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**How to Handle the Macroeconomics of Oil Wealth**

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**Resource Curse**

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## Chapter 7: How to handle the macroeconomics of oil wealth?

Jeffrey Sachs

### Abstract

The idea that oil is a “curse” is only partly true. On many measures oil rich states are doing well. Nonetheless, the economic performance of oil economies has fallen far short of potential, and sometimes disastrously so. One reason for this is that large earnings from oil and other natural resources can have adverse effects on other sectors of economies, particularly those sectors that can be motors for sustained economic growth. This problem arises when oil earnings are used for consumption rather than for public investment. The solution lies in a long run growth focused investment strategy. With the correct investment strategy non-resource export sectors can benefit from increased natural resource earnings and indeed it is possible to reverse the infamous Dutch disease by generating growth in sectors that are central for poverty alleviation but that are in practice non-tradable (including food production) alongside real exchange rate depreciation.

## Introduction

The idea that oil is a “curse” is only partly true. Oil is, of course, an enormously valuable resource, that can bring enormous economic benefits to an economy. As a general matter, oil-rich states have actually tended to outperform their neighbors which lack oil. This is illustrated in Table 7.1, where regional comparisons are made using the most recent available data. We can see in the table that as a general rule, oil-rich countries, region by region, tend to have higher per capita income levels (in purchasing power terms). This often corresponds to higher levels of private consumption as well. In most other categories of well-being -- life expectancies, child mortality rates, electricity use per capita, paved roads -- oil producers are better off than their oil poor counterparts. Sometimes the gap is statistically significant, though often not. There is no generalized tendency, to be sure, for oil-rich countries to perform economically less well than oil-poor counterparts in terms of *levels* of economic performance.

Table 7.1

Indicators of Welfare Across Regions

	CIS		Latin America		Middle East		Sub-Saharan Africa	
	<i>Oil</i>	<i>Non-Oil</i>	<i>Oil</i>	<i>Non-Oil</i>	<i>Oil</i>	<i>Non-Oil</i>	<i>Oil</i>	<i>Non-Oil</i>
Oil production (barrels/cap/year)	19.2	0.7	31.6	2.5	161.7	1.4	46.0	0.1
Life Expectancy	63.7	66.5	72.3	68.7	71.7	70.7	51.3	45.1
Child Mortality (deaths per 1,000 live births)	71.8	63.0	22.7	40.3	27.1	32.7	149.3	173.5
GDP per capita (PPP)	6012	2384	6086	4581	9959	4202	5109	1178
Net Primary School Enrollment (%)	85.5	86.5	94.0	94.0	81.4	90.7	72.3	62.0
Roads (km paved/1000 pop)	4.2	4.0	3.4	5.0	5.2	1.4	5.2	3.2
Electricity (KWh produced/cap)	3705	2586	3029	781	7147	1681	304	283

**Source:** Authors calculations based on World Bank data

The “curse” is real, however, in one important sense: economic performance of oil economies has fallen far short of potential, and sometimes disastrously so. Oil earnings have rarely lived up to the plausible expectation that they should be a stimulus to long-term economic development. Many oil-rich countries experienced declines in per capita income

between 1970 and 2000, and quite a few fell into deep debt crises. The curse -- that oil earnings often do not translate into long-term development -- is not a matter of fate, however. Oil can be a springboard to development. This paper discusses ways to turn oil and gas holdings to the advantage of long-term economic development.

### **Oil in the context of national development strategies**

Despite the checkered history, oil in principle should offer three huge benefits for poor oil states. First, the oil income itself can boost real living standards by financing higher levels of public and private consumption. This has typically been the case. Second, oil can finance higher levels of investment, both out of oil income itself and out of borrowing made possible by the oil income. Third, since the oil income typically accrues largely to the public sector, and indeed to the public budget, the oil can obviate one huge barrier to development: the lack of fiscal resources needed to finance core public goods, including infrastructure. The point, of course, is that oil is not only part of national income, but also of *fiscal* income, with the potential advantage of financing *public* investments that are inevitably a key part of any coherent development strategy.

The starting point of managing oil, therefore, is taking a long-term view of national development. While volumes can and have been written on appropriate development strategies, and while circumstances necessarily differ across countries, some general principles are helpful.

First, development depends on a *mixed* economy, in which both public and private investments contribute to economic growth. Public investments are needed to finance two kinds of goods: public goods and merit goods. Public goods are goods that are *under-provided* by the private-sector in a market economy, generally because the goods are non-rival or non-excludable or both.<sup>1</sup> Public goods include national defense, the rule of law, environmental protection, scientific research, infectious disease control, and basic infrastructure networks (roads, power, urban water and sanitation). Even when some of these goods are technically excludable (e.g. access to roads can be rationed by toll booths or permits for use), it is often very inefficient to exclude potential users because marginal costs of new users are low. Merit

goods are goods that on principle should be available for everybody in the society for the sake of social harmony and justice. Merit goods include basic health care, basic education, social insurance for unemployment and disability, safe drinking water and sanitation, adequate basic nutrition, and safe shelter. The provision of merit goods to the poorest members of society has spillover benefits for the entire society in the form of enhanced political and social stability.

