

# Extractive Sectors and the Poor

An Oxfam America Report



Cover photo: Porgera Mine in Papua, New Guinea.  
Credit: Steve D'Esposito/Mineral Policy Center

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*(photo opposite page) People living in and near the town of Tambogrande, Peru, are confronted with a proposal from a Canadian mining company to exploit a polymetallic deposit directly beneath their town. Roughly half the citizens of the town would have to be relocated, and there is widespread resistance to the proposal in the town and surrounding agricultural areas. (credit: Ernesto Cabellos/Guarango Cine y Video)*

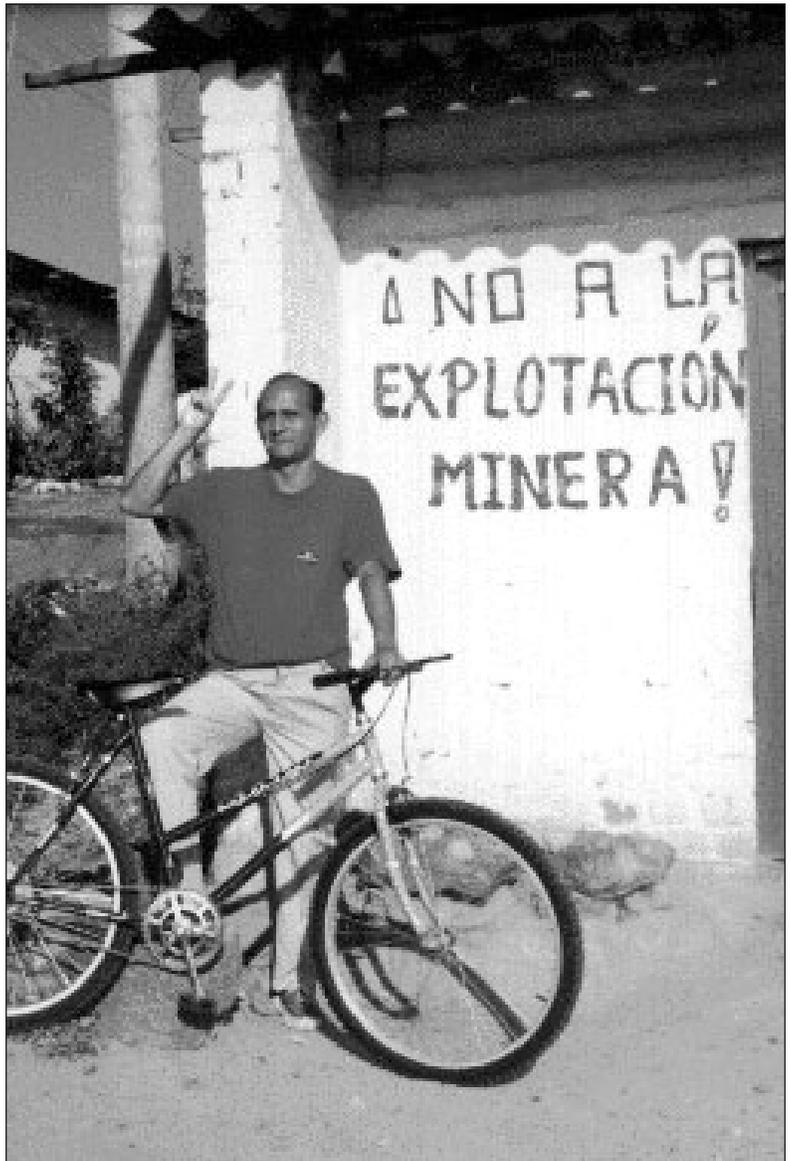
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by

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# Foreword

**A**s debates continue about the impacts of globalization on developing countries, perhaps no issue has become more controversial than the role of the oil, gas, and mining sectors in these countries. High profile human rights cases involving transnational oil companies in Nigeria, Sudan, and Burma have raised questions about the proper roles and responsibilities of companies in such situations. Environmental disasters in Ecuador, Peru, Indonesia, and elsewhere have highlighted the negative impacts oil, gas, and mining can have in environmentally and socially fragile areas.

With this increase in the environmental and social impact of resource extraction, economists and activists in both the North and South are challenging economic models that base development on the extraction of non-renewable natural resources. They point to the fact that many countries in the developing world possess tremendous oil and mineral wealth yet continue to suffer from crushing poverty. For a variety of reasons, these countries simply have not converted their resource wealth into real improvements in the lives of the majority of their citizens. Despite these failures and the challenges made to the “extractive paradigm,” national governments and international financial institutions such as the World Bank continue to promote these industries for poverty reduction purposes.

As an organization dedicated to combating poverty in the developing world, Oxfam America is particularly concerned about the effects of oil, gas, and mining on impoverished communities. Through the work of our partner organizations around the world, and particu-

larly in the southern Andean region of South America, Oxfam America sees local communities struggling to defend their rights against encroachment by large-scale resource extraction while experiencing few of the benefits.

The linkages between oil, gas, and mineral extraction and poverty are the focus of this special report commissioned by Oxfam America. In the report, political scientist Michael Ross of the University of California at Los Angeles finds strong direct and indirect linkages between developing countries’ dependence on oil, gas, and mining and their poor performance on key poverty-related indicators. Professor Ross then suggests possible reasons for these correlations and offers a set of recommendations for making the extractive sectors better benefit the interests of the poor.

We hope that the analysis and recommendations presented here will provide an important catalyst for rethinking the role of minerals extraction as a tool for poverty reduction and economic development in developing countries. We recognize, however, that this analysis and these recommendations can only be a starting point. Enabling poor countries to break away from their dependence on oil and minerals will require a commitment from everyone — governments, corporations, financial institutions, and civil society in the global North and South — to creative thinking about alternatives and to creating a more just and sustainable global economic system.

Keith Slack, Policy Advisor  
Oxfam America, Washington, DC  
October 2001

## Executive Summary

**T**his paper examines how states that rely on oil and mineral exports address the concerns of the poor. Its central finding is that oil and mineral dependence are strongly associated with unusually bad conditions for the poor. To explain this link, it draws on both original econometric analyses, and recent academic studies. Some of its key findings are:

- Overall living standards in oil and mineral dependent states are exceptionally low — lower than they should be given their per capita incomes;
- Higher levels of mineral dependence are strongly correlated with higher poverty rates;
- Oil and mineral dependent states tend to suffer from exceptionally high rates of child mortality.
- Oil dependence (though not mineral dependence) is also associated with high rates of child malnutrition; low spending levels on health care; low enrollment rates in primary and secondary schools; and low rates of adult literacy;
- Mineral dependence is strongly correlated with income inequality;
- Both oil and mineral dependent states are exceptionally vulnerable to economic shocks.

A set of problems like this might normally lead to calls for government action. But we also find that oil and mineral dependence has a harmful effect on governments themselves. Oil and mineral dependent states tend to suffer from unusually high rates of:

- Corruption;
- Authoritarian government;
- Government ineffectiveness;
- Military spending;
- Civil war.

To address these problems, Oxfam calls for:

- Oil and mineral dependent states to diversify their economies; and for the World Bank Group and the OECD states to take measures to help this process;
- Full disclosure of all financial transactions between extractive firms and host governments;
- International funders to only offer extractive sector assistance to states that have become democratic, and have demonstrated a commitment to fighting poverty;
- International funders to only support projects in which the host government specifies in advance how the resource revenues are to be used to alleviate poverty, and agrees to independent monitoring to ensure that this occurs.



