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# HOW TO

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**How to Design a Fiscal Strategy  
in a Resource-Rich Country**

Fiscal Affairs Department

# How to Design a Fiscal Strategy in a Resource-Rich Country

Prepared by Olivier Basdevant, John Hooley, and Eslem Imamoglu

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## HOW TO NOTE

Fiscal Affairs Department

How to Design a Fiscal Strategy in a Resource-Rich Country:  
Prepared by Olivier Basdevant, John Hooley, and Eslem Imamoglu

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## Introduction

This How to Note provides operational guidance for policymakers and IMF staff teams on designing—or revising—a fiscal strategy in resource-rich countries (RRCs). Properly managed, resource revenue can support fiscal sustainability and development and equity objectives. Resource revenues also create significant stabilization challenges for fiscal policy because of their size, uncertainty, volatility, and finite nature. The guidance in this note is intended to be general and applicable to RRCs with a range of income levels, resource endowments, and macroeconomic contexts. It is designed primarily to help policymakers analyze the trade-offs associated with alternative fiscal paths and select the right fiscal strategy, given country-specific circumstances.

In this way, the guidance may be helpful for RRCs revising their fiscal strategies in response to the coronavirus disease (COVID-19) pandemic, which has led to a widespread deterioration of fiscal balances in the short term because of declining tax revenues and additional spending needs (for example, health-care and support to vulnerable workers). Producers of commodities for which demand may be durably lower in the wake of the pandemic (oil), are likely to experience a more persistent deterioration in the fiscal outlook. This may imply that the pre-COVID-19 fiscal policy stance is no longer sustainable. The framework in this note can help countries assess the size of any new medium-term fiscal adjustment needs and design a fiscal consolidation that appropriately balances both sustainability and development concerns.

The concepts underlying the guidance are based on a large body of IMF work on fiscal frameworks in RRCs (for example, IMF 2012 and IMF 2015), including analytical and policy papers and technical assistance and training (see the first section on general

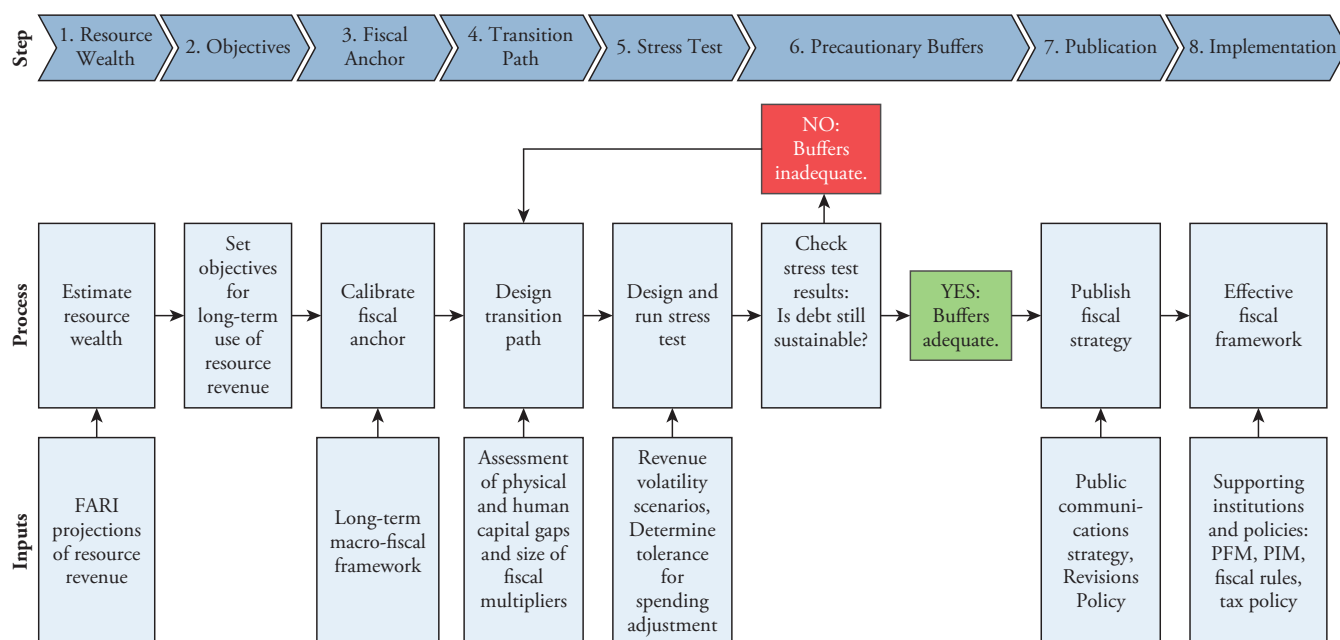
principles). The guidance is centered on (i) fiscal sustainability and intergenerational wealth sharing, based on a long-term fiscal anchor; and (ii) macroeconomic stabilization, through the maintenance of a stock of liquid financial assets (“buffers”). A stylized framework for designing a fiscal strategy in an RRC is shown in Figure 1 and signposted in the main body of the text. The framework is intended as an organizing device for the guidance in this note and is not definitive (there are many possible ways to design a fiscal strategy). Its main elements are described below:

- *A long-term fiscal sustainability anchor.* For RRCs, the fiscal anchor is typically based on some version of the permanent income hypothesis (PIH), translated into a target for the non-resource primary fiscal balance (NRPB). In principle, RRCs can run a non-resource primary deficit, financed with the expected permanent income generated from future natural resource revenues (and any initial wealth). There is also an important distinction between the PIH used as a long-term fiscal anchor (as presented in this note) versus the PIH used as a fiscal rule. A PIH-based anchor serves as a long-term reference to guide fiscal policy, though can be usefully complemented by operational fiscal rules to guide fiscal policy in the short-to-medium term, including during the transition to the long-term anchor.
- *A transition from the current fiscal policy stance to the long-term anchor.* For several RRCs already engaged in resource production, the current stance may be unsustainable, due to either past fiscal policy that was too loose, or a shock that affects the outlook for resource revenues or creates additional budgetary pressures (COVID-19, for example). In such cases, the transition will require a degree of fiscal consolidation.<sup>1</sup> For others, (particularly those with newly discovered reserves) natural resources may provide a valuable opportunity to invest those revenues domestically to speed up development (Collier 2010, van der Ploeg and Venables 2011). A credible

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<sup>1</sup>See also a companion How to Note on the adjustment to lower commodity prices by Danforth, Medas, and Salins (2016).

**Figure 1. Illustrative Framework for Designing a Fiscal Strategy in Resource-Rich Countries**



Source: IMF staff.

transition requires careful planning, particularly if countries intend to temporarily depart from an adjustment path to achieve other policy objectives.

- *Stabilization.* If the volatility of resource revenues is not adequately managed, it can translate into volatility in public spending. A simple and effective approach to mitigate these impacts is to set aside savings from resource wealth in good times in liquid financial assets. This financial “buffer” can then be used during bad times to support spending, including the delivery of essential public services and infrastructure.
- *Implementation.* Considerations for effective implementation of a fiscal strategy include communication and supporting fiscal institutions.

This note is supported by an online Excel template (and companion guidance note), which users can customize to operationalize the framework for a particular RRC.<sup>2</sup>

The guidance outlines many of the key considerations for setting appropriate fiscal policy anchors,

<sup>2</sup>The Excel template and companion guidance note are available here: <https://www.imf.org/-/media/Files/Publications/How-ToNotes/2021/data/HTNEA2021002.ashx>. For illustrative purposes, all figures in this note (for a stylized RRC) have been generated using the template.

transition paths, and financial buffers. It does not—and cannot—specifically prescribe their design and calibration in individual countries, largely because of the diversity among RRCs. The appropriate fiscal framework for each country will depend on commodity dependence,<sup>3</sup> net financial asset levels, development needs, macroeconomic circumstances, institution strength, and social preferences.

Further, this note also does not cover the related issue of fiscal rules in RRCs.<sup>4</sup> Fiscal rules can help enforce fiscal discipline and therefore support the successful implementation of a fiscal strategy. But they should be thought of as the next stage in the design of a comprehensive fiscal framework, once the underlying fiscal strategy—consisting of the objectives, anchors and transition path—has been developed. They also require strong political commitment and

<sup>3</sup>An economy is typically considered ‘resource-rich’ when its exhaustible natural resources (e.g., oil, gas and minerals) comprise at least 20 percent of total exports or 20 percent of natural resource revenues (IMF, 2012). More generally, and as discussed in the first section on fiscal sustainability, a fiscal framework derived from the PIH is usually appropriate for countries that derive a large share of fiscal revenue from natural resources and also have large positive financial assets, versus countries with more limited resource revenues and with negative net financial assets.

<sup>4</sup>IMF (2018) “How to Select Fiscal Rules: A Primer,” FAD How to Note contains a discussion of fiscal rules for RRCs.

public financial management practices (IMF 2009 and 2013), which many RRCs still need to strengthen.<sup>5</sup> But for those RRCs already with fiscal rules in place, the framework can assess whether the calibration of current rules follows longer-term fiscal sustainability and objectives for resource wealth.

## Principles for Designing Fiscal Strategies in Resource-Rich Countries

### Sustainability

An RRC's fiscal position is sustainable if the present value of future non-resource primary deficits does not exceed its initial net asset position (including public resource wealth). In this way, assessment of fiscal sustainability differs from non-RRCs, where the government's financial asset position is often small, so the focus of sustainability is on gross public debt.<sup>6</sup> RRCs, however, often have large stocks of public wealth, in both financial assets and resources in the ground that impact fiscal sustainability.

Because resource wealth is finite, fiscal sustainability in RRCs should also ensure a fair distribution of resource wealth across generations. By saving and investing a portion of the resource rents that flow to government from the extraction of natural resources (often implying running fiscal surpluses), an RRC can produce a stable future stream of additional budgetary income. This investment income can then sustain a permanently lower non-resource fiscal balance even after the depletion of the natural resource. The income can be generated from the accumulation of either financial assets (interest and dividends), or physical or human capital (higher non-resource fiscal revenues).

