Using natural resource revenues for education

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Using natural resource revenues for education
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Introduction: Using natural resource revenues to finance social investments

The discovery and existence of abundant non-renewable natural resources (oil, mineral and gas) represent an opportunity and a major challenge to domestic policymakers to invest new revenues in high return areas while avoiding the negative economic and political “curses” of natural resource wealth. In resource rich countries, the revenues accrued from taxation of the extractive industries, royalties, contracts and licensing fees have tremendous potential to boost economic activity and offer economic opportunities for countries to come out of the poverty trap. In many cases however, the extraction and allocation of natural resource revenues (NRR hereafter), tends to make countries more vulnerable to prevailing problems associated with resource curse, including Dutch disease, slower economic growth, violent conflict, corruption, and political instability (Ross 1999, Karl 1997, Auty 2001, Collier and Hoeffler 1998, Sachs and Warner 1995). At the end of the day, the critical policy dilemma is How to make the best use of scarce resources for the benefit of the population in a credible and sustainable way? And more specifically, how can NRR be invested in high return areas, such as education, to ensure the sustained development of future generations? This is the driving question of this background paper.

It has been well argued that the strength and quality institutional arrangements can play an important role to mitigate the resource curse (Rodrik, Subramanian and Trebbi 2002, Mehlum et al. 2006, Ross 1999).

We argue that existing political and institutional mechanisms to manage NRR can contribute to at least three goals:

a) Maximizing the extraction of NRR, by making strategic decisions regarding when and how to extract rents from companies, whether this is done at the level of concessions or negotiating licensing fees, the share of state participation in the extraction, production and distribution, and whether revenues are extracted in the form of taxes or royalties, etc.

b) Optimizing the use of revenues, by making a series of strategic choices to save, spend or further invest these revenues. Revenues could be converted into stabilization funds to absorb price volatility, smooth revenue flow and avoid macroeconomic mismanagement. NRR could also be saved or redistributed among broader sectors of the population or specific territories where the extractive industry is located.

c) Promoting social investment, by allocating revenue allocations to high return areas such as investment in human capital. The debate about allocation has been so far independent of the destiny given for the collected revenues that is whether these go to fund public sector salaries, infrastructure projects, new investments in specific sectors, and so forth.

In short, institutions are portrayed as safeguards of political transactions, in the sense that they can increase accountability and transparency in the use of NRR, ensure and protect investments from wasteful spending, allow for greater voice and participation in decision
making and impose sanctions on corrupt behaviour. The problem in most new resource rich countries however, is that institutions are weak, ineffective or prone to political capture.

This background paper does not deal with the modes and mechanisms of revenue extraction. Rather, it focuses on the roles of institutional choices and existing mechanisms to promote reliable and sustainable investments in human capital. Some of the guiding questions include:

- What are the advantages and shortcomings of existing mechanisms to allocate NRR?
- How can these mechanisms be compared? Are they fair and transparent, prone to political capture, rigid over time?
- When relevant, which countries have used NRR to invest in the social sector? What kind of social investments have been privileged? When have countries privileged spending for social and human capital development such as education?

While the research question is of utmost policy relevance, there is a surprisingly large gap in the literature to properly address this question. There are several theoretical and empirical challenges. First of all, in most countries the amount of collected revenues is accrued to central government accounts. With the exception of some stabilization and savings funds, most of these revenues go into national budgets and therefore become indistinguishable from other revenue sources, making it empirically difficult to trace the usage of NRR. Secondly, no single mechanism is used in isolation but rather, savings, stabilization and spending mechanisms are meant to complement one another. In practice, countries may put some of the revenues into saving funds while putting other resources into a stabilization fund or extract cash transfers from previously earmarked expenditure. Thirdly, it is very difficult to assess the return from different investment activities or sectors without making a proper sector analysis. When considering policy choices, elected politicians with short time horizons would prefer to invest in visible, short term strategies regardless of return rates. A final difficulty for exploring the impact of NRR on social investment is the actual gap between the effective investment (ie. education spending) and the expected outcome (ie. improved school enrollment). There is no sufficient time series data to measure visible improvements and establish causality.

Despite these important caveats, this background paper offers an outline to conceptualize and explore empirical pathways into these policy questions. The first part of the paper surveys the logic and principles guiding the adoption of existing mechanisms; different criteria for each mechanism is developed and explained and the tradeoffs between them are discussed. The second part looks at some comparative statistics looking at the magnitude of the “education deficit” in ten selected countries, both in terms of education indicators and spending commitments. This section then attempts to estimate the “cost of addressing the education deficit” by contrasting the reported NRR for each country and the per capita cost of primary education in each country. This gap is useful to develop a sense of the existing “room for manoeuvre” for adopting reforms and addressing investment gaps given the amount of
available resource wealth. The third part of the paper looks at ten case studies to document which mechanisms have been put in effect, whether they have been effectively implemented and if they appear to have worked to boost social investment, especially education. The cases include Brazil, Botswana, Chad, Ghana, Indonesia, Kazakhstan, Mongolia, Nigeria, Peru, South Sudan and Zambia. The fourth part concludes with a summary and some policy recommendations.

I. Mechanisms for managing natural resource revenue

The abundance of revenues give governments in resource rich countries an unparalleled opportunity to use, with a fair degree of autonomy, their non tax revenues to increase spending, pay off their debts, invest on strategic sectors of the economy or save for a rainy day. There is a wide array of institutional mechanisms that have been designed with specific purposes: to smooth future revenues from volatile fluctuations, to maximize fiscal revenues in the short run, to protect sovereignty over natural resource revenues, to ensure direct ownership of beneficiaries, to encourage greater spending transparency, to promote long term investment, or protect future spending. Often, these mechanisms may produce governance modalities that combine or confront with one another: for example, spending current revenues on education purposes could be explained as a form of long term investment of human capital. Also, the increased volume of investment for the provision of public services such as health and education may not be a sufficient condition for success if social investment lacks transparency in the administration of such funds or there is no strategic vision that is linked with development objectives (Bennett, 2002).

