum management and revenues between the federal government and the KRG.

Fiscal Levies on Petroleum as a Management Instrument

The cost of finding and producing petroleum is often substantially less than the price paid for it. This discrepancy gives governments a strong interest in the fiscal regime governing the petroleum sector because of the substantial revenues that may flow to them. In fact, it may be argued that for most governments, optimizing their fiscal take is their primary objective in relation to the petroleum sector—but even this objective involves judgments and preferences related to the timing of revenue flows and other factors. Fiscal levies may be established

through royalties, resource rent taxes, corporate income taxes, import and export duties, value added taxes (VATs), bonuses, government participation, profit oil, and other instruments. Typically, such levies are relatively transparent when they apply to private investors, but many governments that make heavy use of their national oil companies have extracted revenues from their NOCs on a highly discretionary and nontransparent basis.

In almost all federations, the order of government that is directly responsible for administering the petroleum sector (which may or may not “own” the resource) also determines the principal fiscal levies on the sector. However, deciding what the fiscal levies will be is different from determining the allocation of the petroleum revenues, as is discussed in the following section on revenue sharing. The purpose of this discussion is neither to consider the merits of different levies nor to consider the optimal design of a petroleum fiscal regime, which are both addressed in chapter 4 of this publication (see also Cottarelli 2012, Tordo 2007). The purpose of this section is, rather, to consider the role that fiscal levies can play in the management of the petroleum sector and what this role may mean, given the distribution of fiscal responsibilities within federal systems.

There seems to be a general pattern that in federations where the federal government manages hydrocarbon rights and their use, it also determines all—or virtually all—of the fiscal terms in the petroleum industry. Thus, in Brazil, Malaysia, Mexico, Nigeria, Pakistan, Russia, and the República Bolivariana de Venezuela, the constituent units have no say regarding fiscal levies on the industry, or have only very limited powers. In some cases, constituent unit taxes of general application, such as a VAT, cover the petroleum industry. But even in those cases, as in Brazil, the federal government may have the authority to establish complementary laws, which set the basic rules for a particular tax by a constituent unit (Rezende 2007). In the República Bolivariana de Venezuela, states have been able to tax nonoperational contractors serving the oil industry on the same basis as other industries, and this has been a very modest source of revenue for a few producing states (Manzano and others 2012). States in India can levy charges on the petroleum industry at various stages of development and can collect some fees levied by the federal government. However, these fees are minor (Noronha and Srivastava 2012), so they are unlikely to affect the character, pace, or management of petroleum activities.

In contrast to the very limited powers of constituent units over petroleum management in federations where the federal government controls rights, in states where the constituent units control rights, federal governments do have a number of potentially substantial fiscal powers that can be—and have been—used to affect the pace and character of petroleum development, as well as to achieve the federal governments’ broader revenue-raising and other purposes. Argentina is, perhaps, the most dramatic recent example: although the provinces administer the petroleum sector and have the right to impose and collect royalties along with various other taxes on it, from 2002 to 2017, the federal government used its power to tax hydrocarbon exports (and its power to impose export and import controls) to extract twice as much in petroleum revenue as the provinces did with royalties. The federal use of this instrument had a major depressive influence on the sector, both because of the weight of fiscal take and

because it forced the internal price for oil and gas below international levels (and thereby reduced the value of royalties received by the provinces). Although the federal government's motives were fiscal rather than sector-related, its intervention shows how dramatically a fiscal instrument can affect activity in the petroleum sector.

After the second international oil shock in 1979, the Canadian federal government intervened to change the nature and the course of the country's petroleum sector by implementing the National Energy Program (NEP). The NEP was a far-reaching scheme to redistribute government revenues from petroleum, protect consumers from world oil prices, and promote much greater petroleum activity in the offshore zone and in northern lands that were under direct federal jurisdiction. The Canadian provinces controlled petroleum rights; therefore, the NEP relied heavily on fiscal instruments, including an export and a petroleum and gas revenue tax, changes in corporate taxation, and incentive payments for exploration on lands under federal jurisdiction. Although the NEP foundered on domestic politics and falling oil prices, it demonstrates how powerful federal revenue authority can be as an instrument to affect the management of the sector in a federation where constituent units control petroleum rights within their boundaries. More recently, in 1997, the Canadian federal government intervened to accelerate the development of the huge oil sands resource in Alberta by providing special cost allowances against corporate income tax; these allowances are now being phased out.

Energy security has long been a preoccupation of governments of the United States; as a result, the federal government has a history of issuing "supply-side preferences" that have given special incentives to the petroleum industry to favor its development. These incentives have included special deductions for certain expenses as well as a generous depletion allowance. Estimates of total federal tax preferences for the petroleum industry in 2009 range from about US\$3 billion to US\$6 billion (Mieszkowski and Soligo 2012, 325–26).

Environmental Regulation of the Petroleum Sector

All countries with petroleum industries will proclaim their commitment to safety and environmental protection. However, in practice, the extent of this commitment varies greatly, and there are many stories of terrible industry practice and inadequate government regulation. Environmental regulation is an intrinsic part of the responsibility of oil and gas regulators, but when these regulators are the oil ministry, a special oil regulatory agency, or, worse, an NOC, there is an inevitable conflict among their various responsibilities. Strict environmental compliance can add costs and delays and thus hurt government revenues and exports; as a result, environmental standards may be compromised. These internal conflicts and compromises are mitigated by many governments through the enactment of a strong environmental law and a ministry that establishes standards that apply to all industries, including the petroleum industry. In some cases, the implementation of these standards is assigned to the petroleum regulator (with greater or lesser oversight by the environmental authorities). In other cases, the environmental department or agency has hands-on responsibility for regulating the petroleum industry in the field.

Inevitably, the story becomes more complicated in federal systems. When the petroleum regulator is within one order of government (federal or constituent unit), the question is whether the industry is subject to some degree to environmental regulation by the other order of government. The answer has some similarity to the regulation of fiscal levies, in that when the petroleum regulator is federal, the constituent units typically have weak (or even no) regulatory authority over environmental impacts of the industry. When the petroleum regulator is at the constituent unit level, the federal government usually has considerable legal authority over the environmental impacts of the petroleum industry. And in all cases, the actual outcomes depend on political will and priorities as well as on the ability of the public to bring effective pressure to bear.

An extreme example of local environmental disempowerment when the federal government is the petroleum regulator is Nigeria. Its states and local communities “have no constitutional or statutory rights, voice, or even consent regarding oil and gas industry projects in their locale.” This “total exclusion” from participation in the local industry has “combined with the environmental, socioeconomic, and political deprivations of the region to engender the militant campaign for regional and local ‘resource control’ in the Delta” (Iledare and Suberu 2012). The República Bolivariana de Venezuela is in a similar situation.

In most other federations with centralized oil and gas rights management, the constituent units have some (limited) role in environmental regulation of the industry. In Malaysia, Sarawak seems to have won political consent to its requirement, which has a dubious legal basis, for environmental impact assessments on certain activities (Hui 2012, 182–83). In Mexico, local governments have very limited legal powers, but they have become increasingly effective in bringing political pressures to bear on Pemex to comply with environmental regulations (Carreon-Rodriguez and Rosellon 2012, 218). In Brazil, the federal government has exclusive rights over the exploitation of natural resources, but the environment is an area of concurrent competence, with federal power to override. In practice, the Brazilian states seem to have little role in regulating the environmental impacts of petroleum activities, although they can use various consultative mechanisms. Subnational governments in India and Pakistan have somewhat stronger legal responsibilities for environmental regulation that bears on the petroleum industry. In Pakistan, provinces regulate major field operations comprising seismic surveys and drilling, which cannot proceed without an environmental assessment and a no-objection certificate (Ahmed 2012, 277). The Indian constitution has no heading for the environment, but the subject is captured within several other issues, such as water and land, which are largely state matters, and forests, which are concurrently regulated. In general, the Indian central government has the advantage because it controls so much framework legislation, but the states also have a role in administration. Much of the environmental debate regarding the petroleum sector in India relates to inadequate compensation for environmental damage. A few states in the northeast with large tribal populations have been given special status and control over land and natural resources in response to compensation demands.

The situation is quite different in federations in which the constituent units manage petroleum rights. In these cases, the federal government has strong environmental powers, which can impinge directly on the oil sector.

Australia, Canada, and the United States all have very old constitutions in which there is no explicit mention of the environment, but the federal governments have recourse to other powers that permit them to establish environmental standards of virtually all kinds. The Argentine constitution was amended in 1994 to include a new provision (Art. 41) that establishes the right of all inhabitants “to a healthful, balanced environment” and that makes environmental regulation a concurrent responsibility of the federal government and the provincial governments, with the federal laws paramount. All four of these federations have high environmental standards, in which the federal government has usually taken the lead, and have seen substantial coordination, including delegation by the federal governments of some regulatory responsibilities to state or provincial authorities.

While federal environmental regulations have not been designed explicitly to influence the pace or nature of petroleum activities, they have sometimes had this effect because of requirements for extensive environmental review prior to approval of projects or for costly damage-mitigation measures. In these federations, the federal governments also have the power to impose a carbon-pricing regime—whether a carbon tax or cap-and-trade—which could have a substantial impact on the petroleum industry, but so far, only Canada has made initial steps in this direction.

Petroleum Transport and Marketing

The final major area where there can be aspects of “jointness” in managing the petroleum sector relates to the transport and marketing of petroleum once it is out of the ground. In federations where the constituent units manage petroleum rights, the federal government powers related to transportation and marketing can have a major impact on the petroleum sector and can be used as a major lever by which federal governments influence petroleum policy, even though they do not manage most rights. Such federal powers can be used to promote the development of the sector or to constrain it.

In the United States in the 1930s, oil prices dropped below US\$0.10 a barrel—well under the cost of production—because of a flood in production following huge discoveries in Texas and Oklahoma. Texas moved to proration production as a way to increase prices, but its efforts were undermined by so-called hot oil, which was oil production that exceeded legally allowable quotas. The state’s attempts to raise prices largely failed. Chaos ensued in the industry, so the federal government eventually stepped in to prohibit the sale of hot oil across state boundaries and suggested appropriate production levels to different states. It also imposed an import duty on foreign oil. Together, these measures raised prices and stabilized the industry (Yergin 1991, 248–59). In the 1950s, the federal government established a limit on oil imports, which resulted in domestic oil prices at least 50 percent higher than import prices. These limits were eliminated in the 1970s after the first oil-price shock, when the federal government brought in price controls. The federal government also had authority over interstate pipelines, and, in the case of natural gas, it actually regulated wellhead prices of gas destined for interstate commerce (Mieszkowski and Soligo 2012, 313–16).³

In Canada, the federal government also intervened in the 1950s to promote the country’s nascent oil industry by supporting the development of the

Trans-Canada natural gas pipeline and by reserving domestic oil markets west of a line near the Ontario-Quebec border for Canadian supply. It thereby boosted prices for western oil producers. However, after the oil price shock in 1974, federal policy shifted toward security of supply and protecting consumers, which was implemented by restricting exports and controlling oil prices outside the province of production. Export restrictions were tightened further as part of a broad range of federal measures, including a tax on oil exports following the second oil shock (Plourde 2012, 90–94). While Canadian policy is now essentially market driven, there have been growing claims by aboriginal people and provincial governments to have some control over and to receive benefit from pipelines that cross their territory. The position of aborigines has been strengthened by the country's supreme court's ruling that the aborigines have a right to be consulted about pipelines—which means they must be seriously considered and accommodated where reasonably possible. In practice, this enables them to gain material benefits. The province of British Columbia argues that it should receive material benefit from a pipeline traversing its territory, in part because it assumes the environmental risks associated with the pipeline. Both of these developments are altering the context in which the federal government regulates major pipelines. In August 2018, a court found that the approvals given by the federal government for the Trans Mountain pipeline from Alberta to the British Columbia coast were deficient in relation to environmental impacts and consultations with aboriginal peoples, so the federal government was obliged to conduct a new round of consultations and studies. The oil industry in Alberta has been increasingly concerned that barriers to completing major pipeline projects are having a serious impact on its ability to get oil to markets and on the price it can get for the oil it produces.

Additional examples of marketing controls include the aggressive interventions by the previous Argentine federal government through export quotas on natural gas, restrictions on the use of natural gas for electricity, and very high export taxes on both oil and natural gas. The Australian government has similar constitutional powers that would permit it to control exports and internal prices and to impose export taxes, but it has not used them to intervene in this way. Finally, the Iraqi government was able to use its leverage over the marketing of oil exports to reach a major agreement with the KRG on marketing and fiscal matters, as discussed earlier.

These examples illustrate how strongly federal powers over markets, exports, and transportation can affect the petroleum industry even in federations where the constituent units are responsible for managing petroleum rights. These federal powers, along with federal taxing powers and, in some cases, control of offshore and federal lands, have been the main instruments used by federal governments to influence petroleum policy at the national level. Their use has involved both cooperation and conflict with producing constituent units (as well as with nonproducing ones).

The Petroleum Management Nexus in Federations

This brief review was designed to give a sense of the different management arrangements for petroleum within federations. Management has been defined broadly to include all those powers or levers that might be used by a government—whether federal or of a constituent unit—to influence petroleum policy

and activity. Clearly, the allocation of the core responsibility for managing petroleum rights and their use is fundamental in any federal regime. Its assignment may be to a government deemed to “own” the resource, but this is not necessarily the case. In addition, we have seen that other powers or responsibilities can influence the management of the sector. The overall picture that emerges is one of strong contrasts between regimes where petroleum rights are managed by the federal government and regimes where the rights are managed by constituent unit governments.

- In the former, federal governments control virtually all the levers affecting the petroleum industry; although constituent units may have some limited fiscal or environmental powers that permit them to influence how the federal government manages the sector, these powers are typically quite limited, even in the most permissive cases. What matters most in those contexts is the political preparedness of the federal government to consult and cooperate with the constituent units.
- By contrast, when the constituent units control petroleum rights, federal governments still typically have considerable powers to affect petroleum policy: these powers include taxation and other fiscal instruments such as regulatory powers relating to the environment; transportation; internal markets; international trade; and sometimes the control of “federal” lands in the offshore, in federally managed territories, or within constituent units themselves. Thus, the dynamics around petroleum policy are much less one-sided in such scenarios, and each order of government has significant legal powers. This can lead to intergovernmental cooperation or conflict, depending on who controls each order of government and the nature of their objectives at the time.

