Natural Resources and Economic Growth: From Dependence to Diversification

by Thorvaldur Gylfason*

Abstract

This paper reviews the relationship between natural resources and economic growth, and stresses how natural capital tends to crowd out foreign capital, social capital, human capital, and physical capital, thereby impeding economic growth across countries and presumably also over time. Specifically, the paper presents empirical evidence that nations with abundant natural capital tend to have (a) less trade and foreign investment, (b) more corruption, (c) less education, and (d) less domestic investment than other nations that are less well endowed with, or less dependent on, natural resources. This matters for growth because empirical evidence also indicates that trade, honesty, education, and investment are all positively and significantly related to economic growth across countries.

* Research Professor of Economics, University of Iceland; Research Fellow, CEPR and CESifo; and Research Associate, SNS – Center for Business and Policy Studies, Stockholm. Address: Faculty of Economics and Business Administration, University of Iceland, 101 Reykjavík, Iceland. Tel: 354-525-4533 or 4500. Fax: 354-552-6806. E-mail: gylfason@hi.is. This paper was prepared for an Expert Group Meeting on *Economic Diversification in the Arab World* organized by The United Nations Economic and Social Commission for Western Asia (UN-ESCWA) in cooperation with the Arab Planning Institute (API) of Kuwait, held in Beirut, Lebanon, 25-27 September, 2001.

This paper reviews some aspects of the experience of natural-resource-rich countries around the world since the 1960s. The paper begins by identifying four main channels through which natural resource abundance or intensity seem to have inhibited economic growth across countries. As we proceed, an attempt will be made to provide a glimpse of some of the empirical results that have emerged in the past few years from studies of the cross-country relationships between natural resource dependence and economic growth and various key determinants of growth across the world. Even if the evidence reviewed below is exclusively cross-sectional, it reflects a pattern that accords with a number of historical case studies of individual resource-rich countries.[1] This review is followed by a brief discussion of the disappointing economic growth record of the OPEC countries, and then by a brief discussion of the lessons that may be drawn from Norway's singularly successful management of its oil wealth.

I. Four Channels: Theory and Evidence

The structure of recent models of the relationship between natural resource abundance or intensity and economic growth is nearly always the same. An abundance of or heavy dependence on natural resources is taken to influence some variable or mechanism "X" which impedes growth. An important challenge for economic growth theorists and empirical workers in the field is to identify and map these intermediate variables and mechanisms.

To date, four main channels of transmission from natural resource abundance or intensity to slow economic growth have been suggested in the literature.[2] As we shall see, these channels can be described as crowding out: natural capital, it will be argued, tends to crowd out other types of capital and thereby inhibit economic growth.

Channel 1: The Dutch disease and foreign capital

An overvalued currency was the first symptom associated with the Dutch disease following the discovery of natural gas deposits within the jurisdiction of the Netherlands in the North Sea in the late 1950s and early 1960s, but subsequently several other symptoms came to light. Natural resource abundance is, as a rule, accompanied by booms and busts: the prices of raw materials fluctuate a great deal in

[1] A number of such case studies is to be found in Auty (2001).
[2] This discussion draws on Gylfason and Zoega (2001).

world markets, and so do supplies. The resulting fluctuations in export earnings trigger exchange rate volatility, perhaps no less so under fixed exchange rates than under floating rates. Unstable exchange rates create uncertainty that can be harmful to exports and other trade, including foreign investment. Further, the Dutch disease can strike even in countries that do not have their own national currency. In this case, the natural-resource-based industry is able to pay higher wages and also higher interest rates than other export and import-competing industries, thus making it difficult for the latter to remain competitive at world market prices. This problem can become particularly acute in countries with centralized wage bargaining (or with oligopolistic banking systems, for that matter) where the natural-resource industries set the tone in nation-wide wage negotiations and dictate wage settlements that other industries can ill afford.[3]

In one or all of these ways, the Dutch disease tends to reduce the level of total exports or bias the composition of exports away from those kinds of manufacturing and service exports that may be particularly good for growth over time. Exports of capital – i.e., inward foreign direct investment – may also suffer in the same way. The mechanism is essentially the same. In other words, natural capital tends to crowd out foreign capital, broadly speaking.

Figure 1 presents relevant empirical evidence for two groups of Arab countries, a group of six nonoil-producing countries (Egypt, Jordan, Morocco, Sudan, Syria, and Tunisia) and a group of six oil-producing countries (Algeria, Iran, Kuwait, Libya, Saudi-Arabia, and United Arab Emirates). Figure 1a shows that the nonoil-producing countries have achieved, on average, a significant increase in their total exports relative to GDP since 1960. Meanwhile, the total exports of the oil-producing countries have declined as a proportion of GDP. Figure 1b tells a similar story about foreign direct investment, but here the pattern is less clear. In the nonoil-producing Arab countries, gross foreign direct investment has since 1975 hovered around or below 1 percent of GDP (adjusted for purchasing power parity). In the oil-producing countries, however, foreign investment has been higher relative to GDP, and much more volatile. Figure 1c shows that the share of manufacturing exports in total exports in the nonoil-producing Arab countries increased from about 10 percent in the 1960s to 40 percent in the 1990s, while the same ratio has hovered around 10 percent in the

[3] Greenland, which uses the Danish krone, is a case in point (Paldam, 1997). Greenland's fishing industry dominates the national economy to the virtual exclusion of other manufacturing.

oil-producing Arab countries without showing a strong tendency to rise over time. These things matter because exports and foreign investment are good for growth (see, for example, Frankel and Romer, 1999). Openness to trade and investment stimulates imports of goods and services, capital, technology, ideas, and know-how. Further, too much primary-export dependence and too little manufacturing may hurt economic growth over the long haul. The upshot is that the Dutch disease is a matter of concern mainly because of its potentially deleterious consequences for economic growth.

What is the empirical evidence? Figure 2a shows a scatterplot of natural resource abundance and openness to external trade around the world. Natural resource abundance or intensity, which is measured along the horizontal axis, is measured by the share of natural capital in national wealth in 1994 – i.e., the share of natural capital in total capital, which comprises physical, human, and natural capital (but not social capital; see World Bank, 1997). The natural capital share used here is close to the source: it is intended to come closer to a direct measurement of the intensity of natural resources across countries than the various proxies that have been used in earlier studies, mainly the share of primary (i.e., nonmanufacturing) exports in total exports or in gross domestic product (GDP) and the share of the primary sector in employment or the labor force.[4] Openness on the vertical axis is defined as the difference between the actual average ratio of exports to GDP over the period under review, 1965-1998, and the export ratio predicted by a linear regression of the average export ratio on the logarithm of the average population (in thousands) across countries to adjust for country size. This adjustment is made to reflect the fact that large countries are less dependent on foreign trade than smaller ones that need to extend their home markets beyond their national borders to make up for their small size. This indicator of openness is above zero for countries that are more open to trade than their size predicts, and below zero for countries that are less open to trade than their size predicts. The 91 countries in the sample are represented by one observation each for each variable under study.

