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Ronald U. Mendoza, Harold J. MacArthur, Anne Beline Ong Lopez,



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# Devil's excrement or manna from heaven?

## A survey of strategies in natural resource wealth management

Ronald U. Mendoza and Harold J. MacArthur
*AIM Policy Center, Asian Institute of Management, Makati City, Republic of the Philippines, and*
Anne Beline Ong Lopez
*United Nations Children's Fund (UNICEF) – Philippine Country Office, Makati City, Republic of the Philippines*

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**Abstract**

**Purpose** – This paper aims to provide an updated review of policy literature and evidence on the development implications of extractive industries.

**Design/methodology/approach** – It synthesizes the main lessons drawn from an extensive review of policy and academic literature on this topic. It outlines the risks attached to the natural resource curse as well as the associated solutions, as demonstrated by empirical evidence and policy experience.

**Findings** – Based on the authors' review of case studies and multi-country empirical analyses, there is a mixed picture on the link between extractive industries and inclusive growth. The authors find that, on the one hand, significant risks are commonly associated with the natural resource curse faced by countries that wish to tap this wealth for development. On the other hand, the mixed results also suggest that the many challenges related to expanding extractive industries are not necessarily unavoidable.

**Practical implications** – For policymakers, the main message is that some countries that have taken important steps to improve the governance of their wealth as well as channel these toward productive investments – notably human capital – appear to have transformed the natural resource curse into a boon for development.

**Originality/value** – The main contribution of this paper is that it provides the most comprehensive review to date on this body of the policy and academic literature. It will serve as a guide for policymakers, civil society and other stakeholders working on issues linked to extractive industries.

**Keywords** Human capital, Inclusive growth, Human development, Stabilization, Extractive industries, Sovereign wealth fund

**Paper type** Literature review

## 1. Introduction

Juan Pablo Pérez Alfonso, founder of the Organization of Petroleum Exporting Countries, phrased the risks attached to natural resource wealth as follows: "I call petroleum the devil's excrement. It brings trouble […] waste, corruption, consumption, our public services falling apart. And debt, debt we shall have for years". Although he primarily referred to oil, the amalgam of evidence and experience suggests that other forms of natural resource wealth risk bringing about similar debilitating dependence that runs contrary to human and economic development and undermines child rights.

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The extraction of natural resources such as mineral and hydrocarbon deposits has become a large (and for many, still growing) part of developing countries' economies. These industries have the potential to generate significant amounts of hard currency for developing countries – wealth that could be used to boost investments in support of social and economic development. However, the track record of countries with major extractive industries is mixed. Rather than serve as a boon to development, natural resources are often characterized as a curse[1]. Countries like Angola, Chad, Democratic Republic of Congo and Venezuela, for example, are among the countries that have faced various symptoms of the natural resource curse, such as vulnerability to boom-bust episodes and wild swings in public spending and investments (i.e. spending bonanzas during times when the price of commodities are favorable, and crushing debt and severe fiscal austerity during commodity price downturns). Slower growth, higher corruption and more prevalent conflicts also form part of the broader malaise for these countries.

Nevertheless, some developing countries are on the opposite side of the spectrum, where natural resource wealth can be characterized as a blessing. Botswana, Chile and Malaysia are widely touted as examples of those natural resource exporters that effectively channeled their wealth toward investments in economic and human development, boosting education and health of the population, while also improving economic diversification and competitiveness. A synthesis of these experiences, coupled with the amalgam of empirical evidence to date, would suggest that natural resource wealth is a double-edged sword. Indeed, this wealth could fuel rapid and inclusive development, or it could stifle economic diversification, and breed dependence, corruption and social and macroeconomic vulnerability.

Thanks to improvements in technology and strong global demand among other factors, natural resources are being explored and will soon be extracted in ever increasing volumes in a growing number of least developed and lower middle-income countries, including Cambodia, Ghana, Papua New Guinea, Sierra Leone, South Sudan, Timor Leste, Mongolia and Uganda. These are among a growing cohort of countries that will ramp up their natural resource exports, while their starting points are characterized by relatively less advanced human development, governance and economic diversification. Their vulnerability to the natural resource curse is, therefore, seen to be much more acute, when compared to countries that already had some level of development and somewhat stronger institutions for good governance prior to the development of their extractive industries. Their potential for rapid human and economic development and advancing child rights is also much larger.

Can these countries avoid the natural resource curse, and chart a path toward sustained growth and development? The evidence points to an affirmative answer, even as the risks are considerably large. The goal of this paper is to synthesize how to mitigate these risks, and to present the main lessons behind tapping natural resource wealth more effectively for human and economic development and advancing child rights. These lessons include policy and institutional innovations that manage natural resource wealth much more effectively, as well as investment patterns that boost human capital – including investments in child education and health – and promote more inclusive growth and enhance competitiveness at the same time.

In what follows, Section 2 briefly summarizes the global and Asian landscape of selected extractive industries. Section 3 then reviews the amalgam of evidence tracing the links between extractive industries and human and economic development as well

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as child rights. Finally, a concluding section synthesizes the main lessons and possible innovations that could inform natural resource wealth management for low-income countries, such as the three analyzed here.

## 2. Snapshot of extractive industries: rising role of developing Asia

The USA Energy Information Agency (2010) projects that world marketed energy consumption will grow by about 49 per cent between 2007 and 2035[2]. Developing countries are going to account for the lion's share of this rise in energy consumption – energy consumption in the developing world is expected to rise by 84 per cent, compared to a mere 14 per cent increase in energy use among the countries that form the Organization for Economic Cooperation and Development (OECD). Economic growth in the developing world will both help fuel, as well as be driven by, extractive industries and energy production. Gross domestic product (GDP) in purchasing power parity terms is expected to increase by 4.4 per cent per year on average in the developing world, compared to a mere 2 per cent per year for OECD countries during the period analyzed (Figures 1-3).

As for minerals, improvements in technology and the continued investments in exploration are both expected to drive supply upward to meet growing projected demand (Wilburn, 2004). Mineral exploration spending has increased from about US$3.5 billion in the 1950s, rising to US$12 billion in the 1970s and further increasing to US$28 billion in the 1990s. Although figures on mineral exploration for the 2000s are not yet available, improvements in technology combined with the exhaustion of near-surface deposits of different minerals and hydrocarbons is widely expected to open new frontiers of exploration, including deep undersea sources (Doggett, 2007, p. 63). The world's top ore and mineral exporters now include relative newcomers like Mongolia and Papua New Guinea (Figure 4; Tables I and II).

