

The Next Generation Of Challenges for Investors

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A considerable effort has been devoted in recent years to understanding the links between mineral investment and processes of development. At the extreme there is on one hand a body of research that suggests that attracting exploration and mining expenditure should be a principal objective of national policy, especially in poor developing countries. On the other hand, there is a body of research that suggests that mineral investment stunts the development process, leads to low levels of economic growth, and engenders corruption and social conflict.

Critical analysis of these ideas leads to a series of questions that are rarely asked directly, and even more rarely answered with empirical evidence.

1. To what extent can and do “investor friendly” policy frameworks in fact attract mining and exploration investment?
2. Does mining and exploration investment lead to sustainable forms of development?
3. What determines whether mining investment does or does not fuel positive kinds of development?

Where Does Mineral Investment Go?

There is considerable interest in year to year trends in minerals exploration: how much is being spent, where it is being spent, and what it is being spent on.¹ Much of the detail of this information is proprietary; in general only aggregates are published.

¹ See as one example Metals Economics Group, **World Exploration Trends** (2005).
<http://www.metalseconomics.com/catalog/pages/pdac2005.pdf>

It seems very difficult to draw real conclusions about long term trends and the underlying forces that drive them based on short-term data about exploration, since these are often affected by single decisions of one company, and may not lead to projects that are successful and productive in the long run. One approach to understanding is therefore to look at what these exploration trends have led to in terms of projects in production. This leaves out investment that does not lead to production – it is a measure of the success of investment rather than total investment. It assumes without argument that increases in production in general cannot be accomplished without at least some investment.

Obviously, there are many minerals and time periods to choose from. The overall task is a large and daunting one. This paper is not more than a preliminary approach to the issue.

We have chosen copper production over the period 1974 to 2004 for our first approach to the subject. We are pleased to be able to use data from the International Copper Study Group.²

Table I

Copper Production by Country, 1974 and 2004³

Country	1974	2004
Argentina	0.3	176.4
Australia	251.3	854.1
Canada	821.4	563.1
Chile	904.5	5412.5
China	99.8	612.5
Congo	495.7	75.8
Indonesia	65.5	843.2
Iran	0.7	190
Japan	82	1
Kazakhstan ⁴	0	461.8

² The ICSG website is at <http://www.icsg.org/home.htm>

³ Data are in thousands of tones of mined copper. Countries presented are only those which produced at least one percent of reported world production in either of the two years presented. The total reported for the listed countries is therefore somewhat less than total reported world production.

⁴ Presented as part of USSR in 1974.

Mexico	76.1	399.5
Papua New Guinea	183.7	173.4
Peru	211.6	1035.5
Philippines	226	18
Poland	185	531
Russian Federation ⁵	0	630
South Africa	178.7	86.4
USSR (former)	565	0
United States	1448.8	1174
Yugoslavia (former) ⁶	112.1	0
Zambia		
	698	426.8
Total Copper Production of Selected Countries	6606.2	13665
Total World Copper Production	7097.4	14525.2

What this shows is that total world production of copper approximately doubled over this thirty-year period. These data are presented as percentages of total reported world production in Table II.

Table II
Percentage of Reported World Production
by Country in Selected Years⁷

country	1974	2004
Argentina	0.00%	1.21%
Australia	3.54%	5.88%
Canada	11.57%	3.88%

⁵ Presented as part of USSR in 1974.

⁶ Copper production in the nations making up the former Yugoslavia was so low as to be unreported in 2004.

⁷ Includes only those countries responsible for at least 1% of world production in either of the two years presented.

Chile	12.74%	37.26%
China	1.41%	4.22%
Congo	6.98%	0.52%
Indonesia	0.92%	5.81%
Iran	0.01%	1.31%
Japan	1.16%	0.01%
Kazakhstan	0.00%	3.18%
Mexico	1.07%	2.75%
Papua New Guinea	2.59%	1.19%
Peru	2.98%	7.13%
Philippines	3.18%	0.12%
Poland	2.61%	3.66%
Russian Federation	0.00%	4.34%
South Africa	2.52%	0.59%
USSR (former) ⁸	7.96%	0.00%
United States	20.41%	8.08%
Yugoslavia (former)	1.58%	0.00%
Zambia	9.83%	2.94%
Percentage of Total World Production	93.08%	94.08%

Using these data, we can therefore start to analyze the geographic shifts in world mined copper production over the thirty-year period.

