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Abstract

In a number of countries that depend on the export of oil and other nonrenewable resources, governments have put in place fiscal rules or fiscal guidelines and/or nonrenewable resource funds (NRFs) in the expectation that these institutional mechanisms might help in the implementation of fiscal policy. This paper focuses on the experience of nonrenewable resource exporting countries (NRECs) with fiscal rules and funds, and draws some lessons of relevance to Latin American resource producers. It is organized as follows. Section 1 discusses briefly the challenges that revenues from nonrenewable resources pose to fiscal management regarding short-run stabilization and long-run sustainability. Section 2 reviews the evidence on the fiscal responses of NRECs to the recent resource price and economic cycle. Sections 3 and 4 provide information on fiscal rules and NRFs in NRECs, respectively, and discuss their role in fiscal management. Section 5 reviews econometric evidence on the impact of fiscal rules and NRFs on the fiscal responses of NRECs. Section 6 looks in detail at the fiscal framework in Norway, which relies on an integrated model of fiscal guideline and NRF. Section 7 concludes.

JEL codes: E62, H60
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1. The Management of Fiscal Revenue from Nonrenewable Resources[1]

Nonrenewable resources pose significant policy challenges to the formulation and implementation of fiscal policies in the producing countries.

- Nonrerenewable resource revenues are very volatile and uncertain. This complicates fiscal management, budget planning, and the efficient use of public resources.
- These revenues arise from the exploitation of resources that are exhaustible and that run the risk of obsolescence. This raises complex issues of intertemporal welfare, long-term fiscal sustainability, and asset management.
- Since nonrenewable resource revenues largely originate from abroad, the fiscal use of these resources can have significant implications for the domestic economy, as it can affect the competitiveness of the nonresource tradable sectors.
- The exploitation of nonrenewable resources can give rise to sizable rents. This, in turn, can lead to political economy and governance issues, particularly in terms of distributional conflicts and rent-seeking.

1.1 Macroeconomic and Fiscal Stability

As in other countries, fiscal policy in NRECs should contribute to the achievement of objectives such as macroeconomic stability, sustainability, and efficient resource allocation. In these countries, fiscal policy, given its crucial role in injecting part of the revenue from nonrenewable resources into the economy, is a particularly important tool for short-term macroeconomic management. There are well-known macroeconomic and fiscal arguments for decoupling public spending as much as possible from volatile and uncertain resource revenue streams in the short term.

First, there is a strong macroeconomic case to seek to smooth public spending and the nonresource fiscal balance (NRB)—that is, the overall fiscal balance excluding nonrenewable resource-related revenues and expenditures.

[1] This paper draws in part from Ossowski, Villafuerte, Medas, and Thomas (2008), International Monetary Fund (2009b), Villafuerte, López-Murphy and Ossowski (2010), and Ossowski (forthcoming).

- Fiscal volatility, sudden changes in public spending and the NRB, and procyclicality in fiscal policy contribute to macroeconomic volatility, which in turn entails adverse effects for investment, growth, poverty reduction, and income distribution. The macroeconomic costs of such fiscal policies include the need to reallocate resources to accommodate changes in demand and relative prices, the volatility of the real exchange rate (including episodes of Dutch Disease during booms) and greater risks for private investors.[2]

Second, there are fiscal arguments for stabilizing public expenditure.

- Fluctuations in public spending can entail fiscal costs, including in the quality and efficiency of spending. The sudden creation or enlargement of spending programs—including public investment—in a context of rising resource prices can overwhelm the public administration's capacity to design, manage, and execute expenditure efficiently. Costs faced by the public sector may also increase when supply bottlenecks occur if the private sector is booming.
- Many expenditure programs are difficult to contain or streamline following expansions, given the powerful hysteresis mechanisms that usually set in and that tend to prolong high spending levels, with possible negative implications for fiscal sustainability.
- Increases in spending during booms can increase fiscal vulnerability: depending on the availability of financing, sudden resource revenue falls may require rapid fiscal adjustments, with associated costs in terms of inefficiency, procyclicality, and regressiveness.

1.2 Intergenerational Equity and Long-term Fiscal Sustainability

Nonrenewable resources are exhaustible and run the risk of obsolescence. Therefore, countries have to consider how to allocate resource wealth to the current generation and to future generations. This has important implications for the decision of how much to consume and to save during the period of resource production and how to allocate savings into different forms of assets. Furthermore, in some countries the need for fiscal

[2] See Fatás and Mihov (2003, 2005) and Aizenman and Pinto (2005). Hnatkovska and Loayza (2005) find that macroeconomic volatility and long-run growth are negatively related, and that this negative link is exacerbated, inter alia, in countries unable to conduct countercyclical fiscal policies. See also Devlin and Lewin (2005), Pinto (1987), Auty (2001), Auty and Mikesell (1999), and Gelb (2002).

saving also arises from long-term pressures on public finances, such as ageing populations and growing healthcare costs.