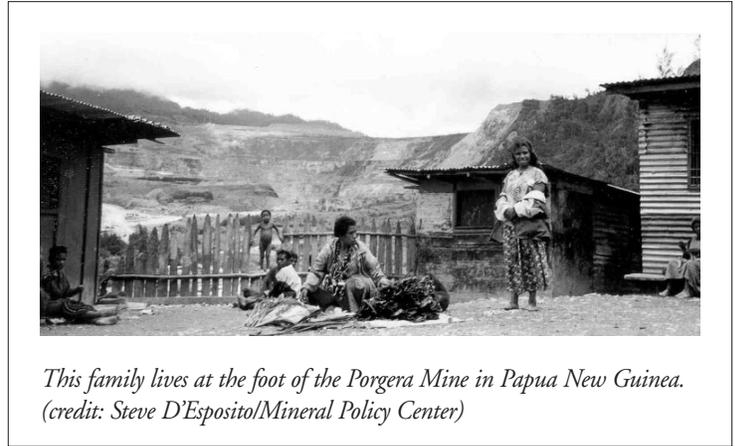
*Marketplace in La Oroya, Peru. The smelter for the Doe Run mine is directly behind the town. It is estimated that the La Oroya operation emits 17 times as much sulfur and 100 times as much lead as the entire copper industry in the U.S., and 17 times the amount of lead in a Doe Run operation in Missouri. (credit: Keith Slack/Oxfam America)*

# Introduction

In the 1940s, 1950s, and 1960s, many economists believed that developing states could prosper by extracting and exporting their oil and mineral wealth. Fifty years of development experience has refuted this belief. States that depend on oil and mineral exports are among the most troubled states in the world today: they suffer from exceptionally slow rates of economic growth; their governments tend to be weak and undemocratic; and they more frequently suffer from civil wars than resource-poor states. These ailments — along with pressure from environmental, human rights, and pro-poor groups — are prompting the World Bank and other international financial institutions (IFIs) to review their policies towards the exploitation of oil and minerals.

This paper examines how states that rely on oil and mineral exports address the concerns of the poor. It shows that these states have a significantly worse record of alleviating poverty than states with similar levels of income but little or no oil and mineral wealth. Oil and mineral exports do not simply fail to alleviate poverty; they appear to make it worse.

To understand why this occurs, we must recognize that not all forms of economic activity are equally good at promoting development. States that develop their oil, gas, and minerals sectors embark on a different development path than those that develop their agricultural, manufacturing, or service sectors. Extractive sectors tend to be capital-intensive, and use little unskilled or semi-skilled labor; they are geographically concentrated, and create small pockets of wealth that typically fail to spread; they produce social and environmental problems that fall heavily on the poor; they follow a boom-and-bust cycle that creates insecurity for the poor; and they are generally run by the state, or



by large corporations, in ways that lead to high rates of corruption, repression, and conflict.

When it comes to the oil and mineral sectors, the policies of IFIs — particularly the World Bank Group — are out of date. The World Bank supports investments in extractive sectors because they generate high rates of return, and boost both exports and government revenues in the host country. Yet the World Bank is measuring the wrong things. We acknowledge that extractive industries are highly profitable — for oil and mining firms, for well-placed politicians and bureaucrats, and for the World Bank itself. Indeed, loans to the oil and mineral sectors are the most profitable loans in the World Bank's portfolio. But they have been disastrous for the poor, as we explain in this report. If the IFIs are committed to alleviating poverty — as they claim — they must change their stance towards extractive industries.

This report begins by reviewing the original basis for the belief that states could promote economic development by exporting fossil fuels and minerals. The second section presents econometric evidence that extractive industries tend to harm the poor. The third section explains why this occurs, and the final section discusses what should be done. A statistical appendix explains our analytic methods and findings in greater detail.

# 1. Early Approaches to Extractive Industries

**F**rom the 1940s to the 1960s, several prominent economic theories suggested that the “backwards” states of Asia, Africa, and Latin America could prosper by exploiting their oil and mineral industries. The developing states were thought to suffer from imbalances in the factors of production: most had surpluses of labor but shortages of investable capital. Most development economists believed that the key dilemma facing these impoverished states was attracting foreign capital.

According to the “staple” theory of growth, states with abundant oil and mineral resources could overcome their capital shortages by attracting foreign firms to exploit their natural resources. Once an extractive industry had

begun, the profits from the extractive sector would help build local infrastructure; eventually, these profits would be re-invested in industries that would process and add value to the oil or minerals before they were exported. Soon resource-rich states would be exporting aluminum cookware instead of aluminum ores, and plastic resins instead of crude oil. The end result would be a diversified pattern of growth.<sup>1</sup>

Similarly, the “big push” theory of economic development suggested that poor states remained poor because they were caught in low-income “equilibrium traps.” To escape, they needed a large expansion in demand — a sustained “big push” — that could encourage private firms to invest in industrialization. A boom in oil and mineral exports could provide this push and lead to a self-sustaining pattern of growth.<sup>2</sup>



*After metals are chemically extracted from ore that has been mined, the resulting wastes are called “tailings.” These tailings in the department of Junin, Peru, are a threat to nearby water sources and other pasture lands. (credit: Chris Hufstader/Oxfam America)*

## 2. Extractive Industries, Development and the Poor

**M**any economists once believed that oil, gas, and mineral exports would bring about high growth rates. But were they right?

Today most of the world's mineral-dependent states are concentrated in sub-Saharan Africa [Table 1]; most oil-dependent states are in the

Middle East and Africa [Table 2]. An initial inspection of these countries suggests they are not performing well: twelve of the world's 25 most mineral-dependent states, and six of the world's 25 most oil-dependent states, are classified by the World Bank as "highly-indebted poor countries" — the most troubled category of states.

Is resource dependence associated with poverty — and if so, how strongly? To answer

**Table 1: Mineral Dependent States and HDI Rankings, 1995**

State	Minerals Dependence	HDI Rank
1. Botswana	35.1	122
2. Sierra Leone*	28.9	174
3. Zambia*	26.1	153
4. United Arab Emirates	18.2	45
5. Mauritania*	18.4	147
6. Bahrain	16.4	41
7. Papua New Guinea	14.1	133
8. Liberia*	12.5	127
9. Niger*	12.2	173
10. Chile	11.9	38
11. Guinea*	11.8	162
12. Congo, Dem. Rep.*	7.0	152
13. Jordan	6.3	92
14. Bolivia*	5.8	114
15. Togo*	5.1	145
16. Central African Republic*	4.8	166
17. Peru	4.7	80
18. Ghana*	4.6	129
19. Bulgaria	4.0	60
20. Angola*	3.6	160
21. Zimbabwe	3.4	130
22. Iceland	3.1	5
23. Kazakhstan	2.6	73
24. Norway	2.5	2
25. Australia	2.4	4

\*Highly Indebted Poor Country

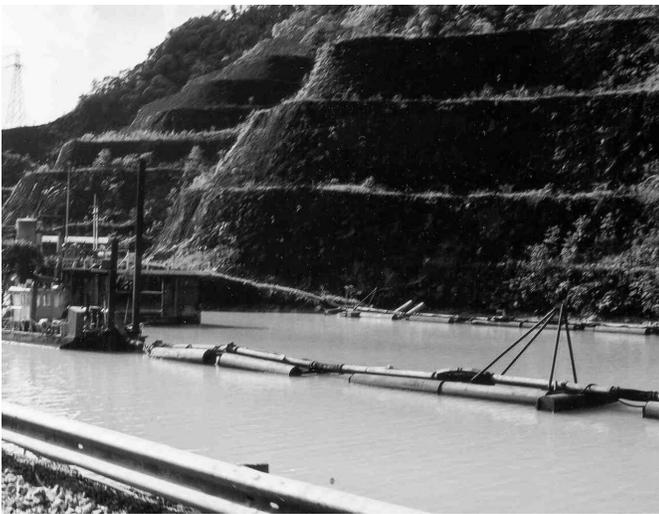
Mineral Dependence is the ratio of non-fuel mineral exports to GDP. HDI rank is a state's rating in the UNDP's Human Development Index, which ranks states according to a combined measure of income, health, and education; rankings range from 1 (highest level of human development) to 174 (lowest). A more detailed description of these measures is found in the appendix.

