Lao PDR Development Report 2010
Natural Resource Management for Sustainable Development

BACKGROUND PAPER
Fiscal Policy Options for Resource-Rich Laos

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Summary

Lao PDR is rich in natural resources that comprise more than 50 percent of its total natural wealth, including forests and protected areas, agricultural land, minerals, and hydroelectric energy. This is compared to only about 30 percent for an average low-income country (LIC) and 20 percent for an average country in East Asia and the Pacific (EAP).

Laos will face challenges in managing its natural wealth, but there is enough time for it to introduce the right policies so that its natural resource wealth can make a positive contribution to its economic growth and to reducing poverty. In many countries, the discovery of significant natural resources has been described as a “curse” for development, in that such wealth suppressed productivity growth, negatively impacted competitiveness, or created extensive rent-seeking activities. However, other countries, have managed to turn their natural resource wealth into blessing thanks to appropriate government policies and institutions, especially fiscal policies and institutions.

Volatility is the main way in which any negative economic effects from natural resource exploitation are usually spread. Landlocked countries with underdeveloped financial sectors face greater problems in managing their natural wealth than others, as they are more prone to negative effects from macroeconomic volatility induced by prices for natural resources.

One way to reduce harmful impacts of volatility is to conduct fiscal policy that explicitly accounts for the exhaustible resource revenues. In case of Laos, it is minerals and especially copper; but also hydroelectric revenues in as much as the coming on stream of the new power stations is uncertain, or the weather shocks that could affect the output. Introduction of simple fiscal rules that specifically guide spending from the resource-related revenues will help increase predictability, improve impact of investment and allow for sharing with future generations.

A fiscal policy that smoothes government spending over time will help to manage the volatility of revenues while also helping save for a “rainy day” and for times when revenues are low. Allowing the revenues from resource development to be used only for capital or growth-related uses only would also help to keep the deficit low in times of shocks. Apart from the benefits of reduced volatility and managing exchange rate appreciation that may arise through the spending effect, a fiscal policy that restricts government spending of natural resource revenues to a sustainable level will help to ensure that the country has adequate foreign assets and enough credibility in global financial markets to help it ride through any adverse commodity price shocks. Linking fiscal policy with the development plan would also benefit the country in terms of policy coordination and help in deciding on the relative amounts of investment and consumption in spending of the resource revenues.

The spending effect that stems from increased expenditures from resource revenues and that can lead to the suppression of manufacturing, agriculture, or other tradable goods production (the so-called Dutch disease) can also be controlled by capping spending from the natural resource revenues. A fiscal policy that caps spending will, therefore, also deal with the negative impact of natural resource wealth on competitiveness and growth. The fiscal projections in this paper take volatility into account in estimating mineral revenues but also include relatively large hydropower revenues. Even if hydro revenues are less volatile, they also need to be spent efficiently and without jeopardizing fiscal sustainability.

The choice of an adequate fiscal policy will depend on the government’s strategic objectives.

• **First**, the government must decide whether it wishes to share natural resource revenues with future generations – which will define how much of the resource revenues it will spend beyond what is needed for stabilization purposes.
• **Second,** the government must decide how to share these revenues with future generations (for example, assets or investments in productive growth), which will then define the amount it spends on investment and where it invests. The latter will be constrained by the quality of public financial management and the government’s ability to implement and screen projects.
• **Third,** the government will need to identify the extent of its aversion to macroeconomic shocks and to decide if a stabilization fund is needed (and on its objectives, size, and rules), as well as to decide if the country’s external debt should be repaid from resource revenues.

The rest of this paper considers the elements of such a policy in more detail by reviewing the literature and identifying potential challenges.

**Based on the Lao PDR’s fiscal profile and projections until 2025, an “optimal” fiscal strategy** would allow for higher investment than the pure “permanent income strategy” but would also allow for a build-up of modest savings. Specifically, if primary expenditure was around 17 percent of GDP after the spike in 2009 and gradually was increased to 20 percent of GDP, then 1 percent of GDP could potentially be saved each year, as well as will help reduce foreign debt below the LIC threshold by 2020. Such a strategy takes into account the country’s development needs as well as the macroeconomic challenges related to managing large resource revenues.

**If the government contemplates using a natural resource fund as part of its fiscal policy, its integration into the budget process is essential to ensure that expenditures from the revenues are coordinated.**

• A virtual fund (an accounting mechanism within the budget) is a good option, especially in countries where political economy constraints or a loss of fiscal control may be a threat.
• Even when a separate structure is established for accounting purposes, the transfers should go through the budget to maintain the same approval mechanisms and budgetary and policy integrity. All expenditures should be executed by the Treasury.
• The rules of the fund should be transparent, accountable, and without discretion to prevent them from being diverted by political interests. In some countries, the funds are subject to independent audits and evaluations of their investment performance.
• An appropriate asset management and investment strategy should be designed, especially in cases where the proceeds can be invested in public projects. This should include building the capacity to evaluate and screen public programs and to implement projects.

**For Laos, we are recommending introducing a simple fiscal rule that sets a ceiling on the total expenditures as percentage of GDP and sets up a simple resource fund for the purposes of emergency saving against such shocks as a fall in copper prices, lower than projected hydroelectric revenues, or weather shocks.** Only countries with strong PFM systems and medium-term planning mechanisms can successfully implement complex fiscal rules and natural resource funds, and therefore we suggest that the simplicity of the rule is the key to its successful implementation and enforcement. What is also important is making use of a fiscal framework that allows the government to set and achieve targets for debt levels as well as the non-resource deficit.

**Additional research is needed to establish more specific rules for the spending of the proceeds and fund management** once the government has taken a coordinated approach at the aggregated expenditure level. The guiding principles should be a coordinated approach to spending led by the Ministry of Finance and integrated into or coordinated with the budget through predetermined strict rules on each type of spending. Preference should be given to investments over recurrent spending. Investments should comply with general rules and should aim to increase productivity and growth in the long run, and to reduce poverty (for example, education and market-supporting infrastructure such as rural roads).
Introduction

The extent of Lao PDR’s substantial natural resource wealth has come to be accurately assessed only in recent years. The expected growth in natural resource production over the next few decades has increasingly been influencing most aspects of Lao PDR’s economic development. It is only recently that policymakers have begun to assess the policy implications of these coming changes.

This paper focuses on only two components of this wealth: energy (hydro-electricity) and mining. We project both sources of revenues into the future, based on assumptions about future mineral extraction and hydroelectric power generation. However, when it comes to the analysis of the fiscal aspects of the natural resource management, a distinction is usually made between renewable and non-renewable (exhaustible) resources.

- It is a consensus that, from the fiscal sustainability perspective, revenues from renewable resources such as hydroelectricity should be treated just like the revenues from other economic activities. However, if the necessary investments to maintain dams over the long term are not properly made and if prices are not fixed ahead for prolonged periods of time (as is currently the case in Laos), even hydro-energy will become less renewable. Also, there is an element of uncertainty about the pace at which the planned hydropower stations will come on stream. Therefore, in this paper, we unavoidably make references to the hydroelectric sector and incorporate the potential revenues from the hydroelectricity into the fiscal framework.

- The revenues from minerals, due to their exhaustible nature as well as their tendency to create high economic volatility, are considered separately, and we account for this volatility. Therefore, when it comes to volatility, we focus on the revenues from copper, gold, and other metals and minerals, all of which could be called “exhaustible.” Our conclusions about the stochastic intervals within which debt might move also pertain to how prices of copper have moved in the past.

Figure 1: Lao PDR – Fiscal Revenues from Mining (% of domestic revenues – excl grants)

Source: Staff calculations using official data.