How much should be saved? Analyses of fiscal sustainability are usually based on medium-term projections of the public debt-to-GDP ratio given certain macroeconomic projections and fiscal policy assumptions. The expected trajectory of that ratio gives an indication of whether the underlying fiscal policies can be sustained under plausible macroeconomic conditions without jeopardizing public-sector solvency. In the case of NRECs, however, the analysis should include the exhaustibility of nonrenewable resources, given the importance of the associated fiscal revenues for the public finances.

- The projection period should be extended significantly beyond the typical horizon used in traditional debt sustainability analyses.
- The main indicator of the fiscal position for sustainability analyses in NRECs (equivalent to the primary balance in other countries) is the nonresource primary balance (NRPB). This indicator makes explicit that from a sustainability point of view, fiscal revenue should exclude nonrenewable resource income on the grounds that it is more like financing—a transformation of assets from exhaustible resource reserves in the ground to other assets (Barnett and Ossowski, 2003; Villafuerte and López-Murphy, 2010). Exhaustible resources give rise to important intergenerational allocation issues that require the use of long-term intertemporal models with explicit intertemporal welfare criteria regarding how much resource revenue to consume now versus how much to save for future generations. [3] [4]
- Policymakers have to consider how to split public savings during the production period into the net accumulation of foreign financial assets and investment in domestic physical and human capital to accelerate growth—an issue particularly acute in low- and lower-middle income NRECs that face large deficits in infrastructure and human capital, which may call for scaling up investment in

[3] Traditional debt sustainability analyses in other countries incorporate intertemporal welfare choices implicitly, 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 that are usually not made explicit.

[4] See Baunsgaard, Villafuerte, Poplawski-Ribeiro, and Richmond (forthcoming) for a discussion of the issues. Examples of permanent income models include Carcillo, Leigh, and Villafuerte (2007), Jafarov and Leigh (2007), and Shiell and Busby (2008). For critiques of the use of permanent income models in low-income countries, see Collier, van der Ploeg, Spence, and Venables (2009), Van der Ploeg and Venables (2009), and Van der Ploeg (2011).

domestic capital. Public investment can relieve capital scarcity and lead to higher nonresource growth and revenues. This will depend on the quality of the expenditures and on whether the government can reap fiscal dividends from growth. Sustained growth benefits will come if investment is productive. Growth would lead to higher fiscal revenues if the higher potential revenue base is not given away through tax holidays or exemptions.

Major uncertainties surround long-term sustainability exercises. The estimation of wealth from future resource revenues is subject to uncertainty about many of the parameters in the estimates, including future resource prices and production costs, the size of resource reserves in the ground, the fiscal regime applied to the resource sector, and interest rates. Future resource prices are particularly uncertain. This is related to the characteristics of the stochastic process that drives them. In particular, while there is no broad consensus on this issue, an important body of expert opinion considers that the process driving oil prices is nonstationary and that there is no well-defined "long-term average price" for oil.[5]

2. Fiscal Policies of Nonrenewable Resource Exporters: Recent Experience

In a recent study, Villafuerte and López-Murphy (2010) concluded from the analysis of a sample of 31 oil-exporting countries that fiscal policy in most of those countries was procyclical during the period of rising oil prices (2003–08), and in many cases was also procyclical in 2009, when the average price of oil fell by a third and many economies went into recession. These fiscal policies exacerbated the fluctuations in economic activity. During the boom, they contributed to increases in inflation and currency appreciations in real terms. And some of the fiscal adjustments that a number of countries implemented in 2009, due to a lack of financing in the downturn, were sudden and substantial, with all the costs that this entails. The degree of procyclicality was inversely related to the countries' income levels: on average, low-income countries showed the highest procyclicality. In contrast, high-income oil producers were

[5] For example, in a detailed study of the statistical properties of oil prices, Engel and Valdés (2000) concluded that in terms of out-of-sample prediction power, no statistical model perfomed better than a random walk without drift. In a major recent study of oil prices, Hamilton (2008) also found that the statistical evidence is consistent with the view that the price of oil in real terms seems to follow a random walk without drift, and he emphasized the enormous uncertainty surrounding oil price forecasts.

moderately procyclical during the boom, and their nonoil primary fiscal positions adjusted for the nonoil cycle were, on average, neutral in 2009.

The study also analyzed the evolution of long-term fiscal sustainability in the sample countries. Using a uniform intertemporal welfare criterion for all the countries, the authors concluded that long-term sustainability had deteriorated between 2003 and 2009 in many countries, in spite of the fact that the price of oil had doubled during the period. This surprising result is mainly due to the large increases in the nonresource primary deficits and currency appreciations in real terms.

Sturm, Gurtner, and González Alegre (2009) also concluded that the fiscal policies of oil-exporting countries were expansionary in 2003–08. Public expenditures increased strongly and nonoil deficits deteriorated. In some countries, the estimated elasticity of expenditure with respect to total revenues was 0.9 or higher. The fiscal expansions, however, were often masked by high and rising fiscal surpluses.