**Table 2: Oil Dependent States and HDI Rankings, 1995**

State	Oil Dependence	HDI Rank
1. Angola*	68.5	160
2. Kuwait	49.1	36
3. United Arab Emirates	46.3	45
4. Yemen*	46.2	148
5. Bahrain	45.7	41
6. Congo (Brazzaville)*	40.9	139
7. Nigeria	39.9	151
8. Oman	39.5	86
9. Gabon	36.1	123
10. Saudi Arabia	34.3	75
11. Qatar	33.9	42
12. Algeria	23.5	107
13. Papua New Guinea	21.9	133
14. Libya	19.8	72
15. Iraq	19.4	126
16. Venezuela	18.3	65
17. Norway	13.5	2
18. Syrian Arab Republic	13.5	111
19. Ecuador	8.6	91
20. Bhutan	6.8	142
21. Cameroon*	6.0	134
22. Malaysia	5.8	61
23. Indonesia	5.7	109
24. Vietnam*	4.9	108
25. Côte d'Ivoire*	3.5	154

\*Highly-Indebted Poor Countries

Oil Dependence is the ratio of oil, gas, and coal exports to GDP. HDI rank is a state's rating in the UNDP's Human Development Index, which ranks states according to a combined measure of income, health, and education; rankings range from 1 (highest level of human development) to 174 (lowest). A more detailed description of these measures is found in the appendix.



OK Tedi Mine in Papua, New Guinea. (credit: Steve D'Esposito/Mineral Policy Center)

this question, we examine whether a state's mineral and oil dependence is correlated with the condition of the poor. By "mineral and oil dependence," we mean the ratio of a country's mineral exports, and its oil and gas exports, to its gross domestic product (GDP).<sup>3</sup> To assess the condition of the poor we use several measures. Our preferred indicator is the Human Development Index (HDI), a measure developed by the United Nations Development Program that combines data on a country's per capita income with data on health and education. The HDI is available for 174 countries, making it the most comprehensive measure of living standards available. We also look at the correlation between a country's oil and mineral dependence and the fraction of its population living below the poverty line. This latter measure is only available for 51 countries, however, making it less reliable than HDI as an indicator.

In our assessments we also take into account — that is, we statistically control for — the effects of per capita income. It is no surprise that countries that are mineral-dependent and rich (like Australia) have less poverty than states that are mineral-dependent and poor (like Zambia). What we wish to examine is whether states

with similar levels of income, but different levels of oil or mineral dependence, do better or worse in addressing the needs of the poor.<sup>4</sup>

Our analysis finds a strong negative correlation between a country's level of mineral dependence and its HDI ranking: the more that states rely on exporting minerals, the *worse* their standard of living is likely to be.<sup>5</sup> For every 5 points that a country gains in our measure of minerals dependence, it tends to drop 3.1 points in the HDI rankings. Moreover, over the course of the 1990s, the mineral-dependent states lost ground: the greater a country's level of mineral dependence, the larger the amount it tended to fall in the HDI rankings between 1990 and 1998. Mineral-dependent states like Zambia, Zimbabwe, and Kazakhstan were among those who lost the most ground.<sup>6</sup>

The effect in oil states is somewhat ambiguous: when we control for per capita income, oil wealth has a harmful effect on the standard of living; when we do not, we detect no correlation.<sup>7</sup>

When we use our alternative measure — the fraction of the population living below the poverty line — these results are largely confirmed. There is a strong *positive* correlation between mineral dependence and the fraction of the population living in poverty: the greater the level of mineral dependence, the greater the poverty. There is, however, a somewhat weaker *negative* correlation between oil dependence and the fraction of the population below the poverty line: a higher level of oil dependence is associated with less poverty. Since data on this measure is available for just 51 states, we believe these findings are less reliable than those using the HDI index.

We conclude that mineral dependence is strongly linked to lower standards of living and increased poverty rates. Oil dependence is not directly linked to poverty; as we show below, however, oil dependence is indirectly linked to the condition of the poor through health care and education.

### 3. Explaining the Link Between Extractive Sectors and Poverty

**W**hy do countries with large extractive industries do so badly in addressing the needs of the poor? To answer this question, we must look at the factors that influence poverty rates in the developing world, and see how they are affected by oil and mineral wealth.

According to the World Bank's *World Development Report 2000/2001*, to alleviate poverty countries must address at least seven challenges:

- they must foster economic growth<sup>8</sup>;
- they must foster the right type of economic growth — growth that produces opportunities for the poor<sup>9</sup>;
- they must invest in their children by improving health care, nutrition and education<sup>10</sup>;
- they must reduce levels of income inequality<sup>11</sup>;
- they must reduce the vulnerability of the poor to economic shocks, including terms of trade shocks<sup>12</sup>;
- they must promote government accountability and responsiveness<sup>13</sup>;
- they must curtail the danger of civil war.<sup>14</sup>

In each of these seven areas, the development of oil, gas, and mineral industries tends to have a *harmful* effect.

#### Rate of Economic Growth

According to both the *World Development Report 2000-2001*, and a recent World Bank study, “growth is good for the poor.”<sup>15</sup> In other words, policies that lead to economic growth also tend to reduce poverty. Yet academic studies consistently show that higher levels of oil and mineral dependence tend to reduce a country's overall rate of growth — even after controlling for other factors that influence

economic performance, including investment rates, initial per capita income, trade policy, and government efficiency.<sup>16</sup>

There may be several reasons why this occurs, although economists have not reached a consensus. It may be due to the long-term decline in the terms of trade for oil and minerals; it may be caused by the boom-and-bust nature of extractive industries, which leads to economic instability and may foil long-term planning; it may be linked to the high levels of corruption typically found in resource-rich states; and it may be caused by an economic ailment known as the “Dutch Disease,” which can hurt the agricultural and industrial sectors of oil and minerals exporters.<sup>17</sup>

Whatever the mechanism, there is strong evidence that oil and mineral dependence tend to reduce economic growth even after all the other factors that influence economic performance have been taken into account. If growth is good for the poor, oil and minerals exports are bad for growth — and hence, bad for the poor.

#### Type of Economic Growth

The *World Development Report 2000-2001* notes that when it comes to the question of poverty, the quality of economic growth matters as much as the quantity. Economic growth can be pro-poor if it provides jobs that are accessible to the poor, who are generally unskilled or semi-skilled. Moreover, growth can lead to declining income inequality if it is “concentrated in sectors from which poor people are more likely to derive their income, such as agriculture.”<sup>18</sup>

Extractive industries tend to rely on a small number of highly-skilled workers. In many cases these workers are expatriates from more developed states. They often live and work in enclaves that separate them from the local economy. In

extreme cases, such as offshore oil rigs, jobs may be filled by foreign workers who never set foot on the soil of the country that owns the resource.

In theory, extractive industries can provide benefits to locals if they spur the development of related, non-extractive industries. One way this could occur is if oil or minerals extraction promotes the development of “upstream” industries — that is, industries that supply goods to the extractive sector. Another is through the development of “downstream” industries, which process and add value to the products of the extractive sector.<sup>19</sup> A third way is if the government uses revenues from oil and minerals exports to promote other, unrelated sectors of the economy.

In practice these linkages tend to be weak.<sup>20</sup> There are several reasons why. One is that the advanced industrialized states place higher tariffs on processed goods than on raw materials to

protect their own manufacturing firms against competition from developing states. In fact, the OECD states place no tariffs at all on the import of many unprocessed oil and minerals, including crude oil, copper, tin, zinc, aluminum, lead, and nickel. Yet if oil and mineral-rich countries wish to add value to these raw materials and export them in refined or processed form — such as plastic resins, copper wire, or aluminum kitchenware — they quickly run into both tariffs and non-tariff barriers [Table 3].