The Asian region plays an important role as both supplier and consumer of natural resources. As a supplier, Asia (and in particular countries like Australia, China and Indonesia) dominate the world market in most of the mined minerals (USA Geological Survey, 2009, pp. 1-2). As a consumer, growth in Asia, coupled with burgeoning young

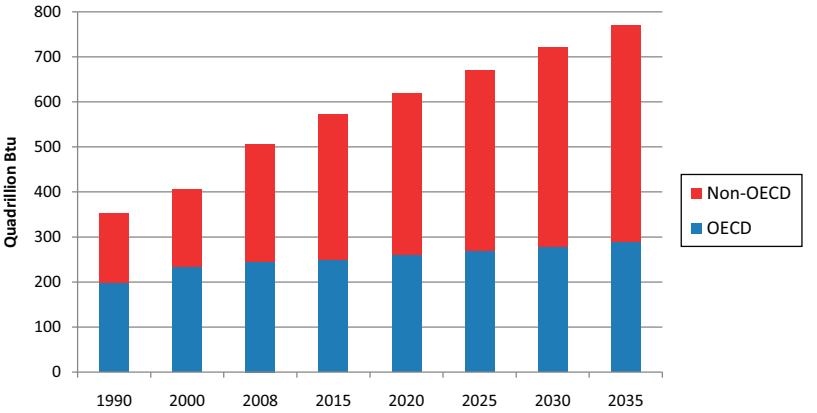
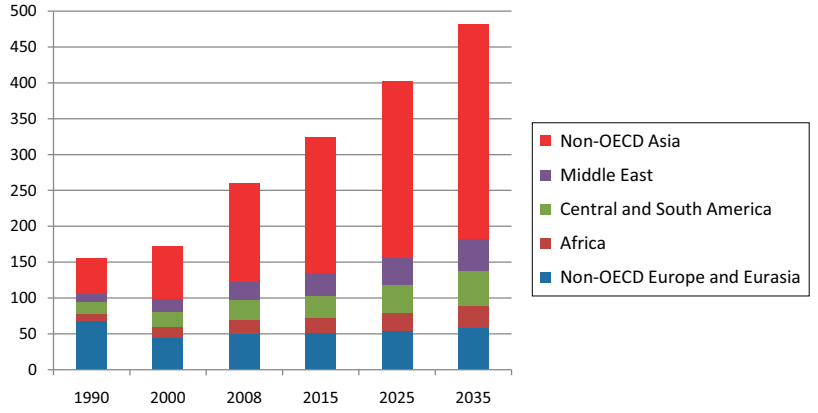


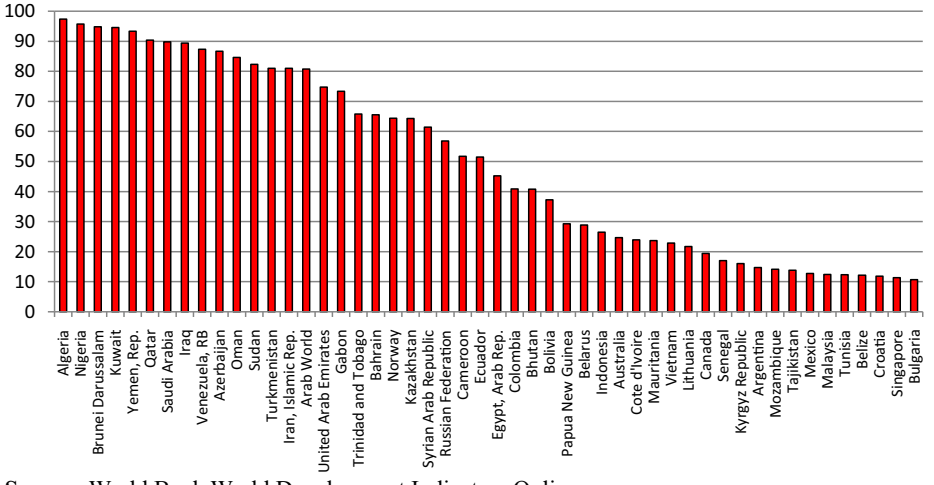

**Figure 1.**
World energy consumption, 1990-2035

**Source:** USA Energy Information Agency (2011)




**Source:** USA Energy Information Agency (2011)

**Figure 2.**
Non-OECD energy consumption, 1990-2035




**Source:** World Bank World Development Indicators Online

**Figure 3.**
World's top 50 fuel exporters (per cent of merchandise exports), 2009

populations in several countries, will fuel robust demand for energy and minerals. For instance, in terms of copper consumption, urbanization and industrialization in Asia – and notably China – is expected to drive a further 40 per cent growth in demand by 2020. China alone consumes anywhere from 40-50 per cent of global copper output based on industry estimates (Economist, 2011).

The abovementioned statistics provide a brief overview of how extractive industries have become a significant portion of developing countries' economies as well as of global trade. Clearly, the major caveat here is the continued uncertainty and volatility in international economic prospects. However, these figures and projections do reflect expected significant increases in global energy and mineral consumption and production. Developing countries will play a key role in both sides of this equation – and in particular, a growing number of less developed countries in Asia will begin to feature

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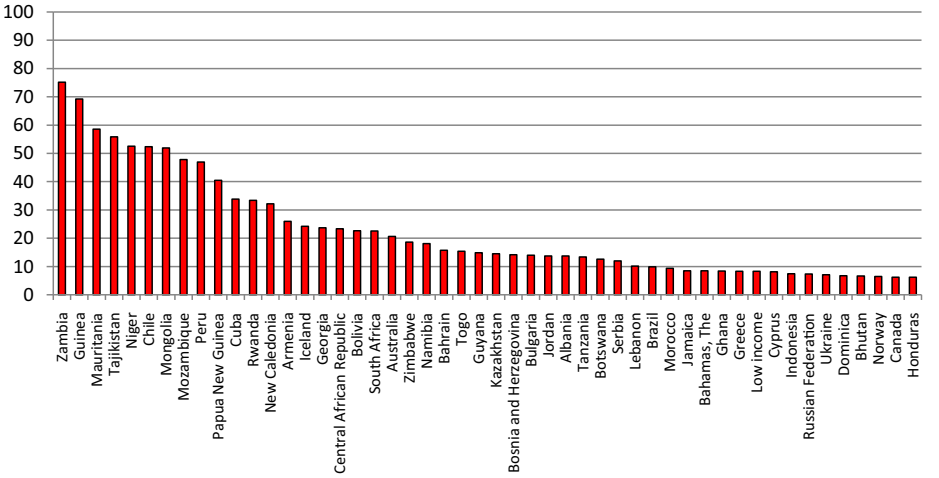


