

The Political Economy of Natural Resource Taxation:

Building Credibility and Investing in Tax Administration Capacity*

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A tax regime that is progressive and based on profits is considered best practice for natural-resource-endowed countries. These regimes promise to capture the bulk of resource rents from the sector while ensuring the required investment associated with high-risk, capital-intensive exploration and extraction. But developing countries often find this model challenging and even impossible to enforce. Instead, underlying political economy drivers and the resulting institutionally weak and fragmented oil and mining revenue administration often lead to excessive reliance on regressive indirect fiscal regimes or those based on proxies to profits. High uncertainty, price volatility, and political pressures make fiscal regimes prone to change and instability, impairing further prospects of attracting investments needed to develop the sector.

Governments face challenges committing to stable taxation policies as a result of the interaction between these distinctive sector features and the lack of mechanisms for credible enforcement of intertemporal policies and commitments, both between domestic forces and between governments and investors. Developing countries facing time consistency problems need to design country-specific “good enough” or “best fit” fiscal regimes, defined as typically simple, transparent, and politically feasible, to conform to a certain set of core objectives and the levels of risk that the state is willing to take.

This note presents policy choices available to natural-resource-endowed countries that focus on both design and implementation. The literature provides extensive policy guidance in the area of natural resource taxation, which builds on an extensive public finance tradition (see, for example, Daniel, Keen, and McPherson 2010; Otto and Andrews 2006). Yet most of this work deals separately with technical, economic, and institutional aspects of taxation. The objective of this note is to illustrate how particular policy choices regarding resource taxation policy and administration can be better understood in the context of the prevailing political economy and institutional endowments. The message is that policy choices are invariably and predictably conditioned by a set of dynamics for given country contexts. This note provides guidance on how different starting points shape the prioritization and sequencing of certain policy designs to enhance both overall rent-capture by the state and successful and sustained extractive industry investment in the sector.

Policy Issues in Design and Implementation of Fiscal Regimes

Policy issues related to the design and implementation of fiscal regimes for nonrenewable resources generally fall into three areas of recurrent

concern that illustrate the paradoxes observed in the third stage of the natural resource management value chain. These policy issues include selection of fiscal regimes in developing countries that are apparently too complex to implement, suboptimal instability in fiscal regimes, and pervasive weaknesses and apparent neglect of administrative capacity in this area.

Perpetuating time inconsistency

Fiscal regimes for nonrenewable resource in many developing countries often seem erratic and myopic. For companies, investments in the mineral sector are risky, capital intensive and long term, and there is always high uncertainty and unpredictability in both demand and production of the output (Osmundsen 2010). For host governments, operation and market risks render the revenue flow highly variable and cyclical by nature. It is clear that both investors and the government would benefit from stable fiscal policies. Nevertheless, the absence of cooperation mechanisms, the high discount rate for the incumbent, substantial payoffs for deviating from agreements, and political exchanges taking place in largely informal, uncertain, and nontransparent arenas—as commonly observed in resource-rich developing countries—all contribute to the ubiquitous time consistency and commitment problems (Kydlund and Prescott 1977; Persson and Tabellini 2000). The paradox is that time inconsistency is exogenous to investors but endogenous to the domestic political economy.

Sectoral characteristics interact with institutional constraints, intensifying the commitment issues.¹ Past tax increases are associated with lack of credible commitments by the government. Investors will expect it to behave opportunistically after their investments are sunk. In order to attract new investments, governments need to signal investors that they are willing to compensate them for the additional risk (and even lock in their ability to change the regime, for example, by introducing stability clauses). However, when investments are completed, especially in the context of high prices, governments have difficulties enforcing such commitments (because of voracity, rent-seeking, and social demands) and consequently tend to increase taxation. In response, companies generally reevaluate future investments and increase production at the expense of the long-term productivity of reservoirs. Thus, the repeated interaction between governments and investors leads to a suboptimal equilibrium of underinvestment and an unstable procyclical taxation regime (Boadway and Keen, 2010; Osmundsen 2010).

Suboptimal, complex, and contradictory design of fiscal regimes

Paradoxically, developing countries often have more complex regimes than countries with higher capacity. In recent years developed countries have strived to simplify their tax systems (Otto and Andrews 2006; van Meurs 2008), whereas resource-rich, low-capacity, and weak-governance countries do just the opposite, or at least refuse to follow the trend. The latter have tended to introduce relatively complex regimes (particularly in their royalty base, which mimics one based on profitability). Resource-rich, low-capacity, and low-governance poor countries often find it overly challenging to administer a fiscal regime centered on progressive direct income taxes. Therefore, they rationally front-load revenues using production-based royalty as the major fiscal instrument. Preference for steadier revenues, short-term horizons, and risk avoidance explains the fact that royalties or other regressive instruments are most commonly used to tax mineral extraction. While royalty is economically inefficient, it is simpler to administer and has lower variability.

Low incentive to invest in revenue administration reforms

Many low-income, resource-rich countries have notably low capacity and poor governance in revenue administration. The typical problems in revenue administration range from inadequate organizational structuring, low human resource capacity, perverse incentive systems for revenue collection and taxpayer service, and cumbersome processes, to lack of information technologies and infrastructure support. In addition, the collection of revenues from the mineral sector spreads across multiple institutions, which generally do not have incentives or are legally bound to cooperate. As revenue administrations have insufficient staffing and training to deal with multinational mineral corporations, self-assessment becomes a mere formal acceptance of returns filed by corporations, subject only to desk audits.

Prevailing institutional and political incentives, however, discourage investment in this area. First, revenue reforms are both resource-intensive and long term; they are highly politically driven, and success is impossible without broad and sustained political support. Second, incumbents with short-term time horizons—and therefore a high discount rate—and management of revenue administrations have high incentives to retain the status quo (Fjeldstad and Rakner 2003). Third, fragmentation in administration of revenues from the mineral sector, including the use of a state-owned corporation as a regulatory and

revenue-collecting institution, without institutional incentives or enforcement mechanisms for coordination, inhibits successful tax administration reforms. Fourth, the lack of transparency in upstream contracting and signing of development agreements is a major constraint on effective revenue administration.

Revenue Mobilization and Accountability

While many low-governance countries have significant room for improvement in tax collection, because of the concentration of ownership and the high profitability in extractive activities, mineral wealth provides a combination of surplus and relative administrative ease, reducing pressures for accountability (Chelliah 2006). To the extent that governments derive large mineral rents or control the production directly, they may be in a position to avoid the politically sensitive task of taxing their population (Dunning 2008) and also may be able to make transfers to large segments of the population to secure the legitimacy of the regime (Anderson 1987; Crystal 1995). These political incentives reduce the urgency to diversify the tax base (Ross 2001) and to make long-term investments in institutional capacity for tax administration, which often results in poor resource mobilization and can trigger the revision of fiscal terms. Additionally, a weak tax administration can easily be manipulated by the incumbent administration or captured by private interests. Taxation is an important aspect of citizenship and governance. Individuals who do not pay taxes are less likely to demand transparency and quality in government spending and hold it to account. Governments that do not derive a substantive part of their resources from their citizens are less likely to pay attention to their demands (Karl 1997; Moore 2004). Overall, the tendency will be greater to use particularistic rewards rather than produce public goods (Bueno de Mesquita et al. 2004).