A second reason is an affliction called the “Dutch Disease.” When states undergo resource booms, their currency tends to appreciate; at the same time, the resource sector tends to draw labor and capital away from other sectors of the economy. These effects can reduce the international competitiveness of the country’s agricultural and industrial exports, making it harder

**Table 3: Mean OECD Tariffs on Processed and Unprocessed Extractive Products**

Product	Description	Tariff
<b>Copper</b>	Copper ores and concentrates	0.00
	• Wire of refined copper, if maximum cross sectional dimension exceeds 6 mm	4.06
	• Tubes and pipes of refined copper	4.12
	• Cooking or heating apparatus used for domestic purposes	3.98
<b>Aluminum</b>	Aluminum ores and concentrates	0.00
	• Unwrought Aluminum (not alloyed)	4.10
	• Wire of aluminum, if maximum cross section exceeds 7 mm	6.13
	• Table or kitchenware of aluminum	5.83
<b>Lead</b>	Lead ores and concentrates	0.00
	• Refined lead	1.88
	• Lead tubes, pipes and fittings	3.90
<b>Nickel</b>	Nickel ores and concentrates	0.00
	• Nickel bars, rods and profiles (not alloyed)	0.33
	• Tubes and pipes of nickel (not alloyed)	0.31
	• Cloth, grill and netting of nickel wire	0.77
<b>Tin</b>	Tin ores and concentrates	0.00
	• Tin rods, bars, profiles and wire	0.36
	• Tin tubes, pipes and fittings	0.40
<b>Zinc</b>	Zinc ores and concentrates	0.00
	• Refined zinc (Containing by weight 99.99 percent or more of zinc)	1.80
	• Zinc bars, rods, profiles and wire	3.84
	• Zinc tubes, pipes and pipe fittings	3.92
<b>Petroleum</b>	Petroleum oils; crude	0.00
	• Petroleum resins, coumarone, indene or coumarone-indene resins and polyterpenes	7.00
	• Woven fabrics made from high tenacity yarn of nylon or other polyamides or of polyesters	8.47
	• Polyethylene (used for grocery bags, shampoo bottles, children’s toys, etc.)	6.87
	• Polymers of vinyl chloride (PVC plastic)	7.52
	• Polycarbonates (used for light fittings, kitchenware, and CD’s)	7.84

Source: UNCTAD-TRAINS database (United Nations Conference on Trade and Development Trade Analysis and Information System); available at <http://www.unctad.org/trains/index.htm>. Consulted June 1, 2001.

for the country to diversify its exports and generate pro-poor forms of growth.<sup>21</sup>

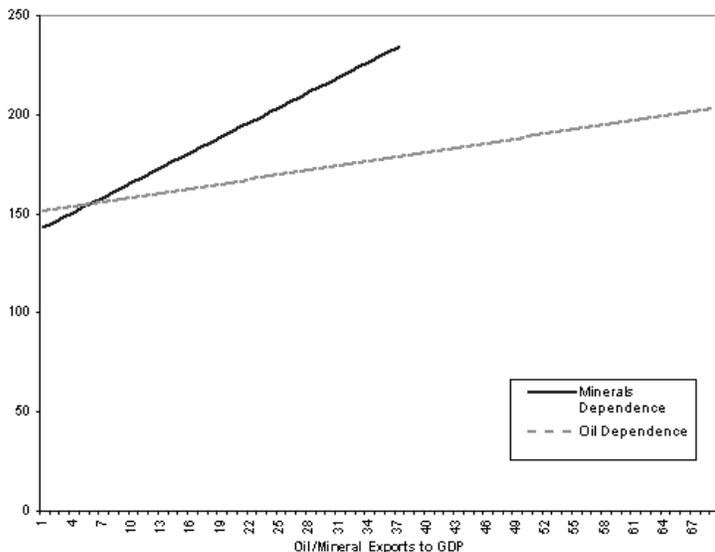
The net result is that once states become dependent on oil or minerals exports they have difficulty diversifying their economy, and promoting sectors like agriculture and manufacturing, which provide greater direct benefits to the poor. Oil and mineral dependence becomes an obstacle to pro-poor types of economic activity.

## Child Welfare

To reduce poverty, countries must improve the condition of children, through programs to promote health care, nutrition, and education. States that rely on oil and minerals exports tend to do worse on these accounts.

There are several ways to measure the quality of health care for children. One is to look at the mortality rate for infants and small children; another is to consider the average life expectancy at birth. On both measures, countries that rely on oil and mineral exports do worse than other states at the same income levels. For each increase in minerals dependence of 5 points, the mortality rate for children under the age of five tends to rise by 12.7 per thousand; for each 5 point increase in oil dependence, the under-five mortality rate rises by 3.8 per thousand [Figure 1].

**Figure 1: Impact of Oil and Mineral Dependence on Infant and Child Mortality (deaths per thousand)**

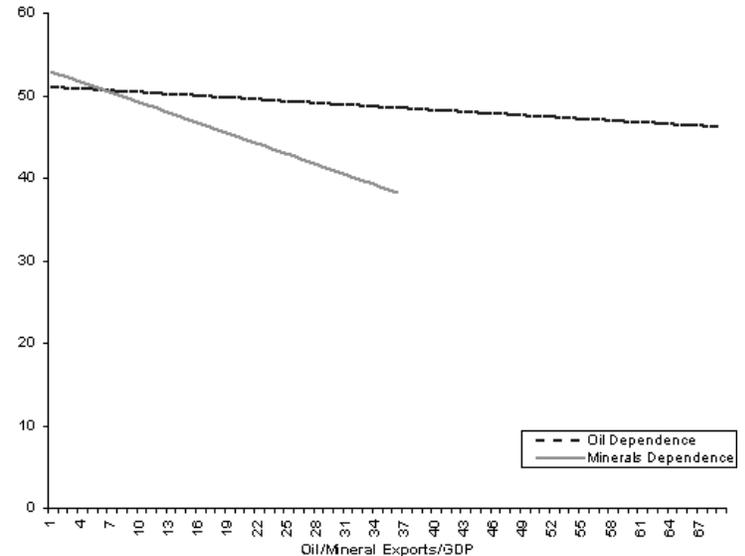


The results are similar if we look at life expectancy. Even after accounting for differences in per capita income, a 5 point rise in minerals dependence is linked to a drop in life expectancy of 2.1 years [Figure 2]. The association between oil exports and life expectancy is somewhat weaker: still, it implies that a 5 point rise in oil dependency is connected to a drop in life expectancy of one-third of a year.

What accounts for this link between resource dependence, poor health care, and reduced longevity? One reason is that a country's oil dependence is *negatively* correlated with the amount of money it spends health care. In other words, the more that a country depends on oil exports, the less money it spends (as a fraction of GDP) on health.<sup>22</sup>

Another reason is that oil dependence is linked to malnutrition rates: for every 5 point rise in oil dependence, there is a one percent rise in the percentage of children under 5 who are malnourished, once the effects of per capita income are accounted for. Across the globe, an average of 26.5 children per thousand are malnourished. Yet in oil-rich Nigeria, the rate is 37.7 per thousand; in oil-rich Yemen it is 51.7 — one of the highest rates in the world.

**Figure 2: Impact of Oil and Mineral Dependence on Life Expectancy at Birth**



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On education, mineral-dependent states perform about as well as other states at the same income level. But oil-dependent states are another matter. Once per capita income has been accounted for, there is a negative correlation between oil dependence and the key indicators of educational achievement: enrollment in primary school and adult literacy.<sup>23</sup> For each five point rise in oil dependence, the fraction of children enrolled in primary schools tends to drop by two percent.

## Income Inequality

The *World Development Report 2000-2001* emphasizes that if states wish to reduce poverty, they should reduce income inequality. It notes that “when initial inequality is low, growth reduces poverty nearly twice as much as when inequality is high.”<sup>24</sup>

Oil-dependent states have about the same inequality levels as other states with similar incomes. But mineral-dependent states have significantly higher levels of inequality than other states with similar incomes: the more that states rely on mineral exports, the smaller the share of income that accrues to the poorest twenty percent of the population. This link is especially worrisome, since it suggests that once impoverished states become dependent on minerals exports, any subsequent economic growth tends to do little to alleviate the condition of the poor.

## Vulnerability to Economic Shocks

In any society, the poor are the most vulnerable to economic shocks. For those in the upper and middle classes, an economic shock will reduce discretionary spending. But for the poor, an economic shock can imperil their day-to-day survival.