Petroleum Revenue Sharing and the Fiscal Architecture of Federations

The importance of petroleum for the economies and government revenues of federations varies enormously. In some cases, petroleum revenues are the largest—even the dominant—source of government revenues. In all federations, federal governments determine a broad range of fiscal taxes and levies; they also collect more revenues than they need for their own purposes, and a portion of these revenues is allocated to the constituent units through a revenue-sharing formula, transfers from the federal budget, or both. Within the broader context of how governmental revenues are allocated, there can be special arrangements for sharing petroleum revenues. Each regime must determine the weight to be assigned to derivation (the jurisdiction where a revenue was generated) versus need in allocating revenues. Some regimes give significant weight to derivation for petroleum revenues, but the net effect of this weight can depend on whether the allocation of other revenues takes account of and offsets petroleum income of constituent unit governments. There are arguments for and against a special treatment for petroleum revenues, and these arguments may be resolved by finding an appropriate balance. Experience across federations in handling revenue sharing varies greatly.

A central feature of any federation is its fiscal architecture: which levels of government have what powers to raise what revenues, how revenues are distributed, and who has what expenditure responsibilities. These questions have both a vertical dimension—between the federal government and the constituent units—and a horizontal dimension—among the constituent units. Federations vary a great deal: in the extent to which revenues are raised centrally, in their procedures for allocating revenues, and in the distribution of expenditure responsibilities. In all federations, more revenue is raised centrally than is directly spent by the federal government, so there are arrangements for distributing some centrally raised revenue to the constituent unit governments (and even directly to local governments in some cases). Some federations, such as Malaysia, are highly centralized for both revenue raising and expenditure; several other federations are centralized for revenue raising but decentralized for government expenditures (which necessitates significant sharing or transfer of centrally raised funds); and a few federations have relatively balanced revenue-raising and expenditure responsibilities (necessitating relatively minor sharing or transfers).

- Oil and gas production can generate very large revenues for governments. In some oil-dependent economies, such as Nigeria and the República Bolivariana de Venezuela, petroleum levies can account for 80 or even 90 percent of all government revenues in the federation. Even in more diversified economies, such as Mexico and Russia, petroleum levies can be as much as half of all government revenues. Because the cost of developing petroleum is often only a small fraction of its price, governments can collect the normal taxes they would on any business plus the so-called *resource rent*, which is the potential profits beyond what investors would normally require. (The amount will vary according to factors such as geological and political risk.) In practice, few revenue regimes try to distinguish between resource rent and other revenues from the sector;⁴ some governments have extremely simple regimes based on one kind of levy, while others invoke a whole bevy of fiscal instruments.
- In certain federations, all fiscal levies on petroleum are at the federal level; in others, both orders of government collect from the industry. It matters greatly who decides what charges there will be on the industry and what will be the distribution of petroleum revenues among the federal, constituent, and local governments. In fact, the distribution of petroleum revenues has been considered so important in Brazil, Nigeria, and Pakistan that the rules for their allocation are explicitly established in the countries' constitutions.
- The allocation of petroleum revenues needs to be considered in the broader context of the allocation of all revenues. Federations approach these allocation issues in very different ways. Some federations treat petroleum revenues as special; others do not. Some federations accept major disparities in the fiscal resources available to the governments of different constituent units; others try to equalize or at least limit disparities. Before looking in some detail at the varied approaches of federations to petroleum revenue sharing and management, it is important to set a broader context regarding the principles for allocating revenues.

Derivation versus Need, and Sharing versus Transfers

One principle for the allocation of revenues is *derivation*, which means that revenues (or some part of them) should be allocated to the political unit where they are generated. In federations where the constituent units have extensive revenue-raising powers of their own, the units typically keep the revenues that they raise;⁵ thus, the devolution of taxing powers is implicitly tied to a notion of derivation. The story becomes more complicated when revenues are raised by the federal government. In this case, a good part of those revenues will be for the federal government's own expenditure needs and the territorial allocation of its expenditures will not necessarily reflect the territorial sources of its revenues. But in all federations, some part of federally raised revenues is allocated to the constituent unit governments (and sometimes to local governments, too). This can be done through two alternative methods called revenue sharing and inter-governmental transfers:

- *Revenue sharing.* This approach refers to the sharing of some or all federally collected revenues with the constituent units according to a set of rules. The rules establish which revenues are to be shared and which proportions are to go to the various constituent units. The revenues to be shared can be as inclusive as all federally collected revenues (as in India) or limited to the receipts from particular taxes and levies (as for petroleum revenues in Nigeria). Revenue sharing provides constituent units with unconditional lump-sum payments—in fact, in many federations the constituent units' allocations from shared revenues never appear in the federal budget. Rather, all the revenues to be shared among the federal and constituent unit governments go directly into a common national account (outside the federal budget) and from there are distributed to the various governments. Thus, such revenues are often considered *own source*, even when the constituent units have not determined or collected them.
- *Intergovernmental transfers.* The alternative to sharing all or certain federal revenues is for the federal government to vote to transfer funds from its budget to the constituent units. These transfers can be general-purpose and unconditional, like shared revenues, or they can be conditional, in that they are to be used by the constituent units for specific purposes subject to conditions. Conditional transfers may require some proportion of matching funds from the constituent units. These transfers provide an incentive for the constituent units to undertake programs that are federal priorities, although, in principle, the constituent units can decline to receive them (which rarely happens).

Some federations make use of both shared revenues and intergovernmental transfers.

The principles guiding allocations to constituent units for these two alternative methods have similarities and differences. Both methods can make unconditional transfers, and both can accommodate allocation formulas on the basis of various measures of need (for example, population size, own fiscal capacity, territorial size, or cost structure). But only the revenue-sharing method can make allocations on the basis of derivation, and only the intergovernmental transfer method can make conditional transfers.⁶ In practice, the derivation principle in

revenue-sharing regimes seems always to be attached to the allocation of a particular revenue stream, not of all revenues. Thus, in India, which pools all federal revenues and then shares a portion of these revenues with the states, the principle of derivation has no bearing on the allocation. In Pakistan, however, the general revenue pool is shared without reference to derivation, but resource revenues, which are established and collected by the federal government, are kept out of the general revenue pool and are allocated to the provinces strictly on the basis of derivation.

Federations vary greatly in the extent to which constituent units are financed by revenues they generate themselves, by revenues that come through a sharing mechanism (from a general pool or particular revenue sources), and by inter-governmental transfers (unconditional or conditional) from the federal budget. In terms of the latter two categories, some federations, such as Nigeria, rely very heavily on revenue sharing; others, such as India, mix revenue sharing and inter-governmental transfers; still others, such as Canada and Mexico, have little to no revenue sharing and operate through intergovernmental transfers.

Every federation must find its own balance between the principles of derivation and of need. A justification for the derivation principle, when taxing powers are devolved, is that it provides an incentive for constituent units to make use of their powers to raise revenues for their own purposes. There is no such incentive when the federal government determines and collects the tax. When the derivation principle is applied, the justification for doing so seems to be that a particular tax somehow “belongs,” at least in some degree, to the constituent units where it is collected. This relationship may be tied to ownership, notably in the case of natural resources, but the link is weak or nonexistent in many cases. Although natural resources are probably the most important revenue source for which the derivation principle is applied to centrally raised revenues in federations, there are important exceptions to its application: in Russia, for example, derivation is used to allocate national corporate and income tax revenues but not natural resource revenues. Finally, the derivation principle can be applied in degrees—it is not necessarily the case that all the revenues from a source will be allocated on the basis of derivation. In Nigeria, for example, the producing states get 13 percent of petroleum revenues, but the remainder goes into the general pool for allocation among all governments, federal and state.

The principle of need is quite flexible and is applied in different ways not only across federations but also in relation to particular revenue sources. Some countries, especially Organisation for Economic Co-operation and Development (OECD) federations such as Australia, Germany, and Switzerland, have highly developed overall systems of equalization, though the design of their regimes differs (for example, in assessing only capacity to raise revenues or assessing both this capacity and expenditure needs), as does the extent to which they try to achieve full equalization versus a limit to disparities. Many other federations, especially in developing countries, do not have a coherent, integrated definition of need, nor do they have an equalization program, as such. Rather, they apply a number of criteria in the allocation of the revenue pool. These criteria may still result in significant fiscal disparities between constituent units, and sometimes the formulas used for allocation actually worsen disparities. The United States has never tried to have an equalization program; instead, it has scores of conditional transfers, each of which has its own formula for allocations. The overall

distribution of federal transfers in the United States does not reflect need, so there are major disparities in the fiscal resources available to states.

Provisions and Mechanisms Governing the Allocation of Revenues

The most fundamental provisions relating to revenues in a federal constitution allocate taxing and other revenue-raising powers. Some federations empower both orders of government with broad revenue-raising powers, while others tend to concentrate the most important revenue instruments in the federal government. In some federations, such as Australia and Canada, the ability to impose royalties is tied to the provincial or state ownership of extractive resources. As discussed in the revenue-raising section, most federations in the developing world tend to be fiscally centralized, especially in terms of revenue raising, even if expenditure responsibilities are relatively decentralized. In this case, there needs to be substantial revenue sharing or federal transfers to the constituent units.

The more fiscally centralized a federation, the more important the principles and provisions relating to the allocation of centrally raised revenues become. Some federations have constitutional provisions related to the principles for allocating revenues among governments, including the following:

- Canada: there should be “equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation” (Art. 36.2).
- Germany: the federal government may legislate in areas of concurrent legislation with the provinces where necessary to provide for equal living conditions (Art. 72) throughout the country.
- Iraq: the federal government shall distribute “its revenues in a fair manner in proportion to the population distribution in all parts of the country” (plus some transitional provisions) (Art. 112).
- Nigeria: the Nigerian constitution specifies a number of principles for making allocations from the federation account, including “population, equality of states, internal revenue generation, landmass, terrain, as well as population density” (Sec. 162).
- South Africa: there should be “the equitable division of revenue raised nationally among the national, provincial, and local spheres of government” (Art. 214.1).

A few federal constitutions have explicit formulas for the allocation of petroleum revenues among governments. In addition to the principles cited above, the Nigerian constitution provides that not less than 13 percent of natural resource revenues shall go to the producing states (Sec. 162). The Brazilian constitution has detailed formulas for allocating petroleum revenues among the federal government, the governments of producing and other states, and the governments of producing and other municipalities. The Malaysian constitution guarantees 5 percent of royalties to producing states. In general, these arrangements have proven unsatisfactory and have given rise to serious fiscal imbalances within the federations, especially when oil revenues are very large. In Nigeria, for example, the richest oil-producing state has on occasion had more than 15 times more

revenues per capita than the poorest nonproducing state. Although in principle it might be possible to design a formula that would be appropriate for very different oil prices and production rates, in practice, these constitutionalized formulas have had the same sharing ratios no matter the circumstances.

This is why there are real advantages to limiting constitutional provisions to a set of principles for guiding the allocation of revenues. Whatever these principles may be, governments need to put mechanisms in place to consider and decide on the matter. In Canada, this decision is strictly the prerogative of the federal government, which can consult the provinces as much or as little as it pleases. But in several federations, independent advisory bodies play an important role in this matter. The constitutions of India, Nigeria, Pakistan, and South Africa establish such independent advisory bodies, but they can also be established by federal legislation, as they are in Australia. In Ethiopia, Germany, and South Africa, the constituent units have a formal role in reviewing the sharing of revenues through the upper houses, but in Germany and South Africa, the final decision rests with the lower house. Finally, the courts have sometimes played an important role in interpreting constitutional provisions on revenue allocation.

Because government priorities and capabilities change over time, it is best for federations not to have too rigid a system for revenue allocation. In most federations, the federal government has significant discretion over not just the allocation of revenues among the constituent units (and, in some cases, the local governments), but also what share it shall have for its own purposes. In federations with revenue sharing, there may also be intergovernmental transfers, so there can be a mixed system of revenue sharing; in those cases (such as in India and, to a lesser extent, Nigeria), the mandate of the finance commission might be restricted to revenue sharing, and it might not include fiscal transfers.

Are Natural Resources Special?

Revenues from natural resources are just one source of government revenues, but it is striking how often federal systems treat them differently from other revenue sources—notably, with a special fiscal benefit going to the constituent units where the resource was produced (or in the case of offshore production, in the zone adjacent to the constituent unit). There are arguments for and against treating natural resources as special:

For:

- When constituent units “own” the resource, they should receive a material advantage. However, even when a constituent unit does not have a legal claim of ownership, its population may still feel that the resource “is ours” and, therefore, that they should receive some benefit.
- Producing regions should receive some special revenues as compensation for local environmental damage, for infrastructure and manpower training costs associated with servicing the industry, and for investments needed to prepare for the time when the resource is depleted. In practice, no federation has implemented such concepts with any rigor, although in Mexico, such compensations account for very small payments.
- Resource revenues are a depleting asset and should not be treated the same way as income or other current revenues.

- When resource rights management and relevant revenue-raising powers are decentralized, the constituent units need an incentive of net fiscal gain if they are to have appropriate taxation and royalties; otherwise, they will undertax and seek to extract benefits in other ways.

Against:

- Federal governments are better able to manage the major swings in revenue from the petroleum sector than are constituent unit governments: they have a broader fiscal base, easier access to debt markets, and more flexibility in spending than constituent units normally do.
- When the petroleum sector is a major part of a country's economy or a major source of government revenues, the management of the sector and its taxation will have a major bearing on macroeconomic policy of the whole country, which is the responsibility of the federal government.
- Assigning too much revenue to resource-producing regions in a federation could lead to major fiscal disparities between constituent units. Such disparities could be inequitable and could also cause economic inefficiency if resource-rich regions are able to use their fiscal advantage to lower taxes and enhance services, thus leading to a "fiscally induced migration" of people and capital.
- A dollar from resources is not fundamentally different from a dollar from other sources. If there is concern about a depleting capital asset, the resource revenues could be assigned to a wealth fund, but income from that fund should be treated like other income.
- Producing regions receive nonfiscal benefits, such as employment and investment, from the resource sector and do not need special fiscal benefits.