York and Zhan (2009) found that the fiscal policies of all eight Sub-Saharan African oil-exporting countries during the recent boom had been procyclical, with nonoil deficits widening, in some cases dramatically. For 2006–08, growth in current spending outpaced the growth in oil revenue in five of the countries. In most of the countries, the fiscal position worsened as oil prices soared, and fiscal vulnerabilities increased. The fiscal positions of only two of the countries were estimated to be relatively close to broad notions of long-term fiscal sustainability.

In the case of NRECs in Latin America and the Caribbean, Villafuerte, López Murphy, and Ossowski (2010) found that fiscal policies were also predominantly procyclical during the boom, but to significantly differing degrees. Countries that pursued more conservative fiscal policies during the boom were able to implement countercyclical fiscal policies in the downturn. The countries that had the most procyclical responses to the boom are also those whose fiscal positions are currently most vulnerable to resource price shocks and/or those whose long-term fiscal sustainability may be in question. Countries that pursued less procyclical fiscal policies in the upswing currently enjoy relatively comfortable fiscal vulnerability and sustainability positions. The evidence in the paper also suggests no obvious link between the presence of fiscal rules and NRFs and the cyclicality of fiscal policy: rules and funds were associated with a broad range of fiscal responses to the cycle.

3. Fiscal Rules in Nonrenewable Resource Exporting Countries

In NRECs, as in other countries, fiscal rules are often motivated by a desire to reduce the procyclicality of fiscal policy in the face of volatile resource revenues, and promote savings and sustainability.[6] In some cases, fiscal rules have also been motivated by political economy factors: they have been seen as potentially useful instruments to address spending pressures or to enhance the credibility of the government.

About one-third of the oil-exporting countries in Villafuerte and López Murphy's sample have, or have had, fiscal rules or fiscal guidelines in place.[7] While fiscal rules are less common than NRFs in NRECs (as will be seen below), they can play a more critical role, because, unlike NRFs, they are intended to constrain fiscal policy directly.

In NRECs, the design of appropriate fiscal rules is more challenging than in other countries because a key component of revenues, namely resource-related revenues, are highly volatile and uncertain, they depend on exhaustible resources, and they largely originate from abroad. Other factors, such as revenue sharing in federal states and resource revenue earmarking, can also complicate the design and implementation of fiscal rules in these countries.[8] Therefore, the applicability in NRECs of the types of fiscal rules found in other countries must be carefully assessed, as discussed below.

While the use of fiscal rules by NRECs has been relatively limited, their design has varied greatly.[9] Some countries have targeted a single fiscal indicator, while others have targeted two or more indicators. The following fiscal indicators have been targeted:

- Overall balance (Canadian Province of Alberta, Indonesia, Mexico, Nigeria, Peru)
- Current balance (Venezuela)
- Structural balance adjusted for nonrenewable resource prices (Chile, Colombia)

[6] Fiscal rules are defined as standing commitments to specified numerical targets for some key budget aggregates (Ter-Minassian, 2010).
[7] Unlike fiscal rules, fiscal guidelines are not legally binding.
[8] See, for example, Cueva (2008).
[9] Some NRECs have implemented fiscal rules in conjunction with NRFs.

- Nonresource balance (Azerbaijan, Ecuador, Timor-Leste)
- Nonresource current balance (Ecuador, Equatorial Guinea)
- Structural nonresource balance (Norway)
- Expenditure (rate of growth or level) (Chad, Ecuador, Peru, Venezuela)
- Public debt-to-GDP ratio (Alberta, Ecuador, Venezuela)

Case studies and econometric evidence (discussed later in the chapter) suggest that the experience of NRECs with fiscal rules has been mixed. In some countries, fiscal rules seem to have contributed to more prudent fiscal management, at least during certain periods. The Chilean structural fiscal rule, for instance, while undergoing modifications over time, was met throughout the period, buttressed by consensus and political support, although it was eased in the last year of the boom. In Peru, the expenditure rule, although it was repeatedly modified, seems to have helped moderate procyclicality.

The design and implementation of fiscal rules has been a challenge for many of the countries. To a greater or lesser extent, depending on the country, this has been primarily due to three main factors:

- The technical difficulty of designing effective and robust rules that can withstand the uncertainty and volatility of nonrenewable resource revenues, the rapidly changing economic environments facing these countries, and structural changes in the economy.
- Complications arising from the political economy of spending resource rents (Eifert, Gelb, and Tallroth, 2003), which in the case of NRECs with fiscal rules are evidenced by the difficulties that many countries have faced in securing and then maintaining political consensus and commitment towards the rule.
- The need to meet technical and institutional prerequisites, such as a basic level of public financial management capacity, fiscal transparency, and robust monitoring.

Fiscal rules were associated with a broad range of responses to the recent cycle, including highly procyclical responses. In part, this was the result of the many modifications to the rules that were introduced in many countries as circumstances and policy objectives changed, sometimes dramatically. Broadly speaking, rules targeting NRBs and expenditure came under pressure during the boom, while rules targeting overall balances were tested in the downswing.