The *World Development Report 2000-2001* argues that states should take precautionary measures to reduce the risk of harmful shocks.<sup>25</sup> When states become dependent on oil or minerals exports, they also become more vulnerable to terms of trade shocks.

For the last century, the international prices for primary commodities — including oil and minerals — have been more volatile than the prices for manufactured goods.<sup>26</sup> Since 1970, this volatility has grown worse.<sup>27</sup> This means that when countries become more dependent on oil and minerals exports, they also become more vulnerable to economic shocks.<sup>28</sup>

In theory, governments should be able to buffer their economies — and particularly, the poor — against these market shocks. For decades the World Bank has urged developing states to protect themselves against the volatility of international commodity markets by levying “stabilizing” export taxes and setting up stabilization funds. The logic of these arrangements is sound: when international oil and minerals prices are high, states can use export taxes to place money in their stabilization funds; when international prices fall, the government can draw down these funds to stabilize the economy and protect the poor from any economic downturn.

Yet in practice, government stabilization plans work poorly. When times are good, governments typically raid their own stabilization funds and embark on spending sprees. When oil or mineral export prices drop, the government has no money left to buffer the economy or protect the poor.<sup>29</sup>

Consider the example of oil-dependent states during the 1973-74 and 1978-79 oil shocks. According to several major studies, the oil-exporting states quickly overspent their windfalls, leaving their economies wracked with debt and economic stagnation.<sup>30</sup> Richard Auty, a noted economic geographer, found that the performance of oil-dependent governments was so poor that in all but one case (Indonesia), they became less diversified, and more oil-dependent, than they were before.<sup>31</sup>

Often these policy disasters occurred despite the recognition by policymakers that conserving their windfalls was essential. In Ecuador, for example, the government’s Planning Board (*Junta de Planificación*) noted that in the country’s past,

the periods of relative bonanza [export windfalls] were translated in a short time into economic instability manifested in balance of payments problems and a fiscal deficit of even greater magnitude than prevailed prior to the period of prosperity.<sup>32</sup>

The Board crafted a detailed plan whose main objective was to avoid a similar fate. Yet the farsighted “Plan of Transformation and Development” for 1973-1977 was largely ignored; so was the 1980-1984 plan, which covered the second oil boom. Instead, Gelb and Marshall-Silva found, “Many [budgetary] decisions were made on the spur of the moment in the face of political pressures.”<sup>33</sup>

Even more striking was the case of Venezuela. Following the first oil shock, the government established the *Fondo de Inversiones de Venezuela*, a financial institution whose chief purpose was to prevent the windfall from over-rapidly entering the economy. The fund was charged with placing half of Venezuela’s oil revenues, over a five year period, in foreign investments. Yet in 1975 the plan collapsed and the

government instead spent the windfall on a costly investment program — producing high inflation, an overvalued currency, uncompetitive industrial exports, and a massive foreign debt.<sup>34</sup>

Mineral-dependent states have also done a dismal job of protecting their economies against international market volatility. One survey found that mineral-exporting states used their mineral revenues so poorly that export booms have led to higher levels of external indebtedness, and less diversification, than before.<sup>35</sup> Often this has occurred despite the use of stabilization funds. When the price of copper rose in the early 1970’s, for example, Zambia discarded its Mineral Stabilization Fund; this move contributed to subsequent decades of slow or negative economic growth; crippling rates of child malnutrition; and one of the world’s lowest rankings on the Human Development Index.<sup>36</sup>

## Government Accountability and Responsiveness

As the *World Development Report 2000-2001* notes, poverty is “an outcome of the accountability and responsiveness of state institutions.”<sup>37</sup> There are at least three possible ways to measure a government’s “accountability and responsiveness.” One is by gauging the level of corruption; another is by measuring how democratic (or authoritarian) the government is; a third is to use a scale that assesses how effectively the government addresses health and education concerns, given the country’s income level.

Government corruption tends to harm the poor, since the poor are least able to pay the bribes necessary to obtain government services. Several recent studies have found that states with large oil and minerals sectors tend to be abnormally corrupt — perhaps because these sectors periodically flood the government with revenues, creating heightened opportunities for the misuse of funds.<sup>38</sup> Regardless of the mechanism, the outcome for the poor is the same.

A government’s regime type — that is, whether it is democratic or authoritarian — is



*Citizens of Choropampa, Peru, at a community meeting to discuss their claims against the Minera Yanacocha mine company, which is responsible for a mercury spill in their community in June, 2000. Hundreds of people in the area were affected by the mercury spill, and they are seeking compensation from the mine company. Mercury is a by-product of the gold mine. (credit: Ernesto Cabellos/Guarango Cine y Video photo)*



*Maria Dolores Soldana Nare, who lives near Choropampa, Peru. For the last year she and her family have been struggling to overcome poisoning after a truck from a nearby gold mine spilled mercury near her home. She told a delegation from Oxfam America, "I am sick, [with] my three children, my husband, my father in law and my sister in law. I have a two-year-old girl, she wakes up at night with her nose covered in blood. I am losing my eyesight . . . I ask you, who have come here . . . that you tell about this where you live in the States, tell that we suffer." (credit: Ernesto Cabellos/Guarango Cine y Video)*

important because authoritarian governments are more inclined to respond to the needs of the few and the wealthy, rather than the many and the poor. Authoritarian governments also tend to outlaw the types of organizations — such as poor people's associations, peasant associations, and labor unions — that give voice to the poor and enable them to influence government policy.

There is strong evidence that oil and minerals dependence makes states less democratic — making them less accountable to the poor, and less inclined to address the problems of poverty. There are at least three reasons for this pattern: first, resource-rich governments tend to use low tax rates and patronage to dampen democratic pressures; second, resource-rich governments spend an unusually high fraction of their income on internal security, which helps them to suppress democratic movements; and third, when economic development is based on the export of oil and minerals it generally fails to bring about the social and cultural changes that tend to produce a more democratic government — such as rising levels of education and higher levels of

occupational specialization.<sup>39</sup> Moreover, the anti-democratic effects of oil and mineral exports are stronger in poor countries than in rich ones: an oil boom that would set back democracy in a low-income state would have little effect on a wealthy state like Norway or Britain.<sup>40</sup>

Finally, the United Nations Development Program has developed a simple measure of government effectiveness by subtracting a country's HDI ranking from its GDP per capita ranking. This provides a way to assess how effectively the government is addressing the country's health and education needs, given its income levels. There is a strong *negative* correlation between a state's oil and mineral dependence, and its "GDP minus HDI" score. States with higher levels of oil and minerals dependence — such as Gabon, Oman, Algeria, and Papua New Guinea — tend to be less effective; governments with lower levels of oil and minerals dependence — such as Sri Lanka, Madagascar, and Tanzania — tend to be more effective.

## Civil War

Nothing is more devastating to the poor than civil war. As the *World Development Report 2000-2001* explains, "Wars cripple economies by destroying physical, human, and social capital — reducing investment, diverting public spending from productive activities, and driving highly skilled workers to emigrate."<sup>41</sup> Those who are impoverished in peacetime are most likely to suffer from the catastrophe of war.

Countries that are dependent on oil and mineral wealth face a much higher danger of civil war than states that are resource-poor. According to Collier and Hoeffler [2000], a state that depends heavily on the export of oil and minerals faces a risk of civil war of 23 percent for any given five-year period; an identical country with no natural resource exports has a civil war risk of just 0.5 percent. Table 4 lists 12 oil and mineral dependent countries that have recently suffered from civil war.