Figure 2: Lao PDR – Primary Balances (% of GDP)

The rapid growth of the natural resources sectors is already transforming Lao PDR’s economic landscape. Mining and hydropower production rose from around 2 percent of GDP before

1 See Davading (2010), Larsen (2010).
1998 to 11.9 percent in 2008, contributing up to one-third of real economic growth annually in recent years, while exports reached close to 60 percent of merchandise exports by 2007.\(^2\)

**Revenues from the natural resource sector are also dramatically altering the government’s fiscal position.** Fiscal revenues from mining have risen from 3 percent of total revenues in 2001 to close to an estimated 18 percent in 2008 (Figure 1). Initially, the government took the fiscally prudent course of saving a large part of these natural resource revenues, which resulted in a sharp fall in the overall fiscal balance together with a nearly stable non-natural resource fiscal deficit. However, due to the increased spending that was needed to mitigate the impact of the global financial crisis as well as some directed lending\(^3\) during the same period, these gains were lost in 2009 (Figure 2).

**Even more significant economic changes are likely to lie ahead as the size of natural resources development continues to grow.** Some experts calculate the country’s potential reserves of gold and copper to be five to eight times greater than the size of the currently proven reserves. Hydroelectric power production is expected to quadruple as major projects (led by the Nam Theun 2 project) come on stream by 2010. Additional hydroelectric potential could double that level once more.\(^4\)

**Nearly all of the direct benefits from the mineral exploitation and development of hydroelectricity that accrue to the residents of Lao PDR will be in the form of government revenues.** Thus the potential benefits or costs of natural resource abundance are likely to be closely related to the government’s fiscal policy, in particular to its decisions about whether to spend natural resource revenues in the domestic economy versus saving them, about different kinds of spending in the domestic economy, and about the particular uses of the funds.

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\(^2\) See the main Lao PDR Development Report (2010).

\(^3\) The details of the government’s crisis response, monetary policy, and directed lending are discussed in the Lao Economic Monitors (2009).

\(^4\) Marutani (2006), see also Larsen (2010) and Fraser (2010).
Challenges of Natural Resource-based Development

The view we take in this report is that the expected expansion of the natural resource sector in Laos, if carefully managed, can accelerate the country’s economic and social development. The increasing importance of natural resources in the economy will, however, raise difficult policy challenges. These challenges, if not adequately addressed, could harm Lao PDR’s long-run development. In this paper, we faced a similar problem to the one faced by the authors of the other background papers for the Lao PDR Development Report, which is that, while natural resources will play a much larger part in Lao PDR’s future development, the country has so far had relatively little experience of its own with the effects of such development. Therefore, we draw on the experience of other countries to a greater extent than is normally the case for country reports of this kind. This section will begin with a brief overview of the relationship between natural resources and development and list some of the principal ways in which natural resources might have an adverse impact on the Lao PDR economy. A more detailed analysis can be found in Brahmbhatt and Vostroknutova (2010).

A survey of the large and rapidly growing empirical research in this area suggests that, in the words of a recent World Bank report, natural resources are “neither curse nor destiny” (Lederman and Maloney, 2007a). Instead, the long-run impact of natural resources seems to primarily depend on the quality of a country’s institutions and policies. In those countries with poor institutions and policies, they contribute to declining long-run growth, while, in other cases, they provide a valuable foundation for development. A more recent study has found more concrete evidence that the direct effect of natural resources on growth is positive, while the indirect negative effect is predominantly through volatility (van der Ploeg and Poelhekke, 2009). The same study also found that the main channel through which the Dutch Disease affects growth is through increased volatility of the exchange rates and other macroeconomic variables that suppress innovation and growth.

A natural resource boom creates pressure for an appreciation of the country’s real exchange rate, leading to a decline in the profitability, productivity, and size in those sectors whose products are internationally tradable but which are not based on natural resources, such as the manufacturing sector. This is the so-called Dutch disease. Some inflationary effects can also be observed when spending from natural resource revenues is greater than productivity gains. Unemployment can also increase in the long run. These issues are studied in detail in Brahmbhatt and Vostroknutova (2010), which also considers the signs of Dutch disease in Laos.

There are two types of effects that can lead to real exchange rate appreciation - a resource movement effect and a spending effect. The boom in the natural resource sector attracts capital and labor from other parts of the economy, which tends to reduce output in those other sectors. The spending effect is more relevant to the fiscal side, as it often works through increased public spending; increased domestic income from the booming natural resource sector leads to higher aggregate demand for domestic goods (as well as for imports). Increased spending leads to higher prices and output in the non-tradables sector. Wages in the economy will tend to rise, squeezing profits in the non-natural resource tradables sector (“manufacturing”) where prices are fixed at international levels. Output in this sector will fall while imports will rise. The latter effect is the most likely source of Dutch disease in Lao PDR.

Why should countries with substantial natural resources worry about a potential appreciation of the real exchange rate? If the rise in natural resource income is permanent, any structural changes in the economy leading to a smaller tradable goods sector and larger natural resource sector in equilibrium should not be a matter of concern. However, if the increase in resource-related income is not permanent (in other words, most of these resources are exhaustible) or if the non-resource tradable sector (manufacturing) has some special dynamic characteristics that affect long run growth, then such structural changes could be detrimental to growth and government revenues in the long run. Many researchers have argued that manufacturing indeed has special characteristics such as increasing returns to scale, learning by doing, or abundant technological spillovers. Rodrik (2007) argued that real
exchange rate overvaluation may exacerbate market failures that hinder firms from innovating and entering new lines of production. This is important because of evidence that there is a strong association between a country’s long-run growth rate and its ability to master new export products and to export a diversified basket of products (Hausmann et al., 2007 and Lederman and Maloney, 2007b). Dutch disease thus can lock the country onto a less dynamic growth path.

In addition to exacerbating Dutch disease effects, the increased economic volatility associated with natural resources extraction can be a channel for a natural resource curse. Natural resource prices and revenues tend to be very volatile due to the low short-run elasticity of supply of natural resource output with respect to prices. If spending in an economy is closely related to its natural resource revenues, then the spending will also become more volatile. Spending volatility will in turn drive volatility in the real exchange rate (through the spending effect described above). A large body of empirical work now documents the adverse impact of economic volatility on investment and growth (Ramey and Ramey, 1995). Among other types of volatility, volatility in real exchange rates is often found to have an especially clear adverse impact on economic performance.5

Another related way in which commodity price volatility can affect growth is by fostering over-borrowing. High commodity prices in the 1970s encouraged many resource-abundant countries to use their resources as collateral to borrow abroad and to finance large investment projects and high public consumption. When commodity prices plunged in the 1980s, these countries were left with balance of payments crises and unsustainable external debt levels (Manzano and Rigobon, 2007).

Any economic volatility related to natural resources in Lao PDR would be related mainly to the prices of copper and, to a lesser extent, of gold and other metals. Electricity prices are unlikely to increase economic volatility because of the specific arrangements in the industry where prices are locked forward for the full concession period, which is usually 25 years (see MacGeorge et al., 2010, for a more detailed description). However, hydroelectricity revenues could be affected by other factors, such as new projects coming on stream, weather-related fluctuations in production, and investments in the long-term life of dams.

**Copper Price Volatility**

Copper prices are volatile. Analyzing the statistical properties of metal prices between 1972 and 1995, Brunetti and Gilbert (1995) showed that the volatility distributions of metals were positively skewed and exhibited excess kurtosis; in other words, metal prices tend to deviate upward and tend to exhibit much higher values than is normal.