Second, public investments should be based on a sound macroeconomic strategy, meaning a budgetary framework that preserves both short-run macroeconomic stability and long-term fiscal solvency. Macroeconomic stability entails overall price stability, and the absence of abrupt cuts in spending that result from a sudden worsening of credit terms. Fiscal solvency, of course, means the management of the public sector to maintain the ability to service public debts without crisis. The investment framework should take account of the inherent instability of oil earnings on a year-to-year basis, and the eventual depletion of oil reserves. Both because of volatility and depletion, it is useful to distinguish a “sustained” or “permanent” level of oil income flows as distinct from the oil earnings in any particular year. Based on the long-term profile of oil income, a sound public investment profile should be adopted for incorporation into annual and medium-term (say 5-year) budget frameworks.

Third, the public investment spending should be seen as a complement rather than substitute for private investment spending. In practice, this means achieving a clear understanding of the respective roles of the public and private sectors in the economy. Public investments should be focused on public goods and merit goods, leaving the private sector free to build a private-owned economy alongside the public investments. The major public sector investments come down to infrastructure, health, education, social security, and knowledge creation (especially basic science). Private sector investments focus on the rest: agriculture, mining, manufacturing, and non-state services.

Fourth, the public investment spending should be part of a development strategy with a time frame of a decade or more, since many public investments have long lead times. The Millennium Development Goals (MDGs) provide an enormously useful framework for such a development strategy, because the MDGs set bold but achievable poverty-reduction goals

which have been endorsed by all of the world's governments. The MDGs therefore offer the enormous practical advantage to poor countries that they can appeal for help to the rich donor "development partners." Of course, "stretch goals" raise special challenges. If public investment projects are scaled up too quickly, inefficiencies are bound to multiply because of limited absorptive capacity in the domestic economy. For example, increased physical investments in health and agriculture (e.g. clinics, irrigation systems) are far more effective when they are combined with multi-year training programs for workers in those sectors, to avoid skill shortages and other bottlenecks. The MDGs are achievable in all parts of the impoverished world (see the UN Millennium Project Report, 2005), but require sophisticated intersectoral planning on a decade-long timetable to achieve them.

### **Oil and Public Investments**

The key recommendation of this paper is that oil earnings in low-income countries should be turned into public investments rather than into increased private consumption. Most poor countries are severely constrained in their development by the under-provision of public goods. Economic development, though undoubtedly requiring a predominance of the private sector in agriculture, industry, and services, also depends on core public goods. These are generally deficient, sometimes so much so that their absence impedes investments by the private sector and leaves countries in a poverty trap. The poverty trap works as follows. The profitability of private investment depends on complementary public investments (in key infrastructure, health, education, etc.). Public investments, however, require budgetary outlays. In impoverished countries, those outlays are constrained by poverty itself. Typically, the government is not creditworthy, and therefore cannot borrow the needed investment funding from private capital markets. Thus, poverty leads to under-investments in public goods, which in turn lead to under-investments in the sector, and poverty continues or worsens (for example, because of continued population growth). The causal chain, and vicious circle, is therefore as follows:

Poverty → Lack of public finance → Lack of public goods → Lack of Private investment → Poverty

Oil earnings, at least in principle, allow countries to break out of this trap. The key is to use the oil earnings in a responsible manner to finance outlays on public goods that serve as the platform for private investment and long-term growth. When oil earnings rise and are successfully invested in public goods of various sorts, the resulting economic activity and stimulus to private investment should lead to higher incomes, improved budgetary resources *including non-oil income*, and therefore increased possibilities of financing public goods through an overall rise in economic activity. Even as oil resources are depleted, or diminished by declines in world oil prices, a strengthened private sector economy should be able to compensate.

In this view, the popular idea of dividing the oil earnings into “citizen shares” and distributing the purchasing power to the public, as has been done in Alaska, is generally the wrong answer in poor countries, where public investment outlays rather than private consumption spending is typically needed to break out of a poverty trap. Even when increased private consumption is an urgent short-run objective for vulnerable groups, e.g. for the elderly or for people in extreme hunger, targeted public outlays rather than a general distribution of oil income will be preferable. Some of those outlays may be direct cash transfers (e.g. for the elderly), but more often they should be in the form of public services (such as health care) or the provision of inputs for private producers (such as fertilizers and improved seeds for smallholder farmers, or the extension of microfinance).