**Figure 4.**
World's top 50 ore and metals exporters (per cent of merchandise exports), 2009

**Source:** World Bank World Development Indicators Online

| Alumina | | Bauxite | | Copper | | Iron ore | | Nickel | |
|---|---|---|---|---|---|---|---|---|---|
| China | 23,800 | Australia | 65,231 | China | 970 | China | 880,000 | Indonesia | 203 |
| Australia | 19,948 | China | 40,000 | Australia | 859 | Australia | 394,000 | Australia | 165 |
| India | 3,100 | India | 14,000 | Indonesia | 610 | India | 245,000 | Philippines | 137 |
| Japan | 310 | Indonesia | 1,200 | Papua NG | 167 | Korea, N | 5,300 | New Caledonia | 93 |
| | | Malaysia | 263 | Mongolia | 130 | Malaysia | 1,470 | China | 81 |
| | | Vietnam | 80 | Philippines | 49 | Thailand | 1,401 | | |
| | | Pakistan | 37 | India | 31 | Mongolia | 1,380 | | |
| | | | | Pakistan | 19 | Vietnam | 1,060 | | |
| | | | | Korea, N | 12 | Korea, Rep | 455 | | |
| | | | | Vietnam | 12 | Pakistan | 260 | | |
| Asia (share) | 100 | | 100 | | 100 | | 100 | | 100 |
| World (share) | 60 | | 61 | | 19 | | 66 | | 43 |

**Table I.**
Top natural resource producers in Asia, 2009 (in 1,000 metric tons unless otherwise specified)

prominently on the supply side. These countries could draw on the lessons, experiences and policy innovations of other countries that have tried to minimize the risks of the natural resource curse, while seeking to maximize their associated development benefits.

## 3. Review of evidence on extractive industries and development

Case studies and multi-country empirical analyses paint a mixed picture as far as the general link between extractive industries and human development, and extractive industries and child rights[3]. On the one hand, this relates to the significant risks faced by countries who wish to tap this wealth for development – indeed, only a few countries seem to have managed to do this effectively. On the other hand, the mixed results also suggest that the natural resource curse is not necessarily unavoidable. Indeed, a number of countries that have taken important steps to improve the governance of their wealth

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**Table II.**
Top natural resource producers in Asia, 2009 (in 1,000 metric tons unless otherwise specified)

| Tin (metric tons) | | Zinc (metric tons) | | Coal (bituminous) | | Natural gas (million cubic meters) | | Petroleum (1,000 42-gal barrels) | |
|---|---|---|---|---|---|---|---|---|---|
| China | 115,000 | China | 3,400,000 | China | 2,300,000 | Indonesia | 80,000 | China | 1,370,000 |
| Indonesia | 55,000 | Australia | 1,290,000 | India | 450,000 | China | 72,000 | Indonesia | 280,000 |
| Australia | 13,269 | India | 365,000 | Australia | 348,000 | Malaysia | 58,560 | India | 255,000 |
| Vietnam | 5,400 | Mongolia | 156,500 | Indonesia | 190,000 | Australia | 42,345 | Malaysia | 240,843 |
| Malaysia | 2,412 | Korea, N | 70,000 | Mongolia | 13,164 | Pakistan | 39,000 | Australia | 169,211 |
| Burma | 672 | Vietnam | 45,600 | Philippines | 4,687 | India | 30,000 | Vietnam | 119,528 |
| Laos | 350 | Thailand | 34,000 | New Zealand | 4,563 | Thailand | 26,362 | Brunei | 61,000 |
| Thailand | 153 | Philippines | 10,035 | Pakistan | 3,600 | Bangladesh | 19,000 | Thailand | 56,302 |
| | | Pakistan | 5,000 | Japan | 1,100 | Burma | 11,555 | Pakistan | 27,000 |
| | | Laos | 3,400 | Malaysia | 1,050 | Brunei | 11,300 | New Zealand | 19,617 |
| | | Burma | 45 | Afghanistan | 150 | Vietnam | 8,010 | Papua NG | 12,806 |
| | | | | Bhutan | 124 | New Zealand | 4,097 | Burma | 6,881 |
| | | | | Nepal | 16 | Japan | 3,700 | Japan | 5,795 |
| | | | | | | Taiwan | 310 | Philippines | 2,920 |
| | | | | | | Papua NG | 100 | Mongolia | 1,870 |
| | | | | | | Afghanistan | 50 | Bangladesh | 1,800 |
| | | | | | | | | Taiwan | 101 |
| | | | | | | | | Afghanistan | 20 |
| | 100 | | 100 | | 100 | | 100 | | 100 |
| | 70 | | 48 | | 65 | | 14 | | 10 |

**Source:** USGS (2009)

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as well as channel these toward productive investments – notably human capital – appear to have transformed the natural resource curse into a boon for development.

Empirical and case studies of the links between extractive industries and development outcomes identify at least two main channels of interest (Humphreys *et al.*, 2007; Frankel, 2010; Collier and Venables, 2011):

- *Public goods*: How does natural resource wealth support stronger government revenues and, in turn, enhance public sector investments to boost development?
- *Private consumption and investments*: How does natural resource wealth contribute to high and inclusive growth that boosts employment and livelihoods, in turn, increasing household incomes and private/household consumption and investments to children and the general well-being of the family?

Sachs and Warner (1995), for example, examined data for about 70 countries during the period 1970-1990; they found evidence that economies with a high ratio of natural resource exports to GDP in 1970 (the base year) tended to grow slowly during the subsequent 20-year period, i.e. 1970-1990. This slower growth could translate to weaker public sector revenues and thus also more constraints to public investments in human capital. Similarly, this may also translate to slower growth in household income, in turn, resulting in lower household consumption and investment for the benefit of children. Nevertheless, evidence on these two main channels affecting human development and child rights appears inconclusive.

