

The Relationship between Mineral Rents and Poverty: Evidence from Sub-Saharan Africa and  
South America

by

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## Table of Contents

List of Tables .....	vi
List of Figures .....	vii
Abstract .....	viii
List of Abbreviations Used .....	ix
Chapter 1: Introduction .....	1
Chapter 2: A Conceptual Framework .....	5
2.1 Mechanisms .....	6
2.1.1 Resource Reallocation across Sectors.....	6
2.1.2 Allocation of Rents between the Host Country and Foreign Firms.....	8
2.1.3 Allocation of Resources among Citizens.....	10
2.1.4. Allocation of Rents over Time.....	11
2.2 Indicators.....	13
2.3 Related Literature.....	15
Chapter 3: Country Evidence.....	18
3.1 Botswana.....	18
3.2 Nigeria.....	24
3.3 Zambia .....	29
3.4 Bolivia.....	34
3.5 Chile.....	38

3.6 Venezuela.....	42
Chapter 4: Discussion .....	47
4.1 The Redistribution of Resources across Sectors.....	47
4.2 The Distribution of Rents between the Host Country and Foreign Firms .....	50
4.3 The Allocation of Resources among Citizens.....	53
4.4 The Reallocation of Rents across Time for Precautionary Saving .....	55
4.5 What Works? .....	59
Chapter 5: Conclusion.....	65
References.....	70
Appendix: Data .....	75

## List of Tables

Table 1: Comparison of Major Indicators for Each Country Beginning and End of Period	87
Table 2: Sectoral Value Added as a % of GDP Average Growth Rates and Standard Deviation and Average Poverty Rates	88
Table 3: Approximate Share of Rent Accruing to Host Country	89
Table 4: Year of Establishment of a Precautionary Saving Fund	89
Table 5: Standard Deviation of TOT and Variance GDP across Countries	90
Table 6: Impact of a SWF on the Volatility of Household Consumption	90

## List of Figures

Figure 1: Main Indicators, Botswana	78
Figure 2: Main Indicators, Nigeria	79
Figure 3: Main Indicators, Zambia	80
Figure 4: Main Indicators, Bolivia	81
Figure 5: Main Indicators, Chile	82
Figure 6: Main Indicators, Venezuela	83
Figure 7: Inequality Indicators, Botswana	84
Figure 8: Inequality Indicators, Nigeria	84
Figure 9: Inequality Indicators, Zambia	85
Figure 10: Inequality Indicators, Bolivia	85
Figure 11: Inequality Indicators, Chile	86
Figure 12: Inequality Indicators, Venezuela	86

## **Abstract**

There has been considerable research over the years regarding the relationship between natural resource abundance and economic growth, yet much less is known about the link between natural resource abundance and prevalence of poverty. This thesis examines the question of whether mineral resource rents have helped to reduce poverty rates in countries with an extensive mineral base in a cross country case study analysis involving Botswana, Nigeria, Zambia, Bolivia, Chile, and Venezuela. The link between mineral rents and poverty is studied in the context of four major mechanisms; (1) the redistribution of resources across sectors of the economy ('Dutch Disease'), (2) the distribution of rents between the domestic country with the natural resources and foreign extraction firms, (3) the allocation of resources among citizens, and (4) the reallocation of rents over time (for precautionary saving). While none of the countries have achieved substantial economic diversification, Chile emerges as the best performer in this case study. Chile has utilized its extensive mineral base to achieve strong economic growth as well as significant poverty reduction. Facilitating an encouraging private investment climate or a mix of public and private ownership that does not sacrifice productivity and efficiency seems to work in appropriating a stable and fair share of mineral rents. Rents that are prudently invested in the domestic economy, in foreign assets for precautionary saving, and in targeted policies designed to redistribute resources more equally among citizens can significantly reduce poverty, and increase social and economic development.



## List of Abbreviations Used

BOL	Bolivia
BWA	Botswana
CHL	Chile
CSF	Copper Stabilization Fund
CSO:	Central Selling Office
ESSF:	Economic and Social Stabilization Fund
GDP:	Gross Domestic Product
HHC:	Household Consumption
Inc H/L:	The ratio of the income share held by the highest 20% to the lowest 20% of the population
ISI	Import Substitution Industrialization
LBWB	Low Birthweight Babies
NGA	Nigeria
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
PPP	Purchasing Power Parity
SWF	Sovereign Wealth Fund
TOT	Terms of Trade
VEN	Venezuela
ZCCM	Zambia Consolidated Copper Mines
ZMB	Zambia

## Chapter 1: Introduction

The link between natural resource abundance and economic growth has been subjected to intense scrutiny over the years. Many scholars have argued that developing countries depending mainly on primary commodities for exports earnings have experienced relatively slow rates of economic growth.<sup>1</sup> This idea that natural resource abundant countries tend to grow more slowly than natural resource scarce countries has been termed the ‘Resource Curse.’ An illustrative example often used is the fact that relatively resource poor East Asian economies such as South Korea, Taiwan, Hong Kong, and Singapore have made rapid strides in catching up with industrialized countries in terms of standards of living, while many resource abundant countries, such as Nigeria and Mexico, have experienced stagnant or deteriorating growth rates. In a well-known study, Sachs and Warner (1997) empirically test this hypothesis and find that countries with a high ratio of natural resource exports to GDP in 1970 tended to grow slower on average in the 20 year period from 1970 to 1990. Yet, much less is known about the link between natural resource abundance and incidence of poverty. Countries that are endowed with abundant natural resources have the opportunity to utilize these resources to propel economic growth or reduce poverty or both. This thesis examines the question of whether natural resource rents have helped to reduce poverty rates in countries with an extensive mineral base in a cross country case study analysis involving Botswana, Nigeria, Zambia, Bolivia, Chile, and Venezuela.<sup>2</sup>

This thesis focuses on natural resources in the form of minerals and petroleum hydrocarbons (crude oil, natural gas, and coal) and uses the term minerals to refer both forms.

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<sup>1</sup> Frankel (2010) provides a survey of the literature tackling the subject; see also van der Ploeg (2011).

<sup>2</sup> The term poverty generally refers to the percentage of the population making less than \$2 a day (PPP) but other measures will be discussed to provide a broader perspective on this issue.

Dependence on the production and export of exhaustible mineral resources has serious implications for the viability of future income. The finite nature of this subset of natural resources is often combined with an inherent instability in commodity prices, causing mineral income to be both transitory and uncertain (Collier, van Der Ploeg, Spence, and Venables, 2009, p. 1). Moreover, in many cases the extraction, production, and export of mineral resources generates large resource rents. A resource rent is defined here as economic profits accruing after paying out factors of production and taking into account the opportunity costs of production – essentially above marginal costs. These profits can be quite large and the capacity to efficiently utilize these economic gains to both propel economic growth and reduce poverty and inequality may vary widely across countries and time (van der Ploeg, 2011). The very existence of these rents means that there would be competition to control them.

Four major mechanisms arise when considering the links between natural resource rents and poverty in mineral dependent countries. These are the redistribution of resources across sectors of the economy (“Dutch Disease”), the distribution of rents between the domestic country with the natural resources and foreign extraction firms, the allocation of resources among citizens, and the reallocation of resources over time (for precautionary saving). Three countries from Sub-Saharan Africa, Botswana, Nigeria, and Zambia, and three countries from South America, Bolivia, Chile, and Venezuela, are examined in this context. These countries have been chosen because their economies are highly dependent on minerals and they offer a wide variation in data. Diamonds are essential for Botswana’s natural resource rents, petroleum for Nigeria and Venezuela, and copper for Zambia and Chile. In Bolivia, combinations of several mineral resources, such as natural gas, tin, and zinc, have been the backbone of resource rents.

The countries also vary in terms of economic growth, government policies chosen to manage mineral income, and levels of socio-economic indicators.

This research finds that these countries have been unable to successfully diversify their economies away from a high dependence on exhaustible, volatile mineral resources. Chile and Botswana have managed to utilize mineral rents to propel strong economic growth and reduce poverty but inequality levels remain high in both countries. Levels of poverty are noticeably the lowest in Chile. Nigeria and Zambia have been unable to capitalize on their extensive mineral bases to achieve economic growth and poverty rates are the highest among the countries. Venezuela and Bolivia have experienced both volatile economic growth and varied levels of poverty. A policy that seems to work is appropriating a fair share of the resource rent through either facilitating an encouraging foreign and domestic private investment climate or a mix of public and private ownership that does not sacrifice productivity and efficiency. Furthermore, mineral rents that are prudently invested in the domestic economy through social services and infrastructure development, in overseas funds for precautionary saving, and in targeted policies designed to redistribute resources more equally among citizens can significantly reduce poverty and increase social and economic development.

This thesis is organized as follows. Chapter 2 begins with a discussion of these mechanisms, articulating the core issues, provides a description of the indicators used in this thesis, and reviews the literature on the link between mineral resource rents and poverty. Chapter 3 provides a historical background on each country and examines each in the context of the four main mechanisms and the link to poverty. Chapter 4 compares and contrasts country experiences and discusses the cases of successes and failures regarding mineral rent

management. Chapter 5 concludes with a summary of the main findings and policy recommendations.

## Chapter 2: A Conceptual Framework

Countries with an extensive mineral resource base have the opportunity to utilize this resource as an input in production to promote economic growth.<sup>3</sup> On the other hand, it has been well documented that natural resource abundant countries tend to be susceptible to the ‘Resource Curse.’ This is a worrisome finding for reducing poverty as many important social welfare indicators, such as life expectancy, school enrolment and infant mortality rates tend to improve with positive economic growth. Therefore, countries with slow economic growth may be especially vulnerable to persistent poverty. At the same time, this link between economic growth and poverty reduction is not always clear cut and the causal relationship between economic growth and poverty reduction is a hotly debated issue in economics.<sup>4</sup>

The link between natural resources and poverty, which is the focus of this thesis, has been less extensively researched and is complex. Resource rents may lead to economic growth and/or poverty reduction, or neither. Why would the existence and utilization of natural resources be a deterrent of poverty alleviation and/or economic growth? To address this question, I frame the discussion around four main mechanisms: the redistribution of resources across sectors of the economy, between the host country and foreign firms, among citizens, and across time (for precautionary saving).

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<sup>3</sup> For instance, Norway has successfully used extensive mineral resources to propel economic growth (van der Ploeg, 2011).

<sup>4</sup> Brazil has achieved periods of strong economic growth that have been combined with high rates of poverty and inequality.

## 2.1 Mechanisms

### 2.1.1 Resource Reallocation across Sectors.

One possible explanation for the negative correlation between economic growth and natural resource abundance is the so-called ‘Dutch Disease.’ This is the phenomenon that can occur when a booming primary commodity export causes factors of production, such as capital and labour, to be drawn away from the non-booming tradable sector resulting in the de-industrialization of the economy. The discovery of natural resources or a large increase in the price of a commodity export can result in a sharp appreciation of the real exchange rate.

Increased income induces domestic relative price inflation through higher spending. When part of this spending goes to nontradable goods, in the short run, domestic firms cannot meet the increased demand by increasing production, and the prices of nontradable goods tend to rise relative to that of the non-booming tradable sector. This shift in prices causes a reallocation of scarce resources both within the tradable goods sector and between the tradable and nontradable sectors. Resources tend to be drawn from the non-booming manufacturing sector of the economy and costs of inputs increase, hindering international competitiveness.

It is conceivable that the ensuing *de-industrialization* will cause slow economic growth, which can hinder poverty alleviation. Moreover, relative to other sectors of the economy, manufacturing is thought to be more technologically dynamic and to generate spillovers that encourage growth (Durlauf and Blume, 2009, pg. 42; Frankel, 2010, p. 5; van der Ploeg, 2011, p.7). As Sachs and Warner (1997, p. 6-7) emphasize, de-industrialization can be problematic if there are positive externalities in production inherent to manufacturing that are not innate to the natural resource industries and non-traded goods. In this context, the growth rate and levels of the sectoral composition of GDP and the real exchange rate are important indicators of the

redistribution of resources across sectors of the economy. If the inflow of foreign exchange and increase in nontradable prices hinder the development of a productive, labour intensive manufacturing sector and the long run growth of the economy, this can hinder sustained and significant poverty alleviation.

On the other hand, the poor can benefit from a boom in mineral exports, which provides a boost for those in the nontradable sector, usually services, through increased demand and prices. This could generate additional employment possibilities as well as increase the income of those working in this sector and the informal sector of the economy. This increase in demand for non-traded goods and services can reduce poverty rates even if the direct benefits from the booming export sector are concentrated within political and national elites. Furthermore, a thriving industry experiences an increase in the marginal productivity of inputs. This generates income directly for capital owners and also increases wages and can absorb labour. Yet, the mining industry is relatively capital intensive and the benefits from increasing prices tend to go towards capital owners. If wealth distribution is highly concentrated, the booming sector can be thought as an enclave in production with limited spillovers to the rest of the economy. Resources from contracting sectors of the economy tend not to be absorbed by the booming oil industry, causing unemployment rates to increase and the wellbeing of low income groups to decrease.

Moreover, the prices of primary commodities, and in particular minerals, tend to exhibit high *volatility*. These fluctuations can be costly to the economy because resources cannot simply flow smoothly between expanding and contracting sectors without significant economic costs. One consequence would be frictional unemployment, which would be especially troubling in countries that lack social safety nets to support the unemployed. Even with resource reallocations fluctuating incomes are costly. A large segment of the population may be thrown



into cyclical poverty as people living just above the poverty line tend to be especially vulnerable to negative income shocks.

In addition, minerals are non-renewable resources. The income from mineral production cannot last forever and this creates an additional impetus for the *diversification of the economy*. So while some aspects of ‘Dutch Disease’ are a natural and efficient reallocation of resources that can be beneficial for large segments of the population, long-term de-industrialization remains a serious concern. Unfortunately, government policies to diversify the economy can result in large welfare costs due to potentially inefficient reallocation of resources (Sachs and Warner, 1997, p. 27 – 28). Furthermore, if the government is mainly concerned with policies that promote the mining industry and diversification of manufacturing, agriculture may be neglected. This is important because agriculture, and food security in general, is important for low-income households (Dunning, 2005). Therefore, economies that are dependent on mineral resources for development may be vulnerable to deindustrialization, volatile income flows, and food insecurity. This may cause low economic growth and increase unemployment, hindering both social development and poverty reduction.

### **2.1.2 Allocation of Rents between the Host Country and Foreign Firms**

In most cases, resource rents would not exist without the investment of foreign extraction firms. Developing countries may not yet have the resources and technical know-how required to effectively develop their mining industry. Not only are there large sunk costs inherent to the exploration and extraction of mineral resources but foreign expertise is generally required. Consequently, there is continual friction between foreign firms and the resource abundant country as both sides wish to reap as much benefit as possible from any mining endeavour. The allocation of resources and rents between the host country and foreign firms will depend on the

bargaining power of each side, the current resource price and the type, quality and quantity of resources to be extracted. Furthermore, the ability of the domestic government to expropriate a fair share of the rent will directly affect their capacity to utilize this income to improve the wellbeing of the population.

Cawood and Minnitt (2002, p. 291) believe an optimal rent sharing model to be where approximately 60 percent accrues to the investor and 40 percent to the government. There is a fine line between creating an enabling environment for investors and capturing an appropriate portion of rents. If a country has poorly developed institutions and a relatively inept government this may be a difficult task to manage. The main methods with which a host government typically appropriates a share of the mineral rents are through corporate taxes, mineral royalties, and other minor taxes (Cawood & Minnitt, 2002, p. 292-293).

If foreign firms have already made large, profitable investments in the host country then they will have a weak bargaining position in contract renegotiations. For example, Manzano and Monaldi (2008) state that because the oil and gas industry requires substantial sunk investments and tends to generate such large rents, foreign firms will have strong incentive to continue operations even if the host government reneges or forces to renegotiate. This gives the government stronger bargaining power relative to the extraction firm and may even provide incentive to nationalize the industry.

Indeed, nationalization has been a route taken by many countries with mineral resources. However, nationalization redirects the benefits, as well as the costs, of production towards the host country. If with nationalization the main goals of the enterprise deviate substantially from profit maximization towards the provision of social services for the population and rents for government appropriation, this can hinder productivity, increase costs, and decrease profits. This

would impede the ability of the country to utilize resource rents to promote social and economic development and reduce poverty.

### **2.1.3 Allocation of Resources among Citizens**

Countries that benefit from mineral resources are in a position to not only increase economic growth but to reduce poverty and inequality. However, this is complicated by the very nature of rents, which may lead a privileged few to expropriate the benefits for themselves. As a result, rent seeking, corruption, and conflict may be common in mineral resource abundant countries and coexist alongside high rates of poverty and inequality.

A large segment of the economic literature on natural resources is devoted to the link between rents, conflict, and political instability (Le Billon, 2001; Ross 2004). For instance, Collier and Hoeffler (2002) find a statistically significant nonlinear relationship between the dependence on primary commodity exports and the risk of civil war. There can be discord between levels of government, mineral producing and non-producing regions, and political, business, and military elites and the poor. A climate of political instability, conflict, and corruption will make the equitable distribution of mineral income less likely.

The government plays a large role in the redistribution of resources among citizens and a large portion of the fiscal budget in mineral dependant countries tends to come from rents. When the majority of the budget comes from resource rents as opposed to income taxes from citizens, this can have a negative impact on the incentives for accountability and transparency in government. This 'rentier state' tends to discourage the emergence of a middle class and keep resources in the hands of a privileged few (Falola & Heaton, 2008; Ross, 2003). If governments do not feel accountable to the people, they will be less likely to use mineral rents to provide social services to the poor in the form of health, education, job training/assistance programs, and

welfare. Another way the government can redistribute resources among citizens is to dispense the rents directly to each citizen as a cash transfer. The government could still retain a portion of the rent by setting up a progressive taxation system. This would help to redistribute mineral wealth more equitably among citizens while increasing government accountability.

#### **2.1.4. Allocation of Rents over Time**

The fourth major mechanism to be examined is how the existence of resource rents is related to the reallocation of resources over time for precautionary saving and the link to poverty.

Precautionary saving “...results from the knowledge that the future is uncertain” (Carroll & Kimball, 2008, p. 3). In general, volatility in an economy’s terms of trade (TOT) and the variance of its future income determine the precautionary saving. Since countries that depend upon mineral resources for the majority of their export income are subject to large fluctuations in export prices, they also face high volatility in their TOT. Oil and gas prices are found to be the most unstable with minerals not far behind (Frankel, 2010, p. 11). There is a positive correlation between TOT volatility and income instability (Mendoza, 1995). Not only does this insecurity cause a redistribution of resources across different sectors of the economy but it impels the government, and citizens, to save for precautionary motives. In addition, uncertain, exhaustible mineral resource income may lead to the accumulation of foreign assets as a method of self-insurance in order to diversify and stabilize income flows (Bems and Filho, 2011, p. 48).

One method of precautionary saving is to invest in financial assets that are secured in a Sovereign Wealth Fund (SWF). The type and purpose of SWF varies by country but the main objectives are to secure wealth for future generations, to stabilize and guard the economy from excess instability in exports and income, to diversify income and the economy, and to finance development objectives (<http://www.swfinstitute.org/what-is-a-swf/>). These SWF’s are also an

outlet for the government to sterilize excess foreign income flows in order to keep inflation in check. By contrast, Collier et al. (2009) argue that SWF's should be accumulated as assets invested within the domestic economy because developing countries have relatively low levels of capital and foreign financial assets may yield a lower return.

In addition, SWF's parked in foreign assets as a self-insurance mechanism can be costly: many countries that are highly dependent on mineral wealth are also relatively low-income economies with high rates of poverty and low levels of domestic consumption. While it may be economically sound to promote policies of countercyclical government spending and investing in foreign assets in times of prosperity, it may be socially and politically costly. There may be considerable public pressure to spend in times of export price upswings to improve the wellbeing of the population rather than sacrifice current consumption for future unforeseen events. While increasing current consumption may decrease poverty in the short run, attempts to significantly alleviate poverty in the long run may be hindered. In fact, such pressures may result in overspending on highly visible projects that turn out to be unproductive and very costly (Frankel, 2010).<sup>5</sup>

While the costs and benefits of precautionary saving are complex, one thing that is certain is that the poor are significantly less able to amass this sort of 'buffer stock' saving to guard against income shocks and low income streams. At the same time, this segment of the population are more vulnerable to unforeseen contingencies and many citizens that are just above the poverty line may be thrust into destitution due to negative income shocks. Government policies, such as SWFs, that help stabilize social safety nets can help to reduce this type of fluctuating poverty as well as reduce the negative impacts felt by all members of the population.