Table III

**Countries Increasing and Decreasing as a
Percentage of Total World Production**

Countries that have increased as a percentage of total world production⁹

Argentina
Australia
Chile
China
Indonesia

⁸ See notes to Table I for explanation of how former USSR data are presented.

⁹ USSR reported 7.96 % of total world production in 1974; the total for Kazakhstan and the Russian Federation in 2004 was 7.52%. Because of doubts as to whether to regard this as an increase or a decrease, we have omitted these states from the listing.

Iran
Mexico
Peru
Poland

Countries that have decreased as a percentage of total world production:

Canada
Congo
Japan
Papua New Guinea
Philippines
South Africa
USA
Yugoslavia
Zambia

Of course, the existence of possible development impacts of mineral production may not depend so much on a country's percentage ranking as on whether the country's production is growing or declining in absolute terms.

Table IV

**Countries With Increasing and Decreasing
Reported Copper Production**

Countries that have decreased in absolute production:

Canada
Congo
Japan
Papua New Guinea
Phillippines
South Africa
United States
Yugoslavia (former)
Zambia

Countries that have increased in absolute terms of total world production:

Argentina

Australia
Chile
China
Indonesia
Iran
Mexico
Peru
Poland
Former USSR (Russia and Kazakhstan)¹⁰

It starts to become time to ask what if anything these data show? For example, what do the United States, Papua New Guinea and Congo have in common other than falling copper production? Is there a hypothesis that explains where the investment in additional copper is going and why? We believe there is.

Costs of Production in Highly Developed Economies

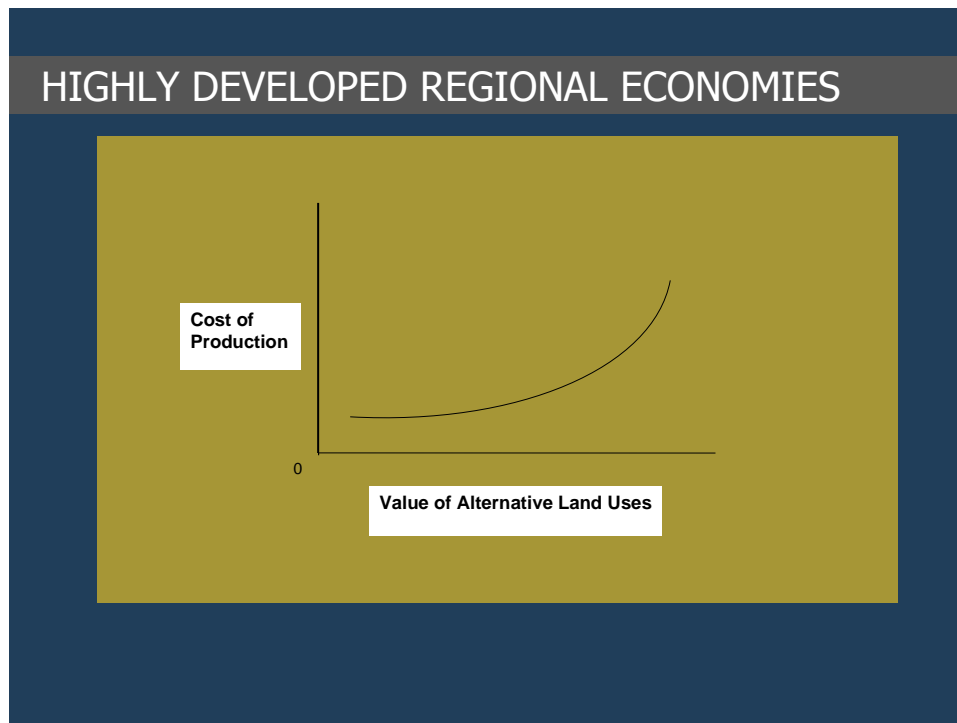
There is a considerable literature that discussed the increased cost of mineral production in the most developed economies. Much of it is decries supposed long permitting processes, complex procedures for acquiring the right to explore or develop deposits, high tax levels, environmental requirements, or other factors that add to the cost of doing business. In such countries wage rates may be higher.