Hinojosa *et al.* (2010) combine correlation, regression and cluster analysis of data on about 74 countries in which the level of export dependence on minerals (fuel and metals) has been superior to 10 per cent in the period 1995-2005. These authors find little evidence of a definitive link across mineral wealth, state revenue and social welfare policy. With regard to social sector and human development outcomes, Pineda and Rodriguez (2010) undertake multi-country regression analysis, and they uncover evidence that changes in human development from 1970 to 2005 are positively and significantly correlated with natural resource abundance. This suggests that the extractive industries sector could contribute to human development and advancing child rights.

In terms of the potential for poverty reduction and reduced inequality, Segal (2011) helps to illustrate a "resource dividend" policy, which is essentially a redistribution of the share of the natural resource rent[4]. Analyzing data for 17 developing countries with populations larger than 50 million, he finds that if every developing country in his sample implemented a redistribution of some of this natural resource wealth, then the number of people living below US$1 a day could be cut by between 27 and 66 per cent (p. 19). Using India as a specific illustration, Segal further notes that a resource dividend scheme could cut poverty by more than half in that country, from 42 18 per cent (p. 24).

Country case studies also provide further insights as to how some countries have managed the risks posed by extractive industries. In a recent volume by Collier and Venables (2011), for example, analyses of extractive industries in Russia, Iran, Malaysia, Chile, Cameroon, Nigeria, Kazakhstan and Zambia reveal how economic growth and human development through natural resource wealth is essentially a challenge of avoiding the "weakest link" in a chain that connects natural resources with development outcomes. The first link in this chain focuses on the discovery and development of natural resource wealth, which requires not just investments in public goods (mineral

surveys and clear property rights regimes) but also large capital and technology investments for extraction. A second link has to do with the government effectively assessing and channeling that wealth through its public finance management system. A final link focuses on investing that wealth in ways that strengthen assets and capital for high and inclusive growth and development. As far as policy experience goes, this will typically involve strong human capital investments as well as industrial diversification that absorb and utilize these investments effectively. Each of these links risks being broken not just by poor governance but also by a variety of challenges linked to the natural resource curse.

Drawing on the literature, the following are some of the main symptoms of the natural resource curse:

- *Dutch disease*: A sudden and strong inflow of hard currency could lead to strong appreciation pressure on the domestic currency. In particular, this is a risk for countries that maintain some form of managed or fixed exchange rate regimes.
- *Crowding out of manufacturing*: Linked to Dutch disease, a stronger currency essentially takes out one important policy tool for industrialization policy, i.e. an undervalued exchange rate. In addition, the development of extractive industries could also introduce risk and volatility, as noted earlier, and this, in turn, could serve as a severe disincentive for the rest of the economy to diversify and develop[5].
- *Poor governance and weak institutions*: Countries with governments that maintain strong control over natural resource deposits or with elites that maintain their hereditary grip on this wealth may be less likely to develop strong institutions for good governance and well-functioning market economies[6].
- *Crowding out of human capital investments*: The two preceding factors could lead to weak public and private sector investments in children and youth, due in part to weaker household incomes as well as unresponsive and bad governance. This, in turn, could lead to even weaker long-term economic and human development prospects, possibly introducing a low-level development trap[7].
- *Unsustainability and conflict*: Weak and inequitable access to basic needs such as education, health and some social protection, as well as unresolved disputes in the appropriation and management of natural resource wealth, combined with bad governance and unaccountable governments, could eventually lead to unsustainable depletion of this wealth (as well as the surrounding environment) as well as trigger conflict among the different stakeholders.
- *Economic volatility*: Overdependence on extractive industries could open channels for external shocks coming from volatility in international markets. This, in turn, could create a further knock-on effect to the rest of the economy that may not be able to develop and diversify because of strong disincentives to invest.
- *Potentially deteriorating trends in world commodity prices*: Although there is less evidence of this for most minerals and hydrocarbons, this is still a concern for commodity exports in the agricultural sector.

These symptoms of the natural resource curse have played out in varying degrees across different countries that boosted their natural resource exports. Cameroon, for

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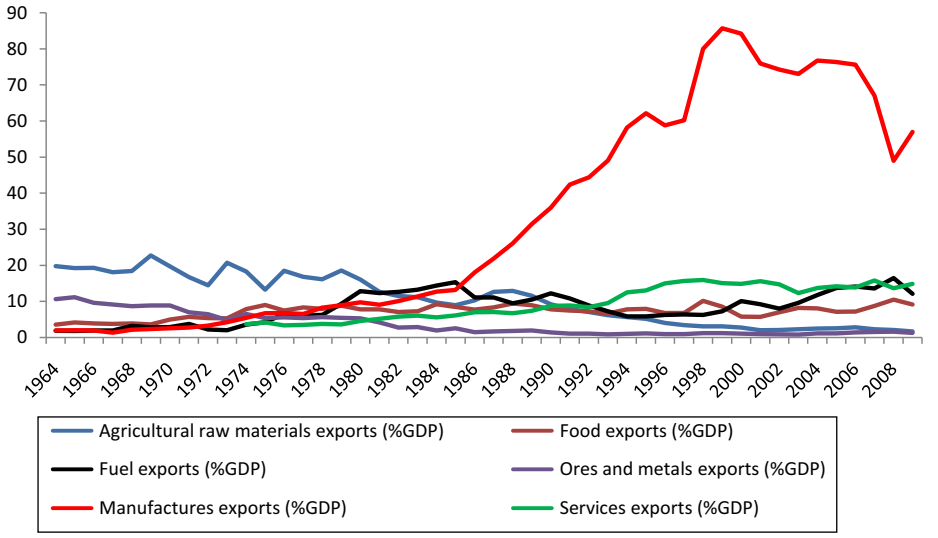
example, has little to show for the vast amounts of oil wealth that has been extracted out of that country. Recent analysis by Gauthier and Zeufack (2011, p. 27) show that up to 54 per cent of the total oil rent in that country has not been transferred to the public sector budget and remains unaccounted for. Even as it boosted the extraction of oil since the late 1970s, that country saw its infant mortality increase from 61 to 78 per 1,000 children, child malnutrition increase 14 to 22 per cent and life expectancy decrease from 56 to 50 years during its boom period (p. 29).