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<sup>5</sup> These 'white elephants' may be due to the poor quality of the investments in the domestic economy but not necessarily the quantity.

In this context, Bems and de Carvalho Filho (2011) find that major oil and gas exporting countries typically manage large current account surpluses when exported commodity prices are high and run deficits when prices are low; running current account surpluses on average. This suggests that the resource rents from mineral production are potentially being converted into foreign assets to smooth consumption and diversify income in many resource dependant countries. The question then is whether countries with mineral rents are using precautionary saving to have a beneficial impact on poverty and inequality rates.

## 2.2 Indicators

The World Bank (2011) provides a measure of *natural resource rents* as a percentage of GDP for each country which includes mineral, oil, natural gas, coal, and forest rents. This thesis uses total resource rents (% of GDP) which include all natural resources except forest rents. In general, diamonds are not included in the calculation of natural resource rents. So, the indicator used for Botswana to measure the importance of minerals in the economy is value added, mining and quarrying (% of GDP in constant US \$2000). For a number of African countries where mineral production is highly relevant to the economy the correlation between this indicator and total rents is strongly positive.<sup>6</sup> Moreover, Botswana's diamond industry is quite profitable, and a low ratio of operating costs to sales has resulted in large rents (Harvey & Leith, 1990, p.122; Modise, 2000, p.3). Furthermore, since all diamond output is exported, value added in production is a good approximation for export income (Modise, 2000, p. 7). These factors help to maintain the validity of cross-country comparisons.

*Poverty* is measured using both direct and indirect indicators. The *direct indicators* are the poverty headcount ratio at \$1.25 a day (PPP) (% of population) and the poverty headcount

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<sup>6</sup> The correlation for Guinea is 0.74, Zambia is 0.44, and Cameroon is 0.69.

ratio at \$2 a day (PPP) (% of population). The \$1.25 a day line is generally considered a measure of extreme poverty (Chen & Ravallion, 2008) and is too restrictive for the purposes of this paper. Furthermore, available data on national poverty lines provide higher estimates for all the countries in the case studies for both poverty measures. Therefore, for the purposes of this thesis, the \$2 a day line is a better measure of economic wellbeing and poverty.

The World Bank estimates allow for cross country comparisons of direct indicators of poverty and are of relatively good quality. However, these are limited by the timing of national surveys and whether the surveys include the essential questions needed to calculate poverty rates. Consequently, data on direct poverty indicators tend to be sparse. Given similar concerns, researchers have also used *indirect measures* of poverty. This thesis uses the instance of low birthweight babies (% of births) and the infant mortality rate (per 1000). These data are more widely available and these indicators are closely related to poverty and inequality. To measure *inequality*, this thesis uses the GINI coefficient and the ratio of the income share held by the highest 20% to the lowest 20% (Inc H/L) of the population as indicators, with increases in both indicators indicative of growing inequality.

In addition, the analysis uses several *socio-economic indicators*; adult life expectancy, unemployment rate (% of total labour force), and secondary school enrolment (% of gross). The unemployment rate is a measure of the health of the economy. Furthermore, the link between mineral resource dependence and unemployment is important when analyzing the impact of the reallocation of resources across sectors of the economy and ‘Dutch Disease’ (van der Ploeg, 2011). Secondary school enrolment is a commonly used indicator of the capability of the workforce. Tilak (2007, p. 436) argues that secondary and higher education are more relevant for poverty reduction than primary education as they strengthen and build upon knowledge

begun in the primary levels, provide essential skills for the labour market, and have greater potential to bring people higher above the poverty line (with less danger of falling back into poverty). In addition, while there is emphasis on promoting universal access to primary education in developing economies by multilateral organizations such as the United Nations and the World Bank, increasing enrolments in secondary education not only reflect success in this area but a commitment of national governments to the education of the population.

The analysis also uses key macroeconomic performance indicators; GDP per capita, PPP (constant 2005 international \$), net barter terms of trade index (2000 = 100), and agriculture, manufacturing and services value added as a percentage of GDP. Detailed information regarding the indicators, including the short form names used in tables and graphs, can be found in the Data Appendix.

## **2.3 Related Literature**

While the bulk of literature regarding mineral resources has been devoted to examining its connection to economic growth, conflict, and corruption, there is some research that examines the link between mineral resources and poverty. Segal (2011) uses the World Bank estimate of resource rents as a share of GDP to calculate a “Resource Dividend” and argues that all citizens should have equal ownership of natural resource rents. This implies that resource rents should be shared broadly and the government should have a large role regarding the distribution of these rents. Segal (2011) finds that if developing countries were to redistribute resource rents equally among all their citizens this would approximately half the existence of extreme global poverty. However, Segal (2011) does not consider whether resource rents have historically helped to reduce poverty but rather suggests a specific policy to do so and discusses its benefits, advantages and challenges.



Ross (2003) utilizes regression analysis and finds a robust correlation between a decline in conditions for the poor in the late 1990s and an economy's dependence on mineral exports in 1970, controlling for initial income. Ross (2003, p. 27) also finds that the poor were worse off in oil dependant states because of a decrease in the availability of low-wage jobs, a decline in manufacturing sector employment and reduced democracy, while non-oil mineral exporters experienced greater poverty because of slower economic growth. While Ross (2003) does not control for other variables that can affect poverty, he provides an excellent summary and discussion of the variety of mechanisms in which mineral rents may affect the poor.<sup>7</sup> Ross (2003) asks whether mineral wealth reduces or aggravates poverty and focuses on the effect of the mineral and fuel export structure on poverty rates in a broad cross-section of countries.

Weber-Fahr (2002, p. 15) classifies the mining industry as a 'relevant' part of the economy when it comprises 5 to 15 percent of total exports, classifies it as 'crucial' at 15 to 50 percent, and 'dominant' above 50 percent. Weber-Fahr (2002) considers the existence of widespread poverty in 51 countries where mining (excluding oil and gas) is a relevant portion of exports and questions how mineral wealth can be turned into an asset with which to alleviate poverty. Weber-Fahr (2002, p. 28) argues that econometric evidence presented on this topic should be interpreted with caution due to both the availability and quality of data. It goes on to cluster mining exporting countries into a subgroup of the best and worst performers in terms of the percentage by which the country's GDP per capita growth rate differs from regional growth. The study then considers how the relevance of mining to the economy could have influenced this difference. It concludes that (i) the three best performers, Botswana, Chile, and Namibia had resisted the urge to go on lengthy investment spending sprees, had outward looking and prudent

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<sup>7</sup> See Weber-Fahr (2002, p. 28-29) for an excellent summary of the conflicting findings based on econometric analysis on the link between mineral wealth and economic growth.

policies of macroeconomic management, and typically engaged in sound financial management of mineral wealth and productive investments and (ii) mining has contributed to poverty reduction by creating employment opportunities directly in the sector, promoting growth in other businesses, encouraging investment in growth enabling infrastructure, and enabling the provision of public services.

In order to be specific regarding the mechanisms considered indirectly in the above papers, this thesis uses a country case study approach. This approach allows for a larger set of issues to be examined when considering countries with an extensive mineral resource base, such as: inequality, precautionary saving motives, and the distribution of rents between foreign firms and host countries. Furthermore, this approach allows one to be specific regarding how these mechanisms affect economic growth and *poverty reduction* in mineral dependent countries.

## Chapter 3: Country Evidence

### 3.1 Botswana

Botswana (BWA) is a small, landlocked, drought-prone country in Sub Saharan Africa. The economy is highly dependent on primary commodity exports, especially diamonds.<sup>8</sup> Economic and social conditions at independence from Britain in 1966 were dismal. Botswana was one of the world's poorest countries, lacked even basic infrastructure, had extremely low levels of education and institutional capacity, and was recovering from a serious 4 year drought (Acemoglu, Johnson, and Robinson, 2002, p. 2; Harvey and Lewis, 1990, p. 1).<sup>9</sup> In spite of this inauspicious beginning, Botswana is largely regarded as an African success story and currently an upper middle income country.

The economy of Botswana remains highly dependent on diamonds, an exhaustible luxury good, for the majority of exports and income.<sup>10</sup> This precious mineral was discovered in 1955 and large scale production begun at various mines in 1971, 1977 and 1982 (Republic of Botswana, 2009, p. 9). Botswana has never experienced a military coup and has relatively low levels of ethnic diversity. This small, open economy combines low capital controls with high levels of government involvement in the economy and strives to encourage a positive private investment climate (Hope, 2002). Botswana is stated to have the highest sovereign credit rating on the continent (as of 2006) and has been rated the least corrupt country in Africa for five consecutive years (African Economic Outlook, 2005-2006, p. 3). In addition, the central Bank of Botswana enjoys considerable autonomy in its operations, which facilitates consistency in

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<sup>8</sup> For instance, in 2004/2005 diamonds accounted for 80 percent of export earnings, copper-nickel 5 percent, and the next significant commodity, beef, 2 percent (African Economic Outlook, 2005-2006, p. 7).

<sup>9</sup> In 1966 the GDP per capita (PPP) was a mere \$837 (author's calculations from World Bank (2011)).

<sup>10</sup> In 2006/07 the mining sector accounted for 75% of export earnings, 42% of GDP and 48% of government income (Republic of Botswana, 2009, p. 7).

monetary policy<sup>11</sup>. The government generally has responded to rapid income from mineral exports by maintaining steady spending and avoiding unproductive projects (Harvey and Lewis, 1990). This helped to largely avoid the most negative shocks from the world debt crisis in the 1980s (Figure 1).

Over the years mineral rents have led to strong economic growth but not significant poverty or inequality alleviation. Poverty and inequality rates are quite high (Table 1) and the country was hit hard by the HIV/AIDs epidemic of the 1990s.<sup>12</sup> Considering the fact that Botswana is an upper middle income country, data availability on direct poverty indicators is sparse. Data on infant mortality rates are the most widely available and were on a steady decrease until the AIDs epidemic (Figure 1). They have only recently seen improvement relative to pre-1990s levels. The percentage of low birthweight babies has been on an increasing trend (Figure 1). On a more positive note, several socio-economic indicators, such as school enrolment rates (Table 1) and access to health services, have greatly improved. Yet many socio-economic indicators in Botswana remain dismal – especially illustrative is the fact that life expectancy at birth in 2009 is 55, which is not only low but the same as it was in 1970 (Figure 1).<sup>13</sup>

*The reallocation of resources across sectors:* While the discovery and exploitation of diamonds and copper-nickel in the first decade of independence was a major cause of the rapid rate of growth of GDP, it also resulted in significant structural changes in the economy. Whereas in 1966 agriculture had comprised 39 percent of GDP and mining none, by 1986 the roles had

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<sup>11</sup> Botswana has been prone to income shocks from diamond production and exports. Yet, since the inception of the Pula in 1976, monetary policy has been committed to various forms of a fixed exchange rate regime. This provides a source of automatic stabilization in the face of instability from large capital flows, and in principle helps to promote exports.

<sup>12</sup> At 36 percent Botswana has the highest HIV prevalence rate in the world (UNAID, 2000, as cited in Hope, 2002, p. 8).

<sup>13</sup> The OECD average life expectancy at birth is 79 years (World Bank, 2011).

significantly reversed with mining accounting for 47 percent of GDP and agriculture 4 percent (Harvey and Lewis, 1990, p. 32). This dramatic redistribution of resources was caused by the boom in the mining industry but exacerbated by Botswana's arid, drought-prone climate. The decline in manufacturing value added in GDP has been less severe but is still noticeable (Table 1).

An issue in Botswana is that the booming tradable sector is extremely capital intensive and does not employ a large segment of the population. For instance, in 2001 the employment share of mining and quarrying was a mere 4 percent while agriculture absorbed 12 percent (Iimi, 2007, p. 11). Yet incomes remain low in rural areas.<sup>14</sup> More significantly, in 2006 the unemployment rate was 18 percent which is quite high and detrimental to any long-run attempts at poverty alleviation (Table 1). In this context one policy option is economic diversification away from such a heavy dependence on the diamond industry, which would help lower unemployment and have a positive impact on poverty.

Government policies have focused on economic diversification, the mitigation of the Dutch Disease, and promoting domestic and foreign investment (Harvey and Lewis, 1990). However, in spite of the policies to redistribute resources across sectors to diversify the economy, diamonds have been, and continue to be, the driving force of the economy. Botswana's low population levels means the economy has a small domestic market and its landlocked position is another natural barrier to trade. This limits opportunities for firms to realize the benefits from economies of scale in production, increases transportation costs, and decreases Botswana's attractiveness as a place of investment. While some headway has been made in the promotion of industries such as tourism and telecommunications (African Economic Outlook,

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<sup>14</sup> The poverty headcount ratio at rural poverty line (% of rural population) is over 25 percentage points higher than that of urban in 1985, 1993, and 2003 (World Bank, 2011).

2005-2006) attempts to branch out into highly competitive and saturated industries such as textiles are not likely to be successful. Overall, these above factors have inhibited the creation of a labour intense industrial sector and had a negative impact on attempts to reduce poverty.

*The distribution of rents between the host country and foreign firms:* The combination of minimal government capacity and low availability of skilled workers at independence meant that foreign firms would be an integral part of the development of the mining industry in Botswana. Debswana was formed to extract diamonds at the first mining site Orapa and was owned 85% by the foreign extraction firm Debeers and 15% by the government (Harvey and Leith, 1990, p. 51-52). Early on the government recognized the importance of allowing foreign firms to receive a competitive rate of return on projects while simultaneously maximizing their share of mining profits (Harvey and Leith, 1990, p. 117). Through contract renegotiation, government shareholding in Debswana increased to 50 percent in 1975 and through various royalties, taxes, and dividends the government's share of total profits is estimated to be 75 percent (Modise, 2000, p. 4). Resource rents have accounted for about half of the government budget (African Economic Outlook, 2005-2006, p. 4).

The quality and quantity of mineral reserves has helped to strengthen the bargaining power of the Government of Botswana.<sup>15</sup> This bargaining power enabled the government to appropriate over half of total profits early on while still allowing foreign firms a competitive return to profits. This has been important in maintaining and fostering productivity and growth in the mining sector as well as in directing profits towards the natural resource endowed country. Moreover, Botswana has never nationalized or expropriated foreign firms. Because Botswana is relatively successful at securing a large proportion of available mineral resource rents, the

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<sup>15</sup> Botswana is the world's foremost producer of gem quality diamonds (Republic of Botswana, 2009, p. 7).

government has substantial opportunity to capitalize on these returns to increase the wellbeing of the population.

*The allocation of resources among citizens:* The Government of Botswana has shown prudent and relatively effective utilization of mineral rents. Foreign exchange from mineral exports has been channelled into foreign reserves (see below) as well as much needed investment in infrastructure, health and education (Acemoglu et. al., 2002, p. 3). For instance, the five year drought of the early 1980s was met quickly with government policies to mitigate the more negative effects on the most vulnerable members of the population (Harvey and Lewis, 1990). The government has also tackled the massive HIV/AIDs epidemic by investing in public education campaigns and was the first African country to offer free antiviral AIDs medication (Figure 1).

Overall, the Government has used mineral rents to invest in social services, such as health, education, sanitation, and water supply, which suggest that the poor do have some access to essential resources. This spending does redistribute some resources towards the poor and is beneficial in the short-run. Yet, the allocation of resources among citizens remains extremely skewed in Botswana. Since the mining sector in Botswana is highly capital intensive any increase in wages stemming from the profitability of this industry is unlikely to be spread far in the absence of targeted government policies. The GINI coefficient remains persistently high (Table 1) and Hope (2002, p. 7) states that high poverty rates can be explained by both this distorted income distribution as well as the notable absence in earning potential. The coexistence of high rates of economic growth and persistently high inequality are strong indicators that the political elite in Botswana reap the majority of the benefits from mineral rents. Furthermore, while Botswana is considered a stable democracy, the Botswana Democratic Party

has won every election since independence, suggesting that political elites have not had much threat of competition for resources (World Bank, Botswana: Country brief, 2010). This inequality in resource distribution across citizens is likely to inhibit the ability of economic growth to reduce poverty on its own (Ross, 2003, p. 6).

*The reallocation of rents across time:* In the short run, volatility in the TOT and the prices of major exports will cause cyclical booms and busts which are more difficult for the poor, and those just above the poverty line, to endure. What makes Botswana somewhat unique in this respect is the organization of the diamond market. The Central Selling Office (CSO) has a monopoly on diamond sales and buys diamonds in periods of excess supply, essentially stock piling diamonds to a certain extent (due to relatively low storage costs), for times of excess demand (Dunning, 2005, p. 461). This provides an automatic source of stabilization for Botswana's economy. Fluctuating diamond prices and demand will have less of an impact on the terms of trade which will mitigate the potential for negative external shocks to affect income and consumption.

While this tends to reduce a country's desire to build up precautionary saving, it has not completely eliminated the need for buffer-stock savings in Botswana. It has been considered it prudent to invest a portion of diamond rents in a precautionary saving fund. In 1972 and 1973 the government of Botswana established, respectively, the Revenue Stabilization Fund and the Public Debt Service Fund to absorb temporary excess mineral income, for both domestic investments and to pay the principal on foreign loans (Harvey and Lewis, 1990, p. 53). More recently, the creation of the Pula Fund in 1994 continues to allocate mineral rents towards saving for the future as well as to diversify income away from export earnings ([www.swfinstitute.org/swfs/pula-fund/](http://www.swfinstitute.org/swfs/pula-fund/)).



### 3.2 Nigeria

Nigeria (NGA) established independence from British colonial rule in 1960 and has the largest population in Africa.<sup>16</sup> Nigeria has substantial oil reserves. Petroleum and petroleum products make up over 90 percent of total exports and have transformed Nigeria into a mono-product economy. Oil was discovered in 1956 and exports began just prior to sovereignty in 1958 (Gelb, 1988, p. 238). Due to the existence of this petroleum wealth, a large domestic market, and ocean access, Nigeria was thought to have great potential for economic and social development (Falola and Heaton, 2008, p. 158). Unfortunately, economic growth and life expectancy at birth have been largely stagnant, poverty and inequality rates have increased, and child mortality rates remain unacceptably high (Table1).

Considered to be related to the significant oil resources, Nigeria has a long history of political violence and was led by four different military leaders between 1966 and 1979 (Gelb, p. 256). Furthermore, the civil war from 1967 to 1970 not only disrupted development but greatly exacerbated tensions between the country's 200 plus ethnic groups (Falola and Heaton, p. 158). The transition to democratic rule did not begin in Nigeria until 1999. There is no doubt that political and social instability greatly increase the difficulty in properly managing resource income.

In addition to conflict, corruption has also been a long running characteristic of Nigeria's government and society (Falola and Heaton, 2008). Furthermore, the country has typically lacked prudent oil investment and expenditure policy. The government budget is positively correlated with oil income and the increases in spending typical in Nigeria in times of large oil windfalls are difficult to undo when oil prices and, in turn, incomes collapse (Sanusi, 2004). The

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<sup>16</sup> The population size is 158.2 million (2010) is by far the largest of the countries included in this study (The World Bank Country Brief, Nigeria, 2011).

government has used mineral rents as a tool of patronage and has embarked on numerous ‘white elephant’ projects. Such spending caused economic difficulties and a large debt burden when world interest rates increased and oil prices fell in the 1980s (Figure 2). Furthermore, the Central Bank of Nigeria has been vulnerable to Federal Government intervention, which severely limits their ability to resist debt monetization.<sup>17</sup> These factors have resulted in an economy characterised by unstable macroeconomic management, dysfunctional institutions, rampant corruption, conflict, low income levels and high poverty rates.