Economists tend to argue for strict limits on treating resource revenues as special; however, the politics of many countries have often resulted in many fiscal benefits accruing to producing regions.

Comparative Experiences in the Allocation of Resource Revenues in Federations

Federations vary in terms of

- Which order or orders of government impose specific levies on the petroleum sector;
- Whether the distribution of petroleum revenues (or particular kinds of petroleum revenues) is determined in whole or in part by the principle of derivation, and, if so, what the legal basis for this distribution is; and
- Whether or not the distribution of petroleum revenues to constituent units influences the distribution of other centrally raised revenues to them.

The answers to these questions vary not just between federations, but also, in some cases, within a federation if different revenue streams (for example, onshore versus offshore petroleum revenue) are treated differently.

Table 10.1 shows how varied and complex fiscal arrangements concerning the allocation of revenue powers over and benefits from petroleum can be. The table

TABLE 10.1 Petroleum Revenue Determination and Allocation in Federal Systems

Country	Levies Determined by	Derivation Applicable	Impact on Allocation of Other Revenues	Importance of Petroleum Revenues
<i>Argentina</i>				
-onshore	Provinces plus federal government (export tax until 2017)	Yes for provincial revenues; federal revenues into national budget	No impact	Moderate nationally; high for producing provinces
-offshore	Federal government	N/A	N/A	Nil at present; recent call for exploration bids
<i>Australia</i>				
-onshore	State-levied royalties; federal PRRT	Yes for state royalties; federal revenues into general budget	Yes, full impact: these revenues are included in the calculation of state fiscal capacity, a key determinant of federal transfers	Low for producing states and nationally (but other resource revenues are moderate to high)
-offshore	Federal PRRT (beyond three miles) and state royalties inshore	As above	N/A	Low
<i>Bolivia</i>				
	Central government	Yes for royalties, but very little for direct tax on hydrocarbons	No	High nationally; very high for producing departments
<i>Brazil</i>				
-onshore	Federal government	Yes; federal revenues, four-way allocation to federal government, producing states and municipalities, and other states and municipalities	No	Moderate nationally; high for key producing states and municipalities
-offshore	Federal government	Divided into deemed zones for adjacent states and municipalities, then four-way allocation as above	No	As above
<i>Canada</i>				
-onshore	Provinces	Yes: provinces keep their own revenue	Yes and no: onshore and offshore resource revenues can reduce equalization payments for eligible (poorer) provinces but have no impact on other federal transfers	Moderate nationally; high for producing provinces
-offshore	Provinces (within federal framework)	As above	As above	Low nationally; high for Newfoundland

table continues next page

TABLE 10.1 continued

Country	Levies Determined by	Derivation Applicable	Impact on Allocation of Other Revenues	Importance of Petroleum Revenues
<i>India</i>				
-onshore	Federal government	Yes: states get federally determined royalties, but the federal government keeps other, larger imposts	No: state royalties have no impact on revenue sharing or other transfers from the federal level	Low nationally; moderate in one or two states
-offshore	Federal government	No share to adjacent states	N/A	Low nationally
<i>Indonesia</i>				
-onshore	Central government	Yes: producing regions and provinces get a share; special shares for Aceh and Papua	Yes: some offset through general transfer	Low to moderate nationally; low to very high for producing regions
-offshore	Central government	No except for Aceh	N/A	Low nationally; has been high for Aceh
<i>Iraq</i>	Federal government and Kurdish government	Not formally: federal revenues distributed to regions on the basis of population; the KRG illegally kept some revenues from its own production	Federal government periodically withheld payments to the KRG in response to the KRG's illegal oil exports and withholding of some revenues	Very high for all governments, both producing and nonproducing
<i>Malaysia</i>				
-onshore	Federal government	Yes: states get 5 percent royalty onshore, though this is a very small share of total petroleum revenues	No: royalty payments do not influence other transfers	Low to moderate nationally; low for producing states
-offshore	Federal government	Depends: Borneo states get royalty from entire offshore production; other states do not	As above	As above
<i>Mexico</i>				
-onshore	Federal government	Limited: producing states receive very minor payments in certain conditions	No impact on other federal transfers	High to moderate nationally with offshore; low for producing states
-offshore	Federal government	No sharing of offshore revenues	N/A	With onshore, high to moderate nationally

table continues next page

TABLE 10.1 continued

Country	Levies Determined by	Derivation Applicable	Impact on Allocation of Other Revenues	Importance of Petroleum Revenues
<i>Nigeria</i>				
-onshore	Federal government	Yes: producing states get 13 percent of revenues; the balance goes to the federal government	No	With offshore, very high nationally and for producing states
-offshore	Federal government	States get 13 percent from most, but not all, adjacent offshore production	As above	As above
<i>Pakistan</i>				
-onshore	Federal government	Yes: most petroleum revenues (out to three miles) go to producing provinces	No impact on other transfers	Low to moderate for producing states; very low for federal government
-offshore	Federal government	No	N/A	No production
<i>Russian Federation</i>				
-onshore	Federal government	No, but derivation does apply to corporate and personal income taxes	N/A	High nationally
-offshore	Federal government	No	N/A	Low to moderate nationally
<i>United States</i>				
-onshore: state land	State governments	Yes: states keep revenue	No: the United States has no integrated sharing or transfer regime but many conditional transfers	High for some producing states
-onshore: federal land	Federal government	Yes: federal government gives states large share of revenue	As above	As above
-offshore	Federal government	Very limited revenue to adjacent states	N/A	Low nationally and for states
<i>Venezuela</i>	Federal government	No, whether onshore or offshore	N/A	Very high nationally

Note: KRG = Kurdish Regional Government; N/A = not available; PRRT = Petroleum Resources Rent Tax.

is necessarily at a high level of generality. The following discussion elaborates a little on the situation in various federal or devolved regimes.

Argentina: The federal government introduced a heavy export tax from 2002 to 2017, which effectively took about two-thirds of petroleum revenues, even though the provinces own the resource and levy a royalty on production. The provincial take of petroleum revenue was further reduced when the export tax caused domestic oil prices to drop.

Australia: Australia has what is perhaps the most equalizing fiscal regime of any federation: federal revenue sharing and transfers take account of all state revenues as well as the different cost structures associated with each state's delivery of a standardized bundle of public goods. Thus, although states keep onshore revenues, they get little net fiscal benefit from them. This process may incentivize them to focus more on stimulating activity than on trying to raise their own petroleum revenues through royalties. Despite state ownership of onshore resources, the federal government has introduced a petroleum resource rent tax, which applies within the states, to collect a portion of the rent.

Bolivia: Bolivia had a major debate on whether to federalize its government, which the relatively affluent petroleum-producing regions strongly supported. After an extended political process, the country's new constitution is formally unitary, with the central government controlling petroleum management and revenue distribution. There are elected departmental governments: the few producing departments receive 12.5 percent of the main petroleum revenue, while the much more populous nonproducing departments receive 31.25 percent. This arrangement benefits the producing departments, especially those with small populations (Just Quiles 2013).

Brazil: Brazil has a regime that strongly favors not just producing states, but also "producing municipalities," including those with revenues from their adjacent offshore areas. With major new offshore oil discoveries, the allocation of fiscal benefits—particularly between producing states and municipalities and nonproducing ones—became a major issue in Brazilian politics. In 2012, representatives of nonproducing states in Congress forced through a new law (over the veto of President Rousseff) that would raise the percentage of petroleum revenues given to nonproducing states and municipalities while lowering the percentage given to producing states and municipalities and, to a lesser extent, to the federal government. In an appeal to the country's supreme court, the producing states asserted that this law was unconstitutional; in the meantime, the rules remain as they were.

Canada: Canada has an equalization program that is designed to lift its poorer provinces to a national standard. However, this program does not bring richer provinces down to a national standard, and richer provinces receive most federal transfers on the same basis as do poorer provinces. On occasion, high petroleum production and prices have caused the per capita fiscal resource capacity of producing provinces to approach twice that of nonproducing provinces. The federal government, with limited access to petroleum revenues (mainly through the corporate income tax, and without a special levy on the sector), has not been able to significantly reduce the disparities between producing and nonproducing provinces, especially during periods of high oil prices.

India: Despite state ownership of petroleum resources, the much larger share of petroleum revenues flow to the central government, where they are pooled with other revenues for general sharing without reference to derivation. India does not have a formal equalization system, although its revenue sharing reduces disparities. Producing states have complained about their small fiscal share of onshore revenues and lack of a share of offshore revenues.

Indonesia: Indonesia has separate rules for allocating oil revenues versus gas revenues: for oil revenues, 84.5 percent goes to the central government, 3.1 percent goes to the provinces, and 12.4 percent goes to the districts; for natural gas revenues, 69.5 percent goes to the central government, 6.6 percent goes to the provinces, and 24.5 percent goes to the districts. In both cases, the share going to the districts is allocated half to the producing districts and half to the rest. This arrangement produces major fiscal disparities between districts and provinces. As part of the peace deal in 2005, Aceh was to receive 70 percent of petroleum revenues for nine years and then 50 percent after that. Papua and Papua Barat, which have much smaller production, will receive 70 percent for 25 years before dropping to 50 percent (Agustina and others 2012).

Iraq: Petroleum arrangements were left ambiguous in Iraq's hurried completion of its federal constitution in 2005. Since then, the federal government has controlled the petroleum sector outside of Kurdistan, while the Kurdish government has controlled it within that province. Kurdistan was meant to send 83 percent of its oil revenues to the federal government, and in exchange, it was to receive 17 percent of the federal budget, equivalent to its share of the population; it produces about 10 percent of the country's oil. This arrangement was frequently violated by both sides, but in December 2014, the Iraqi and Kurdish governments agreed on a cooperative arrangement regarding petroleum exports from Kurdish-controlled areas and revenue sharing. However, since the failed Kurdish referendum in 2017, the federal government has taken Kirkuk, which accounts for half of Kurdish oil production, and it has dramatically reduced the Kurdish Regional Government's share of federal revenues, leading to a major fiscal crisis in the KRG.

Malaysia: Because Malaysia's states are very weak fiscally compared with those in most federations, their share of royalties, while only a small part of total petroleum revenues, has been important to producing states, and these states are seeking to enlarge their share. Petronas, the national oil company, is the major source of petroleum revenues for the government, and the major lack of transparency in its system has been a central issue in the recent change in government; charges have been pressed against the outgoing prime minister.

Mexico: Mexico has always had a highly centralized regime, with the states fiscally dependent on the federal government. However, producing states receive almost no advantage from production, except for small amounts under limited conditions. For many years, the central government decided what revenues it would take from the national petroleum company in a nontransparent manner. It has recently moved to a transparent fiscal regime for petroleum.

Nigeria: Oil dominates government revenues in Nigeria, and the distribution of these revenues is a perennial political issue. The current system gives the producing states 13 percent of oil revenues plus all the other transfers that other states receive; therefore, there are huge fiscal disparities between Nigerian

states, with per capita differences as much as 15 times, depending on oil prices. Even so, the producing areas in the Niger delta have had poor economic and social development, partly because of bad local governance and corruption and partly because of federal neglect. The poor conditions in these regions have led to widespread crime and oil theft. The federal government has accelerated its direct efforts to aid development in the delta through special regional agencies (Osaghae 2013).

Pakistan: As part of far-reaching reforms to its federalism in 2010, Pakistan amended its constitution to acknowledge joint ownership of natural resources between the federal government and provincial governments. In addition, it was agreed that the producing provinces would receive all petroleum revenues. Pakistan is a small producer; therefore, its petroleum revenues are not important nationally. However, they are significant for Baluchistan, which has a small population and a large share of production.

Russia: Russia amended its constitution to deprive the petroleum producing “subjects of the federation”—which have huge territories but mostly very small populations—of any control over the petroleum industry or any special benefit from petroleum revenues. However, the derivation principle does influence the distribution of corporate and income taxes; therefore, the producing regions enjoy a significant indirect fiscal benefit because of high local corporate and personal incomes.

United States: Although the American petroleum industry is huge, it is a relatively small part of the country’s economy, so revenues from the sector have not been significant nationally. However, revenues from the petroleum sector have been very important to several producing states, a few of which have had much higher fiscal revenues per capita than other states. The sharing with states of mineral revenues from federal lands within those states started in the 19th century and increased to a 50 percent share by 1970, with another 40 percent going into a fund for reclamation and infrastructure projects in 17 western states. Coastal states with offshore production receive only a modest share of offshore petroleum revenues, and they are campaigning for more.

There are a few general observations to be drawn from these experiences. Some countries, such as Argentina, Brazil, Canada, Indonesia, Nigeria, Pakistan, and the United States, have significant fiscal advantages for producing constituent units, while others, such as Australia, Bolivia, India, Iraq, Mexico, and Russia, do not. Pakistan moved recently to enhance the fiscal advantage of producing constituent units, while Brazil and Russia moved to limit it. The extent of fiscal advantage varies from country to country—from extremely high, as in Nigeria, to relatively modest, as in Pakistan. Australia is unique in the extent to which it “claws back” the fiscal advantage of producing states by reducing their other transfers. Canada and Indonesia also have some mechanisms that work in this way, but they are partial and have less effect.

Good Governance and Fiscal Probity

The presence of significant petroleum resources can offer major opportunities for betterment, but it can also add to the challenges of achieving good governance—both in controlling corruption and in managing a resource-based economy subject to volatile prices. While major principles of good

governance—including clarity on responsibilities, transparency, and probity—are well known, they can be undermined in the context of a highly profitable oil sector, and they can be even more difficult to manage in a devolved or federal regime. Some petroleum-producing countries have tried to address these challenges with special stabilization and savings funds; increasingly, federal regimes are adopting fiscal responsibility laws, as well as detailed provisions regarding financial governance, in their constitutions.