Fiscal Instruments for Mining and Oil and Gas

This section briefly discusses alternative fiscal regimes. There are multiple fiscal instruments available for taxing extractive industries, each with its own benefits and disadvantages along economic, administrative, and revenue-enhancing dimensions. The inherently complex process of policy design becomes even more challenging in the minerals sector owing to the distinctive technical and economic characteristics of oil, gas, and mining, and

the multiple interactions between these and institutional and political constraints.

Table 1. Economic Impacts of Alternative Tax Regimes

Type of Tax	Extraction Profile	Grade Selection Profile	Cutoff Grade	Administration Cost	Revenue Variability
Per unit royalty on output (nominal)	Present to future	Present to future	Increases	Low	Low
Ad valorem royalty	Function of discounted price path	None	Increases	Intermediate	Intermediate
Variable royalty	Function of rate of growth of prices and tax rates	Function of rate of growth of prices and tax rates	Increases	Intermediate	Intermediate
Profits tax	None	None	Unchanged	High	High
Profits tax with cost depletion	Future to present	Future to present	Decreases	High	High
Profits tax with percentage depletion	Function of discounted price path	None	Decreases	High	High
Property tax	Future to present	Future to present	Increases	Intermediate	Low

Source: Shukla and Le 1999.

Governments mix instruments to overcome the trade-offs between efficiency and effectiveness in revenue raising or between revenue adequacy and variability implied by the different instruments. On the one hand, governments resort to fiscal and nonfiscal instruments to collect natural resource rents. The most commonly used fiscal systems are tax/royalty in mineral-rich countries (Otto and Andrews 2006) and concessions and production-sharing contracts in oil producers (Tordo, Johnston, and Johnston 2009). Nonfiscal alternatives include auctioning exploration and extraction rights, production sharing, and equity participation.ⁱⁱ Yet they are generally associated with revisions of the terms throughout the project cycle (Blake and Roberts 2006). On the other hand, the fiscal instruments that are most commonly used for extractive industries include royalty (specific and ad valorem), corporate income tax, presumptive income tax, resource rent tax (RRT), and property tax, as well as other taxes such as value added tax (VAT), and import and export duties (Boadway and Flatters 1982; Nellor 1987; Otto 2001; Otto and Andrews

2006; Sunley, Baunsgaard, and Simard. 2003). The incentives created by the various tax and royalty instruments are summarized in table 1 (for a more extensive discussion, see Barma, Kaiser, Le, and Viñuela 2012, chapter 4).

The alternative taxes not only create different incentives for extraction, grade selection, and differences in terms of deadweight loss, but they also affect the variability or uncertainty of government revenues (Shukla and Le 1999). The uncertainty in revenue streams flowing to the government imposes a cost on the economy. In other words, taxes that create higher uncertainty are less desirable than those with less variability in government revenues. From this point of view, output-related taxes are preferable to income-based taxes. Taxes such as a resource rent tax create a great deal of uncertainty and therefore impose higher costs on the economy. A unit, or ad valorem, royalty on output is dependent only on the quantity and price of the output, and it creates a revenue stream that is least variable or uncertain. Moving to a variable royalty, clearly the extent of variability or uncertainty increases. Income tax revenues not only depend on the quantity extracted and price of output but also on the prices of inputs, cost overruns, and so on. The revenue stream from income taxes has a higher variability; the variability of a combination of income tax and royalty lies in between and is moderate compared to a pure income tax. When an additional profits tax or resource rent tax is employed, the result is multiple rates and the revenue stream becomes more variable. The property tax is a function of revenue from the extraction of the resource, and its variability is similar to that of an ad valorem royalty.

The various taxes also have different administration costs, which have two components. One is the cost of collection or administrative cost, representing the public sector cost incurred by the revenue department of the government in administering tax laws. It includes wages and salaries, cost of accommodation and transportation, expenditures on investigation of tax evasion/tax avoidance and enforcement, and maintenance of a legal system for adjudication of disputes. The other is the compliance cost—the cost borne by the taxpayers or the private sector in meeting the legal requirements of the tax system. It includes the expense of keeping records, accounts, and other necessary data; cost of acquiring the knowledge of legal obligations and penalties; payments for professional tax advice; and other incidental costs.

Moreover, while preventing fiscal corruption is always a challenge, the simpler and more easily

understood tax system is typically associated with less risk and higher compliance. A clear and simple fiscal regime prevents tax collectors from taking it upon themselves to interpret tax laws and regulations, and also prevents companies from taking undue advantage of loopholes or exemptions.

Standardization of tax procedures in administration can also prevent companies from using bribes as a means of avoiding a lengthy and complicated process to determine tax liability. Regarding specific fiscal instruments, unit or value-based royalties are least susceptible to fiscal corruption, given that they require a relatively low level of administrative capacity and are usually straightforward to calculate from a company's total production. This recommendation is also consistent with studies that show that corruption impacts direct taxes more than indirect taxes (Ghura 2002; Tanzi and Davoodi 1997). Profits-based taxes, on the other hand, allow more room for corruption and therefore require more monitoring from the government.

Centrality of Tax Administration

To a large extent the quality of implementation and enforcement of the regimes determines the effectiveness and efficiency of instruments and the variability of the revenues as much as their design. Implementation can also create delays and distortions that will affect investment and production decisions. Tax administration is one of the areas most vulnerable to corruption. In most low-income countries, there is much room for improving the tax administration capacity, which can yield substantial increases of public revenues from natural resources. Most resource-dependent countries have an overall low to moderate state effectiveness at collecting taxes or other forms of government revenue, and their performance falls behind that of countries with similar levels of gross domestic product (GDP) (Karl 1997; Knack 2008). The number of tax administration agents per thousand inhabitants is lower on average in these countries, but the cost as a percentage of the revenues collected is also lower on average (Rozner 2009). These figures are symptomatic of the relative ease that rents offer, but in the long run, rents reduce the need for other taxes and lower domestic tax effort. Nonetheless, they require sustained investment in tax administration, which is often at odds with short-term time horizons and the prevailing political economic incentives.

The main challenge that many developing countries and donors that provide technical assistance face lies in attracting and retaining qualified professionals. Salaries are generally low and noncompetitive, and as

a result turnover is high. Many of the more experienced agents are routinely hired by the same companies they monitor. Taxing extractive industries involves multiple actors, including sector ministries, mineral commissions, customs, and tax collection agencies. The specific features of each country, such as the form of government and the formal and informal distribution of functions, will determine how fragmented the implementation of taxation will be. In settings where interagency coordination and alignment of incentives are poor, revenue collection is lower. Institutional duplication and fragmentation increase the cost of controlling and scrutinizing adherence to rules by tax agents. At the same time, lack of coordination between different agencies and between levels of government often reflects the noncooperative nature of the political system (Haggard and McCubbins 2001).