A third dimension of fiscal sustainability in RRCs is the need to avoid a sudden large fiscal adjustment as resources in the ground are depleted. Production, and hence fiscal revenues, can sometimes decline rapidly toward the end of a resource's extraction horizon. A large or rapid adjustment as this occurs may be undesirable or infeasible. Thus, while some RRCs can enjoy

high levels of resource revenue for several years, it is generally desirable to plan ahead for the post-resource era by adjusting gradually.

### Stability

A sound fiscal strategy also supports the use of countercyclical stabilization policy when shocks occur. In RRCs, fiscal policy is tasked with dampening the macroeconomic impact of both the business cycle *and* the volatility in commodity revenue, which can be subject to large and persistent shocks to both prices and production. Fluctuations in resource revenue often translate directly into changes in public spending, sometimes resulting in a procyclical fiscal stance and amplifying the impact on the rest of the economy (IMF 2015). Cuts to capital expenditure can be among the most harmful, since they both dampen demand and reduce the productivity of the investment project itself.

A key goal of fiscal stabilization in RRCs is therefore to shield, or delink, public expenditure from volatility in resource revenues—drawing on financial resources to support spending during commodity “busts,” while saving some of the revenue during booms to limit any procyclical increases in spending.

### A Long-Term Anchor to Ensure Fiscal Sustainability

A long-term fiscal anchor, linked to the sustainability principle, can serve as a useful benchmark to guide setting the path for fiscal aggregates. For RRCs, an appropriate anchor is the NRPB (Box 1 provides a derivation), although if debt vulnerabilities are high, a debt anchor can sometimes complement an NRPB-based anchor (or serve as an interim anchor).<sup>7</sup> The main steps in selecting a suitable target level for the NRPB anchor can be summarized as follows—*Step 1*: estimate resource wealth and project the flow of future resource revenues; *Step 2*: define objectives for the consumption of resource wealth across genera-

<sup>5</sup>IMF (2015) found that the effectiveness of fiscal rules in RRCs has sometimes had mixed results. In some cases, fiscal rules have focused on managing short-term resource revenue volatility (often through price-smoothing rules) without being underpinned by a broader articulation of long-term fiscal sustainability objectives.

<sup>6</sup>The IMF has developed a formal framework to assess the sustainability of public debt (gross or net of financial deposits): <https://www.imf.org/external/pubs/ft/dsa/index.htm>.

<sup>7</sup>For non-resource-rich countries, a natural fiscal anchor is the gross debt to GDP ratio, set as a ceiling, below which debt is likely to remain sustainable with a reasonable degree of probability. For an RRC, a debt anchor alone would provide a partial and potentially misleading indicator of capacity to repay debt (due to large stocks of current/future assets), while it would also not address the question of whether consumption out of resource wealth is consistent with intergenerational equity objectives.



tions; *Step 3*: translate objectives into an appropriate NRPB anchor.

### Step 1: Estimate Resource Wealth

The stock of public resource wealth  $V_t$  can be defined as the present value of the stream of future resource revenue  $RT_t$  (net of resource-related expenditure) expected to flow to the budget (Figure 2)<sup>8</sup>:

$$V_{t-1} = \sum_{s=t}^N \frac{RT_s}{(1+i)^{s-t+1}}$$

Projections of resource revenue can be generated using either a bottom-up or top-down approach. A bottom-up aggregation of revenue projections from individual extraction projects is most accurate, since even for the same commodity, production costs, prices, and fiscal regime can vary between different projects.<sup>9</sup>

The IMF's Fiscal Affairs Department (FAD) has developed a model that can assist countries in forecasting natural resource revenues at the project level, the Fiscal Analysis of Resource Industries (FARI).<sup>10</sup> Experience using the model indicates it is possible to predict with some degree of accuracy the timing and size of payments that the government should expect to receive from an individual project. The bottom-up method is not always practical, however, particularly in cases where there is a lack of project-specific information or many individual sites. In these instances, projections can be generated using a top-down approach, based on the extrapolation of historical trends in extraction and fiscal revenues, adjusted for projected changes in commodity prices.

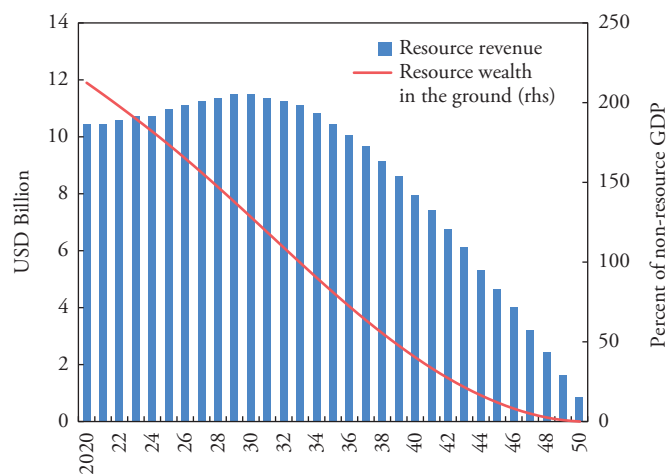
The main inputs into a resource revenue forecast include estimates of reserves in the ground, projections of commodity prices, information on the fiscal regime, and assumptions about production and costs:

<sup>8</sup>The discount rate represents the opportunity cost of leaving the resources in the ground. Typically, a risk-free interest rate is used and should be the same as the rate used to discount financial assets and liabilities (see Box 1).

<sup>9</sup>FAD advice has emphasized the fiscal and governance benefits of a standardized fiscal regime across different projects for the same commodity.

<sup>10</sup>IMF (2016a), Fiscal Analysis of Resource Industries (FARI) Methodology. See also <https://www.imf.org/external/np/fad/fari/>. Although the primary aim of the model is to support fiscal regime design and evaluation, it can also be applied as a revenue forecasting tool since it allows for the non-linear sensitivity of commodity revenues to prices. For example, the timing of corporate income tax revenue is affected not only by production, price, and operating cost profiles, but also by the schedule of capital allowance, loss carry forward rules, and the size of the royalty payment.

Figure 2. Resource Revenue and Resource Wealth



Source: IMF staff.

- *Reserves in the ground.* Estimates of discovered reserves at existing or potential project sites are readily available. But the portion of proven reserves that is extractable is less certain and subject to future developments in production technologies, costs, demand, and commodity prices. For fossil fuel producers, there are significant downside risks to production from potential future policy action to combat climate change (which could affect both consumer demand and production costs). It is prudent, therefore, to be conservative about projections of future demand. The possibility of new discoveries also means a country's endowment of natural resources may be higher than is currently known. It is useful to explore the revenue impact of alternative reserves and production scenarios, although for budgetary purposes, revenue forecasts should generally only include sanctioned extractives projects (that is, those with an approved final investment decision and/or development plan).
- *Commodity prices.* Commodity prices are highly volatile and accurate forecasting is difficult. Futures markets and statistical models can provide a guide to the near-term outlook and the IMF's World Economic Outlook database provides projections for major commodities one to two years ahead in US dollars, based on financial market data and updated semi-annually.<sup>11</sup> The medium- to long-term outlook is more difficult to predict. An approach often used

<sup>11</sup>Conversion into local currency of a price forecast denominated in US dollars, in turn, requires forecasts of exchange rates and any

### Box 1. Derivation of Fiscal Sustainability Anchors for Resource-Rich Countries

This box provides a derivation of fiscal sustainability anchors, adapting simple identities to the realities of resource rich countries. It is assumed that future resource revenues (and the paths of other variables) are known with certainty. The fourth section and Box 4 outline a practical approach for how the framework can be adapted to address uncertainty, particularly in relation to commodity price volatility.

The overall fiscal balance  $OB_t$  in year  $t$  can be decomposed into resource revenues  $RT_t$ , and non-resource revenues  $NRT_t$ , primary expenditure  $E_t$ , income from the initial stock of financial assets, and payments on the initial stock of liabilities:

$$OB_t = NRT_t - E_t + RT_t + i_t^a A_{t-1} - i_t^b D_{t-1} \quad (1)$$

where  $i_t^a$  and  $i_t^b$  are the net yields associated with the stock of assets and liabilities, respectively.<sup>1</sup> The overall fiscal balance is also equal to the change in net financial assets:

$$OB_t = \Delta(A_t - D_t) \quad (2)$$

The non-resource primary balance can then be defined as:

$$NRPB_t = NRT_t - E_t \quad (3)$$

The law of motion of net financial assets is given by:

$$A_t - D_t = NRPB_t + RT_t + (1 + i_t^a)A_{t-1} + (1 + i_t^b)D_{t-1} \quad (4)$$

The government's intertemporal budget constraint requires that the initial stock of net financial assets equals the present value of the cumulative future primary balances. For countries with exhaustible natural resources, this comprises the non-resource primary balance ( $NRPB_t$ ) and net resource revenue ( $RT_t$ ) (only for a fixed period of time,  $N$ ). If both financial assets ( $A_t$ ) and debt ( $D_t$ ) are discounted at the same constant rate,  $i$ , and that the no-Ponzi condition holds, this can be expressed as:

$$A_{t-1} - D_{t-1} = -\sum_{s=t}^{\infty} \frac{NRPB_s}{(1+i)^{s-t+1}} - \sum_{s=t}^N \frac{RT_s}{(1+i)^{s-t+1}} \quad (5)$$

The assets the government holds in the form of natural resources can be viewed financially as the present value of the future path of resource revenue (the "resource wealth"). Thus, the net wealth of the government at the end of period is given by the net

<sup>1</sup>Although this is a simplifying assumption, in practice there are incentives for convergence (if the interest rate on debt is high compared to assets there is an incentive to pay down debt until the cost of borrowing falls).