The notion of the “oil curse” has been discussed in earlier chapters. One dimension of this curse is the risk that petroleum revenues present for corruption, while a second, quite distinct dimension, is the challenges that a large petroleum sector can present for managing a diversified economy through economic cycles. Fortunately, “the resource curse is not inevitable: a range of countries with prudent and transparent management practices (including Botswana, Canada, Chile, and Norway) has benefited from resource wealth” (IMF 2007). The challenges of successfully managing resource revenues are greater in developing countries with large resource sectors. There can also be additional challenges if the political regime is significantly devolved, as in federal systems. The International Monetary Fund (IMF) and the World Bank have developed guidelines for good fiscal practices for resource revenue management. A review of some of the more important principles of these practices follows, with special attention paid to their application in a federal regime:

- The need for *clarity of roles and responsibilities*, including within the legal framework and the fiscal regime, and for transparency regarding revenue flows and borrowing as well as required expenditures by resource companies on social or environmental purposes and consumer subsidies without explicit budget support. Arrangements for assigning or sharing resource revenues between central and subnational governments should be well defined and should explicitly reflect national fiscal policy and macroeconomic objectives.
- The need for *open budget processes*. Budget frameworks should incorporate a clear policy on the rate of exploitation of natural resources within the context of overall fiscal and economic objectives. Resource-related revenue funds should have clear operational rules coordinated with fiscal policy, and the investment policies for such funds should be clear. The government accounting system or special fund arrangements should identify all resource-revenue receipts on a timely and public basis.
- The need for *public availability of information*. There should be transparent and comprehensive reporting on government finances, including on all assets and debt. The nonresource fiscal balance should be presented as an indicator of macroeconomic impact and sustainability. Debt reports should identify any direct or indirect collateralization of future resource production as well as any risks or obligations from debt. Estimates of the asset value of probable production should be clear, as should contingent liabilities associated with the resource sector. Finally, price risks and contingent liabilities’ association with resource revenues should be explicitly considered in budget documents.

- The need for *assurances of integrity*. Audit procedures and internal controls should be clear. Tax obligations and rights should also be clear, and the scope for discretionary action by tax officials should be clearly defined. A national audit office should report regularly on revenue flows between companies and the government (IMF 2007).

These principles set a high standard that few, if any, countries fully realize. Moreover, complying with them, notably with those related to coordinated fiscal policy, will be especially difficult in a federation with highly devolved resource management and taxation. As outlined in this chapter, many federations have quite rigid rules on the sharing of resource revenues or of centrally imposed revenues in general. This rigidity can present challenges for macroeconomic fiscal management, in that revenue flows to the constituent units are not coordinated with fiscal policy. In principle, federations with revenue sharing could address this issue through an arrangement whereby resource revenues (or even revenues in general) are shared not only between the orders of government but also with a resource revenue fund (or funds—one for stabilization and one for savings). Russia adopted a stabilization fund in 2004, and this fund became a principal instrument for holding down excessive liquidity and lowering inflationary pressures at a time of skyrocketing petroleum prices. In 2008, the country shifted to a new approach whereby oil and gas revenues were accounted for separately from other revenues. Part of them, known as the oil and gas transfer, was included in the federal budget. The size of this transfer was set, and the balance of resource revenues went into a reserve fund or, above a certain threshold, into a national wealth fund (Kurlyandskaya, Pokatovich, and Subbotin 2012, 298–300). There is no such formal arrangement in Nigeria, and federal measures to hold back some portion of centrally collected revenues for various purposes, including for revenue stabilization, have been found illegal by the country's supreme court and are objected to by the states—but the federal government persists in doing so (Iledare and Suberu 2012, 240).

A number of federations have tried to address these issues of fiscal coordination through fiscal responsibility laws. Such laws can establish fiscal targets as well as procedural rules for transparency and accountability; they can include rules around borrowing and incentives for fiscal prudence (Liu and Webb 2011). Although such laws can be helpful, it can be difficult to get the political agreement necessary to put them in place. Cooperation is more likely to happen in the context of addressing a crisis, when the federal government must step in, as happened in Brazil in the 1990s. If a federal government makes large, discretionary transfers to the constituent units, it may use this concession as a lever to win their cooperation. However, when the overwhelming share of revenues going to constituent units are transferred through revenue sharing, the challenge of establishing fiscal responsibility laws can be especially acute, as has been seen in Nigeria, because the federal government may have limited leverage.

Transparency takes on additional importance in federal regimes with revenue sharing in that the constituent unit governments have a material stake in knowing exactly what revenues have been collected. However, no federation gives their constituent units a role in auditing the federal accounts; the national audit office typically is named by the national government, perhaps with parliamentary approval. In some federations, such as India, there is one national audit

office that serves both the national and constituent unit governments. This method has efficiency advantages but limits the extent to which constituent unit governments can interfere with the audit function—which has been a problem, for example, in Nigeria, where each state has its own audit office. Some of the newer federal-type constitutions, such as those of South Africa (Sec. 213–18) and Kenya (Sec. 220–29), give strong authority to the central government to establish rules relating to fiscal prudence.

Summary Observations and Some Recommendations

A number of federal and other devolved systems of government have had to deal with the issues of oil and gas ownership, management, and revenue sharing. The approaches they have developed reflect their constitutional history (oil and gas may not have been an issue when the basic law was drafted), their political culture, and the importance of the resource itself within the national context. The federations with devolved management tend to be older federations in which the petroleum sector is central to neither the economy nor government revenues. Even so, in these federations, the federal governments have important fiscal and legal levers that they can use to influence the development of the petroleum sector. Federations in developing countries tend to have given almost all of the management instruments relative to the petroleum sector to the central government. In some cases, such as in Malaysia and Russia, the federal government captured these powers through legal or constitutional change when the industry was significant. Management control may be linked to ownership, but often it is not—especially in developing country federations.

In developing countries with federal regimes, there is a natural pressure to centralize management of the oil sector. Arguments for centralized management include that the issues surrounding oil production are complex and that big foreign oil companies are extremely sophisticated, so the limited human and financial resources of a country should be concentrated to build an effective central management capacity. Furthermore, if the resource is very large, it will necessarily be of national significance, justifying federal government leadership. However, centralization has too often been done with little sensitivity to circumstances in the producing regions. Producing regions naturally have a strong interest in petroleum exploration within their territory because of the potential impacts to the environment, employment, and society. Thus, there are strong reasons to find a way to give real voice in petroleum management to producing regions. The challenge is to find a workable balance, one that permits timely and effective decisions and avoids competition between governments using their powers for narrow partisan or personal gain.

Federations have very diverse approaches to revenue raising and allocation. In all federations, the federal government raises more revenues, through taxes and debt, than it spends on its own purposes; therefore, some federally raised revenues flow to the constituent units, through revenue sharing, fiscal transfers, or some combination of those. When revenue sharing is used, the allocation of revenues can be determined using various criteria, including need (or rough proxies for need) and derivation. However, the choice of these criteria by federations has been very political. When resource revenues have been isolated from

other revenues for sharing, the derivation principle has been given some weight. But many federations pool resource revenues with all other revenues for sharing—in which case principles other than derivation are used for allocation. Still others rely principally on fiscal transfers—in which case derivation is not applied (in fact, federal transfers can decrease when a constituent unit gains access to resource revenues).

Although the technical challenges concerning resource revenue sharing are less difficult than those around joint management, the politics surrounding this issue can be extremely contentious. There is a case for giving some extra fiscal benefit to producing regions, but this benefit should be given in a way that does not create major distortions between regions of the country. It is wise to avoid rigid formulas in constitutions, which may not prove appropriate in all contexts.

Although there are few hard rules, architects of federal regimes would do well to consider such basic economic principles as efficiency and equity, as well as the benefits of transparency and accountability, in designing arrangements around natural resource management and revenues. They will also need to consider the importance of the natural resource sector within the country and the broader political context or understanding on which the country may be based.

Notes

1. See Watts 2008, 8–9. Other characteristics of federations can include a second legislative house based on regional representation and an umpire of the constitution, normally a high court.
2. Such ownership also exists in Canada for lands transferred to the Canadian Pacific Railway to induce the building of that railway in the 19th century.
3. While the federal government regulates interstate pipelines, American states have some powers over the “siting” of pipelines, for example, the power to protect environmentally sensitive areas, as well as over the technical standards and construction of pipelines.
4. Australia’s Petroleum Revenue Rent Tax is an exception; for information on this tax, see <https://www.ato.gov.au/Business/Petroleum-resource-rent-tax/>.
5. Germany is a rare exception among federations in that the richer provinces make transfers directly to the poorer provinces. These transfers supplement other revenues flowing to the provinces from the federal government as well as locally raised revenues. See Feld and von Hagen (2007, 143–46).
6. For a much fuller discussion of these methods, see Boadway and Shah (2009, 291–339).

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Petroleum Development and Conflict Prevention Strategies

David Nyheim

Introduction

This chapter will offer perspectives and insights on how to prevent petroleum-related violent conflicts by addressing risks and vulnerabilities posed by petroleum-sector governance challenges, contextual circumstances, and the operational practices of petroleum companies.

Conflict related to petroleum development is inevitable in most countries. Indeed, such conflict is critical to ensure that the interests of key stakeholders (such as government, opposition groups, civil society, and the private sector) are reflected in a national approach to petroleum development. What is avoidable and needs to be prevented is the violent expression of such conflict.

The violent expression of petroleum-related conflict takes several forms. At a macro level, it can involve armed secession movements and rebellions. It may also lead to further entrenched insecurity, where more criminal and armed groups become involved in the illegal exploitation of oil and gas products (for example, crude oil and condensate theft, artisan refining, and so on). At a micro level, it may include increased inter- and intracommunity violence, attacks on industrial and exploration sites, sabotage of oil and gas assets (such as blowing up pipelines), and taking government and oil and gas company staff hostage.

This chapter will argue that the vulnerabilities that have led to petroleum-related violent conflicts elsewhere go beyond precursors to the resource curse and include a range of vulnerability drivers. It will also argue that an early step

in mitigating such vulnerabilities is the formulation of a prevention strategy that—among other things—requires oil and gas companies to “do no harm” in their operations.

The three sections that follow will elaborate on (i) key vulnerabilities that set the stage for petroleum-related violent conflict, (ii) strategies and measures for tackling these vulnerabilities, and (iii) the role of oil and gas companies in preventing violent conflict. The chapter will finish with a brief summary and conclusion.

There are several caveats to this chapter. The first is that available literature is skewed toward the analysis of the governance of petroleum resources as a source of vulnerability or resilience to violent conflict. There is significant thinking around important concepts, such as the resource curse and rentier states. Reviewing the literature on these concepts is important but arguably provides only part of the vulnerability picture.

Second, there is not much written analysis on applied lessons learned by practitioners who have engaged in the resolution of petroleum-related violent conflicts. The author’s experience from such work in Nigeria and Iraq is presented here, supplemented by insights from semistructured interviews with extractive sector personnel involved in conflict resolution in those and other places, such as the Arab Republic of Egypt, Guinea, Honduras, Indonesia, Madagascar, and Myanmar.

Third, although the chapter provides an overview of conflict-prevention strategies and measures, these strategies should be taken as a resource, not as any form of blueprint. Context is paramount for any strategy, and a conflict-prevention strategy in the context of petroleum development will need to be tailored to the national and local context and dynamics.

Finally, this chapter is written for a knowledgeable but nonspecialist audience. Simplifications are made that specialists may object to; these simplifications seek to open access to a subject that is both broad and complex.

Governance, Context, and Corporate-Driven Vulnerabilities to Petroleum-Related Violent Conflict

Governing the petroleum sector is challenging. There is a significant level of complexity associated with related laws, economic policy, and the management of environmental and social impacts, to mention but a few. This section touches on some of these topics with regard to how they increase the risk of petroleum-related violent conflict. Emphasis is on literature related to the resource curse and the rentier state, which describes governance vulnerabilities to violent conflict, and literature related to risk factors associated with (i) armed conflict and the petroleum sector at the country level and (ii) oil exploration and production, the behavior of oil companies, and their interaction with local communities.

The Resource Curse and Rentier State

The literature on the resource curse and rentier state provides useful insight on governance-based vulnerabilities to violent conflict in oil- and gas-producing countries.

The resource curse literature argues that abundant natural resources negatively affect a country's economic performance. Some also argue that they undermine the rule of law and democracy and carry with them the risk of violent conflict. Unless effectively managed, the resource sector drives up the value of the local currency, hurts the competitiveness of manufactured exports, and over time sees nonresource sectors (such as agriculture and other industries) contract (Tran 2012). In an article looking at Uganda's recent oil discoveries, Bergo (2015) argues that the discovery of oil tends to worsen existing corruption and encourage a political system based on cronyism and patronage.

The academic debate on the resource–violent conflict link has been dominated by Collier and Hoeffler's (2001) influential work on greed and grievance, which argues that natural resource wealth increases the likelihood of civil war onset by providing opportunity and motive (greed) for armed rebel activity and causing grievance that, in turn, triggers conflict. The link between natural resources and violent conflict has been further developed since, and Humphreys (2005) outlines six possible causal paths for civil war onset:

- The “greedy rebels” mechanism (in line with Collier and Hoeffler's research)
- The “greedy outsiders” who intervene militarily either directly or through support for internal warring factions in order to gain or maintain control over natural resources
- The “grievance” multiplier, whereby perceived deprivation of producing regions or negative economic consequences of resource wealth, such as Dutch disease, price shocks, or uneven distribution of revenues, create grievances that trigger a violent uprising or secessionist movements in producing regions
- The “feasibility” mechanism, whereby natural resources are used to finance rebel groups
- The “weakened state,” where the corrosive effects of resource abundance on state institutions (for example, through corruption and clientelism) set the stage for a state that cannot provide for its citizens and creates grievance that makes internal violent conflict more likely
- The “sparse network” mechanism, whereby the one-sided integration of rentier economies in the world economy reduces their ability to develop the broader economic interface and exchange that is conducive to peace and stability

There is some empirical evidence to support the resource abundance and violent conflict link (and the broader resource curse). For example, the top eight African oil producers in 2011 (Algeria, Angola, the Republic of Congo, the Arab Republic of Egypt, Equatorial Guinea, Libya, Nigeria, and Sudan) have all experienced some type of violent conflict or instability in the last decade. All of these countries have a negative score on the World Bank's Control of Corruption Index. The U.S.-based Polity Project, which measures the authority characteristics of

states, generally scores these countries as performing poorly (Lawson-Remer and Greenstein 2012).