But beyond this, highly developed economies are characterized by a diversity of economic activities. This may imply that mineral exploration and production may have more competition for the use of land. To the extent that mining is regarded as an undesirable neighbour, the cost of doing business will reflect not just the cost of acquiring the land on which exploration is conducted or a project is built, but resistance on the part of neighbouring landowners or community members who see the project as a threat to their land values, their preferred land uses, or the general environment. This potential resistance to mineral development has the highly elaborated permitting and land use systems characteristic of the mature legal systems of the highly developed economies within which to express itself.

The more developed economies may tend to have more competition for land use, higher land prices, more burdensome regulatory requirements, higher taxes, and related factors that increase the cost of minerals operations. To some extent these may have been counterbalanced by a series of very positive factors: a high quality of transportation, communication, energy and water infrastructure, strong rule of law, low levels of corruption, proximity to markets and the like. But at some point, these positive

¹⁰ The data are reported as USSR in 1974 and a combination of the Kazakh and Russian Federation data for 2004.

factors are not enough to balance the costs of doing business in a highly developed economy.



If this hypothesis is correct, we would expect to see the minerals investor confronted by a cost curve that looks something like Fig. 1.

While there are more sophisticated ways of examining the question of levels of national economic and social development, such as the Human Development Index, one rough but easy way to identify the group of relatively prosperous developed economies is the membership of the Organization for Economic Cooperation and Development (OECD).¹¹ The hypothesis we have advanced would suggest that these countries are over time experiencing increasing cost disadvantages as minerals producers. This would suggest that over time there would be declining minerals investment, eventually reflected in reduced proportional and even absolute roles as producers.

We should be hesitant to jump to far reaching conclusions from applying very limited data sets to such broad generalizations. But the results are, for whatever this may be worth, consistent with our hypothesis as seen in Table V.

¹¹ www.oecd.org

Table V**OECD Copper Production as Percent of World Total**

Country	1974	2004
Australia	3.54%	5.88%
Austria	0.04%	0.00%
Canada	11.57%	3.88%
Czech Republic (*)	0.07%	0.00%
Finland	0.51%	0.11%
France	0.01%	0.00%
West Germany (*)	0.02%	0.00%
Greece	0.01%	0.00%
Hungary	0.02%	0.00%
Ireland	0.18%	0.00%
Italy	0.01%	0.00%
Japan	1.16%	0.01%
Korea	0.04%	0.00%
Mexico	1.07%	2.75%
Norway	0.34%	0.00%
Poland	2.61%	3.66%
Portugal	0.08%	0.66%
Spain	0.48%	0.00%
Sweden	0.57%	0.57%
Turkey	0.55%	0.32%
United Kingdom	0.01%	0.00%
United States	20.41%	8.08%
Percent of total world production for OECD countries	43.29%	25.91%

In 1974, the relatively rich countries of the OECD produced well over 40% of the world's copper output. Indeed, the three geographically large countries with relatively low population densities, the U.S., Canada, and Australia together produced over a third of world copper output. Two of these three countries, Canada and the U.S., have over this thirty-year period declined both absolutely and as a percentage of world production.

Thanks in large part to increased production in Mexico (not generally considered a rich country) and Australia, total OECD copper production did not decline, as Table VI shows. But while total world production doubled, OECD production was relatively flat. This indicates that while there was some investment in the OECD countries, the bulk of the investment necessary to achieve this doubling of world output did not go to the highly developed economies.

Table VI

OECD Copper Production 1974 and 2004¹²

Country¹³	1974	2004
Australia	251.3	854.1
Austria	2.7	0
Canada	821.4	563.4
Czech Republic (*)	4.7	0
Finland	36.2	15.5
France	0.4	0
West Germany (*)	1.7	0
Greece	0.8	0
Hungary	1.2	0
Ireland	12.6	0
Italy	0.8	0
Japan	82	1
Korea	2.8	0
Mexico	76.1	399.5
Norway	24.1	0
Poland	185	531
Portugal	5.6	95.7
Spain	34.3	0
Sweden	40.6	82.8
Turkey	38.8	46
United Kingdom	0.4	0

¹² OECD Countries source:
http://www.oecd.org/document/58/0,2340,en_2649_2001185_1889402_1_1_1_1,00.html

¹³ Thousand tonnes of copper.