In any event, there is a strong case against transferring a depleting resource solely to the current generation, rather than spreading the benefits across the current and future generations. Inter-generational sharing is best accomplished through fiscal means. Norway, for example, invests its hydrocarbon income in the Government Pension Fund in order to spread consumption benefits to future generations, mainly by accumulating assets that will help indirectly to fund future pension benefits to be paid by the government’s social security system (see Chapter 8).

### **Public investments within an overall development strategy**

A successful development strategy should include three components:

- (1) a time path of public investments suited to the national circumstances
- (2) an economic policy framework to support private-sector economic activity
- (3) a political framework to ensure the rule of law and macroeconomic stability

The detailed sequence of public investments must of course be based on the context of each country. For the poorest oil countries, the overriding goal is to use oil income to enable the economy to meet basic needs (food, safe drinking water, essential health services, basic education) and to put in place the infrastructure (power, irrigation, roads, ports, telecoms, internet) for private-sector-led economic growth. For middle-income oil countries, the overriding goal is typically to promote the transition from a resource-based rural economy (including agriculture, oil, and other mining) to a human-capital and knowledge-based urban economy. Key investments typically need to be made in knowledge creation and diffusion (higher education, scientific institutions) as well as in infrastructure in fast-growing urban areas. For high-income oil countries (e.g. Norway), which already have extensive physical infrastructure as well as well-endowed systems of higher education and science, a priority for oil earnings may be to support the budget burdens of social insurance (e.g. pensions, low-income support, public-sector insurance).

In the poorest oil-exporting countries, e.g. Sao Tome e Principe, Nigeria, the prevailing conditions are characterized by a rural economy in extreme poverty and an absence of basic infrastructure (power, water and sanitation, roads, rail, telecoms, primary education, primary health care). Generally, these countries have long ago developed public investment strategies for each of these key sectors, but have been unable to fund those strategies because of a lack of fiscal resources and an inability to tap into private capital markets for project financing. A key priority for the poorest countries should be the power sector itself. Many impoverished oil economies export their oil and gas without developing their own modern energy system. Yet exporting the hydrocarbons without a strategy for expanding access to electricity and refined products can be a major lost opportunity, one exemplified by the situation in Chad, where the country is exporting its limited oil reserves while depending for the vast majority of its energy needs on burning biomass. Other investment priorities are likely to include the construction of a road system, port facilities, access to safe drinking water and sanitation, a



fiber optic network for telecoms and internet, primary schools, and primary health services (including community health workers, village-based dispensaries, local clinics, and hospitals).

The Millennium Development Goals, as already noted, offer a useful “checklist” and organizing structure for public investments in poor countries. The eight MDGs call for decisive progress against extreme poverty in all its major dimensions -- low income, high disease burden, hunger, lack of schooling, lack of safe childbirth (and attendant high maternal mortality), environmental degradation, and lack of access to basic amenities including safe drinking water and sanitation. Many middle-income countries are on track to achieve most or all of the MDGs (with maternal mortality and environmental goals being the most frequent exceptions), while the poorest countries are often far off course from achieving most or even any of the goals. The most glaring gaps between the MDGs and current trajectories are found in sub-Saharan Africa. The UN Millennium Project has emphasized the centrality of increased public investments needed to achieve the MDGs, in key sectors including agriculture, education, health, and infrastructure (power, roads, ports, telecoms).

### **Some Distinctive Aspects of Development Strategies in Hydrocarbon Economies**

Oil is different from other sources of national income, in that the preponderance of the income stream is a natural resource *rent* rather than the returns to reproducible capital (such as factories, machinery) or human capital (education, health). For this reason alone, it is easy for the state to appropriate the natural resource income (e.g. through nationalization), if it does not own the resource base in the first place. In fact, public ownership of hydrocarbon reserves is the norm. Major fields are often located on public lands or in public waters in the first place. Public ownership of hydrocarbon resources is often required by the national constitution. And where private owners are in control of oil fields, they often must transfer licit and illicit shares of oil earnings to governments and political leaders in order to maintain their share of the rents.

Treating the oil earnings as a simple rental income, however, is misleading in two important ways. First, a considerable investment of reproducible capital is required to produce the hydrocarbons, both for exploration and development of fields, and of course storage and transport. By “overtaxing” the oil flows, and thereby reducing or eliminating the returns to reproducible capital, the amount and value of the oil ultimately produced from a given field may be adversely affected. Second, since oil is a depleting commodity, the flow of oil income is in fact a conversion of natural capital (oil in the ground) into financial capital, and from there into consumption or into other kinds of capital such as human capital or reproducible physical capital. A sound investment strategy must take into account the time paths of oil production and depletion, so that the time paths of investment and consumption will be smoothed over time (see Chapter 6).

