

Managing Commodity Risk: Can Sovereign Funds Help?

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Abstract

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1. Introduction

Countries that derive a substantial share of income from commodities are faced with thorny questions of economic policy. Since these resources are exhaustible, it is important for the sake of intergenerational justice not to immediately consume the rent drawn from producing them, but to save something for future generations. Moreover, the high volatility and unpredictable prices of commodities create economic problems for these countries, where heavily fluctuating income often sets the pattern for government spending, to the detriment of the economy.

A number of commodity producing countries have set up stabilisation funds and reserve funds (savings or future generations funds) precisely to remedy the problem of volatile, unpredictable and exhaustible income. When oil revenue is high, a portion is held back and added to the stabilisation fund; when it is low, the fund finances the shortfall in government receipts. The idea is to stabilise fiscal revenue, and hence spending, to make fiscal policy more effective in the short term. The savings funds' goal is to accumulate reserves, which will be used to meet the needs of future generations when natural resources have been exhausted or when needs are particularly acute (for example, to finance pensions in Norway, Chile and France).

In practice, however, the picture is not as simple as it may appear. Countries that have set up commodity funds have not necessarily achieved greater stability in spending relative to income. In a number of cases, discretionary deductions from fund resources or excessive borrowing using the funds as collateral to finance the budget deficit have sidetracked the funds from their initial objectives of stabilisation and reserve. Thus, in addition to creating an institution such as a sovereign fund, governments need incentives not to capture the economic rent from commodity extraction, spend the revenue immediately or borrow excessively during boom periods.

We examine the past experiences of commodity funds in various countries as well as the conditions for effective commodity risk management, concentrating on producer countries. We also discuss incentives for greater effectiveness.

2. Commodity risk

A number of commodity producing countries are dependent on sources of revenue that are both very large (compared with other sources of government funding) and very volatile. This creates a problem for fiscal policy, because the volatility of spending is often sub-optimal. This is because government expenditure generally has declining marginal benefits. Thus the social benefit obtained from spending the revenues in a given year is less than the loss related to the long-term spending reduction, and thus does not offset it.

The literature on the "resource curse" (Auty (1993), Sachs and Warner (1995), Humphreys et al. (2007)) shows that commodity producers suffer from many social and economic problems and tend to have lower growth rates than other countries. Gylfason (2001) demonstrates a negative relationship between resources and growth (and also human

development) in 86 countries¹. The distinctive feature of commodities is that, unlike other sources of wealth, they need not be produced but merely extracted, and therefore resources can be generated independently of other economic processes. Moreover, these resources are non-renewable and, for the country, their destruction corresponds to the loss of a stock of assets.

Commodity producing countries often suffer from the “Dutch disease”², whereby a rapid inflow of revenue from natural resources causes their domestic currency to appreciate (Ebrahim-Zadeh (2003)). This has deleterious effects, because currency appreciation tends to reduce the competitiveness of other sectors of the economy (Gylfason (2001)). Moreover, commodity price volatility generates high real exchange rate volatility, which may slow exports (as happened in the 1973 oil shock) and make government spending volatile. These fluctuations may be made worse by borrowing on international markets. When conditions are good, the country borrows abroad and thus amplifies the boom. When prices fall, lenders demand to be repaid, which drives down spending even further.

The “resource curse” stems from other factors such as rent seeking from natural resources, whether by the government or the private sector. The government may want to introduce tariff protection for other domestic producers. Moreover, politicians may be tempted to spend the rent immediately (squandering it on unnecessary expenditures) rather than leave part of it to their successors. This problem can be exacerbated by corruption, which reduces economic efficiency and social equity. The temptation is even stronger if the expenditures make it possible to hold onto power longer. The same politicians may also be tempted to pile on debt, using the country’s natural resources as collateral. This may work as long as commodity prices are rising. But if they fall, the real exchange rate often falls and the cost of foreign currency debt increases and suddenly becomes unsustainable. This happened in Nigeria and Venezuela in the 1980s, after the 1970s commodity boom ended.

Furthermore, as Gylfason (2001) shows, countries with significant natural resources very often allocate a much smaller share of national income to education. Although the effects are not visible in the short run, they become acute in the long run when the country seeks to diversify its economy. Such problems are often linked to weakness in a country's institutions.

Revenue from commodity extraction differs from that derived from a country’s other revenue sources, because natural resources will sooner or later be depleted. Although this presents no short-term difficulty, in the longer term the problem of finding a substitute source of revenue will become critical. Thus, the country faces the problem of transforming an exhaustible, non-diversified source of revenue into a diversified investment portfolio that can become a source of revenue for the long term once the resources have run out.