[4] The year 1994 is the only year for which the World Bank has as yet produced data on natural capital, for 92 countries. In most cases, however, natural capital in 1994 is probably a pretty good proxy for natural resource abundance or intensity in the period under review, 1965-1998. There are some exceptions, true, but, even so, all the empirical results reported in this paper can be reproduced without significant deviations by using the average share of primary exports in total exports or GDP or the average share of the primary sector in total employment during 1965-1998 rather than natural capital in 1994 as a proxy for natural resource abundance, and also by measuring growth in terms of GNP per worker rather than GNP per capita.

The regression line through the scatterplot in Figure 2a suggests that an increase of ten percentage points in the natural capital share from one country to another is associated with a decrease in the openness indicator by about four percent of GDP on average. The relationship is economically as well as statistically significant (Spearman's rank correlation is -0.33).[5] Given existing evidence that foreign trade is good for growth, Figure 2a suggests that natural resource abundance may hurt growth by harming trade.

It needs to be understood that no conclusions are being drawn here as to cause and effect. Figure 2a is only intended to display the data in a way that accords with the results of multivariate regression analyses that can help account for more potential determinants of exports (Gylfason, 1999), and where the attempt was made to distinguish cause from effect. The same disclaimer applies to all the figures that follow. Even so, the study of bivariate cross-sectional relationships has many shortcomings. For one thing, such studies bypass the diversity of individual country experiences. For another, they do not account for economic developments over time, as panel studies are designed to do.

Figure 2b shows a scatterplot of openness as defined above and economic growth per capita from 1965 to 1998. The figure covers 87 countries. The growth rate has been adjusted for initial income: the variable on the vertical axis is that part of economic growth that is not explained by the country's initial stage of development, obtained from a regression of growth during 1965-1998 on initial GNP per capita (i.e., in 1965) as well as natural capital. The regression line through the scatterplot in Figure 2b suggests that an increase of 14 percentage points in the openness indicator from one country to another is associated with an increase in per capita growth by one percentage point per year on average. The relationship is thus economically as well as statistically significant; Spearman's rank correlation is 0.40. The data thus seem to support the view that openness is good for growth.

Taking Figures 2a and 2b together, we see that an increase in the natural capital share by ten percentage points goes along with a four point decrease in the openness index which, in turn, goes hand in hand with a decrease in annual per capita growth by about 0.3 percentage points.

[5] Gylfason (forthcoming) presents corresponding scatterplots of exports and natural capital and of foreign direct investment and natural capital.

Channel 2: Rent seeking and social capital

In second place, huge natural resource rents, especially in conjunction with ill-defined property rights, imperfect or missing markets, and lax legal structures in many developing countries and emerging market economies, may lead to rampant rent-seeking behavior on the part of producers, thus diverting resources away from more socially fruitful economic activity (Auty, 2001; Gelb, 1988). The combination of abundant natural resources, missing markets, and lax legal structures may have quite destructive consequences. In extreme cases, civil wars break out – such as Africa's diamond wars – which not only divert factors of production from socially productive uses but also destroy societal institutions and the rule of law. In other, less extreme cases, the struggle for huge resource rents may lead to a concentration of economic and political power in the hands of elites that, once in power, use the rent to placate their political supporters and thus secure their hold on power, with stunted or weakened democracy and slow growth as a result (Karl, 1997). Moreover, an abundance of natural resources may tempt foreign governments to invade with destructive consequences and the possibility of such an event may prompt the domestic authorities to spend vast resources on national defense. Large military expenditures tend to inhibit growth through their adverse effects on capital formation and resource allocation (Knight, Loayza, and Villaneuva, 1996).

Rent seeking can also take other, more subtle forms. For example, governments may be tempted to thwart markets by granting favored enterprises or individuals privileged access to common-property natural resources, as, for example, in Russia, or they may offer tariff protection or other favors to producers at public expense, creating competition for such favors among the rent seekers. Extensive rent seeking – i.e., seeking to make money from market distortions – can breed corruption in business and government, thus distorting the allocation of resources and reducing both economic efficiency and social equity. Empirical evidence and economic theory suggest that import protection (which is often extended to foreign capital as well as goods and services), cronyism, and corruption all tend to impede economic efficiency and growth (Bardhan, 1997; Mauro, 1995).

Furthermore, abundant natural resources may imbue people with a false sense of security and lead governments to lose sight of the need for good and growth-friendly economic management, including free trade, bureaucratic efficiency, and institutional

quality (Sachs and Warner, 1999). Put differently, abundant natural capital may crowd out social capital, by which is meant the infrastructure and institutions of a society in a broad sense: its culture, cohesion, law, system of justice, rules and customs and so on, including trust (Woolcock, 1998; Paldam and Svendsen, 2000). Incentives to create wealth through good policies and institutions may wane because of the relatively effortless ability to extract wealth from the soil or the sea. Manna from heaven can be a mixed blessing. The argument can be extended to unconditional foreign aid. There are indications that natural-resource-rich countries are more dependent than others on foreign aid, which may actually exacerbate their economic predicament.

Now consider corruption, to take but one aspect of social capital corrosion into account. Insofar as natural resource abundance involves public allocation of access to scarce common-property resources to private parties without payment, thereby essentially leaving the resource rent up for grabs, it is only to be expected that resource-rich countries may be more susceptible to corruption than others. What do the data say?

In Figure 3a, which covers 60 countries, the share of natural capital in national wealth is plotted along the horizontal axis as before and the corruption perceptions index for the year 2000 along the vertical axis.[6] The corruption perceptions index (from Transparency International, Berlin) is constructed from information obtained from businessmen who are willing to report how often and how forcefully bribes and the like are demanded of them in various countries, and how high these are. The index extends from zero, in countries where corruption is greatest, to ten, where corruption is practically nonexistent (as, for example, in Finland and Denmark). The picture shows a clear and statistically significant relationship: corruption, as measured by this index, increases from one country to the next in accordance with the increase in natural resource abundance or intensity. When the share of natural capital in national wealth goes up by 15 percentage points, the corruption perceptions index drops (i.e., corruption increases) by two points. The rank correlation is -0.52.[7]

Similar results obtain when natural resource abundance or intensity is instead measured by the share of the primary sector in the labor force, 1965-1990 (Figure 3b). Now we have data for many more countries, or 88 rather than 60. The correlation is

[6] Corruption rankings for earlier years (1995-1999) give similar results.
[7] When the corruption index is purged of that part which is caused by initial income, the results remain unchanged.

again quite significant; the Spearman rank correlation is -0.67.

Figure 3c shows the cross-sectional relationship between corruption and economic growth. The figure suggests that an increase in the corruption perceptions index (i.e., a decrease in corruption) by one point from one place to another goes along with an increase per capita growth by almost one percentage point per year on the average, for given initial income.[8] This is not a small effect – if it is an effect, that is, as opposed to a mere correlation.[9] The pattern is quite significant; the rank correlation is 0.78. The number of countries is 64.