- During the resource boom, and under the prevailing conditions of abundant liquidity generated by rising resource revenues, a number of fiscal rules in NRECs targeting NRB and expenditure were put to the test by mounting expenditure pressures as the increases in resource prices were increasingly seen as "permanent." A number of rules were relaxed (sometimes several times), not complied with, not implemented, or abolished (examples include Azerbaijan, Chad, Chile, Ecuador, Equatorial Guinea, Peru, and Venezuela).
- Fiscal rules targeting the overall balance achieved a greater degree of compliance during the boom, and particularly in the latter years of the boom when resource prices surged. However, they allowed procyclical fiscal policies as nonrenewable resource revenues increased (for example, Alberta and Mexico).[10]
- In 2009–10, due to the fall in nonrenewable resource prices and the recession, some fiscal rules targeting the overall balance came under pressure. As a result, several rules were modified or suspended. This happened, for instance, in Alberta (the rule was suspended from 2010), Mexico (the rule was relaxed in 2009 and temporarily suspended in 2010), and Peru (the rules were relaxed for the years 2009-10 to undertake a countercyclical fiscal response).

The recent experience of NRECs that adopted fiscal rules, and earlier evidence, illustrate the difficulties involved in designing and implementing fiscal rules in these countries. In particular, the frequent changes to rules and compliance problems in many NRECs highlight the challenges that the volatility and unpredictability of nonrenewable resource revenues pose to the design and implementation of rules, and the difficult tradeoffs between rigidity, flexibility, and credibility in the design of rules. Rigid rules can easily be overcome by events, undermining their credibility. Excessive flexibility can increase uncertainty about the direction of fiscal policy.

While the difficulties that countries heavily dependent on revenues from nonrenewable resources face in designing and implementing fiscal rules have to be borne in mind, international experience suggests some tentative lessons for successful strategies in these countries (see also Kumar and Ter-Minassian, 2007, and Ter-Minassian, 2010):

[10] Kneebone (2006) provides a detailed review of the performance of fiscal rules and oil funds in Alberta.

- Rules that target the overall balance or the current balance are not advisable for NRECs. These rules transmit the volatility of resource revenues to fiscal policy and can result in major shifts in expenditure, which is made hostage to the vagaries of resource revenues. Targeting the nonresource current balance is doubtful for a number of reasons, including lack of an effective anchor and the incentives it provides for creative accounting.
- NRECs that do not face liquidity constraints and that have sustainable fiscal positions can consider fiscal rules that target the NRB or the NRPB. These are key fiscal indicators of government demand in NRECs. Focus on them can help governments decouple fiscal policy in the short run from the vagaries and uncertainties of resource prices and resource price forecasts. If the initial fiscal or financial position is precarious, feedback loops from the debt or the overall balance to the fiscal rule should be incorporated to provide greater assurances of fiscal sustainability and not lose sight of debt and financing issues.
- If adequate technical capacity exists, the fiscal rule could target the NRB or the NRPB adjusted for the nonresource cycle. The cyclically adjusted NRB or NRPB provides a clearer picture of the underlying policy stance and of discretionary fiscal policy. The cyclically adjusted NRPB is also crucial for assessing the long-term sustainability of fiscal policy, as discussed above. By allowing the action of nonresource automatic stabilizers, rules targeting the cyclically adjusted NRB or NRPB provide greater flexibility to respond to nonresource economic fluctuations than rules without such adjustments.[11]
- In all cases, the targeted NRB or NRPB must be set taking into account long-term fiscal sustainability estimates and vulnerability to resource shocks, which should be reviewed as circumstances change. However, frequent revisions to the targets due to changes in sustainability assessments arising from movements in resource prices or resource revenues would reintroduce procyclicality "through the back door" into the rule. Hence, revisions to the targets in the light of new sustainability estimates should only be carried out from time to time.
- Given the uncertainties facing NRECs and recurrent large exogenous shocks, fiscal rules in these countries should be designed incorporating sufficient flexibility and appropriate escape clauses. These features enhance the robustness

[11] According to a recent study, advanced economies tend to adopt fiscal rules with targets adjusted for the cycle more frequently than emerging economies (International Monetary Fund, 2009a).

of the rule to unpredictable events and shocks. Fiscal guidelines that are not legally binding and that allow temporary departures from the targets can offer appropriate flexibility, and there have been successful cases such as Norway (discussed below) and Timor Leste.[12]

- As in other countries, adequate public financial management capacity and fiscal transparency are key requirements.
- Consensus and political commitment to the fiscal rule are vital for its success.

4. Nonrenewable Natural Resource Funds

In response to the challenges and complications that nonrenewable resource revenues pose to fiscal policy and asset management, many NRECs have established NRFs. Of the 31 oil-exporting countries in the study by Villafuerte and López-Murphy mentioned above, about two-thirds have, or have had, a NRF. And in a quarter of the countries, a fund coexists, or coexisted, with a fiscal rule or guideline.[13]

NRFs are a group of funds that form part of the wider set of funds known in recent years as sovereign wealth funds (SWFs). SWFs make up a heterogeneous group of funds, with various objectives, asset accumulation and withdraw mechanisms, and institutional features. The IMF estimated that at the beginning of 2008 the total assets managed by 32 identified SWFs were within the range of US$2.2 trillion and US$3.1 trillion (IMF, 2008).[14] However, some "SWFs" are actually just investment mechanisms for the central bank's external assets, for example in Saudi Arabia and Botswana.