¹ However, there are significant individual differences. Norway, Argentina, the UAE and Kuwait have high levels of human capital, whereas Gabon, Congo, Yemen, Niger and Angola have very low levels.

² The name comes from the problem the Netherlands encountered in the 1970s when it discovered oil in the North Sea. Many countries have dealt with the same problem, e.g. Australia in the 19th century when gold deposits were discovered and Colombia in the 1970s with coffee-growing.

3. Do commodity funds really help? Review of various experiences

Many commodity producing countries have set up stabilisation funds or reserve funds (sometimes both) to smooth government outlays and avoid immediately spending revenue from extracted natural resources. Have these funds achieved their objectives? The track record is uneven, to say the least. Fasano (2000) examined several countries that had set up stabilisation and saving funds. In practice, there are as many successes as mixed outcomes. In certain cases, such as Norway and Chile, the funds did help to steer a substantial share of commodity revenue away from government coffers and to avoid real exchange rate appreciation. In other countries, however, frequent changes in the rules and discretionary deductions from fund resources by the government made findings less conclusive.

Davis et al. (2002) carried out an econometric study on a sample of 12 countries that produce non-renewable resources, including oil, to measure the relationship between changes in government spending and revenues. Five of the countries had funds. The researchers showed that although some countries with sovereign funds were less sensitive to commodity revenue in terms of expenditure, that advantage pre-dated the fund's creation. It is therefore impossible to show that setting up a fund modifies a government's spending patterns and helps to smooth revenue in a specific manner. Medina (2010) examines eight Latin American commodity producing countries and compares them with four developed producer countries (Australia, Norway, New Zealand and Canada). He shows that the fiscal position of the Latin American countries tends to fluctuate sharply in reaction to commodity price shocks. Chile is the only exception, with a fiscal response to price shocks very similar to that of developed countries.

There are many examples of misspent resources, where commodity revenues were initially allocated to a sovereign fund only to be commandeered later on by the government to boost spending. One such example is Chad, even though the creation of a sovereign fund was a condition set by the World Bank for providing pipeline and oilfield financing. The highly corrupt government was able to change the fund's rules easily to make much greater use of the resources. Nigeria experienced a similar problem. Before 1995, various types of extra-budgetary funds were financed by oil receipts and used to meet off-budget expenses. From 1990 to 1994, spending by these funds rose from 4% of GDP to 12%, amounting to more than one-third of the federal budget. The spending covered various types of investments in the oil industry, as well as development projects with lax procedures and selection criteria. A number of investment projects absorbed large amounts of expensive financing for very little subsequent payback.

The Pacific Island countries of Nauru, Papua New Guinea, the Marshall Islands and Micronesia accumulated reserves in their funds despite being deeply in debt and burdened with systematic deficits (Le Borgne and Medas (2007), Cox (2009)). In two cases, Nauru and Papua New Guinea, fund assets were used as collateral to finance the budget deficit. Papua New Guinea had to close its fund, while Nauru's lost all its assets.

Venezuela is another good illustration of the syndrome. In 1998, on the advice of the International Monetary Fund, Venezuela established a macroeconomic stabilisation fund to receive exceptional oil revenues. Initially, the rules of the fund were transparent: it received revenues from oil sold above a benchmark price, defined as the average of the last five years. If the price fell below this benchmark, the fund was obliged to transfer revenue to the

Treasury. But in 1999 the rules were changed. The benchmark oil price was set lower (authorising de facto larger transfers to the government) and the law gave the president discretion to draw on the fund. Thus, the fund did not prevent the government from implementing an expansionary budget policy when oil prices rose in 2000. The state only managed to make its mandatory payments to the fund in 1999 and 2000 by taking out high-interest loans from domestic sources. Nowadays, a large portion of Venezuela's oil revenue does not even pass through the stabilisation fund but is deposited directly into the National Development Fund, called Fonden. This fund was created in 2005 with the aim of financing social projects, at the discretion of President Hugo Chavez. In 2009 the stabilisation fund's assets stood at slightly over \$800 million, while Fonden held more than \$15 billion. Its total contributions since 2005 have exceeded \$57 billion.