Taking Figures 3b and 3c together, we see that an increase in the primary labor share by 16 percentage points goes hand in hand with a decrease in the corruption perceptions index by one point (Figure 3b), which in turn goes along with a decrease in per capita growth by one percentage point per year on the average, for given initial income (Figure 3c). Here we have another possible reason why natural resource abundance or intensity appears to inhibit economic growth across countries.

Channel 3: Education and human capital

Third, natural resource abundance or intensity may reduce private and public incentives to accumulate human capital due to a high level of non-wage income – e.g., dividends, social spending, low taxes. Awash in cash, natural-resource-rich nations may be tempted to underestimate the long-run value of education. Of course, the rent stream from abundant natural resources may enable nations to give a high priority to education – as in Botswana, for instance, where government expenditure on education relative to national income is among the highest in the world. Even so, empirical evidence shows that, across countries, school enrolment at all levels is inversely related to natural resource abundance or intensity, as measured by the share of the labor force engaged in primary production (Gylfason, Herbertsson, and Zoega, 1999). There is also evidence that, across countries, public expenditures on education relative to national income, expected years of schooling, and school enrolment are all inversely related to natural resource abundance (Gylfason, 2001; see also Temple,

[8] Notice that the growth measures are slightly different in Figures 2b and 3c. The reason is that the adjustment for initial income in the two figures is based on different measures of natural resource abundance, the natural capital share in Figure 2b and the primary labor share in Figure 3c. This difference has no material effect on the patterns displayed in the figures.

[9] For comparison, Mauro (1995) presents econometric evidence that suggests that a decrease in the corruption index by one point (i.e., increased corruption) from one country to the next is associated with a reduction in per capita growth of one-quarter a percentage point per year on the average.

1999). Once again, abundant natural capital appears to crowd out human capital. This matters because more and better education is good for growth.[10]

As far as economic growth is concerned, however, the supply of education may matter less than demand (Birdsall, 1996). This is relevant here because public expenditure on education tends to be supply-led and of mediocre quality, and may thus fail to foster efficiency, equality and growth, in contrast to private expenditure on education, which is generally demand-determined and thus, perhaps, likely to be of a higher quality and more conducive to growth. For this reason, I prefer to use school enrolment rates rather than public expenditures on education as a measure of education in the empirical analysis to follow.

Figure 4a shows a scatterplot of secondary-school enrolment as a percentage of each cohort from 1980 to 1997 on the vertical axis and, on the horizontal axis, the natural capital share measured as in Figures 2a and 3a. Imperfect though it is, secondary-school enrolment is the most commonly used yardstick for education in the empirical growth literature. Even so, other measures of education such as primary-enrolment rates, tertiary-enrolment rates, public expenditures on education, and years of schooling for girls or boys yield similar results (Gylfason, 2001). The regression line through the 91 observations suggests that an increase of ten percentage points in the natural capital share from one country to the next is associated with a decrease in secondary-school enrolment by 18 percentage points. The relationship is also statistically significant: the Spearman rank correlation is -0.66.

Figure 4b shows a scatterplot of secondary-school enrolment for both genders from 1980 to 1997 and economic growth. If we fit a straight line through the scatter (not shown), the figure shows that a 25 percentage point increase in secondary-school enrolment goes along with a one percentage point rise in the annual rate of growth of GNP per capita. In fact, the relationship is significantly nonlinear, indicating decreasing returns to education, and it is, moreover, statistically significant (the rank correlation is 0.62). The number of observations is 87. It needs to be emphasized that school enrolment reflects, at best, the quantity of education provided rather than the quality of education received. Public expenditure on education is also positively correlated with economic growth across countries in our sample (not shown), but the correlation is not significant in a statistical sense.

[10] For a survey of education and growth in OECD countries, see Temple (2000).

Taking Figures 4a and 4b together, we see that, across countries, secondary-school enrolment is inversely related to natural resource abundance and directly related to economic growth. Specifically, an increase in the natural capital share by 25 percentage points goes along with a decrease in secondary-school enrolment by 45 percentage points according to Figure 4a, which, in turn, goes along with a decrease in economic growth by almost two percentage points by Figure 5b. Therefore, natural resource abundance seems capable of reducing economic growth significantly, not only through the Dutch disease, rent seeking, and overconfidence that tends to reduce the quality of economic policy and structure, but also by weakening public and private incentives to accumulate human capital. If so, the adverse effects of natural resource abundance on economic growth since the 1960s that have been reported in the literature may in part reflect the effect of education on growth.

How can we interpret these results? Natural-resource-based industries as a rule are less high-skill labor intensive and perhaps also less high-quality capital intensive than other industries, and thus confer relatively few external benefits on other industries (Wood, 1999). Moreover, workers released from primary industries, such as agriculture, fisheries, forestry, or mining, generally have relatively limited general, labor-market relevant education to offer new employers in other industries. There are exceptions, though, such as in modern agriculture and, indeed, in high-tech oil-drilling operations. But insofar as high-skill labor and high-quality capital are less common in primary production than elsewhere, this may help explain why natural resource abundance and the associated preponderance of primary production and primary exports tend to impede learning by doing, technological advance, and economic growth. This linkage reinforces the case for investment in education and training as an engine of growth: more and better education tends to shift comparative advantage away from primary production towards manufacturing and services, and thus to accelerate learning by doing and growth.

Channel 4: Saving, investment, and physical capital

Fourth, natural resource abundance may blunt private and public incentives to save and invest and thereby impede economic growth. Specifically, when the share of output that accrues to the owners of natural resources rises, the demand for capital falls, and this leads to lower real interest rates and less rapid growth (Gylfason and

Zoega, 2001). Moreover, if mature institutions are conducive to an efficient use of resources, including natural resources, and if poorly developed institutions are not, then natural resource abundance may also retard the development of financial institutions in particular and hence discourage saving, investment, and economic growth through that channel as well. As in the case of education, it is not solely the volume of investment that counts because quality – i.e., efficiency – is also of great importance. Unproductive investments – white elephants! – may seem unproblematic to governments or individuals who are flush with cash thanks to nature's bounty.

Figure 5a shows a scatterplot of the average ratio of gross domestic investment to GDP in 1965-1998 and natural resource abundance or intensity measured as in Figures 2a, 3a, and 4a. The regression line through the 87 observations, one per country, suggests that an increase of about ten percentage points in the natural capital share from country to country is associated with a decrease in investment by two percent of GDP. The relationship is statistically significant: the rank correlation -0.37.

Figure 5b shows a scatterplot of economic growth as measured in Figures 2b, 3c, and 4b and the average investment ratio over the same period, 1965-1998. The regression line through the 85 observations suggests that an increase in the investment ratio by about five percentage points is associated with an increase in annual economic growth by one percentage point. The relationship is highly significant: the rank correlation is 0.65. The slope of the regression line is consistent with the regression coefficients on investment in cross-country growth equations reported in recent literature (Levine and Renelt, 1992).