Governments often have to squeeze their investments if their revenues are reduced (for example as a consequence of an external shock) because there is less flexibility for them to reduce fixed recurrent expenditures such as wages. Since Laos had not enjoyed any sizeable resource revenues and exports until 2005, it is only possible to estimate how volatility will affect the economy by illustrating how a decline in revenues can result in a squeeze on domestically financed investments (Figure 7 and Figure 8). The rest of the paper looks into fiscal policies that would reduce such volatility for Laos.

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5 Loayza et al. (2007) provided a recent survey. Serven (2003) documented the impact of real exchange rate volatility on investment. Aghion et al. (2006) observed that the extent to which real exchange rate volatility reduces growth depends critically on a country’s level of financial development. It is only in countries with low financial development that real exchange rate volatility has a significant impact on growth. The authors suggest that it is because such volatility tends to exacerbate the negative effects of domestic credit market constraints and imperfections.
Figure 5: Copper Price, US$ per metric ton

Source: London Metal Exchange data.

Figure 6: Log-differences of the Copper Price are Stationary

Source: London Metal Exchange data.

Figure 7: Domestically Financed Capital Expenditures Get Squeezed When Revenues Decline (FY2001-2008, US$ millions)


Figure 8: Recurrent Expenditure Stays About the Same While Capital Expenditure Declines in Hard Times (US$ millions)

Generally, landlocked countries with less developed financial sectors suffer the most from volatility induced by dependence on natural resources, according to a recent study by van der Ploeg and Poelhekke (2009). Therefore, it is extremely important for Laos to implement fiscal and macroeconomic policies that would mitigate such effects as much as possible, as well as to increase efforts to develop the financial sector, diversify the non-resource economy and facilitate trade, and to improve the investment climate. We discuss fiscal policies in this paper, while the other important policies are discussed in Brahmbhatt and Vostroknutova (2010).

We use the Fiscal Sustainability Tool based on the World Bank and IMF’s Debt Sustainability Framework (DSF). Budina and Wijnbergen (2009) and Bandiera et al. (2007), among others, have applied this tool to specific country cases. When modeling volatility, it assumes a normal distribution of shocks in the copper price model. This assumption is not completely correct, as we can see from the copper price data (in Figure 5) that the copper price is only normal in logarithmic differences. An ADF test on log differences confirms that it stays stationary (Figure 6). Our stochastic simulations based on the above assumptions are presented on page 21.

Fiscal Policy in a Resource-rich Economy

The actual impact of natural resources on an economy depends to a large extent on what policies are in place. In particular, a good macroeconomic policy would be one that can answer the following questions:

- How can we mitigate the volatility and uncertainty of resource prices and mute their effects on the economy?
- How should mineral wealth be shared across generations? In particular, how much of it should be saved and how much invested?
- How long will the revenues last and how can we best prepare for the post-resource period?

Fiscal policy that restricts government spending out of natural resource revenues brings benefits in terms of reduced volatility, managing exchange rate appreciation, and improves the country’s debt rating if it can borrow on international markets—because it reduces risks associated with commodity price shocks. Linking the fiscal policy with the development plan would also benefit the country in terms of policy coordination and help in deciding on the relative amounts of investment and consumption in spending of the resource revenues. Most importantly, committing recurrent spending out of volatile resource revenues would be unwise, as discussed below.

The exact choice of such a fiscal policy will depend on the government’s strategic objectives. First, the government would need to decide how much of the resource revenues it wishes to share with future generations—which will define how much of the resource revenues will be spent in the present day beyond what is needed for stabilization purposes. Second, the government will decide what form that sharing with future generation should take (either assets or investments in productive growth), which in turn will define the amount and kind of investments to make. The latter will be constrained by the quality of public financial management and the country’s ability to implement and screen projects. Third, it will need to specify its risk aversion with respect to macroeconomic shocks and decide whether or not it wishes to establish a stabilization fund (and to decide on its objectives, size, and rules) as well as to decide if its external debt should be repaid from resource revenues. The rest of this paper considers the elements of such a policy in more detail by reviewing the literature and identifying some potential challenges. In the following sub-sections, we consider three fiscal strategies that are based on different

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6 Ley (2009) applied a modified model to the case of Zambia, while Frank and Ley (2009) built a new Fiscal Sustainability model that took these volatility properties into account and that accounted for structural breaks in the underlining data.
preferences. Our calculations take into account the volatility of mineral revenues, and we also consider the case of lower than projected hydroelectric revenues.

**The Permanent Income Benchmark for Fiscal Policy and Other Rules**

The permanent income approach provides an important benchmark for fiscal policy in a natural resource abundant economy. This approach is applicable to exhaustible resources (such as minerals). In taking this approach, it is first useful to calculate the net present value of all expected net future revenues from these resources and then the constant real amount (or annuity) that received forever would yield the same net present value. The permanent income approach then recommends restricting government spending from these exhaustible natural resources revenue to only this constant annuity amount, while saving the rest. Later, when exhaustible natural resources -- such as Lao PDR’s copper and gold -- have run out, the government will be able to draw on its accumulated financial assets to continue spending the same constant annuity amount.

The permanent income approach addresses several of the key issues associated with natural resource management. It is by definition a sustainable policy in that it converts a temporary, exhaustible stock of natural resources into a stock of financial assets that generates a permanent income stream. It incorporates the value judgment that future generations should enjoy the same benefit from the stock of natural resources as the current generation. Since the policy calls for saving a substantial proportion of natural resource revenues, it reduces the pressure of rising domestic demand that leads to real exchange rate appreciation and Dutch disease effects (through the so-called spending effect) and also potentially rules out the over-borrowing problem by constraining expenditures. The policy also moderates the problems caused by volatility in natural prices and revenues. The permanent income approach to fiscal policy in natural resource abundant economies is studied in more detail in Van Wijnbergen (2008), Davis et al. (2001), and Barnett and Ossowski (2002).

The permanent income approach is most effective in countries with very high revenues from exhaustible natural resources, and even then it usually provides a benchmark rather than a rigid rule. Perfect implementation of this approach would require strict fiscal discipline. This strategy effectively aims to raise the consumption of the population permanently and, therefore, places a very high priority on generations well into the future. While this is a valid option in general, several issues arise when it is applied to developing countries. If the present generation is very poor and if higher growth and technological improvements are expected in the future, this strategy may actually reduce the marginal utility of the resource revenues because it deprives the poorest generation of needed resources while transferring them to those that will most probably be in less need. This strategy and its implications for Laos are considered in the sections below.

**The “Bird-in-hand” Rule**

In order to partially correct for these considerations, the so called “bird-in-hand” rule corrected for investment, has been frequently recommended for developing countries. It differs from the permanent income rule in that it proposes that all the revenues be saved in a stabilization fund, net of public investment. This would mean that consumption cannot increase by more than the return to the assets allows but that investment can. Recent research suggests that this rule could be too restrictive because it precludes any near-term increases in consumption (Collier et al., 2009). This strategy is not analyzed in this paper.

**An “Optimal” Rule for a Developing Country**

The permanent income rule is usually used as a guideline rather than a strict policy threshold and can be modified according to a country’s development and poverty reduction plan. While saving most of the revenues in order to smooth future consumption may be a useful part of the development strategy of some countries, others (especially low-income countries like Lao PDR) have
great and immediate development needs to reach their national growth and poverty reduction targets. Collier et al. (2009) argue that directing all resource revenues to current consumption is wasteful and inequitable; however, postponing the consumption into far distant future is the same. They have suggested an “optimal” fiscal rule for a developing country. Under this rule, governments would save some of the revenues, less at the beginning and more at the end of the high resource revenue period, allowing for more investment and consumption from the resource revenues. This “gradual adjustment” strategy is discussed on page 22 below.