However, causality in the correlation of resources to violent conflict remains contested, and there is much nuance in the literature. For example, using the World Bank's "total natural capital stock" to measure resource dependence and data for two years and 100 countries, Brunnschweiler and Bulte (2009) found no correlation between natural resource dependence and violent conflict onsets. By contrast, Lei and Michaels (2014) considered the effects of discovering giant oil fields, using models that included country and year fixed effects. They found that major oil discoveries increase the incidence of armed conflict by about 5 to 8 percentage points, compared with a baseline probability of about 10 percentage points. In countries with recent histories of political violence, the effect is much stronger.

The concept of the rentier state follows the study of oil-producing states in the Middle East, such as the Gulf monarchies and the Islamic Republic of Iran, and adapted the Keynesian definition of "rentier" to define a country that generates income on the basis of owned natural resources and their proceeds. It stipulates that the main function of the state in rentier economies is to distribute rent. In the resource curse literature, attention is given to the rentier state as one of the negative consequences of resource abundance on the economy, institutions, and democracy, one which creates vulnerability to violent conflict. Yet rents also provide ruling elites with resources through which to offset these indirect negative effects on peace and stability. Basedau and Lay (2009), Le Billon (2001), and Humphreys (2005), for example, outline four ways in which rentier states maintain security and stability.

- The "repression" mechanism, whereby rentier states invest in a large security apparatus to suppress opposition and vocal dissent.
- Given their role in ensuring energy security (or the supply of other commodities of vital interest), rentier states are often supported by major powers, who discourage or deter internal rebellion or counter the encroachment of "greedy outsiders."
- The "inducement" mechanism, whereby rentier states use revenue proactively to buy off demands and opposition or engage in large-scale distributive or populist policies that boost public sector employment, allocate subsidies, or provide free education and health care.
- Rentier states may distribute rents selectively, to buy the loyalty of a relatively small part of the population, and create clientelist networks.

Whether a rentier state is successful often depends on whether the commodity export capacity is sufficiently expanded so that rents accrued from export reduce the need for taxation. Revenues are then used to buy peace through a mix of patronage, large-scale distributive policies, and repression. The combination of low or zero taxation with distributive spending policies favors some states with greater income but is also likely to be seen by the larger population as acceptable.

As such, much of the literature on the rentier state counters the resource curse conclusions and sees scaled-up natural resource wealth as an important contributor to stability.

Basedau and Lay (2009) offer a nuanced view of the different conclusions regarding security and stability offered by proponents of the resource curse and rentier state concepts. They observe that almost all studies on the subject conducted since 1995 use primary commodity exports as a percentage of gross domestic product (GDP) as the measure for resource wealth. However:

Dependence means that rents from resources are the most important source of income relative to other value-adding activities, while abundance or wealth refers to the absolute amount of resource rents available in per capita terms. It can be easily illustrated that these two variables may differ substantially. Nigeria and Saudi Arabia, for instance, were almost equally dependent on oil exports in 2002—oil exports accounted for 38.9 percent and 38.5 percent of GDP, respectively. Yet, if the governments had decided to pay out the proceeds from oil exports to their citizens, Nigerians would have been given a mere US\$140 while Saudi Arabia's citizens would have earned US\$2,715. (Basedau and Lay 2009, 760)

In essence, they argue that wealth per capita, particularly in politically unstable areas, may be a more appropriate measure of resource wealth and its likely impact on security and stability. By extension, vulnerability to violent conflict increases in rentier states once oil starts to run out or the price of oil drops (Basedau and Lay 2009).

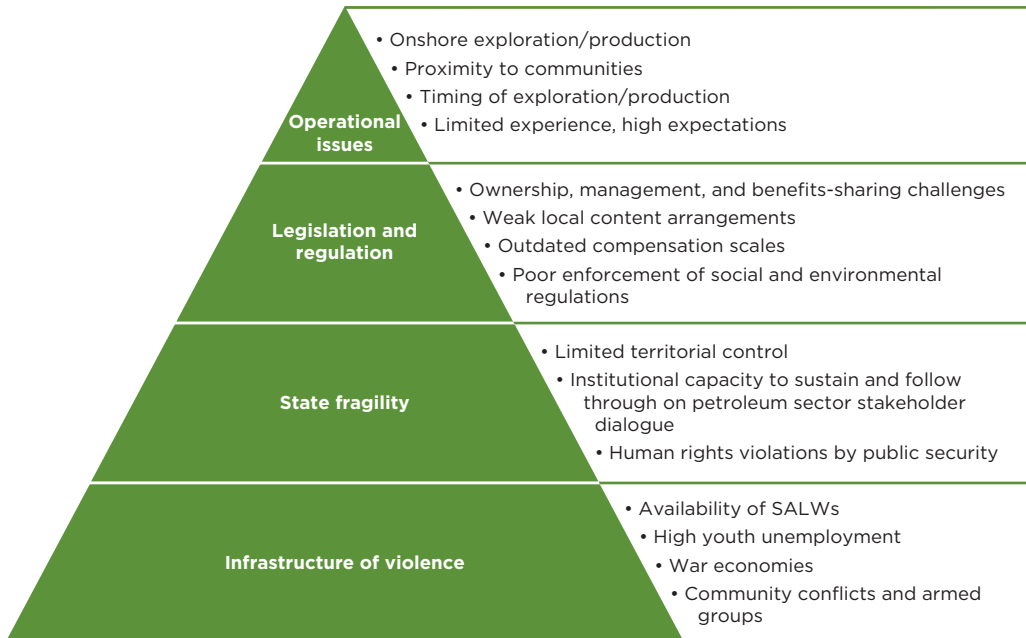
The resource curse and rentier state frameworks offer useful insights on how governance challenges and other factors contribute to the vulnerability of oil- and gas-producing states to violent conflict. However, a more complete picture emerges when contextual and corporate contributions to vulnerability are provided.

Contextual Vulnerabilities

Beyond the insights on vulnerability to violent conflict found in the literature on the resource curse and rentier states, other important contextual vulnerabilities should be considered. These vulnerabilities are drawn partly from the conflict analysis and state fragility literature and partly from experience preventing and resolving petroleum- and natural-resource-related violent conflicts. They relate specifically to aspects of the existing infrastructure of violence, state fragility, weaknesses in national legislative and regulatory frameworks, and operations of oil and gas exploration and production (see figure 11.1).

In many violent conflict-affected areas, there is an established political economy or infrastructure of violence (for example, firepower, foot soldiers, finance, and insecurity), which creates the basic conditions for violence to erupt or escalate. Four factors are particularly important for petroleum-related conflicts:

FIGURE 11.1 Contextual Vulnerabilities



Note: SALWs = small arms and light weapons.

- *Widespread availability of small arms and light weapons (SALWs).* The widespread availability of SALWs tends to encourage violent rather than peaceful ways of resolving problems and often undermines confidence- and security-building measures. In areas where oil and gas resources are contested, the presence of SALWs increases the risk that the contestation flares up into violent conflict (OECD and DAC 2005).¹
- *High unemployment or underemployment among youth.* Research on the correlation between youth unemployment and state instability shows that very high youth unemployment in contexts of significant socioeconomic inequality and corruption contributes to instability and insecurity (Azeng and Yogo 2013). In areas where groups are actively contesting oil and gas resources, idle youth (often young men) are targeted for recruitment into armed groups and are an important resource for perpetrating violence and the continuation of violent conflict.
- *An established war economy.* War economies typically involve strong informal black markets, predation and violence against civilians by combatants to control sources of income, illegal trade in natural resources, and cross-border trading networks (Ballentine and Nitzschke 2005). The illegal exploitation of natural resources (through crude oil and condensate “bunkering,” illegal refining, artisanal mining, or drug cultivation and production) becomes an important source of revenue and sustains armed groups. Sources of finance (for example, transport routes for stolen oil or access points where crude oil

bunkering is possible) tend to become a source of conflict between armed groups or between government forces and armed groups.

- *Community conflicts and presence of armed groups.* A prevailing sense of insecurity, driven by either ongoing violent conflicts within or between communities or ethnicities or by the activities of armed groups, is a critical factor that motivates youth to become involved in violence, fuels the trade in SALWs, and creates an enabling environment for war economies.

The discussion of the resource curse and rentier states addresses many of the aspects of state fragility or fragile situations² raised above. Here, three factors are identified that increase vulnerability to petroleum-related conflict:

- *Limited territorial control and presence of the state.* Where the state has limited presence in oil- and gas-producing areas through government institutions (such as administrative bodies, law enforcement, and security), services (such as health, education, and emergency and disaster management), outreach and engagement with the population, and basic infrastructure (such as roads, electricity, and water lines), alternative governance systems—licit or illicit—often replace it. During oil and gas exploration or production, benefits from either activity often become contested between the (absent) state and local groups who control the areas where exploration or production takes place.
- *Limited institutional capacity to sustain and follow through on dialogue with petroleum-sector stakeholders.* The presence of functional institutions and mechanisms within government that allow for a constructive and inclusive national discussion on petroleum development is critical to ensuring that conflict associated with the sector does not turn violent.
- *Human rights violations by security forces.* Human rights violations committed by police, military, paramilitary, or private security³ forces in oil- and gas-bearing communities tend to create a high level of resentment and distrust among the local population. In some cases, these violations result in active resistance to public security forces as they carry out their duties (that is, investigations, arrest, crime prevention, and so on) or direct attacks on these forces by local groups. This resistance creates no-go zones for public security in areas where clashes with local armed groups are frequent and violent conflict can easily escalate.

There are four weaknesses in national legislative and regulatory frameworks that typically increase a country's vulnerability to violent conflicts:

- *Unclear or evolving resource ownership, management, and benefits-sharing arrangements.* Covered elsewhere in this volume, resource ownership, management, and benefits-sharing issues are often a major source of tensions between the state and other actors. In a federal system, an additional layer of conflict emerges between the center and subnational state structures (for example, provincial governments).
- *Weak or evolving local content arrangements.* Local production–service linkages are among the main ways in which local groups can benefit from natural

resource exploitation and drive the development of national capacity in the oil and gas sector and in other sectors of the economy. Typically, local content arrangements spell out the targets for local procurement by oil and gas companies that are developing onshore or offshore fields. Such arrangements become a potential source of violent conflict when (i) foreign workers take jobs that are perceived as doable by locals or (ii) nepotism and corruption are perceived in procurement processes.

- *Unclear and inconsistent social and environmental regulations and weak enforcement.* There is an increasing awareness of the rights of communities and the obligations of governments and companies to uphold social and environmental standards in contexts of oil and gas exploration and production. When social and environmental regulations are unclear and companies take shortcuts that negatively affect local communities, or when government agencies do not effectively or consistently enforce such regulations, protests and demonstrations by community groups may follow. How these protests are handled (for example, with government action to enforce regulations or with heavy-handed security responses) will often determine whether additional grievances are created.
- *Outdated compensation scales.* Oil and gas development—particularly when it takes place onshore—may involve negative economic impacts on livelihoods through land acquisition, resettlement, pollution of lands or water, destruction of crops, and so on. Normal practice is to compensate affected individuals and groups according to government compensation rates. If government compensation rates are outdated, then this inadequate compensation will often cause resentment and further grievance in local populations.

Oil and gas exploration and production operations do not in themselves create vulnerability to violent conflict. However, four operational aspects feed into other vulnerability drivers.

- *Onshore exploration and production, particularly in populated areas, will affect some of the aforementioned vulnerability drivers more than offshore exploration and production.* This effect is substantiated in research by Ross (2014), who found that “when oil is found offshore, it has no robust effect on a country’s conflict risk; when it is onshore, it appears to have a large effect” (Ross 2014, 14).
- *Proximity of activities to communities.* If onshore exploration and production activities are close to communities, then they are more likely to affect or be affected by any preexisting violent conflict dynamics. The location of such activities also plays a role, as shown by research surveyed by Ross (2014):

[O]il is more likely to spark conflict when it is found in regions that are poor relative to the national average (Østby, Nordås, and Rød 2009) and populated by marginalized ethnic groups (Basedau and Richter 2011, Hunziker and Cederman 2012); when the resource is located in a region with a highly concentrated ethnic group (Morelli and Rohner 2010); when ethnic minority entrepreneurs use it to promote collective resistance to the central government (Aspinall 2007); and more generally, in countries that have high levels of ethnic fractionalization and polarization (Ross 2014, 15).

- *Timing of exploration and production activities.* When (and where) exploration and production activities happen may exacerbate existing tensions or disputes. For example, onshore exploration activities in a contested area before or during efforts to arrive at a settlement between the contesting parties will necessarily increase the perceived stakes and make negotiations more complex.
- *Limited experience with—and high expectations for—oil and gas exploration.* In countries with limited experience in oil and gas exploration, expectations of benefits to come are often unrealistically high. With between 50 and 90 percent of exploration activities failing to go on to production,⁴ the potential for disappointment is also significant. Communities and governments may expect immediate benefits, and when these benefits do not materialize, frustration quickly mounts.

Corporate-Driven Vulnerabilities

Oil and gas companies engaged in exploration and production activities in contexts that are vulnerable to petroleum-related violent conflict may inadvertently trigger or fuel violence. There are several ways in which this typically happens, related to corporate policy, culture, and practice.

A key determinant of how companies operate in areas that are vulnerable to petroleum-related conflict is corporate policy. There are three policy areas in which weaknesses can fuel tensions:

- *Weak social performance policy and guidance.* A weak policy framework and limited resources and guidance for staff on how to consult and engage with stakeholders, implement basic nontechnical standards (such as the International Finance Corporate Performance Standards), select and implement social investment projects, and so on, often leads to corporate inconsistency. This inconsistency, in turn, sets the stage for disputes with key actors (for example, “You built a clinic in the neighboring village, but when we now ask for one, you say you don’t do infrastructure projects!” or “Your free, prior, informed consent (FPIC)⁵ was not free and was demanded after the fact!”).
- *Inaccessible or weak grievance mechanisms.* The absence of effective grievance mechanisms means that a company may not be alerted to issues associated with its activities. There have been situations in which companies become aware of grievances only after community members acted violently or the grievances were reported by the press.
- *Limited guidance and experience with the Voluntary Principles on Security and Human Rights (VPSHR).* The VPSHR are designed to help companies reduce the potential negative impacts of their security arrangements in areas where human rights may not be respected. Not using the VPSHR, or using a poorly conceived VPSHR action plan, creates exposure to adverse impacts and increases the potential of harm to community rights holders.