*The reallocation of resources across sectors:* The production and export of oil, combined with windfall profits from the oil price increases in the 1970s, changed the structure of Nigeria’s economy dramatically. The state increased in both size and economic intervention, and drew labour away from rural areas. This redistribution of resources from agriculture decreased the sector’s output and increased prices and import dependence (Sala-i-Martin and Subramanian, 2003, p. 14). Furthermore, the military government promoted import substitution industrialization (ISI) policies and created state enterprises (Falola and Heaton, 2008). This increased incentives and the ability to distribute rents as forms of patronage to secure votes, further increased import dependence, and discouraged productivity.

In the 1970s monetary policy involved a pegged exchange rate regime, which was allowed to appreciate slightly (Obadan, 2006, p. 5). This, combined with the large oil price increases exacerbated the appreciation of the real exchange rate. Obadan (2006, p. 5) argues that the appreciation of the real exchange rate promoted imports, discouraged the allocation of resources towards tradable goods, and primarily benefited the new business elites involved in ISI

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<sup>17</sup> In 1997 the Federal Government of Nigeria passed legislation removing what limited autonomy the Bank of Nigeria previously possessed ([www.cenbank.org/AboutCBN/history.asp](http://www.cenbank.org/AboutCBN/history.asp)).

who benefited from cheap imports . The combination of large oil rents, ISI, and powerful interest groups discouraged economic growth and had a negative impact on poverty (Figure 2).

Since 1986, the exchange rate regime has been various forms of a managed float. The manufacturing sector contracted as the inefficiencies in state-led projects were exposed (Table 2) and is currently adding very little to GDP (Table 1). This reduces the potential for employment opportunities in a relatively more labour intensive industry (compared to oil) and has a negative impact on poverty. Furthermore, the enclave nature of the oil industry means that there have been few linkages between it and the rest of the economy. Booms in this capital intensive industry have typically not resulted in an increase in employment in this sector or broad-based increases in purchasing power, and have tended to benefit the few (see below), increase unemployment in the rest of the economy and overall had a negative impact on poverty. Economic diversification remains elusive: between 1975 and 2006 oil income contributed an average of 80 percent to the government budget and made up over 90 percent of exports (Ogwumike and Ogunleye, 2008, p. 205).

*The distribution of rents between the host country and foreign firms:* Nigeria recognized the importance of appropriating a large share of oil rents from early on. Through the Petroleum Profits Tax Ordinance of 1959 the state obtained a fifty-fifty profit sharing agreement with foreign extraction firms (Gelb, 1988, p. 248). In 1971 Nigeria joined the Organization of the Petroleum Exporting Countries (OPEC) and established the Nigerian National Oil Company, and between 1972 and 1975 the state negotiated a more favourable revision of the terms of compensation (Gelb, 1988, p. 248). By 1975 the Petroleum Profit Tax had increased to 84 percent of total oil revenues, royalties increased to 20 percent and by 1979 the government owned 60 percent of foreign oil firms (Rwabizambuga, 2009, p.85). This ‘indigenization’

coincided with an increase in Nigeria's capacity in the oil industry but multinational firms retained control over company operations (Rwabizambuga, 2009, p. 85). This was probably helpful in maintaining and stimulating growth, productivity, and profitability in the industry.

There has been a constant tug of war for resources between the government and foreign firms in Nigeria. For example, the drop in oil prices in the 1980s resulted in the redistribution of resources toward multinationals as the government provided incentives to continue exploration and production (Rwabizambuga, 2009, p. 85). Furthermore, the presence of indigenous oil companies has increased in Nigeria (Rwabizambuga, 2009, p. 86). The government of Nigeria remains highly involved in the oil industry and rents are the largest contributor to the state budget.<sup>18</sup> Accordingly, fiscal policy is highly dependent on this volatile resource.

*The allocation of resources among citizens:* In Nigeria, an important factor that needs to be considered is the distribution of resources among the different regions and political levels. There is considerable friction between oil producing and non-oil regions as well as between various levels of government regarding the proper distribution of natural resources and oil income. Ahmad and Singh (2003, p. 4) characterize historical allocation arrangements as conflict ridden, lacking transparency and accountability, with distinctly inadequate information flows. This secrecy, combined with high expectations of the benefits regarding oil production, has led to mistrust and conflict throughout Nigeria.

Nigeria's large size both geographically and population-wise complicates the ability of these opposing forces to come to an agreement. In an effort to diffuse the tension between different regions and ethnicities, the four regions existing at independence have extended to 36 states (Ahmad and Singh, 2003, p. 12). The Federal Government acquires the resource rents and

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<sup>18</sup> Ogwumike and Ogunleye (2008, p. 4) find oil income to have provided over 70 percent of the total Federal Government budget for approximately 30 years.

then redistributes this back to each state. Although this is supposed to ensure that ‘have-not’ states accrue a fair proportion of oil income, Ahmad and Singh (2003, p. 18) find middle and high income states to receive higher transfers. Furthermore, the federal government, often of the military form, has responded to dissatisfaction with regional distribution by repressive means rather than open dialogue (Rwabizambuga, 2009, p. 87). The combination of conflict and oppressive policies is not conducive to poverty alleviation and the use of oil rents as payments to political elites to diffuse ethnic tensions has exacerbated corruption and rent seeking behaviour.

When there is a large impoverished population and high social expectations of the benefits of oil income, there is intense pressure to spend in times of prosperity. While the Federal Government has re-invested oil rents into infrastructure and social services, they have also tended to overspend in the good times and to make hasty, unproductive investments (Ogwumike and Ogunleye, 2008). Statist development ideologies and an extensive mineral base allowed the government to invest in state-led industrial projects in the 1980s. Not only were these projects not cost-effective but they required subsidies and simply increased the number of rent-seeking individuals in the economy (Auty, 2008). This intensified the redistribution of resources away from the poor and towards industrial, political, and military elites.

Furthermore, fiscal overdependence on foreign export income has resulted in decreased accountability to the citizens of Nigeria and increased corruption. This ‘rentier’ state does not allow for re-distributional income policies and inhibits the creation of a middle class. Inequality rates, as measured by the GINI coefficient and Inc H/L, have risen and poverty rates in Nigeria remain extremely high (Table 1). The Paris Club has written off 2/3 of Nigeria’s debt, freeing up resources which will most likely continue to be redistributed among the society’s elite.<sup>19</sup>

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<sup>19</sup> <https://www.cia.gov/library/publications/the-world-factbook/geos/ni.html>

*The reallocation of rents across time:* Economic and social incentives to reduce the uncertainty of future income in Nigeria are quite high due to its extreme dependence on an exhaustible resource with highly volatile prices. While the Federal Government initially sterilized a portion of the massive 1974-78 oil rent in an offshore saving account, the rent-seeking behaviour of interest groups and poor investment policies obliterated the savings by 1978 (Auty, 2008, p. 11). The recent establishment of a SWF, the Excess Crude Account in 2004 is a step in the direction of stabilizing the country against volatile oil income however the fund has the lowest transparency rating available (<http://www.swfinstitute.org/fund/nigeria.php>). Continued corruption and the unaccountable nature of the political system will affect the ability of the Fund to reduce the impact of negative income shocks for the poor. Furthermore, extremely high poverty rates (Table 1) increase the opportunity costs for Nigeria to sacrifice current consumption and divert resource rents into this type of savings.

### **3.3 Zambia**

Located in south-central Africa, Zambia (ZMB) is a mid-sized, landlocked country with a sub-tropical climate. When independence was achieved from Britain in 1964, it was already a major producer and exporter of copper and was considered a middle income country.<sup>20</sup> The main exports then and now are copper and cobalt, with other minerals and tobacco playing secondary roles. Unfortunately, extraction and export of Zambia's extensive natural resources have not translated into improved social or economic conditions. In fact, income levels have deteriorated to low income country status. The GDP per capita (PPP) decreased from 1,865 in 1970 to 1,299 in 2009 (Table 1). In addition, child mortality rates remain high, poverty rates have increased and the life expectancy at birth has decreased (Table 1).

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<sup>20</sup> Copper made up 90 percent of exports, 60 percent of government revenue and 50 percent of GDP (Aron, 1997, p. 259 as cited in Auty, 2008, p.5).

A multi-party democratic system briefly existed in Zambia from independence until 1973 when a new law established a one-party state in which other political parties were banned (Walker and Boulanger, 2008, p. 8). During this time period the government embarked on a wide-spread program of nationalization and by the 1980s the state was in control of approximately 80 percent of economic and financial activities (Kalyalya, 2001, p. 3). Import-substitution was a major part of industrial policy and is considered to have increased dependence on foreign technology and shifted import dependence from consumer goods to capital inputs and intermediate goods (Woldring & Chibaye, 1984, p. 117-118). Zambia's economy was negatively impacted by the oil price increases in the 1970s and the economic recession of the 1980s (Figure 3). Structural adjustment programs were introduced in 1989 to liberalize and privatize the economy. Fiscal policy since the 1990s has been focused on debt services rather than social services and this had a negative impact on economic growth and Zambia's ability to alleviate poverty and the HIV/AIDs epidemic (Weeks & McKinley, 2006, p. 5). Since Zambia's return to a democratic electoral process in 1991, power has been dominated by the Movement for Multiparty Democracy (Walker and Boulanger, 2008, p. 7).

*The reallocation of resources across sectors:* In Zambia, mining and quarrying value added as a percentage of GDP was on a steady decline from 1970 to 2000 (World Bank, 2010), and there was strong growth in manufacturing until the 1990s (Table 2).<sup>21</sup> This was caused, in part, by government intervention in the economy which nationalized the mines and promoted ISI policies. The government used the mining industry to increase employment and extract rent at the cost of productivity (Radetzki, 1983, as cited in Auty, 2008, p. 9). Furthermore, Woldring and Chibaye (1984, p. 117) argue that ISI promoted a manufacturing industry dependent on

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<sup>21</sup> There was a transition to a floating exchange rate regime in 1991 and this was followed by a massive contraction of the manufacturing sector and a large increase in the service sector (Table 2), perhaps due to a large real appreciation of the domestic currency.

capital intensive western technology and did not provide widespread employment opportunities. Auty (2008, p. 9) states that Zambia's state-owned manufacturing enterprises were rendered uncompetitive and became part of the nontraded goods sector. Furthermore, Zambian monetary policy has varied widely over the years and has been a source of instability in the macroeconomy. The Bank of Zambia has experimented with seven different types of exchange rate regimes from a fixed exchange rate regime at independence to the floating exchange rate regime of 1991 (Mungule, 2004).

Since the early 1990s, the decline in manufacturing and mining, which are potentially high productivity industries, has potentially had a negative impact on low income groups. Although there are attempts to re-diversify the economy towards tradable goods, these may be hindered by Zambia's landlocked position, poor infrastructure, high transportation costs and electricity shortages (Walker and Boulanger, 2008, p. 16). More importantly, Zambia has experienced a high volatility in the average growth rates of agriculture, manufacturing, and services as a percentage of GDP from 1970 to 2009 (Table 2). This implies a frequent redistribution of resources across the sectors of the economy and has likely had a negative impact on the poor.

*The distribution of rents between the host country and foreign firms:* At independence, the Zambian government was anxious to establish national identity and state control over resources. In 1970, the government obtained a 51 percent interest in the copper mining companies and by 1974 had taken control over operations (Woldring & Chibaye, 1984, p. 23). 'Indigenization' of the mines reallocated resources and rents from foreign extraction firms to the host country but came at a high cost. The cancellation of former contracts resulted in large penalty fees paid to foreign firms (Woldring and Chibaye, 1984, p. 29). Furthermore, over time



the combination of falling copper prices and government intervention in the mining industry lowered production, productivity, and rents (Figure 3). In fact, these mines became a drain on the fiscal budget rather than the hoped for stimulus to economic and social development (Kangwa, 2001). In Zambia, this has severely limited opportunities to utilize mineral rents to provide social services and reduce poverty.

The Zambia Consolidated Copper Mines (ZCCM) enterprise was privatized in 2000. This provided increased production and productivity in the copper mining industry and relief to the government budget but eliminated essential social services previously provided by the enterprise (Kangwa, 2001). It is estimated that over 85 percent of previous ZCCM employees have had serious difficulty providing the basic necessities required to properly care for themselves and their families (Kangwa, 2001, p. 30). Not only was Zambia urged to privatize during a time of low copper prices but its status of a heavily indebted poverty stricken country weakened the state's bargaining power and resulted in extremely generous concessions for foreign extraction firms.<sup>22</sup> In terms of overall mineral rent distribution, Cawood and Minnitt (2002, p. 293) approximate the public share of rent to be 37% and investor rent to be 63 percent.<sup>23</sup>

This redistribution of resources and rents in favour of foreign investment firms channels income out of the country and limits Zambia's capacity to utilize its portion to invest in the domestic economy and provide essential social services. On a more positive note, production will no doubt increase and mineral rents have indeed rebounded in recent years (as have copper prices). Furthermore, the government is no longer dealing with a huge fiscal drain.

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<sup>22</sup> Transparency International characterized the process of privatization of ZCCM as a 'looting exercise' (Kangwa, 2001, p. 28).

<sup>23</sup> The government has recently increased taxes on the mining industry.

*The allocation of resources among citizens:* Zambia's position as a middle income country in the 1970s deteriorated as average economic growth rates turned negative. The contracting economy and rapidly declining mineral rents coincided with an increase in inequality in the distribution of resources: The share of income received by wealthy Zambians increased slightly, while low income groups experienced a marked decline in their share of total income (author calculations from World Bank, 2011). This likely had a negative impact on poverty and infant mortality rates started to rise in the 1980s (Figure 3).

A contributing factor to these trends was the state-led development policies in the 1970s, which resulted in an inflated public sector that distributed resources towards elite interest groups and exacerbated rent-seeking.<sup>24</sup> The privatization policies initiated in 1991 did not help either: the restructure and sale of state enterprises decreased employment and favoured insiders at the expense of the poor (Auty, 2008, p.10). The new administration managed to lower levels of petty corruption but continued to utilize mineral rents to favour political and business elites (Auty, 2008, p.10). While the GINI coefficient decreased from 1991 to 2005 it is still quite high at 50.7 and signals persistent income inequality (Figure 9). At the same time, in the 2000s the World Bank provided debt relief, which freed up resources to be redistributed amongst citizens (Walker and Boulanger, 2008, p. 28). In 2005 the Zambian government used some of these resources to abolish health fees in rural areas.

*The reallocation of rents across time:* The reallocation of resources into a fund in order to stabilize the macroeconomy and guard against unforeseen contingencies has not been a priority in Zambia, except during the brief existence of a copper revenue stabilization fund in the 1960s (Auty, 2008).<sup>25</sup> Governments have viewed mineral rents as a way to implement statist

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<sup>24</sup> Auty (2008, p. 9) lists examples as bribes for permits, overly generous public contracts, and biased planning.

<sup>25</sup> This fund was depleted by the early 1970s (Auty, 2008).

development policies and a source of patronage to help maintain a one party political system. Since the transition to democracy, Zambia has not yet invested in any type of SWF and the poor are without a social safety net. Additionally, a large quantity of Zambian export income has been channelled into debt service and economic growth and the availability of mineral rents have been on a declining trend until recently (Figure 3). These factors have greatly reduced the incentive to invest in this type of saving mechanism.

### **3.4 Bolivia**

Bolivia (BOL) is a sparsely populated, landlocked South American country that achieved independence from Spain in 1825. The country is characterized by a high altitude, difficult terrain, vast mineral and energy resources, and has the largest indigenous population on the continent.<sup>26</sup> While the relative importance of various primary commodities have fluctuated over the years, main exports are natural gas, zinc, gold, silver, soybeans, tin, and sugar. The mining sector dominated the Bolivian economy in the 1970s and, largely due to increased production of natural gas in the late 1990s, its significance continues today.<sup>27</sup>

Bolivia has a strong history of social activism and revolution. The revolution of 1952 was driven by an extremely unequal distribution of power and resources and resulted in a state-led development strategy, which implemented universal suffrage, agrarian and educational reform and the nationalization of mining enterprises (Klein, 2003). This did not translate into economic growth and Bolivia experienced a military coup in 1964. The military remained dominant in politics until the transition to civilian leadership in 1978. The period between 1978 and 1982 was marked by political instability, as leadership changed hands 9 times (Auty and

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<sup>26</sup> BBC news – Bolivia Country Profile 2011 reports just over 65% of population to be indigenous peoples.

<sup>27</sup> In the early 1970s mining accounted for 20 percent of GDP, 44 percent of the government budget, and 77 percent of exports (Auty and Evia, 2004, p. 180).

Evia, 2004, p. 188). Furthermore, foreign exchange from volatile mineral income was not prudently invested in foreign assets or used to decrease external debt, in fact, during the 1970s foreign borrowing increased (Auty and Evia, 2004, p. 185). Bolivia suffered a massive economic meltdown in the 1980s culminating in a period of severe hyperinflation from 1984 to 1985 (Figure 4). Subsequently, an extensive set of neoliberal policies was implemented and the 1990s continued a reversal of nationalization (Klein, 2003, p. 244). While halting inflation and promoting economic growth, these reforms had a massive social cost.<sup>28</sup> Rising discontent among the population led to the election of Bolivia's first indigenous president in 2005. Main policy goals of this regime include poverty and wealth inequality reduction, land reform, and the nationalization of the energy sector (Chaplin, 2010, p. 353).

Bolivia remains one of the poorest countries in Latin America and has had difficulty utilizing abundant natural resources to improve economic and social conditions. While GDP per capita has barely increased since its level in 1970, it has been on an upward trend since the late 1980s (Figure 4). Similarly, poverty and inequality rates have increased from the 1990s levels but are now on a downward trend and the percentage of low birthweight babies and infant mortality rates have declined (Table 1). These indicators suggest recent improvement in the direct and indirect indicators of poverty in Bolivia.

*The reallocation of resources across sectors:* The oil price increases in the 1970s coincided with tin price increases, foreign exchange from mining exports flowed into the country, mineral rents increased, and so did consumer purchasing power. This resulted in a classic case of 'Dutch Disease': the price of nontraded goods relative to traded goods increased, there was a sharp appreciation of the real exchange rate, and Bolivia's non-mining tradables sector became internationally uncompetitive (Auty and Evia, 2004, p. 186). Unfortunately, over-

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<sup>28</sup> The 2001 census indicates only 16% of the population had their basic needs met (Chaplin, 2010, p. 349).

consumption and the government's inefficient allocation of resources left the economy extremely vulnerable to negative external shocks.

The collapse of oil and tin prices in the 1980s and rising world interest rates increased the already unbearable debt burden and led to policies decreasing employment in state-owned mines.<sup>29</sup> In 1985, during a period of hyperinflation, monetary authorities devalued the Bolivian Peso against the US dollar. The devaluation improved the competitiveness of non-mining tradables and effectively redistributed resources across sectors back to manufacturing (Table 2).

Current attempts to diversify the economy away from an overdependence on mining and primary commodity exports have been hindered by increasing commodity prices and natural barriers to trade (Table 2). The country's landlocked position, sparsely populated nature, and high cost of infrastructure work together to discourage investment and growth, and raise barriers that shield the manufacturing industry from competition, and effectively transform the products into nontradables (Auty and Evia, 2004, p. 189).

*The distribution of rents between the host country and foreign firms:* Previous to the revolution of 1952, the resources from mineral exploitation accrued to Bolivian capitalists residing outside of the country, which directed the benefits of this extensive mineral base to foreign countries (Auty and Evia, 2004, p. 182). After the nationalization of the mines, the state mining company, Comibol, was established with the explicit purpose of providing employment and social services to large segments of the population (Auty and Evia, 2004, p. 182). While such a policy may have a positive impact on poverty in the short term, it also decreased production, profitability, and expansion of the industry. Thus, while resources have been redistributed from foreign extraction firms to the host country, the long term benefits of these resources have been diminished.

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<sup>29</sup> Approximately 27,000 miners were forced to leave their jobs between 1985 and 1987 (Klein, 2003, p. 244).