financial assets accumulated by the end of period  $t$ , plus the present value of the natural resource asset in the ground. Hence, the following identity:

$$W_{t-1} = A_{t-1} - D_{t-1} + V_{t-1} = -\sum_{s=t}^{\infty} \frac{NRPB_s}{(1+i)^{s-t+1}},$$

where  $V_{t-1} = \sum_{s=t}^N \frac{RT_s}{(1+i)^{s-t+1}} \quad (6)$

These definitions imply that

$$\forall s \geq t, W_s = (1+i)W_{s-1} + NRPB_s \quad (7)$$

There are potentially many alternative paths for the non-resource primary balance consistent with this intertemporal constraint. The basis for the fiscal anchor approach is the *permanent income hypothesis (PIH)*, which is consistent with a constant non-resource balance over time for an infinitely long period,<sup>2</sup> which can be written as:

$$\forall s \geq t, NRPB_s = NRPB_t = -iW_{t-1} \quad (8)$$

More generally, the PIH is consistent with the non-primary balance growing at a constant rate  $g$  (for example, if the NRPB grows at the same rate as non-resource GDP, then the PIH would lead to a level of NRPB constant in percent of non-resource GDP). In this case, equations (7) and (8) lead to:

$$\forall s \geq t, NRPB_s = NRPB_t(1+g)^{s-t} \quad (9)$$

$$NRPB_t = -(i-g)W_{t-1} \quad (10)$$

The economic intuition of the formula is that of the total financial return from investing the financial wealth at a rate  $i$ , one part is used to keep wealth growing at the rate  $g$  (hence the need to increase wealth by  $gW$ ) so that the annuity also grows at the rate  $g$ , while the remaining part is used to finance spending. In other words, the annuity from net wealth is growth-adjusted. Different variations of the NRPB annuity can then be defined, depending on the definition of  $g$ . In particular<sup>3</sup>:

<sup>2</sup>A finite horizon version of the PIH would generate a time-bound annuity from net wealth (i.e. future generations would benefit from a country's resource wealth until year  $T$ ). This approach would allow for higher consumption out of resource wealth during the period  $t \leq T$ , although it may be difficult to justify why some future generations should benefit and others not.

<sup>3</sup>Note that these equations imply that over the long run, the nominal interest rate must be greater than  $g$ . If  $i - g$  is negative, the income on the stock of wealth would be insufficient to prevent wealth declining over time (in real terms, real per

### Box 1. Derivation of Fiscal Sustainability Anchors for Resource-Rich Countries (continued)

#### Constant real annuity per capita: $g = \pi + \alpha$ .

Here  $\pi$  is the annual rate of inflation and  $\alpha$  is annual population growth. This ensures the NRPB is constant in real per capita terms.

capita terms, or as a percent of GDP) and additional income is required by running primary surpluses in order to maintain a constant level of wealth. In countries where the yield on assets is currently below the rate of GDP growth (for example, in some low-income countries), a simple practical approach is to assume  $i-g$  is positive in the long run, while allowing  $g$  to be greater than  $i$  over the near- and medium- term.

#### Constant annuity as a share of non-resource

**GDP:  $g = \pi + \gamma$ .** Here  $\pi$  is inflation and  $\gamma$  is the rate of real non-resource GDP growth. This ensures the NRPB grows in line with nominal non-resource GDP growth and is constant in percent of non-resource GDP.

**Constant real annuity:  $g = \pi$ .** As before,  $\pi$  is the annual rate of inflation. This ensures the NRPB grows in line with prices and so is constant in real terms.

in fiscal planning is to assume that real commodity prices follow a random walk, implying the best forecast would be a constant level of prices in real terms for the period beyond the medium term. Although the statistical evidence in support of a random walk process is weak,<sup>12</sup> since structural factors (such as persistent changes in global demand or supply) significantly affect commodity prices, a convenient practical approach is to use a constant-in-real-terms price as a baseline forecast, and then stress test the fiscal framework using alternative assumptions about the long-term (for example, to account for structural demand shifts from the transition to cleaner energy).<sup>13</sup>

- *The fiscal regime, production, and costs.* There are several different fiscal instruments used in the extractives sector, for example, corporate tax paid on the profits generated by the extraction company, non-tax royalties paid on production volumes, resource rent taxes, state participation, and production sharing systems. Finally, forecasting fiscal revenues at the project level also requires projections

country price premium (for example, due to differences in quality of the product compared to the world benchmark).

<sup>12</sup>For example, Hamilton (2009) finds that changes in the real price of oil have historically tended to be 'permanent, difficult to predict, and governed by very different regimes at different points in time,' while Cherif and others (2017) argue that long-term demand and supply dynamics point to a secular long-term decline. For example, the long-term outlook for oil prices will be affected, inter alia, on the demand side by the transition to cleaner energy, and on the supply side by changes to the geopolitical situation in oil producing countries.

<sup>13</sup>Alternative scenarios could include other deterministic price scenarios (e.g., alternative low/high scenarios) or the use of stochastic methods to conduct short to medium term sensitivity analysis of revenue and the response by the fiscal rule.

of production and costs that are consistent with the expectations for prices and extractable reserves.

### Step 2: Define Objectives for the Long-term Consumption of Resource Wealth

Given estimates of the size and time profile of future resource revenues from *Step 1*, policymakers need to decide how and when to "consume" them (either through increased spending or lower taxes). A generally accepted principle is that future generations should also derive benefit from resource wealth as well as the generation(s) living during the period of extraction. Alternatives to an intergenerational wealth sharing approach are possible, however, both more prudent (such as "bird-in-hand") and more profligate (such as "spend-as-you-go"), though these both have several drawbacks.<sup>14</sup>

<sup>14</sup>In the Bird-in-hand (BIH) approach, all resource revenues are invested in financial assets and consumption out of resource wealth is equivalent to the interest earned on accumulated financial wealth (i.e. not based on permanent income concepts). The approach is prudent, since it does not permit bringing forward consumption of (uncertain) future resource revenue and may be an appropriate anchor for some countries; for example, if there is high degree of uncertainty about future resource revenues, borrowing constraints (either due to high cost or debt sustainability issues), or absorption capacity issues that prevent an efficient scale-up in spending. The drawbacks of the BiH include benefiting future generations more than the present and inflexibility about borrowing to finance productive investment opportunities. Spend-as-you-go (SAYG), on the other hand, is a highly procyclical approach, where the government automatically spends all resource revenues on receipt, to buy goods and services and to make capital investments. As a result, when natural resource revenue increases, the government increases its expenditures; when it decreases the government is forced to cut its expenditures;

Even within an intergenerational wealth sharing approach, there are different views on what is a fair distribution of resources. Technically, these differences are reflected in the constant rate  $g$  at which the NRPB anchor grows over time in the PIH framework (see Box 1). For example, to ensure future *individuals* are not left worse off, the NRPB should grow in line with expected changes in population. Similarly, for future generations to enjoy the same level of consumption in *real terms*, expected changes in purchasing power should be taken into account.<sup>15</sup> On the other hand, some economists argue that since current generations are likely to be poorer than future generations, this could justify a growth rate below GDP or population growth, to generate a consumption profile tilted in favor of the current, relatively poorer generation.<sup>16</sup>

### Step 3: Calibrate the Fiscal Sustainability Anchor

The calibration of the NRPB anchor should be consistent with the objectives for the long-term consumption of resource revenue. An “equal” distribution of resource consumption across generations would be ensured by an anchor that is constant in real per capita terms (for example, NRPB equivalent to \$X per individual, in today’s prices). However, in practice, many countries define the anchor as a constant share of non-resource GDP. This calibration facilitates fiscal planning since it is directly translatable into a budgetary framework, although a key shortcoming is that it will result in future potentially richer generations enjoying a higher level of resource consumption than the present, whenever economic growth exceeds population growth. Another calibration option is an anchor that is constant in real terms. This would lead consumption to decline over time in real-per-capita terms (if population growth is positive).

When selecting the anchor calibration method, it is important for policymakers to understand the implications for intergenerational resource consumption

<sup>15</sup>Appreciation of the real exchange rate in RRCs can result from several mechanisms, for example, Balassa-Samuelson or ‘Dutch disease’ type effects.

<sup>16</sup>Collier and others (2010) and van der Ploeg and Venables (2011). Since the marginal benefit (added value) of an additional 1 unit of consumption is likely to be higher today, compared to tomorrow, a downward-tilting consumption path could be welfare-improving. Consumption tilting might not improve welfare, however, if the resource windfall stimulates a splurge in wasteful spending or causes a breakdown in governance.

and the trade-offs with alternative methods (Annex 2 provides a comparison).

Computation of the anchor itself requires data on the initial wealth and fiscal position and assumptions for the long-term evolution of key macro-fiscal variables, such as GDP growth, population, inflation, and interest rates. Figure 3 shows simulated paths—for a stylized RRC—of the NRPB, wealth, savings out of resource wealth, and revenue and expenditure for an anchor constant in terms of non-resource GDP. Note that, whereas the paths for the NRPB and total wealth are constant, net financial wealth increases as resources in the ground decline and are converted into financial assets, preserving total wealth (financial assets plus resources in the ground) at its initial level. Saving fluctuates with resource revenues, keeping the level of expenditure constant.