United States	1448.8	1174
Total- produced by OECD countries	3072.3	3763

If this investment is not going to the world's rich countries, where is it going? In a world in which so many of our central economic activities are dominated by the OECD countries, is there an opportunity here for the poor to acquire foreign direct investment?

Production in the Highly Indebted Poor Countries

There has been much focus lately on the group of nations who have done least well in development terms. Many of these countries fall into the group of heavily indebted poor countries, or HIPC,¹⁴ who not only face low indices of development but unsustainable burdens of indebtedness.

But even a cursory look at these countries makes it clear that wherever minerals (or at least copper) investment is going; it is not here, as Table VII makes clear.

Table VII¹⁵

Copper Production in the HIPC¹⁶

Country	1974	2004
Bolivia	8.10	0
Congo	495.70	75.8
Honduras	0.00	0.3
Kenya	0.10	0
Mauritania	20.10	0
Mozambique	0.80	0
Myanmar	0.10	31.8
Nicaragua	1.80	0
Tanzania	0.00	4
Uganda	12.20	0

¹⁴ <http://www.imf.org/external/np/exr/facts/hipc.htm>

¹⁵ Thousand tonnes of copper.

¹⁶ While there are over three dozen countries potentially eligible for international assistance under this HIPC category, <http://www.imf.org/external/np/exr/facts/hipc.htm>, we include only those that report copper production in one or both of the study years.

Vietnam	0.00	1.2
Zambia	698.00	426.8
Total produced in HIPC countries	1236.90	539.9

As a percentage, the decline in copper production in the HIPC countries has of course been even more dramatic.

Table VIII

Copper Production in Heavily Indebted Poor Countries as Percentage of World Production

Country¹⁷	1974	2004
Bolivia	0.114%	0.000%
Congo	6.984%	0.522%
Honduras	0.000%	0.002%
Kenya	0.001%	0.000%
Mauritania	0.283%	0.000%
Mozambique	0.011%	0.000%
Myanmar	0.001%	0.219%
Nicaragua	0.025%	0.000%
Tanzania	0.000%	0.028%
Uganda	0.172%	0.000%
Vietnam	0.000%	0.008%
Zambia	9.835%	2.938%
HIPC copper production as percentage of total world	17.428%	3.71699%

The investment outlook in these countries seems to be even less positive than in the OECD. While the OECD members seem to be attracting sufficient investment to keep up

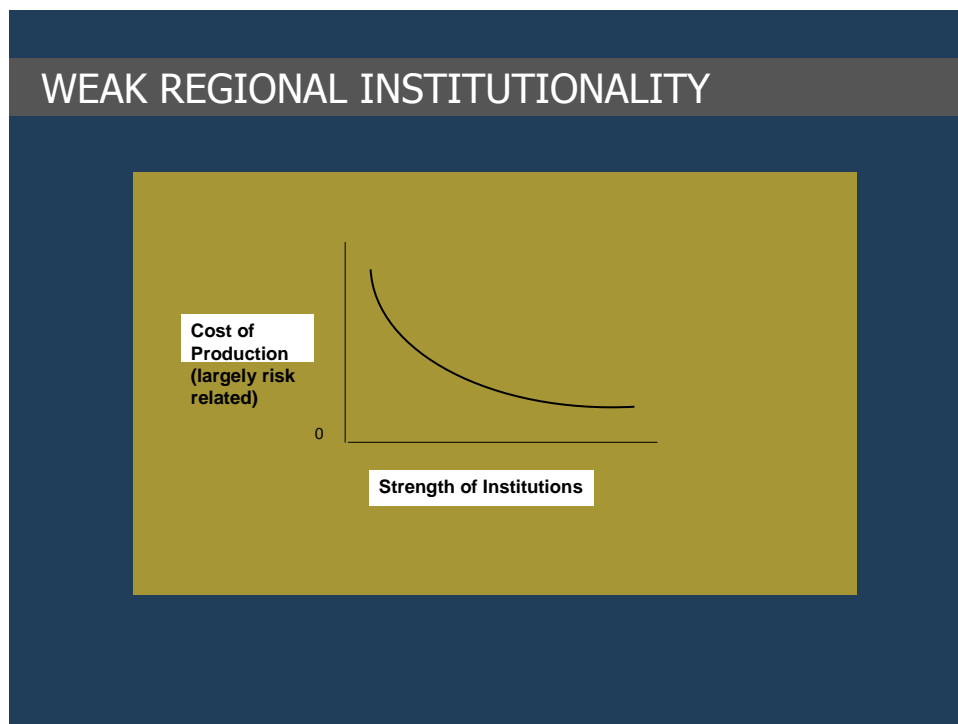
¹⁷ While there are over three dozen countries potentially eligible for international assistance under this HIPC category, <http://www.imf.org/external/np/exr/facts/hipc.htm>, we include only those that report copper production in one or both of the study years.