Oil and mineral wealth heightens the risk of civil wars in several ways. Poorly-governed mining operations can lead to the expropriation of land, environmental damage, and human rights violations; these factors, in turn, may create grievances that lead to armed conflict, as in the Bougainville rebellion in Papua New Guinea, and the West Papua (Irian Jaya) rebellion in Indonesia. The discovery of resource wealth in a discontented region may add fuel to separatist sentiments, as in Nigeria (in the Biafra rebellion), Angola (the Cabinda rebellion), and Indonesia (the Aceh rebellion). Rebel groups may also finance themselves by looting or selling off natural resources, as in the cases of Liberia, Sierra Leone and the Congo Republic.<sup>42</sup>

Oil and mineral dependent states also tend to be more heavily militarized. This may be because they face a higher risk of civil war; it may help cause a higher risk of civil war; and it may be because these states tend to be less democratic. In any case, these states do not simply spend more money on their militaries; they spend a larger fraction of their entire government budgets on the military. In 1997, the typical government spent 12.5 percent of its budget on the military. For every 5 point rise in minerals dependence, governments tended to spend an additional

**Table 4: Recent Civil Wars in Oil and Mineral Dependent States**

Country	Duration	Resources
Algeria	1991-present	Oil
Angola (UNITA)	1975-present	Diamonds
Angola (Cabinda)	1992-present	Oil
Congo, Republic	1997-1999	Oil
Congo, Democratic Republic	1997-present	Copper, diamonds
Indonesia (Aceh)	1986-present	Natural gas
Indonesia (Irian Jaya)	1969-present	Copper, gold
Iraq	1974-75, 1985-92	Oil
Liberia	1989-95	Diamonds, iron ore
Nigeria	1967-1970, 1980-84	Oil
Papua New Guinea	1988-present	Copper, gold
Sierra Leone	1991-present	Diamonds
Sudan	1983-present	Oil
Yemen	1986-87, 1990-94	Oil

1.7 percent of their budget on the military; for every 5 point rise in oil dependence, they spent a further 1.6 percent of their budget on the military. Ecuador, for example, spends 20.3 percent of its national budget on the military; the Central African Republic spends 27.7 percent of its budget on the military; Saudi Arabia spends 35.8 percent of its budget on the military. One consequence is that less money is available for programs that address the needs of the poor.



*Construction of the Yadana Gas Pipeline in Thailand. (credit: Earthrights International)*

## 4. Summary and Recommendations

This analysis has shown that:

- Oil and mineral dependence tend to reduce the rate of economic growth;
- Oil and mineral dependence produce a type of economic growth that offers few direct benefits for the poor; moreover, oil and mineral dependence make pro-poor forms of growth more difficult, due to the Dutch Disease.
- Oil and mineral dependence are strongly correlated with poor health care and high rates of child mortality; oil dependence is also correlated with high rates of child malnutrition and low spending levels on health care;
- Oil dependence is strongly correlated with poor performance on education, including low enrollment rates in primary schools, and low rates of adult literacy;
- Mineral dependence is strongly correlated with income inequality;
- Both oil and mineral dependent states are exceptionally vulnerable to economic shocks. In theory governments should be able to buffer the poor against these shocks. In practice they rarely do.

A set of problems like this might normally lead to for calls for government action. But we have also found that in oil and mineral dependent states, *government itself* is part of the problem. Oil and minerals dependence is significantly correlated with:

- Corruption;
- Authoritarian government;
- Government ineffectiveness;
- High levels of military spending;
- A heightened risk of civil war.

All of these findings describe the *overall trends* among states [Table 5]. There are exceptions: some states with large extractive industries — like Botswana, Chile, and Malaysia — have

overcome many of the obstacles described in this study, and implemented sound pro-poor strategies.<sup>43</sup> There is also a handful of states, like Kuwait and Brunei, with tiny populations and enormous per capita oil wealth. Our analysis finds, however, that these states are statistical anomalies — rare exceptions, whose success has been difficult for other states to replicate. In the overwhelming majority of cases, oil and mineral dependence are linked to heightened levels of poverty and immiseration. These findings are especially worrisome for countries like Chad, Equatorial Guinea, Sudan, and Kazakhstan, which are almost certain to become more oil-dependent over the next decade.

**Table 5: Summary of Findings**

	Oil-Dependence	Mineral-Dependence
Low Human Development Index*	✓	✓
Low Human Development Index		✓
Drop in HDI 1990-98		✓
Population in Poverty*		✓
Low Economic Growth*	✓	✓
High Under-five Mortality*	✓	✓
High Child Malnutrition*	✓	
Low Life expectancy*		✓
Low Health Spending (% of GDP)*	✓	
Low Primary School Enrollment*	✓	
Low Secondary School Enrollment*		
Low Adult Literacy*	✓	
High Income inequality*		✓
Vulnerability to Economic Shocks*	✓	✓
High Corruption*	✓	✓
Authoritarianism*	✓	✓
Lack of Government Effectiveness*	✓	✓
Likelihood of Civil War*	✓	✓
High Military Spending (% of govt spending)	✓	✓
High Military Spending* (% of govt spending)	✓	✓

A check mark indicates a link that is statistically significant. The results for “Low Economic Growth” are taken from Sachs and Warner 1995, Leite and Weidmann 1999 and Gylfason et al. 1999. The results for “High Corruption” are from Leite and Weidmann 1999 and Gylfason 2001. All other results are original findings and explained in greater detail in the appendix and Table 7.

\* *controlling for the influence of per capita GDP*

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## What should be done?

These problems should be addressed through international action. Multilateral development banks and export credit agencies allocated \$51 billion between 1995 and 1999 to support extractive projects in the developing world and the former Soviet bloc states.<sup>44</sup> The World Bank Group also provides states and mining firms with advice, technical assistance, and risk insurance to promote extractive industries. To their credit, the World Bank Group, and a set of international mining firms, have begun to look for ways to reduce the social and environmental costs of oil and minerals projects in developing states.

We believe these actions are worthy but as yet insufficient. They stem from the belief that extractive projects may create local costs, but that these costs are offset by national benefits. Our analysis shows that in most cases there are few if any national benefits. Extractive industries generate government revenue, but the economy as a whole — and the poor in particular — tend to suffer.

We believe the best course of action for poor states would be to avoid export-oriented extractive industries altogether, and instead work to sustainably develop their agricultural and manufacturing sectors — sectors that tend to produce direct benefits for the poor, and more balanced forms of growth.

Yet we recognize that countries that have oil and mineral wealth seldom refrain from exploiting it. We therefore recommend four sets of measures that, taken collectively, can help make extractive industries more pro-poor — and perhaps, make countries less dependent on oil and mineral exports. They are: help poor states diversify their exports; promote transparency; offer extractive sector aid only to governments that are already democratic and pro-poor; and establish mechanisms to monitor the flow of resource revenues between firms and governments.

## Diversify Exports

For decades economists have urged developing states that rely on the export of primary commodities to diversify their exports. States with more diverse exports are better protected against international market fluctuations. For oil and mineral exporters, one obvious route to diversification has been to develop “downstream” industries, which can process and add value to raw materials. Many downstream enterprises use large numbers of low-wage laborers, and hence, offer opportunities to the poor. Yet downstream industries in oil and mineral dependent states rarely succeed.

One reason for these failures are the tariff and non-tariff barriers that the OECD states maintain against processed minerals and petroleum products (see Table 3). *The OECD states should remove these tariffs. Moreover, if the IFIs support an extractive sector, they should include assistance to help the host country add value to — rather than simply extract — their oil and mineral wealth.*

## Promote Transparency

To make extractive sectors pro-poor, greater transparency — on the part of international lenders, extractive firms, and the host governments — is essential.

*Multilateral development banks and export credit agencies should require firms to disclose complete information about the payments they make to host governments, including both regular payments (such as royalties, taxes, and revenue sharing) and irregular payments (such as signing bonuses); and any payments they make, or programs they fund, for local communities. Host governments should make similar disclosures about all revenues they receive from extractive firms.* Such disclosures should encourage both firms and governments to be more responsive to popular concerns.

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## Only Aid Governments that are Democratic and Pro-poor

Transparency can create pressures for policy reform, but only in states where citizens have unfettered access to information, and where governments are regularly held accountable to the public in free and fair elections — in other words, in states that are democratic.

Democracy in itself cannot solve all the problems of oil and mineral dependent states. But our statistical analysis finds that some of the key ailments of the oil and mineral dependent states — including low life expectancy, child mortality, income inequality, and the fraction of the population living below the poverty line — are significantly diminished when the government is at least partially democratic. Democratic governments are also less likely to spend their resource revenues on the military, and more likely to spend them on health care. Moreover, many of the states that have successfully used resource revenues to alleviate poverty — including Malaysia, Chile, and Botswana — are at least partly democratic.