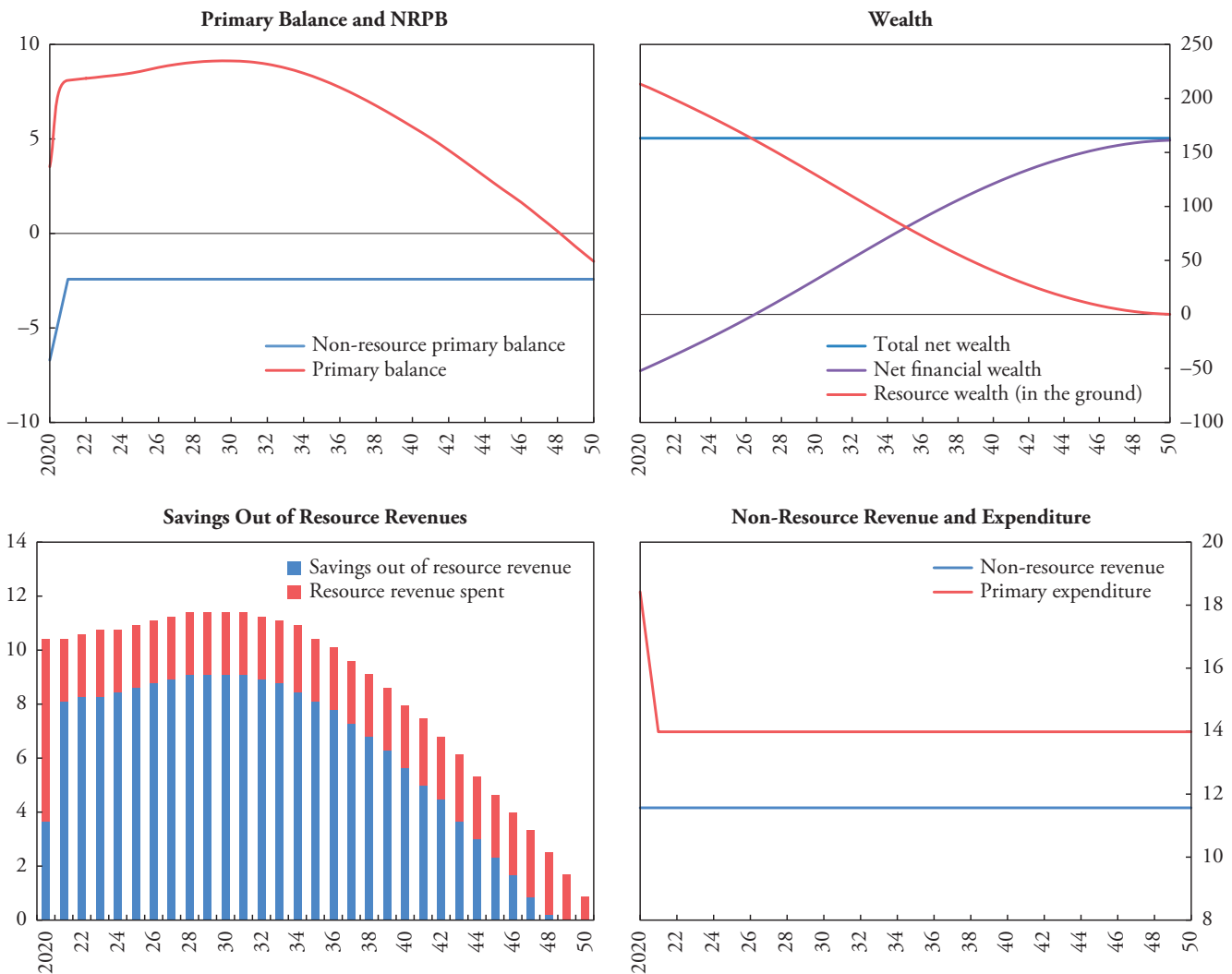
The calibration can be sensitive to the underlying method. Figure 4 shows how the level of real per capita consumption differs according to different definitions of the anchor (constant in GDP, real, or real per-capita terms). Calibration is also highly dependent on the underlying macroeconomic assumptions. Sensitivity analysis should therefore be conducted to ensure the fiscal framework is robust to uncertainty and a range of different assumptions and the choice of the long-term anchor should—everything equal—err on the side of caution to avoid unexpected and large fiscal adjustment needs. Figure 5 shows how the level of the anchor increases with lower yields on invested resource revenues and lower resource revenues themselves. Estimates of resource wealth can also be very unstable as they are highly sensitive to resource prices (which are highly volatile) and the discount factor, especially for countries with large reserves and hence long horizons.

### The “Transition”: Reaching a Sustainable Fiscal Position while Supporting Growth

If the current fiscal stance differs from the stance consistent with the fiscal anchor, the gap will need to be closed with a fiscal adjustment or “transition.” This section discusses the key considerations in designing such a transition path and generalizes the approaches outlined in IMF (2012), the Modified PIH (MPIH) and Fiscal Sustainability Framework (FSF).<sup>17</sup> Box 2

<sup>17</sup>The MPIH framework allows for a deviation from the constant NRPB deficit target to accommodate a temporary frontloading of capital spending. The FSF extends the MPIH by incorporating an expectation that public investment has positive spillover effects on

**Figure 3. Example of a Calibrated Fiscal Sustainability Anchor for a Stylized RRC**



Source: IMF staff.

Note: The anchor is calibrated with  $g$  = non-resource GDP growth and all charts are shown as percent of non-resource GDP. In this example, the initial level of the non-resource primary balance is below the anchor level, which is reached in the first year of projection horizon (2020) through a consolidation in primary expenditure.

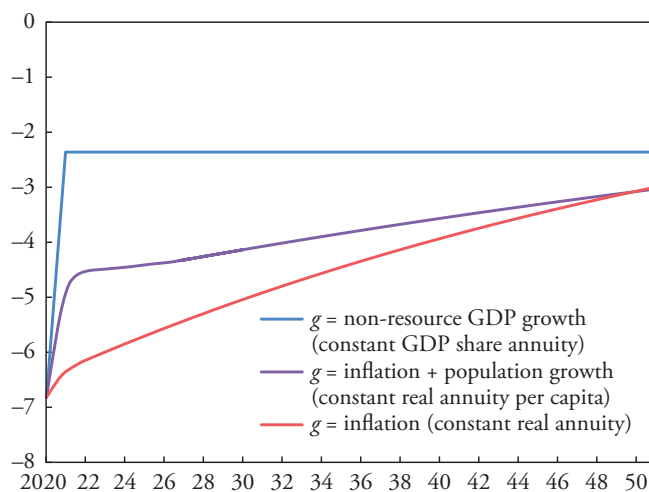
outlines some considerations for cases when large fiscal consolidations are needed.

growth and non-resource revenues. The approach in this note is consistent with these approaches but generalizes it to incorporate a broader set of country circumstances (fiscal consolidation needs as well as scaling-up of investment; different starting points with respect to the long-term anchor, and so on). A more detailed comparison is included in Annex 3.

**Step 4: Design the Transition Path**

The speed, composition, and end point of any transition path all need to be considered.

- *Speed.* If the current NRPB is far below the anchor-implied level, a fiscal consolidation will be needed. While an immediate adjustment may be considered too painful, particularly if it carries economic, social, or political costs, gradual and lengthy adjustments can also be costly. They may lead to lower wealth for future generations (compared to a fast adjustment), or heightened vulner-

**Figure 4. Non-Resource Primary Balance Anchors**

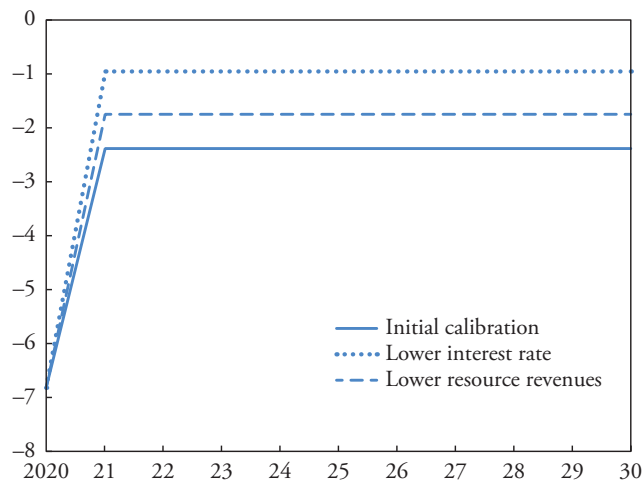
Source: IMF staff.

Note: Different calibrations for the NRPB anchor are shown in constant prices per capita terms. In this example, nominal interest rate > inflation > non-resource GDP growth > population growth.

ability to commodity price shocks (if the country does not have adequate stabilization buffers). Long transitions may also lead to time inconsistency problems (for example, the brunt of the adjustment may repeatedly be postponed to “tomorrow”). If, however, the current level of the NRPB is above the anchor-implied level, there is an opportunity to increase spending (or possibly reduce the tax burden). The speed at which spending can be increased should be guided by an analysis of existing absorptive and institutional capacity constraints and should be dependent on the identification of productive spending opportunities; otherwise rapid increases in spending are likely to be wasteful and lead to a deterioration in public wealth (as well as other adverse spillovers, such as overheating and “Dutch-disease” real exchange rate appreciation). Policymakers should be particularly cautious when borrowing to finance spending based on expected future resource revenues that are uncertain (liquidity constraints may also mean this is infeasible).

- *Composition.* Long-term structural revenue and expenditure priorities should primarily guide the composition of the adjustment.<sup>18</sup> Significant negative impacts on growth or inequality from cuts in

<sup>18</sup>IMF (2015) found that RRCs on average collect only about half as much from goods and services taxes compared to non-RRCs, suggesting considerable scope for boosting these revenues.

**Figure 5. Sensitivity of Anchor Calibration**

Source: IMF staff.

Note: Figure shows impact on the NRPB anchor in Figure 2 of a 25% reduction in interest rates and a 50% reduction in resource revenues.

spending should be offset with mitigating policy measures. A separate How to Note (Danforth and others 2016) provides an in-depth discussion of these issues in the context of fiscal adjustment in response to a fall in commodity prices. On the other hand, scaling-up of spending should be guided by national development priorities and should be consistent with achieving the Sustainable Development Goals (SDGs). While using resource revenues to scale-up infrastructure investment, in particular, can provide an opportunity to accelerate development, a cautious approach is sensible, since it has not always delivered the anticipated growth benefits and sometimes has been associated with poor-quality projects with low efficiency (Box 3).