In sum, an increase in the natural capital share by 25 percentage points goes along with a decrease in the investment ratio by five percentage points by Figure 5a, which in turn goes along with a decrease in economic growth by one percentage point by Figure 5b. Thus, empirical evidence seems consistent with the idea that an abundance of or heavy dependence on natural resources may erode or reduce the quality of foreign, social, human, and physical capital, and thus stand in the way of rapid economic growth on a significant scale.[11] It is a matter of taste and classification whether the some or even all the mechanisms reviewed above are regarded as additional symptoms of the Dutch disease or as separate channels of transmission from resource dependence to slow growth.

[11] There is also evidence that natural capital may crowd out financial capital. See Gylfason and Zoega (2001).

Natural capital and economic growth

To conclude the story, Figure 6a shows a scatterplot of economic growth per capita from 1965 to 1998 and natural resource abundance as measured in Figures 2a, 3a, 4a, and 5a. The figure covers 85 countries. The growth rate has been adjusted for initial income as before. The regression line through the scatterplot in Figure 6a suggests that an increase of about ten percentage points in the natural capital share from one country to another is associated with a decrease in per capita growth by one percentage point per year on average.[12] The relationship is also significant in a statistical sense (Spearman's rank correlation is -0.64), and conforms to the partial correlations that have been reported in multiple regression analyses where other relevant determinants of growth (investment, education, etc., as well as initial income to account for catch-up and convergence) are taken into account. A relationship of this kind has been reported in a number of recent studies (Sachs and Warner, 1995, 1999; Gylfason and Herbertsson, forthcoming; Gylfason, Herbertsson, and Zoega, 1999).

At last, Figure 6b shows that a similar inverse relationship between natural resources and economic growth emerges when natural resource abundance or intensity is measured by the share of the primary sector in total employment as in Figure 3b. There are now 105 countries in the sample. The relationship is significant. The rank correlation is -0.85. The adjustment for initial income entails a speed of convergence of about 2 percent a year (not shown), a common result in empirical growth research. An increase of 11 or 12 percentage points in the primary labor share from one country to the next is associated with a decrease in per capita growth by one percentage point per year on average, for given initial income. A reduction by one percentage point in any country's annual growth rate is a serious matter because the (weighted) average rate of per capita growth in the world economy since 1965 has been about 1½ percent per year.

[12] There is admittedly an element of statistical bias in Figure 4 in that increased education and investment increase human and physical capital, thereby reducing the share of natural capital in national wealth *and* increasing economic growth. This bias, however, is probably not serious because Figure 6a can be reproduced by using different measures of natural resource abundance, such as the share of the primary sector in the labor force or the share of primary exports in total exports or GDP. See Figure 6b.

II. The Experience of the OPEC Countries and Norway

In most countries that are rich in oil, minerals, and other natural resources, economic growth over the long haul tends to be slower than in other countries that are less well endowed. For example, in Nigeria, with all its oil wealth, gross national product (GNP) per capita today is no higher than it was at independence in 1960. And Nigeria is not alone. From 1965 to 1998, the rate of growth of GNP per capita in Iran and Venezuela was on average -1 percent per year, -2 percent in Libya, -3 percent in Iraq and Kuwait, and -6 percent in Qatar (1970-1995), to mention six other OPEC countries (World Bank, 2000). For OPEC as a whole, GNP per capita actually *decreased* by 1.3 percent on average during 1965-1998 compared with 2.2 percent average per capita growth in all lower- and middle-income countries. King Faisal of Saudi Arabia (1964-1975) would hardly have been surprised, for he described the situation as follows (quoted from a newspaper interview with his oil minister, Shaikh Yamani):

> In one generation we went from riding camels to riding Cadillacs. The way we are wasting money, I fear the next generation will be riding camels again.

Is OPEC an exception? No. The above examples from the OPEC countries seem to reflect a consistent pattern. Of 65 countries that can be classified as natural-resource rich, only four managed to attain both (a) long-term investment exceeding 25 percent of GDP on average from 1970 to 1998, equal to that of various successful industrial countries lacking raw materials, and (b) per capita GNP growth exceeding 4 percent per year on average over the same period. These four countries are Botswana, Indonesia, Malaysia, and Thailand. The three Asian countries achieved this success by diversifying their economies and by industrializing; Botswana, rich in diamonds, without doing so. Of the four, only Indonesia has oil. In East Asia, the countries with few raw materials (Hong Kong, Singapore, South Korea, and Taiwan) have done even better than the resource-rich ones (Indonesia, Malaysia, and Thailand).

But let us not jump to conclusions. The problem is not the existence of natural wealth as such, but rather the failure to avert the dangers that accompany the gifts of nature. It is not inevitable that abundant natural resources prevent the emergence of a dynamic economy or that the discovery of such resources acts to dampen an already developed economy. Natural resources can be a blessing as well as a curse. Norway, indeed, is a case in point. The world's second largest oil exporter (after Saudi-Arabia),

Norway shows as yet no clear symptoms of the Dutch disease – other, perhaps, than a stagnant ratio of exports to GDP, albeit at a rather high level, or about 40 percent of GDP, since before the oil discoveries, indicating that Norway's oil exports have crowded out non-oil exports krone for krone relative to income (recall Figure 1a). Moreover, as we saw in Figure 1b, Norway has attracted a relatively limited, yet gradually increasing inflow of gross foreign direct investment, equivalent to 8 percent of GDP in 1998 (adjusted for purchasing power parity; see World Bank, 2000), far below the figures for Sweden and Finland next door (23 percent and 36 percent). Nor does Norway show any signs yet of socially damaging rent-seeking behavior even if increasingly loud calls are being voiced for using more of the oil revenue to address domestic social needs rather than continue to build up the government-owned oil fund, which is invested in foreign securities. There are no signs either of a false sense of security or of an inadequate commitment to education, on the contrary. Growth has thus far remained stubbornly high. Even so, some observers of the Norwegian scene have recently expressed concerns that some deep-seated structural problems in the country's education and health care sectors (government monopoly, insufficient competition, low efficiency, etc.) may be misdiagnosed as financial problems because the money available from the oil fund may blunt the willingness of politicians to undertake difficult structural reforms.

One of the factors that separates Norway's experience from that of OPEC is timing. Norway was already a developed country at the time of the oil discoveries in the 1970s. Most importantly, Norway's social institutions were mature and the financial system relatively developed, although by no means fully liberalized. All of this facilitated judicious and far-sighted management of Norway's oil wealth, at least compared with most other oil producers (Hannesson, 2001). In contrast, full-fledged capitalist development did not take place in most OPEC countries prior to the discovery of their oil resources, or since for that matter (Karl, 1997). While Norway has built up substantial assets abroad, Saudi-Arabia has accumulated debts.