In the 1990s, private foreign firms were allowed back into the natural gas industry to increase exploration, production and profitability.<sup>30</sup> This redistribution of resources back to foreign firms was short lived as the first indigenous president, Eva Morales, immediately increased the taxes in the mining industry and moved forward with nationalization plans (Chaplin, 2010, p. 8). A law passed in 2005 which increased the governments take from the two largest natural gas fields from 50 to 82 percent (Now it's the people's gas, 2006).

*The distribution of resources among citizens:* The people of Bolivia are no stranger to an unequal distribution of resources and have a long history of struggling for a fair share. The military government of the 1970s ended with a rocky transition to democracy in which questionable macroeconomic policies were pursued. Mineral rents stimulated unsustainable consumption and foreign borrowing and were not prudently invested. Consequently, the economy crashed and economic growth plummeted triggering a drastic change in economic policy. The program of structural adjustment implemented in Bolivia in the mid-1980s is a textbook case of the perusal and achievement of a stable macroeconomic environment and economic growth at the cost of social despair (Klein, 2003, p. 256). The reallocation of resources increased inequality and unemployment triggered widespread poverty (Figure 10). This had a devastating impact on the poor.

In 1994 the law 'Popular Participation' was passed seeking to partially decentralize the national budget and increase local social organizations' participation in decisions regarding the use of resources (Chaplin, 2010, p. 5). The underlying intent of this law was to weaken national social movements but it had the opposite effect by providing knowledge and experience regarding the daily operations of local governments. Low income, mostly indigenous groups,

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<sup>30</sup> Numbers on approximate mineral rent sharing agreements between Bolivia and foreign extraction firms are not easy to find for this time period.

largely excluded by the political and social system gradually gained political experience and knowledge. When indigenous leader Evo Morales was elected in 2005, he immediately increased the government take on resource rents and redistributed these rents toward the poor (Chaplin, 2010). In the 2000s, mineral rents have exploded, and inequality indicators and poverty rates have been on a decreasing trend (Figure 10).

Bolivia's record of prudently managing volatile income from the mining industry is discouraging. The large mineral rents that accrued in the 1970s funded consumption, culminating in the debt crisis of the 1980s with lower mineral rents, and ensuing spread of poverty (Auty and Evia, 2004, p. 185). While the recent revival of the economy has been due to an upsurge in mineral rents, Bolivia has not, so far, redistributed any mineral resource across time for precautionary saving, and this could be detrimental to the poor in the long run.

### **3.5 Chile**

Chile attained independence from Spain in 1818 and has a wide variation in climate and topography. Historically the economy has been dependant on the production and export of copper but other major exports include fish, fruit, wine, and wood and paper products. In the 1970's copper provided over 70 percent of the country's foreign exchange and was considered to be Chile's most valuable resource (Collier and Sater, 1996, p. 334).

Consequently, when the socialist government of Allende was elected in 1971 the mining industry was nationalized to directly benefit the nation, and to improve the living standards of the country's worst off. Unfortunately, this resulted in 85 strikes in the mines between 1971 and 1972, reduced production in most sectors, and led to stagnant economic growth (Collier and Sater, 1996, p. 336). The 1973 military coup put the country under the brutal dictatorship of General Pinochet until 1990. During this repressive time period, major economic reforms were

initiated in the form of the privatization of state controlled companies and trade liberalization. Moreover, political parties, free speech, and labour union activity were banned and rural and urban poverty rates increased (Collier and Sater, 1996).

The era of the Pinochet dictatorship saw some economic growth and substantial improvements in low-cost housing, water supply, life expectancy, and child mortality rates but also experienced two major recessions, a reduction in spending on state health services, and high unemployment (Collier and Sater, 1996, p. 372-374).<sup>31</sup> Since the 1990s, and the return to a civilian government, the reduction of poverty has been a main priority in fiscal policy (Adema, Reuterswärd, and Sloommaekers, 2009, p. 106). Furthermore, the Chilean government is strongly committed to counter-cyclical spending to reduce the negative impacts of fluctuating copper prices (Adema et al., 2009).

Overall, Chile has seen significant improvements in a number of socio-economic indicators. Poverty and child mortality rates have dramatically decreased and adult life expectancy and education levels are high (Table 1). A substantial rise in per capita GDP (PPP) combined with a strong overall growth rate allows Chile to enjoy upper middle income country status. A blight on this remarkable record is the fact that income inequality, as measured by the GINI coefficient, remains persistently high (Table 1).

*The reallocation of resources across sectors:* Chile began the 1970s with a strong performance in the manufacturing, services, (Table 1) and mining sectors. The oil price increases of this time were negative shocks that redistributed resources throughout the economy. There was a sharp increase in manufacturing valued added in GDP in 1975 that is matched by a sharp decrease in the proportion of services in GDP (World Bank, 2011). The slump in copper prices in the 1980s exacerbated the negative effects of the debt crisis that had begun to sweep

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<sup>31</sup> Other negatives are obviously the many human rights abuses perpetrated by the regime.



over the nation and the fixed exchange rate regime of the 1970s ended with a sharp devaluation (Collier and Sater, 1996, p. 371).

Even though the manufacturing sector has decreased from its 1970s levels and Chile is the world's leading producer and exporter of copper, the country has still been fairly successful in terms of economic diversification (Adema et al., 2009, p.17). The country has access to the ocean, which decreases export transportation costs, and has a relatively strong domestic market. Growth in the wine industry has been successful and accounted for almost 7% of total exports in 2003 (Poverty, 2008, p.1). Forestry and fruit exports are also important.

*The distribution of rents between the host country and foreign firm:* Chile nationalized the mining industry in 1971, effectively transferring all mineral rents and resources from foreign extraction firms to the state. Similar to the Bolivian situation, employment in the mines increased by 45 percent, potentially having a positive impact on poverty, but production per capita decreased by 19 percent (Collier and Sater, 1996, p. 336).<sup>32</sup> This decrease in production corresponded with a decrease in profits and hindered the ability of the socialist government to realize their goals. The extensive privatization policies during the Pinochet dictatorship did not extend to the mining industry. Instead, the state mining company, CODELCO, was allowed to enter into partnership with local and foreign extraction firms to increase the exploration of minerals and embark on new mining projects (Poverty, 2008, p. 2). This mix of private and public ownership has redistributed some resources back to foreign firms but resulted in overall gains for Chile. Production and mineral rents increased.<sup>33</sup> The return to democracy in 1990 also maintained this allocation of mineral resources.

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<sup>32</sup> Production was also hampered by the decrease in copper prices between 1971 and 1973 and the exodus of skilled workers (Collier and Sater, 1996).

<sup>33</sup> The share of Chilean copper in the world total increased from about 11 percent in 1970 to almost 21 percent in 1992 (Poverty, 2008, p. 2)

*The allocation of resources among citizens:* Attempts at the redistribution of resources from an elite minority to the poor in the 1970s were subjugated by a military coup in 1973. During the 17 long years of the Pinochet dictatorship inequality and poverty rates both increased substantially (Collier and Sater, 1996, p. 372). The income share held by the top 20 percent of the population increased by 18 percent and that of the lowest 20 percent decreased by 25 percent from 1968 to 1987 (author's calculations from World Bank (2011)). The most vulnerable groups, mainly women and children under five, were the recipients of targeted assistance, which decreased malnutrition and child mortality rates (Lustig, 1995, p. 315). The benefits of this allocation of resources to the poor were greatly diminished by policies that significantly decreased spending on health and unemployment insurance (Collier and Sater, 1996, p. 373).

Since the return to democracy there has been strong economic growth but persistent income inequality as Chilean elites have managed to maintain their large shares of income (Figure 11). Democratic governments have been more successful in extending resources in the form of social services to the poor. For example, health expenditures were increased by 70 percent in real terms between 1990 and 1994 (Weyland, 1997, p. 44). In 2002, Chile Solidario was implemented as a targeted anti-poverty instrument based on providing services and support programs rather than cash benefits to recipients (Adema et al., 2009, p. 121-123). In addition, a national health fund, FONZAS, provides free health insurance for low income households (Adema et al., 2009, p.117). This transfers resources towards vulnerable, low-income groups and has helped to substantially reduce poverty in Chile. The successful reduction of poverty has sparked serious demands for a more equitable distribution of resources among citizens and targeted government policies (Adema et al., 2009). In fact, income inequality, as measured by Inc H/L and to a lesser extent the GINI coefficient, has recently declined (Figure 11).

*The reallocation of rents across time:* Chile faces income uncertainty due to the importance of copper to the economy and the volatile nature of the price of this resource. A SWF, the Copper Stabilization Fund (CSF) was established in 1985 to mitigate this volatility and has been used to reduce foreign debt and as a source of income in times of recession (Poverty, 2008, p. 2-3). Strong economic growth and decreasing poverty rates help to reduce the opportunity costs of the reallocation of copper rents across time for precautionary saving. In fact, recent increases in mineral rents have coincided with the establishment of a long term savings fund in 2006 (Figure 5). This Pension Reserve Fund was created by copper income and investments in the fund cannot be cashed in for 10 years (<http://www.swfinstitute.org/fund/chile.php>). Furthermore, in 2007, the Economic and Social Stabilization Fund (ESSF) replaced the CSF and receives fiscal surpluses that are greater than 1 percent of GDP (<http://www.swfinstitute.org/fund/chile.php>). The creation of these SWFs reduces the uncertainty of future income in Chile and is likely to have a positive impact on the poor.<sup>34</sup>

### **3.6 Venezuela**

Independent since 1811, Venezuela (VEN) is a mainly tropical country rich in natural resources. Main exports include petroleum, aluminum, steel, and chemical products. The discovery of massive oil reserves in the 1920s transformed Venezuela from a relatively poor agricultural society into the world's second largest producer of oil in the 1950s (Di John, 2009, p. 21-22). Venezuela was a leader in the creation of OPEC in the 1960s and, shortly after, established a national oil company (Di John, 2009, p. 3-4). The country has a long history of democracy and

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<sup>34</sup> The government resisted public pressure to increase spending during the commodity price upswings in the mid-2000s and maintained the policy of distributing excess revenue to the ESSF. When the global recession hit Chile in 2008/2009, the government was able to use the ESSF to maintain spending and smooth income (Stimulating, 2009).

begun the 1970s as a middle income country with relatively strong socio-economic indicators (Table 1).

Venezuela experienced substantial windfall gains from the oil price increases in 1974 and 1979 yet seemed to be unable to translate this into increased economic and social prosperity (Gelb, 1988, p. 302). Di John (2009, p. 5) argues that the state was relatively ineffective during the 1970s and 1980s in its attempts to channel large resources and oil income into productive and growth enhancing investments. Stagnation in the economy led to policy changes in 1989 – known as the ‘Great Turnaround’. This included privatization, financial deregulation, and trade liberalization, as well as tax reforms and a large currency devaluation (Di John, 2009, p. 111).

In 1998, Hugo Chavez was elected as president on a platform promising broad social and economic reforms. The socialist style government is extremely controversial in the country and his first few years in government were marked by political instability and a serious oil strike. The Chavez government has greatly increased the provision of social services and made great strides in the provision of health care (Weisbrot and Sandoval, 2008, p. 4-5). Table 1 shows that poverty, child mortality, and income inequality rates have substantially decreased and adult life expectancy is relatively high. The country has not fared as well in terms of economic growth. The GDP per capita (PPP) was lower in 2009 than its 1970 level, and strong economic growth seen from 2003 on has been dampened by the most recent global recession (2007 to 2009).

*The reallocation of resources across sectors:* Increasing oil prices in the 1970s reallocated resources in the Venezuelan economy from agriculture, manufacturing, and services towards the mining industry (Table 2). From 1965 to 1983 there was a combination of a fixed exchange rate regime, free exchange system, and no restrictions on capital flows from 1965 to 1983 (Vaez-Zadeh, 1989, p. 3). During the debt crisis of the early 1980s, the currency was

devalued, and price, import, and interest rate controls were imposed (Lustig, 1995, p. 404).

Lustig (1995, p. 405) argues that the ability of the currency devaluation to redistribute resources into the tradable goods sector was hindered by the price and import controls. Growth since the late 1980s has been dominated by an expansion in oil and, to a lesser extent, nontradables (Table 2). The enclave, capital intensive nature of oil production in Venezuela means that the industry is unlikely to absorb labour. So, most of the benefits from expansion in this sector to the poor would be due to an expansion in the nontradable sector and redistributive government policies.

Unfortunately, recent global commodity price increases has coincided in Venezuela with a decrease in agriculture, manufacturing and services as a percentage of GDP (Table 2). In response to the 2007/2009 recession, the government has increased foreign currency restrictions and refused to devalue the currency. While this promotes short term goals of high levels of consumption, it is likely to inhibit economic diversification and have long run consequences.

*The distribution of rents between the host country and foreign firms:* From early on Venezuela has enjoyed strong bargaining power against foreign firms and was able to increase its share of oil profits in the 1950s (McMillan and Waxman, 2007, p. 3). The fiscal take on profits was about 50 percent from 1943 to 1958 and rose to 94 percent in 1974 (Manzano and Monaldi, 2008, p. 2). The creation of a national oil company helped to generate the necessary expertise in the petroleum industry to smooth the transition when the industry was nationalized in 1974 (Di John, 2009, p. 4). This nationalization coincided with a period of substantially rising oil prices and effectively transferred large resources from foreign firms to Venezuela.

Declining oil production in the 1980s and deteriorating economic conditions led to private firms being allowed back into the oil industry in the 1990s (DiJohn, 2009). This redistribution of some resources back to foreign firms increased the exploration for and

production of oil.<sup>35</sup> The election of Hugo Chavez saw increasing state involvement in the oil sector and lead to full (re-)nationalization in 2007 (Manzano and Monaldi, 2008, p. 30). Policies in the mid-2000s increased the state oil company's share in foreign oil companies from between 60 and 90 percent and gave them operational control, royalties increased from 1 to 30 percent, and corporate taxes increased from 34 to 50 percent (Chávez squeezes the oil firms, 2005). As a result, Venezuela received a minimum of 82.5 percent of oil profits (Chávez squeezes, 2005).

*The allocation of resources among citizens:* In the 1970s, the government used the massive rents generated by large oil price increases to distribute resources and rents to citizens in the form of direct transfers and increased public employment (Gelb, 1988, p. 313). These policies tend to distribute resources fairly equally among citizens and so income inequality remained persistently high (as measured by Inc H/L in Figure 12). Nevertheless, these policies also improved the wellbeing of the poor and had a positive impact on poverty (the indicator LBWB (%) shows a decreasing trend from 1974 to 1984 in Figure 6). Economic crisis in the 1980s, and subsequent structural reforms in the early 1990s, led the government to counter social discontent with direct transfers targeted to the poor, but failed to reform the inadequate social service system (Lustig, 1995, p. 401). The delivery of public services such as education, health, and water were deteriorating and reforms to these policies were blocked by strong union and political opposition (Lustig, 1995, p. 406). In fact, as seen in Figure 12, a period of decreasing inequality reverses abruptly in 1993.

In Venezuela, powerful political elites tied to the parastatals were effective in controlling available resources and resisting their reallocation to the poor. Widespread discontent from low income groups led to a change in political leadership in 1998. The promised economic and

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<sup>35</sup> Numbers on the approximate distribution of rents between Venezuela and foreign firms are difficult to obtain.

social reforms of the Chavez administration have caused conflict and instability in the economy. On the other hand, poverty and inequality rates have recently decreased in Venezuela (Figure 6).

*The reallocation of rents across time:* Given that oil prices are unpredictable and unstable, the governments of the 1970s set up a stabilization fund for precautionary saving (Gelb, 1988, p. 308). Unfortunately, the public sector became a net borrower after 1976 and the fund no longer fulfilled the intended short-run purpose of macroeconomic stability or the long-run intent of securing income against an uncertain future (Gelb, 1988, p. 308).

In a continued trend, further attempts to set up oil stabilization or savings funds have been fleeting. For example, the Investment Fund for Macroeconomic Stabilization was established in 1998 to mitigate the impact of oil shocks on the government budget (Da Costa and Olivo, 2008, p. 19). This was quickly replaced by the current Macroeconomic Stabilization Fund in 2003 with a mere 11 percent of the net worth of 2001 preserved (Da Costa and Olivo, 2008, p. 19).

## **Chapter 4: Discussion**

The ability to use an extensive mineral resource base to significantly reduce poverty will vary widely across countries. The experiences of the case-study countries regarding mineral rent management and prevalence of poverty are compared and contrasted in the context of four mechanisms: the redistribution of resources across sectors ('Dutch Disease'), the distribution of rents between the host country and foreign firms, the allocation of resources among citizens, and the reallocation of rents across time (precautionary saving). This chapter further discusses whether each mechanism is essential for poverty reduction in the case-study countries and discusses the cases of successes and failures regarding mineral rent management.

### **4.1 The Redistribution of Resources across Sectors**

When comparing the average growth rates of value added in agriculture, manufacturing, and services as a percentage of GDP from 1970 to 2009 across the countries, what stands out is all of the countries remain highly dependent on mining for economic and social development (Table 2). The recent global commodity price increases have been matched by a substantial reallocation of resources towards the mining industry for all six countries, with the exception of services in Botswana and services and agriculture in Nigeria (Table 2). This coincides with economic growth and strong rents in all countries until 2009. Economic diversification remains an elusive goal, yet it can be argued that some countries have a wider sectoral base than others.

Despite devotedly pursuing economic diversification, Botswana's economy is one of two that remains the most highly dependent on minerals (the other being Nigeria). Botswana has seen the most dramatic decline in the agricultural sector (Table 2), which increases food insecurity for the poor. Furthermore, there has also been a decrease in an already small manufacturing base and unemployment rates are very high due to the capital intensive nature of



the diamond industry (Table 1). While there has been some growth in the nontradable service sector, diamond production still drives the economy. It is these factors, versus a high volatility in sectoral growth (Table 2), which has had a negative impact on attempts to substantially reduce high levels of poverty in the long-run in Botswana.

The oil producing countries, Venezuela and Nigeria, have also had to deal with the impact of high dependence on a low employment, enclave industry. Moreover, the oil industry also has a low ability to generate positive externalities in other sectors of the economy. This decreases incentives to invest in human capital and suggests that currency appreciations may have limited re-distributional effects, negatively affecting employment and poverty. Nigeria, for instance, has the lowest percentage of secondary enrolment, extremely high levels of poverty (Table 1) and the largest long run decrease in the manufacturing growth rate as a percentage of GDP (Table 2).

Volatility in oil prices translate into high volatility in TOT in these countries (Table 5). This has resulted in unstable income flows as can be seen by the large yearly fluctuation in both resource rents and GDP per capita in these countries (Figures 2 and 6). The oil price increases in the 1970s generated large mineral rents. In Venezuela, resources were drawn from the other sectors of the economy towards mining and in Nigeria, agriculture and service sectors contracted while the manufacturing sector experienced strong growth. While both countries experimented with ISI, Venezuela has a much higher average percentage of manufacturing value added in GDP, the second highest in the sample, and is successfully exporting steel. In contrast, Nigeria has the second lowest average contribution of manufacturing and the major steel complex did not produce a single ton of steel from the 1970s to the early 2000s (Sala-i-Martin and Subramanian, 2003, p.13).

With the collapse of oil prices in the 1980s, the manufacturing industry in Nigeria also collapsed (Table 2) and Nigeria's economy remains a mono-product economy. Venezuela experienced growth in the manufacturing, services, and agricultural sectors (as a percentage of GDP) in the 1980s but overall has not been able to maintain economic diversification. Continued dependence on volatile oil income has a negative impact on both countries ability to reduce poverty. Poverty rates in both countries have increased on average between the 1980s and 2000s by about 6 percentage points (Table 2) but Venezuela's overall levels of poverty and dependence on oil are lower than Nigeria (Table 1).