Corporate culture determines the behavior and approach taken by company staff during exploration and production. There are three corporate culture issues that typically increase tensions or trigger violence:

- *Inappropriate behavior and actions.* A limited or poor understanding of local customs, etiquette, or taboos is often followed by inappropriate behavior or

actions by company or contractor staff. These actions may include liaisons with local women, cutting down sacred trees, disrespecting customary protocol associated with traditional leaders, or placing surveillance cameras in areas where they may capture taboo footage (for example, unveiled women).

- *Confrontational and insensitive community relationships.* When operating in insecure areas, most companies will deploy security forces to protect staff. Although this precaution is reasonable, it becomes confrontational or insensitive when weapons are brought into meetings with community members or when public security intimidate or harass locals. Outright dismissal of community concerns or failure to inform communities of planned exploration activities in their area may also increase tensions.
- *Unfulfilled promises.* Some oil and gas companies specialize in exploration and later sell off data or findings to larger companies for development and production. Sometimes exploration teams make promises to local communities in order to ensure that exploration schedules stay on track but have no intention of following through on those promises. The legacy of unfulfilled promises is passed on to the production company that then is often forced to renegotiate.

The extension of policy and culture is corporate practice. Several company practices may fuel or trigger violence. Four that are key are given here:

- *Limited contextual understanding.* Surprisingly, many companies involved in exploration activities fail to invest in adequately understanding the context and power dynamics of the countries or localities in which they operate. In settings characterized by state fragility or violence and instability, the consequences of insufficient understanding are at best, being drawn into power tussles, and at worst, stoking violence.
- *Poor management of expectations.* As mentioned above, a mix of high community expectations and limited experience with oil and gas exploration complicates the operating environment for petroleum companies. Weak corporate management of this issue and inconsistent messaging further perpetuates this challenge.
- *“Throw money at it.”* Some oil and gas companies approach disputes with communities or other groups in fragile contexts as a financial transaction. For example, an exploration rig held up because of community action may cost the company \$100,000 for each day of delay. Meeting community demands through cash transactions or small projects (for example, building a village sports facility or refurbishing the local power broker’s house) becomes expedient. However, the message this action conveys is that violence pays, and the legacy it leaves sets the stage for future violent actions.
- *Nepotism in hiring practices and corruption in contracting.* In contexts where clientelism is common, there is often an expectation from external oil and gas companies that some jobs and contracts must go to specific people or subcontractors. Such nepotism and corruption feeds into a real and perceived sense of exclusion and marginalization of groups who do not benefit, and it further contributes to grievance.

Implications for Conflict Prevention

The literature on the resource curse and rentier states offers the following implications for conflict prevention, among others:

- Poor management of the economic downsides associated with oil and gas production (such as Dutch disease, uneven distribution of revenues, price shocks, and so on) sets the stage for reduced livelihood opportunities, inflation, and high unemployment, all of which add to grievances and often feature among the causes of violent conflict.
- Corruption and limited transparency in oil and gas revenue—in contexts where the divide is significant between elites who benefit from existing patronage systems and a dispossessed majority—arguably creates tension, which over time and with other factors may lead to violent conflict.
- Oil and gas revenue may be contested in contexts where there is perceived or actual marginalization of oil- and gas-producing communities, a perception by an opposition that the power of a regime is directly linked to its control of oil and gas resources, or when oil and gas resources become important revenue for rebel or insurgent movements.
- Violent conflict may erupt when changes in the price of oil and gas or reduced national supply disrupts the state's ability to sustain patron–client relationships, finance a repressive security apparatus, or fund schemes for distributing sizable benefits.

Contextual vulnerabilities bear the following implications for conflict prevention:

- Places affected by an established infrastructure of violence and state fragility are more likely to experience the violent expression of petroleum-related conflicts.
- Petroleum-related violent conflicts are likely to be triggered by human rights violations by public security forces; governance-rooted disputes related to the ownership and management of petroleum resources (and the sharing of their benefits); and frustration linked to local content, compensation, and weak enforcement of social and environmental standards.
- Operational issues (such as onshore exploration and production, proximity to communities, limited experience and high expectations, and the timing of activities) are likely to increase vulnerability further.

Corporations can play a part in these and other drivers of vulnerability:

- Oil and gas companies can play an important role in fueling violence and tensions in countries where the state is weak and society is affected by divisions. This role is best unpacked by understanding the corporate culture, policy frameworks, and practices of individual companies.
- Time pressures, limited funds to invest in social performance, and, last but not least, lack of knowledge and experience in how best to operate in fragile environments are the main drivers of corporate contributions to violence and tension.

Strategies for Preventing Petroleum-Related Violent Conflict

The vulnerabilities outlined earlier in this chapter involve a range of actors: government, communities, civil society, and the corporate sector (oil and gas companies and others). The vulnerabilities also span a number of areas related to governance, security, the economy, public and private sector operations, and corporate practices. By extension, any prevention strategy that addresses the potential for petroleum-related violent conflict needs to involve multiple actors and address issues in multiple sectors.

It is not the purpose of this section to suggest a blueprint for a strategy to prevent petroleum-related conflict. Rather, drawing on lessons from elsewhere, it offers insights on where and how to start the process of formulating such a strategy, perspectives on the political decision making required, technical measures that may be used to address identified vulnerabilities, and a set of basic “do no harm” measures for companies conducting oil and gas exploration activities.

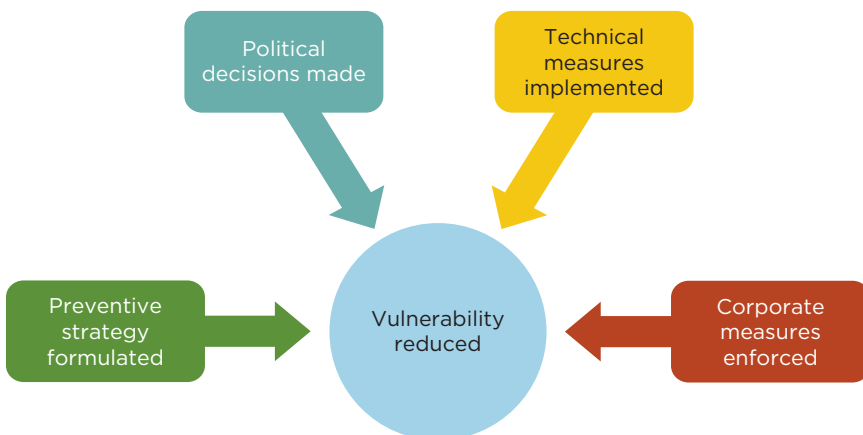
The basic theory of change is that if a preventive strategy is formulated, appropriate political decisions are taken, key technical measures are implemented, and measures specific to companies are enforced, then vulnerability to petroleum-related violent conflict will be reduced and such conflict may be prevented (figure 11.2).

There are three main caveats to consider when reading the following discussion of preventive strategy formulation, political decision making, technical measures, and measures specific to the corporate sector.

First, the purpose of the subsequent sections of this chapter is to provide an overview of the available processes and options that may reduce a country’s vulnerability to petroleum-related violent conflict. However, the processes and options given are not exhaustive. Ultimately, context determines what needs to be done, and the processes and measures needed may not be ones listed here.

Second, all the processes and options that follow involve complex activities and implementation challenges and dilemmas. There is a rich body of literature on practices relevant to each of them. The descriptions given are likely to be found wanting. Simplification and generalization have been used liberally.

FIGURE 11.2 Theory of Change: Preventing Petroleum-Related Violent Conflicts



Finally, the record of preventing petroleum-related violent conflict is poor. We simply do not know enough about what works and what does not, and there are many intervening factors beyond any one actor's control that determine success or failure. Therefore, the reflections that follow aim only to provide a small contribution to improving the existing knowledge base.

Evidencing and Framing a Preventive Strategy

The first step required when considering a preventive strategy for petroleum-related violent conflicts is to determine if the risk warrants it. A key question, therefore, is whether the vulnerabilities identified for petroleum-related violent conflict risk in a given country are significant. Table 11.1 places the vulnerability indicators identified earlier in a risk assessment framework.

TABLE 11.1 Risk Assessment for Petroleum-Related Violent Conflict

Risk Category	Risk Factor for Petroleum-Related Violent Conflict	Risk Score for Country X
Resource curse	There is limited development of government policy on the management of the economic downsides associated with oil and gas production.	Y/N
	There is a risk for corruption and limited transparency in oil and gas revenue sharing.	Y/N
	Oil and gas revenue is contested or is likely to be contested.	Y/N
Rentier state	State-society relations are characterized by patron-client relationships.	Y/N
	There is a risk that oil and gas revenue will be used to sustain large and repressive state security forces.	Y/N
Infrastructure of violence	There is widespread availability of SALWs.	Y/N
	There is high youth unemployment.	Y/N
	War economies are established and entrenched.	Y/N
	There are a number of important community conflicts and armed groups in oil- or gas-rich areas.	Y/N
State fragility	The state has limited territorial control, particularly in oil- or gas-rich areas.	Y/N
	There are systematic human rights violations by security forces.	Y/N
	There is weak institutional capacity to sustain and follow through on petroleum sector stakeholder dialogue.	Y/N
	Petroleum-related contract negotiations are nontransparent, or there are credible allegations of corruption in these negotiations.	Y/N
Legislation and regulation	There are unresolved ownership, management, and benefits-sharing challenges.	Y/N
	The state has not legislated on local content arrangements, or these arrangements are weak.	Y/N
	Compensation scales for lost land, livestock, and livelihoods are outdated.	Y/N
	There is weak or poor government capacity to develop and enforce social and environmental regulations.	Y/N
Operational issues	There are significant onshore exploration or production activities.	Y/N
	Onshore exploration or production is in proximity to communities.	Y/N
	Exploration or production activities are taking place at a sensitive time for the country.	Y/N
	There is limited government or societal experience with oil or gas production and high expectations of what it may yield.	Y/N

Note: SALWs = small arms and light weapons.

BOX 11.1

Efforts to Prevent an Escalation of Violent Conflict in the Niger Delta

In 2002–03, the Shell Petroleum Development Company (SPDC) in Nigeria initiated the preparation of a Peace and Security Strategy (PASS). The objectives of the PASS were to enable SPDC to understand violent conflict trends in the Niger Delta, position the company to “do no harm,” and better support federal and state government efforts to improve the operating environment. An internal SPDC steering group oversaw the work of external consultants, who, over 12 months, studied the external Niger Delta’s conflict environment and SPDC’s corporate culture, policy framework, and practice. The resulting

analysis fed into a PASS designed to enable SPDC to reach its objectives. It also led to the creation of an internal PASS Secretariat that coordinated the implementation of the strategy, followed by the establishment of a civil society–led Niger Delta Peace and Security Working Group and Secretariat, funded by the Nigerian National Petroleum Corporation and supported by then-president Olusegun Obasanjo.

Note: For additional background, see also the United States Institute of Peace’s Strategies for Peace in the Niger Delta at <https://www.usip.org/publications/2005/12/strategies-peace-niger-delta>.

If the risk is deemed high, then the second step is to qualify and quantify the vulnerability of a given country to petroleum-related violent conflict and to assess the extent to which corporate actors⁶ do or do not contribute to this vulnerability. This exercise has been done before in Nigeria, for example, in a process initiated by the Shell Petroleum Development Company (SPDC) and subsequently supported by the Federal Government of Nigeria. See box 11.1⁷ for details on how this was done.

A third step could be a broad-based national consultation on how to use potential oil and gas revenue for national development. The United Nations Development Programme (UNDP) in Mauritania successfully implemented such a consultation in 2005 as part of a broader dialogue on the Millennium Development Goals between government and opposition. The consultation on oil and gas revenue was part of a conversation on the national economy and served multiple purposes: (i) it opened up a public discussion on oil and gas revenue implications for the country, which had hitherto been restricted; (ii) it used radio and television coverage of the consultation to educate the population on exploration activities and what oil or gas production could mean; and (iii) it created a space for a constructive discussion on different visions for how to use oil and gas revenue in the context of national development.⁸

Beyond these three steps, preventive and other measures have been used to manage specific vulnerabilities. Some of these measures speak to political decision making, while others are technical remedies to specific vulnerabilities. These measures are outlined below, drawing on the author’s experience and interviews with other practitioners.