absolute production levels, the HIPC countries seem to be attracting little or no outside copper production investment capital; production in the group is falling dramatically.

A quick review of the countries in the list in many cases explains this phenomenon: these are countries where in many if not all cases there is political instability. Indeed, a number of these countries have in the 30 year study period, passed through war and revolution, with minerals revenues in some cases among the issues over which war was fought. It is unfair to paint all with the same brush, but it is also true that in a number of these countries the rule of law is weak, and the level of capacity in government institutions is inadequate.

Further, while land may be very inexpensive, widely recognized land titles may be hard to come by. And in general, these very poor countries have little physical infrastructure. Investors must in general therefore foot a large part of the bill of energy, water, transportation and communication infrastructure, maintaining adequate levels of public health in the project area, etc.

The result might be presented conceptually as something very much like Fig. 2.



Where Is Investment Going?

The investment that has supported a doubling of world copper production over our thirty-year study period has clearly not gone to the three dozen or so countries that meet the criteria for assistance as Heavily Indebted Poor Countries. Figure 3 shows

where the production is coming from – and where, therefore, at least roughly, the investment must have gone.

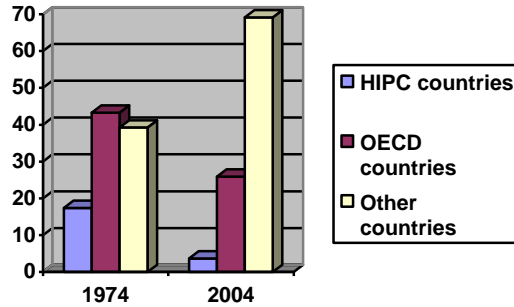
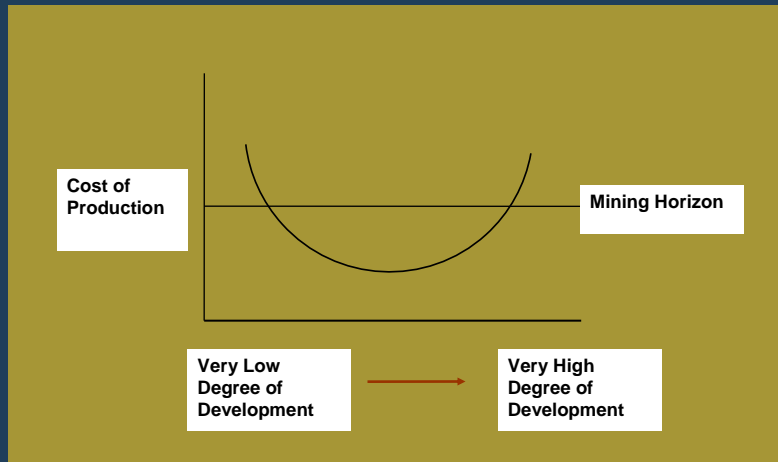


Fig. 3 Copper Production as Percentage of Total World Production for 1974 & 2004

We suggest as a hypothesis that *both* ideas presented above could be correct. In short, minerals production may face serious cost barriers in the most developed economies, and a different but equally real series of barriers in the least developed economies.

REGIONS OF FEASIBLE MINERAL PRODUCTION



This hypothesis – which before anyone takes it too seriously should certainly be tested far more rigorously than we have been able to do in this very general paper – could be presented in conceptual terms as shown in Fig. 4.