Zambia has had the strongest performance in terms of overall growth rates of non-mining sectoral contribution to GDP (Table 2). Unfortunately, this has not translated into noticeable improvements in poverty. Zambia has also had the highest volatility of growth in these sectors, with the exception of manufacturing in Bolivia (Table 2). Between 1990 and 2000 the share of workers employed in agriculture increased by 44 percent to 71 percent while those employed in manufacturing decreased by 47 percent to 5.8 percent (author's calculations from WDI, 2011). This, combined with a substantial decrease in the importance of manufacturing in the economy in the 2000s, shows a redistribution of resources away from traded goods in potentially high productivity sectors. Zambia does not have strong social service provision in terms of welfare assistance or programs to train or retrain workers to mitigate the costs of this resource reallocation and it is noticeable that average poverty rates have risen over this period (Table 2).

The importance of different minerals for economic growth has fluctuated in Bolivia. Bolivia has, on average, the strongest growth rate in sectoral contribution of manufacturing as a percentage of GDP from 1970 to 2009 but also the highest volatility in the growth rate of

manufacturing as a percentage of GDP (Table 2). The Bolivian economy also has the lowest volatility in the growth rate of services and agriculture (Table 2). Similar to Zambia, this suggests that there have been frequent redistributions of resources between manufacturing and mining industries, which has had a negative impact on the ability of the country to alleviate poverty (Table 2).

In contrast, Chile has been successful in diversifying the economy away from copper and has managed to avoid the natural resource curse (see also Adema et al., 2009, p. 17): for instance, Chile exports wine, fruit, and paper products. While the growth rate of manufacturing (as a % of GDP) between 1970 and 2008 is negative 1.1 percent, Chile has the second lowest volatility in growth in this industry (Table 2) and the highest average percentage of value added between 1970 and 2008 (at about 20 percent based on World Bank (2011) data). Chile has also been the most successful in significantly reducing poverty rates.

#### **4.2 The Distribution of Rents between the Host Country and Foreign Firms**

Botswana is the only country of the six which has never nationalized or ‘indigenized’ the mining industry. The government has been able to secure a large portion of total mineral rents from production while simultaneously promoting foreign investment. This has most likely been valuable in stimulating the necessary exploration for and production of mineral resources and has been the backbone of strong economic growth. Mineral rents have increased sharply since the discovery of diamonds and have been a relatively stable source of income (Figure 1). This rent stability has enabled the Government of Botswana to make productive investments in the economy. For instance, human capital has been strengthened by investing in areas such as education and health and this has translated into some progress in improving living conditions in

the country.<sup>36</sup> Between 1986 and 2005 the poverty rate \$2 a day (PPP) decreased by 26 percent. On the other hand, the percentage of low birthweight babies and infant mortality rates have risen since the late 1980s (with infant mortality rates decreasing again since 2000, see Figure 1), and poverty rates are quite high in comparison with the other upper middle countries Venezuela and Chile.<sup>37</sup>

In contrast, both Bolivia and Venezuela have promoted policies of nationalization, followed by a period of privatization, and then a process of re-nationalization of the mineral industry. In both countries this redistribution of resources to and from foreign extraction firms has coexisted with volatile and low economic growth over the years. Similarly in both countries, the period of privatization appears to coincide with increasing poverty rates while the recent re-nationalization and redistribution of mineral rents and resources back to the host country coincide with decreasing poverty rates (Figures 10 and 12). Zambia has also nationalized the mining industry and has used state owned companies to provide social services at the expense of productivity. The resources that were redistributed from foreign extraction firms to Zambia were not efficiently allocated by the government. While nationalization in Bolivia and Venezuela did not appear to substantially affect the availability of mineral rents, this has not been the case in Zambia. Rents, and economic growth, were mostly on a steady decline from the 1970s to 2000s (Figure 3). This has greatly impacted the government's ability to provide social services and reduce poverty.

The crisis in Zambian state-owned mines in the 1980s corresponds with a notable increase in infant mortality rates and low birthweight babies (Figure 3).<sup>38</sup> The increase in infant

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<sup>36</sup> Between 1970 and 2007 secondary school enrolment rates in Botswana increased by 1184 percent (Table 1).

<sup>37</sup> The HIV/AIDS epidemic hit Botswana more severely than the other countries and no doubt negatively impacted the percentage of low birthweight babies and infant mortality rates.

<sup>38</sup> Also negatively impacting rents and the poor is the slump in copper prices and the debt crisis in the early 1980s.

mortality is especially alarming when one considers the fact that this indicator is typically on a downward trend for most countries. From the available data it also appears that poverty was on the rise in the early 1990s. The process of privatization of the copper industry that began in the late 1990s alleviated the drain of the mining industry on the government budget, but also heavily favoured the foreign extraction firms. This led to a sharp decrease in the availability of social services. Overall, Zambia has been the least successful in terms of efficiently utilizing mineral resources expropriated from foreign firms to promote economic and social development and has also been the least successful in re-negotiations with foreign firms for an equitable share of future mineral rents.

Nigeria's experience with indigenization was quite different as foreign oil companies were allowed to maintain control over operations. This helped to maintain the profitability of the enterprise and a strong, albeit volatile, portion of mineral rents. Unfortunately, similar to Zambia, this distribution of resources into the hands of the government did not translate into economic growth or improved wellbeing for the majority of the population. Infant mortality rates remained stagnant from 1975 to 1995 and the poverty rate at \$2 a day increased by 7 percent between 1986 and 2005 (Figure 2). Furthermore, the current levels of both indicators are the highest among the case-study countries (Table 1).

These five countries are in sharp contrast with Chile, which has both nationalized the mining industry and has seen significant economic growth and decreases in poverty.<sup>39</sup> The system of public and private ownership in place since the mid-1980s has successfully maintained mineral rents and a healthy distribution of resources towards the Chilean government and citizens. Furthermore, Chile's rate of economic growth is very strong and second only to Botswana's (Table 1).

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<sup>39</sup> Between 1987 and 2009 Chile's poverty rate decreased by 90 percent.

### **4.3 The Allocation of Resources among Citizens**

Botswana and Chile have managed to achieve a stable portion of resource rents, poverty alleviation, and strong economic growth, yet levels of inequality in both countries have been persistently high. Botswana has the highest GINI coefficient and is the only economy in which it has never declined (Figure 7). Furthermore, for an upper middle income country, the availability of data regarding the wellbeing of the most vulnerable members of the population is quite sparse. Policies promoting economic growth have not seemed to be matched by ones promoting poverty alleviation and the equal allocation of resources. The decrease in poverty that has occurred may be, in part, simply due to the fact that a strong growth rate of GDP per capita has shifted everyone's income up, decreasing the percent of people under the poverty line without any resource redistribution. Furthermore, the country has a long history of democracy but elections have typically been dominated by one party and so political elites have not had much threat of competition for resources from other political parties, or military elites such as in Bolivia, Chile, and Nigeria. Botswana's highly unequal distribution of resources across political and business elites and the poor may be hindering the ability of strong economic growth to significantly improve the living conditions of the more vulnerable members of the country.

Chile also exhibits a relatively unequal distribution of resources across citizens. While there has been significant success in poverty alleviation, income inequality, as measured by the GINI coefficient, has been persistently high (Figure 11) and is only slightly lower than in Botswana. Chile does have the lowest poverty rates, which indicates some success of government programs designed to redistribute non-monetary resources, such as Chile Solidario and FONZAS. However, the elite in Chile have traditionally been successful in resisting any

attempt to redistribute income.<sup>40</sup> This situation has recently changed as, with the exception of Bolivia, Chile has seen the largest decrease in income inequality (Figure 11). From 2006 to 2009, the share of income held by the highest 20 percent of the population decreased by 45 percent while the income share held by the lowest 20 percent increased by 109 percent. This signals that low income groups in Chile are finally significantly benefiting from the country's mineral resource abundance and economic growth.

This recent trend can also be seen in Bolivia (Figure 10), and to a lesser extent in Venezuela (Figure 12). Beginning in the early 2000s, large oil rents have been matched by large decreases in poverty and inequality in both countries. This is in contrast to Zambia (Figure 9), which has seen a recent revival of resource rents combined with stagnant and high poverty rates and increases in inequality.<sup>41</sup> Zambia is the only country in which there is a negative correlation between the inequality indicators and poverty (Figure 9). In Venezuela, and to some extent Bolivia, there is a distinct co-movement across time between poverty rates and inequality (Figures 12 and 10 respectively). This suggests that utilizing mineral rents towards policies that redistribute resources in a more equitable manner across citizens can have a significantly positive impact on the poor.

In 1987, poverty and inequality rates in Venezuela dropped significantly until approximately 1993 when they began to increase (Figure 12). This increase may be partially due to the fact that the most inefficient state owned companies were not privatized during the 'Great Turnaround' in the early 1990s and social service provision deteriorated (Di John, 2009). The political elites that were tied to these losing parastatals blocked reform. Furthermore, the privatization that did occur most likely transferred resources directly from the state to elite

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<sup>40</sup> Income share held by the highest 20 percent has been approximately 59 percent from 1987 to 2006.

<sup>41</sup> Although the large foreign firm take on the rents limits their benefits to the Zambian society.

interest groups. This has the effect of increasing inequality and poverty, as low income groups are well-known to be the most vulnerable to negative effects of structural adjustment programs. Recently, the Chavez administration has used mineral rents to increase the availability of social services and inequality and poverty rates have declined.<sup>42</sup> In the past, poverty and inequality rates in Venezuela had been volatile and so it has yet to be seen whether this current decrease will be sustained.

The country with the lowest level of inequality, as measured by the GINI coefficient is Nigeria. While this might lead one to believe that Nigeria has a more equal distribution of resources among citizens, this may be simply masking inequality. This is due to the fact that the construction of the GINI coefficient is sensitive to movements in the middle class, and poverty rates in the country are extremely high. Moreover, Nigeria has the highest level of ethnic diversity of the countries and mineral rents have typically been distributed to political elites in the many regions and levels of government as a tool to decrease ethnic strife. Other successful rent seekers are influential military and business leaders. Once this powerful trio gets through with available mineral rents there is not much, if anything, left over to benefit the massive low income population. While there has been a slight decrease in inequality since the mid-1990s, this method of distributing resource rents has had a negative impact on poverty.

#### **4.4 The Reallocation of Rents across Time for Precautionary Saving**

Bolivia and Zambia are the only countries never to have utilized income from exhaustible mineral resources to invest in an SWF. In Zambia, export income in the 1960s that had been invested in a copper stabilization fund was quickly exhausted. Copper income in the 1970s was used by the government to promote state-led development policies and was invested in the

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<sup>42</sup> Between 2003 and 2006 poverty at \$2 a day, as a % of population decreased by 68 percent.



domestic economy. This provided no long-term safety net for the poor. Moreover, Zambia has had a large debt burden and is the only country to have had zero mineral rents at times. This greatly reduces both ability and incentive to invest in precautionary saving to decrease future income vulnerability. Furthermore, the country also has the highest rate of extreme poverty in both 1970 and 2009 and the largest decrease the average growth rate of GDP per capita (Table 1) and so this type of savings mechanism is also the most costly. At the same time, Zambia has the highest volatility in terms of trade of all the countries (Table 5), which should impel the government and central bank to invest in this saving mechanism. So far, Zambia has not been able to redistribute resources over time and smooth volatility of its household consumption (HHC) and poverty rates have increased (Table 4).<sup>43</sup>

Bolivia's situation is slightly different. While the other countries tend to be highly dependent on one main mineral for export, Bolivia has more of a range of primary commodity exports. The mix of natural gas, zinc, silver, gold, and tin resources reduces the economy's vulnerability to individual commodity price shocks. Increasing gas prices that will negatively affect mineral production in Botswana, Chile, and Zambia will have a positive impact in Bolivia. After Botswana, Bolivia has the lowest instability in terms of trade and a noticeably lower variance in income than the other countries (Table 5). These factors, combined with a negative average balance on the current account, suggest a relatively low incentive to redistribute scarce resources over time for precautionary saving.

In stark contrast the major oil exporters, Nigeria and Venezuela, exhibit extremely high volatility in TOT and a relatively high variance in income (Table 5). This increases incentives to redistribute resources across time to decrease the risk of low income and higher poverty in the future. Bems and de Carvalho Filho (2011) find precautionary saving as a percentage of GDP in

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<sup>43</sup> Volatility in the growth rate of HHC for Zambia is the second highest of the six countries at 11.6 (Table 6).

2007 to be 0.4 percent for Nigeria and 0.6 percent for Venezuela. This amount is argued to remain fairly consistent over time. Furthermore, the two countries also run current account surpluses on average, further evidence of resource redistribution for buffer stock savings (Bems and de Carvalho Filho, 2011, p. 4). The Nigerian Government budget is the most highly dependent upon foreign income and the Excess Crude Account, a SWF, was established in 2004 for stabilization purposes. Recent oil price increases have greatly increased mineral rents and a portion of these rents have been diverted towards the fund.<sup>44</sup> Poverty rates decreased a tiny fraction from 2004 to 2005 and infant mortality rates and the instance of low birthweight babies are decreasing (Figure 2) but HHC volatility has increased (Table 6). Furthermore, the Nigerian SWF has the lowest transparency rating possible, suggesting that the fund is vulnerable to ‘looting’. This decreases its effectiveness as a stabilization mechanism. These factors suggest that Nigeria has not been able to use this saving method to effectively redistribute resources across time and poverty rates have increased (Table 1).

Venezuela’s SWF also has a transparency rating of one. This Macroeconomic Stabilization Fund was established in 1998 and had limited success in stabilizing volatility in poverty rates and economic growth (Figure 6). Recent administrations in Venezuela and Bolivia have committed to providing social services, alleviating poverty, and redistributing resources towards the poor. This will provide important short-term benefits to the poor and poverty rates have decreased in both countries. On the other hand, large and unsustainable increases in consumption will depress savings and investment in these countries, which is detrimental to long term growth and stability. Low income groups are less able to build up bufferstock savings and the SWF in Venezuela can help to safeguard the poor against volatile mineral income flows and

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<sup>44</sup> The Crude Oil Account increased by 239.2 percent from 2004 to 2007 (<http://www.swfinstitute.org/fund/nigeria.php>).

further relieve poverty. In Bolivia, the absence of policies to redistribute resources over time into a savings fund reduces the country's ability to guard against future contingences and increases risks to the poor, and those just above the poverty line, in the long-run.

Traditional incentives for Botswana to reallocate mining resources over time are not as strong as for the other mineral dependent economies (Table 5). This is due to the aforementioned relationship with Debeers and the CSO, which greatly decreases negative external shocks such as volatile diamond demand and price. Nevertheless, the Government and Bank of Botswana have prudently invested a portion of diamond income into various saving funds since the 1970s and in 1994 a SWF was established. The government is utilizing this resource to help stabilize the economy against shocks and guard against unforeseen contingencies. The fund has a transparency rating of 6, quite a bit higher than Nigeria and Venezuela (<http://www.swfinstitute.org/swfs/pula-fund/>) and volatility in HHC has decreased since its inception (Table 6). This helps to guard the poor, and those just above the poverty line from having to cope with large shocks to the economy. Poverty has indeed decreased but actual levels are still relatively high. An issue may be that current consumption levels in Botswana may be below an optimal amount for significant poverty reduction to take place and the country may be overinvesting in precautionary saving.<sup>45</sup>

Chile was the first country to establish a SWF in 1985 and it has the highest transparency rating possible (<http://www.swfinstitute.org/fund/chile.php>). Relative to the other countries, Chile has moderate instability in TOT and a mid-range variance of income (Table 5). The volatility of HHC has decreased since the inception of the copper fund and this has had a positive impact on levels of poverty in the country (Table 6). Furthermore, the recent commitment to

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<sup>45</sup> In 2007, the Pula Fund amounted to 56 percent of GDP in Botswana (<http://www.ifswf.org/members-info.htm#bot>).

stable macroeconomic management by the political leaders saw the creation of two additional funds in 2006 and 2007. These short and long term funds work together to diversify assets and income, and to address the exhaustible income component of copper resources. Resources are redistributed over time in Chile to stabilize income today and in the future and are the most comprehensive of the countries. This has the most potential to have a positive impact on sustainable poverty reduction.

#### **4.5 What Works?**

*Is economic diversification essential for poverty reduction?* The case study countries remain highly dependent on mineral production for development. Their comparative advantage in trade is the utilization of their extensive mineral base and so economic diversification is likely to be difficult. Typically this will require government intervention in the form of targeted policies, which can be costly if inefficiencies arise. This is seen most dramatically in Nigeria and Zambia, where resource rents facilitated rapid and large investments in state-led development schemes to diversify the country. Nigeria's attempted steel industry involved huge costs and low productivity and increased the number of powerful rent seekers in the economy. The main exports remain petroleum and petroleum products, similar to Botswana and Zambia whose major exports continue to be minerals. Moving forward, lack of economic diversification will likely continue to hinder significant poverty reduction in Botswana and Nigeria due to the extremely high capital to labour ratio involved in these mining industries and the enclave nature of production in Nigeria. So far, the benefits of a booming mineral export industry have been largely concentrated to an elite minority.

Furthermore, the Latin American countries, Chile, Bolivia, and Venezuela, have more developed manufacturing sectors, a wider range of exports, and lower levels of poverty than the

Sub-Saharan African countries. In fact, in Venezuela and Bolivia, deindustrialization is associated with increasing poverty. This suggests that economic diversification is essential for poverty reduction, especially in the long-run. For example, Chile has largely avoided the ‘Dutch Disease’ and experienced both significant economic growth and poverty reduction.

*Is privatization of the mining industry essential for poverty reduction?* Chile has a mix of state-led and private firm mining development and has experienced both strong economic growth and poverty reduction. This suggests that privatization is neither essential nor sufficient for poverty reduction. In fact, Zambia’s experience with privatization suggests that it may be detrimental for poverty reduction. Evidence from Bolivia and Venezuela also imply that privatization can be harmful. On the other extreme, Botswana has been fully committed to private enterprise and has successfully negotiated higher rent shares and has seen strong economic growth and some reduction in poverty.

Botswana, Chile, and Nigeria have been the most successful in their ability to extract rents while promoting competitiveness, productivity, and growth in the mining industry. Nigeria has partially indigenized the industry but allowed foreign and private firm control over operations. Of the three, Nigeria has had the least success in utilizing the rents to improve the welfare of the poor. Bolivia, Venezuela and Zambia went further with statist development policies than Nigeria and have all experimented with full nationalization of the mining industry. This has decreased productivity, growth and the availability of resource rents. Moreover, the process of privatization has had a significantly negative impact on poverty in all three countries. But, Bolivia and Venezuela have recently re-nationalized the mining industry and implemented government policies that use mineral rents to provide targeted social services. This has had a

significant and positive impact on poverty alleviation in both countries in the short-run. Whether this improvement can be maintained in the long-run is yet to be seen.

What is essential in reducing poverty in these countries is appropriating a fair share of the resource rent through either facilitating an encouraging foreign and domestic private investment climate or a mix of public and private ownership that does not sacrifice productivity and efficiency. This has generated large rents for domestic firms and governments in Botswana, Chile, Nigeria, and Venezuela. Furthermore, consistent, or counter-cyclical fiscal spending in the economy on productive investments concentrated in areas that the private market would typically underperform have been successful in Botswana and Chile to alleviate poverty. Some examples of investments are in human capital (education and training programs), social services, and infrastructure. Nigeria, Venezuela, and Bolivia utilized mineral rents from export price upswings in the 1970s to quickly spend in the domestic economy and suffered greatly when prices plummeted in the 1980s. The expectation of continued high income from mining encouraged overconsumption, wasteful spending, and increased foreign borrowing. When the economies of these countries crashed hard, it had devastating effects on the vulnerable members of society.

From reviewing the case studies, what appears to *fail* are nationalization programs that use the mining industry as a mechanism to provide social services to the people and rents to the government. The state-owned firm is unable to run efficiently by minimizing costs and maximizing benefits. This results in uncompetitive, unproductive firms and diminishes, or outright eliminates the availability of mineral rents. This has been seen in Bolivia, Venezuela, and most clearly in Zambia in different time periods. Problems in such state-owned mines ultimately lead to their privatization. This process of redistributing resources from the

government to private foreign and domestic firms results in rent seeking behaviour by elites and exacerbates inequality and poverty in the country. While nationalized firms as providers of social services to their workers may provide short run benefits for the poor, in the long run low productivity reduces wages and rents and sparks a privatization process which tends to hinder the wellbeing of the poor.