Oil is distinctive for other reasons as well. The world price of oil is highly unpredictable and subject to large swings. Therefore, to the extent that the government relies on oil income for a significant part of budget revenues, policy makers must anticipate unpredictable and variable budgetary revenues. These pose enormous risks to macroeconomic stability. There are three basic approaches that have been taken address these risks. The first is hedging against future price changes, e.g. in the futures markets, but hedging possibilities are generally limited to the near term of a year or so. The second is to budget based on estimates of “permanent” oil flows based on predictions of long-term average prices and quantities, rather than on short-term income based on current prices and current production levels. The third is diversification, through privatization of public-sector holdings of oil, and investment of the cash value from privatization in a diversified portfolio. This third option depends on the ability of the government to carry out a privatization program which secures a market bid for the oil fields reflective of their actual present value. As argued by Stiglitz in Chapter 2 of this book, such returns might be difficult if not impossible to achieve because of problems of asymmetric information and lack of enforcement of property rights subsequent to privatization (both of which lead prospective bidders to underbid the expected net present value of the oil income).

Another aspect of oil revenues is that they often can serve as a kind of collateral or security for international borrowing by the government. As a result, it is possible that following an

oil boom (caused either by rising international prices or increasing production) a government will be able to increase spending more than one for one with the increased oil earnings, by borrowing in international capital markets against the increased future flow of oil income. Many oil exporting countries in the midst of an oil export boom have actually ended up deeply in debt, since they spent more than 100% of the increased oil income. If future oil incomes were wholly predictable, borrowing against future oil earnings in order to raise public investment spending might indeed make good sense. Given the enormous uncertainties of oil income flows, however, borrowing against future oil earnings can be treacherous.

### **The Exaggerated Fear of Dutch Disease**

One of the possible harms of an oil export boom is that the rise in oil earnings leads to increased public and private spending which in turn leads to a sharp appreciation of the real exchange rate, and then to a decline in non-oil exports and to slower economic growth. This pattern is called a “Dutch Disease,” and is named after the overvaluation of the Dutch Guilder in the wake of a boom in the Netherlands’ natural gas earnings in the 1960s. The frequent counsel given to oil states is therefore to refrain from spending much of the increased oil earnings, and rather build up financial assets, in order minimize real exchange rate appreciation.

The proposed mechanism is understood in an economic framework which draws the distinction between internationally traded goods on the one hand, and non-traded goods and services on the other. When spending increases following an oil boom, the increased spending falls both on traded and non-traded goods. Traded goods include sectors such as cash agriculture (coffee, tea, cocoa) and manufactures (processed foods, textiles, apparel), which are traded in world markets. Non-traded goods include food production for local use (maize, cassava) or local services.

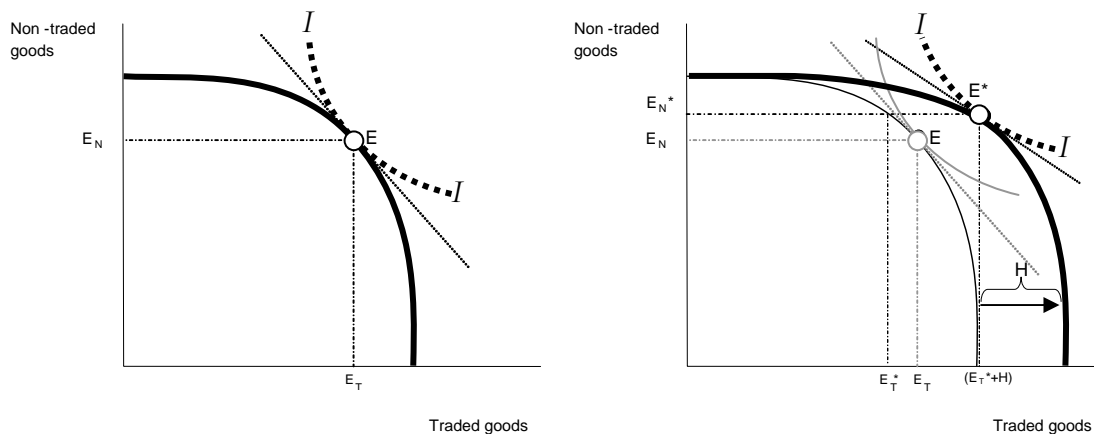
The dollar price of traded goods is set in international markets. The dollar price of non-traded goods, on the other hand, adjusts to clear supply and demand of non-traded goods. The increased demand for traded goods can be met through increased imports. The

increased demand for non-traded goods, however, must be met by increased local supply. The price of non-traded goods rises relative to the price of traded goods in order to equilibrate increased supply with increased demand. The rise in the relative price of non-traded goods to traded goods (or equivalently, the fall in the relative price of traded goods) is termed a real exchange rate appreciation.