In addition, countries like Algeria, Angola, Azerbaijan, Myanmar (Burma), Cambodia, Chad, Congo-Brazzaville, Democratic Republic of Congo, Equatorial Guinea, Gabon, Kazakhstan, Nigeria, Sudan and Venezuela are among those that have seen conflict risks intensify alongside the development and extraction of natural resource wealth. Nigeria, in particular, has experienced severe conflict that is linked in part to natural resource management issues. The Niger Delta which contains vast amounts of natural resource wealth has also been the scene of ethnic unrest and conflicts, especially in the late 1990s and early 2000s. During a particularly volatile period in the mid-1990s, analysts point out that the conflict led to severe human cost: about 30 villages were razed by soldiers, 2000 civilians killed and about 100,000 refugees displaced (Ajakaiye *et al.*, 2011, p. 236).

Yet, examples of countries where some of these risks have been successfully mitigated do abound. Corporate social responsibility (CSR) initiatives by various mining companies have helped to shore-up some of the potential conflict risks, notably among communities that are affected by mining operations. Sagittarius Mines Incorporated in the Philippines, for example, has invested in technical and vocational education for affected communities, training on heavy equipment operation and management (in anticipation of mining employment opportunities), feeding program for vulnerable members of the community, health professionals training programs and subsidies on health insurance for community members[8].

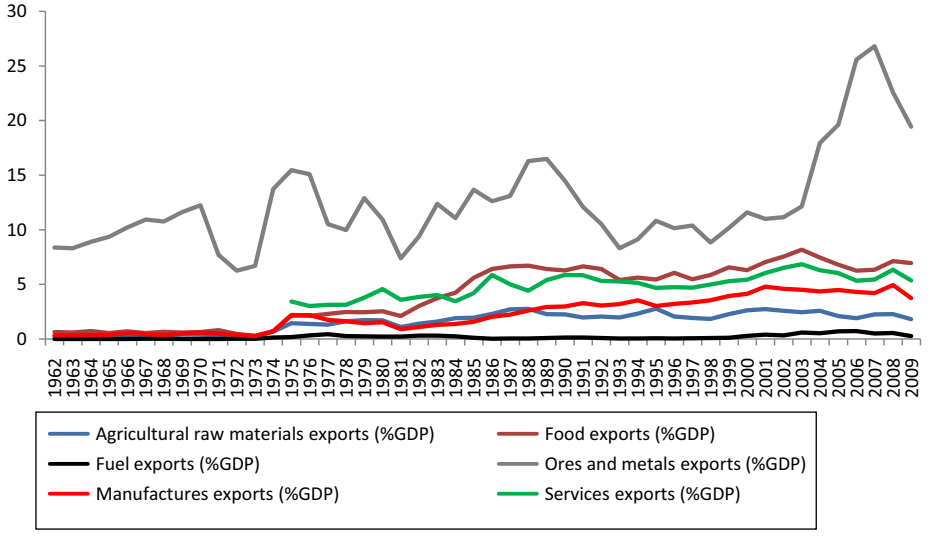
In addition, Malaysia invested heavily in policies that promoted stronger human development outcomes and improved equity. It reduced poverty from 50 per cent of its population in 1970 to a mere 4 per cent by 2007, while boosting its oil and other natural resource production. That country was able to diversify its economy, thanks to strong investments in research and development that served as public goods for domestic industries (Yusof, 2011, p. 188; Figure 5). Malaysia's growth and development trajectory was also anchored on a sound and stable business and investment regulatory regime (to encourage private sector investments); and public sector investments toward equity, which included policies to enable young people to participate in the subsequent economic transformation that relied on higher levels of skills, and policies to directly redistribute part of their growing wealth to the vast majority of the population[9].

On the other hand, Chile has found it much more difficult to diversify, and still maintain a high dependence on commodity exports (Figure 6). Today, it is the largest producer of copper in the world, accounting for some 43 per cent of the world's total copper output (Fuentes, 2011, p. 82). Despite this vulnerability to external shocks, it has found a way to mitigate the risks attached to this economic structure by creating financing mechanisms, like the Economic and Social Stabilization Fund (formerly, the Copper Stabilization Fund), which enable it to implement countercyclical fiscal policies. Further, Chile channeled part of its mineral royalties into a Fund for Innovation for Competitiveness managed by the Ministry of Economics. It also created a National




**Source:** World Bank World Development Indicators Online

**Figure 5.** Malaysia's export industries (per cent GDP)




**Source:** World Bank World Development Indicators Online

**Figure 6.** Chile's export industries (per cent GDP)

Council for Innovation for Competitiveness whose role has been to advise the government on human capital development, creation and dissemination of technology and broader innovation policies.

Financing mechanisms have been created with varying objectives related to improving the management of natural resource wealth. To help preserve the wealth for

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future generations and improve the sustainability of its use, some countries have created savings funds along with rules that govern the amounts and conditions for withdrawal. For instance, the so-called "Hartwick rule" limits withdrawals to the return on the investment of the fund, while keeping the fund balance constant in real terms. However, some have questioned an overly conservative use of natural resource wealth, citing that present consumption should be given greater weight, notably in less developed countries with high scope for investing in human and economic development. Essentially, these analysts argue that, rather than bequeath proceeds from natural resource wealth, present generations can build a more diversified economy and a society with higher human development for future generations (Heuty and Aristi, 2011; Van der Ploeg and Venables, 2011).

In addition, investment rules have also been adapted to recognize the importance of human capital in countries' sustainable and effective use of their natural wealth (e.g. Botswana's Pula Fund). Finally, stabilization funds have also been created to help provide resources during difficult economic times, in anticipation of the boom-bust tendency of extractives-dependent economies. Chile, for example, has an Economic and Social Stabilization Fund that helped provide part of the resources to implement countercyclical social spending during the recent global economic downturn. Other countries with smaller populations and larger natural resource wealth are able to provide more generous public goods, such as free education and health care in Brunei. Table III outlines some of the funds created to manage natural resource wealth, and it lists some of the ways through which these funds boost investments in children and human development.

Furthermore, Save the Children (2003, p. 3) estimates that extractive industries are critically important in over 50 developing countries which are home to about half of the global population. Of this group, about 1.5 billion people – including over 700 million children – live on less than US$2 a day. Based on their review of the policy choices and governance of natural resource wealth in countries like Azerbaijan, Colombia, Nigeria, Sudan and Venezuela, they conclude that the net impact of extractive industries has become adverse, notably for children, particularly when governments mismanage the wealth and do little to mitigate both the initial as well as the subsequently exacerbated inequality that could result from natural resource extraction and non-inclusive growth. Poor regulation (as well as corruption at the central and local government levels) is associated with (sometimes illegal) artisanal mining, child labor and subsequent harmful environmental repercussions[10]. In addition, bad governance and corruption is also associated with weaker or very unstable and volatile human capital investments and social spending. Typically, the most vulnerable – poor households and children, as well as indigenous communities – are often severely affected[11].