Norway has charted a long-run-oriented, tax-based, and reasonably market-friendly approach to the management of its vast oil resources. Exactly how vast they are depends on oil prices, which are quite volatile: estimates of the oil wealth range from 50 percent to 250 percent of GNP (Thøgersen, 1994). According to Section 1-1 of the Petroleum Act of 1996, the title to petroleum deposits on the Norwegian continental shelf is vested in the State. This means that, in principle, all the rent from

oil and gas should accrue to the Norwegian people through their government. The State's title to these resources constitutes the legal basis for government regulation of the petroleum sector as well as for its taxation in accordance with the Petroleum Taxation Act of 1975.

Exploration and production licenses are awarded for a small fee to domestic and foreign oil companies alike. Why small? Because the Norwegian government has decided to expropriate the oil and gas rent through taxes and fees as well as direct involvement in the development of the resources rather than through sales or auctioning of exploration and production rights (OECD, 1999). The State has a direct interest in most offshore oil and gas fields and, like other licensees, receives a corresponding proportion of production and other revenues, roughly 40 percent of the total. Through its direct partnership with other licensees as well as through various taxes and fees, it is estimated that the Norwegian State has managed to absorb about 80 percent of the resource rent since 1980.[13] Thus, in 1997, revenues from petroleum activities accounted for more than a fifth of total government revenues and were equivalent to 9-10 percent of Norway's mainland GNP, or 8-9 percent of total GNP, including oil. In 2000, the oil sector's contribution rose to more than 25 percent of GNP, but it is envisaged to drop to 5 percent by 2020. The oil revenue is deposited in the Norwegian Petroleum Fund, which is being built up and invested mostly in foreign securities for the benefit of the current generation of Norwegians when they reach old age as well as for future generations, and also in order to shield the domestic economy from overheating and possible waste – a shrewd strategy, efficient and fair.

At the same time, however, a variable proportion of each year's net oil-tax revenue is transferred from the Government Petroleum Fund to the fiscal budget, essentially to cover the non-oil budget deficit. The proportion of net tax revenues from petroleum thus transferred to the government budget was about one-fourth in 1997 and almost 40 percent in 1998, but is envisaged to drop to less than ten percent in the years ahead. Even so, the Norwegians have not been tempted to expand their central government beyond reasonable limits as a result of the oil boom. Even 20 years after discovering their oil, the Norwegians continue to content themselves with smaller central government than Denmark, Finland, and especially Sweden. On the other hand, local governments (municipalities and counties), which employ over three

[13] The main revenue items are corporate tax (28 percent) and a special resource surtax (50 percent), but also royalty (8-16 percent), area fee, and carbon-dioxide tax.

quarters of all public-sector workers and almost one fourth of the entire labor force (OECD, 1998), a doubling since 1970, have not managed to exercise similar restraint, but they do not have oil-tax revenue to fall back on except perhaps indirectly through income transfers from the central government. Since 1980, public employment in Norway has increased by almost 60 percent, compared with a 20 percent increase in Denmark over the same period and no increase at all in Sweden. However, the social cost of local government expansion is probably smaller than that of central government expansion, krone for krone, other things being the same. The reason is that local governments, especially in sparsely populated countries such as Norway, are typically more efficient providers of public services like education and health care than the central government because of their closer proximity to their clients.

As indicated before, Norway's long tradition of democracy and market economy since long before the advent of oil has probably helped immunize the Norwegian people from the ailments that inflict most other oil-rich nations. Large-scale rent seeking has been averted in Norway, investment performance has been adequate, and the country's education record is excellent. For example, the proportion of each cohort attending colleges and universities in Norway rose from 26 percent in 1980 to 62 percent in 1997. It is not certain, however, whether the average quality of college education in Norway has changed in tandem with – or perhaps, as some fear, in inverse proportion to – the huge increase in enrolment since 1980.

Even so, Norway faces challenges. Some (weak) signs of the an outbreak of the Dutch disease can be detected, as was indicated above, notably stagnant exports, the absence of a large, vibrant high-tech manufacturing industry (as in Sweden and Finland next door), and sluggish foreign direct investment. But perhaps the main challenge is to make sure that the oil fund does not instill a false sense of security, a feeling that anything goes and that difficult decisions can be deferred or avoided. To this end, it may be necessary to find ways to immunize the fund from political interference, just as other key institutions – the courts, media, and now even central banks – have been depoliticized over the years. Such immunization may require privatization, by, for example, turning the oil fund over to the people in the form of pension savings. It is not certain, however, that such a solution would be perfect, for the private sector is not infallible either. Another, intermediate solution might be to invest the authority to dispose of the oil revenues in a special independent, yet democratically accountable and fully transparent authority in accordance with the

spirit of modern central banking legislation in countries that have granted their central banks and financial inspection agencies substantial independence from political interference. Perhaps it would be most advisable to adopt a mixed strategy, with shared public and private responsibility for the disposal of the oil wealth, in order to spread the risks and reconcile different points of view.

III. Concluding Remarks

Natural resources bring risks. One is that too many people become locked in low-skill intensive natural-resource-based industries, including agriculture, and thus fail through no fault of their own to advance their own or their children's education and earning power. Another risk is that the authorities and other inhabitants of resource-rich countries become overconfident and therefore tend to underrate or overlook the need for good economic policies and institutions as well as for good education and good investments. In other words, nations that believe that natural capital is their most important asset may develop a false sense of security and become negligent about the accumulation of foreign, social, human, and physical capital. Indeed, resource-rich nations can live well of their natural resources over extended periods, even with poor economic policies and institutions and a weak commitment to education. Awash in easy cash, they may find that difficult reforms do not pay. Nations without natural resources have a smaller margin for error, and are less likely to make this mistake. In resource-rich countries, awareness of these risks, as well as a conscious effort and ability to contain them, is perhaps the best insurance policy against them.

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Figure 1a. Arab Countries: Exports of Goods and Services 1960-1999 (% of GDP)

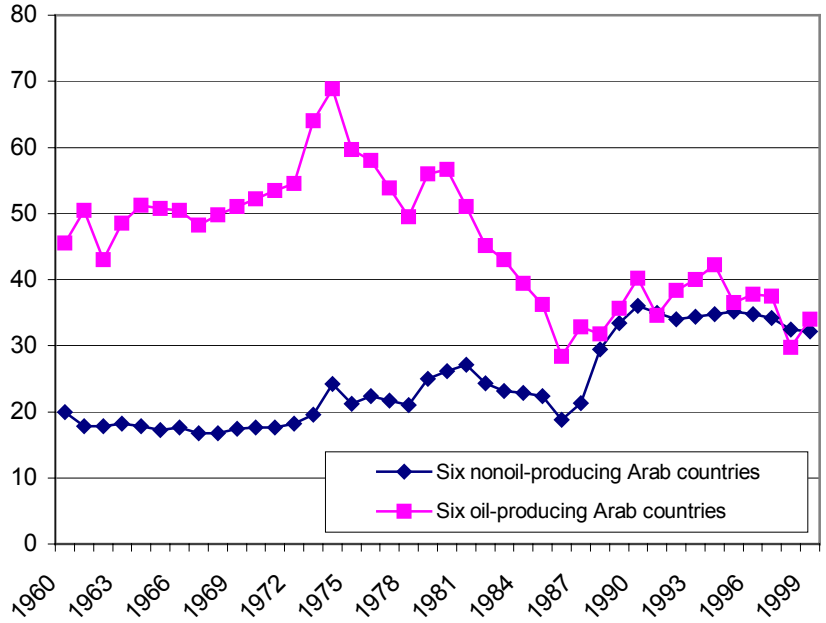

Figure 1b. Arab Countries: Gross Foreign Direct Investment 1975-1999 (% of GDP, ppp)