- The *economy policy objectives* of NRFs typically include macroeconomic stabilization; financial savings (intergenerational equity); and enhancement of transparency in the management of nonrenewable resource revenues and fiscal policy.
- The *operational objectives* or NRFs are often formulated in terms of smoothing the net flow of nonrenewable resource revenue into the budget; depositing a part

[12] In Timor Leste, the fiscal guideline targets the NRB. It limits the NRB to the estimated permanent income from government net wealth, including oil wealth. The government can propose budgets with a nonresource deficit greater than estimated permanent income, but it has to justify in detail the reasons in budget documentation and provide information on the impact on permanent income in future years.

[13] Oil-exporting countries that have, or have had, oil funds include the following (countries marked with * also have, or have had, a fiscal rule or guideline): Algeria, Azerbaijan*, Bahrain, Brunei, Chad*, Ecuador*, Gabon, Equatorial Guinea*, Iran, Kazakhstan, Kuwait, Libya, Mexico*, Norway*, Oman, Qatar, Russia, Sudan, Timor-Leste*, Trinidad and Tobago, and Venezuela*. The State of Alaska and the Province of Alberta also have funds, and Alberta also has a fiscal rule.

[14] The wide range is due to the lack of data about the assets held by a few large SWFs.

of those revenues into the fund; accumulating assets and financing nonresource deficits; and/or providing information about revenues and changes in gross financial assets.

- The *operational regulations* of NRFs set out the specific rules for the accumulation and withdrawal of resources; principles of asset management; and mechanisms of governance, transparency, and accountability.

In contrast to fiscal rules, NRFs do not place formal restrictions on overall fiscal policy. Rather, these funds are expected to influence fiscal policy indirectly.

NRFs can be divided into three types according to their main objectives: stabilization funds, savings funds, and stabilization and savings funds (financing funds). As discussed below, stabilization funds and savings funds typically have rigid rules (which can be contingent or non-contingent) for the accumulation and withdrawal of assets, while financing funds have more flexible operational principles.[15]

4.1 Stabilization Funds

Stabilization funds aim to reduce the short-term impact of volatile nonresource revenues on the budget and the economy and support fiscal discipline. Most of these funds have rigid price- or revenue-contingent deposit and withdrawal operational rules, whereby deposits and withdrawals depend on the realization of an outcome (resource price or revenue) relative to a specified trigger. In some funds, limits are placed on the total accumulation of assets. The objective is to smooth and reduce the uncertainty of resource revenues flowing into the budget. This, in turn, would facilitate the decoupling of budget expenditure from changes in revenue flows. When resource prices are "high," the expectation is that placing assets in the fund will help contain spending, thereby preventing the economy from overheating. When prices are "low," the fund is expected to act as a damper (through the withdrawal of funds) to forestall the need for large and unpredictable fiscal adjustments. Two types of contingent mechanisms for the accumulation and withdrawal of assets are most frequently used:

- Rules contingent on resource prices or revenues that are pre-specified in advance (either fixed or set through a formula). Examples include Chile (copper stabilization fund until 2006), Russia (until 2008), Sudan, and Venezuela.

[15] Bacon and Tordo (2006) provide a detailed operational review of many NRFs.

- Rules contingent on the difference between the price (revenue) specified in the budget for the current year, and the actual price (revenue). Examples include Alberta (since 2004), Algeria, Bahrain, Iran, Libya, Mexico, Oman (since 1998), Qatar, and Trinidad and Tobago.

It should be noted that stabilization funds in themselves do not reduce the volatility or uncertainty faced by the public sector as a whole. The aim of reducing the volatility and uncertainty of budget revenue is achieved by transferring volatility and uncertainty to the fund.

4.2 Savings Funds

The objective of savings funds is to create a store of wealth for future generations. This would allow those generations to benefit from part of the revenues that are currently generated from the depletion of exhaustible natural resources. An ancillary aim might be to reduce the reliance of the budget on a particularly volatile source of revenues and provide incentives for the enhancement of more stable nonresource revenues.

Savings funds typically have rigid non-contingent operational rules that require the deposit of a specified share of resource revenues, or of total revenues, into the fund. For example, the Kuwaiti Reserve Fund for Future Generations requires the deposit of 10 percent of total budget revenue. 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 saving objective. Examples of savings funds include Alaska, Alberta (until 1987), Azerbaijan, Chad (fund eliminated), Ecuador (fund eliminated), Gabon, Equatorial Guinea, Kazakhstan, Kuwait, Oman (until 1998), and São Tome and Principe.

4.3 Stabilization and Savings Funds (Financing Funds)

In contrast with the types of funds discussed above, financing funds have flexible operational mechanisms more clearly aligned with overall balances. Their operational objective is to finance the budget: the fund accumulates budget surpluses and finances budget deficits. Operationally, the fund receives all resource revenues and finances the budget's nonresource deficit by way of a reverse transfer. Therefore, these funds do not try to "discipline" expenditure through the removal of resources from the budget: the flows in and out of the fund depend on resource revenue and policy decisions embodied in the nonresource fiscal stance.