However, there are also successful examples. The experience of Norway's oil fund is well known. It finances the overall budget, and the vast accumulation of resources in this fund (invested abroad) represents genuine public savings. It operates to rigorous standards of transparency, accounting and investment management. Since the Norwegian fund functions as a public account controlled by the finance ministry, it does not interfere with fiscal policy or the budget process. All government revenue from oil production is transferred to the fund, and only the fund's expected real return of around 4% has to be turned over to meet budgetary expenditures. Thus, the fund builds up financial reserves to cover the future expenses of an ageing population, and it smoothes government spending. And by investing a large share of oil revenue abroad, it helps to stabilise exchange rates.

In Chile, the Fiscal Responsibility Law took effect in 2006 and created two funds under the authority of the finance ministry: the Pension Reserve Fund (PRF) to supplement funding of pensions and social security liabilities, and the Economic and Social Stabilisation Fund (ESSF), which aims to contribute to financing the budget deficit that can occur during periods of low growth or low copper prices. The ESSF can also be used to pay back government debt and to finance the PRF. A structural balance rule is used to estimate the sustainable level of fiscal expenditures, i.e., the level compatible with the government's structural revenue, and thus not influenced by large short-term fluctuations in prices for copper and other sources of fiscal revenue. In 2008 the structural surplus was targeted at 0.5% of GDP, and it was reduced to 0% in 2009 to deal with the crisis. Every year the PRF receives at least 0.2% of the preceding year's GDP. If the budget surplus exceeds this amount, the contribution to the PRF may increase to as much as 0.5%. The remaining part of the budget surplus is then added to the capital of the Chilean central bank up to a maximum of 0.5% of GDP. Finally, the remainder of the budget surplus is transferred to the ESSF. This system has been successful in helping to reduce the effect of cyclical revenue variations on government expenditures. Both these funds have a real countercyclical effect on government spending. They have accumulated reserves from their inception until 2008, and the ESSF started to trim its balance sheet for the first time in 2009, during the financial crisis.

From reviewing these experiences, we see that merely establishing a sovereign fund is not enough to manage the problems linked to a country's dependence on revenue from natural resources. There is absolutely no guarantee that the fund's rules will not be altered, giving the government even greater freedom to dip into its resources at any time. Such actions run counter to one of the main reasons for establishing the funds.

4. Necessary conditions for an efficient management of sovereign fund's resources

As the preceding examples clearly demonstrate, it may be a good thing to segregate part of the wealth from the government budget, but this is not a necessary condition for efficient allocation of resources. What has been the practice in those countries – Australia, Norway, New Zealand and Chile among other – that have succeeded in stabilising government spending and in creating savings? In general, they have established extremely clear, fixed spending policies, and created institutions that prevent the government from deviating much from the rules.

We do not intend to address the issue of determining an optimal spending path (Engel and Valdès (2000)). Heal (2007) shows that the optimal path should balance the negative effects of a high revenue inflow in foreign currencies with the long-term need to invest in other sectors of the economy so as to achieve higher growth rates. But it is important to bear in mind that the government's optimal spending path is by nature independent of revenue patterns. Thus, a government needs to resolve an asset/liability management problem and manage the mismatch between its revenue sources and expenditures. A stabilisation fund or a reserve fund enables wealth to be transferred from one time period to another, in response to expected payment outflows. If the government expects significant expenses linked to pension or social security funding 20 or 30 years from now, receipts must naturally be saved now and then disbursed when spending needs are high. This is a classic problem of resource management, identical to that of an individual investor who has a stock of revenue-generating human capital and a need to cover cash flow needs for future consumption, and who has a choice between spending wealth immediately or saving it to meet later needs (Merton (1969), Bodie et al. (1992)). In the case of a government, human capital is replaced by the stock of exhaustible natural resources, and the government has the choice between immediately spending the revenue generated or saving it in a sovereign fund.

Another significant factor to consider is that, because the resources in question are non-renewable, all consumption of fiscal revenue from resource extraction must in fact be considered as consumption of capital, not just revenue. Thus, if all available revenue is continuously consumed, the country's capital declines, just as in a life-cycle model the capital stock is exhausted when the individual becomes too old to work. Therefore, the capital must be transformed into financial assets, which will generate revenue after the natural resources are gone. Managing the risk on a sovereign balance sheet should be considered in an asset/liability management framework (Gray et al. (2007)).

But a well-defined expenditure policy is not enough. An institutional framework must be devised to prevent the government from making discretionary forays into fund resources, or from borrowing against the fund as collateral, which amounts to the same thing. Governments are sorely tempted to borrow when commodity prices are high and the fund's assets are growing, and to use the fund to pay back debt when the situation takes a turn for the worse. The same is true for reserve funds. If the government borrows to finance the deficit that results from paying out receipts to the fund, global government saving does not change; the reserve fund's assets are simply neutralised by the government debt. Accordingly, monitoring and planning government expenditures involves making decisions on fiscal policy; setting up a stabilisation fund alone is not enough.