**Optimal Allocation of Public Expenditures**

How much to consume, save or invest abroad, or invest domestically? The answer to this question depends on the relative rates of return to investments, as well as on the discount rate for the future consumption (the so-called social discount rate). If the social discount rate is higher than the domestic and international rate of return to investment, then all resource revenues should be consumed today. Otherwise, they should be invested into those activities with the highest returns.

The rate of return to investment abroad depends on a country’s debt levels and its intention to borrow or pay back external debt from the resource revenues. For Laos, it is probably quite high. The rate of return on domestic investment for a developing economy with high growth rates and scarce investment may be higher than the world interest rate (indeed, Lao interest rates are higher than abroad), but it also depends on a country’s risk and its ability to implement projects and thus may be not as high in Laos as it is in an average middle-income developing country.

Thus, there is a strong case for orienting spending towards investment rather than consumption, assuming that the country has cautiously included public investment in its spending limit. To the extent that the country continues to experience some real exchange rate appreciation and other adverse effects of rising natural resource revenues, there may be a case for orienting spending particularly to investments that would enhance the productivity in the tradables sector of the economy, for example, investments in transport and logistics infrastructure or expanded investment in education and skills training to foster faster absorption of foreign technology and innovation. The country might also undertake other reforms that would not necessarily involve large expenditures but would also enhance broad economy-wide productivity, such as improving business regulations, reducing in red tape, abolishing any monopolistic barriers that discourage innovation, and making other such improvements in the overall business climate.

Most importantly, the revenues need to be used effectively for poverty reduction and public investment programs as part of the implementation of the Government of Lao PDR’s development program under the NSEDP. For example, rural infrastructure has been shown to be the single most important driver of growth in Lao PDR. Other investment options that increase growth in the long run, such as human capital (including education and health as well as professional training) should also be considered. The NT2 hydroelectric dam represents international best practice in this respect and identifies priority sectors where the revenues can be used.7

Improvements in public investment management are needed to facilitate the effective screening of investment projects and more effective investments from the revenues obtained. In particular, the capacity to choose and screen projects as well as their budgeting, procurement, implementation, and evaluation all need to be improved. As suggested by Rajaram et al. (2010) and Allen and Tomassi (2001), a capacity-building program could be established to support this objective.

**Fiscal Regime**

An ideal fiscal regime would focus on two main criteria, efficiency and equity, so that it can help to correct for externalities and distribute the wealth among the whole population. Several

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7 See the Lao PDR Development Report (2010).
trade-offs will need to be made in designing the optimal fiscal regime among the desire to attract foreign investment in competition with other countries, to ensure the adequate distribution of risk between the government and the foreign investor, to maximize government revenues, and to balance the benefits for development versus environmental concerns. Related to the broader governance regime in the resource sector, this report has also looked in more detail at the taxation and royalty regime in the mining and energy sector (see Larsen, 2009, MacGeorge et al., 2010, Fraser, 2010, and Barma and Fritz, 2010). Here we briefly summarize the results of these papers where they concern sector-specific fiscal regimes.

**Fiscal Regime in the Hydropower Sector**

Lao PDR does not explicitly legislate a clear fiscal regime for hydropower development, and approaches every project on a case-by-case basis. While this approach is convenient for dealing with different projects, it also involves a significant risk that the government may not capture the full economic rents from hydropower development in some cases, especially taxation is concerned. In order to make sure that the government’s expectations are made clear to developers in an explicit and transparent way, it is important to develop a policy that defines a standard method for determining the fiscal benefits from hydropower projects (particularly export projects). The following steps would help to alleviate these constraints:

- **Legislated taxes such as profit, excise, and business turnover taxes should be specified as primary taxes and no dispensation from these taxes should be allowed.**

- **It is essential to clearly define how the economic rent (in other words, the value of production after deductions for operating and capital costs) is to be charged and how to levy it by including in the developer’s agreement with the government the specific procedure by which the government will calculate the economic rents.**

- **While the current mechanism for extracting economic rents\(^8\) is working properly, adopting an economic rent taxation system based on actual rather than projected profits would improve collection. Furthermore, revisiting the policy for distributing royalties among the government, the off-taker, and the developer could also bring benefits.**

- **In addition to primary and secondary taxes, additional types of fiscal arrangements such as up-front concession fees, dividend returns from investment, and discounted electricity sales should be considered.**

- **Up-front concession fees could cover the government’s cost of development and should consist of a minimum amount (in other words, a fixed fee regardless of the project’s size) and a set percentage proportional to the estimated cost of the project applicable to all projects.**

**Assuming a 20 percent equity for projects in the pipeline, the financing needs for taking equity stakes could go up to almost $400 million a year by 2018 (Figure 9).** Given the constraints in borrowing that Lao PDR is facing, a financing strategy or a change in approach would need to be taken regarding the equity stakes. There has not yet been any clear indication of the government’s IPP investment policy.

**Taking equity is risky.** Getting a high percentage of revenues from equity stakes rather than taxes and royalties increases the risk taken by the government in each project and could lead to losses in the future. Currently, for Laos it is projected that around half of all government revenues will come from dividends (Figure 10). However, equity stakes, especially if they are taken up-front when the risks of the

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\(^8\) The current mechanism for extracting economic rents involves levying a royalty based on a percentage of gross revenue for each concession operating year and allocating one-third of it to the off-taker and dividing the remaining two-thirds between the government and the developer on a case-by-case basis.
project have not yet materialized, are the riskiest source available. Instead, shareholding based on a small free carried interest (i.e. 5 percent) could be considered to reduce risk. Moreover, it could consider requiring developers to give it the option of acquiring additional shares when a project is confirmed to be commercially attractive, instead of taking large stakes up-front in projects with potentially high risk. To ensure appropriate participation in export-oriented hydropower projects, the LHSE should be designated as the government’s shareholder in these projects (see MacGeorge et al., 2009).

Fiscal Regime in the Mining Sector

A specific fiscal regime is needed in the mining sector due to its long and costly exploration period, its capital intensity at the initial stages, and its high closure costs. In choosing such a regime, a fine balance needs to be struck between seeking international competitiveness and maintaining a simple regime, capturing the maximum possible rent, getting revenues early in the project process, getting dependable revenues, and taking care of central-local issues. This is usually achieved by using such instruments as surface rentals, royalties, income and other taxes, and state participation in projects (equity).

The existing regime suffers from several drawbacks and correcting these would improve collection and reduce risk. The effective tax rate (ETR) is around 50 percent, which is in line with the international best practice that balances competitiveness with the highest revenues of between 45 to 50 percent. However, the current fiscal regime allows discretion in determining the regime for specific mines, as the Mining Law does not specify numerical attributes that are valid for all mines. This reduces the rent captured from the projects, and the gap in actual and possible rent capture will increase if more projects come on stream. Moreover, as in the hydropower sector, the risk of having obligatory state participation in all projects may be too high.

The capacity of the authorities to monitor and enforce the fiscal regime in the mining sector is also extremely low. There are no staff either internally or contracted who have the appropriate skills.
There is also no clarity on the technical roles for the assessment, collection, and the flow of funds; nor is there any room for improving forecasting capacity. Most importantly, there are no reliable cadastre data on the reserves or explorations being undertaken.

In order to remain internationally competitive and to be able to attract responsible investors at this early stage of the industry’s development, introducing the following measures could help strike better balance between staying attractive to investors and collecting adequate revenues:

- Introducing a clearer and more predictable investment regime, for example, by legislating an explicit non-discretionary fiscal regime in an amendment to the Mining Law.
- Increasing security of tenure of the mining title.
- Making the approval of “finder’s right” more automatic for investors who have successfully explored a mineral resource.
- Increasing access to essential inputs, including geological data, skilled labor force, equipment, finance, and services.