*Is lowering inequality essential for poverty reduction?* The redistribution of resources among citizens has been a problem area in all six countries. The very existence of rents naturally lends itself to detrimental rent seeking behaviour. Chile and Botswana suggest that some significant poverty reduction can occur alongside high levels of inequality, but policies that target a more equal distribution of resources among citizens will be essential for sustained and substantial reductions in poverty. So far, Chile has had the most success in the creation of social services and policies that directly allocate resources to vulnerable members of the population, reduce poverty rates, and, recently, decrease income inequality. The Chilean model does not simply rely on economic growth to ‘trickle down’ to the poor and improve social development and alleviate poverty on its own. This has been essential in using mineral rents to attain reductions in poverty.

Bolivia and Venezuela have seen recent increases in mineral rents and declining rates of poverty and inequality. Recent moves towards re-nationalization of the mining industry and policies promoting a more equitable reallocation of resources in both of these countries have so far had a positive effect. In contrast, Botswana and Nigeria’s economies remain the most seriously dependent on mineral production for development. This continues to concentrate the benefits of booms in the mining industry to an elite few and reduces the opportunities for employment in the economy. Inequality rates have remained stagnant and poverty levels are

relatively high. Furthermore, HIV/AIDS rates in Botswana are among the highest in the world and the government is spending a serious portion of the fiscal budget on programs targeting those affected and vulnerable. Moving forward, these factors will most likely hinder Botswana's ability to significantly reduce poverty.

Over 80 percent of Nigerians and Zambians live in poverty. These shockingly high rates are the largest of the countries and especially disturbing for Nigeria when one considers the fact that the government has managed to secure a large flow of mineral rent income. Continued economic and fiscal dependence on this outside income source has decreased government accountability and transparency and limited incentives to invest in human capital. Moving forward, issues of corruption and inefficiency in Nigeria will most likely have to be addressed before any serious poverty reduction is possible. In Zambia, the first democratic elections were held in 1991, after which inequality declined. Since then, privatization has decreased fiscal burden but has also significantly reduced social service provision and Zambia's share of mineral rents. Poverty, and recently inequality, has increased. It is yet to be seen whether debt relief and increased taxes on the mining industry will result in a more equitable redistribution of resources among citizens and reductions in poverty.

*Is a SWF essential for reducing long-run poverty and fluctuations in the poverty rate?*

The experiences of Chile and Botswana suggest that a SWF is an essential *component* in successful poverty reduction strategies in mineral dependent countries: volatility in the growth rate of household consumption has significantly decreased since the inception of a SWF. Moreover, Chile and Botswana have seen the largest decline in poverty rates. Looking forward, Botswana's high share of mineral rents allocated towards precautionary saving may hinder further success in poverty reduction in the long-run.



Bolivia and Zambia provide further evidence that a SWF is important for significant and sustained poverty reduction. So far, neither country has redistributed a portion of mineral rents into a SWF. Moving forward, this does not provide a stabilization mechanism for income and poverty fluctuation in the short-run and is likely to hinder long-run poverty reduction. On the other hand, Venezuela and Nigeria suggest that the establishment of a SWF is not sufficient in of itself to alleviate poverty. Precautionary savings have not, as of yet, decreased volatility in the growth rate of household consumption or poverty in either country.

## Chapter 5: Conclusion

Mineral rents are income that accrues from the extraction, production, and export of a country's natural resource base. It is widely accepted that these natural resources are the property of all the citizens of the country and therefore that these citizens also have a claim on a portion of any available mineral rents (Weber-Fahr, 2002; Cawood & Minnitt, 2002). There are a number of important stakeholders involved in mineral production including foreign and domestic firms, host governments, citizens, and indigenous peoples living on the land. Yet, countries that are dependent on income from an extensive mineral resource base confront a number of challenges when trying to promote economic and social development. The exhaustible nature of the resource combines with a highly volatile export price to increase the risk of large external shocks to the economy. These increase the difficulty for developing countries in implementing prudent, stable and transparent government policies. Mineral rents also create conflict, corruption, and possibly an inequitable distribution of resources which can be damaging to economic growth and social prosperity.

This thesis discussed four main mechanisms through which the availability of mineral rents can affect poverty. These are the redistribution of resources across sectors of the economy, the distribution of rents between the domestic country with the natural resources and foreign extraction firms, the allocation of resources among citizens, and the reallocation of resources over time for precautionary saving. These mechanisms are examined within the context of six emerging economies, Botswana, Nigeria, Zambia, Bolivia, Chile, and Venezuela. These countries have extensive resource bases and a large average proportion of mineral rents to GDP.

If one were only considering the existence of an extensive mineral base, large resource rents, and economic development, then Botswana is indeed a success story. Botswana has the

strongest growth rate of GDP per capita among the comparison countries by far and has been able to not only mitigate the natural resource curse but to thrive. When one considers social indicators measuring the wellbeing of the overall population the picture is considerably different. In this regard, Chile emerges as the star performer of the case-study countries.

Chile has managed to combine large mineral rents and initially high levels of inequality and poverty with economic growth and improvements in socioeconomic indicators. The contribution of the main four sectors of the economy to GDP is not overly skewed and exhibits relatively low volatility in growth, and a mix of public and private involvement in the mining industry has guaranteed the country a large portion of a healthy flow of mineral rents. Inequality has been a persistent problem over the years but in recent years policies which have redistributed resources towards the poor have been implemented. Furthermore, Chile has taken advantage of strong economic growth and mineral income to comprehensively redistribute a portion of copper rents over time for precautionary saving. These factors have strongly contributed to the improved wellbeing of the most vulnerable members of society: 2009 levels of poverty, infant mortality, and low birthweight babies are the lowest of the countries and the percentage of poverty decreased by a significant 90 percent since 1986.

Botswana also emerges as relatively successful in utilizing mineral rents to propel economic growth and alleviate poverty. Unfortunately, absolute levels of poverty are still quite high, and the country is plagued with persistently high inequality and unemployment. In general, government policies regarding the negotiation of a fair share of mineral rents from foreign firms and the utilization of these rents in prudent investments in the domestic economy and across time for savings have been much more successful than those attempting to diversify the economy.

Moving forward, diversification away from the capital intensive diamond industry is essential if the country hopes to reduce both unemployment and poverty in the long-run.

In starkest contrast, Zambia and Nigeria have emerged as the worst performers in this study. Neither country has been able to utilize their considerable mineral resources and flow of rents to propel economic growth or improve living conditions for the many people who live in poverty. Poverty rates are over 80 percent and have been exacerbated by corruption, wasteful investment, and rent seeking behaviour by elite groups which seek to improve their own wellbeing over that of the broader society. Rents in Nigeria have been cycled towards military, business, and political elites to reduce ethnic conflict and maintain political control. This has increased corruption and conflict while prudent investments in human capital and infrastructure have been neglected. Rents in Zambia have also tended to favour an elite minority – although the government did attempt to provide important social services and jobs to the poor through unsuccessful statist policies. Neither country has so far effectively transferred resources across time to guard against volatile income and unforeseen contingencies.

Bolivia and Venezuela have both experienced difficulties with utilizing large mineral resources to propel economic growth and social development. Venezuela has experienced the most volatile levels of poverty and has had some recent remarkable improvement.<sup>46</sup> While not quite as dramatic, Bolivia has also experienced decreasing poverty levels over the 2000s. Both economies have a historically unstable relationship and flow of resources between themselves and foreign firms and have made recent moves towards increased control over the mining industry. This has redistributed rents towards the state and the Chavez and Morales governments have committed to policies that promote improved wellbeing of the poor. Time will tell whether these policies ensure efficiency and high resource rents for these countries. Venezuela has

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<sup>46</sup> Between 2003 and 2006 poverty at \$2 a day, % of population decreased by 68 percent.

distributed some of the resources from oil production into a SWF that can be used to decrease long-run risks to the poor. Bolivia has yet to take advantage of economic growth and increased rents to invest in precautionary savings to stabilize the economy and the poor. Again, time will tell whether the short run improvements in poverty alleviation will translate into sustained success.

One important policy issue that comes up in all areas regarding mineral wealth is transparency and accountability. Information sharing is essential to determine the actual size of the resource rents and to minimize the potential difference in expectations versus reality. This is likely to reduce friction in negotiations for rents between host countries and foreign firms, increase equality in the distribution of resources among citizens, and increase the effectiveness of precautionary saving funds. Through these mechanisms, increasing transparency and accountability in mineral dependent countries will likely reduce poverty.

If the 'expectation gap' between the actual costs of production, rent size, and what shareholders think they will receive is large this will cause additional conflict in society (Cawood & Minnitt, 2002 p. 1). Citizens in countries that discover mineral resources, especially oil, typically have large expectations regarding increases in wellbeing. Mistrust in the government and hostility towards the foreign firms will grow if these expectations are not met. The governments and foreign firms involved in mineral resource production need to have a clearly laid out process of negotiation and terms of agreement so that everyone is aware of both the size of the rents and the portion accruing to the host country. Furthermore, transparency in policies regarding the redistribution of mineral rents within the host country will limit opportunities for rent-seeking and for 'looting' precautionary saving funds.

Mineral rents can make up a large portion of the government budget. This can decrease accountability and increase corruption in the government. If poor institutional capacity is combined with a large amount of the population that live in poverty, a developing country may be unable to efficiently collect taxes. To avoid the trap of this rentier state, a *portion* of mineral rents can be redistributed to citizens as a direct income transfer and used to institute a tax system. This not only redirects income towards low income groups who would not otherwise gain from mineral wealth, but also increases government capacity and accountability.

This policy can dramatically reduce poverty, increase state capacity, reduce corruption, and lessen informality in the system by encouraging citizens to register with the government (Segal, 2011, p. 486). The idea of redistributing resources as an unconditional cash transfer to citizens is not unique and has been proposed for specific resource dependant countries such as Nigeria by Sala-i-Martin and Subramanian (2003) and Bolivia (Durán et al., 2007 as cited in Segal, 2011).

A further policy goal is to maintain a certain consistency in spending in the domestic economy. Targeted policies that increase human capital, provide social services for the poor, and redistribute resources more equitably are necessary for all citizens of a nation to benefit from economic growth.<sup>47</sup> Resisting the urge to overspend in times of prosperity and saving a portion of mineral income in a savings fund will decrease the impact of negative shocks to the economy. Policies that transfer a portion of mineral rents across time for precautionary saving can also increase transparency in regards to managing mineral wealth. These policies can assist a country with an extensive mineral base to utilize available mineral rents to significantly alleviate poverty.

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<sup>47</sup> 'Trickle down' policies of the 1980s have been largely discredited as resources are simply concentrated on the minority of the population.

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## **Appendix: Data**

**Ttl Rents (% GDP)** = Total Resource Rents (% of GDP) and has been calculated as total natural resource rents (% of GDP) minus forest rents (% of GDP). This is the sum of mineral rents (% of GDP), oil rents (% of GDP), natural gas rents (% of GDP), and coal rents (% of GDP).

Minerals included in the calculation are tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. Essentially, rent is estimated by the formula;

$\text{Rent} = (\text{Production volume})(\text{International Market Price} - \text{Average Unit Production Cost})$

(Bolt, Matete, & Clemens, 2002, p. 8). Rents are divided by GDP (current US\$). This indicator includes a measure of average rate of return to profit in costs and does not differentiate between rents accruing to foreign extraction firms and those accruing to the host country. Data was accessed on May 14<sup>th</sup>, 2011 from The World Bank, World Development Indicators (WDI) (2011).

**Mining (% GDP)** = Value added, mining and quarrying (constant 2000 US\$) divided by GDP (constant 2000 US\$). Mining and quarrying is a subset of industry (ISIC 10-14) and includes diamonds. Valued added mining and quarrying was accessed on May 14<sup>th</sup>, 2011 from The World Bank, African Development Indicators (ADI) (2010) and GDP (constant 2000 US\$) was accessed on May 27<sup>th</sup>, 2011 from WDI (2011).

**Pov \$1.25 (%) and Pov \$2 (%)** = Poverty headcount ratio at \$1.25 and \$2 a day respectively (PPP at 2005 international prices) (% of population). Data accessed on May 24<sup>th</sup>, 2011 from WDI (2011). 2005 data for Botswana, Chile, Nigeria, and Zambia accessed June 2<sup>nd</sup>, 2011 from The World Bank (2011) Poverty Reduction and Equity, poverty and inequality data estimations for 2005.

**Infant Mort (per 1000)** = Mortality rate, infant (per 1,000 live births). Data accessed on May 25<sup>th</sup>, 2011 from WDI (2011).

**LBWB (%)** = Low-birthweight babies (% of births). Data accessed on May 25<sup>th</sup>, 2011 from WDI (2011).

**GINI** = Gini index. Data accessed on May 24<sup>th</sup>, 2011 from WDI (2011). 2005 data for Botswana, Chile, Nigeria, and Zambia accessed June 2<sup>nd</sup>, 2011 from The World Bank (2011) Poverty Reduction and Equity, poverty and inequality data estimations for 2005.

**Inc H/L** = The ratio of the income share held by the highest 20% of the population to the income share held by the lowest 20% of the population. Data accessed on May 24<sup>th</sup>, 2011 from WDI (2011). 1970 data for Chile is from World Development Report (1978). 1973 data for Bolivia, Botswana, Venezuela, and Zambia is from World Bank (1987) Social Indicators of Development.

**GDP per capita (PPP)** = GDP per capita, PPP (constant 2005 international \$). Data accessed on June 5<sup>th</sup>, 2011 from WDI (2011) from 1980 to 2009. Data from 1960 to 1979 has been calculated by dividing GDP per capita, PPP by GDP per capita (constant 2000 US\$) and extracting the trend. GDP per capita (constant 2000 US\$) is then divided by the constant trend amount. This extends the data on GDP per capita (PPP) from 1960 to 2009.

**Life expectancy at birth, total (years)** = Data accessed on May 25<sup>th</sup>, 2011 from WDI (2011).

**School enrollment, secondary (% gross)** = the ratio of total enrollment (regardless of age) to the population of the official age group that corresponds with secondary education. Data accessed on June 5<sup>th</sup>, 2011 from WDI (2011).

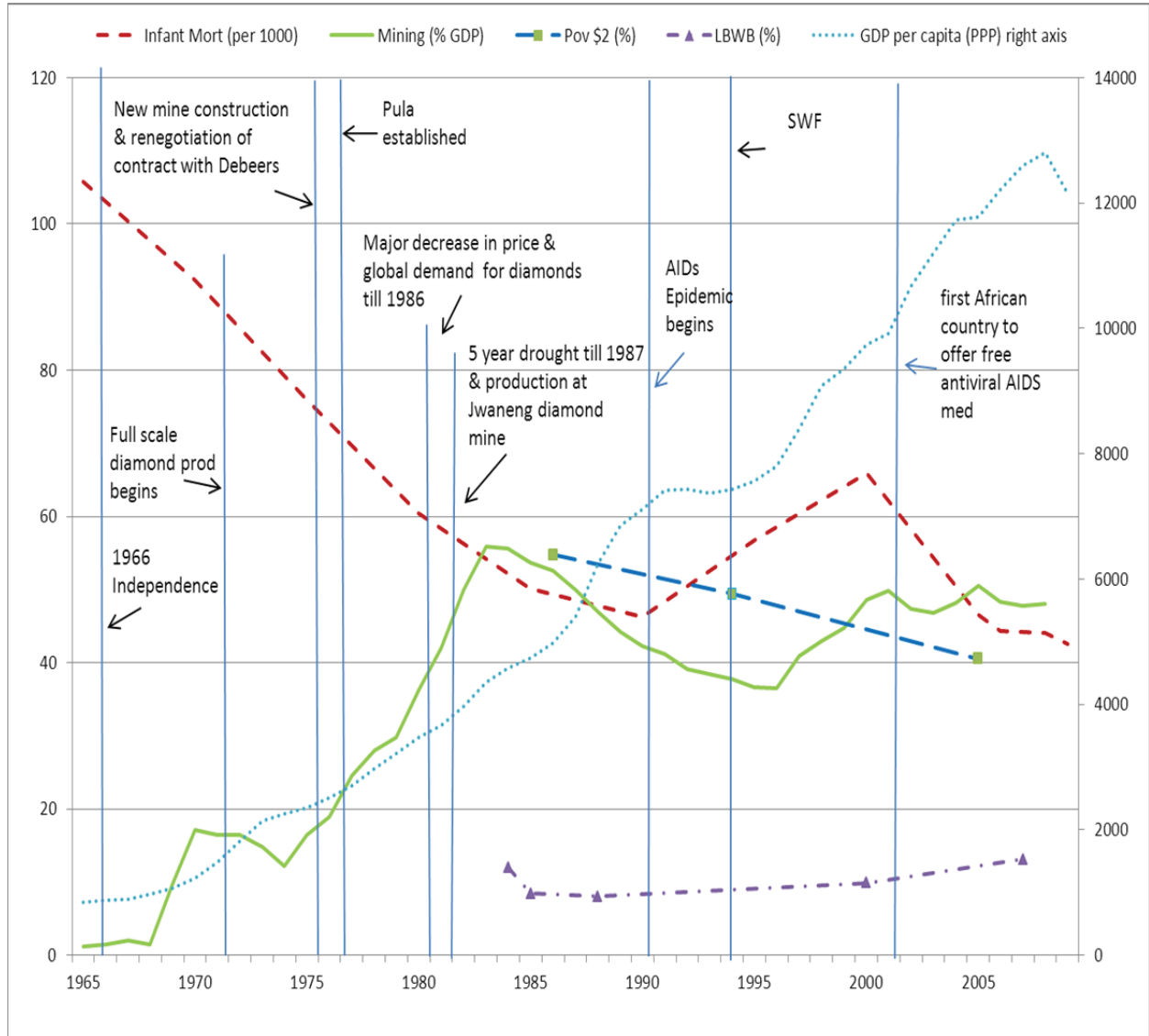
**Manufacturing, value added (% of GDP)** = Manufacturing refers to industries belonging to ISIC divisions 15-37.

**Agriculture, value added (% of GDP)** = Includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production and corresponds to ISIC divisions 1-5.

**Services, etc., value added (% of GDP)** = Services correspond to ISIC divisions 50-99. This includes value added in wholesale and retail trade, transport, and government, financial, professional, and personal services.