In many cases, funds that stick to a rigorous policy have issued strict rules on maximum expenditures to be authorised, or even formulae for the exact amount that can be spent relative to annual revenue or total wealth. In Norway, the fund is fully integrated into the state budget. All government revenue enters the fund, and policy requires that no more than 4% be spent annually to cover the budget deficit. This 4% rule corresponds to the fund's expected return and sets an implied cap on the structural government deficit. Similarly, in São Tomé, all oil revenue flows into the fund, and outflows from it cannot legally exceed a ceiling considered to be sustainable in perpetuity. The formula is spelled out in the law on oil revenue management. Outflows go directly into the government budget, but must be used for development purposes. Likewise, in Alaska, a fixed proportion of oil revenue flows into the fund and a formula determines the amount that can be taken out. The rules are enshrined in state law and the constitution. Outflows can only go to the citizens, in the form of permanent dividends. In addition to rules concerning the amounts allocated to funds and amounts authorised for expenditure, some countries have made rules about the use to which resources may be put. Ecuador allocates its oil revenue to various purposes specified by law. In Chad, a fixed percentage is allocated to certain priority sectors such as healthcare and education. Although these rules have the attraction of "tying the government's hands", they have a serious drawback, namely their lack of flexibility for meeting unexpected expenses in the event of a natural disaster, crisis or war.

Compliance with rules may be threatened if politicians have incentives to change them. One alternative to prevent this is to reduce the incentive via a separation of powers. Even though Norway's sovereign fund is formally placed under the finance ministry and is completely integrated into the budget, transfers to the fund must be approved by parliament, and the fund is managed by a subdivision of the central bank, Norges Bank Investment Management. As the opposition in Norway has significant influence and there are often minority governments, this amounts to a true division of authority in decision-making. Another solution is to entrust the setting of the fund's objectives to a panel of experts who are independent of the government. In Chile, the finance ministry determines the policy that guides both sovereign funds, but estimates for growth rates and medium-term copper prices, used to calibrate the transient income share (to be saved via the funds) and the permanent share, are not set by the government but by several panels of independent experts including economists representing both the government and the opposition. The central bank manages the funds received. In Australia, yet another system reigns, but it also guarantees a form of autonomy to the sovereign fund. A Board of Guardians that is independent of the government manages the Future Fund. The law stipulates that assets must not be expended before 2020, unless the fund's value surpasses the government's estimate of pension liabilities.

But in many developing countries, truly independent institutions are rare, because they may come under government pressure. In this case, one possibility is for the government to tie its own hands by means of a third party with solid institutional legitimacy that can guarantee compliance with the rules set when the fund was established. A foreign or international institution such as the IMF or World Bank could also take on this role. Another possible option is to create an international clearinghouse. In addition to helping the government hedge the risk of commodity exposure, the clearinghouse could also act as guarantor, for example by accepting only accounts of countries that comply with the rules defined when their funds were created, or by freezing an account in an event such as a coup d'état.

Conclusion

The high and volatile prices of commodities in recent years, as well as conditions set by international institutions for certain countries, have accelerated the movement to create commodity funds. Although this approach has succeeded for some countries and proved to be an effective means of saving or stabilising government spending, in many cases, establishing a sovereign fund did not have the expected results.

Separating part of the wealth from the state budget by means of one or more sovereign funds is not a necessary precondition for efficient resource allocation over time or for keeping the government from making discretionary incursions into the fund's resources to finance volatile spending. The funds that have succeeded in stabilising government expenditures and in saving (Norway, New Zealand, Chile and others) generally follow an extremely clear, fixed spending policy, and have institutions and a legal framework that keep the government from deviating much from the rules, and from dipping into fund resources to finance volatile expenditures. Separation of powers and oversight by a body that is independent of the government (a board composed of members of the government and the opposition) may strengthen such a system and ensure that the fund's original objectives are pursued at all times, thus making it less dependent on the political power in place.

However, this approach may not be appropriate for all countries. Those that have successfully established commodity funds (New Zealand, Australia, Norway) typically followed sound, transparent fiscal and macroeconomic policies before establishing oil funds. An essential factor in a sovereign fund's success is the creation of an institution that is capable of rising above political conflicts and pressures, with legitimacy that can survive changes in government. But in many developing countries, independent institutions are rare because they may easily be exposed to government pressure. In these cases, one possibility is to call on an international institution to guarantee compliance with the institution's rules.

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