- *Wealth preservation.* Wealth can either be stabilized at its initial level or its post-transition level. In cases where the fiscal stance is looser than the anchor-implied level, stabilizing wealth at its initial level would preserve the value of the resource for future generations. It would, however, usually require smaller deficits (compared to the anchor) in the latter part of the transition to rebuild wealth to its initial level. Stabilizing wealth at its post-transition level, on the other hand, would allow for a smoother fiscal path. If the difference in wealth levels from the two approaches is small, a smoother path may be preferable.

## Box 2. Large Fiscal Adjustments in Resource-Rich Countries

Resource-rich countries (RRCs) can sometimes face very large fiscal adjustment needs. A sharp commodity price shock can instantly make a country poorer and make a fiscal stance unsustainable, while other economic shocks can lead to additional spending needs and debt accumulation (COVID-19, for example). Large deteriorations in sustainability can also be more gradual, for example, because of running a too-loose fiscal policy for several years.

The transition to fiscal sustainability can be complicated by weak demand, high gross debt, and a lack of buffers or financing needs. Large shocks to commodity revenues can often be associated with a decline in non-commodity activity (for example, due to spillover effects or if there is a simultaneous shock to external demand), with the risk that the fiscal adjustment becomes procyclical. On the other hand, high gross debt or financing needs, and a lack of available buffers may require immediate action.

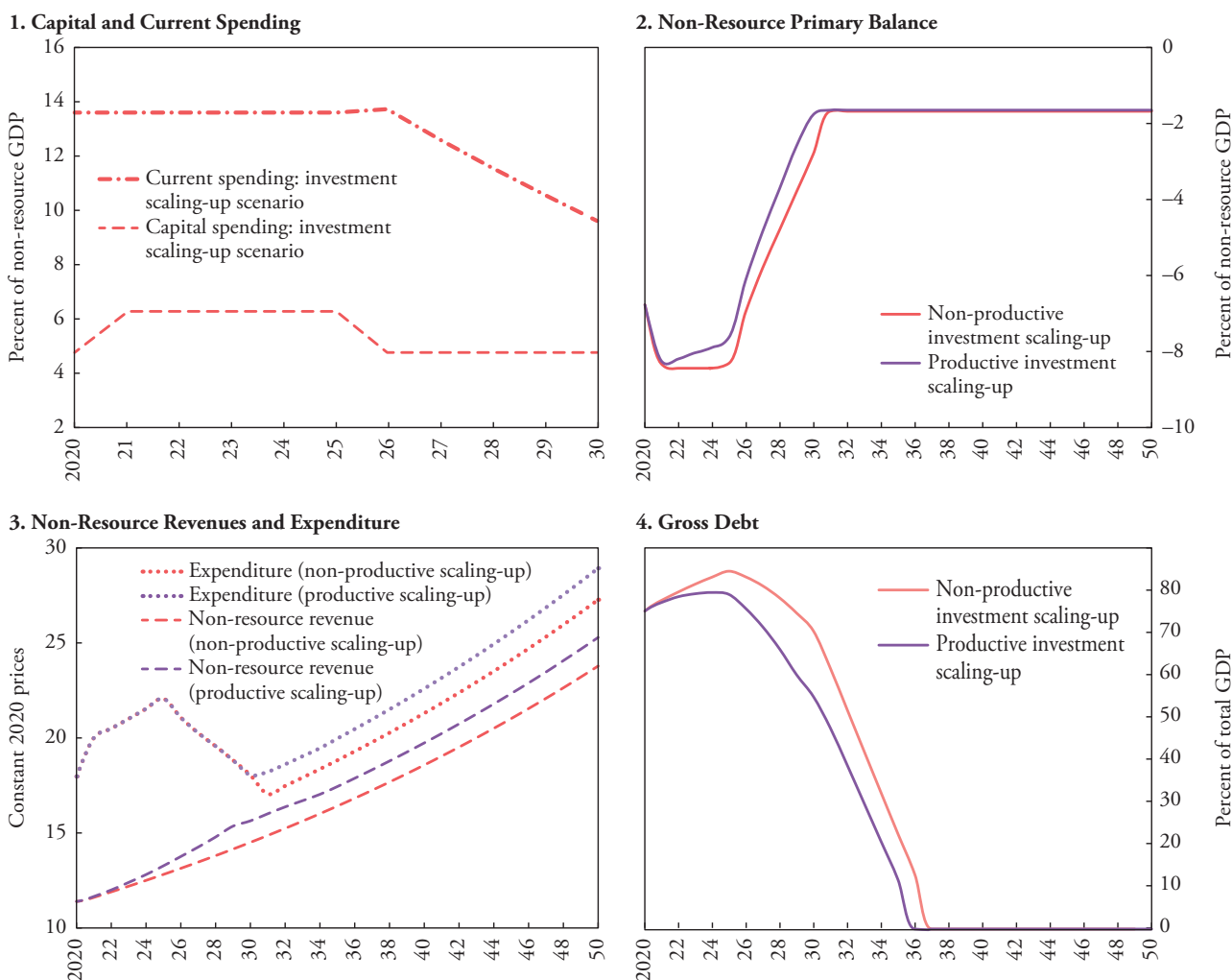
Some general considerations for the design (or revision) of a fiscal strategy in this context are offered below (see also Danforth, Medas, and Salins 2016). The strategy will, however, need to be carefully adapted to the country-specific circumstances.

- Establish credibility upfront with immediate communication of a new or revised fiscal strategy. Quick action to show credibility is crucial, since it can help to contain financing costs and risks and potentially reduce the overall adjustment need. An important step is to clearly set out and communicate the new fiscal strategy to achieve sustainability and other objectives, including the needed supporting policies and financing sources, and should be accompanied by a medium-term fiscal framework.
- An interim target may be needed for countries with high debt. If gross debt is an issue, an interim debt target (gross or net) can complement the long-term non-resource primary balance (NRPB) sustainability anchor. The target should be set to be consistent with a stabilization of debt at a prudent level in the medium term.
- Begin adjustment as soon as possible but ensure it is gradual enough to minimize growth impacts and risks to social cohesion. Frontloading has the advantage of building credibility and potentially harnessing any initial favorable momentum for reform, whereas backloading adjustment too much is unlikely to be credible to investors who may be needed to finance the deficit. However, the design of the fiscal path needs to carefully manage

the trade-offs: too much frontloading risks a big hit to growth and backlash from the population which could make future reforms more difficult to implement. Overall, gradual fiscal adjustment, tends to be associated with lower multipliers, thus supporting growth objectives (Pennings and Pérez Ruiz 2013). If sufficient buffers are available, a few small measures could be taken initially to help signal credibility, and the adjustment could start in earnest only once the recovery is underway. In general, countries with fiscal buffers can focus on a smoother, pro-growth adjustment process in the face of large shocks.

- Both revenue and expenditure measures are likely to be needed. Different strategies may be possible, though both revenue and expenditure measures are likely to be needed for large adjustments. The design of expenditure measures should ideally be based on a careful review of the size and efficiency of all spending components, although some immediate postponement or curtailment of nonpriority spending may also be necessary. In some cases, the fiscal adjustment could involve a major rethinking of the size and functions of the state. Revenue enhancing measures are likely to be particularly fruitful in RRCs where low non-commodity revenues can reflect a low non-resource tax burden (possibly including the absence of some taxes) and low collection efforts. Well-designed revenue measures can often help to limit negative growth impacts.
- Adjustments undertaken through fiscal policy action should be considered within the wider macro-financial context. A flexible exchange rate has been found to mitigate growth losses after a shock and a depreciation of the currency could help with the adjustment process. Countries with fixed exchange rate regimes experience large and significant declines in real GDP in response to negative terms-of-trade shocks because the real exchange rate depreciates slowly so may need a relatively stronger fiscal response (Broda 2004).
- Fiscal structural reforms should support a sustainable large adjustment. Large fiscal adjustments tend to be more sustained when they are gradual and supported by reforms (for example, energy subsidies and civil service reforms). Policies should be put within a medium-term framework and a political and social consensus should be built through transparency, accountability, and proactive engagement with the population and stakeholders.

**Figure 6. A Transition Scenario for a Stylized RRC**



Source: IMF staff.

Note: In this scenario, the NRPB anchor (calibrated as a constant share of non-resource GDP) is attained following a 10 year transition period, during which capital spending is increased during the first 5 years and current spending is reduced in the subsequent 5 year period to attain the anchor. Two cases are compared: one in which investment is assumed to be productive and leads to higher non-resource GDP and revenues (short- and long-term multipliers of 0.3 and 1.4 respectively) and another in which investment is not productive (fiscal multipliers are assumed to be zero). In the productive case, non-resource revenues and expenditure are higher and debt remains on a declining path but in the non-productive case there is no additional revenue benefit and debt breaches standard vulnerability thresholds.

The choice of transition path should be informed by an assessment of the likely impact on growth, debt, wealth, and spending. Simulations of different options should incorporate the expected impact of discretionary changes in revenues or expenditure on non-resource GDP and non-resource revenues, based on an analysis of short- and long-term fiscal multipliers.<sup>19</sup> It is also useful to check sensitivity of the

path to underlying assumptions for the fiscal multiplier (reflecting, for example, alternative scenarios for spending productivity, efficiency, and absorption capacity), since different values can have large implications. Figure 6 shows an example of a transition involving an initial scale-up of investment, followed by a consolidation in current spending to reach the anchor. The simulations illustrate the importance of fiscal multipliers: if investment is assumed to be productive, non-resource revenues and expenditure are

<sup>19</sup>IMF (2014) provides guidance on the determinants of the size and persistence of fiscal multipliers.