In this section we examine four different instruments used to manage revenues from the extractive industries (to spend, save or invest): stabilization funds, saving funds, revenue sharing formulas and direct cash transfers. We explore how these instruments work, what are the main arguments for the adoption of such mechanisms, who are the main stakeholders supporting such instruments, and what are the main expectations in terms of performance.

In evaluating the advantages and shortcomings of each mechanism, we have considered five relevant criteria, to understand: 1) the purpose of the instrument, 2) the degree of centralization in the management of the fund, 3) the level of “ownership” or legitimacy that the mechanisms has vis-à-vis the population, 4) the effectiveness in targeting and delivering public services (ie. education), and 5) the transparency in the management of the fund, ie, to what extent the fund prevents or minimizes opportunities for political capture or rent seeking practices. We briefly outline each dimension below, all of which has direct implications to understand the feasible space to fund education initiatives with natural resource wealth.

1. Purpose. we identify what is the rationale behind the adoption of the fund, depending of whether its aimed at creating long term savings, investment or direct spending, and related to that question, which type of outcomes are envisioned: fairness in the allocation of funds, macroeconomic stability, strong local ownership, etc.
2. **Control of the fund.** The relevant question here is which government level has the authority to determine how the fund is allocated: whether this is a decision that belongs to the executive office, is embedded in the constitution, or it is part of a continuous political bargaining between different stakeholders.

3. **Ownership.** The question here is to understand who claims authority over the funds, or who does the natural resource wealth belong to. In some cases, when the funds are centrally controlled but away from political influence, then natural resource wealth is a state asset—outside the control of political influences—, or whether they are part of the political bargaining at the national level or local level.

4. **Effective provision of services.** One of the most difficult challenges in resource rich countries is to ensure the effective translation of expenditures into projects that yield adequate benefits. This dimension looks at how different mechanisms can facilitate direct and visible investments on education initiatives, that produces tangible outcomes.

5. **Transparency and Accountability.** One of the key premises of successful financing social investment is that mechanisms must ensure legitimate ways to manage revenues and enforce transparency provisions (Bennett, 2002). Legitimate mechanisms will enhance implementing measures for the reporting, auditing and monitoring proceeds. Again, there is significant variation in this regard, with most of the transparency and accountability initiatives being located at the national level but much work remaining at the local level.

6. **Rent seeking and political capture.** The raising, sharing and distribution of natural resource revenues almost inevitably leads to direct conflicts over resource allocation (Haysom and Kane 2009). In general, the space of mismanagement of funds is inversely proportional to the presence of legal frameworks and checks and balances to ensure that natural resource revenues are collected in a transparent and fair way. It argued that creating funds with clearly designed objectives can isolate resource revenue more effectively from political pressures, potential wastage and corruption than the government budget (IMF 2007).

**Investing on education: comparing distribution mechanisms**

The previous discussion illustrates that different institutional mechanisms can serve diverse goals. All things equal, distribution mechanisms could be best used to promote macroeconomic stability, to protect long term savings, to promote transparent investment in each sector, guarantee the effective delivery of public services or to minimize potential rent seeking.
Making the linkage between these mechanisms and actual education spending is a different matter. In a federal country like Nigeria, where education spending is decentralized to the regional and local level, a revenue sharing formula for using NRR would match existing attributions, but it would not have the same impact in a country like Peru where education spending remains fairly centralized. Similarly, the sole allocation of conditional transfers to individuals could not undermine the resources available local or national education authorities to deliver good quality education. Thus, different mechanisms may need to reconcile diverging objectives when it comes to investing on education. The next section summarizes how the different mechanisms are best suited to maximize the use of natural resource revenues.

1. Stabilization funds

There are two types of sovereign wealth funds (SWF): saving funds and stabilization funds. Stabilization SWFs are created to reduce the volatility of government revenues due to fluctuating commodity prices and to dampen the fiscal and economic impact of boom and bust cycles through countercyclical spending. Savings SWFs are created to accumulate savings for future generations.

The adoption of stabilization funds is the most classic mechanism adopted by resource rich countries to protect themselves from volatile world commodity prices and smooth the flow of government revenues. The main purpose of stabilisation funds is to build up reserves when commodity prices are high and draw reserves down when prices are low. Stabilization funds can effectively contribute to long term fiscal planning if there are clear and enforceable rules to ensure contributions into the fund during boom times and constrain the conditions under which these funds can be withdrawn or used during bust periods. Stabilization funds are most effective with mining revenue because of the cyclical pattern unlike with oil and gas.

The objective of stabilization or savings funds can be achieved through implementation of a sound fiscal policy in the context of an overall budget strategy with clear fund targets. The formulation can be aided by a MTEF to help limit the expenditure of short run expenditure responses to rapidly changing resource revenue (Davies et al., 2001). The professional management of the fund according to technical criteria may enhance performance.