In many cases in which the lack of independence and capacity has compromised the effectiveness of revenue collection, governments have resorted to state-owned enterprises, such as Yacimientos Petrolíferos Fiscales Bolivianos (YPBF) in Bolivia and Petroecuador in Ecuador, that are generally better endowed than tax agencies, to mobilize taxes from extractive activities. However, this dual role often compromises the performance of such entities (McPherson 2003; Marcel and Mitchell 2006) while further reducing the resources available for tax administration. In extreme situations, governments with weak capacity resort to bundled deals that completely bypass tax collection and public expenditure management. While reducing the transactions costs for the government, these contracts create additional risks because mining and oil companies become engaged in operations that are not covered by the mining or hydrocarbon legislation, such as the development of major infrastructure facilities (roads, railways, power generation), as well as processing plants and local community development.

Political Economy Settings and Dynamics

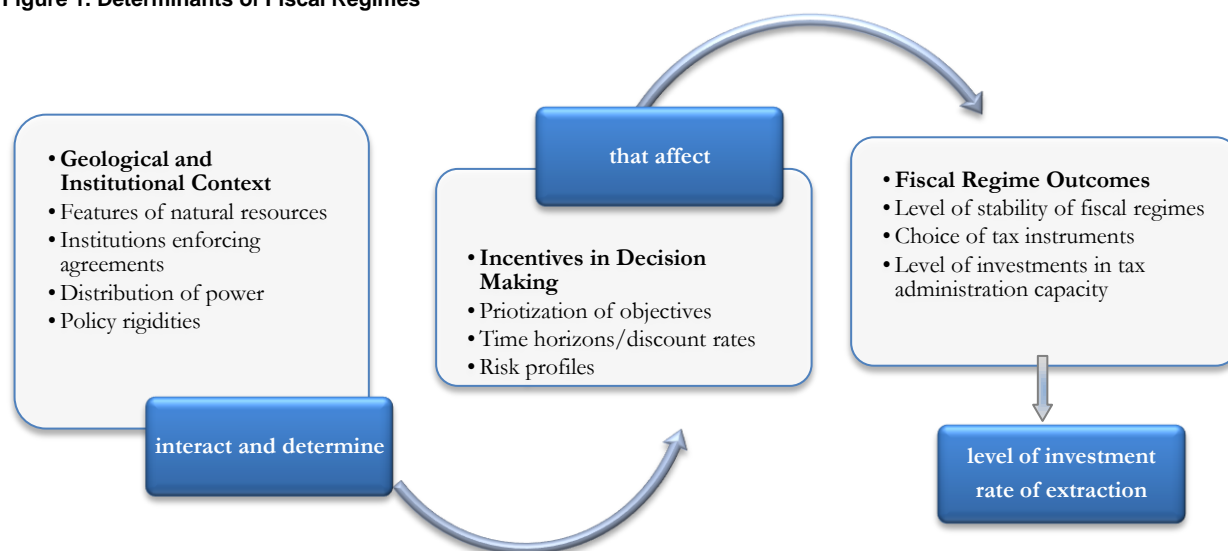
As expressed by Bates (1989, 479), “taxation inherently implies politics.” When selecting fiscal instruments, governments face competing objectives. On one hand, governments seek to reduce revenue variability and the associated political costs. On the other hand, they want to maximize their share of resource rents over time and to internalize the social and environmental costs associated with these activities. While pursuing these sometimes rival

objectives, governments from scarce-capital countries also need to create incentives that attract foreign investment to develop the sector. Political economy scholarship suggests a number of country characteristics that are likely to (1) condition the overarching policy motivations and (2) shape the fiscal regime choices resource-rich countries make. Figure 1 presents a stylized overview of this sequence. Unlike geological endowments, technological and institutional factors are likely to be endogenous to the country setting and will change over time.

The political economy context has been characterized along two dimensions: the tendency and ability to enforce agreements over time and the extent to which the political system is broadly inclusive (see Table 2). Regarding the first dimension, understanding how well political forces or elites coordinate regarding policies and whether there are formal or informal mechanisms at their disposal to ensure that those agreements are upheld allows us to assess the length of governments’ time horizonsⁱⁱⁱ and risk orientations.^{iv} Settings with high discount rates or short-term horizons are likely to see greater instability in the fiscal regime, which in turn is likely to affect investors’ perceptions of risk. Furthermore, domestic political forces that cannot sustain agreements tend to mobilize fewer resources from the sector and are associated with a more informal (and front-loaded) rent extraction. In turn, these instruments affect the production time profile of mines and oil fields. In sum, short-term horizons are associated with faster rates of resource extraction and front-loading of taxes (Robinson, Torvik, and Verdier 2006) and underinvestment in the long run.

Price and production changes aggravate cooperation problems by generating strong incentives to change fiscal terms as social expectations and political costs of taxing other sectors or individuals rise during boom times. In contrast, in environments where cooperation is possible, policy change tends to be incremental and done through compromise. Repeated interactions in institutionalized arenas extend time horizons and create incentives to invest resources in creating policy capabilities, such as tax administration capacity (Stein et al. 2008). In turn, professional bureaucracies can limit the scope of opportunistic policies and enhance trust in commitments, because they implement them over time (Huber and McCarty 2001). They can reduce the incentives to change fiscal regimes by efficiently maximizing revenues within the framework of existing regimes. They also increase the strength of the government in relation to other actors.

Figure 1. Determinants of Fiscal Regimes



Source: Authors.

Table 2. Political Economy Contexts

Political inclusiveness	Credibility of intertemporal commitments	
	Weaker/less enforced	Stronger/more enforced
Less inclusive	<p>Patrimonial rule Individualized political authority, crony hierarchy, few restraints on power High discount rate, risk averse, and narrow distribution of rents</p> <ul style="list-style-type: none"> Extremely short time horizons create pressures to revise fiscal regimes, front-load revenues, disincentivize investments in institutional capacity, and reduce risk-sharing to the detriment of long-term fiscal stream. Limited inclusiveness reduces the space for collective action and demands for good governance. 	<p>Hegemonic government Institutionalized one-party regime, either predatory or benevolent Low discount rate, risk taking, and narrow distribution of rents</p> <ul style="list-style-type: none"> Longer time horizons create a relatively more stable fiscal environment. It is in the best interest of the ruling elite to maximize income over time and therefore share the risk in the development of extractive industries. Limited inclusiveness leads to a narrower distribution of rents, which are used to secure supporters and discourage opponents.
More inclusive	<p>Clientelist pluralism Political competition based on extensive use of patronage High discount rate, risk averse, and broader distribution of rents</p> <ul style="list-style-type: none"> Short time horizons due to low institutionalization and electoral cycles create pressures to revise fiscal terms and front-load revenues, creating suboptimal outcomes in investment and production. Revenues are more broadly distributed, but patronage and earmarking remain significant. 	<p>Programmatic pluralism Electoral competition based on programs; horizontal and vertical accountability Low discount rate, risk-taking, and broader distribution of rents</p> <ul style="list-style-type: none"> Longer time horizons create a stable fiscal environment leading to long-term investments and contracts. Nonetheless, broader political inclusiveness creates a greater space for collective action for good governance and mitigating informational asymmetries.