All these are critically linked to weak institutions. In response, a growing number of international development agencies and international civil society groups support improving transparency, publishing all payments and improving the development impact of business operations comprise some of the strategies that could improve the net positive impact of mineral wealth on children and poor families[12]. Box 1 contains a brief description of the successful transition of Botswana from a low-income and low human development trajectory to a country with high and inclusive growth and stronger promotion of child rights.

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**Table III.** Summary descriptions of selected sovereign wealth funds

| Country | Fund name | Date estimate | Assets (US$ billions) | Fund type | Modes of distribution | Impact on social development and children | Transparency score[a] | Source of revenue |
|---|---|---|---|---|---|---|---|---|
| Botswana | Pula Fund | 1994 | 6.9 | Savings | The fund is part of the foreign exchange reserves. Its goal of preserving a portion of the income for future generations | Investment rule recognizes investments in human capital as part of "sustainable investment/spending" | 6 | Diamonds and minerals |
| Brunei | Brunei Investment Agency | 1983 | 30 | Savings | Earnings produced from the oil industry are utilized to build up foreign reserves | The fund helps to finance free education and health care provided by the government | 1 | Oil |
| Chile | Social and Economic Stabilization Fund | 1985 | 21.8 | Stabilization Savings | The aim of the Pension Reserve Fund is to address an expected future government pension liability shortfall. As a savings fund, it enables a transfer of wealth from one generation to the next for the purpose of future sustainability | In 2009, 14.5 % growth in public spending despite fiscal revenues falling by 23 %; Direct transfer to low-income families of around US$80 each during the crisis | 10 | Copper |
| Kiribati | Revenue Equalization Reserve Fund | 1956 | 0.4 | Stabilization | The fund is part of the government's assets and contained more than US$500 million in 2009 | | 1 | Phosphates |
| Mauritania | National Fund for Hydrocarbon Reserves | 2006 | 0.3 | Stabilization Savings | The fund plays the role of a macroeconomic stabilization for country. It has goal of accumulating savings for future generations | | 1 | Oil and gas |
| Mongolia | Mongolia Human Health Fund | 2013 | 30 | Stabilization | SW Fund will come on line in 2013; Direct transfer cash/non-cash securities to 2.7 million citizens plus central budget allocations for health and education | Special monthly direct cash transfers to all citizens | N/A EITI | Copper and gold |
| Papua New Guinea | PNG Mineral Resources Stabilization Fund | 1974-1999 | | Stabilization | The Mineral Resources Stabilization Fund was designed as a fiscal tool to support macro-economic management of the national economy. The current government plans to create a new SWF | Special youth and children support grants to local governments and communities | N/A | Minerals, oil/natural gas |
| Qatar | Qatar Investment Authority | 2005 | 85 | | The fund devoted to diversification using money from its energy sector to invest in non-energy related sectors. The QIA controls around US$75 billion in assets | | 5 | Oil |

(*continued*)

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Table III.

| Country | Fund name | Date estimate | Assets (US$ billions) | Fund type | Modes of distribution | Impact on social development and children | Transparency score[a] | Source of revenue |
|---|---|---|---|---|---|---|---|---|
| Timor-Leste | Timor-Leste Petroleum Fund | 2005 | 8.3 | Stabilization Savings | The fund is integrated into the State Budget. By law, annual draw downs cannot exceed the Estimated Sustainable Income. The fund has built in requirements for transparency and accountability | Currently funding overseas graduate education for 160 students, central budget support for health and education | 1 EITI | Oil and natural gas |
| Texas | Permanent School Fund | 1895 | | | The fund is used exclusively for the benefit of Texas Public Schools | Supports primary and secondary schools | N/A | Oil/gas and mineral royalty payments |
| Nigeria | Sovereign Investment Fund | 2011 | 1 | Savings stabilization | Funding mechanism for two funds: Future Generation Fund Infrastructure Fund Stabilization Fund | Supports human development and infrastructure investments | N/A | Oil revenues |
| Kuwait | Investment Authority | 1953 | 296 | Savings | It provides a source of reserve funding for Future Generation Fund | | 6 | State transfers 10% of oil revenues annually to this fund |
| Bahrain | Taskeen Investment Board | 2007 | | Savings | Funding mechanism to support investments in job creation | Targets creation of 20,000 jobs | N/A | Oil revenues |

**Notes:** [a] Linaburg–Maduell transparency index; SWF, sovereign wealth fund; QIA, Qatar investment authority; EITI, extractive industries transparency initiative

**Sources:** www.swfinstitute.org/fund-rankings/swfs/; www.swfinstitute.org/tag/mongolia/; www.swfinstitute.org/swfs/brunei-investment-agency; www.swfinstitute.org/fund/chile.php; www.state.gov/r/pa/ei/bgn/1836.htm; www.swfinstitute.org/fund/mauritania.php; http://epress.anu.edu.au/ssgm/global_gov/mobile_devices/ch14s02.html; http://taighde.com/w/Qatar_Investment_Authority; www.swfinstitute.org/swfs/heritage-and-stabilization; www.laohamutuk.org/Bulletin/2007/Mar/bulletinv8n1.html

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**Box 1. Case of Botswana**

Large diamond deposits were discovered in Botswana due in part to the conducive exploration and investor environment that its government put in place. Subsequent commercial extraction of minerals helped fuel the phenomenal growth in the country – turning Botswana into the fastest growing country (developing or otherwise) in the last 35 years. Much of Botswana's natural resource wealth has been invested in public goods and services. Social spending accounts for about 30-40 per cent of total public spending (average growth of about 11 per cent a year in real terms). Botswana's children have benefited immensely: 99 per cent of births are now attended by skilled health staff; 97 per cent of one-year-olds are fully immunized against tuberculosis. The country also has the highest public spending on education in the world (in per cent of gross national product [GNP]). […] It spent approximately US$ 77 per capita on public health in 1998. Improvements to under 5 years of age mortality have been spectacular, falling from 13.9 per cent in 1970 to 4.8 per cent in 1998. Transparency in managing the wealth is part of Botswana's success. Transparency International's 2003 Global Corruption Report credited Botswana as the most transparent country in Africa. Save the Children notes that:

> Transparency in tax and royalty receipts has put the onus on the government to widen the circle of beneficiaries beyond public officials, politicians and the diamond industry's narrow employment base.