While there are many economic conditions to ensure a transparent and accountable management of natural resource revenues, the effective performance of a stabilization fund is a political concern (Bagattini 2009). In this sense, stabilization funds tend to work better in a context where there are solid state institutions, preferably with an independent civil service to prevent electoral swings in the management of reserves. Stabilization funds also tend to perform better in a context where there are greater constrains on the discretionary use of executive power and usually where there is greater party competition and increased citizens’ awareness (Bagattini 2009).
Citizens can also be actively involved in the monitoring and enforcement of transparency and accountability mechanisms including regular reporting, auditing and press releases (Stevens, 2003). Conversely, stabilization funds are most likely to be undermined in a context of increased fiscal uncertainty, in a context where the executive power concentrates discretionary decision making power, or when existing rules may change depending on political circumstances (Stevens 2003).

2. Savings funds

Savings or sovereign wealth funds constitute an alternative mechanism to dampen the fiscal and economic impact of volatile commodity prices, with a focus on saving those revenues for future generations. According to Dumas, there are three factors that are critical for the success of saving funds (Dumas 2011): a) to disassociate the decision on how much should be saved from what to be saved, b) to create a separate account to directly deposit all natural resources revenues and to ensure proper transparency and governance principles to account for those deposits, c) to control and minimize the discretion for determining the level of transfers and disbursements out of the fund.

The Government Pension Fund of Norway is an example of a savings fund. Originally created in the late sixties, it has two components: The Government Pension Fund - Global (formerly known as The Government Petroleum Fund) was established as a fiscal tool to encourage counter cyclical spending in the nineties. The Government Pension Fund - Norway was initially established as The National Insurance Scheme Fund in 1967. While the GPF Global derives its financial backing from strategic investments from the surplus wealth produced by norwegian oil income, the GPF derives its income from pension contributions. As of 2010, it is calculated that the total value of the GPF Global is around $525 bn USD, making it the biggest sovereign wealth funds worldwide today.

The GPF Global aims to smooth the path of spending out of volatile oil revenues whereas the GPF Norway seeks to accumulate long term savings from the oil revenues to cope with rising pensions and related expenditures on an aging population. All revenues accrue to central government and the funds are integrated into the Budget process which is controlled by the Ministry of Finance (UNECA 2002). The centralized control of the fund allows the government to absorb fiscal fluctuations and ensure a better distribution of funds to minimize inter-regional disparities. Another element of success is the well developed structure of its institutions, capable of adopting and implementing good fiscal policies, coupled with a professionalized and independent staff to manage these policies.

Despite the existence of good governance principles, the Norwegian government has not been exempt from considerable political pressure. The Norwegian parliament has the authority to allocate oil revenues into the budget within an estimated 4% of the petroleum earnings.

Political pressure however, has been mounted on MPs to increase government spending beyond the 4% action rule (Havro and Santiso 2011).

3. **Revenue sharing formulas between central and sub national governments**

The adoption of revenue sharing formulas is predominantly driven by the need to distribute natural resource wealth between the central government and resource rich territories. This formula emerges as a convenient way to transfer fiscal resources to sub national governments to promote a more equal redistribution of wealth. While the principle of redistribution is generally uncontested, the actual form of the distribution is subject to intense debate. Some relevant questions include: Where are located the points of extraction? Who are the main generators of natural resource revenues? Who will benefit from revenue sharing and why? These are imminent political concerns and therefore subject to continuous bargaining among the main stakeholders. In most cases, the central government retains significant control of the proportion, criteria and conditionalities of the transfers made to sub national governments.

To alleviate the potential mismanagement of fiscal funds, it is generally advised that governments centralize tax collection activities while they decentralize spending to sub national governments according to different criteria. Some scenarios include:

**Fairness.** In this scenario, sub national governments receive a proportion of transfers according to their own production, but non-producing districts do not receive allocations or are seriously marginalized from distribution. There are several difficulties stemming from this direct type of distribution. One problem is that it highlights and deepens horizontal inequalities across districts and regions: those districts that generate more revenue will continue to receive greater transfers and potentially create a problem of “regional resource curse”. And associated problem can emerge if larger transfers from the central government reduce the need to extract non oil taxation, thus creating greater dependency from the national government and potentially volatile natural resource revenues. One last pitfall, in the case that revenues are transferred directly to autonomous territorial units, is that reduces the incentives to have transparent expenditure management. If regional or local governments feel they are “entitled” to receiving specific allocations, they would feel less compelled to account for those transfers back to the central government.

**Equality.** The logic of distribution would favour a compensation formula to address existing inequalities. Revenue sharing formulas can be adapted to allocate rents proportional to the existing population, to equalize and improve the provision of public services between provinces, to proportionally reduce poverty rates or any other socioeconomic indicator, or to balance expenditure patterns between the national and regional levels. Another potential use for revenue sharing formulas is to compensate provinces, districts and indigenous people for the exploitation of natural resources and associated environmental damage (Hayman and Kane 2009). An immediate problem associated with this type of revenue sharing is that it is difficult to determine the relevant jurisdiction entitled to receive the resources. If a particular
local district or municipality is home for a mine, should the neighbouring districts also benefit or should the region in which the district is located?

Revenue sharing formulas increase the sense of ownership for the recipient localities, but this does not necessarily translate into stronger regional and local governments. Regions are more likely to claim autonomy where political parties or regional movements are stronger. They are more likely to be accountable to the needs and demands of their own population rather than the conditionalities imposed by the central government.

In terms of improving education spending, the use of revenue sharing formulas would ensure the direct transfer of resources to a region or locality, but it doesn’t necessarily ensure that those resources are directed to a specific sector, like education. If the local government is sufficiently autonomous, improve education spending will be achieved through the promotion of accountable governments. If the territory has poor political or administrative capacity, education spending can be secured from the central government, if it is established for example that a certain percentage of transfers must be spent on education.