Source: Authors.

Regarding the other dimension, political inclusiveness, fiscal regimes distribute resources and generate winners who actively mobilize to sustain those creating positive feedbacks or roadblocks for reforms that constrain the political space. More inclusive systems and competitive systems also tend

make greater use of voluntary tax compliance for nonresource taxes, since the government's legitimacy is higher because the distribution of revenues is wider (Alm 1996; de Juan, Lasheres, and Mayo 1994; Feld and Frey 2002; Levi 1988; Pommerehne and Weck-Hannemann 1996). In these cases the tax base is

broader, administration cost is lower and, consequently, total revenues are higher (Kenny and Winter 2006; Winer and Hettich 2006).

Political systems in which there is fair electoral competition, but where political forces do not engage in long-term agreements, are generally associated with the extensive use of clientelism to mobilize support. Patronage links are strong and embedded in political parties, regional networks, and business conglomerates. Parties are weakly institutionalized and rely on personalistic strategies, rather than competing on the basis of programs. Electoral rules are often the object of choice and manipulation, as seen in Bolivia, Ecuador, and Mongolia. Legislative coalitions are generally short-lived and imply significant costs that create pressures to expand fiscal spending. In these countries, sudden changes in revenues can have significant political costs. As time horizons are relatively short, discount rates are high and incentives to invest in institutional capacity are low, while formal regulation is often ignored. Politicians in such countries frequently use populist promises and sovereignty narratives to increase taxation or nationalize companies during boom times. In other cases, such as Mexico, parties face credibility problems in committing to a politically costly reform of the national oil company (in Mexico, PEMEX). The problems of time consistency are common to these settings.

The Democratic Republic of Congo (DRC) and Niger are examples of countries with noninclusive political systems in which cooperation among political forces is weak. In such countries, policy makers have short time horizons and systemic instability is prevalent, as power continues to be highly contested. As a result, decisions in the sector lead to front-loading revenues through signing bonuses and bundle deals as well as the renegotiation of contracts. In these contexts, price shocks generate additional instability. For example, since independence in 1960, Niger has had four coups and five constitutions, which closely followed the uranium boom-and-bust cycles. Because of fragmentation, power holders needed to balance coalitions from different regional and ethnic groups while securing the support of the military. Sharp price and production changes have reshaped the distribution of power and destabilized coalitions. In DRC, the ruling coalition derives its support from the eastern provinces in a context of regional and ethnic fragmentation and frequent interference from neighboring countries. The smuggling of mineral resources has contributed to regional conflict.

Noninclusive political systems in which one political force is hegemonic and there are established

mechanisms to determine succession in power and enforce intertemporal agreements, such as Angola and Lao People's Democratic Republic (PDR), are better placed to provide a stable fiscal environment for investors, chose tax instruments that maximize revenues over time, and attract foreign capital to explore new areas. Nonetheless, the concentration of power in the executive often implies that rents are diverted downstream or extracted through informal channels. Part of the rents is distributed to key groups that support the ruling government, such as Luanda's urban classes and the Angolan military, or the party cadre in Lao PDR.

Finally, countries with politically competitive systems, where institutional technologies are available to enforce policy agreements, provide the most stable fiscal environment for the development of extractives activities and a greater level of efficiency in public spending. Fiscal and electoral rules in countries such as Chile and Trinidad and Tobago are stable and provide incentives for political groups to enter into agreements and sustain them across political cycles.

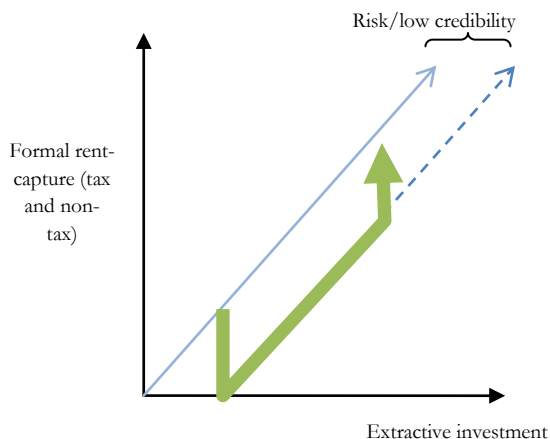
Implications, Options, and Interventions: Building Credibility as a Reasonable Tax Collector

As Bird (2008, 2) emphasizes, fiscal regimes are shaped by “changing economic conditions, administrative constraints and technological possibilities, and especially, the political institutions within which these factors are at play.” The specific characteristics of the extractive sector and the volatile price environment create a time consistency problem between long-term investments and short-term political commitments. In the absence of strong institutions and capable bureaucracies, low- and middle-income countries that lack formal or informal institutional mechanisms to sustain policies over time face the greatest challenge in building credibility as reasonable tax collectors. The policy swings that result from price volatility, electoral and political cycles, and the absence of executive constraints increase the perceived risks for investors. Policy instability requires governments to offer lower takes and compensate for the higher risk to attract investment, which are difficult to uphold.

Consequently, policy recommendations need to consider the use of instruments along with the level of taxation of the industry. Governments should initially tailor rates commensurate with economic, geological, and technological conditions, and then

gradually change to a neutral and stable tax system (Osmundsen 2010). Once credibility has been established, the government could incrementally increase its take and adjust the instruments to make them neutral or progressive. Figure 2 charts a credible path in fiscal reform. The policy and administration interventions along the 45-degree line would allow governments to obtain a fair share of the rent and at the same time create a favorable environment for investment. A hypothetical ideal path begins with a low equilibrium (low government revenue intake and low investment), where countries may start adjusting the level of revenue intake. As countries learn more about taxing resource rent, they introduce more neutral or progressive elements in their fiscal regime, creating the path parallel to the 45-degree line. The distance between the fiscal path and the 45-degree line represents the “credibility gap”: once it is “filled,” countries may safely uptick their revenue intake through deepening tax policy and administration reforms without sacrificing the robust level of investment.

Figure 2. Path to Building Credibility



Source: Authors

In the absence of third-party institutions that penalize governments for changing tax rules, a country can improve its reputation as a reasonable tax collector only by accepting a reasonable tax burden and short-term losses of tax revenues while engaging in long-term reforms. Ultimately, the main constraint on rulers’ pursuit of wealth for themselves is the threat of declining revenue caused by capital flight or reduction of economic effort. However, leaders will weigh the political and electoral costs associated with tying the government’s hands. Box 1 shows that countries have been able to successfully adjust their rates in the context of high prices, but doing so required incrementalism and signals to investors that

such increases would prevent further adjustments or changes in the model of ownership.