We also recognize that international funders cannot use aid to force states to become democratic; nor can it force them to adopt pro-poor policies. Most observers agree that conditionality — the practice of tying aid to major policy reforms — is rarely successful.<sup>45</sup>

*We therefore urge international funders to only offer assistance to states that have become democratic, and have demonstrated a commitment to fighting poverty.*

## Monitor and Control Resource Revenues

To turn extractive industries into tools to help the poor, democracy is necessary but not sufficient. Many states that are relatively democratic — such as Bolivia, Ecuador, Papua New Guinea and Ghana — have failed to make effective use of their resource revenues to alleviate poverty.

Often these revenues are lost in patronage, corruption, and military spending.

*To ensure that resource revenues are properly used, international lenders should only support projects in which the host government specifies in advance how the resource revenues are to be used to alleviate poverty, and agrees to independent monitoring to ensure that this occurs.*

The World Bank's recent arrangements with the government of Chad offer a useful precedent. The Chadian government has agreed that all of its oil revenues must be initially deposited in an offshore escrow account; that the account be annually subjected to an independent audit; that the funds be spent according to a strict formula that allocates 80 percent to education, health care, social services, rural development, infrastructure, and environmental and water resource management; and that this process be supervised by a board that includes both government officials and representatives of labor and human rights NGOs. The system will undoubtedly face challenges: last year, before these controls were in place, Chadian President Idriss Deby used \$4.5 million in oil revenues to buy weapons to fight a rebellion in the northern desert. Still, we believe that the Chad arrangements — or a strengthened version of them — provide an example of the type of monitoring that donors should insist upon to increase the fraction of resource revenues spent on the poor, and reduce the amount spent on corruption or arms.

Oil and mineral industries create opportunities to address the needs of the poor; they also create opportunities for corruption and conflict. In all but a few cases, oil and mineral revenues have been wasted on the latter. To turn extractive industries into tools for development, international funders, mining firms, and host governments must be prepared to transform their policies.

## Appendix: Statistical Results

The results described in this paper were obtained with cross-national regression analysis using an ordinary least-squares process in Stata 7.0. The independent variables of interest, Oil Dependence and Mineral Dependence, were measured for the year 1995; the indicators for the other variables were measured for 1997, 1998, or 1999, taking the most recent year for which data were available. Hence the regressions test the impact of the Oil Dependence and Mineral Dependence on the other variables with a two, three, or four year lag.

The basic econometric model for the analysis is:

$$P_i = a_1 + GDP_i b_1 + D_i b_2 + e_i$$

where  $P_i$  is a measure of poverty for country  $i$ ;  $GDP_i$  is the natural log of per capita GDP for country  $i$ ;  $D_i$  is a measure of oil or mineral dependence; and  $e_i$  is the error term.

The variables are summarized in Table 6.

**Table 6: Summary of Variables**

Variable	Obs	Mean	Std Dev	Min	Max
Oil Dependence	144	5.05	12.2	0	68.5
Mineral Dependence	123	2.6	5.72	0	35.1
Income per capita (log)	150	8.28	1.15	6.13	10.4
HDI (rank)	150	90.5	51.9	1	174
HDI (score)	150	.671	.183	.252	.935
HDI Change	128	.0243	.0284	-.058	.087
Poverty Rate	51	36.4	17.5	6	86
Under Five Mortality	150	69.5	69.8	4	316
Life Expectancy	150	64.7	11.3	37.2	80
Child Malnutrition	97	26.4	15	0	64.2
Health Spending	143	3.23	2.05	.2	8.3
Primary School Enrollment	128	82.2	22.6	13.2	99.9
Secondary School Enrollment	119	65.3	25.7	9.4	99.9
Adult Literacy	150	78.2	22	14.7	99.8
Income Inequality	109	6.44	2.34	1.1	11.9
Government Effectiveness	150	-.407	17.2	-60	43
Military Spending	124	2.68	2.59	.2	14.9

The variables are defined as follows:

- *Oil Dependence* is the ratio of fuel-based exports — including oil, natural gas, and coal — to GDP in 1995. The underlying data were obtained from the World Bank's *World Development Indicators 2001* and the *UNCTAD Commodity Yearbook 1995*. The export figures for Singapore and Trinidad have been corrected to reflect net exports, since both states are transshipment points for raw materials extracted from neighboring states. The values for both states were set at 0.01. When figures for 1995 were unavailable from either source, figures for the nearest year were used. Export figures for Liberia and Sierra Leone were taken from Reno [1999].
- *Mineral Dependence* is the ratio of nonfuel minerals to GDP in 1995. The underlying data were obtained from the World Bank's *World Development Indicators 2001*. The export figures for Singapore and Trinidad have been corrected to reflect net exports, since both states are transshipment points for raw materials extracted from neighboring states. The values for both states were set at 0.01. When figures for 1995 were unavailable from either source, figures for the nearest year were used. Export figures for Liberia and Sierra Leone were taken from Reno [1999].
- *Income per capita* is the natural log of per capita GDP in 1998, measured as purchasing power parity. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Human Development Index* and *Change in Human Development Index* refer to the UNDP's 1998 Human Development Index, which combines measures for per capita income, education, and life expectancy, and is the most recent available. Tests were run on

The market just outside Tambogrande, Peru. The nearby agricultural areas in the San Lorenzo valley are the most productive in Peru. Growers of mangos, coconuts, lemons, limes, and other vegetables feel threatened by a mine proposal in the area that would involve diverting a river, upon which they depend for their irrigation system. (Ernesto Cabellos/Guarango Cine Y Video)



both the HDI ranking of 174 states (an ordinal figure) and the HDI score itself (a cardinal measure); the results were nearly identical. Note that for the HDI ranking, a low number is an indicator of high development, while for the HDI score, a high number suggests high development. The change in HDI indicates a change in the ranking between 1990 and 1998. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.

- *Poverty Rate* is the fraction of the population under the national income poverty line for the most recent year between 1987 and 1997. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Under Five Mortality* is per 1000 live births, in 1998. The data were taken from the United Nations Development Program web site,

[www.undp.org](http://www.undp.org), on May 15, 2001. A separate test was run on the under-five mortality rate in 1999, based on data from the World Bank's *World Development Indicators 2001*; the results were similar, although the correlation with oil dependence loses significance.

- *Life Expectancy at Birth* is for the period 1995-2000. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001. A separate test was run on life expectancy in 1999, based on data from the World Bank's *World Development Indicators 2001*; the results were virtually identical.
- *Child Malnutrition* is the malnutrition prevalence by height, measured as a percentage of children under the age of five. Since these data are scarce, the figures for the most recent year since 1990 were used. The data are from the *World Development Indicators 2001*.

- *Health Spending* is the percentage of GDP spent on health care during the years 1996-98. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Primary and Secondary School Enrollment* are measured for 1997, as a percentage of the relevant age group. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Adult Literacy* is for 1998 and measured as a percentage of those aged 15 and higher. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Income Inequality* is the fraction of income or consumption that accrues to the poorest 20 percent of the population. The data are for the most recent year between 1987-98. The data were taken from the United Nations Development Program web site, [www.undp.org](http://www.undp.org), on May 15, 2001.
- *Government Effectiveness* is taken from the UNDP web site, and is calculated as a state's GDP per capita ranking minus its HDI ranking. A state that performs at a "normal" level will thus have a score of zero, while a positive score indicates a state is providing a higher level of human development than might be expected from its income level.
- *Military Spending* is measured as a fraction of government spending in 1997. The data are taken from the World Bank's *World Development Indicators 2001*.