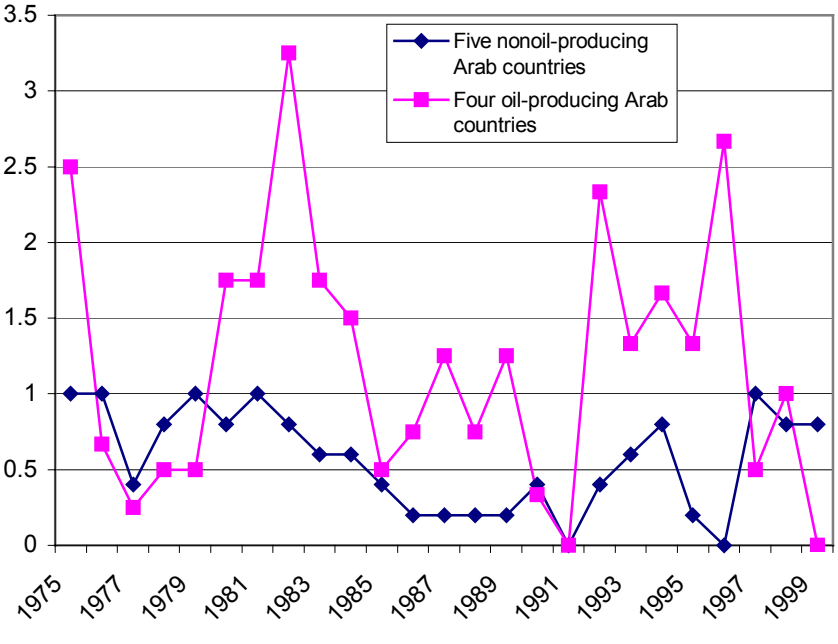

Figure 1c. Arab Countries: Manufacturing Exports 1963-1999 (% of Total Exports)