Box1: Responses to the Mineral Price Boom

During the last mineral price boom (2004–08), Chile, Mongolia, Peru, and Zambia increased their levels of taxation, as their existing fiscal regimes did not allow them to capture part of the windfalls. However, their responses and levels of success varied. Chile introduced a profit-related royalty in 2005, after many years of imposing only a flat income tax. Unable to increase investment in state-owned CODELCO, the Chilean government started allocating unexplored areas to private investors. For years this country offered below-average tax rates to private investors. Because Chile had built credibility as a restrained tax collector, private companies did not resist the measure. Peru sought to avoid modifying its mining legislation by creating a “voluntary contribution” scheme related to prices in 2006. All companies adhered to the scheme, as it represented a preventive measure against more aggressive tax reforms, while the government was able to placate popular demands.

Mongolia’s parliament passed a law that created a windfall tax in 2006, but its stability clauses effectively restricted its application to only one mine. However, such tax is likely to negatively affect future investments. In a similar manner, Zambia introduced a “windfall tax” in 2008, but withdrew it in 2009. After two decades of low investment in the copper industry, Copperbelt was privatized in the mid-1990s. At that time, buyers used their leverage to obtain low tax rates and a broad stabilization clause. As copper prices quadrupled from 2003 to 2008, the Zambian government came under domestic and international pressure to raise tax rates. In 2008, it increased tax rates, annulled stabilization agreements, and introduced a windfall tax. Nonetheless, soon afterward, the government reversed the measure in response to pressure from international investors.

Source: Navia (2009) and Finch (2009).

‘Good Fit’ Fiscal Regimes

This section presents some the policy recommendations proposed in the volume *Rents to Riches* that provide minimally acceptable government performance without significantly hindering economic and political development (Grindle 1997) given the country-specific political economy context. The underlying rationale is that in each of these settings are fiscal instruments that can help minimize corruption risks and maximize revenue, given the existing tax administration capabilities and incentives to invest in strengthening capacity and the degree of geological maturity. However, improving the fairness of the country’s share and building in mechanisms that allow both investors and government to regularly revise agreements in light of major shifts in the

market environment will disincentivize unilateral revisions of the tax regimes, which hurt the country’s credibility and prospects of attracting new investments.

These recommendations are based on the country’s ability to sustain commitments over time in tax policy and how it is reflected in its overall credibility, and the degree of inclusiveness of the political system, that is, how many groups or political parties

have a say in the decision-making process. In addition, the degree of certainty about geological prospects^v is considered (Mazaheri 2010). Table 3 displays the recommended fiscal and nonfiscal instruments for natural-resource-dependent countries along these three dimensions, with the assumption that “high administrative capacity” is likely to be the exception rather than the norm and that even advanced countries face numerous challenges in the collection of receipts.^{vi}

Table 3. ‘Good Enough’ Fiscal and Nonfiscal Instruments for Natural Resources

Political inclusiveness	Credibility of intertemporal commitment	
	Less credible/weaker enforcement	More credible/stronger enforcement
Less inclusive/ less collectively oriented	<p>Patrimonial rule Individualized political authority, crony hierarchy, few restraints on power</p> <p><i>With certain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with windfall royalties • Use of stability clauses with built-in regular revisions <p><i>With uncertain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with windfall royalties • Use of stability clauses with built-in regular revisions 	<p>Hegemonic government Institutionalized one-party regime, either predatory or benevolent</p> <p><i>With certain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with income tax and windfall royalties or sliding-scale royalties, production sharing <p><i>With uncertain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with windfall royalties or sliding-scale royalties • Use of stability clauses with built-in regular revisions • Targeted tax incentives
More inclusive/ more collectively oriented	<p>Clientelist pluralism Political competition based on extensive use of clientelism/patronage</p> <p><i>With certain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with income tax and windfall royalties, sliding-scale royalties • Use of stability clauses with built-in regular revisions <p><i>With uncertain geological prospects:</i></p> <ul style="list-style-type: none"> • Production-based royalties combined with windfall royalties, production sharing, equity sharing • Use of stability clauses with built-in regular revisions 	<p>Programmatic pluralism Electoral competition based on programs; horizontal and vertical accountability</p> <p><i>With certain geological prospects:</i></p> <ul style="list-style-type: none"> • Auctions, progressive income tax, or profit-based tax <p><i>With uncertain geological prospects:</i></p> <ul style="list-style-type: none"> • Auctions, progressive income tax, or profit-based tax • Use of stability clauses with built-in regular revisions • Targeted tax incentives

Source: Authors, adapted from Mazaheri 2010.

Variation along each of these dimensions yields different recommendations for resource-rich countries. The government’s ability to credibly commit to policies and contracts over time is of special concern to companies and investors. When countries have the reputation of breaking commitments and reversing policies, companies will need governments to signal commitment. Stability

clauses—which take a variety of forms, including the fixation of tax rates over a given period or a rule-based guarantee of the fiscal terms under signed development agreements—are the most commonly used instruments to signal to companies that their investments are secure and that contracts will be honored. Transparent stability clauses, especially

when subject to third-party arbitration, tend to be the most credible.

Similarly, governments may need to provide extra reassurances to investors when geographical prospects are uncertain. Uncertainty is defined here in terms of the expected value of a country's natural resources. For countries that recently discovered natural resources and have not proven their reserves, or whose resources exist in hard-to-reach regions surrounded by poor infrastructure, investors will be assuming greater financial risk and thus expect to be better rewarded. A range of targeted tax incentives can help governments compensate for this risk, such as accelerated depreciation in combination with prolonged loss, carried-forward allowance, or reinvestment tax credits.

On the other hand, when geological prospects are more certain, a government may resort to auctions as a way to allocate resources and generate revenues (Cramton 2007). However, auctions are typically recommended only when the government has some degree of credibility, because auctions need to be conducted in a transparent and accountable atmosphere where clear, formal rules are honored and where corruption is not endemic. To maximize their take, governments will need to invest in gathering sufficient geological data to draw blocks and mining areas and set the terms of the auction. Although using auctions when geological prospects are unknown can be a way for poor countries to obtain revenue up front and to reveal the true value of reservoirs and basins, there are risks in both collusion and investors capturing a higher share of the actual value of the resources over time. On the other hand, there is the risk that a resource project will not be profitable over time, in which case royalties or production-sharing arrangements can be used alongside auctions to help governments obtain a certain amount of revenue while sharing part of the extraction and production risks. Note, however, that this is very much dependent on the specific country context and the relative bargaining power between government and investors.