**Mineral Revenue Projection**

Given the size of revenues from all kinds of natural resources, the fiscal sustainability analysis in this paper focuses on those that are expected to be large, the most volatile, and the most exhaustible. In the case of Laos, this is mining, and especially copper. Hydro-energy in Laos is usually sold forward for a number of years, and therefore the revenues from it are mostly subject to project-related risks than to price shocks. Energy revenues are assumed to be the same under all scenarios, but an example with much lower projected hydro revenues is considered in the sensitivity analysis section below. Given the high volatility of mining revenues, this paper focuses on the analysis of the stochastic nature of these revenues, keeping everything else constant. However, when it comes to determining the spending profile, hydro revenues are taken into account as well.

In Laos, copper-related revenue accounts for more than 90 percent of total fiscal revenues from the mining sector. Other revenues include those related to the extraction of gold, silver, and - potentially - potash. Given the different projections of future mineral production and their projected prices, we have constructed three scenarios for mineral revenues – baseline, high case, and low case.

The undiscounted cash flow to the Lao government is projected to be about US$3.2 billion (constant 2008 dollars) under the baseline assumptions, US$5.4 billion in the high case, and US$1.7 billion in the low case. If discounted by 8 percent (3 percent safe return plus 3 percent risk premium plus 2 percent US inflation rate), the NPV of mineral wealth is about US$0.88, 1.53, and 1.53 and 2.54 billion (in 2008 US dollars), or 17, 29, and 48 percent of 2008 GDP in the low, baseline, and high cases respectively (see Table 1).

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9 See Ridgway (2009).
10 See section on page 12 for more details on these assumptions.
Table 1: Net Present Value of Mineral Resources and Corresponding Permanent Income (PI)

<table>
<thead>
<tr>
<th>Mineral Rev. $US billion</th>
<th>% of GDP</th>
<th>2008 $US billion</th>
<th>% of 2008 GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low case</td>
<td>0.88</td>
<td>16.6</td>
<td>0.026</td>
</tr>
<tr>
<td>Base case</td>
<td>1.53</td>
<td>28.9</td>
<td>0.046</td>
</tr>
<tr>
<td>High case</td>
<td>2.54</td>
<td>47.9</td>
<td>0.076</td>
</tr>
</tbody>
</table>

Discount rate = 8% equal to sum of real interest rate = 3%, risk premium = 3%, and US inflation rate = 2%

Source: Staff estimations based on WB’s price projections as of August 2009.

Figure 11: Copper Price Assumptions (US$/t)

Figure 12: Mineral Revenue (US$ million)

Figure 13: Mineral Revenue (percentage of GDP)

Source: Staff calculations on official data.

Source: Staff calculations using official data.
Non-mineral and Hydro Electric Revenue Assumptions

Non-mineral revenues (including grants) fell from nearly 17 to 12 percent of GDP between 2000 and 2004. This fall was followed by a strong recovery and then another drop. By FY2008, non-mineral revenue stood at 13 percent of GDP, including 1.2 percent of GDP in grants. Looking forward, it is assumed that non-mineral revenue will grow steadily to 18 percent of GDP in the next 20 years. In terms of assumptions about the macroeconomic framework, in order to separate out the fiscal impacts, we did not explicitly model or project the exchange rate and other Dutch disease effects. We made standard assumptions consistent with the Debt Sustainability Analysis (2009) in the long term.

Figure 14: Baseline Non-mineral Revenue Projection, including Hydropower, from 2010 (percentage of GDP, fiscal years)

Source: Staff calculations using official data.

Fiscal Strategies

In this paper, we compare two standard fiscal strategies that the government could adopt and the corresponding expenditure and saving profiles following the general approach described on page 8. We then propose a more appropriate strategy for Lao PDR.

1. "Business as usual." In this scenario, the expenditure level is predetermined and no Resource Fund exists. The non-resource primary deficit (NRPD) is covered by resource revenue and by issuing debt if the resource revenues are less than the NRPD. The expenditure level (as a percentage of GDP) is consistent with the most recent Debt Sustainability Analysis (2009) and assumes that primary expenditure will rise from 18 percent of GDP in 2010 to above 21 percent by the end of projection period. Taking into account the non-resource revenue assumptions above, this strategy implies a non-mineral primary deficit ranging from 2 to 5 percent of GDP depending on what non-mineral revenue assumptions are made.

2. Pure “Permanent Income” (PI) strategy. In this scenario, expenditure is endogenously determined by the amount of non-mineral revenues plus the corresponding “permanent income” (PI) from mineral revenues each year. A part of the resource revenues equivalent to the PI is transferred to the budget, while the rest is kept in the Resource Fund. In this case, the government would be targeting the NRPD given how much non-resource revenue is available. The strategy would require a very significant reduction in expenditure, regardless of which mineral revenue scenario prevails. This strategy does not make a correction in 2009 for the increased expenditure needs induced by the recent economic crisis (see
We derived a PI estimate corresponding to each mineral revenue scenario. When resource revenues are higher, so is permanent income, which allows for a larger non-resource primary deficit and for higher primary expenditures.

3. **“Gradual Adjustment” strategy.** This scenario is designed as a middle ground between the “business as usual” scenario and the permanent income (PI) strategy. Expenditure level under this scenario is about 2 percent of GDP higher than in the permanent income scenario on average. This strategy also takes into account the higher expenditures in 2009 and also assumes that expenditures will grow steadily from the pre-crisis levels to reach 20 percent of GDP in 2024.

**Figure 15:** Primary Expenditure (percentage of GDP)

Source: Staff calculations using official data.

Note: Baseline, low case, and high case refer to the level of mineral revenue. PI indicates permanent income strategy and otherwise “business as usual” or high expenditure strategy, if not indicated. For example, label “low case” refers to the outcome of low mineral revenue and high expenditure (“business as usual”), while “low case+PI” means mineral revenue is low and permanent income fiscal strategy is used.

When thinking about an appropriate level of the projected expenditures, we took into account what would be necessary to achieve the national development strategy as well as political and economic feasibility. In this sense, a sudden downward adjustment in expenditures from their current level would not be feasible. It would also be undesirable as the brunt of such a downward adjustment would most likely fall on investment expenditure rather than current expenditure, as current expenditures are typically harder to reverse. This is because current expenditure includes items such as wages, interest payments, and social transfers. Or if it does fall on the current side, the cut would be likely to fall on maintenance expenditures, which could seriously undermine the productivity and longevity of existing investments. In a low-income (and capital-scarce) country like Laos, the return on domestic investment can be expected to be greater than that on foreign financial assets in which the proceeds of a resource fund would typically be invested. The logic for greater public investment is that it will help to build or modernize infrastructure that will in turn lead to higher growth, including by crowding-in private sector investment.

At the same time, it may be imprudent to rapidly increase public investment for both macroeconomic and microeconomic (project-selection) reasons. From a macroeconomic perspective, a rapid increase in public spending could result in Dutch disease effects (see section on page 7). From a microeconomic perspective, it is crucial to ensure the efficiency of this additional public spending so that funds are not wasted on low-return projects. The existence of people with technical expertise in areas such as social cost-benefit analysis and the availability of capacity to implement the selected projects as
planned will be crucial to ensure that high returns do materialize. This requires, for instance, sophisticated expertise in areas such as procurement and financial management. In addition, experience in other countries has shown that political incentives can lead to a selection of projects that are not necessarily based on a reasonable level of rigorous cost-benefit analysis. A rapid increase in public investment would require that these necessary technical skills be available in fairly large quantities. Political pressures may also be higher to acquire a share of the enlarged expenditures. However, given that technical skills are hard to come by even in higher income countries, the pace of increase in a LIC would need to be carefully calibrated.