### Box 3. Investing Resource Revenue to Fill Infrastructure Gaps: A Good Idea?

In principle, using resource revenues to scale up investment could be preferable to investing in financial assets, especially in low income countries facing large infrastructure gaps (see Collier, van der Ploeg, Spence, and Venables 2010). Marginal returns on quality investment can be higher than from financial assets when the stock of capital is low. Scaling up investment in physical—or human<sup>1</sup>—capital in the non-resource sector can enhance prospects for sustainable and resilient growth and meet the Sustainable Development Goals (IMF 2019). Diversifying the economy away from natural resources also reduces vulnerability to the “Dutch disease,” while creating jobs in more labor-intensive sectors than the extractive industries. Further, if the growth impact of an investment project also leads to fiscal returns, it can provide fiscal space that could support a higher level of spending (see IMF 2016b). Financial market imperfections may also justify financing productive projects from a country’s own revenue sources, particularly if there is insufficient availability of external financing.

Securing the expected benefits from increased investment has been challenging in practice, particularly for developing economies. For instance, the IMF (2014) notes, only half of the increase in government investment in emerging market and developing economies during the period 1980–2012 translated into productive capital. Although the IMF (2014) found that public investment shocks raise the level of output by about 0.4 percent in the same year, and 1.5 percent after four years in advanced economies, the impact in emerging market economies and low-income countries is much smaller, at around 0.25 in the same year, and 0.5 after four years. Lower multipliers can be due to several factors, including weakness in the

<sup>1</sup>Investing in human capital (e.g. through education, health) requires a different strategy to physical capital, as the returns are typically generated over a longer horizon. It also requires a sustained investment in terms of recurrent spending.

investment management processes, broader capacity constraints, and supply bottlenecks which can lead to wage-inflation pressures and/or higher imports (Sachs and Warner 1999; Van der Ploeg 2011). Structural Dynamic Stochastic General Equilibrium (DSGE) models have also been developed specifically for the analysis of scaling up of investment in resource-rich countries, for example, Berg and others (2013) and Melina, Yang, and Zanna (2016).

The scale-up decision should be guided by an assessment of the likely benefits and should be commensurate with existing institutional and absorptive constraints (Collier 2011 and Berg and others 2013). A thorough assessment of the size of infrastructure gaps, the likely returns compared to investing in financial assets, and the impact on fiscal sustainability and intergenerational wealth sharing should all be considered in countries’ infrastructure strategies. An assessment of institutional constraints requires an in-depth study of the strength of public investment management processes, while absorptive capacity will involve analysis of cost and price dynamics in labor and product markets.

Sound governance is critical to support an effective scaling-up. To ensure that investment projects, especially large ones, can fully meet their economic and social objectives, it is essential that countries establish the capacity to effectively appraise, select, and implement public investment projects. Without these in place, it is sensible to adopt a gradual and cautious approach to scaling-up. Maintaining adequate *fiscal buffers* is critical to avoid investment projects being affected by revenue shortfalls during commodity price declines. Collier and others (2010) argue that investment scale-up should only take place after building sufficient fiscal buffers. The IMF has developed a comprehensive framework to assess infrastructure governance and to identify the priorities for reforming it—the Public Investment Management Assessment (PIMA, IMF 2018a).

higher; if investment is not productive, debt breaches vulnerability thresholds with no additional growth or revenue benefit.

### A Precautionary Stabilization Buffer

In the event of temporary shocks to commodity revenues, maintaining a stable level of spending is important to avoid procyclicality of fiscal policy. During a commodity boom, windfall resource revenues should be saved, leaving the pre-shock spending path

unchanged. A sudden unexpected fall in commodity revenues is more challenging. Unless the revenue shortfall can be met with additional financing, for example through drawing down existing assets or new borrowing, a reduction in expenditure (or increase in taxes) is likely to be needed, which can have subsequent negative effects on economic growth and the provision of public services.

To mitigate these risks, it may be prudent to maintain a precautionary financial buffer composed of liquid financial assets in some cases.<sup>20</sup> Whether an additional liquid asset buffer is needed—and its appropriate size if it is—will depend on a range of factors, including the risks to commodity revenues, the initial level of debt, and the availability of new borrowing and policymakers' level of risk aversion. When faced with a shock, policymakers do not know whether the shock is transitory or permanent. A useful way to assess the adequacy of existing buffers is to conduct stress tests of the impact of a range of different commodity revenue shock scenarios on macroeconomic and fiscal variables.<sup>21</sup>

### Step 5: Design Stress Test

The first step in designing a stress test is to specify a shock scenario. For commodity revenues, this can be as simple as outlining a “worst-case” path for commodity prices (for example, oil prices falling to \$30 a barrel), or based on more sophisticated value-at-risk (VaR) approaches, using the historical stochastic properties of the revenue volatility.<sup>22</sup> In general, the shock should have both a low but reasonable probability of occurring and the policymaker should consider it important to insure against it. Estimating the impact of a price shock on actual resource revenues should take

<sup>20</sup>The October 2015 Fiscal Monitor (IMF 2015) discusses (in the context of the 2014 decline in commodity prices) how resource-rich countries could use precautionary buffers to better manage uncertainty.

<sup>21</sup>Model-based approaches can also be used to estimate buffer needs. The models developed by Berg, Portillo, Yang, and Zanna (2013) and Melina, Yang, and Zanna (2016), are specifically designed for RRCs.

<sup>22</sup>A VaR is a simple method to estimate the minimum size of a stabilization buffer that can absorb tail risk in resource revenue volatility that occurs with probability  $p$ , over a given time horizon  $t$ . For example, a VaR-based estimate of a \$1 billion buffer, with  $p=0.1$  and  $t=3$  means there is a 10 percent chance that the buffer would fall by more than 1 billion over the next three years. In other words, a \$1 billion buffer would cover 90 percent of shocks over that horizon, and fiscal adjustment would be needed for the remaining 10 percent of adverse shocks.

into account exchange rate movements as well as any non-linearities because of the fiscal regime or other factors. The impact on overall fiscal revenues will depend on the level of resource dependence.

The policy response to a resource revenue shortfall also needs to be considered. Several options are possible: i) maintain spending at its pre-shock level and finance the shortfall with liquid assets or new borrowing; ii) reduce spending (or raise taxes) to fully compensate for the lost revenue; or iii) a combination, whereby spending reductions only partially offset the shortfall in revenue. The response will depend on both the nature and severity of the shock. For temporary shocks that have a minimal impact on estimates of long-term resource wealth, it may be best to leave spending paths unchanged, replacing revenue with additional financing (from new borrowing or the use of financial assets). More persistent shocks may lead to a reduction in projections of future resource revenue, necessitating a structural reduction in expenditure.<sup>23</sup> Even if spending needs to be cut, however, it may not be best to do so immediately; in this case borrowing or using financial assets could help smooth the adjustment.

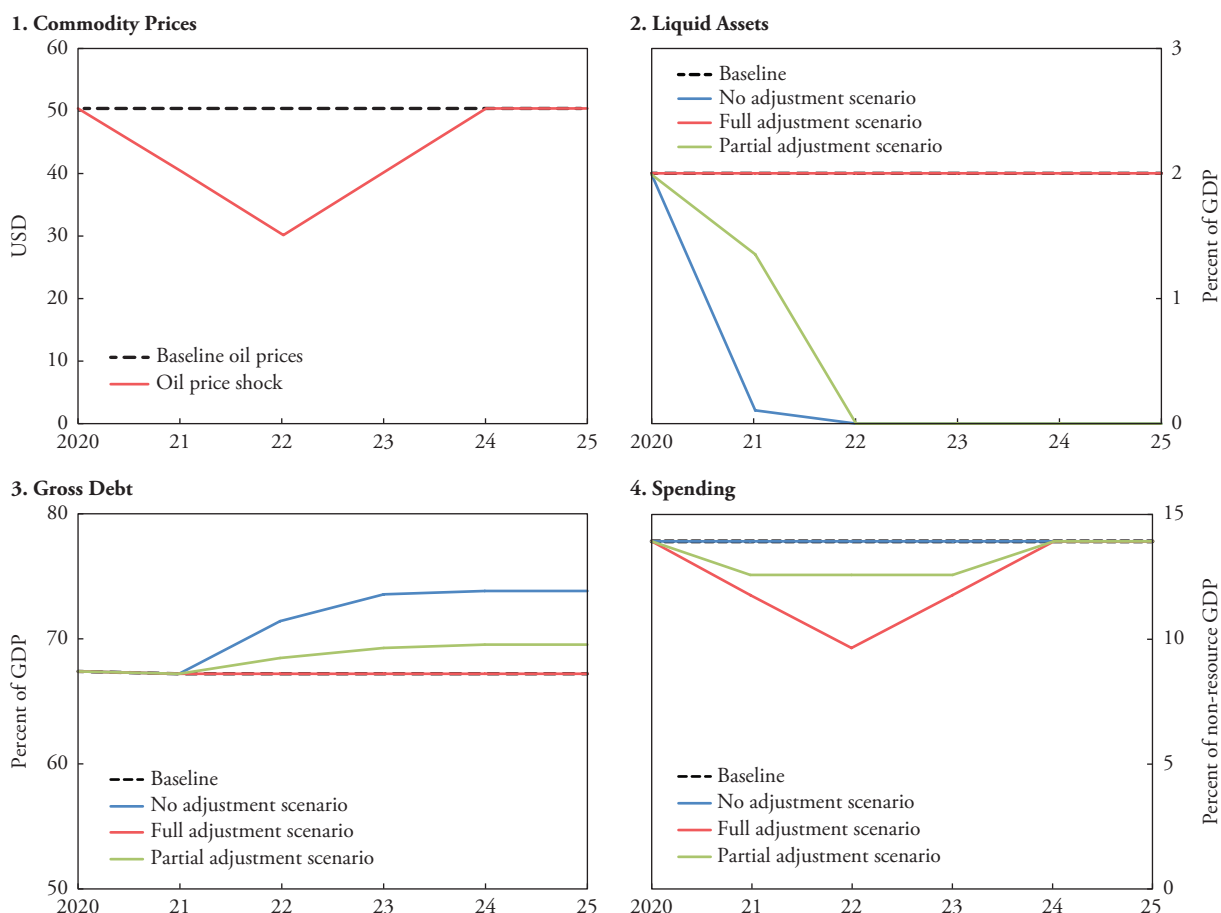
### Step 6: Set Precautionary Buffer Target

The results of the stress test can be used to assess whether there is a need for additional financial buffers (a stylized example is shown in Figure 7). A simple first test is debt sustainability: for a given policy response, does the shock lead to additional borrowing needs such that debt breaches vulnerability thresholds?<sup>24</sup> If the answer is no, the level of debt may be sufficiently low that additional borrowing can be used to finance the revenue shortfall. However, if the answer is yes, then precautionary financial buffers are insufficient. In this case, the near-term fiscal path should be revised (for example, a more front-loaded fiscal adjustment or postponing any planned scaling-up of spending), or the policy response reconsidered (for example, tolerating larger reductions in spending) to accumulate sufficient financial assets or pay down debt. If debt remains sustainable in the stress test, the policymaker should still assess whether the impact on other variables (spending,

<sup>23</sup>In real time, it is difficult to know whether a shock is temporary or more persistent. But it is prudent to assume that some fraction of any large shock is persistent.