Production-sharing or equity-sharing arrangements should be considered when the government has low administrative capacity but some degree of credibility. The government's credibility is important in this regard because production-sharing and equity-sharing arrangements necessitate stable contracts and predictable policies from the government over time. The benefits of these arrangements are numerous, most significantly that the government retains ownership of the resources being extracted.

Linking Transparency to Credibility and Reputation and Signaling

Increasing the transparency that surrounds policy making and revenue flows can also contribute to building credible commitments and solving the time-consistency problem. For governments whose power is not formally limited and for which the use of third-party enforcers is not feasible, increasing transparency can correspondingly increase the perception of government credibility. In general, transparency allows agents to better understand whether deviations from expectations are the result of opportunism or stochastic shocks, a central concern in models of accountability (Alt 2002). Policy makers who support reform can create new institutions to signal commitment or to lock in policies against future incumbents. Politicians can be persuaded to undertake reforms that signal commitment if they believe that investors will react positively, as institutional change can take place when actors with power perceive that their interests can be better achieved through alternative sets of rules (Geddes 1994).

Governments can improve their credibility by creating institutions to give various interests a say in policy making and increase the constraints on their power. Institutions that introduce checks and balances and mechanisms to enforce agreements between domestic actors can create those constraints. Constraints on rulers give investors more confidence that the policy environment will not change radically once they have made specific and irreversible investments. Longer investments tend to increase investors' attention to political stability. Political constraints are expected to reduce rent-seeking and the diversion to private individuals of resources that could be used to finance growth-promoting investments in infrastructure and human capital (Heinsz 2000). As well, democratic institutions can indirectly reduce the compliance and enforcement costs associated with taxation, and increase revenues as a consequence (Levi 1988). Building a reputation of abiding by contracts has positive externalities for other sectors and can attract foreign direct investment into nonmineral sectors.

If institutions benefit both the government, by increasing revenues, and the investors, by increasing productivity or welfare, then the bargain is self-enforcing and thus credible (Acemoglu and Robinson 2001; Escriba Folch 2003; North and Weingast 1989). In addition, governments can use contractual devices, such as stability agreements, to reduce investors' perceptions of risk: more than two-thirds of developing countries offer such incentives

(Baunsgard 2001; Boadway and Keen 2010; Daniels, Keen, and McPherson 2010). Nonetheless, their effectiveness may be reduced when prices surge beyond the normal range of variability and when there is no third-party arbitrator.

Investing in Tax Administration

To raise both revenue and credibility and the related transparency in the tax system, some countries apply tax farming or privatization of revenue collection. While the concept is sensible for a country such as Timor-Leste, which just recently gained independence and is still in the beginning of the state-building process, donors may be cautious about spreading it among countries without weighing its costs and benefits. The recent experience of Mozambique, where crown agents were delegated the collection of customs duties, gave rise to concern about the sustainability and costs—both financial and opportunity costs—of fundamental domestic revenue administration reforms. While revenues collected were increased, the contract proved to be highly costly and the transfer of skills was very limited (Fjeldstad and Rakner 2003).

Tax administration reforms are central to appropriately implementing tax policy and signaling the government commitment that in turn enhances credibility. A number of countries, particularly in Africa and Latin America, have embarked on fundamental organizational restructuring by creating semiautonomous revenue agencies. The reforms aim to improve transparency, integrity, and efficiency. International experience indicates that the success of such innovative institutional formation and tax administration reforms in general depends primarily on political will (see, for example, Bird 2008; Das-Gupta and Mookherjee 1998; Kidd and Crandall 2006; Lledo, Schneider, and Moore 2004; Osmundsen 2010, Thirsk 1997). But political will is either lacking or unsustainable in resource-rich countries.

Therefore, facilitating cooperation and creating incentives for policymakers to enter into long-term agreements on fiscal regime constitute the central challenges of improving tax administration capacity. In such contexts, development partners can provide information and resources to help domestic actors overcome problems of collective action and intertemporal enforcement. Donors' interventions need to rely on the premise that, in order to achieve significant changes in the tax administration policy, broad pro-reform coalitions of government officials, civil society, and private investors are needed to overcome the powerful vested interests of the groups

that benefit from the status quo. Tax administration improvements have the potential to create positive spillovers in addition to increasing revenue collection by creating the basis for broadening the tax base, in turn triggering beneficial strengthening of accountability links.

Conclusion

Defining and practicing a “good enough” fiscal regime for the mineral sector are most critical to ensuring that governments obtain a fair share of revenue while creating a favorable environment for investment. The interaction of a number of technical, economic, and political factors leads to the three key paradoxes observed in resource-rich, low-income, and weak-governance countries: suboptimal, complex, and contradictory conceptual frameworks for the design of fiscal regimes; low incentives to invest in revenue administration reforms; and perpetuating time inconsistency and lack of commitment. Given the maze of paradoxes, the authors make the following recommendations:

Fiscal regimes should be designed to best fit the specific political economy context.

Progressive profit-based taxes, in theory, are the best—helping achieve revenue efficiency and flexibility. But underlying political economy drivers, weak revenue administration capacity and governance, and institutional fragmentation in sector regulation and revenue collection indicate that one size does not fit all. Thus good-enough fiscal regimes are called for, with recommended broad guidelines based on three dimensions: political inclusiveness, the credibility of commitments and policies over time, and the certainty or uncertainty of geological prospects. With the caveat that these are helpful but still indicative, the design of a detailed good-enough regime must be commensurate with the country-specific political, economic, and institutional setting.

Incentives should be built in for countries to sustainably invest in tax administration capacity, which is crucial to a credible and transparent tax policy for the sector.

Fiscal regime reforms in resource-rich countries need to be examined in the broader context of tax administration performance. In essence, the institutional and organizational dimensions of fiscal policy directly affect the level of government take and the effectiveness of any fiscal incentives that the government might use to attract investment and generate revenues. Small improvements in

performance can yield substantial increases in revenue flows, creating positive feedback and mobilizing actors interested in channeling those resources through formal channels. Moreover, as enhanced revenue administration has a central role in enforcing policy and allowing for the adoption of more progressive and flexible tax policy elements, such as windfall royalties, it can considerably mitigate the risks of renegeing on contracts and fiscal terms. Nonetheless, policies to enhance revenue administration must rely on a broad political consensus about sustaining investment in capacity and the introduction of institutional and legal provisions that advance coordination with other collecting agents. Linking capacity-building to transparency and credibility can help motivate domestic actors to strengthen the capacity of collection agencies, as doing so would signal to investors their commitment to provide a more stable fiscal environment.

Intimate linkage and interaction among transparency, capacity, and credibility should be encouraged.

Transparency, capacity, and credibility and their sequential linkage play a key role in successful design and implementation of good-enough fiscal regimes with low transaction cost for the mineral sector. Solving collective action problems requires reducing information asymmetries and introducing institutional technologies that lengthen time horizons. External support for coordination of domestic actors and stakeholders for good governance constitutes a promising avenue for action that should be at the core of engagement in resource-dependent countries.