**Sources:** Acemoglu *et al.* (2003), Iimi (2006) and Save the Children (2003, p. 9).

Botswana is among a number of countries that face demographic transitions, characterized by a large young population. Youth, defined as those aged 15-24 years and expressed as a share of the total national population, is presently peaking in numerous low-income and lower middle-income countries, including Maldives, Zimbabwe, Swaziland, Iran, Grenada and Cambodia. If one defines a youth bulge as a peak in the share of youth in the total national population, then about 71, mostly low- and lower middle-income developing countries are undergoing or are anticipating a youth bulge. Several billion children in multiple cohorts underpin these demographic transitions (Mendoza *et al.*, 2010, p. 2).

In these countries (and regardless of their natural resource wealth), investments in human capital should, therefore, also be associated with broader policies to generate robust and inclusive livelihoods and employment growth. Most developing countries will need to augment domestic resources with foreign capital and investments. However, for those countries with natural resource wealth, there are opportunities to generate enough resources to be able to invest in their young populations in ways that also cohere with economic diversification away from dependence on extractive industries.

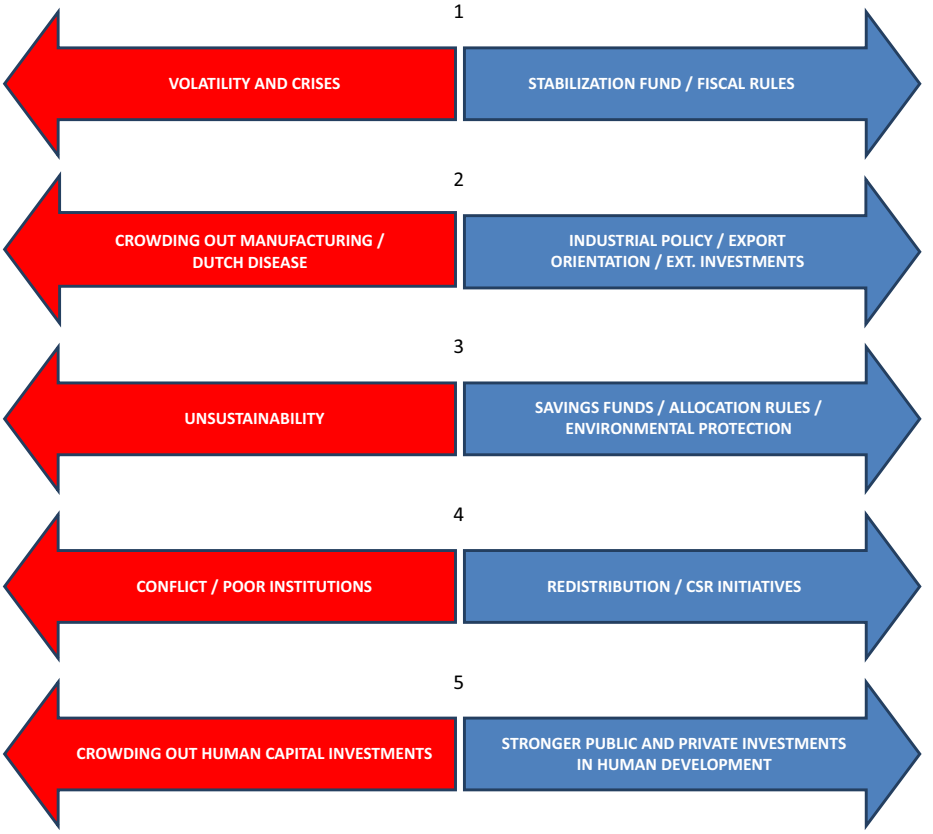
## 4. Conclusion

The foregoing suggests that extractive industries could introduce risks associated with the so-called "natural resource curse". These challenges include the crowding out of manufacturing and other non-extractive industries as well as the crowding out of social spending and human capital investments. These two combined can already stifle the main channels through which any growth can become inclusive in its benefits. Experience and evidence suggest that it is possible to mitigate these and other risks

through different policy innovations and strategies that transform the natural resource wealth from being a curse to a blessing for development. Figure 7 synthesizes the preceding review of literature and policy experience by outlining the risks attached to the natural resource curse and the associated solution to these, as demonstrated by policy experience.

First, countries with natural resource wealth could try to mitigate the adverse impact (and perhaps mitigate the risk) of volatility and crises by channeling some of their wealth into funds that help stabilize public sector spending and investments as well as by implementing fiscal rules that prevent boom-bust cycles in public sector spending (e.g. Chile's Economic and Social Stabilization Fund).

Second, crowding out of manufacturing and the exchange rate appreciation pressure associated with Dutch disease could be counteracted by more proactive industrial policies (including appropriate exchange rate management) as well as investments in public goods (e.g. research and development) that enhance the chances for successful economic diversification (e.g. diversification strategies of Chile, Indonesia and Malaysia). This may also contribute to a more inclusive growth pattern through more




**Source:** Authors' elaboration

**Figure 7.**
Elements of the natural resource curse (red arrows) and policies to improve the development impact of extractive industries (blue arrows)

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robust livelihoods and job creation. External orientation through exports (and in some countries, channeling some of the natural resource wealth toward external investment opportunities) could also introduce some discipline on domestic industries through competitive market forces at the international level[13].

Third, unsustainability could be addressed by following the necessary savings strategy which may include the creation of specially designed savings funds (e.g. Botswana's Pula Fund). The governance of the use of these funds could reflect a variety of rules, including those that require intergenerational equity in the use of the funds. However, there are also alternative views on this angle, such as frontloading human capital investments given high initial human development gaps (and thus, returns on investing in this area). In addition, there is also a timing mismatch regarding the flow of funds and the potential environmental rehabilitation and clean-up after mining operations close down (APEC, 2011).

Fourth, the risk of developing poor institutions and conflict could be mitigated by policies that prioritize social stability and that promote stronger equity. This requires striking a balance and achieving some level of fairness between the national and local, as well as intergenerational benefits from natural resource wealth. A variety of strategies may be explored here, including targeted redistribution schemes (e.g. transfers targeted at marginalized groups). In addition, some analysts have proposed approaches that directly redistribute resource wealth universally to all citizens, and then taxing part of this back through a progressive tax system to achieve equity goals. The crux of this proposal is to try and strengthen the citizen-state linkage through a public finance system that is further strengthened by taxpaying citizens (instead of rentier states that draw their resources from natural resource contracts with corporations)[14].