Only a handful of NRECs have financing funds: Chile, Norway, and Timor Leste. These funds are analyzed in more detail below by looking at the Norwegian fund as an example.

4.4 Operational Performance of Funds

The implementation of funds with rigid rules has been based on the expectation that the removal of "high" resource revenues or of a share of such revenues from the budget will stabilize and/or moderate public expenditure, thereby reducing discretion in fiscal policy and encouraging savings. It is important to note, however, that NRFs do not affect public spending directly. Here it is useful to clarify the technical and political economy aspects of the issue.

- At a technical level, if there are strong liquidity constraints, and if the NRF rules are binding and they are observed, placing assets into a fund would force spending reductions compared to the alternative without a fund. But if the government runs large surpluses, removing some resources from the budget would not necessarily entail a need for reductions in expenditure. And in the absence of surpluses, since money is fungible, the government can borrow or run down other financial assets to increase spending at the same time as it makes the required deposits in the NRF—or it can ignore the NRF rules.
- This would still leave possible political economy arguments for rigid NRF rules: even if there are no liquidity constraints, rules that mandate deposits into a fund can influence the political process in the direction of moderating spending. The evidence 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, or ignored, and that the results seem to be very country-specific.
- On the other hand, rigid NRF rules can have significant fiscal costs in terms of suboptimal asset and liability management, as will be seen below.

In practice, it has been difficult to set trigger resource prices or revenues in contingent funds, given 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 *ex-ante* whether a given shock will be transitory or long-lasting, which could lead to the unsustainability of the fund. Resource price volatility and shock persistence would also argue against using long backward-looking moving average formulæ.

Tensions have frequently arisen between funds with rigid rules and overall fiscal policy. This has happened especially in situations of significant exogenous shocks, changes in policy priorities, mounting spending pressures, and conflicting objectives with asset and liability management. As a result, in a number of cases, funds with rigid rules have either had their rules modified frequently, suspended, or ignored, or the fund was abolished. Some of these issues, arising from country experience, have been the following.

- A number of stabilization funds have undergone frequent changes in the trigger prices or in the revenue base for the calculation of deposits, often due to changes in international prices, expenditure pressures, or changing policy priorities (Algeria, Kazakhstan, Venezuela, Russia), or their assets ran out (Mexico, stabilization fund, 2002). Savings funds have also had changes in their operational rules. In the 1980s and 1990s, the rules of funds in Alaska, Alberta, Oman, Papua New Guinea, and other countries were changed, in some cases several times, to accommodate exogenous changes or expenditure pressures. More recently, the rules of funds in Ecuador, Kazakhstan, and other countries were changed.
- Stabilization funds aimed at stabilizing budget revenue during the year (see above) have proved more resilient. However, these funds can complicate asset and liability management and provide incentives for the strategic fixing of the resource price or revenue in the budget if those are not set by formula. Setting a "high" price in the budget raises the probability that resources can subsequently be withdrawn from the fund. Moreover, if the budget is in deficit, revenues in excess of those budgeted lead to the paradoxical situation of having to borrow to make the required deposits into the fund, with associated financial costs.
- Sometimes it has been difficult to achieve consistency between rigid fund rules on the one hand, and fiscal policy and asset and liability management on the other. The rules may not be appropriate for the specific circumstances. For example, Venezuela was only able to deposit the resources required by its stabilization fund rule in 1999–2000 by issuing debt at higher interest rates than the returns on the fund's assets, given the overall stance of fiscal policies; this led to temporary suspensions of the operations of the fund. In 2000–05, Algeria frequently made deposits into its fund while issuing debt that was serviced by the fund itself. Gabon made deposits into its savings fund with low returns while

at the same time paying significantly higher interest rates on its public external debt. In Chad, Ecuador and Sudan, in contexts of extensive revenue earmarking and fragmentation of cashflow management, compliance with the deposit rules took place at times while payment arrears were incurred. In Alaska, during some periods deposits were made into the fund, and dividends paid from the fund to the population (which over time came to be considered as entitlements), while the state was borrowing outside of the fund.

- In several cases, in view of the inconsistencies between fund rules and other policy objectives, countries opted for not complying with the deposit rules or temporarily suspending their application (for example, Alberta, Gabon, Iran, Sudan, and Venezuela). Some countries, such as Chad, Ecuador, Nigeria, and Papua New Guinea, found their funds operationally or politically unworkable and abolished them.
- In a number of cases, including Alberta, Algeria, Azerbaijan, Chile, Kazakhstan, and Mexico, governments have made efforts in recent years to better integrate their NRFs with budget systems and fiscal policy frameworks, and to strengthen fiscal transparency.