<sup>24</sup>As defined in the IMF's Debt Sustainability Analysis Framework.

**Figure 7. A Stress Test for a Stylized RRC**



Source: IMF staff.

Note: In this scenario, commodity prices are assumed to decline to \$45, \$30 and \$45/barrel in years 1, 2 and 3 of the shock period respectively. The charts show the impact on liquid assets, debt and spending for three different policy responses: i) ‘no adjustment’ where spending remains unchanged and the revenue shortfall is met through running down liquid assets and new borrowing (in that order), ii) full adjustment, where spending reduction fully offsets the revenue shortfall, and iii) partial adjustment, where reductions in spending a subject to a maximum of 10 percent of the pre-shock path. The scenario shows that a no adjustment strategy would leave liquid buffers exhausted and the already-elevated gross debt ratio to increase by a further 4 percent of GDP to almost 65 percent of GDP; a partial adjustment strategy would lead to an almost 2 percent of GDP reduction in expenditure and leave liquid buffers exhausted (although there would only be a small increase in debt), while a full adjustment strategy would lead to a very large 8 percent reduction in spending. These results suggest that a partial adjustment may be the only feasible course of action or the near-term fiscal path should be revised to accumulate additional fiscal buffers.

GDP growth, interest costs) is tolerable before ruling out the need for additional buffers.<sup>25</sup>

If an additional buffer is needed, it can be useful to set a target and a plan to achieve it. The plan should include: (i) the size and composition of the buffers needed to protect spending plans against a specified range of shocks; and (ii) contingency planning: pre-identified fiscal adjustment measures that would

be triggered when buffers are insufficient to protect spending. A liquid asset buffer target would usually be set in gross terms, although if the level of debt is high, it could also be set in net terms (either as net liquid asset/debt target, or two targets for assets and debt, individually) and paying down of debt to a specific level could be explicitly incorporated into the fiscal strategy. The buffer should be composed of liquid assets, held in cash or short-term liquid securities, and usually in foreign exchange. It should also be distinct from any liquid asset holdings dedicated to other purposes, such as cash or debt management.

<sup>25</sup>Feedback effects should be incorporated into the stress test, for example, the impact of spending reductions on growth and non-resource revenue, as well as increases in borrowing costs in a shock scenario.

In addition to short-term revenue volatility, the considerable uncertainty surrounding income from natural resources over the long run provides an additional reason for maintaining a precautionary stabilization buffer. Projecting long-run levels of resource prices, reserves, and returns on investment is extremely difficult and leads to uncertainty over the appropriate level of the long-term fiscal anchor. A practical approach to deal with these issues (and the one adopted in this note) is to calibrate fiscal strategies under both a baseline and alternative scenarios (based on different assumptions for the key determinants of resource income). Based on the outcomes of these scenarios and the policymaker's risk tolerance level, a more conservative fiscal strategy than implied by the baseline scenario may be appropriate (for example, with higher levels of financial savings in the early years, so that fiscal policy would be better prepared to manage the volatility of commodity prices). More sophisticated approaches are also possible, for example, a precautionary version of the PIH benchmark can be derived (IMF 2015b) that accounts for the uncertainty that surrounds commodity revenues and the preference that policymakers have for stability.

### Implementing and Updating the Fiscal Strategy: Practical Considerations

The core elements of a fiscal strategy for the use of resource revenues in RRCs is consistent with the objectives (for consumption of resource wealth), fiscal sustainability anchor, transition path, and precautionary buffer target described previously in this note. These elements can guide the setting of medium-term and annual fiscal targets and, if relevant, any fiscal rule. To ensure the strategy is credible and can be implemented effectively, however, it also needs to have wide support among politicians and other stakeholders and be underpinned by robust fiscal institutions.

#### Step 7: Communicate Fiscal Strategy and Establish Revisions Policy

Communication of a strategy for the fiscal management of resource wealth can be challenging, particularly since some of the concepts can seem abstract. Saving a portion of resource revenues can be difficult to understand, particularly in countries with pressing development needs. However, effective communication can be facilitated with the use of some simple indica-

tors. Transparency about the portion of revenue that is saved in financial assets and the portion that is invested in domestic infrastructure can help to convince stakeholders and the public that saved revenue is not wasted through bad investment decisions or corruption. Computing the additional public expenditure from resource revenues in per-capita terms for all current and future generations can also be powerful. Communication can be framed in both positive or negative terms, for example, "this strategy ensures all current and future generations will benefit from our natural resources by an additional \$x per person" or "unless we adjust now, when the resource runs out, spending on public services for our children will be lower by \$x per person."

The strategy should ideally be set out in separate legislation and should be published as a policy document, which includes a discussion of the rationale and the choices, including any trade-offs they imply (for example, attaining a target level for financial buffers in the near-term may lead to some postponement of investment spending). The process for revisions or updates of the strategy should also be spelled out. Revisions may be necessary following the occurrence of large and persistent shocks that affect estimates of resource wealth (such as proven recoverable reserves or commodity prices) or other parameters (growth, interest rates, and so on), since they will also impact the calibrated level of the fiscal sustainability anchor and any financial buffer target. This does not mean that the fiscal strategy should be updated in response to every structural shock. Instead, the approach to revisions should balance the strategy's aim of providing reasonably long-term and durable guidance for fiscal policy with the need for flexibility when large shocks do occur. Some considerations are outlined in Box 4.

#### Step 8: Develop Supporting Institutions for an Effective Fiscal Framework

Successful experiences in some RRCs show that effective use of resource wealth needs to be supported by a strong set of policies, institutions, and regulatory and legal frameworks, as well as political commitment and sound fiscal governance. Some of the most important areas are discussed as follows:

- *Public financial management.* Prioritization should be given to the development of strong public financial management (PFM) practices. Important elements include a strong and credible medium-term fiscal framework, which, in turn, requires the ability to

#### Box 4. When and How to Revise the Fiscal Strategy

Long-term assumptions and commodity price volatility present a significant challenge for fiscal strategies in resource-rich countries (RRCs) that are set on an ex-ante expected basis. Indeed, ex-post realizations of commodity prices, together with assumptions on potential long-term growth and the real effective exchange rate can shift long-term anchor estimations. Further, in RRCs, shocks to commodity prices typically have an important fiscal impact.

For small and cyclical deviations of commodity prices, the best response is not to revise the overall fiscal strategy. If the shock is small and not seemingly related to a structural change to supply or demand, the previously projected price path remains the best predictor of future prices. The deviations are expected to be symmetric around the projected price path and should broadly cancel out over time. Wealth would also remain close to its projected path over time and thus the fiscal anchor and targets could remain unchanged.

If the shock is large and/or expected to be persistent (thus leading to a significant cumulative deviation in resource revenue), the fiscal anchor and targets should be adjusted. In this case, estimates of resource wealth could shift substantially and the existing strategy may no longer be sustainable. For example, if the previous fiscal targets remained unchanged, a persistent negative shock to resource wealth would lead to an exhaustion of wealth over time, while a persistent positive shock could lead to wealth increasing over time, benefiting future generations at the expense of the current one. It is difficult to know in real-time the specific nature of some shocks, so policymakers should err on the side of minimizing adverse consequences, particularly for negative shocks. There are costs associated with both underpredicting and overpredicting a commodity price shock. These costs are not symmetric, however. Underpredicting a persistent negative shock (and

hence maintaining fiscal targets unchanged) could quickly lead to a depletion of fiscal buffers and hence undermine macroeconomic stability (in contrast, when positive shocks are underpredicted, fiscal buffers are built up). A prudent approach for policymakers could therefore be to more readily adjust the strategy in the event of large negative price shocks. The costs of prediction errors are also likely to differ among countries. If the extraction horizon for the natural resource is long, a change in price may have a small impact on the level of the sustainable fiscal anchor. And if fiscal buffers are substantial, this can provide more room for the policymaker to wait before adjusting the strategy.