All of this is illustrated by the famous traded-non-traded goods model shown in Figure 7.1. The figure in the first panel shows the production possibility frontier (PPF) of the economy before the oil boom, with possible combinations of (non-oil) traded goods production (horizontal axis) and non-traded goods production (vertical axis). The curve  $II$  (marked with a dotted line) shows the consumer indifference curve. The initial equilibrium is at point  $E$ , at a point of tangency of the PPF and the  $II$  curve. On the horizontal axis we find  $E_T$ , the level of non-oil traded goods production, and on the vertical axis we find  $E_N$ , the level of non-traded goods production. The slope of the PPF at point  $E$  is equal to the real exchange rate (or the relative price of traded goods to non-traded goods). The steeper is the curve, the more depreciated is the exchange rate.

Figure 7.1

The geometry of the Dutch Disease



Now, suppose that there is an oil boom, which raises the total output of traded goods, equal to the sum of non-oil traded goods plus the oil production. The entire PPF shifts to the right by the amount of the oil boom,  $H$ . The new equilibrium is shown in the right hand panel as point  $E^*$ . Notice that non-traded production has risen to  $E_N^*$ . The total amount of traded goods (both oil and non-oil) has also risen, in this case to the level  $E_T^* + H$ . But importantly, the amount of *non-oil* traded goods production has actually declined to  $E_T^*$ . We can see that the real exchange rate has appreciated since the slope at point  $E^*$  is less steep than at point  $E$ , signifying a rise in the relative price of non-traded goods, i.e. a real-exchange-rate appreciation.

The real exchange rate appreciation, we see clearly, has induced a re-adjustment of output in the non-oil part of the economy. With a rising relative price of non-traded goods, workers and capital shift into non-traded goods production. Those workers and capital arrive in the non-traded goods sector by leaving the non-oil traded goods sector. In short, the rise in oil spending induces a shift of production away from traded goods (e.g. cash agricultural and manufactured export goods) and towards non-traded goods and services.

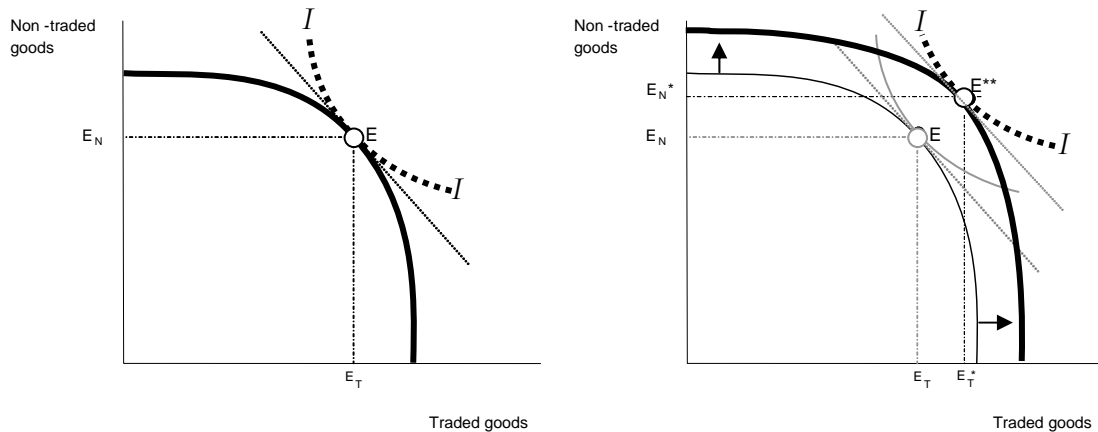
These adjustments are not really a “disease” *per se*. The rise in non-traded production at the expense of (non-oil) traded production does not by itself constitute a “mistake” of market forces, but rather the only way that the economy can enjoy more of *both* traded and non-traded goods. The increase in traded goods is met through increased imports. The increase in non-traded goods and services can be met only through an increased domestic output of those goods and services.

These resource shifts can become a true “disease” or market failure if there is something special about the traded goods sector that is being squeezed. Suppose, for purposes of illustration, that the economy is exporting apparel before oil is discovered. Once oil is discovered, workers and capital goods are induced to leave the international apparel sector and to migrate to the non-traded goods sector. If the apparel sector were making a special contribution to growth, e.g. by spreading international best practices in computerization and logistics, the decline of the apparel sector could spell trouble for economy at large. The oil boom would therefore induce a decline in a technologically leading sector of the economy,

with adverse consequences for long-term growth. One solution would be to limit the boom in oil spending, and thereby limit the spillover of workers from apparel to non-traded goods. Another possibility, however, would be to provide special targeted subsidies for the apparel sector, to support the transfer of technologies taking place in that sector. A squeeze of the non-oil tradable sector might, under some circumstances, also have special adverse consequences for income distribution, particularly hurting the poorest of the poor. That is less likely than often supposed, however, since the poorest of the poor are often economically isolated rather than in tradable goods production. Moreover, the advice to save rather than invest the oil income in order to protect the poorest of the poor would not make sense in any case if the public investments have direct benefits for the income-earning opportunities of the poorest (e.g. by expanding the road and power grids into impoverished regions).