Getting the Politics and Policy Right

Political decision making plays a fundamental role in the management of pitfalls that come with oil and gas abundance, including vulnerability to petroleum-related

violent conflict. The literature about the role of political decision making in countries that have successfully managed the pitfalls of resource abundance (including Norway and Oman) flags three political decisions (among many more) that have contributed to peaceful resource exploitation in those countries:

- *Oil: the people's property.* The Norwegian principle of seeing oil and gas wealth as “owned by the people” has its roots in that country’s social democratic history but also in a little-known concessions law of 1909 pertaining to hydro-power and waterfalls, which stated that the energy given by nature could not belong to any one individual and should belong to the people as a whole (Ryggvik 2010). This principle informed how Norway approached wealth from oil and gas: as an endowment by nature to present and future generations.
- *Take the time to get it right.* When oil prospecting in the Norwegian Sea attracted interest from international oil and gas companies and the first of those companies approached the Norwegian government in 1961, Norway had not yet claimed sovereignty over the Norwegian Continental Shelf. The country had no petroleum law, and its oil- and gas-related regulatory framework was in its infancy. However, by the time the first exploration licenses were granted in 1965, maritime boundaries with the United Kingdom and Denmark had been agreed upon and the Norwegian Parliament had passed the Norwegian Petroleum Law (Heum 2008). Norway did not rush into licensing exploration; rather, it took its time to put into place the agreements and laws required for a good start to resource exploitation.
- *Set a development pathway.* When Sultan Qaboos bin Said deposed his father in 1970, Oman had a population of about 666,000, “three schools, 12 hospital beds, 10 km of paved roads, 557 telephone lines, and a per capita income of less than US\$400,” along with an insurgency in southern Dhofar (Looney 2009, 5). In the period from 1975 to 1995, Oman launched four five-year development plans, which aimed to: (i) develop new sources of national income that would eventually replace oil revenues, (ii) increase national investments directed to income-generating projects, (iii) distribute national investments to spread prosperity to the different regions of the sultanate, (iv) support the maintenance of existing population centers and communities, (v) develop natural water resources, (vi) develop local human resources and meet infrastructure requirements, (vii) remove market deficiencies to support commercial enterprise, and (viii) improve the efficiency of government administration (Looney 2009, 6). Although a number of difficulties in formulating and executing these development plans are noted in the literature (Al Yusef 1997), the period from 1980 to 1995, for example, saw the country’s average life expectancy rise by 10 years and its expected years of schooling increase from 3.5 to 9.7.²

Six political decisions relevant to avoiding petroleum-related violent conflict can be outlined:

- *Make sure the process of developing a vision, policy, and legal framework is conflict sensitive.* Insights on developing a country’s vision, policies, legal frameworks, and regulations for its petroleum sector are given in other chapters of

this volume. The key point relevant to decision making in the context of violent conflict prevention is to ensure that the development process and its outcome is conflict sensitive and does not exacerbate latent tensions.

- *Institute a zero-tolerance policy on corruption, and establish full transparency in revenue generation and use.* Without political leadership and support, anti-corruption efforts fail. A sustained zero-tolerance approach to corruption and a commitment to transparency in revenue generation and use is important.
- *Accept that contestation of revenue ownership, management, and sharing is part of a consensus-building process on how revenue should contribute to national development.* Accepting that contestation is inevitable—and that it provides an opportunity to decide how revenue can best be used for national development—is a precondition for dialogue. Leadership is also critical in the process of negotiating revenue ownership, management, and sharing and in defining solutions that can be agreed upon by contesting parties.
- *Call for and keep on the agenda the demilitarization of society, the empowerment of youth, and the resolution of local and interethnic conflicts.* Experience shows that unless the infrastructure of violence is dismantled, measures to prevent or resolve conflict are likely to fail. Keeping in focus the political goal of demilitarizing society, empowering youth, and resolving localized violent conflicts is a critical step in efforts to make peace work and reduce the potential of petroleum-related violent conflict.
- *Institute a zero-tolerance policy on human rights violations by public security forces.* As are anticorruption efforts, a political commitment to condemn any human rights violations by public security forces is an important way to build trust in public security and keep civilian control of the armed forces.
- *Hold oil and gas companies accountable to international standards for their conduct in the country.* In addition to established international standards for social (including human rights) and environmental performance, this chapter has offered a list of measures needed to ensure that exploration and production companies “do no harm.” A political decision to hold oil and gas companies accountable to international standards and a “do no harm” approach in a fragile context are important.

These political decisions, along with the technical measures detailed later, are outlined in table 11.2.

The Toolbox for Prevention

The literature on measures that reduce vulnerability to petroleum-related violent conflict is broadly focused on conflict prevention in natural resource management.¹⁰ Measures listed in this literature relate to national policy, regional and international instruments, and external support activities. A list of tools emerging from different sources is summarized in table 11.3.

TABLE 11.2 Political Leadership and Technical Measures Required to Address Vulnerability to Petroleum-Related Violent Conflict

Risk Category	Risk Factor for Petroleum-Related Violent Conflict	Political Action	Technical Measures
Resource curse	<p>There is limited development of government policy on the management of the economic downsides associated with oil and gas production.</p> <p>There is a risk for corruption and limited transparency in oil and gas revenue sharing.</p> <p>Oil and gas revenue is contested or is likely to be contested.</p>	<p>Make sure the policy and legal framework is conflict-sensitive.</p> <p>Institute a zero-tolerance policy on corruption and establish full transparency in contracting and revenue generation and use.</p> <p>Accept that contestation of revenue ownership, management, and sharing is part of a consensus-building process on how revenue should contribute to national development.</p>	<p>Apply technical assistance on policy and legal framework development, including conflict-sensitivity assessments of policies considered.</p> <p>Increase government and corporate transparency in contract disclosure and revenue management.</p> <p>Sign, ratify, and implement the UNCAC.</p>
Rentier state	<p>State-society relations are characterized by patron-client relationships.</p> <p>There is a risk that oil and gas revenue will be used to sustain large and repressive state security forces.</p>	<p>Institute a zero-tolerance approach to societal corruption and nepotism.</p> <p>Institute a zero-tolerance policy on human rights violations by public security forces.</p>	<p>Sign, ratify, and implement the UNCAC.</p> <p>Initiate a national consultation process to develop consensus and a framework for the use of oil and gas revenue for national development.</p>
Infrastructure of violence	<p>There is widespread availability of SALWs.</p> <p>There is high youth unemployment.</p> <p>War economies are established and entrenched.</p> <p>There are a number of important community conflicts and armed groups in oil- or gas-rich areas.</p>	<p>Call for and keep on the agenda the demilitarization of society, the empowerment of youth, and the resolution of local and interethnic conflicts.</p>	<p>Disarmament, demobilization, and reintegration processes</p> <p>Youth empowerment (including vocational training, small and medium enterprise support, and entrepreneurship development) projects and programs to stimulate employment through investment in labor-intensive sectors</p> <p>Negotiated law enforcement and community security projects</p> <p>Targeted community-level conflict resolution processes</p> <p>Community-based early-warning and response systems</p>
State fragility	<p>The state has limited territorial control, particularly in oil- or gas-rich areas.</p> <p>There are systematic human rights violations by security forces.</p>	<p>Institute a zero-tolerance policy on human rights violations by public security forces.</p>	<p>Security sector reform processes</p> <p>Human-rights training for public security forces</p>

table continues next page

TABLE 11.2 continued

Risk Category	Risk Factor for Petroleum-Related Violent Conflict	Political Action	Technical Measures
Legislation and regulation	<p>There are unresolved ownership, management, and benefits-sharing challenges.</p> <p>The state has not legislated on local content arrangements, or these arrangements are weak.</p> <p>Compensation scales for lost land, livestock, and livelihoods are outdated.</p> <p>There is weak or poor government capacity to enforce social and environmental regulations.</p>	Through a national consultation process, forge a consensus on the sector's key objectives, management principles, and allocation of oil and gas revenues.	<p>Conduct legislative review and research to update compensation scales.</p> <p>Seek technical assistance to strengthen the inclusion of social and environmental performance standards and norms during contract negotiations.</p> <p>Establish a national ombudsman function and alternative dispute resolution facility.</p>
Operational issues	<p>There are significant onshore exploration or production activities.</p> <p>Onshore exploration or production is in proximity to communities.</p> <p>Exploration or production activities are taking place at a sensitive time for the country.</p> <p>There is limited government or societal experience with oil or gas production and high expectations of what it may yield.</p>	Hold oil and gas companies accountable against international standards for their conduct in the country.	<p>Initiate a national consultation process to develop consensus and a framework for the use of oil and gas revenue for national development.</p> <p>Launch awareness-raising campaigns for oil and gas exploration and production.</p>

Note: SALWs = small arms and light weapons; UNCAC = United Nations Convention Against Corruption.

Preventive Measures: Resource Curse and Rentier State

Technical assistance on policy and legal framework development, including conflict-sensitivity assessments of policies considered. A key challenge in the process of policy development for effective natural resource management (including work on macroeconomic policy, economic diversification, and revenue management) is the absence of a conflict-sensitivity lens. The “right” policy and legal framework, without a conflict-sensitivity lens, may aggravate grievances or reinforce inequitable resource-sharing arrangements, which, in turn, can create tensions. An open and inclusive discussion involving key stakeholders and civil society is paramount to identifying potential tensions in advance and finding consensus and common vision on the petroleum sector development objectives and the right path toward achieving them. This kind of open discussion is also crucial, as mentioned before, for educating society and managing popular expectations on what issues and benefits may come from petroleum development.

Increased government and corporate transparency in revenue management. Transparency along the whole value chain, from contract negotiations and

TABLE 11.3 National Policy, International Measures, and External Support Activities to Tackle Natural Resource Conflicts

National Policy Measures	<i>Macroeconomic Policy</i>
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Fiscal policy:

- Expenditure (short term): Prevent economic overheating and create a reserve fund for countercyclical intervention.
- Expenditure (medium term): Balance public investment to encourage and facilitate diversification into nonresource tradable sectors.
- Revenue (short term): Maximize income on resource flows by setting appropriate royalties and tax rates.
- Revenue (medium term): Broaden the direct tax base, with a view toward preventing excessive inequality.

Monetary policy:

- Short term: Use central bank rate and regulation of commercial bank reserves to prevent excessive inflationary pressure.
- Medium term: Support active exchange rate management and facilitate private investment that supports a diversification of the economy into nonresource tradables.

Exchange rate policy:

- Short term: Employ a stable exchange rate regime to prevent nominal appreciation.
- Medium term: Maintain a stable real exchange rate in order to maintain a diversified economy, including a productive nonextractive tradable sector.

Promote economic diversification:

- Use taxation to incentivize economic diversification.
- Invest revenues in agricultural development.
- Support potentially competitive manufacturing activity, with an initial focus on labor-intensive sectors.^a
- Encourage the extractive sector to tap into local capital and labor inputs to increase local content and strengthen local links along the extraction value chain.

Effective revenue management:

- Build national and local consensus on natural resource management.
- Introduce transparency provisions with a charter of good governance and natural resource laws.

Tackle asymmetries during contract negotiations:

- Support countries at the regional or subregional level to strengthen standards and guidelines for contract negotiations.
- Support international coalitions to influence contract negotiations and publicize contract details.
- Award contracts through an open auction system when there are enough interested investors.

Improve revenue collection:

- Adopt tax regimes that ensure a stable flow of revenues.
- Strengthen the institutional capacity of administrative agencies responsible for levying and collecting taxes.

Invest revenues wisely:

- Use revenues for public investments in physical assets (critical infrastructure) and human capital (education, training, and health) to break the cycle of resource dependence, low human development, and conflict, but make sure the investments are efficient and don't overheat the economy. Invest the surplus in foreign assets through sovereign wealth funds.
- Allocate resources to address horizontal and vertical inequalities.
- Ensure that temporary gains become long-term benefits, especially in the event of a fall in international prices for oil or minerals.

table continues next page

TABLE 11.3 continued

Regional and International Measures	<p>Increase transparency by adopting the following:</p> <ul style="list-style-type: none">• The Extractive Industries Transparency Initiative standard• Publish What You Pay• Country-by-Country Reporting (European Commission) <p>Reduce the ability of armed groups to finance insurgency through natural resources by adopting the following:</p> <ul style="list-style-type: none">• The Kimberley Process Certification Scheme• Timber certification <p>Criminalize poor corporate conduct by doing the following:</p> <ul style="list-style-type: none">• Criminalizing advance finance in return for an entitlement to natural resource extraction should a rebellion succeed• Criminalizing “facilitation payments”• Adopting anticorruption measures <p>Promote good corporate conduct by adopting the following:</p> <ul style="list-style-type: none">• Global Mining Initiative• UN Global Conduct principles• OECD Guidelines for Multinational Enterprises• UN Guiding Principles on Business and Human Rights• Voluntary Principles on Security and Human Rights• International Finance Corporation Performance Standards• European Bank for Reconstruction and Development Performance Requirements• UN Convention against Corruption
External Support Measures	<p>Support consensus building by training disputing groups on advocacy, negotiation, analysis, and dialogue skills to facilitate their engagement in participatory, inclusive, and constructive decision-making processes involving natural resources.</p> <p>Share good practices, including the following:</p> <ul style="list-style-type: none">• Environmental and social impact assessments• Grievance mechanisms• Transparency• Democratic control• Capacity to negotiate concession terms• Monitoring• Dialogue with affected communities• Support for social investments <p>Provide access to impartial scientific and technical information.</p> <p>Strengthen the capacity of government employees through training and mentoring on the following:</p> <ul style="list-style-type: none">• Natural resource management• Conflict resolution <p>Support restoration and rehabilitation projects, such as those involving “common resource pools” such as grazing areas, forests, and wells that may be degraded by conflict or natural resource exploitation.</p>

Sources: Bannon and Collier 2003; Garrett and Piccini 2012; undg-ECHA 2013; undpa and unep 2015; and UN Interagency Framework Team for Preventive Action 2011.

Note: OECD = Organisation for Economic Co-operation and Development; UN = United Nations.

a. For more information on this topic, please refer to chapter 9.

awarding licenses to revenues received and their allocation, is an important confidence-building measure among both interested national actors (including civil society, opposition, and others) and international oil and gas companies. There are several instruments available through which to promote transparency and anticorruption, including the Extractive Industries Transparency Initiative and United Nations Convention against Corruption.

National consultation process to develop consensus and framework on use of oil and gas revenue for national development. An example of how this process was done in Mauritania is outlined earlier in this chapter. Additional approaches include more ambitious engagement in participatory and inclusive decision-making processes involving natural resources (see, for example, UNDG-ECHA Guidance Note on Natural Resource Management in Transition Settings [2013]¹¹).

Preventive Measures: Infrastructure of Violence

Disarmament, demobilization, and reintegration (DDR) processes. Much has been learned over the past 20 years about the do's and don'ts of DDR processes, including the need for different approaches in situations where armed conflict is between clearly defined fighting forces (traditional DDR) and situations characterized by armed violence (second-generation programs). The latter type of approach is deployed to support formal peace processes, build trust, and contribute to a more secure environment, often starting at the very local level and adapting to contextual changes (UN DPKO 2010). There is extensive and accessible literature on this topic, which is not summarized here.

Youth empowerment (including vocational training, small and medium enterprise support, and entrepreneurship development) projects and programs to stimulate employment through investment in labor-intensive sectors. There are several examples of relatively effective youth empowerment and employment programs in violent conflict-affected regions, including Nepal's Jobs for Peace program from 2009 to 2011.¹² These programs are often focused on vocational training, agriculture, enterprise support, public works and waste management schemes, and job search assistance.