The evidence therefore suggests that NRFs with rigid operational rules would best be avoided: their advantages in stabilizing expenditure or promoting saving are uncertain because money is fungible, but they often entail costs. If there is a preference for having a NRF, consideration should be given to funds with flexible rules that are well integrated with budget systems and fiscal policy frameworks. Integration with the budget is best achieved by ensuring that the fund operates as a government account rather than as a separate institution and that it ensures coherent asset and liability management. Stringent mechanisms to ensure transparency, good governance, and accountability are key requirements for NRFs. Norway provides an example of a NRF with these characteristics, as discussed in Section 5.

5. Empirical Evidence on the Impact of Fiscal Rules and Resource Funds in NRECs

There are few econometric studies that analyze the impact of fiscal rules and NRFs on fiscal policy responses or macroeconomic aggregates of NRECs. The limited existing evidence is mixed.

Ossowski, Villafuerte, Medas, and Thomas (2008) carried out an econometric analysis of the impact of fiscal rules and NRFs on the policy responses of oil-exporting countries to the oil revenue boom. Using a panel of about 30 oil-exporting countries and controlling for relevant factors, the study concluded that fiscal rules and NRFs do not have a statistically significant impact on the NRB, expenditure dynamics, or the correlation between oil revenue and expenditure.

Arezki and Izmail (2010) analyzed the effect of fiscal rules on fiscal policy in oil-exporting countries. They concluded that the implementation of fiscal rules in these countries has had limited results in terms of reducing the growth of current spending during booms, but fiscal rules may have contributed to significant reductions in capital expenditure during periods of falling oil prices.

Based on panel data analysis for 15 oil-exporting countries, Shabsigh and Ilahi (2007) concluded that the presence of a NRF contributes towards reducing domestic inflation and price and money volatility.

Clemente, Faris, and Puente (2002) analyzed the performance of the Macroeconomic Stabilization Investment Fund (*Fondo de Inversión para la Estabilización Macroeconómica*—FIEM) in Venezuela. Using a general equilibrium model, the authors concluded that the FIEM had increased the volatility of macroeconomic variables.

Finally, an analysis of the correlation between the presence of fiscal rules and/or NRFs in oil-exporting countries and the degree of fiscal policy procyclicality during the recent oil price cycle based on the data in Villafuerte and López-Murphy (2010) does not show statistically significant differences in the fiscal policy responses of countries with such mechanisms and countries without them.

6. Norway: An Integrated Model of Fiscal Guideline and Resource Fund

The fiscal framework in Norway rests on two pillars: the fiscal guideline and the Government Pension Fund-Global (GPF-G), a financing fund.[16] This framework facilitates appreciation of the intertemporal challenges associated with significant but exhaustible oil reserves and expected long-term pressures on the public finances. At the same time, it provides flexibility for the formulation of short-term fiscal policy aimed at macroeconomic stabilization. The framework is buttressed by strong institutions, governance, and accountability.

6.1 The Fiscal Guideline

Fiscal policy in Norway faces long-term challenges associated with a large prospective increase in pension and health spending and a decline in oil revenues. Even though Norway had been implementing fiscal policies consistent with macroeconomic stabilization before the introduction of its fiscal guideline, a consensus emerged towards 2001 around the need to implement a clearer strategy for the use of oil revenue to achieve short-term stabilization and long-term sustainability objectives.

The fiscal guideline established in 2001 limits the central government's structural nonoil deficit over time to 4 percent (equivalent to the expected long-run real rate of return) of the assets held by the GPF-G at the beginning of the fiscal year (Norway, Ministry of Finance, 2001). The guideline also indicates that the implementation of fiscal policy must place emphasis on the stabilization of the economy. The targeted structural nonoil deficit excludes oil-related budget revenues and expenditures. Adjustments are made for the cyclical fluctuations of the nonoil economy, deviations of transfers from Norges Bank (the central bank) from estimated normal levels, deviations of net interest payments from trend, and technical accounting adjustments and extraordinary items that do not influence the underlying trajectory of the nonoil budget.

This scheme envisages the gradual injection of oil resources into the economy. If the resources held in the GPF-G grow faster than nonoil GDP over the medium- and long term, the nonoil deficit permitted by the guideline rises in relation to nonoil GDP.

[16] This section draws from IMF (2009b).

This could imply greater government intervention in the economy, depending on whether the larger nonoil deficit is "filled" by increases in public expenditure or by reductions in nonoil taxes.

The guideline allows flexibility in fiscal policy. Temporary deviations from the effect of the automatic nonoil stabilizers are permitted over the nonoil economic cycle—this is the meaning of the expression "over time" in the official formulation of the guideline, or in the case of extraordinary changes in the GPF-G's value.

The fiscal guideline was designed to meet several policy objectives. As regards intergenerational equity, the 4 percent guideline preserves the value in real terms of the financial assets that have substituted oil reserves in the ground (on an expectational basis). As regards short-run stabilization, the guideline decouples the annual budget from oil revenue fluctuations. It also aims to forestall the Dutch Disease effects that would arise if oil revenues were spent immediately—which also explains why the GPF-G's assets are entirely invested abroad (see below).