References

- Acemoglu, Daron, and James A. Robinson. 2001. "A Theory of Political Transitions." *American Economic Review* 91 (4): 938–63.
- Alm, James. 1996. "Explaining Tax Compliance." In *Exploring the Underground Economy: Studies of Illegal and Unreported Activity*, ed. S. Pozo, 103–127. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Alt, James E. 2002. "Comparative Political Economy: Credibility, Accountability, and Institutions." In *Political Science: State of the Discipline*, ed. Ira Katznelson and Helen V. Milner, 147–71. New York, Washington, DC: W.W. Norton; American Political Science Association.
- Anderson, Lisa. 1987. "The State in the Middle East North Africa." *Comparative Politics* 20 (1): 1–18.
- Barma, Naazneen, Verena Fritz, and William Rex. 2011. "Governance of Natural Resource Management in Lao PDR: A Value Chain Perspective." In *Lao PDR Development Report 2010: Natural Resource Management for Sustainable Development; Hydropower and Mining*, Report 59005. World Bank, Washington, DC.
- Bates, Robert H. 1989. "A Political Scientist Looks at Tax Reform." In *Tax Reform in Developing Countries*, ed. Malcolm Gillis, 473–91. Durham, N.C: Duke University Press.
- Barma, Naazneen, Kai Kaiser, Tuan Minh Le, and Lorena Viñuela. 2012. *Rents to Riches? Political Economy of Natural Resource-led Development*. Washington, DC: World Bank.
- Baungard, Thomas. 2001. "A Primer on Mineral Taxation." IMF Working Paper WP/01/139. International Monetary Fund, Washington, DC.
- Bird, Richard M. 2008. "Tax Challenges Facing Developing Countries." Working Paper 12 (March). University of Toronto, Toronto, Canada.
- Blake, Andon J., and Mark C. Roberts. 2006. "Comparing Fiscal Petroleum Regimes under Price Uncertainty." *Resources Policy* (31): 95–105.
- Boadway, Robin, and Frank Flatters. 1982. "The Taxation of Natural Resources: Principles and Policy Issues." Policy Research Working Papers 1210. World Bank, Washington, DC.
- Boadway, Robin, and Michael Keen. 2010. "Theoretical Perspectives on Resource Tax Design." In *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*, ed. Philip Daniels, Michael Keen, and Charles McPherson, 13–74. New York: Routledge.
- Brosio, Giorgio. 2006. "The Assignment of Revenue from Natural Resources." In *Handbook of Fiscal Federalism*, ed. Ehtisham Ahmad and Giorgio Brosio, 431–58. Washington, DC: International Monetary Fund/Edward Elgar Publishing.
- Bueno de Mesquita, Bruce, Alistair Smith, Randolph M. Siverson, and James D. Morrow. 2004. *The Logic of Political Survival*. Cambridge, MA: MIT Press.
- Chelliah, R. J. 2006. "Task Force Recommendations on Direct Taxes." *Economic and Political Weekly* 37 (50): 4977–80.
- Cramton, Peter. 2007. "How Best to Auction Oil Rights." In *Escaping the Resource Curse*, ed. Macartan Humphreys, Jeffrey D. Sachs, and Joseph Stiglitz, 114–51. New York: Columbia University Press.
- Crystal, Jill. 1995. *Oil and Politics in the Gulf: Rulers and Merchants in Kuwait and Qatar* (updated edition). Cambridge Middle East Library 24. Cambridge, UK and New York: Cambridge University Press.
- Daniels Philip, Michael Keen, and Charles McPherson, eds. 2010. *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*. New York: Routledge.
- Das-Gupta, Arindam, and Dilip Mookherjee. 1998. *Incentives and Institutional Reform in Tax Enforcement*. New York: Oxford University Press.
- de Juan, Ana, Miguel A. Lasheres, and Rafaela Mayo. 1994. "Voluntary Tax Compliant Behavior of Spanish Income Tax Payers." *Public Finance Review* 49 (issue suppl.): 90–105.
- Dunning, Thad. 2008. *Crude Democracy: Natural Resource Wealth and Political Regimes*. Cambridge UK: Cambridge University Press.
- Escriba Folch, A. 2003. "Legislatures in Authoritarian Regimes." Working Paper 196. Instituto Juan March de Estudios e Investigaciones, Madrid.