In addition to the national perspective taken by these redistribution issues, issues of fairness across and within mining jurisdictions are also a typical challenge. It is often the case that a mine's social license to operate is at risk because of negative public perceptions (warranted or not) regarding its net contribution to development, both local and national. One possible way this could be addressed is through a combined approach that involves both the public and private sectors in partnership to strengthen public goods provision – including environmental protection and restoration of mining sites. Investments by mining companies to help strengthen local communities' education, health, environmental protection and other public goods will most surely help shore-up their reputations with local communities, and so most mining companies see these activities as necessary investments to help secure the social license to mine.

Finally, a fifth and perhaps critically important aspect has to do with the crowding out of public goods, social spending and human capital investments in countries that have not managed their natural resource wealth effectively and equitably. Mitigating this risk requires clear human capital investment strategies backed up by adequate resources (and tied to the management of the funds created for these) and in consonance with an industrial diversification strategy that allows for livelihood and employment opportunities notably for youth in burgeoning populations in the developing world.

## Notes

1. See, among others, Humphreys *et al.* (2007) and Frankel (2010).
2. World marketed energy consumption is expected to increase from 495 quadrillion British thermal units (Btu) in 2007 to 590 quadrillion Btu in 2020, rising even further to 739

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quadrillion Btu by 2035. These forecasts are based on the international energy outlook (IEO) reference scenario which does not consider prospective policies and legislation pertaining to extractive industries. These forecasts also focus primarily on market energy sources, and these do not yet consider the implications of continued financial and economic volatility in several industrial countries. Nevertheless, the figures are illustrative of broader trends that point to the rising role of the developing world as both consumers and producers of natural resources. Unless otherwise stated, the figures are drawn from USA Energy Information Agency (2010, pp. 9-11).

3. Various lenses could be used to try and evaluate the development impact of extractive industries, including but not limited to economic development (e.g. growth of output industrial diversification, employment generation and productivity), social and human development (e.g. freedom from deprivation), environmental sustainability (e.g. preservation of other natural resources) and child and human rights. Clearly, all are linked, and this paper draws on these various perspectives.

4. Rents are approximated as the price minus average extraction cost times the quantity extracted. This calculation provides a rough guesstimate, even as it has limitations (e.g. the costs of extraction are not factored in).

5. Boom-bust cycles are anathema to high and inclusive growth by: destabilizing social sector spending and investments; introducing volatility in household incomes and exposing more vulnerable parts of the population to risk; and creating disincentives for investment due to uncertainty and higher risk. For a discussion of specific country experiences, see Hausmann (2003) on Venezuela, Ajakaiye *et al.* (2011) and Perry *et al.* (2011) on Nigeria, Adam and Simpasa (2011) on Zambia, Perry *et al.* (2011) on Colombia and Gauthier and Zeufack (2011) on Cameroon. In addition, Cavalcanti *et al.* (2012) undertake a multi-country empirical analysis which reveals that economic volatility due to commodity boom and bust patterns is negatively associated with physical capital accumulation and factor productivity.

6. The literature suggests that natural resource dependence could be associated with corruption and poor governance (Leite and Weidman, 1999; Gylfason and Zoega, 2002). Some analysts contend that countries with already good institutions will be able to more effectively leverage natural resource wealth for development (Collier and Goderis, 2009; Robinson *et al.*, 2006). In addition, Alexeev and Conrad (2009) find little empirical evidence that that oil or mineral wealth interacts positively with institutional quality.

7. In particular, public spending on human development could suffer from: lower allocations and poorly timed cuts during crisis periods; mis- and inefficient targeting that ends up benefiting more those who need these less; and high leakages due to corruption and other factors. For a discussion in the context of social budgeting, see Mendoza (2011).

8. The issues surrounding CSR may include sustainability, coherence of CSR initiatives with more general development objectives and the sense of fairness (given that voluntary CSR initiatives may vary in their scale, scope and modality in different jurisdictions, even when dealing with the same company). See APEC (2011) for a review of CSR initiatives of ten mining companies in Asia.

9. These investment strategies that build on human capital, provide stable regulation and promote stronger equity appear common in many of the successful cases, even as the specific elements and approaches may vary. For a discussion of different countries' experiences, and in addition to Malaysia, see Rosser (2007) on Indonesia and Iimi (2006) on Botswana. In

addition, Meller and Simpasa (2011) discuss the divergent experiences of Chile and Zambia, two of the developing world's major copper exporters. These countries' respective (and partly divergent) strategies to involve the private sector played a key role in how stable and competitive their natural resource export industries have turned out.

10. Artisanal and industrial mining interests are in conflict with each other in certain cases, notably when artisanal miners are crowded out by newly established large mining operations (e.g. Tanzania and Peru). For an analysis of perceptions of mining among affected communities, see the case studies of Chile, Ghana, Peru and Tanzania by the World Bank, UNCTAD and ICCM (2006).
11. On the child and gender impact of mining and extractive industries more broadly, see among others Ward (2010); Efitimie *et al.* (2009); ILO (2007) and ICCM (2006).
12. See, for example, the Extractive Industries Transparency Initiative which seeks to improve the governance of natural resource wealth management through initiatives to improve transparency and accountability in this process. See http://eiti.org/eiti/principles
13. Malaysia's state oil company channeled part of the country's natural resource wealth toward foreign investments that required the company to remain competitive at the international level.
14. This proposal presumes that countries' tax regimes are serviceable and the goal is to channel wealth through this system to help strengthen it (rather than divert wealth through parallel systems). For a discussion, see the proposal for an Oil2Cash wealth distribution scheme by Moss (2011) and the proposal for an Oil Redistribution Fund for Iraq by Palley (2003).

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## About the authors

Ronald U. Mendoza is the Executive Director of the AIM Policy Center. He concurrently serves as an Associate Professor of Economics at the Asian Institute of Management. Ronald U. Mendoza is the corresponding author and can be contacted at: ronmendoza@post.harvard.edu

Harold J. MacArthur is a Senior Researcher at the AIM Policy Center. He previously taught at the University of Hawaii and the Asian Institute of Management.

Anne Beline Ong Lopez is a consultant with the Philippine Country Office of the United Nations Children's Fund (UNICEF). Previously, she was a Research Associate with the AIM Policy Center.

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