The structural nonoil deficit exceeded the fiscal guideline in 2002–05 and was below the guideline in 2006–08. This is consistent with the guideline because the Norwegian economy went from a recession in 2002–03 to a strong boom cycle in 2006–07. The economic slowdown in 2008 and the 2009 recession did not lead to any changes in the guideline, but the government increased the structural nonoil deficit above the guideline in 2009 as a countercyclical measure.

There is wide agreement that the fiscal guideline has contributed to moderate the nonoil deficit, decouple fiscal policy from oil volatility, save a large share of oil revenues, and restrain the appreciation of currency in real terms. A number of factors seem to have contributed to the fiscal guideline's success. The guideline's basic elements are relatively simple and are well understood by the public. There has been strong political consensus and commitment to the guideline. Flexibility in fiscal policy is allowed: this makes the guideline robust, even when faced with exceptional cicumstances, as in 2009. The guideline is supported by strong fiscal transparency. Finally, the fiscal framework's credibility is reinforced by the strength of institutions, governance, and accountability.

6.2 The Government Pension Fund-Global

The government established by law the State Petroleum Fund (from 2006 onwards, the GPF-G) in 1990.[17] The fund, however, was not activated until 1995, when the overall fiscal position switched to surplus, and the first deposits were not made until 1996, because under the fund's mechanism net transfers are only made to the fund if there is an overall central government surplus.

The GPF-G is a financing fund aimed at fostering fiscal transparency. In the preparatory work that led to the creation of the fund, it was emphasized that the fund's resources must be incorportated within a coherent budgetary process. The fund receives net oil revenues and transfers resources to the budget to finance the nonoil deficit. The accumulation of assets in the fund reflects government surpluses. This design forestalls transfers to the fund financed by borrowing and addresses the asset and liability management problems discussed above that have affected funds with rigid rule designs.

The fund is precluded from engaging in public spending. All fiscal policy and expenditure decisions are taken within the budget process. The fund can only invest in external assets. These principles preserve the integrity of the budget and avoid the creation of a parallel expenditure budget.

The fund's operations are supported by strong transparency and governance. The level of public information provision is high, and assurances of integrity support the fund's credibility. Transparency is a key factor in the political economy of the fund. Skancke (2003) has noted that if there is a need to build consensus around saving the equivalent of 100 percent of GDP or more in financial assets, policymakers must be willing to tell the public exactly how they are going to invest those resources and what the returns on the investments are.

The GPF-G has no separate legal status and does not have a board. It is formally an account in Norwegian kroner kept by the Ministry of Finance at Norges Bank, which invests the corresponding value of the account in international financial markets in its own name, via the bank's own assets management division (NBIM). Norges Bank is the formal owner of the GPF-G's external assets, and the value of the Ministry of Finance's account held at the bank is equivalent to the market value of the corresponding pool of

[17] The change in the fund's name was made solely to emphasize the rapid increase in pension expenditure expected in future years. The fund's resources are not earmarked to pensions or to any other component of expenditure.

external assets maintained by the bank, These assets are kept separate from the other external assets held by Norges Bank.

The Ministry of Finance is charged with the responsibility of managing the GPF-G. The Ministry has delegated the operational management of the GPF-G to Norges Bank on the basis of regulations, guidelines, and a management agreement, all of which are public information. The asset management objective is to maximize returns subject to the investment guidelines and risk exposure limits. Important changes proposed to the investment strategy are presented to parliament to ensure political support for strategic decisions that are of key importance to future generations.

Until 1997 the fund invested exclusively in fixed-income assets. Investment guidelines adopted by Parliament in 1998 permitted the investment of 30-50 percent of the fund's capital in shares. This followed new long-term analyses indicating that more resources would be accumulated in the fund than had previously been anticipated, and that therefore more time would elapse before it would be necessary to begin making withdrawals from the fund. In 2000, investment in emerging markets was permitted. Ethical guidelines for investment were introduced in 2004. The investment guideline since 2006 has been 40 percent in fixed-income instruments and 60 percent in shares. In the future, it is envisaged that up to 5 percent of fund assets will be allocated to investment in real estate, reducing the share of fixed-income instruments. The market value of the GPF-G's assets at end-2009 was 115 percent of GDP.

7. Conclusions

Many NRECs have implemented fiscal rules and NRFs in response to the challenges that reliance on nonrenewable resource revenues pose to fiscal management. Their experience has been mixed. There is little evidence of links between the presence of these mechanisms and fiscal policy responses to changes in resource revenues. In the recent price and economic cycle, rules and funds were associated with a broad variety of fiscal responses—including highly procyclical responses.

International experience suggests some key elements for the design and implementation of effective fiscal rules and NRFs. As regards fiscal rules: targeting nonresource balances, adjusted for the nonresource cycle if feasible; an enhanced medium- and long-term perspective for fiscal policy; an appropriate degree of flexibility and transparent, clear, and specific escape clauses; public financial management

capacity; fiscal transparency; and strong political support for the rule. As regards NRFs, the need for flexibility in the operational rules and good integration with budget systems, fiscal policy frameworks and asset management suggest that preference should be given to NRFs designed as financing funds.

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