**Table 7: Statistical Results**

	Oil-Dependence	Mineral-Dependence
<b>Human Development Index*</b> (rank)	.416 (.000)	.615 (.020)
<b>Human Development Index</b> (rank)	.145 (.692)	2.03 (.015)
<b>Human Development Index*</b> (score)	-.00136 (.002)	-.00346 (.001)
<b>Human Development Index</b> (score)	-.000417 (.747)	-.00829 (.004)
<b>HDI Change 1990-98</b>	.0000529 (.834)	-.0015127 (.001)
<b>Poverty Rate*</b>	-.43 (.033)	.881 (.004)
<b>Under-five Mortality*</b> (UNDP)	.764 (.004)	2.53 (.000)
<b>Under-five Mortality*</b> (WDI)	.419 (.105)	2.38 (.000)
<b>Child Malnutrition*</b>	.208 (.011)	.0449 (.797)
<b>Life Expectancy*</b> (UNDP)	-.0716 (.083)	-.417 (.000)
<b>Life Expectancy*</b> (WDI)	-.0612 (.196)	-.507 (.000)
<b>Health Spending (% of GDP)*</b>	-.0287 (.011)	-.00441 (.854)
<b>Primary School Enrollment*</b>	-.412 (.001)	-.324 (.226)
<b>Secondary School Enrollment*</b>	-.216 (.074)	.212 (.469)
<b>Adult Literacy*</b>	-.318 (.002)	-.377 (.112)
<b>Income inequality*</b>	-.00682 (.835)	-.102 (.033)
<b>Government Effectiveness</b>	-.434 (.000)	-.652 (.012)
<b>Military Spending</b>	.317 (.000)	.331 (.037)
<b>Military Spending*</b>	.328 (.000)	.304 (.058)

\* controlling for the influence of per capita GDP

All of the regressions were run with an ordinary least squares (OLS) process using Stata 7.0. The numbers in parentheses indicate P>|T|

# Endnotes

- <sup>1</sup> Innis 1956; Watkins 1963.
- <sup>2</sup> Rosenstein-Rodan 1943; Murphy et al. 1989.
- <sup>3</sup> This is a standard way to measure resource dependence, since it captures both the influence of oil and minerals as sources of export revenue, and their role in the overall economy. Others who use this measure of resource dependence include Sachs and Warner 1995; Leite and Weidmann 1999; and Ross 2001a.
- <sup>4</sup> In several cases it may also be appropriate to test for correlations without controlling for the effects of per capita income. In these cases, we describe the results of both tests.
- <sup>5</sup> We reach this conclusion by using a statistical technique called regression analysis. Regression analysis allows social scientists to measure the correlation between one factor (in this case, mineral dependence) and another (such as poverty), while holding constant the confounding influence of additional factors (like per capita income). A more detailed description of the results is presented in the appendix.
- <sup>6</sup> The correlation between extractive industries and poverty is not restricted to developing countries. A survey by Freudenberg and Wilson [forthcoming] finds that inside the United States, there is evidence that mining is strongly linked to poverty.
- <sup>7</sup> The results are similar whether we use the HDI index (which ranges from 0 to 1, and is the combined score of its rating on health, education, and income), or a state's HDI ranking (which ranks 174 states according to their score on the HDI index, and hence ranges from 1 to 174). Both sets of results are reported in the appendix.
- <sup>8</sup> World Bank 2001a, pp. 45-48.
- <sup>9</sup> *Ibid.*, pp. 52-55.
- <sup>10</sup> *Ibid.*, pp. 77-85.
- <sup>11</sup> *Ibid.*, pp. 55-56.
- <sup>12</sup> *Ibid.*, pp. 135-169.
- <sup>13</sup> *Ibid.*, pp. 99-112.
- <sup>14</sup> *Ibid.*, pp. 10-11.
- <sup>15</sup> Dollar and Kraay 2000.
- <sup>16</sup> This finding was first documented in a cross-country growth regression by Sachs and Warner 1995. It has since been replicated, using other measures, by Leite and Weidmann 1999 and Gylfason et al. 1999.
- <sup>17</sup> For a discussion of recent research on these and other possible causes of slow growth in resource-dependent states, see Ross 1999.
- <sup>18</sup> World Bank 2001a, p. 53.
- <sup>19</sup> The classic version of this argument is made by Hirschman 1958, 1977.
- <sup>20</sup> DeRosa 1992; Owens and Wood 1997; Cramer 1999.
- <sup>21</sup> Corden and Neary 1982; Neary and van Wijnbergen 1986.
- <sup>22</sup> Minerals dependence, on the other hand, is uncorrelated with spending on health care – which implies that despite the money they spend, these states do an exceptionally bad job of addressing their citizens' health needs.
- <sup>23</sup> There is also a somewhat weaker correlation between oil dependence and low enrollment in secondary school.
- <sup>24</sup> World Bank 2001a, p. 55.
- <sup>25</sup> *Ibid.* p. 146.
- <sup>26</sup> Grilli and Yang 1988.
- <sup>27</sup> Reinhart and Wickham 1994.
- <sup>28</sup> The nationalization of foreign oil and minerals firms in the 1950s, 1960s, and 1970s has also made states more vulnerable to economic shocks. Before nationalization, foreign corporations often captured and repatriated a large fraction of any resource rents, including those created by resource shocks. This “drain” of wealth was much resented by developing-state governments. Yet ironically, the repatriation of resource windfalls provided these governments with the unintended benefit of insulating state institutions from the volatility of international commodity markets. By expropriating foreign corporations — at a time when resource prices were growing even more variable — resource-exporting governments unwittingly exposed their institutions to large market shocks.
- <sup>29</sup> Ross 2001c
- <sup>30</sup> See Gelb and Associates 1988; Auty 1990.
- <sup>31</sup> Auty 1990. Also see Sachs and Warner 1999.
- <sup>32</sup> Cited in Gelb and Marshall-Silva 1988, p. 179.
- <sup>33</sup> *Ibid.*, p. 181.
- <sup>34</sup> Urrutia 1988; Karl 1997.
- <sup>35</sup> Lewis 1984.
- <sup>36</sup> Another reason why commodity price stabilization schemes tend to fail may be linked to the duration of the price shocks themselves. See Cashin, Liang, and McDermott 1999.
- <sup>37</sup> World Bank 2001a, p. 99.
- <sup>38</sup> Leite and Weidmann 1999; Gylfason 2001.
- <sup>39</sup> Ross 2001a.
- <sup>40</sup> Imagine a country whose per capita income is \$800 a year — about the level of Indonesia or Egypt — with a population of 20 million. Suppose prospectors find an oil field that produces \$10 billion of petroleum each year, all of which is exported; and that prior to this discovery, no oil was exported. The new oil would simultaneously boost per capita income (which tends to have pro-democratic effects), and raise the country's dependence on oil (which has anti-democratic effects). The analysis in Ross 2001a shows that after five years the government would become less democratic, losing about .93 on a 0-10 autocracy-democracy scale. A comparable discovery in a state whose initial per capita income was \$1720 would lose .54 points; if the per capita income were \$8000 — about the level of Argentina and Slovenia — the same oil field would be linked to a drop of .16.
- <sup>41</sup> World Bank 2001a, p. 50.
- <sup>42</sup> Ross 2001b
- <sup>43</sup> It is important to note that these states have been successful in reducing poverty *relative* to other oil and mineral dependent states; their records on poverty reduction still leave much room for improvement.
- <sup>44</sup> Friends of the Earth International 2000.
- <sup>45</sup> Collier et al. 1997; Mosley, Harrigan, and Toye 1991

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*Wetlands area used for disposal of mining waste near Yauli, Peru. Local people in the area have formed environmental "Vigilance Committees" to document illegal dumping of toxic mine waste on their communal lands. (credit: Nancy Delaney/Oxfam America)*

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(photo opposite page) Members of an environmental defense committee near the Yanacocha gold mine in Cajamarca, Peru. They manage a network of irrigation "canals" originating on Quilish mountain, an area proposed for expansion of the Yanacocha mine. They are worried that their water source will become contaminated from mine waste and are solidly against the expansion. One member of the commission told a delegation of visitors from Oxfam America, "We will defend this water with our lives." (credit: Ernesto Cabellos/Guarango Cine y Video)





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