The real fear of the Dutch Disease, in short, is that the non-oil export sector will be squeezed, thereby squeezing a major source of technological progress in the economy. *But this fear is vastly overblown if the oil proceeds are being properly invested as part of a national development strategy.* Suppose that the proceeds of the oil earnings are being invested in infrastructure (roads, power, telecoms) that raise the productivity of workers in both the traded and non-traded goods sectors. Assume for the moment that all of the investment goods are directly imported by the government using the oil proceeds. There is no direct spending effect of the oil income. Consumption rises to the extent that the non-oil sectors (both traded and non-traded) expand following the increased public investments financed with the oil income. In the right panel of Figure 7.2, this is represented as outward (that is, upwards and rightwards, rather than simply rightwards) shift in the PPF shifts outward. Production and consumption of both non-oil traded goods and non-traded goods increase. The real exchange rate at  $E^{**}$  may or may not appreciate relative to the initial equilibrium at  $E$ , but it does not matter very much, since the non-oil traded goods sector expands in any event. It expands as a result of the increased productivity due to public investments.

**Figure 7.2**  
**The Effects of Public Investments via an Oil Boom**



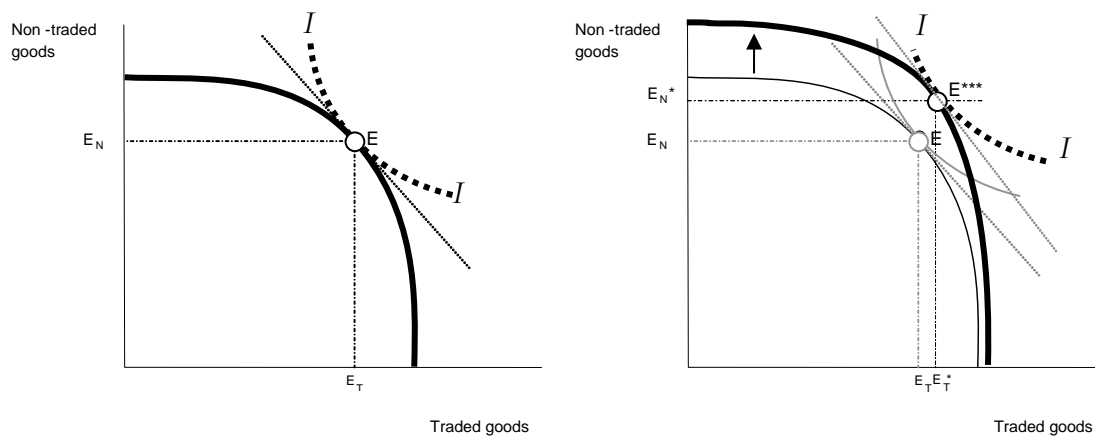
If the increased spending on public investments falls partly on non-traded goods (rather than entirely on imported capital goods), there can be a minor Dutch Disease effect emanating not from a consumption boom but from the investment boom itself. In this case, the rise of investment spending will tend to lead to an appreciation of the real exchange rate and a short-term squeeze on tradable goods, at least until the productivity enhancing effects on tradable production kick in. This can be quite fast, however, since the benefits of roads, power, and other infrastructure investment spending can come on line very rapidly. Any squeeze on tradables production is likely to be very short-lived.

It is also quite possible, especially in the poorest countries, that the oil boom leads to a real exchange rate *depreciation* if the public investment financed by the oil substantially raises the productivity of non-traded sector, as shown in Figure 7.3. This can be a very important and likely outcome. In the poorest countries, staple food production (e.g. maize) is the most important non-traded good in the consumption basket. Although we often think of these staples as internationally traded goods, in fact -- because of very high transport costs in the rural areas of impoverished countries -- staple food production is consumed mainly on the premises of the farm household, rather than being marketed and traded for other goods.

Food also constitutes by far the largest single item of household consumption of the poor. If the oil earnings are invested in raising the productivity of smallholder farmers, e.g. by financing improved seed varieties for local production, then the production possibility frontiers shifts upward, as indicated by the vertical arrow in Figure 7.3. The overall effect of the oil export boom may be a *reduction* of the relative price of non-tradable foodstuffs and therefore a real depreciation. The slope at  $E^{***}$  is steeper than at  $E$ . Moreover, it is clear that the production of both non-traded and (non-oil) traded goods increase. There is, once again, no squeeze of non-oil traded goods.