Negotiated law enforcement and community security projects. In cases where public security forces are seen as complicit in human rights violations and insecurity is high, negotiated law enforcement processes and community security projects may help improve overall security. Negotiated law enforcement is often a temporary measure in which a third party facilitates dialogue between community representatives and public security on the conduct of public security and "terms of entry" into communities or city areas. Communities, in turn, will agree not to give shelter to armed groups or criminals, or at least to not actively protect them. A more structured and sustainable approach is known as "community security," defined by Saferworld¹³ as

a people-centered approach to addressing insecurity that [brings] together a wide range of state and civil society actors from the security demand and supply sides to identify root causes of insecurity collectively and develop coordinated responses to them. The approach builds the capacity and willingness of communities, local authorities and security providers to address their own sources of insecurity. (Saferworld 2014)

Targeted community-level conflict resolution processes. There are many different types of community-level violent conflicts, many issues involved, and of course, many different actors. The variety of ways in which these conflicts break out, their specific histories, and the impact of national and regional contexts necessarily means that there is no one model or process for resolving them. Typically, though, a community-level conflict resolution process involves analysis, intervention planning, the implementation of a set of conflict de-escalating and peace-promoting actions, an agreed-upon resolution process involving key stakeholders, an agreement, and the monitoring of the implementation of that agreement (UNDPA and UNEP 2015).

Community-based early warning and response systems. In particularly volatile areas, community-based early warning and response systems (sometimes referred to as third-generation systems) can be put in place and linked to ongoing conflict resolution and community security initiatives. Such systems involve local monitors and responders whose role is to respond to rumors and other triggers of violence through fact-finding and preventive action.

Preventive Measures: State Fragility

Security sector reform processes. Security sector reform is a lengthy, complex, and politically fraught process that aims to foster effective, inclusive, and accountable security institutions that contribute to peace, security, development, and human rights. In environments characterized by state fragility and violent conflict, difficulties in reforming the security sector are compounded by security concerns, weak government institutions, and, in many cases, a fragmented society. Key areas of action include work on a national security policy and strategy, security sector governance and oversight, management of the security sector, and defense sector reform (England and Boucher 2009). As with DDR, there is extensive and accessible literature on good practice in security sector reform processes, which is not summarized here.

Human rights training for public security forces. A short-term measure often used by companies to reduce the adverse social impacts of public security forces is human rights training. The challenge in implementing such training is typically to, first, gain acceptance of such training and, second, ensure that public security forces deployed to protect petroleum exploration and production assets receive it on a regular basis.

Preventive Measures: Legislation and Regulation

Legislative review and research to update compensation scales. Updating compensation scales for individuals and communities negatively affected by oil and gas exploration and production involves legislation to adjust any previous scales to current market rates associated with the loss or destruction of a livelihood asset.

Technical assistance to strengthen the inclusion of social and environmental performance standards and norms during contract negotiations. Technical assistance is needed to support host country governments on this topic during contract negotiations and to build its knowledge base and regulatory capacity.

Establishment of a national ombudsman function and alternative dispute resolution facility. An ombudsman or facility for alternative dispute resolution is normally established by the government to enable citizens to have cases of rights violations adjudicated or resolved without recourse to the judiciary. In contexts

where the judiciary works poorly and social and environmental standards are poorly enforced, these systems offer alternative, cheaper, and often faster ways for individuals, communities, and companies to resolve disputes.

Preventive Measures: Operational Issues

Oil and gas exploration and production awareness-raising campaigns. It is often necessary for oil and gas companies to explain to communities and other stakeholders what is entailed in exploration and production, what the chances of success are, and what social investments companies will make. Awareness-raising campaigns are typically implemented through direct engagement with communities and a variety of media (such as television, radio, and newspapers) sustained over time.

The Role of Oil and Gas Companies in Preventing Violent Conflict

Oil and gas exploration and production companies can play an important role in reducing vulnerability to petroleum-related violent conflict. Twelve preventive measures that can make a difference are listed in table 11.4 and described further below.

Put in place a code of conduct for staff. Such a code needs to specify the values and behaviors staff are expected to follow in-country along with sanctions for noncompliance.

Provide staff briefings on cultural “do’s and don’ts.” A basic induction package to the country and locality where staff (and contractor personnel) are to be deployed should be prepared. This package should outline etiquette and basic protocol when engaging with community members, women, the elderly, and children; taboos and traditions; and sacred areas and rites, among other topics. Onsite briefings and monitoring of staff behavior are also useful.

Ensure that an adequately prepared community relations team is in place. Inevitably, problems, incidents, and misunderstandings with community members do occur and need to be addressed. A community relations team staffed with individuals with the experience and local contacts needed to peacefully resolve issues is an important asset.

Commission a VPSHR assessment and action plan, and adequately fund its implementation. A VPSHR assessment and action plan is meant to ensure that a company’s security arrangements do not negatively affect the human rights of individuals and communities affected by these arrangements. The VPSHR assessment process involves risk assessment, reviewing and assessing relations with public and private security providers, engaging with stakeholders, and preparing a management and action plan.¹⁴

Review security arrangements from a conflict-sensitivity perspective. A company’s security arrangements should be periodically reviewed from a conflict-sensitivity perspective to identify ways in which these arrangements can ensure good community and labor relations.

Keep a register of commitments and ensure timely implementation. All promises made by company staff to stakeholders need to be logged. Implementation time frames (and any delays) should be communicated proactively to relevant stakeholders.

TABLE 11.4 Corporate Preventive Measures

Company-Driven Vulnerabilities	Key Preventive Measures
<p><i>Corporate policy</i> Oil or gas companies involved in exploration or production have weak social and environmental performance policy and guidance.</p>	<p>Define policy and guidance requirements, develop policies and guidance for staff on key social and environmental performance topics, and fund their implementation.</p>
<p>Oil or gas companies involved in exploration or production operate inaccessible or weak grievance mechanisms.</p>	<p>Develop and implement accessible grievance mechanisms; raise awareness of their existence.</p>
<p>Oil or gas companies involved in exploration or production have limited guidance on and experience with the VPSHR.</p>	<p>Commission a VPSHR assessment and action plan development; adequately fund its implementation.</p>
<p><i>Corporate culture</i> Oil or gas companies involved in exploration or production display inappropriate behavior and actions.</p>	<p>Put in place a code of conduct for staff.</p>
<p>Oil or gas companies involved in exploration or production engage in confrontational and insensitive community relationships.</p>	<p>Provide cultural “do’s and don’ts” briefings to staff.</p>
<p>Oil or gas companies involved in exploration or production engage in “Promise it if it’ll keep us on schedule, others will deal with the legacy” practices.</p>	<p>Ensure that an adequately prepared community relations team is in place.</p>
<p><i>Corporate practice</i> Oil or gas companies involved in exploration or production have limited contextual understanding.</p>	<p>Review security arrangements from a conflict-sensitivity perspective.</p>
<p>Oil or gas companies involved in exploration or production have weak expectation management.</p>	<p>Keep a register of commitments and ensure timely implementation; make sure contractors do not promise what they cannot deliver.</p>
<p>Oil or gas companies involved in exploration or production resolve disputes through cash transfers or project promises.</p>	<p>Invest in context assessments, including stakeholder analyses, political risk assessments, and conflict and human rights analyses; regularly update these assessments.</p>
<p>There is nepotism in oil or gas company hiring practices and corruption in contracting.</p>	<p>Develop and execute an expectation-management strategy; monitor its implementation and punish deviations.</p>
<p></p>	<p>Institute a policy of not rewarding violence and not tolerating bribery or corruption.</p>
<p></p>	<p>Put in place an integrity hotline for staff and others to report corruption or other mismanagement; investigate all allegations.</p>

Note: VPSHR = Voluntary Principles on Security and Human Rights.

Define policy and guidance requirements, and develop policy and guidance for staff on key social performance topics. Settings vulnerable to petroleum-related violent conflict require significant attention to policy and guidance on stakeholder engagement, human rights, community relations, anticorruption, security management (including the VPSHR), social investment, contracting and procurement, and labor relations. Where weak, such policy and guidance should be upgraded and staff should be socialized. These measures need to be done early in the project development stage.

Develop and implement accessible grievance mechanisms, and raise awareness of their existence. A grievance mechanism is a formal (legal or nonlegal) complaint process that a company extends to individuals, workers, communities, and

civil society groups to signal that they are being negatively affected by business activities. Ultimately, the process aims to provide remedy for the aggrieved and serves an important role in de-escalating conflict. Guidance on developing such mechanisms is available from a variety of groups.¹⁵

Invest in the regular updating of context assessments, including stakeholder analyses, political risk assessments, and conflict and human rights analyses. There are a variety of tools and methods to help businesses gain an adequate understanding of their operating environment. Investing in the preparation of context assessments and regularly updating such assessments is important.

Develop and execute a strategy to manage the expectations of all levels of government and the broader public; monitor its implementation and punish deviations. Managing the expectations of the broader public should be coordinated with the government, particularly when a country is new to oil and gas prospecting. The purpose of such strategies is to clarify when exploration activities will take place, when their results will be known, and what the company has committed to do during the exploration phase.

Institute a policy of not rewarding violence and having zero tolerance for bribery and corruption. When a company responds quickly to violent action and slowly to nonviolent complaints, it sends a signal that violence pays and nonviolent means of communication do not work. If, in addition, the company rewards violent behavior with cash, projects, and contracts in order to “get rid of the problem fast,” then it sets precedents that are corrosive for the company and other groups involved. Putting in place a policy (and procedures) to respond effectively to nonviolent expressions of concern or grievance is therefore important, as is having a zero-tolerance policy regarding bribery and corruption.

Put in place an integrity hotline for staff and others to report corruption or other forms of mismanagement, and investigate all allegations. Offering staff and others a way to report integrity problems anonymously will help identify these problems. Resources are needed to investigate allegations properly and to take necessary actions.

Summary and Conclusions

The purpose of this chapter has been to broaden the analytical framework to better understand petroleum-related violent conflicts and offer pointers on strategies and measures to prevent them. Two points in particular have been stressed.

First, vulnerability to petroleum-related violent conflict is rooted not only in resource governance challenges but also in preexisting contextual factors (related to state fragility, the infrastructure of violence, suboptimal or nonexistent legal frameworks, and operational issues) and harmful corporate practices.

Second, actions involving formulating a preventive strategy, making appropriate political decisions, and implementing key technical measures (including measures specific to oil and gas companies) may help reduce vulnerability to petroleum-related violent conflict and prevent such conflict.

And finally, it is important to stress that there are no blueprints for conflict-prevention strategies and measures in contexts at risk for petroleum-related violent conflict. Context is paramount; any petroleum development conflict-prevention strategy must be tailored to the national and local context and dynamics.

Notes

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1. See the OECD/DAC Issue Brief on Small Arms and Light Weapons (2005).
2. The World Bank defines fragility and fragile situations as “periods when states or institutions lack the capacity, accountability, or legitimacy to mediate relations between citizen groups and between citizens and the state, making them vulnerable to violence-related deaths in a year” (World Bank 2011, xvi).
3. There are also many challenges associated with poorly regulated private security providers, especially when they are armed. In many fragile state contexts, public security is—for the most part—privatized, with different forces having loyalty to different individuals or factions associated with the government.
4. See, for example, <http://www.forbes.com/sites/quora/2013/04/03/what-are-the-top-five-facts-everyone-should-know-about-oil-exploration/>.
5. The aim of FPIC is to establish bottom-up participation and consultation with an indigenous population prior to beginning development on ancestral land or using resources within the indigenous population's territory.
6. Understanding the impact of oil and gas companies involved in exploration activities would require a company-by-company assessment of their corporate culture, policy, and practice.
7. See http://www.npr.org/documents/2005/aug/shell_wac_report.pdf.
8. See http://www.democraticdialoguenetwork.org/app/files/documents/17/attachment/MAURITANIA_DIALOGUE.pdf.
9. For more information, see http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/OMN.pdf.
10. Note that these prevention measures differ from those used to resolve natural resource conflicts, although there are, of course, measures applicable to both prevention and resolution.
11. Access the Guidance Note at: <https://undg.org/document/guidance-on-natural-resource-management-in-transition-settings/>.
12. See https://www.ilo.org/kathmandu/whatwedo/projects/WCMS_113782/lang--en/index.htm.
13. Saferworld is an independent international organization working to prevent violent conflict and build safer lives; see <https://www.saferworld.org.uk>.
14. See, for example, https://www.miga.org/documents/VPSHR_Toolkit_v3.pdf.
15. See, for example, <http://www.shiftproject.org/sites/default/files/OG/ECHRSG.OG.12.pdf>.

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Petroleum discovery in a country presents its policy makers with a challenging and complex task: formulating and agreeing on policies that will shape the country's petroleum sector and guide the translation of the newly discovered resources into equitable and sustainable economic and social growth for the nation over the long term. *Balancing Petroleum Policy* provides policy makers and other stakeholders with the basic sector-related knowledge they need to embark on this task. It introduces a number of topics: the petroleum value chain and pivotal factors affecting value creation, a consultative process for developing a nation's common vision on key petroleum development objectives, design of a legislative and contractual framework, petroleum fiscal regimes and their administration, prudent fiscal management, transparency and governance, environmental and social safeguards, and economic diversification through industrial linkages.

Although much of the material is relevant to designing policies for the development of the petroleum sector in general, the book gives special focus to developing countries, countries in a federal or devolved setting, and countries that have experienced or are still experiencing civil conflict. With this focus in mind, the book examines three questions—ownership, management, and revenue sharing of petroleum resources—that are central to petroleum policy in any federal or devolved state. It also offers important perspectives on how to prevent violent conflicts related to such resources.

Petroleum policies tend to vary significantly from country to country, as do the objectives that such policies aim to achieve in the specific context of each particular country. Although there is no one-size-fits-all policy and there are no clear-cut answers to the many potential policy dilemmas associated with the discovery of petroleum resources, this publication may help policy makers find the right balance among the chosen objectives—and the right policy choices to achieve these objectives.

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