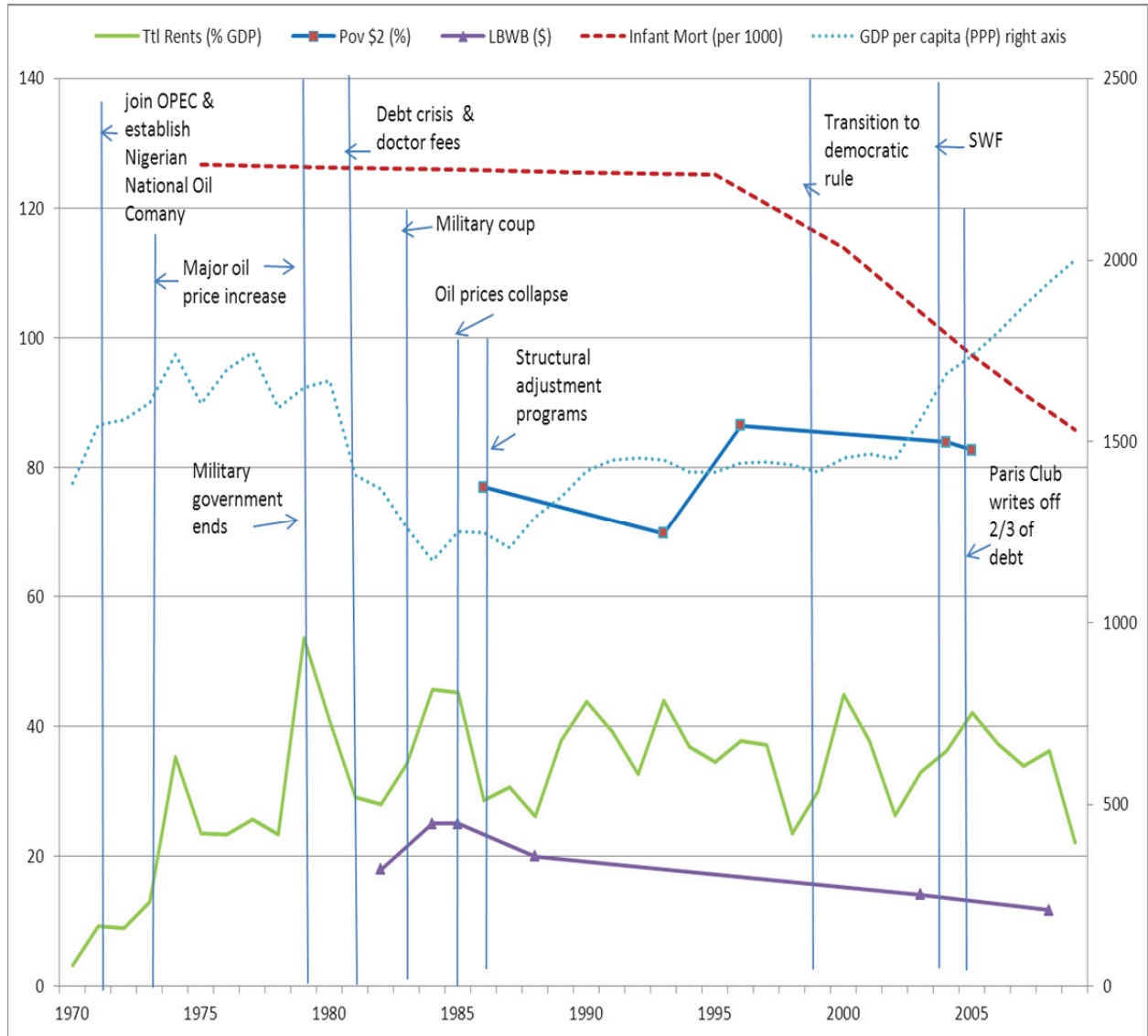
- *Sectoral Value Added as a % of GDP* data for Bolivia, Chile, and Zambia was accessed on June 12<sup>th</sup>, 2011 from the WDI (2011). Data for Botswana is from ADI (2010) and data for Venezuela and Nigeria is from the United Nations Statistical Division (2011) National Accounts Main Aggregates Database and was accessed on June 11<sup>th</sup>, 2011.