4. Direct Cash Transfers-

The mechanism of a cash transfer involves a direct transaction of natural resource revenues from the central government to individual citizens in the form of direct regular payments. The underlying assumption is that natural resource wealth increase the available fiscal space to finance development goals, it encourage greater levels of social expenditure and enables new social policy initiatives (Hinojosa 2008). The cash transfer mechanism is believed to increase tax incentives of individuals (more willing to pay taxes) and produce direct benefits for the poor because it increases individuals’ purchasing power (Todd 2011).

Direct cash transfers are argued to generate individual incentives for greater accountability, both in terms of greater transparency and citizens’ oversight in the management of finances, but also in the form of a greater demand for investment in human capital development. in terms of increased transparency, this is likely to happen when there is a strong sense of public ownership and separation of oversight powers (Tsalik 2002).

Michael Ross argues that Alaska is a prime example of inefficient spending: “the distribution of petrodollars to individuals has substituted for a broad based tax system, a personal income tax, and even a sales tax” (Ross 2007: 273). The results are fairly negative, including chronic budget deficits, unfinished public works projects, lower productivity and spending patterns that privilege consumption over investment (Ross 2007). In the context of dire public finances, Alaska has also threatened to abandon other public services like school systems or health care. Ross argues that the Alaska example raises additional concerns for the applicability or desirability of direct cash transfers in countries where there is less rule of law, less educated populations and less citizen engagement (Ross 2007).
II. The Education Deficit: a comparative analysis of funding the education gap

This section offers some comparative statistics on selected resource rich cases, to illustrate the potential of natural resource revenues to make a difference in funding for education initiatives. We explore three specific questions: a) what is the magnitude of the education deficit in these countries, measured? b) what is the potential of natural resource wealth to fund such deficit, and c) what would be the cost of a solution? In doing this, we have collected and compared available data with the purpose of making broad comparisons, but in no way we imply or speculate the nature of the causal relationships between increased funding and improved education outcomes.

1. The Magnitude of the Education Deficit

How large are the education needs in resource rich countries? What are the average illiteracy rates? What percentage of children are not attending primary school? And how much is the state currently spending to address such gaps?

These are relevant questions that do not have a simple or validated response as the quality of the data varies greatly across cases. But the purpose of comparing these questions is to gain a sense of magnitude of the problem in different countries and see whether resource rich states are spending according to the magnitude of their problem.

Chart 1: The Magnitude of the Education Deficit: Illiteracy rates, average % of children out of primary school and public expenditure on education as a % of GDP (2005 – 2009).
The chart uses simple averages of available data (2005-2009) for public expenditure figures. Adult illiteracy rates are for the most recently available data (2009), with the exception of Peru (2007). Sources: UNESCO and World Bank.

The chart shows a dramatic variation in terms of the size of the problem. Nigeria scores the highest rates of population illiteracy (39.2%) and the rates of children out of primary school (36.3%). This is a sharp contrast with the situation in Kazakhstan or Mongolia where the reported illiteracy rate is 0.3% or the situation in Indonesia, Peru and Kazakhstan where reportedly less than 1.6% of children are out of primary school (UNESCO nd.). The government’s financial commitment to close the education gap does not always vary according to the need. Only 4 out of the 9 reported cases meet or almost meet the suggested UNESCO threshold of public expenditure according to which “Governments are encouraged to invest 4-6 per cent of public expenditure in education (as % of GDP), depending on the country’s demographic and economic status”⁴. If we set the suggested investment at 5%, we see that only Ghana, Botswana, Mongolia and almost Brazil have spent this amount in the 2005-2009 period. With the exception of Ghana, these countries also exhibit relatively low illiteracy rates and percentages of children out of primary school. On the other hand, in Nigeria, a country with a large education gap is also the country that spends less than 1% of its public expenditure on education. Another alarming case is Zambia, which is nearly 3.6% points below the suggested investment and it also features high illiteracy rates. In general, there is a positive relationship between low education spending and bad education indicators, but the reported evidence needs to be interpreted carefully as it refers to five year averages. Further work is required to establish whether sustained investments on education are likely to produce visible results in reducing illiteracy or increasing the share of children attending school.

2. The contribution from Natural Resource Revenues

Natural resource revenues could but do not always play a significant role to ensure continued investment in social sectors, especially education. Although the extraction of natural resources can have a significant impact on a country’s economy in terms of GDP growth, only a percentage of this revenue is accrued to national governments in the form of royalties, income tax, benefits, etc. Chart 2 compares the gap between revenues obtained from the extractive industries with actual government revenues according to data reported for countries members of the Extractive Industry Transparency Initiative (EITI).⁵ The existing

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3 All data on education is presented for primary education only. Data for percentage of children out of school and public expenditure is the average for the period of 2005-2009. Where data points were missing, linear extrapolation was used to obtain an estimate prior to calculating the average. No data for primary school enrolment in Chad is available.

4 http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-all/funding/

5 Data is presented for those countries who participate in the Extractive Industries Transparency Initiative. While Ghana is a EITI participant, oil revenues were not reported until 2011 and as such the data available is non-comparable. In addition the data for Kazakhstan must be seen as illustrative only. The nation is a
gap between these two reflects the governments’ share of participation in the extractive industry. Nigeria is a case of large government participation in the extractive industry: oil extraction contributes with nearly 35% of GDP, most of which (25% GDP) comes into government coffers in the form of revenues. At the other end of the spectrum, we find the case of Mongolia, where the mining industry is largely run by the private sector. Even though the mining industry contributes with more than 36.2% GDP, only 5% of GDP are converted into government revenues. Zambia and Peru are other cases where the government has a limited participation in the revenues extracted from the mining industry. Paradoxically, a greater government participation in the extractive industries does not necessarily translate into increased education spending. As mentioned before, Nigeria spends less than 1% of public expenditure (as % of GDP) in education, whereas Mongolia spends 5.3%.