**Figure 7.3**

**Real Depreciation following a Rise in Non-Traded Food Yields**



*In summary, the Dutch Disease is a worry mainly if the oil boom is used to finance consumption rather than investment. In that case, the non-oil traded sector might well be squeezed on a sustained basis, with adverse consequences for long-term growth. This is very unlikely if the oil earnings are properly used for public investments in economies largely bereft of public goods, especially infrastructure. In that case, the positive benefits of increased public investments on the non-*



oil traded sector are very likely to outweigh any negative consequences of real exchange rate appreciation.

A final note on public investment is warranted here. Even when public infrastructure (roads, ports, power) is highly productive, and when financing is available, the actual physical investments will necessarily take time to put in place, and the optimum pace is itself an economic calculation. Many investment projects impose adjustment costs (e.g. disruptions of other economic activities or congestion due to the investment projects) which increase in proportion to the rate of investment. The optimum response in that case is to spread the investments over time, to maximize the benefits of the investments net of the adjustment costs themselves. This pacing of investments is sometimes described as investing according to the “absorptive capacity” of the economy. Perhaps the most famous example of an investment boom gone awry was the massive and costly congestion in Nigeria’s ports in the spending boom that followed the oil price increases in the early 1970s. The optimum pacing of investment spending is not motivated by the Dutch Disease per se, or by any automatic desire to spread oil spending over time, but rather by the adjustment costs imposed by the investment projects themselves.

### **A Brief Observation on Exchange Rate Policy**

In the “normal” case that the real exchange rate tends to appreciate following an increase of oil earnings, government policy makers can “engineer” that appreciation in two ways. In the first case, the central bank maintains a floating exchange rate. The oil proceeds lead to an appreciation of the nominal exchange rate vis-à-vis the dollar and Euro. This puts downward pressure on the local currency prices of non-oil traded goods, and thereby leads to a fall in the price of traded goods relative to non-traded goods, i.e. a real appreciation. In the second case, the nominal exchange rate of the national currency is pegged to the U.S. dollar, or Euro, or basket. Now the increase in domestic spending that follows the oil boom leads to a rise in the prices of non-traded goods, while traded goods prices are kept constant because of the constancy of the nominal exchange rate. Once again, there is a fall in the price of traded goods to non-traded goods, i.e. a real appreciation. There is no decisive case as to which of these exchange rate mechanisms is to be preferred. For small countries facing

large structural transformations, instability in the demand for the local currency, and the uncertainties of oil and capital flows, there is probably a preference for maintaining an “adjustable peg” exchange rate, wherein the central bank keeps the nominal exchange rate stable, but reserves the option to make discreet devaluations or revaluations in the future. (If oil prices fall sharply, for example, the central bank might undertake a devaluation in order to reduce the relative price of non-traded goods). The pegged rate adds predictability to the price level, and makes monetary policy subordinate to the exchange rate target. Of course a successful peg requires substantial foreign exchange reserves, the avoidance of excessive domestic credit expansion, and the avoidance of high levels of short-term external indebtedness which can lead to panicked withdrawals of foreign capital and self-fulfilling speculative attacks on the domestic currency.

As described above, a real appreciation is not the same as a squeeze on production of the traditional tradable sector (e.g. agriculture). It is perfectly possible that the exchange rate appreciates, and also that the non-oil tradable production expands. This is the case when the oil earnings are used to finance public investments that boost the productivity of the non-oil tradable sector. In poor countries with extremely deficient infrastructure, the productivity gains in the non-oil tradable sector that result from new infrastructure investments (especially in power, roads, telecoms, and port facilities) are likely to outweigh any negative effects on production caused by exchange rate appreciation due to the public investment spending. This conclusion will at least apply over a period of a few years (enough time for the infrastructure to get into place), if not immediately at the start of an oil boom. The idea, therefore, that the government should withhold investment spending in order to prevent real appreciation of the exchange rate, in order to “protect” the non-oil tradable sector, is very likely to be wrong in practice. (Of course, even if the non-oil tradable sector production is actually squeezed, whether or not that is a “disease” depends very much on whether there are special externalities, or income distributional consequences, associated with the traditional tradable sector, as explained earlier).

## **Is there a case for cash transfers of oil earnings to the public?**

Among free-market advocates, there is a repeated call on the state to distribute oil earnings directly to households in a lump-sum transfer. The free-market analysts argue based on three positions. First, they tend to reject the idea that investments in infrastructure (including roads, power, telecoms, water and sanitation) should be provided by the public sector in the first place. The private sector, they claim, will supply the needed investments, but only if government is truly pursuing the rule of law. Second, they distrust the political leaders of the state to manage large income flows on behalf of the general population as opposed to their own behalf. By forcing the state sector to disgorge the oil earnings in direct payments to the public, the argument holds, the abuses of public spending can be avoided. Third, they believe that social safety net spending should be carried out through direct transfers from the state to the poor. This has been done, with some apparent success, in Brazil and Mexico, where direct cash transfers to poor households are linked to a “good performance” by the households in sending the children to school and to health checkups.