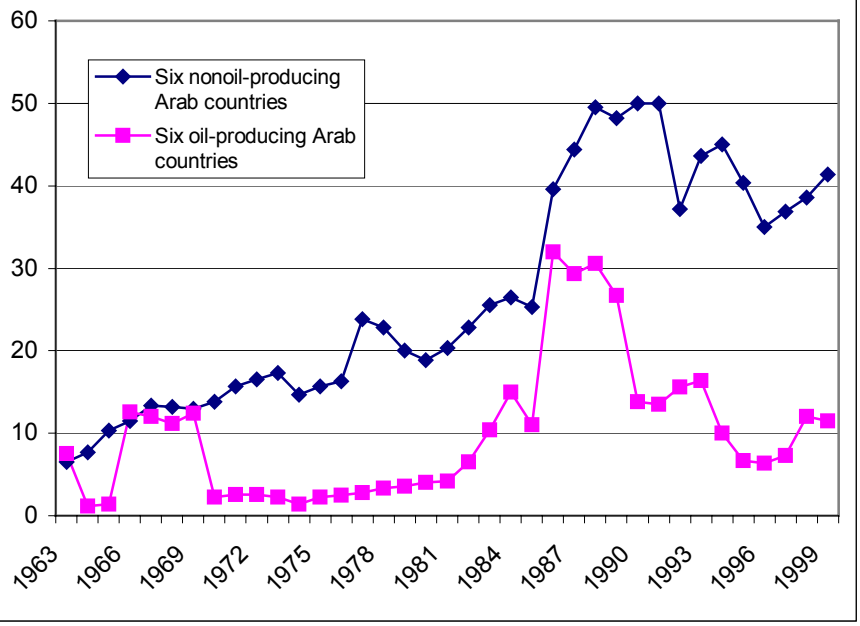

Figure 2a. Natural capital and openness 1965-1998

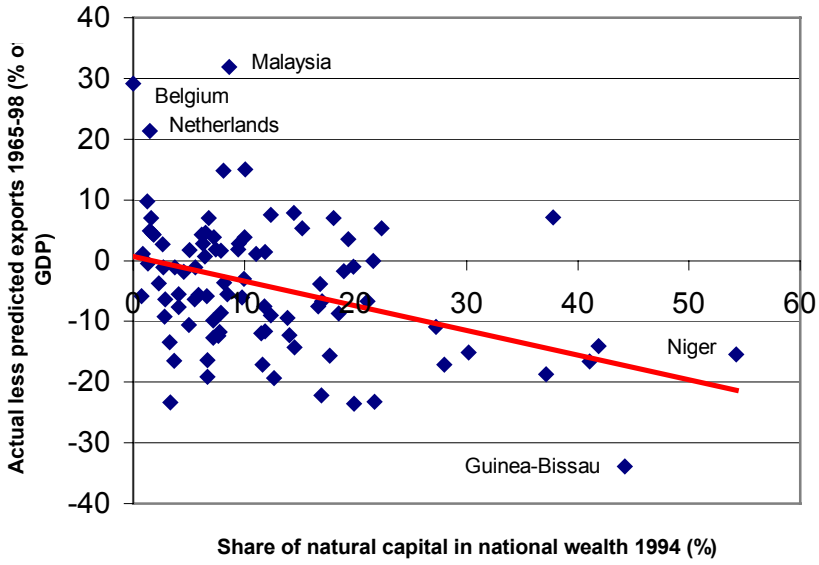

Figure 2b. Openness and economic growth 1965-1998

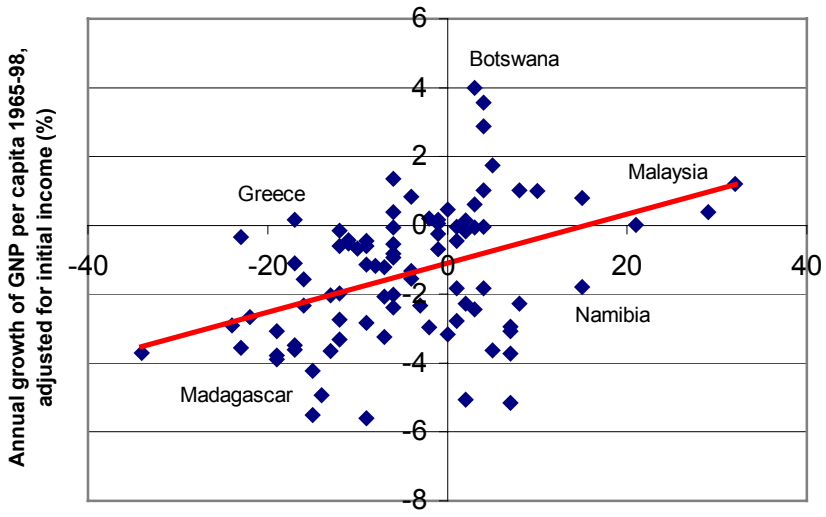

Figure 3a. Corruption and natural capital 1994-2000

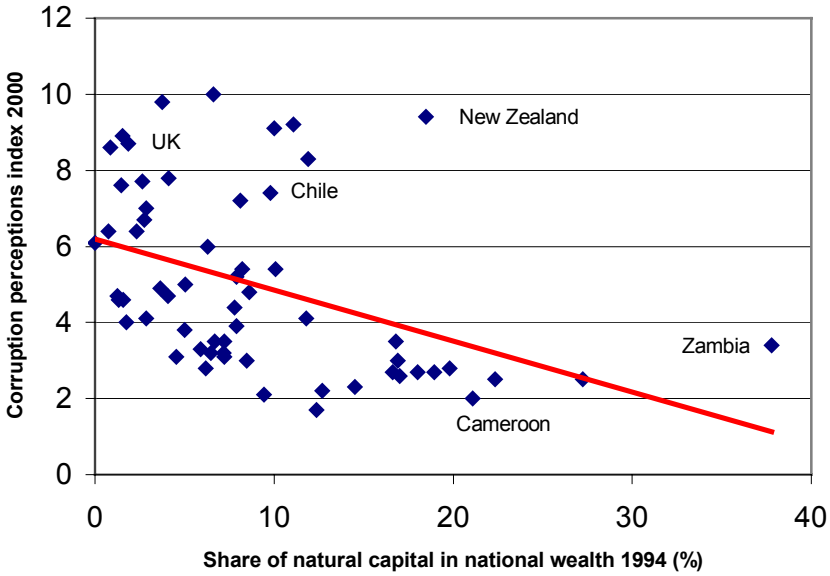

Figure 3b. Corruption and employment in primary sector 1965-1990 (% of labor force)