To develop an idea of the potential use of natural resource revenues to fund the education deficit, we first calculate the gap between actual government spending and the 5% suggested spending target of UNESCO’s Education for All campaign. The red line shows the potential contribution of the country’s extractive industry to fund the education gap, in a factor of magnitude. In Nigeria for example, the government would need to invest an additional 4.1% of public expenditure (as % of GDP) to cover its basic education needs according to Unesco’s campaign target. Given the size of the extractive industry, this gap could be covered 8.5 times over if we consider the total share of natural resource rents, and approximately 6 times over if we consider the amount of government revenues accrued from the extractive sector. By contrast, the funding target has been met by the government in Mongolia, even though government revenues represent a fraction of reported revenues in Nigeria o Kazakhstan.


‘candidate’ country and not yet compliant with EITI reporting regulations. Further, Revenue Watch (n.d) reports that the reliability of the data is questionable.
Notes: simple averages are used to calculate rents and education spending. The 5% target is selected based on the UNESCO Education for All campaign suggestion that countries commit 4 to 6% of GNP to education. Sources: UNESCO and World Bank.

This would be of course, an unfair comparison to make, given that not all of the rents from natural resources are available for current or capital investment, nor is all of the government revenue only available for education, but the comparison does convey a sense of what is the “room for manoeuvre” in terms of bargaining space to extract additional revenues to fund education gap.

In the future, it would be ideal to calculate how much would actually cost to address the issue of education, given the amount of available resources in each country. Calculating the cost addressing one aspect of the education gap in terms of spending per pupil was not possible given major data limitations. Although the data on the total of children out of school as reported by UNESCO is available for most countries (with the exception of some missing years in Brazil), the published data on per pupil spending for primary education is highly incomplete for all countries with the exception of Peru, Ghana and Chad. More effort is needed however to complete the existing data regarding the magnitude of the problem per country and the value of investing in different areas of education.

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6 We used linear extrapolation to estimate the out-of-school population for some years in Brazil, as well as to obtain estimates of per pupil costs where data missing. To estimate the public expenditure to close the gap of school enrolment we calculated as [(average primary children out-of-school * average cost per pupil)/Average GDP]. Given the poor reliability of data, we deemed inappropriate to report these findings.
III. Management of natural resource revenue- Case studies

Another entry point to analyse the potential of natural resource revenues for education spending, is to look at specific country experiences, looking into what kind of stabilization or savings funds are available, what spending allocation formulas have been considered or are currently in place to distribute NR wealth among the population and the extent to which these institutional arrangements actually work. It would be relevant to know for example, whether there are specific coalitions or interest groups in parliament that promoted some allocation formulas over others, or whether NR funds are in practice used with discretionality by the ruling coalition. A third area for exploration would consist in identifying countries where the recent discovery of natural resource wealth in the form of oil, mining or gas deposits, have triggered public debates on the adoption of sovereign wealth funds and if so, whether the education sector is or has potential to be considered as an area of priority investment. Albeit these are most pressing policy concerns, there are only recent systematic debates around these questions. Given the data limitations highlighted above, there is much potential to improve the analysis of existing options and explore empirical scenarios for improved distribution and investments of natural resource wealth.

This section offers an overview into these questions, highlighting whenever relevant, the existing mechanisms of using NR wealth, the political economy considerations that led to the adoption of such schemes and the potential linkages for funding education spending.

1. Botswana – indirect funding of social sector

A diamond rich country, Botswana is one of the few African countries that has been able to convert natural resource wealth into to human capital improvements and effective delivery of basic services. In average, the revenues from the export of diamonds and other extractive activities represented approximately a 6% of GDP between 2005 and 2009 according to the World Bank. Despite this amount being moderate compared to other resource rich countries, Botswana is one of the few countries who reports to have invested at least 4% of its GDP on education spending, according to UNESCO. In Botswana, the illiteracy rate is of approximately 16% as of 2009.

The country has managed to ensure consistent investment and spending on education through several distribution mechanisms, which effectively work in the context of good governance institutions. A revenue stabilization fund and public debt service fund were established in 1972 in order to “sterilise” resource rents, service public debt and accumulate windfall earnings when diamond revenues declined. To avoid exchange rate pressures and maximize earned interests, most of the funds were invested in financial assets abroad. The revenue accrued from these investments translated into significant government revenues, most of which were spent on social services.

The use of mineral resource revenues was channelled through a self enforced budget rule, ‘the budget index’, which establishes a formula through which mineral revenues are expected
to be proportionally expected to finance investment and regular spending on development issues such as health and education. The investments in turn, are designed and allocated according to national development plans, regularly prepared and implemented by government officials to determine the necessary level of public expenditure on different areas. While the Parliament is in charge of voting the national development plan, the central government remains in control over expenditure allocations.

Botswana’s good governance institutions are visible at other stages of the extractive’s value chain. Mining leases for diamond for example, are 25 years long in order to ensure investment stability and to build long term relationships between the government and the private parties. Government effectiveness and policy stability is ensured by the competence of civil servants. The country has an independent anti corruption body and the budgetary and procurement process is reasonably transparent (Lim 2006). The government also ensures a strong rule of law, control of corruption and transparent decision making through the active participation of citizens. Citizens enjoy several voice and accountability mechanisms to monitor the decision making process and demand discipline from authorities in charge of resource extraction.

In summary, the case of Botswana shows continuous and effective investment of natural resource revenues through a mix of transparent stabilization and savings funds. These funds are translated into social spending allocations through transparent, legitimate and traceable distributive mechanisms.