- Feld, Lars P., and Bruno S. Frey. 2002. "Trust Breeds Trust: How Taxpayers are Treated." *Economics of Governance* 3 (2): 87–99.
- Fjeldstad, Odd-Helge, and Lise Rakner. 2003. "Taxation and Tax Reform in Developing Countries: Illustrations from Sub-Saharan Africa." CMI Report R 2003:6. Chr. Michelsen Institute, Bergen, Norway.
- Geddes, Barbara. 1994. *Politician's Dilemma: Building State Capacity in Latin America*. California Series on Social Choice and Political Economy 25. Berkeley, CA.: University of California Press.
- Ghura, Dhaneshwar. 2002. "Tax Revenue in Sub-Saharan Africa: Effects of Economic Policies and Corruption." In *Governance, Corruption, and Economic Performance*, ed. George Abed and Sanjeev Gupta, 369–95. Washington, DC: International Monetary Fund.
- Haggard, Stephan, and Mathew McCubbins. 2001. *President, Parliament and Policy*. Cambridge, UK: Cambridge University Press.
- Heinsz, W. J. 2000. "The Institutional Environment for Multinational Investment." *Journal of Law, Economics and Organization* 16 (2): 334–64.
- Huber, John, and Nolan McCarty. 2001. "Cabinet Decision Rules and Political Uncertainty in Parliamentary Bargaining." *American Political Science Review* 95 (2): 345–61.
- Karl, Terry. 1997. *The Paradox of Plenty: Oil Booms and Petro-States*. Berkeley: University of California Press.
- Kenny, Lawrence W., and Stanley L. Winter. 2006. "Tax Systems in the World: An Empirical Investigation into the Importance of Tax Bases, Administration Costs, Scale and Political Regime." *International Tax and Public Finance* 13 (2–3): 181.
- Kidd, Maureen, and William Crandall. 2006. "Revenue Authorities: Issues and Problems in Evaluating Their Success." International Monetary Fund, Washington, DC.
- Knack, Stephen. 2008. "Sovereign Rents and the Quality of Tax Policy and Administration." Policy Research Working Paper 4773. World Bank, Washington, DC.
- Kydland, Finn E., and Edward C. Prescott. 1977. "Rules Rather Than Discretion: The Inconsistency of Optimal Plans." *Journal of Political Economy* 85 (3): 473–91.
- Levi, M. 1988. *Of Revenue and Rule*. Berkeley: University of California Press.
- Lledo, Victor, Aaron Schneider, and Mick Moore. 2004. "Governance, Taxes, and Tax Reform in Latin America." IDS Working Paper 221. Institute of Development Studies, Brighton, UK.
- Marcel, Valerie, and John V. Mitchell. 2006. *Oil Titans: National Oil Companies in the Middle East*. Washington: Brookings Institution Press.
- Mazaheri, Nimah. 2010. "Policy Credibility, Administrative Capacity, and Corruption Risks in the Taxation of Natural Resource Sectors." Unpublished manuscript. World Bank, Washington, DC.
- McPherson, Charles. 2003. "National Oil Companies: Evolution, Issues, Outlook." In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, ed. Jeffrey M. Davis, Wallace E. Oates, and Annalisa Fedelino, 184–203. Washington, DC: International Monetary Fund.
- Moore, Mick. 2004. "Revenues, State Formation, and the Quality of Governance in Developing Countries." *International Political Science Review* 25 (3): 297–319.
- Nellor, David. 1987. "Sovereignty and Natural Resource Taxation in Developing Countries." *Economic Development and Cultural Change* 35 (2): 367–92.
- North, Douglass C., and Barry Weingast. 1989. "Constitution and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England." *The Journal of Economic History* 49 (4): 803–32.
- Osmundsen, P. 2010. "Time Consistency in Petroleum Taxation: Lessons from Norway." In *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*, ed. Philip Daniels, Michael Keen, and Charles McPherson, 425–44. New York: Routledge.
- Otto, James. 2001. "Fiscal Decentralization and Mining Taxation." Unpublished manuscript. World Bank, Washington, DC.
- Otto, James, and Craig Andrews. 2006. *Mining Royalties: A Global Study of Their Impact on Investors, Government, and Civil Society*. Washington, DC: World Bank.
- Persson, Torsten, and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.
- Pommerehne, Werner W., and Hannelore Weck-Hannemann. 1996. "Tax Rates, Tax Administration and Income Tax Evasion in Switzerland." *Public Choice* 88 (1–2): 161–70.
- Robinson, James A., Ragnar Torvik, and Thierry Verdier. 2006. "Political Foundations of the Resource Curse." *Journal of Development Economics* 79 (2): 447–68.
- Ross, Michael L. 2001. "Does Oil Hinder Democracy?" *World Politics* 53 (3): 325–61.
- Rozner, Steve. 2009. "Taxing Oil: Issues and Trends." In *Best Practices in Fiscal Reform and Economic Governance*. Washington, DC: United States Agency for International Development.
- Shukla, G. P., and Tuan Minh Le. 1999. "Fiscal Policy and Tax Administration from the Perspective of the Mining Sector in Tanzania." Unpublished manuscript. U.S. Agency for International Development. Washington, DC.
- Stein, Ernesto, Carlos Scartascini, Mariano Tommasi, and Pablo Spiller, eds. 2008. *Policymaking in Latin America: How Politics Shapes Policies*. Harvard University, David Rockefeller Center for Latin American Studies. Washington, DC: Inter-American Development Bank.
- Sunley, Emili, Thomas Baunsgaard, and Dominique Simard. 2003. "Revenue from the Petroleum and the Gas Sector: Issues and Country Experience." In *Fiscal Policy Formulation and Implementation in Oil-producing Countries*, ed. Jeffrey M. Davis, Rolando Ossowski, and Annalisa Fedelino, 153–83. Washington, DC: International Monetary Fund.
- Tanzi, Vito, and Hamid Davoodi. 1997. "Corruption, Public Investment, and Growth." IMF Working Paper 97/139. International Monetary Fund, Washington, DC.
- Thirsk, Wayne. 1997. *Tax Reform in Developing Countries*. Washington, DC: World Bank.

van Meurs, Pedro. 2008. "World Fiscal Systems for Oil and Gas." Presentation at the World Fiscal Systems for Oil and Gas Seminar, World Bank, Washington, DC. April.

Winer, Stanley, and Walter Hettich. 2006. "Structure and Coherence in the Political Economy of Public Finance." In *The Oxford Handbook of Political Economy*, ed. Barry Weingast and Donald A. Wittman, 441–63. Oxford UK: Oxford University Press.

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Notes

This note is the third in a series of four notes on the natural resource paradox based on Naazneen H. Barma, Kai Kaiser, Tuan Minh Le, and Lorena Viñuela, *Rents to Riches? The Political Economy of Natural Resource-Led Development* (Washington DC: World Bank, 2012). This note summarizes key messages from chapter 4 of the volume, which provides additional country-specific examples to support the analysis. The authors thank Philip J. Daniel, Nimah Mazaheri, Raúl Junquera, Mick Keen, and other project peer reviewers for their input on the book chapter on which this note is based.

ⁱAustralia's recent efforts to increase revenue mobilization from its mining sector suggest that this type of negotiation is also very much part of the ongoing relationship in more developed economies. As the pronouncements by the government indicate, the country clearly sees the pressures for capturing a fair share of rents for the country while at the same time safeguarding the long-term sustainability of the industry. Some extractive-rich countries, such as Zambia, have been under tremendous pressure from civil society organizations and communities to review their contracts with firms while prices boom. In Tanzania, as the mining sector becomes more prominent in the economy, election year politics drive mining code changes. President Jakaya Kikwete promised to review the mining sector immediately when he took power in 2005. He initiated a review process in 2006, and despite lengthy delays in drafting and negotiating the new mining code, the Mining Act of 2010 was passed by the parliament in April 2010 and is awaiting the president's signature. Prominent in the new act is a sharp increase in the rate and the base of royalty as well as application of the rate to the gross value of minerals instead of the netback value.

ⁱⁱ Production-sharing agreements are equivalent to different tax and nontax instruments (Brosio 2006). Production sharing of physical output is equivalent to a unit royalty. As a share of the value of production, it functions similarly to an ad valorem royalty and, when costs are deducted, to an income tax.

ⁱⁱⁱ The government's discount rate indicates the degree to which it cares about the future. Governments are said to have high rates of discount when the risk of being removed from office is high. The implication for the level of taxation is that governments that are guided by short-term considerations will raise taxation of the sector in the short term using the available mechanisms.

^{iv} Governments willing to take greater risks use neutral taxation instruments and nonfiscal alternatives, such as equity participation and production sharing. Conversely, risk-averse governments tend to resort to instruments that reduce revenue variability.

^v Geological prospects are determined on the basis of existing geological data, the size of prospective areas, and the history of resource extraction in the country.

^{vi} For example, in the United States, the *Report to the Royalty Policy Committee, Mineral Revenue Collections from Federal and Indian Lands and the Outer Continental Shelf*, submitted by the Subcommittee on Royalty (December 17, 2007), pointed to the numerous challenges faced by the Department of Interior's Minerals Management Service (MMS) in collecting royalties and other nontax revenue derived from the extraction of minerals. The problems described are related to the collection and management of information to select companies for audit and determine how much royalty is owned, as well as inadequate policies to protect whistleblowers who reported incidents of corruption.