Figure 1: Main Indicators, Botswana



Source: See the Appendix: Data

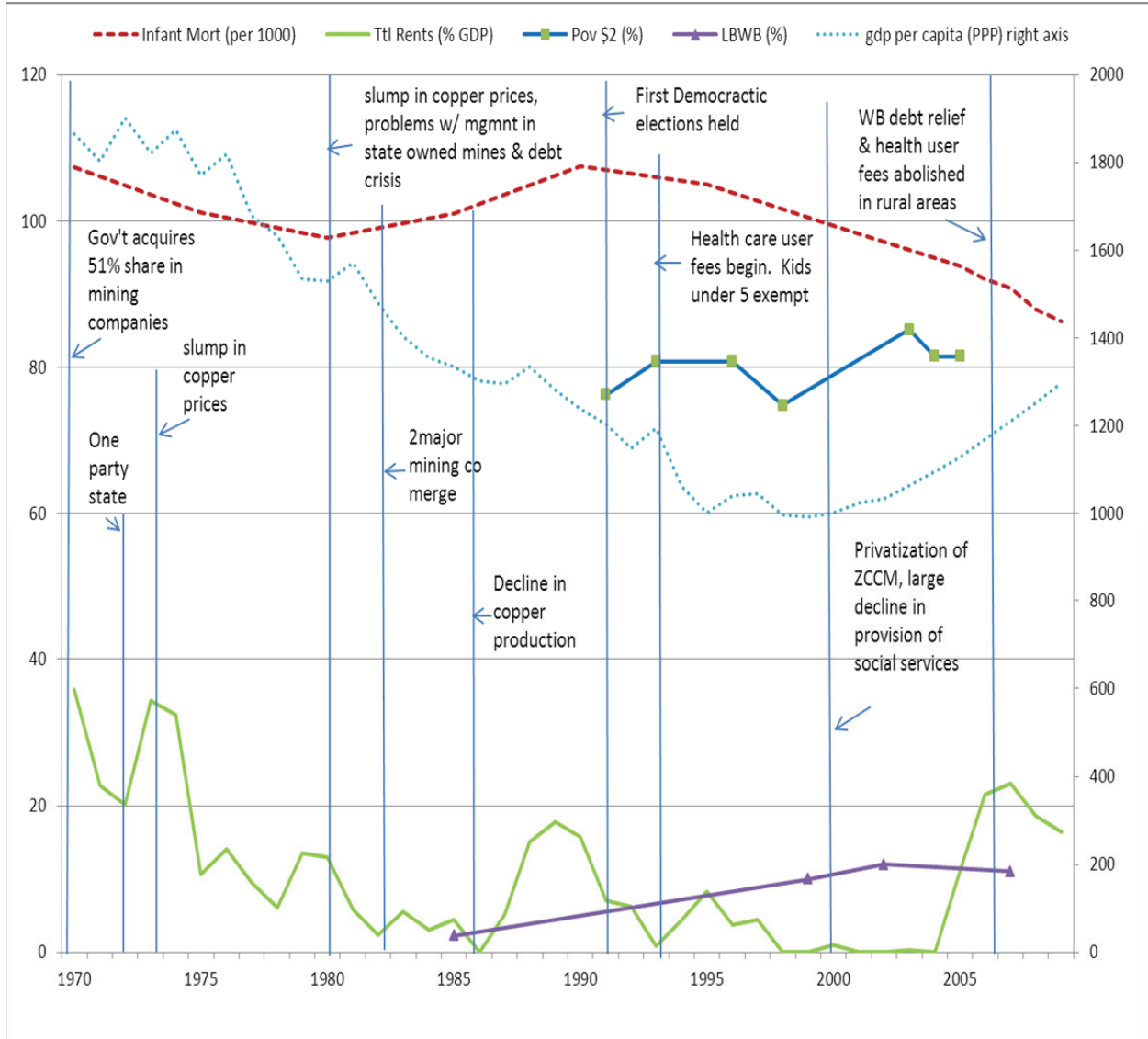
Figure 2: Main Indicators, Nigeria



Sources: See the Appendix: Data

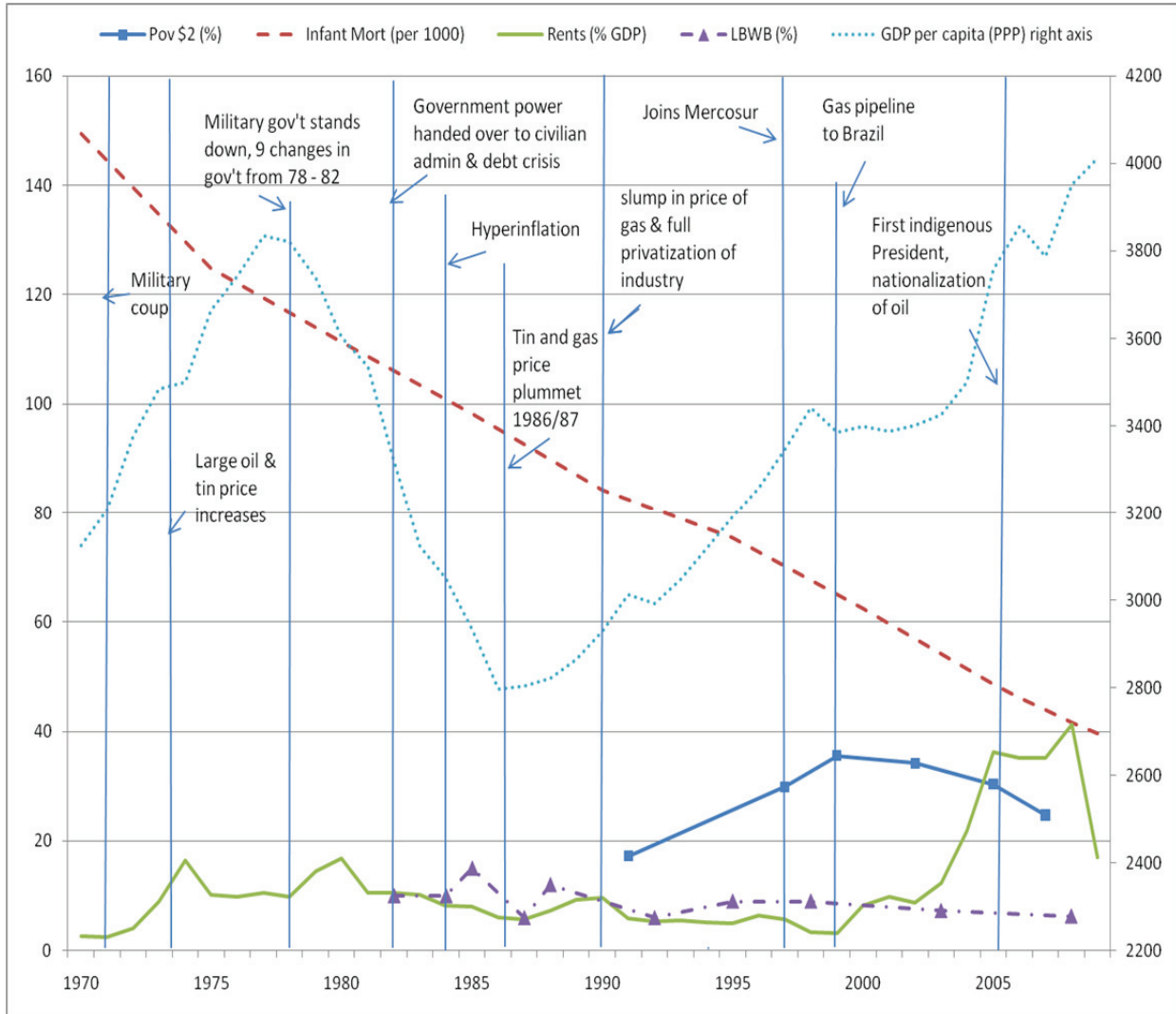


Figure 3: Main Indicators, Zambia



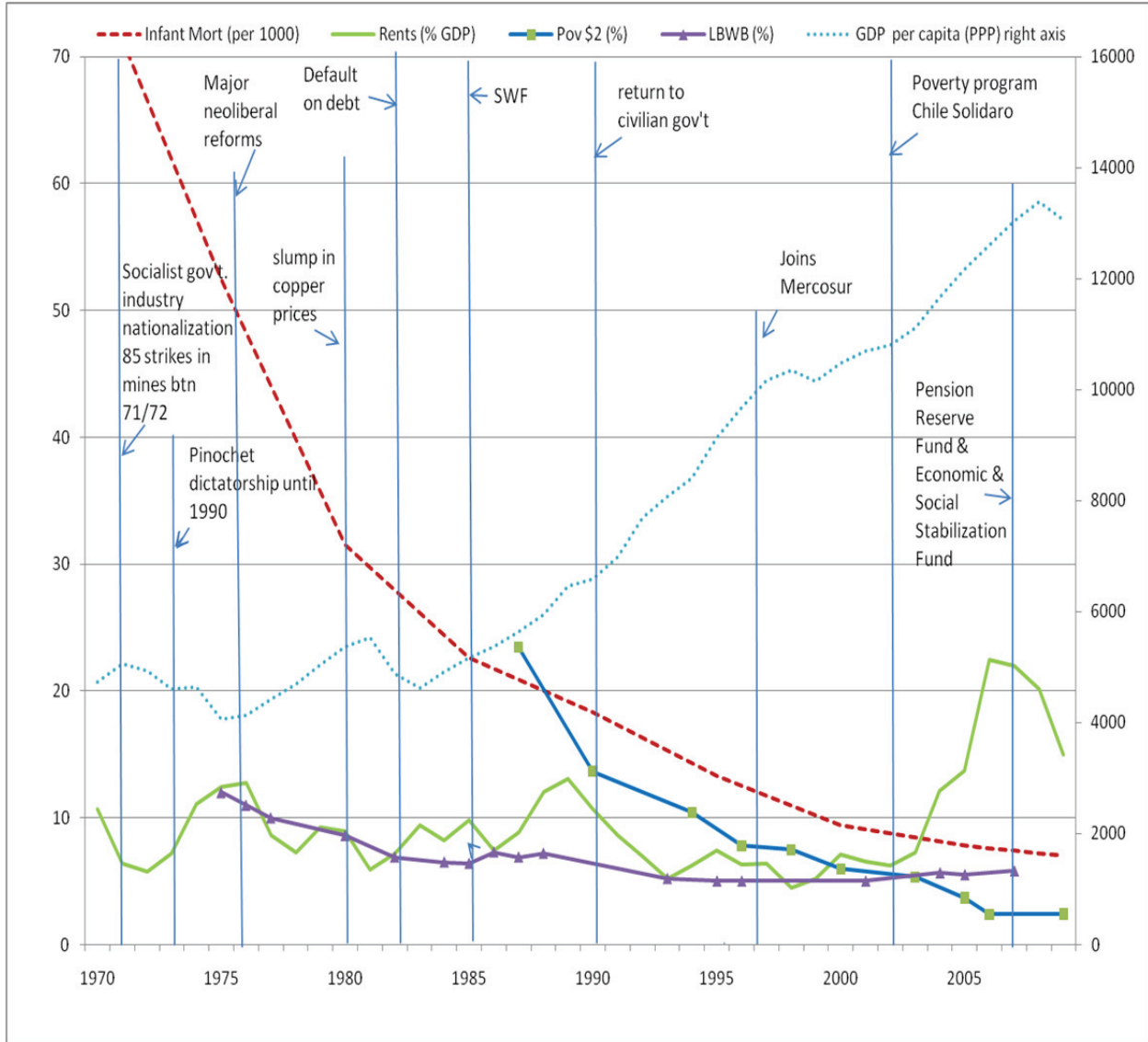
Source: See the Appendix: Data

Figure 4: Main Indicators, Bolivia



Source: See the Appendix: Data

Figure 5: Main Indicators, Chile



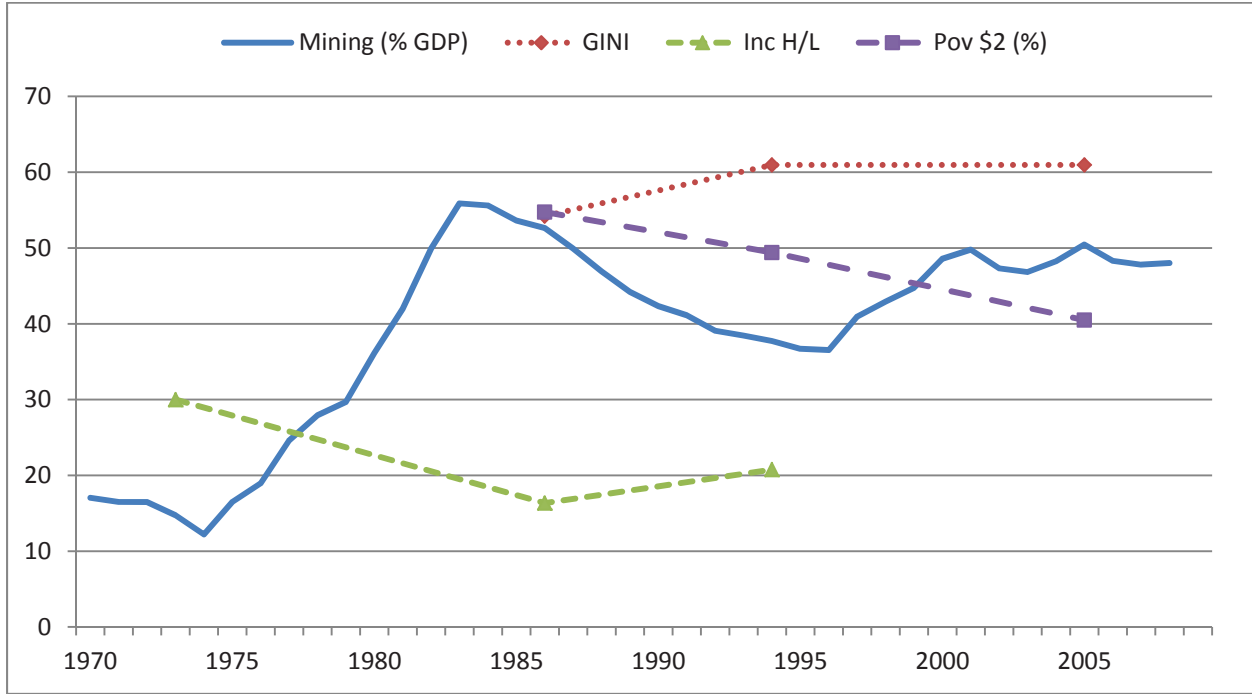
Source: See the Appendix: Data

Figure 6: Main Indicators, Venezuela



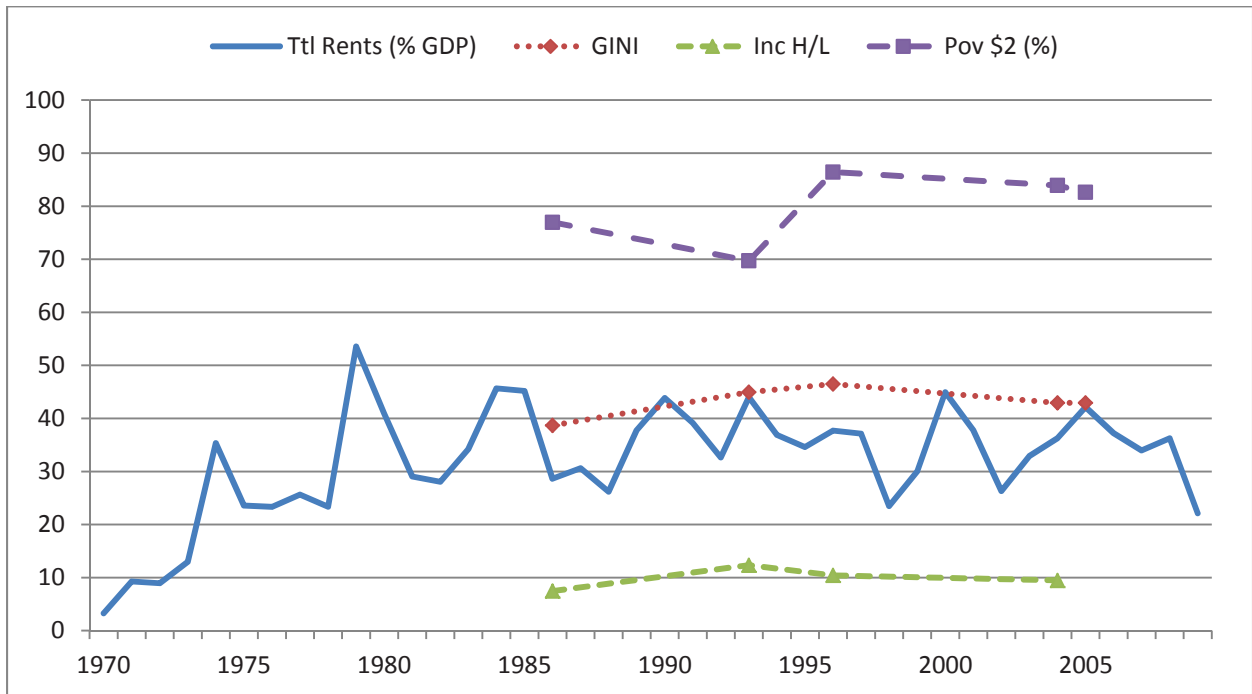
Source: See the Appendix: Data

Figure 7: Inequality Indicators, Botswana



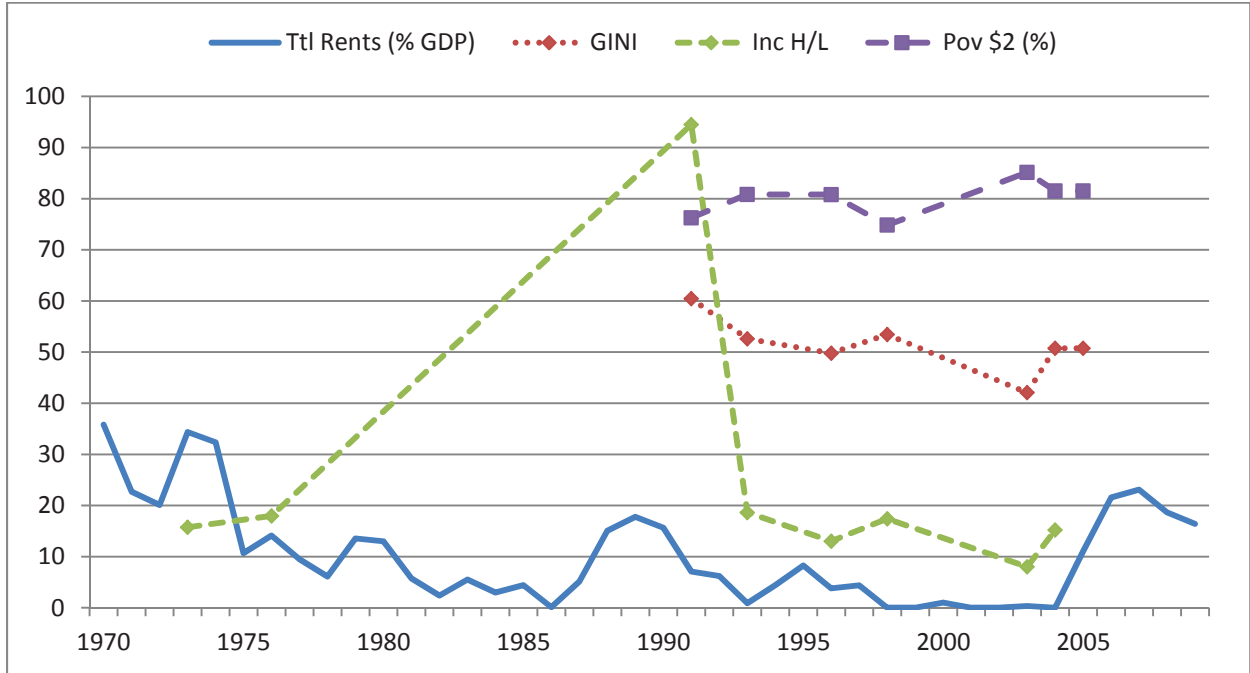
Source: See the Appendix: Data

Figure 8: Inequality Indicators, Nigeria



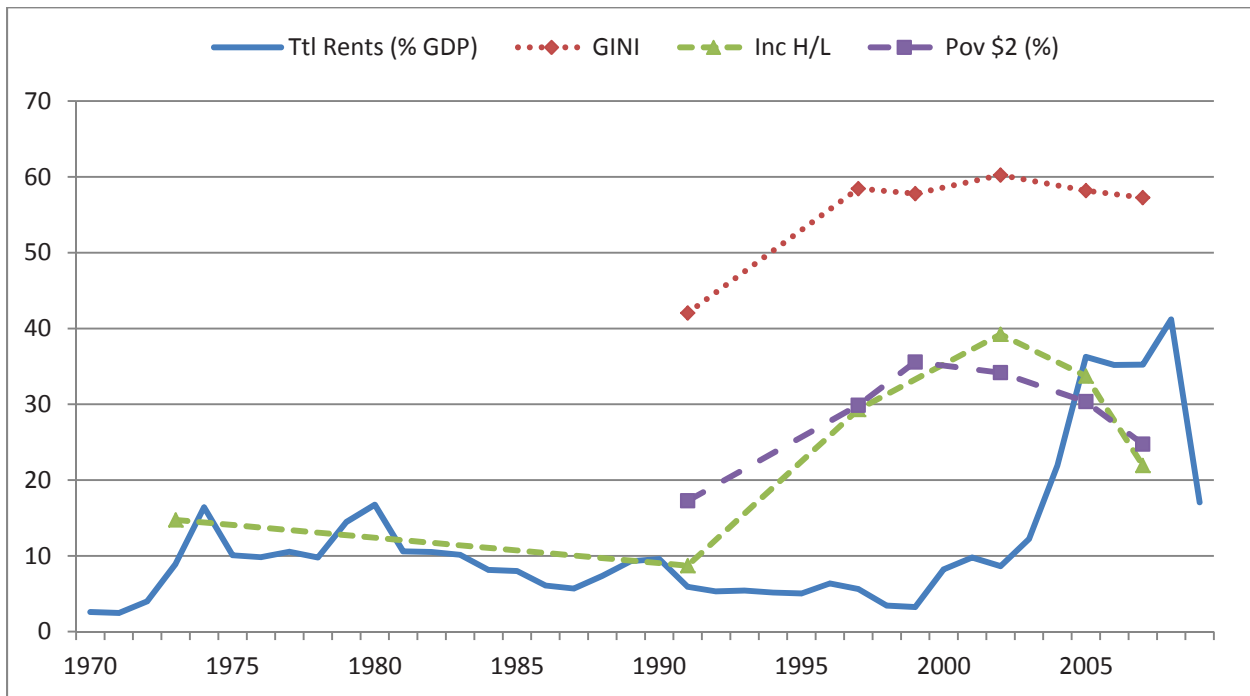
Source: See the Appendix: Data

Figure 9: Inequality Indicators, Zambia



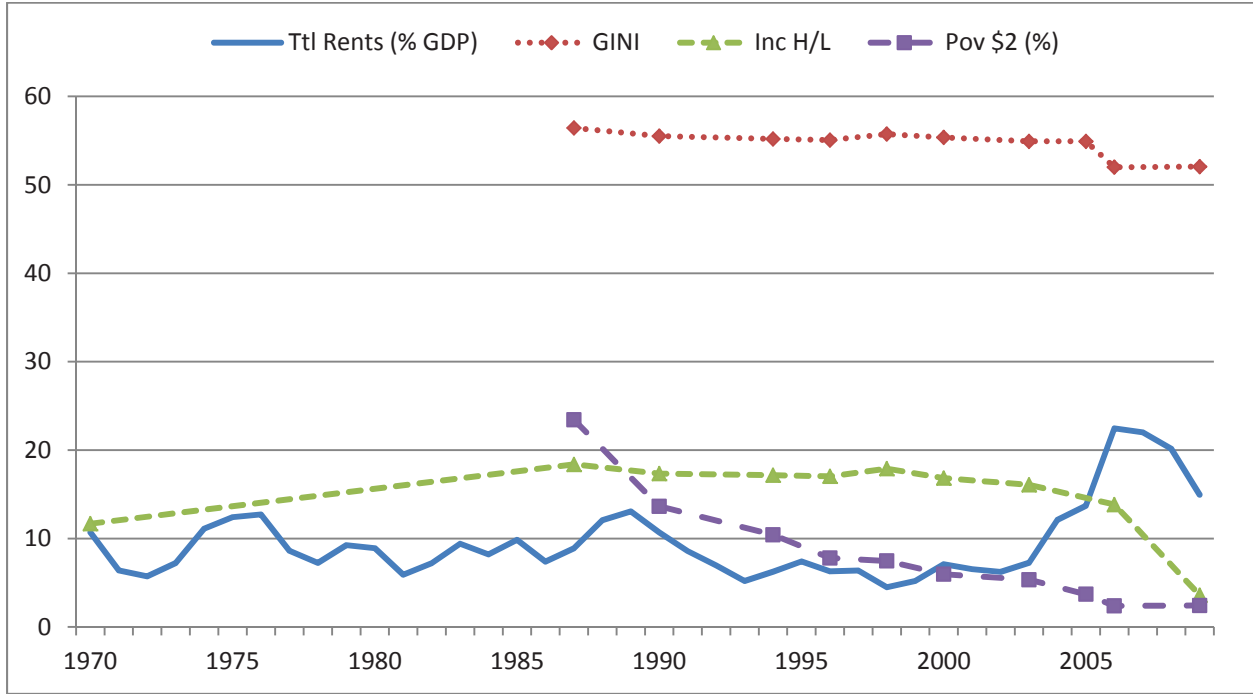
Source: See the Appendix: Data

Figure 10: Inequality Indicators, Bolivia



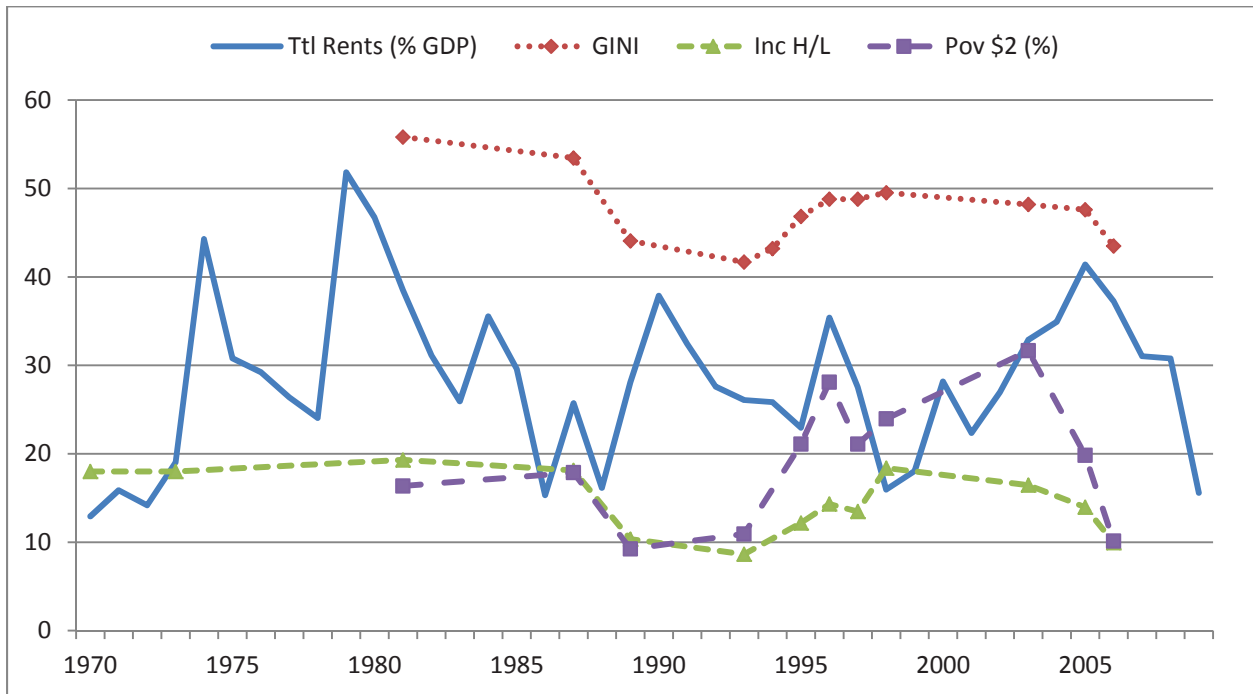
Source: See the Appendix: Data

Figure 11: Inequality Indicators, Chile



Source: See the Appendix: Data

Figure 12: Inequality Indicators, Venezuela



Source: See the Appendix: Data

Table 1: Comparison of Major Indicators for Each Country Beginning and End of Period.

Indicators	Year	BWA	NGA	ZMB	BOL	CHL	VEN
Rents, % of GDP**	1970	17*	3.3	35.8	2.6	10.7	12.9
	2009	48*	22.1	16.4	17.1	15	15.6
Mean	1970-2009	34.9*	31.9	10.4	11.6	9.6	28.3
GDP per capita (PPP)	1970	1,220	1,385	1,865	3,125	4,727	12,463
	2009	12,154	2,001	1,299	4,013	13,057	11,190
Mean growth rate (%)	1970-2009	6.4	1.6	-0.78	0.6	2.7	-0.01
Life Expectancy at birth, total (years)	1970	54.4	40.4	49	46.1	62	65.1
	2009	55	48.1	46.3	66	78.7	73.7
School enrollment, secondary (% gross)	1970	6.3	4.3	13.3	28.2	46.2	35
	2009	81.5	30.5	48.7	81.3	90.4	82.1
Manufacturing, value added (% of GDP)	1970	5.9*	7	11	14.1	25.9	16.1
	2009	2.9*	2.5	9.6	14.4	12.7	15.6
Agriculture, value added (% of GDP)	1970	33*	48.5	11.6	20.8	6.9	6.1
	2009	1.6*	37.2	21.6	13.8	3.3	3.9
Services, value added (% of GDP)	1970	39.4*	28.7	28.6	46.2	51.1	42
	2009	47.3*	28.9	44.3	49.9	54.6	40.4
Infant mortality rate, (per 1000 live births)	1970	92.3	126.7†	107.4	149.5	76.1	48.5
	2009	42.6	85.8	86.3	39.7	7	15.3
Poverty at \$1.25 a day, (PPP, % of population)	Beg	35.6	53.9	62.8	4.03	10.5	6.2
	End	23.5	62.4	64.3	14	0.83	3.46
Poverty at \$2 a day, (PPP, % of population)	Beg	54.7	77	76.3	17.3	23.4	16.4
	End	40.5	82.6	81.5	24.7	2.4	10.1
Low birthweight babies (% of births)	Beg	8.4	18	2.3	10	12	11
	End	13.1	11.7	11	6.3	5.8	8.2
GINI index	Beg	54.2	38.7	60.5	42	56.4	55.8
	End	61	42.9	50.7	57.3	52.1	43.5
Inc H/L	Beg	30	7.5	15.8	14.8	11.7	18
	End	20.8	9.5	15.2	21.9	3.6	10
Unemployment, (% of total labor force)	Beg	25.7	3.9	13	5.8	10.4	5.9
	End	17.6	N/A	12.9	5.2	9.7	7.6
Sources in Data Appendix. * Data ends in 2008. ** Data for BWA is for Mining (% GDP) † Data for 1975.							
Rents, % of GDP: Total resource rents (% of GDP). GINI and poverty rates beginning /end of period are BWA & NGA: 1986/2005, ZMB: 1991/2005, BOL: 1991/2007, CHL: 1987/2009, VEN: 1981/2006. Low birthweight babies data corresponds with							
BWA & ZMB: 1985/2007, NGA & BOL: 1982/2008, CHL 1975/2008, VEN: 1974/2009. Inc H/L: Ratio of the income share held by the highest 20% of the population to the income share held by the lowest 20% of the population and corresponds with BWA: 1973/1994 ,NGA: 1986/2004, ZMB: 1973/2004, BOL: 1973/2007, CHL 1968/2009, VEN: 1970/2006. Unemployment data corresponds with							
BWA 1985/2006, NGA: 1986, ZMB: 1986/2000, BOL, CHL, & VEN: 1980/2009.							



Table 2: Sectoral Value Added as a % of GDP Average Growth Rates and Standard Deviation and Average Poverty Rates

	1971-1979	1980-1989	1990-1999	2000-2009	1970-2009	$\sigma$
Botswana						
Agriculture	-8.42	-10.10	-5.78	-4.94	-7.34	7.9
Manufacture	-1.23	0.83	-0.64	-4.68	-1.35	9.8
Services	-2.58	-0.58	3.76	2.45	0.67	6.2
Pov \$2 (%)	n/a	54.7	49.4	40.5	-14.2	
Nigeria						
Agriculture	-5.27	1.51	1.74	2.47	0.25	14.1
Manufacture	3.14	-2.85	-1	-5.72	-1.73	13.5
Services	-0.08	-1.17	2.12	1.47	0.60	11
Pov \$2 (%)	n/a	77	78	83.3	6.3	
Zambia						
Agriculture	4.65	4.07	5.5	-0.92	3.28	17.8
Manufacture	7.75	5.79	-6.75	-2.15	0.99	14.7
Services	4.17	-2.42	2.77	-1.25	2.42	18.7
Pov \$2 (%)	n/a	n/a	78.2	83.3	5.1	
Bolivia						
Agriculture	-1.16	-0.73	-0.80	-0.80	-0.87	5.9
Manufacture	-0.50	7.38	-1.70	-0.71	1.16	15
Services	0.55	0.29	1.42	-1.15	0.27	3.8
Pov \$2 (%)	n/a	n/a	27.6	29.8	2.2	
Chile						
Agriculture	-5.06	2.33	-2.45	-5.96	-1.03	12.8
Manufacture	-0.94	-0.15	0.26	-3.87	-1.18	10.5
Services	1.18	-0.86	1.34	-0.21	0.34	5.9
Pov \$2 (%)	n/a	23.4	9.8	4	-19.4	
Venezuela						
Agriculture	-2.90	4.26	-3.44	-1.26	-0.78	8.4
Manufacture	-0.18	1.94	-3.88	-1.60	-0.95	13.3
Services	-1.16	1.06	2.93	-2.25	0.18	8.9
Pov \$2 (%)	n/a	14.5	21	20.5	6	
Data sources in Appendix: Data. Averages are expressed as a percentage. Sectoral value added data for BWA ends in 2008. $\sigma$ : the standard deviation of the growth rate of sectoral value added from 1970 to 2009. Pov \$2 (%): Poverty at \$2 a day, (PPP, % of population) and is expressed as the average percentage rate per decade, 1970 to 2009 is expressed as the average percentage point difference from beginning and end of period where data is available.						

Table 3: Approximate Share of Mineral Rent Accruing to the Host Country

	BWA	NGA	ZMB	BOL	CHL	VEN
% of Rent						
1970s	50 to 75	50 to 85	50 to 100	100	100	94
1980s	60 to 80	50 to 80	100	100	< 100	100
1990s	60 to 80	50 to 80	< 100	< 100	< 100	< 100
2000s	60 to 80	50 to 80	37	82*	< 100	82.5
Pov \$2 (%)						
Beg - End	-14.2	5.6	5.2	7.4	-21	-6.3
Pov \$2 (%): Poverty at \$2 a day (PPP, % of population) and is expressed as percentage point difference from beginning to end of period (data in Table 1). Rent percentages are approximate levels. 100 refers to nationalization. * refers to rent from natural gas industry. Sources: See Chapter 3.						

Table 4: Year of Establishment of a Precautionary Saving Fund

	1970 – 1979	1980 – 1989	1990 – 1999	2000 - 2009
Botswana	1972/1973	✓	1994	✓
Pov \$2 (%)	n/a	54.7	49.4	40.5
Nigeria	1974	X	X	2004
Pov \$2 (%)	n/a	77	78	83.3
Zambia	X	X	X	X
Pov \$2 (%)	n/a	n/a	78.2	83.8
Bolivia	X	X	X	X
Pov \$2 (%)	n/a	n/a	27.6	29.8
Chile	X	1985	✓	2006
Pov \$2 (%)	n/a	23.4	9.8	4
Venezuela	1970	X	1998	2003
Pov \$2 (%)	n/a	14.5	21	20.5
✓ Indicates continued savings in the fund. X indicates no savings in the fund and no establishment of fund. Pov \$2 (%): Poverty at \$2 a day (PPP, % of population) and is expressed as the average percentage rate per decade. Source: See Chapter 3.				

Table 5: Comparison of the Standard Deviation of TOT and Variance in Income across Countries

	BWA	NGA	ZMB	BOL	CHL	VEN
$\sigma$ TOT	7.9	18.9	21.2	8.8	10.3	14.9
$\mu$ Y	32	38.9	16.2	9	25.1	31.4
Data source in Appendix: Data. TOT data is from 1980 to 2009 and has been logged and de-trended using the HP filter with the smoothing parameter set to 100. $\mu$ Y is the variance of the growth rate of GDP per capita from 1970 to 2009. Both are expressed in percentages.						

Table 6: Comparison of the Impact of a SWF on the Volatility of Household Consumption

$\sigma$ HHC	BWA	NGA	ZMB	BOL	CHL	VEN
beg – end of period	7	17.4	11.6	3	8.9	8.7
Before SWF	8.9	13.8	n/a	n/a	13.2	8.3
After SWF	3.8	35.8	n/a	n/a	3.3	9.8
Data Source in Appendix: Data. $\sigma$ HHC: the standard deviation of household consumption growth rates and expressed as a percentage.						