2. Zambia – weak state, private social investment

Zambia is a country where approximately 20% of its GDP comes from the mining sector, but has systematically failed to invest in the social sector, especially on education. As of 2009, 3 out of 10 Zambians was illiterate. The lack significant government investment on the social sector is partly explained by a tradition of generous tax regimes for the private (mining) sector, significant political instability and poor institutions and mismanagement of funds.

Copper mining has been exploited in Zambia since 1964. At the time of boom, the state owned the copper mines and government revenues were high. With the decline of copper prices during the eighties, the state had to privatize companies to make up for the loss income and minimize further losses. The situation was reverted after 2003 with the commodities boom, and the state’s regain of the control and ownership of the mines. Yet, the government failed to capture any significant amount of rents without affecting the incentives for exploration, production and distribution of natural resources in the long run. Governments were unable to transfer resource revenues to the domestic economy through taxation and by 2007 copper mining still yielded no significant revenues to fund government coffers.

Low government funding has affected the delivery of services in the social sector in Zambia, despite economic growth rates of around 7% in 2011 according to the World Bank. Access to health services and education is still inadequate due to low funding levels. The Government
of Zambia has one of the lowest percentages of public expenditure on education, at 1.4% of GDP, a full 3.6% under the recommended suggested average spending on education of 5% GDP. In relative terms, the revenues generated by the extractives sector could cover more than five times the reported investment gap on education.

Zambia is in the process of creating public expenditure strategies to allocate additional revenues towards developing public infrastructure projects. Yet, at the same time, the 2006-2010 national development plan is focusing on diversifying the economy away from mining. In the context of government renewal in 2011 and growing expectations from the citizenry, the new government will face greater pressures to spend the revenue resources without even trying to create and implement a **public savings and investment plan** to maximize the benefits from the commodities windfall. Nor is likely that the government of Zambia could find the right mechanism to effectively exploit and manage its resource revenues and **equalise distribution of rents**.

In addition to the lack of solid political support, the government of Zambia is in a poor situation to implement a distributional mechanism, due to the lack of professional management in revenue collection, depleted public infrastructure, past mismanagement of the economy, and lack of transparency and citizen participation on mining agreements (Adam and Simpasa 2009; World Bank 2011).

Without any sustainable government mechanism available to generate tax compliance and long term revenues, other (private) actors have stepped to provide social services. This is the case of the mining sector, which has engaged in operating schools, hospitals, clinics and local road infrastructure especially in the mining areas through corporate social responsibility schemes (CSR). The presence of mining companies have provided a short term solution to the lack of service provision, but could not replace or offer a credible alternative to the challenges of strengthening public finances, improve transparent fund allocation, reduce opportunities for rent seeking, and strengthen social investment mechanisms.

### 3. Nigeria – revenue sharing and sub national curse

Nigeria is a resource rich country where oil represents nearly 35% of its GDP. The considerable government revenues are distributed through a **revenue sharing formula**, whereby the federal government gets 52.68%, states get 26.72% and local governments get 20.60% of oil revenues. The formula used for distribution of oil revenues is decided by parliament every five years taking into account the population, equality of states, internal revenue generation and land mass (Hayson and Kan 2009). The management of oil revenue is in the hands of governors of the oil producing states.

The revenue sharing formula has created conflicting claims over oil resources and a lack of fiscal discipline of sub national governments. A first challenge is the proliferation of conflicts over the revenue sharing formula where oil producing states demand increasing shares of oil revenues and those states that do not produce also claim greater redistribution of revenues.
the resulting unrest over resource control were combined with a growing dependency of states on central (federal) transfers of oil revenues. A related problem has been the lack of fiscal discipline at the local level. While expenditure responsibilities at the sub national level remain stable, the oil revenues transferred from the center, through revenue sharing formulas, are highly volatile. In Nigeria, there are no legal mechanisms to impose fiscal discipline at lower tiers of government. This arrangement also leaves no room for planning on the monetary terms as federal government has to deal with the weight of macroeconomic adjustment as it has no capacity to run fiscal countercyclical fiscal policies while controlling over less than half of the federal revenue (Ahmed and Mottu 2002).

The adoption of revenue sharing in Nigeria has not necessarily lead to improved or more accountable investment at the local level, much less to a targeted government effort to invest on education and other social services. In fact, the government of Nigeria has only committed 2.9% of its public spending to education. Instead, private actors (oil companies) have stepped in for the provision of social services and investments on education and health. Predictably, the private provision of such services has mostly benefitted oil producing communities, with varying quality and adequacy of these projects and not well adapted to local social standards (Sustainable Development Innovation Briefs 2008).

In the context of a weak, resource dependent state, it is not surprising that corruption, rent seeking and vested interests have emerged as obstacles to the transparent management and usage of oil revenues. Some future challenges in Nigeria involve the need to readjust the tax revenue sharing powers to privilege greater equalization of transfers, regain centralized control of revenues and ensure appropriate transparency mechanisms. Some have argued for a direct transfer of resource revenues to citizens, so they could be taxed back to the states. In either case, the challenge remains for Nigeria to renew its commitment towards investing on social policies and physical infrastructure.

4. Indonesia – state investment on education

Indonesia represents a case of relative success in transforming mineral wealth into economic growth while allocating resources towards social programmes. The extractive industry in Indonesia contributes with over 10% of GDP. Traditionally, oil and gas revenues accounted for over 60% of government revenues during the eighties, but reduced to about 30% in the nineties. In 2001, Indonesia changed from a centralised model to a decentralised revenue sharing model. The transfer involved devolving 15% of oil revenues and 30% gas revenues back to the producing provinces. A special arrangement was agreed for Aceh, which allowed it to receive 70% of its oil and gas (Hayson and Kane 2009).