THE ROLE OF GEOLOGY

We have argued elsewhere that excessive focus on geologic factors has led to insufficient attention to surrounding legal and policy frameworks in determining where investors should or do choose to invest. We do not want now to fall victim to the opposite error and discount entirely the importance of favourable geology. Surely without some kind of minerals deposit there is no mining. And if there is no mining, there is going to be no mining-based development, for all the good or bad consequences that can bring.

Certainly, the kind of thinking represented in Figure 4 is representative of some rough average. If a rich enough deposit is found, there will be a strong temptation to try to find a way to exploit it, even if it is in a region with very high value surrounding land uses, or a low degree of institutional stability. We would, however, argue that even if the deposit is rich enough to move the threshold that does not change the fact that there is a threshold: it will be a long time before we see any significant mining development in central London, or Miami Beach on one hand, or Darfur and Iraq on the other. One reason is that even if there are mineral deposits in such places, we are not very likely to know about it, because the risks, costs and difficulties of exploring there will deter even the bold.

THE HISTORICAL PERSPECTIVE

As political, economic and cultural winds shift, the world climate for mineral exploration and investment shifts with it. Our model is hardly static. The kind of high level of development that presents mining with very high value neighbouring land uses and potentially unhappy neighbours is achieved in places where it did not previously exist. Some political systems become more stable and more welcoming to outside private investment; others may become less so.

1. The Postwar Era to the 1970s

In much of the developing world, minerals production in the post World War II era was a legacy of colonial rule; colonial systems of government provided the institutional conditions and political stability that made mining investment possible. In other regions, such as Latin America, colonialism was long dead, but the capital needed for mining investment was still foreign; investment was sometimes under enclave conditions; investors in some cases played a major political role.

In the 1960s and 1970s, driven by a perception that foreign investors had excessive political influence, the idea that mineral wealth is a public rather than a private patrimony, the belief that nonrenewable mineral wealth was being taken by foreign interests without fair payment to national governments, and perhaps other factors, many countries in the developing world began to nationalize mining projects.

A large part of the world's surface was controlled by avowedly communist countries. There was little or no possibility of outside investment in the mining sectors of the USSR, China, Eastern Europe, or the rest of the Communist Bloc.

It is hard from today's perspective to recapture the level of concern that foreign investors developed in the 1960s and 1970s over the nationalization or outright confiscation of mineral properties; revolutions in Cuba, Angola, Vietnam and elsewhere brought Marxists to power; even where this did not occur, politics were often dominated or heavily influenced by anti-capitalist, anti-imperialist, or anti-Western ideas and rhetoric. There were many examples with a profound influence on the minerals industry.

Bolivia's tin mines were nationalized in 1952 after a revolution, at which time a state mining corporation was created, called COMIBOL.¹⁸

¹⁸ Widerkehr, Doris E. (1980). Autonomy overshadowed: A Bolivian Cooperative within the Nationalized Mining Industry. *Human Organization*. vol 39, 2. 8.

Peru nationalized much of the country's mined resources (ie: coal, silver, zinc, copper, petroleum, phosphates and iron) during the regime of General Juan Velasco Alvarado, which extended from 1968 through 1975 (when he was killed in a coup). Cerro de Pasco (1974) and Marcona Mining (1975) were replaced by state owned Minoperu.¹⁹

In 1970, Zambia issued bonds for the book value of nationalized shares, though a ten-year management and sales agreement left mining corporations effective control of these operations. In 1973, the Zambian government redeemed the bonds and formed the metal market corporation of Zambia to be sole agent for Zambian metal productions. In **1974-1975**, management controls were paid off, leaving the Zambian mining industry state owned and self-managing.²⁰

When Salvador Allende took office as Chile's President, he in 1971 completely nationalized the copper, coal and steel industries. Compensation was deemed unnecessary because of companies' supposedly "illegally" high profits.²¹

It is hardly surprising in this kind of atmosphere that much exploration and mining investment was driven to the supposedly 'safe' jurisdictions – the U.S., Canada, and Australia.

2. The 1980s and 1990s

The events of the late 1980s and early 1990s were largely unimaginable a decade earlier, and had a profound effect on geopolitics in general and mineral investment in particular.