The “gradual adjustment strategy”, is thus designed as a path that allows for higher investment than the pure permanent income strategy, but also allows the build-up of a modest saving. Specifically, we assume that after the crisis-related increase in spending, the primary expenditure declines to 17 percent of GDP after the spike in 2009 and gradually rise to 20 percent of GDP; resource revenues of one percent of GDP are saved in the Resource Fund each year and the rest are transferred to the budget.

Other Assumptions

We made the same assumptions on the growth rate, the interest rate, and the inflation rate (GDP deflator) across the different scenarios. GDP is projected to grow at 7.4 percent on average for the projection period. Currently, Laos borrows externally mostly on concessional terms. Therefore, in the baseline case, we assumed that the interest rate on external debt is around 1 percent in nominal terms (or negative in real terms). The domestic interest rate was assumed to be 9.5 percent in nominal terms, and we assumed the share of domestic debt would grow from 4 percent of total debt to 12 percent in 20 years as domestic markets developed.

We projected the mineral revenues as nominal flows. The copper prices are in current dollars per ton. To derive permanent income equivalent annuity, the projected nominal flows were discounted using nominal interest rates in order to obtain the present value of future mineral revenue. We derived the permanent income equivalent annuity as a safe return on the present value at the real interest rate and as equal to the constant real value of the expenditure level that can be sustained indefinitely. Actual expenditure in each year then equals this real value corrected for cumulative inflation after the base year.

However, the resource revenue flows are far from certain. Incorporating all volatility-related factors into the valuation of uncertain future resource flows was highly complex. It is however clear from a simple investment analysis that future flows should be discounted more to the extent that returns are more uncertain. If we assume that copper prices are correlated with returns on equity, the equity premium (the higher expected return on project equity compared with safer bonds) gives an indication of the return difference that should be assumed. The academic consensus is that a forward-looking equity premium is about 3 percent (Dimson et al., 2002), and this can be taken as a starting point (van Wijnbergen, 2008). In comparison to the uncertainty associated with equity returns, the permanent income equivalent is constant in real terms and thus highly certain. Therefore, the revenues stream should be discounted using a lower rate than that assumed for equity returns. See Table 1 for the detailed assumptions.

Debt and Saving

Debt levels in this fiscal sustainability model\(^{11}\) are determined endogenously and depend on assumptions about real economic growth rates, revenues from non-mineral sources, expenditure levels, and assumed real interest rates on debt. The debt level is expected to decline in most scenarios regardless of what fiscal strategies are adopted (Figure 16), but it is very sensitive to the possibility of

\(^{11}\) See [http://go.worldbank.org/L6OVHPEMG0](http://go.worldbank.org/L6OVHPEMG0) for the Fiscal Sustainability Tool, manual, and related references.
lower revenues and especially hydro revenues as discussed below on page 23. In our projections, high growth and resource revenues are the most important factors in the decline of debt levels (see Figure 23). Even in the “worst” case scenario where non-resource revenues are low and expenditures are high, the country ends up with a debt ratio around 50 percent of GDP, even though debt levels rise. In the “business as usual” case, all resource revenues are spent by design and no resource wealth is left for future generations. By comparison, if the country uses the “permanent income” strategy, at the end of the period it would have saved more than 16 percent of GDP in the Resource Fund in the baseline case. Figure 16 compares the levels of debt and the balance of the Resource Fund under the “business as usual” scenario and under the Permanent Income strategy using different mineral revenue scenarios. Figure 17 represents the gross debt and resource fund projections under the different fiscal strategies given the baseline mineral revenue.

**Figure 16; Gross Debt (left) and Resource Fund Balance (right) under High Expenditure and Permanent Income Strategy with Different Mineral Revenue Assumptions (percentage of GDP)**

![Figure 16](image)

**Note:** Baseline, low case, and high case refer to the level of mineral revenue. PI indicates permanent income strategy and otherwise “business as usual” or high expenditure strategy, if not indicated. For example, label “low case” refers to the outcome of low mineral revenue and high expenditure (“business as usual”), while “low case+PI” means mineral revenue is low and permanent income fiscal strategy is used.

**Figure 17: Gross Debt (left) and Resource Fund Balance (right) with Different Fiscal Strategies assuming Baseline Mineral Revenue**

![Figure 17](image)

**Source:** Staff calculations using official data.
The gradual adjustment strategy, which was designed to provide an adequate expenditure profile that takes into account large development needs, still allows for significant savings in the Resource Fund. It also results in debt level stabilization at around 40 percent of GDP -- the same as under the “business as usual” scenario.

**Debt Levels and External Shocks**

In order to estimate the impact of uncertainty, we ran stochastic simulations by varying the price of copper, the change in the real exchange rate, and GDP growth under the baseline assumptions for all variables. We assumed that these variables are normally and independently distributed with the mean equal to the baseline projection and standard deviation equal to that of the last 10 years.12

Figure 18 shows the resulting interval within which public debt will move in the baseline case. It can be seen that the debt levels and dynamics are quite robust to external shocks. However in the event of comparatively large shocks, the debt levels will rise for several years following the recent crisis before they come down to more sustainable levels. In comparison, Figure 19 shows the simulations applied to the permanent income strategy. We considered a case where the baseline resource revenue is received, but the permanent income strategy is used to determine the optimal expenditure level. The same shocks were attributed to the copper price, the real exchange rate, and real growth as above. As we see from this analysis, using the permanent income approach significantly reduces required borrowing and vulnerability to external shocks that can come from variability in the copper price, exchange rate, or growth.

However, under the permanent income approach, expenditures are also significantly lower, which is why this may not be the best strategy to use in Laos, as discussed above. The debt level simulation for the “gradual adjustment” strategy is presented below in Figure 20. We see that in the case of the smooth gradual adjustment of expenditures to the 20 percent of GDP level, debt may rise at the beginning of the period but it will still be falling afterwards. In this case, however, debt levels would be declining slower than in the PI strategy case and would reach 28 percent by 2024.

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12 There are, however, caveats to be introduced regarding the normality and independence of the assumptions in the above estimations. First, copper prices are not distributed normally around the baseline. Copper price volatility is known to be stochastic and correlated with the direction of price change, which results in excess kurtosis and skewness in the copper price distribution (see page 8; see also a model of copper price modeled in a constant elasticity volatility, CEV, model in Geman and Fong Shih, 2009). A more accurate approach would be to build a stochastic model of the copper price (see Ley, 2009), but for the purposes of this paper such complex modeling was not necessary. Second, the shocks are usually not independent of each other. For a resource-rich country, the movement of commodity price would shift the real exchange rate via the mechanics discussed on page 7 and have an impact on the real sector as well. A VAR model is needed to fully estimate the interdependence of these variables. However, such a model requires time-series data covering a long period to estimate. Given the short history of mineral production in Laos, this could not be done.
Sensitivity Analysis

Real growth, resource revenues, and negative real interest on foreign debt are the main driving factors in reducing debt levels. The factors behind the debt dynamics in this model are presented in Figure 22. The non-mineral deficit and the real interest on domestic debt and real exchange rates depreciation are the main factors that have increased debt levels. In this section, we look in turn at all of these driving factors and see how different assumptions about them change the overall result.
The Case of Lower Hydroelectric Revenues

Our results above are highly dependent on what assumptions are made about hydroelectric revenues. As we have discussed, the projected debt levels depend not only on which fiscal policy option is chosen but also on our assumptions about non-mineral revenues. In particular, the results are sensitive to the projected size of revenues from hydropower projects after many of them come on stream after 2015. This is why we estimated the model with only half of the hydro revenues and compared results in Figure 20 and Figure 21.