Already during the Suharto regime, revenues from oil exports were channelled to initiating and sustaining many social programs. During the oil boom in the seventies, the government initiated a policy to expand primary school access to all children, and universal education was almost achieved by the mid eighties. In the health sector, clinics were built and nutrition improved by placing controls on staple foods. Widespread poverty at the beginning of the
New Order Economy made Indonesia commit its resources to investing in social welfare as whole believing that it was a best way to tackle poverty out its roots. Suharto introduced the ‘inpres program’ to allocate additional government resources to lower levels of government to provide social infrastructure projects such as schools and hospitals.

In 2001, decentralization reforms were adopted to strengthen the district administration. The reforms also helped improve the management of hydrocarbon pricing policy which also enabled the governance reformers to reduce subsidies for fuels on domestic markets and allowed the post –Suharto governments to fund the developing social services programmes. Despite reforms, funding social services still remains a challenge, since the central government is under tremendous pressure to subsidize fuel prices and reduce tax collection and royalties (Ascher 2008). There have also been accusations of possible leakages and mismanagement of funds, which reduce the volume of available natural resource revenues for supporting quality and affordability of social services.

Indonesia however remains an interesting case of a country that uses natural resource revenues to invest in education. Despite the country failing to meet the suggested spending target of 5% GDP, the Government of Indonesia is aware that greater investment on education is associated with welfare expansion, poverty reduction and income generation.

5. Peru – public and private provision of social investment

In Peru, minerals account for over 62% of country’s exports and 40% government tax revenues as of 2006. To make use of natural resource revenues, the law has adopted a revenue sharing formula which requires that 50% of income taxes and taxes paid by mining companies to the national government be channelled back to the regional and municipal governments. In the current distribution, the allocation of mining royalties among municipalities is defined on the basis of where the minerals came from rather than where are the areas of impact.

The 2004 amendment of the Canon Law establishes a transfer of 20% of Canon for regional development, 20% of which is for universities in the region, and 30% for promoting sustainable local development (Sustainable Development Innovation briefs 2008). In addition, a windfall tax on operations was established to collect from companies a voluntary contribution of 3.75% of turnover for a period of five years. This contribution from high mineral prices by mining companies has impacted largely towards social investment carried out by the mining companies.

Although Peru has moved decisively to adopt and implement revenue sharing formulas, these are far from the goal of promoting increased social development investment especially around education. The experience suggests that legal entitlements are far from sufficient to ensure effective social investments that promote a more equitable distribution, are accountable to the needs of the population, and spend revenues in a transparent way. Furthermore, the transfer of mining rents to the local level has produced increased social
conflicts between the mining companies and the mining communities (Arellano 2010). The weaknesses of local institutions and sub national governments, which have limited management capacity to effectively spend the money for developmental purposes, has further exacerbated the problem of limited state capacity. The alternative arrangement, of increased social investment by mining companies is far from providing a durable solution or collective learning experience for both communities and the mining industry.

6. Mongolia – multiple state efforts to fund social investment

Mongolia is a country where the extractive industry contributes with nearly 17% of its GDP. In relative terms, is a case of successful management of natural resource revenues to address social investment priorities including education. Mongolia is one of the few cases where public investment on education exceeds the suggested threshold of 5% GDP. Again, this relative success has less to do with the magnitude of revenues or investments per se, but rather to the presence of good allocation formulas and effective governance institutions.

In the context of the 2004-2008 period of high global mineral prices, the government established in 2008 a development fund to channel increasing government revenues from the extractives sector to invest on capital, help balance budget deficits and fund social welfare systems. The windfall revenues prompted the government to increase civil service salaries and pay for public investments. It also allowed the government to offer social cash transfers to eligible citizens. However, the increase in government spending also contributed to high inflation which reached almost 30 percent by mid 2008. In 2009, the government established and approved a Human Development Fund, aimed at pooling all revenues generated from the mining sector in order to address the needs from the most vulnerable parts of the population (Clark 2011). While the reforms are very recent to evaluate specific outcomes, it is noteworthy to observe that Mongolia has managed to maintain a consistent and effective level of investment on education.

7. Ghana

Ghana has recently discovered offshore oil which has raised huge expectations of the benefits oil brings the country. This newly found oil has estimated oil reserves ranging from 800 to 1.8 million barrels. The commercial extraction which began in 2010 is expected to generate US $1 billion per year for the next 20 years. The oil resources account for 3% to government income and constitutes between 6-9 percent of GDP which gives potential to accelerate economy wide growth. Ghana also holds large reserves of a variety of minerals and its mining sector has been dominated by gold which accounts for 90% of mining sector revenue, 40% of total exports and 40% revenue in some area district assemblies. Mining as an important sector in the economy of Ghana accounted for 6.2% GDP and 14% government revenue in 2007.

Oil provides Ghana with revenue to undertake development projects that will benefits ordinary people across the country such as improvement of health services, provision of
social amenities and improvement of education among others should be prioritised. In terms of education, literacy levels stand at only 57.9%. The educational standards have declined and the education ministry in 2011 is reported seeking funds to boost education operations. The education system lacks education infrastructure and facilities, inadequate education personnel such as teachers and supervisors due to poor conditions of service. It is assumed that if Ghana attained 90% literacy levels within 20 years, there will be a significant reduction of unemployment and poverty (Obour, 2011).