The process for revising the fiscal strategy should be set out in advance and could incorporate the following principles:

- *Do not adjust too often.* A fiscal strategy is intended to provide a long-term guide to the setting of fiscal targets, which would be undermined by very frequent adjustment (for example, every year). Frequent adjustment could also lead to overly procyclical fiscal policy. Not adjusting to a shock immediately also allows time for gathering more information on whether it is likely to be temporary or persistent.
- *Periodic assessments could guide updates.* Formal assessments, possibly conducted every three to five years by either an independent fiscal institution, such as a fiscal council, or a committee of experts, could provide a mechanism to guide updates. There could also be exceptional assessments when very large shocks occur.
- *Updates should be aligned with the budget cycle.* Any updates or revisions to the strategy should be aligned with the relevant annual budgetary cycle to ensure budget targets are always consistent with the strategy. They should also be supported by a revised medium-term fiscal framework.

produce robust and realistic forecasts and conduct risk analysis, combined with robust budget execution, cash and debt management, and accounting and reporting. Improving fiscal transparency and enhancing the monitoring of fiscal risks can help foster the more efficient use of public funds and build support for prudent policies.

- *Fiscal rules.* Once adequate PFM systems have been established, fiscal rules can be introduced to help

achieve the fiscal path set out in the fiscal strategy. Fiscal rules are numerical constraints on budget balances, spending, or debt and help to strengthen fiscal discipline through enhanced accountability and transparency. Experience shows that many RRCs find it difficult to stick to fiscal rules and that an important pre-condition for effectiveness is a strong underlying PFM system.

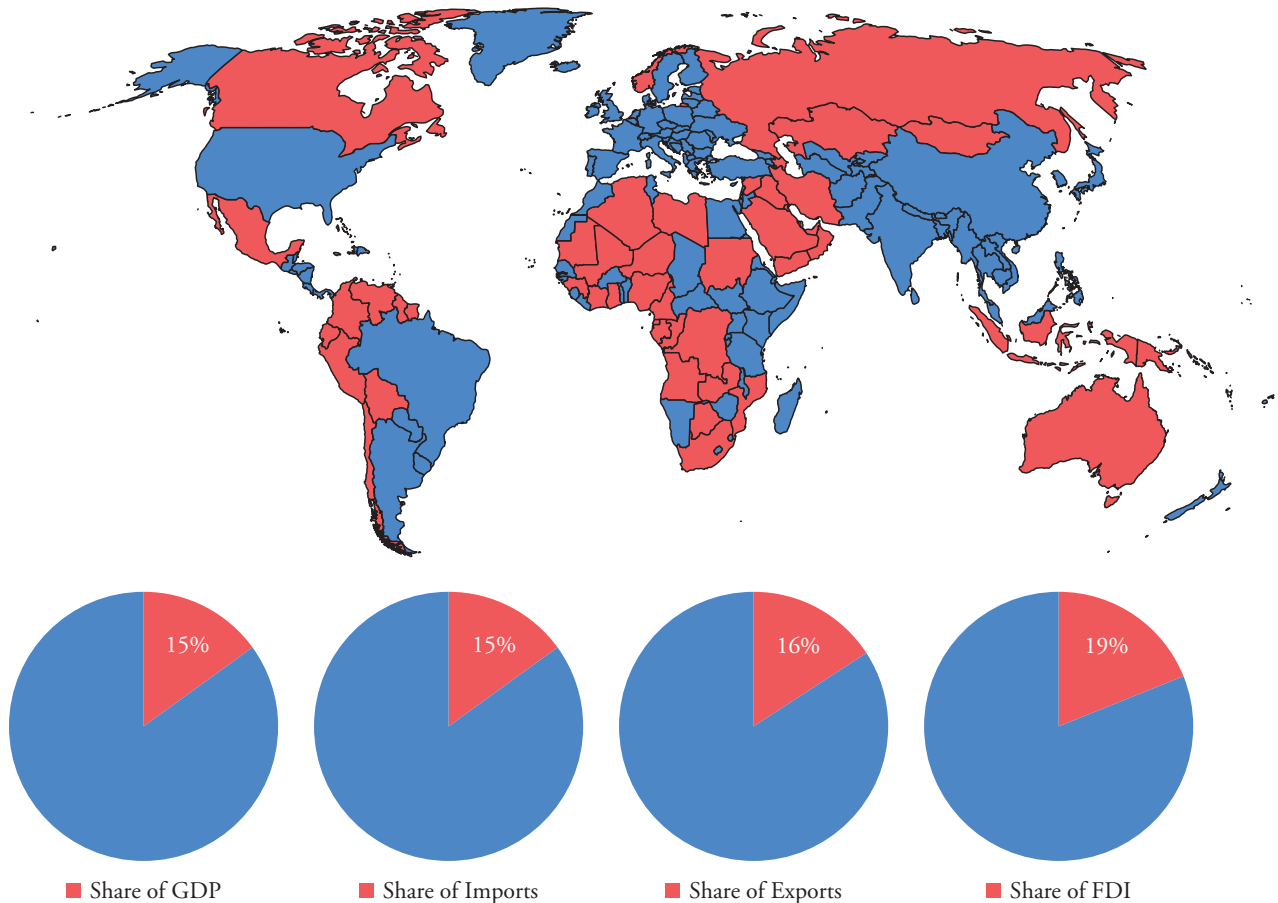
- *Financial asset management.* A policy for the financial investment of resource wealth that carefully balances risk, return, and liquidity objectives should be established. If a separate resource fund is created, it should be fully integrated with the budget and have strong transparency, controls, and accountability. Resource funds should be complementary tools, not the main fiscal policy instrument since potentially complicated rules governing flows between the budget and resource funds are not conducive to effective fiscal policy management. The accumulation of financial assets in a fund for precautionary (buffer) purposes and/or intergenerational objectives should be determined by actual fiscal surpluses derived from the underlying fiscal strategy.
- *Tax policy and administration.* For many RRCs, tax ratios are significantly below their potential and increasing non-resource revenue is vital for easing the burden of any needed adjustment on expenditure while creating fiscal space to finance priority spending (IMF 2016b). It is vital to start the move to higher non-resource-based taxation as soon as possible. Postponing it to after resources are depleted would likely be extremely costly in terms of economic growth. A sound medium-term revenue strategy can help, although the lower incentives faced by resource-rich governments to mobilize revenue from domestic sources must also be addressed. As for the resource sector, the design of fiscal regimes for extraction projects must strike the right balance between maximizing government revenue and attracting new investment, while strengthening institutional capacity to ensure strong tax compliance is often a key priority.
- *Improving governance and fighting corruption.* Weaknesses in governance frameworks can facilitate corruption (IMF 2018b and IMF 2019). Corruption, in turn, can increase the cost of public services and infrastructure and reduce the capacity of countries to mobilize domestic revenue. In the natural resources sector, corruption can exploit governance vulnerabilities in the areas of allocation of property rights, revenue collection from extractive industries, and the oversight of state-owned enterprises involved in the sector.

## Annex 1. Resource-Rich Countries

There are currently 51 countries where non-renewable commodities such as oil, gas, and metals represent at least 20 percent or more of total exports or fiscal revenues. They are a mix of high-, middle-, and low-income countries and together represent close to 15 percent of world GDP and global trade and are an important destination for foreign direct investment (FDI). They hold a large share of the world’s known natural resources, accounting for almost 92 percent of crude oil reserves and 75 percent of copper reserves.

### Annex 1. Nonrenewable Commodity Exporters, 2019

■ Countries with more than 20% of exports from nonrenewable commodities ■ All other countries



Sources: World Economic Outlook; World Development Indicators.

## Annex 2. Comparison of Calibration Methods for the Long-term Fiscal Sustainability Anchor

### Annex 2. Comparison of Calibration Methods for the Long-term Fiscal Sustainability Anchor

Long-term use of resource wealth	Anchor	Calculation	Calibration	Profile of real per capita consumption (out of resource wealth)		
				Equal across generations	Downward tilt (future generations benefit less)	Upward tilt (future generations benefit more)
Wealth shared across current and future generations (PIH-based approach)	NRPB	$-NRPB_t = (i - g)W_{t-1}$	Constant in real per capita terms $g = \pi + \alpha$	Y	N	N
	NRPB	$-NRPB_t = (i - g)W_{t-1}$	Constant as a share of non-resource GDP $g = \pi + \gamma$	When $\alpha = \gamma$	When $\alpha > \gamma$	When $\gamma > \alpha$
	NRPB	$-NRPB_t = (i - g)W_{t-1}$	Constant in real terms $g = \pi + \gamma$	When $\alpha = 0$	When $\alpha > 0$	When $\alpha < 0$
Prudence/Bird-in-hand	NRPB	$-NRPB_t = (i)A_{t-1}$	Constant rate of return on financial assets	N	N	Y
Spend-as-you-go	Debt	$Debt_t < Debt_{limit}$	Debt limit established by DSA	N	Y	N

Note:  $\pi$  is the rate of inflation,  $\gamma$  is the rate of real non-resource GDP growth,  $\alpha$  is the rate of population growth.



### Annex 3. Comparison of Frameworks for Designing Fiscal Transition Paths

This table presents a comparison of alternative approaches for designing transition paths to attain the fiscal anchor. The generalized framework in this How to Note is compared to the Modified PIH (MPIH) and Fiscal Sustainability (FSF) frameworks in IMF (2012).

#### Annex 3. Comparison of Frameworks for Designing Fiscal Transition Paths

This table presents a comparison of alternative approaches for designing transition paths to attain the fiscal anchor. The generalized framework in this How to Note is compared to the Modified PIH (MPIH) and Fiscal Sustainability (FSF) frameworks in IMF (2012).

	Transition period (before NRPB anchor attained)	Fiscal multipliers		Maintenance costs (from incremental investment)	Different transition paths for capital and current spending?	Growth rate of NRPB
		Short-term	Long-term			
Modified PIH (MPIH)	Y	N	N	N	N	$\gamma + \pi$
Fiscal sustainability framework (FSF)	Y	N	Y	Y	N	$\gamma + \pi$
Generalized How to Note framework	Y / N	Y / N	Y / N	Y / N	Y / N	$\gamma + \pi$ or $\pi + \alpha$ or $\pi$

Note:  $\pi$  is the rate of inflation,  $\gamma$  is the rate of real non-resource GDP growth,  $\alpha$  is the rate of population growth.

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