Laos would not be able to graduate from the status of a country with high risk of debt distress by 2025 if only half of the hydro revenues were to materialize, as shown in Figure 21. Hydro revenues are assumed to grow from 0.5 percent of GDP to 2 percent of GDP, instead of reaching 4 percent of GDP by 2025 (compare to Figure 14). Since only the revenue effect is modeled, and not the effect of less hydropower stations on GDP, the actual impact on debt to GDP ratio would be even more severe, to the extent that debt levels might actually grow after 2015. Thus, while we excluded hydroelectric revenues from the analysis of volatility and treated them as non-resource revenues for the purposes of the fiscal sustainability analysis, these revenues are essential to the ability of Laos to manage its fiscal program and debt levels.

The Case of a Lower Growth

What if growth projections do not materialize? The assumption about an average growth rate of 7.4 percent throughout the projection period under the baseline scenario is a key force in driving down the debt ratio, as can be seen in Figure 22. If a lower growth rate is assumed, say due to a slower recovery of the global economy after the recent crisis or less investment in hydropower in Lao PDR, then the debt ratio would in comparison be lower by more than 3 percent per year on average as illustrated in Figure 23.

To capture the sensitivity of our results to GDP growth, we considered two alternative scenarios that are defined relative to the baseline. In Alternative Scenario 1, GDP is projected to grow at the average rate observed in the last 10 years (6.7 percent). In Alternative Scenario 2, we assumed a growth rate of 5.8 percent, which is one standard deviation less than the historical average. On the fiscal side, in both of these cases we assumed that non-mineral revenues as a percentage of GDP remain the same as under the baseline and that primary expenditures are maintained in the same amount in nominal terms to account for their rigidity. Another interpretation could be that in the lower growth cases the efficiency of public expenditure is lower, that is, the same level of expenditure is associated with a lower rate of growth. In each case, no resource fund exists and the mineral revenues are transferred to the budget in their entirety. All other assumptions are the same as for the baseline.

With a lower growth rate, the government is less likely to “grow out of debt.” The second alternative scenario shows that, if expenditure is not reduced in response to lower growth, the level of debt may increase rapidly to unsustainable levels.
Higher Real Interest Rate on Foreign Debt

As Laos is growing and is increasingly taking on less concessional debt, we consider a situation where interest on debt is higher than the currently assumed nominal 2 percent. In this section, we assume that the real foreign interest rate gradually rises to 5 per cent as opposed to being negative as in the baseline. The increased interest rate has a dramatic impact on the debt dynamic. Under this scenario, the debt-increasing effects of interest payments and the deficit outweigh the debt-reducing effects of real growth, thus causing the debt ratio to rise.

Our analysis shows that the baseline fiscal strategy (“high expenditure” scenario taken from the DSA 2009) would not be sustainable if Laos were to borrow the same amount at market rates.
What if our baseline assumptions on the discount rate are wrong? In order to test the sensitivity of our results to the assumptions regarding the discount rate for NPV calculations as well as the risk premium, we also considered a situation with a lower discount rate and zero risk premium (the corresponding NPV and PI values are presented in Table 2 below). In these circumstances, the NPV of resource revenues is higher and therefore the amount to be spent during each year (PI) is also higher compared with Table 1. Spending under the Permanent Income strategy for the first year increases by around 0.2 percent if future mineral revenues are discounted using a 5 percent rate instead of an 8 percent rate.

The gross debt ratio does not change while flows to the resource fund decrease by the same amount as with the higher discount rate of 8 percent.

Table 2: Net Present Value and the Corresponding Permanent Income from Mineral Resources under Different Assumptions about the Discount Rate

<table>
<thead>
<tr>
<th>Discount rate</th>
<th>NPV Mineral Rev., US billion</th>
<th>PI % of GDP</th>
<th>2008 US billion</th>
<th>% of 2008 GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low case</td>
<td>1.04</td>
<td>19.7</td>
<td>0.031</td>
<td>0.59</td>
</tr>
<tr>
<td>Base case</td>
<td>1.93</td>
<td>36.3</td>
<td>0.058</td>
<td>1.09</td>
</tr>
<tr>
<td>High case</td>
<td>3.24</td>
<td>61.2</td>
<td>0.097</td>
<td>1.83</td>
</tr>
</tbody>
</table>
Figure 28: Primary Expenditure as Percentage of GDP under the Sensitivity Analysis of the Discount Rate

Figure 29: Balance of the Natural Resource Fund as Percentage of GDP under the Sensitivity Analysis of the Discount Rate

Institutional Arrangements and Resource Funds

A wealth of experience and theoretical work has been collected to examine the best institutional arrangements to govern non-renewable natural resource revenues. Some overview papers have been especially useful, such as Davis et al. (2001) and Ossowski et al. (2008) among others. This section looks at the institutional options for the fiscal management of Lao PDR’s natural resource revenues, and at the rules and institutional checks and balances needed for the proper functioning of a fund, drawing upon the extensive cross-country experience now available in this area.

Adequate revenue management does not always require setting up of a special fund, but an increasing number of countries have institutionalized fiscal rules to express their preferences over management of the resource revenues by creating an explicit Natural Resources Fund with strict rules that govern payments into and out of the Fund. This approach also usually focuses attention on the government’s non-natural resource fiscal balance\(^{13}\) as a key indicator for fiscal policy in natural resource abundant economies. It is often set up with the aim of making it permanently sustainable; in other words, the government would only run a non-resource fiscal deficit to the extent that could be covered by the constant natural resource annuity.

Institutional arrangements should be driven by the country’s development and by the fiscal policy that supports it. The main questions that policymakers should ask when considering making a special arrangement for managing fiscal revenues from natural resources should reflect the discussion elsewhere in this paper. The institutional arrangements to be put in place will depend on whether the government wishes to share the revenues with future generations or not (create a fund or not), what it wishes the purpose of the fund to be (savings, investment, or a reserve fund), where it wishes the fund to be located (domestic or abroad), and the nature of the natural resources themselves.

Capacity and the state of the public finance management (PFM) system are key factors in deciding on the institutional arrangement. In this regard, Laos could learn from the experience of other countries, especially large copper producers (such as Chile) or oil producers (such as Norway) in deciding on the best arrangement. However, as explained below, the state of the country’s public financial

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\(^{13}\) As discussed earlier, this is the fiscal balance excluding the government’s natural resource revenues as well as the government’s financial income from assets saved out of natural resource revenues.
management system and its capacity to manage and protect complex funds is a key issue to consider in addition to the best practices in middle- and high-income countries. Evidence from evaluations of the performance of existing resource funds has shown that, in some countries, expenditure tended to be less correlated with changes in earnings, but in most countries, the establishment of a fund did not have a defined impact on spending. This suggests that the design of fiscal rules and their enforcement are key to success and that countries that are already good at managing revenues would benefit the most from having a fund. For those with weak PFM systems and low implementation capacity (such as Laos), however, simple spending and saving rules may be better than the establishment of a designated fund with complex fiscal rules.

Box 1: Chile’s Management of a Copper Stabilization Fund

Chilean exports are dominated by copper in a way that is similar to Laos. Around half of its exports consist of copper, and the copper sector accounts for nearly 10 percent of GDP, bringing in about 17 percent of total tax revenues. One difference is that public sector is larger in Chile than in Laos, with the state-owned company mining up to 30 percent of total copper production.

Chile has a Stabilization Fund, established in 1985-1987, which is based on a discretionary reference price determined by the government, and which makes transfers to budget and extra-budgetary lending based on this price. The fund is controlled by the Ministry of Finance, the Central Bank and a state-owned company called CODELCO. Other stabilization funds operate in Kiribati, Kuwait, Norway, Oman, PNG, and Venezuela. Saving funds operate in Canada, United States, Kuwait, and Oman. Some countries either have several funds or use one fund for both savings and stabilization purposes.