Ghana recently passed a Petroleum Revenue Management Act (PRMA) in 2011 which outlines how government oil revenues are to be used. This act allocates government oil revenue between the annual budget and sovereign wealth funds. The basis of this allocation is on benchmark revenue where 50-70% is allocated to the annual budget as it is received of which a minimum of 70% is required to go to eleven priority areas and the balance is consumed. The sovereign wealth fund will have the 30-50% of the benchmark revenue not allocated to the annual budget of which 30% go to the heritage fund for the future generation while the rest goes to the stabilisation fund.

Another proposed mechanism for Ghana is the direct cash distribution of oil receipts: this direct distribution of oil revenues to citizens seeks to strengthen the linkage between citizens and the state. This will provide the citizens with an immediate highly visible welfare benefit as well as a direct incentive to actively participate in monitoring the revenue flow. With this method, the state will also find ways of increasing taxation and providing public services. Moreover, this approach would allocate oil revenues in an equitable, transparent and efficient way. There is interesting potential to include education and its benefits as part of the public service provision expected from the state.

The IMF has projected that the revenue from oil will reach $1.3 billion per year by 2013 and remains at and slightly at that level until 2022. This figure is equivalent to estimated 40% of total government revenue in 2009. Based on these conservative projections, Ghana could thus give a hypothetical payout of more than US$ 80 per adult or US$ 50 per person [establishes and project comparison with per pupil cots of investment in Ghana at different educational levels]. This approach also allows them to spend account to their own priorities and limit the leakage from public spending other projects. Another way to maximise benefits is to set fiscal rules to save for other purposes by allocating only a portion of the revenue for direct distribution and allocate the remainder for other purposes such as a conditional cash transfer education fund or future generations fund.

The current policy debate has considered three other possible options on how Ghana should spend and save its windfall from its extractive industries. The first is to repay its large foreign borrowing as this will reduce credit spreads and alleviate capacity scarcity, stimulate private and public investment and raising wages. The second option is to invest in foreign assets through a sovereign wealth fund. The third option is to invest in domestic capital which includes both human and physical (Ploeg and Wills, 2011).
The Ghana analysis would need to take further into account: a) the stakeholders supporting each policy option, b) the expected cost benefits of each option, and c) the defining features (advantages and challenges as discussed in section I of paper) of adopting each mechanism.

8. South Sudan

South Sudan, a new nation that became independent in 2011 is rich in Petroleum which is the largest foreign exchange earner and biggest contributor to fiscal revenues. The country derives 98% of its revenue from oil wealth yet lacks the capacity to successfully absorb this revenue and translate into socio and economic development gain. It is one of the most underdeveloped countries in the world and oil has the potential to help it finance its own path out of poverty.

According to the EFA monitoring report (2011) South Sudan has some of the world's worst indicators for education whose headlines include, a) in excess 1.3 million primary school age children out of school, b) young girls face extreme disadvantages in education as they are less likely to enter school and more likely to drop out, c) an acute shortage of trained teachers and textbooks, d) school infrastructure is in a weak state. The quality of education provided by the vast majority of schools is low due to lack of resources, facilities and basic teaching materials.

To address the poor education system, South Sudan must build the institutions it needs to provide basic social services (health, education and low income housing). Setting up the right institutions, adopting the right and sound policies and ensures effective and efficient public investment in the sectors that matter to the poor will help lift the maximise number of its citizens out of poverty and commence the country’s journey to social economic transformation.

South Sudan can look for inspiration from other development models. For example, considering an investment fund modelled on Norway's petroleum fund could protect against the diversion of oil revenues from development and social investment. In addition, for oil revenue to benefit the majority of South Sudanese requires EITI ++ approach - an approach that goes beyond basic transparency and maximises the value of oil concessions, monitors compliance with contracts and ensures not only transparency in the management of oil revenue but also its efficient investment in pro poor and sustainable development programs.
Concluding remarks.

This preliminary review of the potential of natural resource revenues to fund education investment suggests three relevant conclusions, with direct policy implications.

1. There is relationship between revenues and investment. Not all the countries that receive large resource rents are necessarily the ones that invest the most on education. This claim is consistent with the findings from the resource curse literature, that resource rich countries are not necessarily the ones with improved social investment and indicators. But the comparison between rents and actual investment is nevertheless relevant to highlight and gain appreciation for the room for manoeuvre when discussing and implementing reforms to existing redistributive mechanisms. Countries like Chad and Nigeria could specially devote more resources to improve the quality and delivery of education to the population.

2. The choice of distribution mechanisms appears to be less important if the amount of government investment is inconsistent. The review does not find sufficient evidence to suggest that different allocation formulas can channel resources more effectively unless there is strong government commitment to sustain good levels of investment over time. The review highlights some of the countries like Zambia or Nigeria that have adopted stabilization and saving funds for example, but these funds have been ineffective to accumulate wealth over time due to the strong political pressures to spend monies in short terms investments.

3. The discussion of distribution formulas suggests that these tend to be more effective in the broader context of good governance, including but not limited to, strong democratic institutions, mechanisms to enhance citizens’ voice and accountability, specialized civil servants, strong judiciary institutions. This is the case of countries like Botswana and Mongolia that have been able to invest fewer resources more effectively than countries with larger revenues. For most of the countries reviewed, the core question appears to be not just the choice of allocation formula, but how to enable good governance institutions to ensure a sustained political commitment, limit the amount of mismanagement and effectively deliver education interventions to the people in most need.
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<td>Centrally controlled finances, with some influence of national politicians</td>
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<td>Not intended for service delivery but long term investment</td>
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<td>Varied. Allocation of resources may not match existing prerogatives to invest on education.</td>
<td>Not envisioned. Individual purchasing power ensures service (self) provision. Limited state role.</td>
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