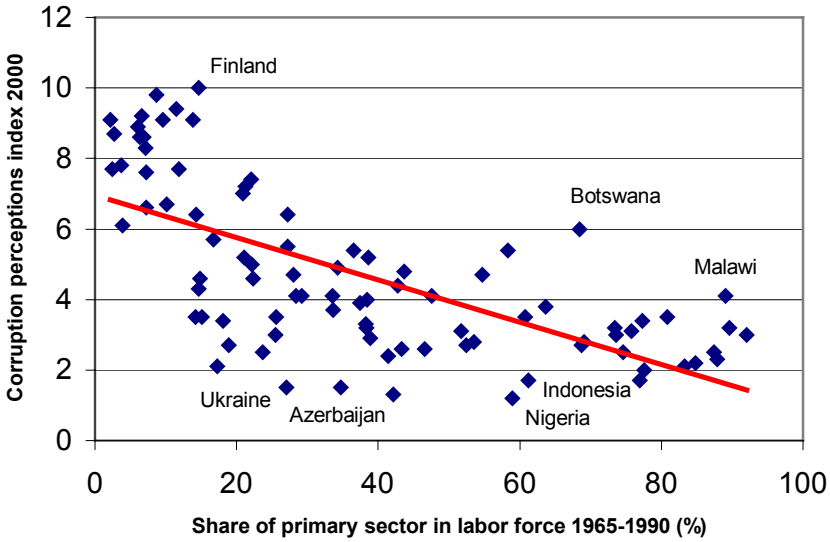

Figure 3c. Corruption and economic growth 1965-1998

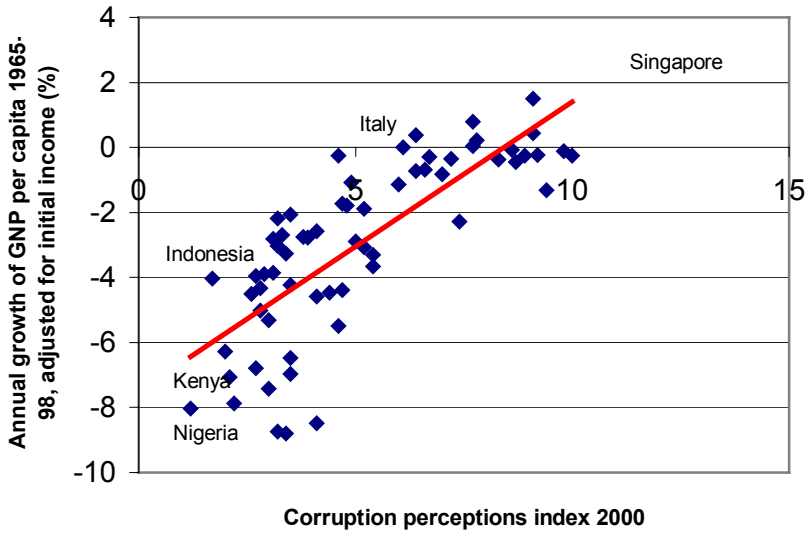

Figure 4a. Education and natural capital 1980-1997

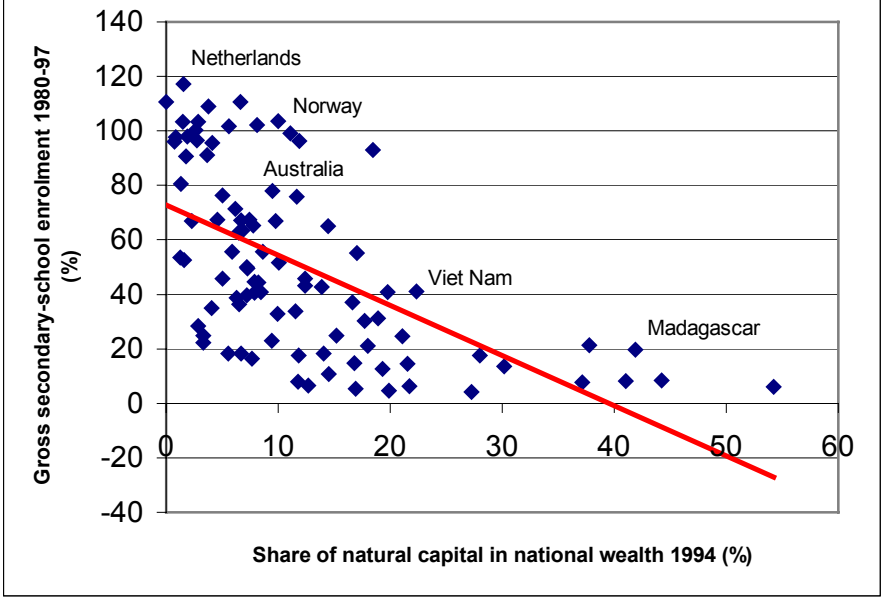

Figure 4b. Education and economic growth 1965-1998

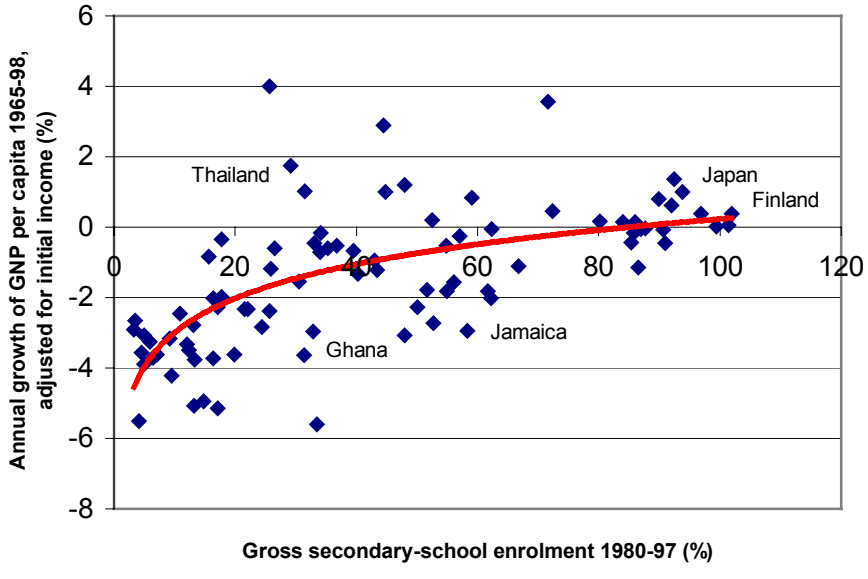

Figure 5a. Investment and natural capital 1965-1998

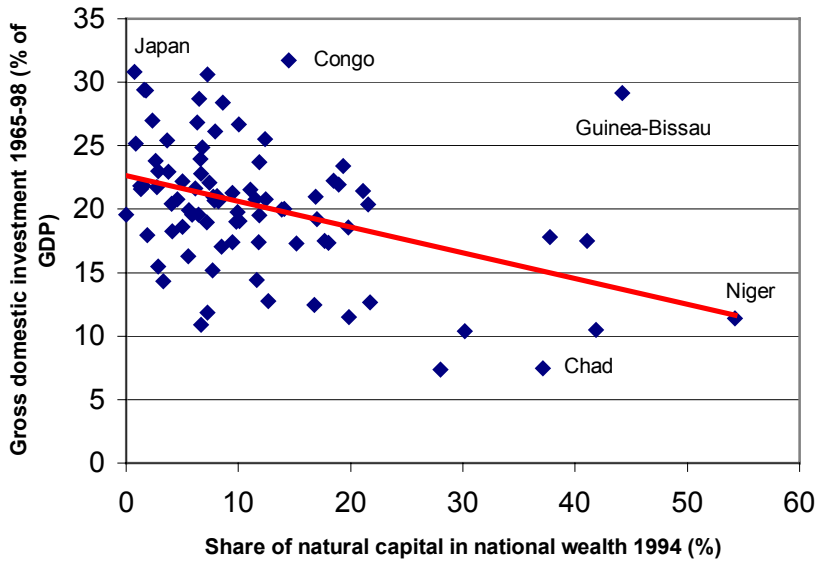

Figure 5b. Investment and economic growth 1965-1998

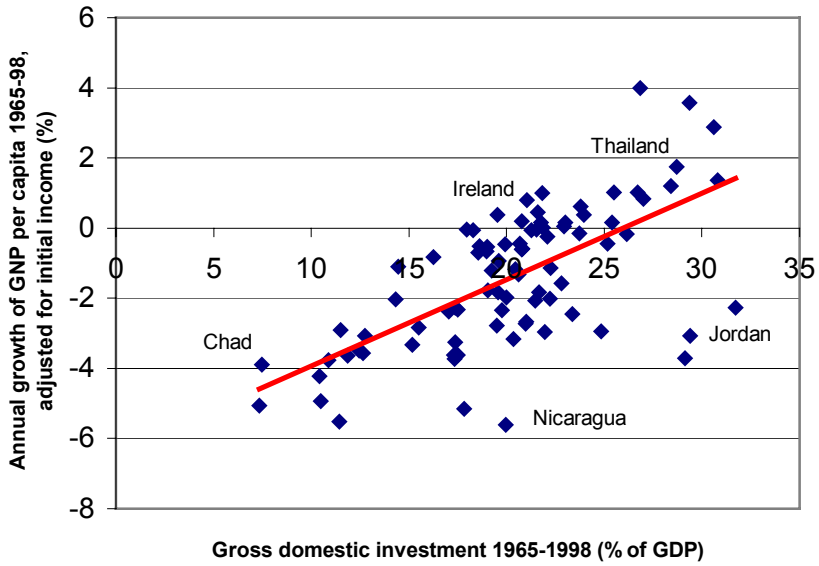

Figure 6a. Natural capital and economic growth 1965-1998

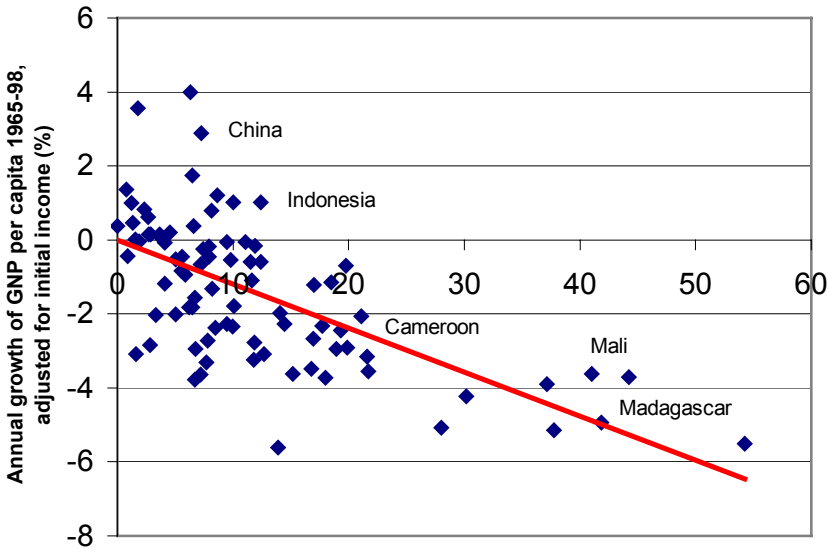

Figure 6b. Natural resources and economic growth 1965-1998, again