The Berlin Wall fell in 1989. In 1990, Poland's the stabilization and liberalization measures of the Balcerowicz Plan created conditions that proved extremely favorable to private business development throughout the Polish economy.²² The Soviet Union broke up in 1991.²³

¹⁹ Skidmore, Thomas E and Smith, P.H. (1997). *Modern Latin America*. (5th ed.). Oxford: Oxford University Press.

²⁰ Shafer, Michael. (1983). *Capturing the Mineral Multinationals: advantage or disadvantage?* International Organization 37. 1. 93. 27p.

²¹ Skidmore, Thomas E and Smith, P.H. (1997). *Modern Latin America*. (5th ed.). Oxford: Oxford University Press.

²² Johnson, Simon and Loveman, G. (1995). Starting Over: Poland After Communism. *Harvard Business Review*. Mar/April. Vol73. Issue 2.

²³ Brezinski, Zbigniew, and Paige Sullivan. 1997 *Russia and the Commonwealth of Independent States: Documents, data and analysis*. The center for strategic international studies, Armonk, NY.

Russia's 1991 Investment Code at least on its face guaranteed foreign investors equal rights to those enjoyed by Russian investors. Massive privatizations started in 1992.²⁴

"Following independence in 1991, the Kyrgyz Government embarked on an ambitious programme of economic reforms to establish a market-based economy and achieve macroeconomic stabilization."²⁵ Kazakhstan launched a comprehensive programme of stabilization and reform (launched in 1993, with support from the international financial community),²⁶ and the government, and opened to privatization of industry in 1994.²⁷ In Uzbekistan, "[m]easures to effect a gradual transition to a market economy, announced in 1994, included price liberalization and the privatization of selected state enterprises, and the trade and currency-exchange systems were liberalized in 1995."²⁸

Immediately after it established its independence, in 1991 and 1992, the Government of Lithuania embarked on a policy of rapid market reforms and macroeconomic stabilization.²⁹ "The [Latvian] Government's programme of stabilization, initiated in 1992, achieved considerable success..."³⁰ "Even before it regained independence in mid-1991, Estonia had begun a transition to a market economy, and far-reaching

²⁴ Country profile: Russia 2004. p33 7p.

²⁵ Maher, J. (Ed.). (2003). *The Europa World Year Book*. London and New York: Europa Publications

²⁶ Maher, J. (Ed.). (2003). *The Europa World Year Book*. London and New York: Europa Publications.

²⁷ Peck, Anne E. (2002). Industrial Privatization in Kazakhstan: The Results of Government Sales of the principal Enterprises to Foreign Investors. *Russian and East European Financial Trade*. Vol 38, 1. 31-58.

²⁸ Maher, J. (Ed.). (2003). *The Europa World Year Book*. London and New York: Europa Publications.

²⁹ *The Economy*. [Country Profile. Lithuania](#); 2005, p22, 11p

³⁰ Maher, J. (Ed.). (2003). *The Europa World Year Book*. London and New York: Europa Publications.

economic reforms were continued in the early 1990s.”³¹ By 1992, Estonia had perhaps most established free market economy of all the countries of the former Soviet Union.³²

Nicaragua privatized its gold industry in 1990. Even Viet Nam joined the movement with its “Doi Moi” program of encouraging foreign investment.³³

Other events outside the Communist and former Communist countries also stimulated foreign investment. In Chile, foreign investment in the mining sector, which had been restrained by the concern of some international institutions about dealing with the Pinochet government. Again became possible when President Patricio Alwyn assumed power December 1989.³⁴ Peru under President Fujimori, created policies not too different from those of Pinochet’s “Chicago Boys.” Peru’s state owned mines were privatized in 1992.³⁵

³¹ Maher, J. (Ed.). (2003). *The Europa World Year Book*. London and New York: Europa Publications.

³² Politics: Political Background. Country Profile: Estonia 2005 p4 2p.

³³ Pushing ‘doi moi’ forward secret of nation’s success. *The Vietnam Investment Review*, April 28, 2003; Background Notes on Countries of the World: Vietnam. Aug. 2004 p6 2p.

³⁴ Skidmore, Thomas E and Smith, P.H. (1997). *Modern Latin America*. (5th ed.). Oxford: Oxford University Press.

³⁵ Skidmore, Thomas E and Smith, P.H. 1997. *Modern Latin America*. Oxford University Press. Oxford. 4,