Chile’s is a rule-based fund. According to a price target, when copper price exceeds or is below the fund reference price, the revenues are transferred to or from the fund. The fund currently accumulates up to 1 percent of GDP every year (and with stock now exceeding 10 percent of GDP), and these revenues are spent on pension and social benefits, reserves, and some other well-defined public expenditure and on debt repayment. Importantly, the reference price is determined by an average suggested by an independent board of experts, which has resulted in significant savings over the last decade.

The proven benefits from the fund’s operation in Chile have been the ability to have a counter-cyclical fiscal policy, to protect the government’s core expenditures, and to reduce output volatility.

The Practical Options for Managing Resource Revenues

The most important decision with respect to natural resource revenues is to treat them with care and make sure spending from these revenues is not in excess of economy’s absorption capacity and prudent macroeconomic management, as discussed above. If fiscal rules are set up, this management can take place within the existing budgetary framework, which would need to include medium-term planning and budgeting. When governments decide to set up a special fund (within or outside the budget), it is usually with the explicit aim of reducing volatility induced by natural resource exports, as well as to share revenues with future generations (to some extent). For the purposes of reducing volatility, a stabilization fund would restrict spending and limit the macroeconomic effects that occur through the spending effect. It would also allow for inter-temporal smoothing and balance of payments support. For the purposes of sharing natural resource revenues with future generations, the government may wish to securitize the revenues and commit to additional spending only up to the amount of the annuity that such securitization will provide (a savings fund) or to invest the revenues in activities that would increase the country’s productivity and technology, thus increasing the level of consumption for future generations (an investment fund). In this sense, an investment fund can be considered a sub-category of the savings funds. There are some important necessary conditions for these funds to function properly and to serve their intended functions.
For a stabilization fund to shield the budget from volatility, fiscal policy rules need to be introduced, including clear spending and accumulation rules. These are often legislated so that the counter-cyclical function works.

For savings funds, the rules for investment, borrowing, and saving (not necessarily only from the fund) need to be considered as a package to avoid over-borrowing against resource revenues. A sound medium-term fiscal framework would help to resolve these problems, and there is evidence that it also allows for better achievement of the funds’ objectives.

**Integration into the budget is essential.** Experience in other countries has shown that, even for the most basic functioning of such funds, the coherence of the fiscal rules with the budget process, or -- even better -- the integration of the funds into the budget, is essential for success. In particular, this allows to avoid problems with expenditure coordination:

- A virtual fund (an accounting mechanism within the budget) is a good option, especially in countries where political economy constraints or a loss of fiscal control may be a potential problem.

- Even when a separate structure is established for accounting purposes, the transfers should go through the budget to maintain the same approval mechanisms and to ensure budgetary and policy integrity. All expenditures should be executed by the Treasury.

- The rules of the fund should be transparent, accountable, and without discretion to prevent them from being diverted by political interests. Often, the funds are subject to independent audits and evaluations of their investment performance.

- An appropriate asset management and investment strategy should be designed especially in cases where the proceeds can be invested in public projects. This should include building capacity in the evaluation and screening of public programs, and in project implementation.

- Last but not least, it has been empirically shown that a fund, however simple and transparent, cannot resolve complex fiscal policy issues by itself – it can only aid in implementing an already sound fiscal policy.

**Rules that are in line with the country’s implementation capacity and policy coordination are more important than any theoretical institutional arrangement.** It is important to note that, since the price of resources cannot be predicted perfectly due to their random walk properties (simply put, the mean price of copper cannot be determined, see page 9), it is therefore also impossible to observe a clear signal to guide policymakers in the timing and amounts of saving to or spending from the fund. The complexity is also added by the links with broader macroeconomic policy through the spending effect, borrowing and debt policy, and balance of payments impacts. These facts are an argument for transparent, simple fiscal rules and overall policy and budget coordination.

**Strong public financial management and procurement systems have been demonstrated to lead to positive long-term development outcomes** if combined with a medium-term expenditure and fiscal framework and with adequate scrutiny and appraisal of public investment decisions, and if accompanied by adequate macroeconomic and fiscal policies. In Laos, the following steps will be needed:

- Using a *fiscal framework* that ensures that recurrent expenditure increases are only committed to non-resource or stable revenues, as well as targeting public debt levels and the non-resource deficit, would go a long way towards managing volatility of mining revenues and uncertainty in the hydro revenue streams.
• Introducing a **simple fiscal rule** that allows some precautionary savings in boom times would help the government to manage the revenues in a way consistent with macroeconomic stability and with the country’s development strategy. Using pessimistic price projections to calculate likely returns would contribute to the sound implementation of such a policy.

• Improvements in **public investment management** are needed to facilitate the effective screening of investment projects and more effective investments from the revenues obtained. In particular, the capacity to choose and screen projects and budgeting, procurement, implementation, and evaluation capacity all need to be improved. As suggested by Rajaram et al. (2010) and Allen and Tomassi (2001), a capacity-building program could be established to support this objective.

A fiscal policy that can constrain government spending over time should be introduced.\(^{14}\) Such a policy would help to reduce volatility and manage the uncertainty and exchange rate appreciation that can arise through the spending effect and to bring spending from natural resource revenues to a sustainable level. Ensuring that fiscal policy is consistent with the development plan through a medium-term expenditure framework (MTEF) would help to deploy resources more efficiently to achieve sound development outcomes.

In particular, a gradual increase in expenditures from 17 percent of GDP in 2009 to around 22 in 2024 would allow for debt reduction, appropriate savings, and yet still finance sizeable spending for to implement the NSEDP. We considered specific properties of hydro and mining revenues and outlined the optimum spending profile that would allow Lao PDR to graduate from the LIC high risk of debt distress status by 2016 while at the same time saving some of the revenues for the future. The figures compared the two cases - “business as usual” and “optimal strategy” - to show how mining and hydro revenues can be managed in a fiscally sustainable way, at the same time allowing adequate savings and sound investments in areas likely to offer a strong development dividend. Given current projections, this would allow for 1 percent of GDP in resource revenues to be saved “for a rainy day” as well as helping to reduce foreign debt to a sustainable level.

**Committing to new recurrent spending, such as wage increases, from relatively volatile resource revenues would be unwise.**\(^ {15} \) However, these revenues can be spent on investments that promote future growth or help to implement the development agenda provided that a sound Public Investment Program (PIP) exists to support the identification and evaluation of projects so that the funds are not wasted due to capacity constraints, corruption, or low absorptive capacity, as has happened in other countries.

**Most importantly, the revenues need to be used effectively for poverty reduction and in public investment programs as part of the implementation of the government’s development program under the NSEDP.** For example, rural infrastructure has been shown to be the single most important driver of growth in Lao PDR. Other investment options that increase growth in the long run, such as human capital (including education and health as well as professional training) also should be considered. The NT2 hydroelectric dam represents international best practice in this respect and identifies priority sectors where the revenues can be used.

**The adoption of a simple fiscal framework to guide recurrent and capital spending based on the source of revenues as well as targeting the debt level and the deficit will go a long way to effectively manage the volatility and uncertainty related to mineral and hydro revenues.** Simple but broad fiscal rules regarding the total amount of expenditures from these revenues and some arrangements

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\(^{14}\) The rest of this section is based on Vostroknutova et al. (2010).

\(^{15}\) See also Brahmbhatt et al. (2010).
for saving during booms combined with the careful use of non-mineral fiscal balance would be the most appropriate approach given the nature and scale of the natural resource wealth that Lao PDR is projected to extract in the near future. Spending resource revenues on efforts to reduce poverty reduction and on investing in growth has been shown to be a key ingredient in a strategy to fight off the “resource curse.”
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