These positions are not generally persuasive, especially for the poorest countries. For example, the experience on private-financing of infrastructure in low-income settings has been very disappointing. There is an increasing skepticism that private investments will finance the basic infrastructure network, especially roads and power. Both sectors are subject to important increasing returns to scale, suggesting the need for a public supplier of the infrastructure or at least a publicly regulated monopoly. In addition, some of the most urgent investments (such as for primary health and education), are beyond the financial reach of the poorest households. Direct public financing of these services is needed to ensure the universal access to such services by those in need. Finally, Brazilian or Mexican private transfer schemes to households work in large part because the basic rural infrastructure (schools, clinics, transport, and power) is already in place in those two countries. That is not the case in rural areas of low-income oil-exporting countries.

Note that even the Brazil and Mexico programs are far from the proposals for a general handout of a fixed share of oil earnings to each household, a proposal repeatedly made by free-market advocates in the United States, and modeled on the distribution in Alaska. The transfers in the Brazil and Mexico programs are targeted to low-income households, and are

conditional on certain actions of the households in support of their children's well being. Thus, the transfers are providing social welfare services. In Norway, the gas earnings are also distributed to the public, but as pension benefits. As such, the gas earnings are first accumulating in national pension accounts, which will then be used to service pension obligations for decades in the future. As in Brazil and Mexico, the gas earnings are thereby satisfying a core public function of social insurance, rather than a mere transfer of income to households.

### **Should Oil Income “Be Saved” for the Future through Financial Assets?**

Oil-rich low-income countries have sometimes been advised to accumulate their oil income into a national financial pool or fund (perhaps held in foreign stocks and bonds), and to spend only the “income” or “earnings” on the financial assets in that fund. The idea is to create a financial endowment that can be used to fund public outlays into the indefinite future, e.g. pension benefits over the course of generations. This kind of advice rightly recognizes that with a depleting asset like oil, there is a powerful case for smoothing consumption over a much longer time horizon than the depleting income flow from the oil itself. Still, the idea of spending only the income from accumulated financial assets makes little sense as a general rule on the timing of oil-backed outlays. To the extent that the oil income is used for public investments, the oil is turned into long-lived physical assets and human capital rather than financial capital, but the inter-temporal benefits of the oil income are similarly spread across time.

In essence, policy makers face a choice among four kinds of long-lasting assets: oil in the ground, financial assets (e.g. foreign exchange reserves), physical assets (e.g. roads), and human capital (e.g. a better-educated labor force). For an oil-rich country like Norway, with extensive physical and human capital already in place, the best choice might well be to accumulate financial assets to cover the long-term costs of the public pension system. This is indeed the policy of the National Pension Fund. For poor countries, however, it is likely to make much more sense to turn oil earnings quickly into physical assets and human capital. It may even make sense in these countries to borrow against *future* oil earnings for the sake of increasing investment outlays on high-return public investments. Still, this latter option

requires great prudence because of the volatility of capital markets and world oil prices. Attempts to mortgage future oil earnings for the sake of increased public outlays have repeatedly led to eventual budget and debt crises.

### **Good Governance and Oil Income**

Many chapters in this book detail aspects of good governance of oil income, from the initial exploration, to auctions and contracting, to long-term fiscal transparency. Here it will suffice to stress some of the elements of good governance as they relate specifically to the linkage of oil earnings and national development strategies. First, there is an urgent need for each government to prepare specific assessments of national income and fiscal revenues that can be expected from the oil and gas sector. These assessments should take account of costs of production, world prices, and depletion, with all of the uncertainties attached to each of these items. The expected income flows should be public information, and subject to regular revision given the enormous uncertainties involved. Second, the specific fiscal flows associated with these earnings should be explained and made public. Fiscal implications of oil earnings typically come in many forms: production sharing, royalties, corporate taxation, and other ways. These should be detailed clearly and consistently, again with stress put on the uncertainties as well as the main forecasts.

As already noted, transparent means should be used to manage the high risks of volatile international prices and uncertain national production. The budget should be based on a cautious assessment of the future path of world prices. Great caution should be used in pledging future oil revenues to secure current borrowing. Aggressive borrowing, often pushed by international banks, has repeatedly proven to be the bane of commodity exporters. Ways to hedge oil price risks should be repeatedly sought.

The government should be explicit about converting the limited and depleting oil resources into long-term and sustainable benefits for society. Rather than transferring the oil earnings as current income to the current generation, the bulk of the earnings should be invested, not only to provide the foundations for long-term growth, but also to ensure that the benefits are spread across generations. That can be accomplished financially (e.g. by investing the oil

earnings in international assets to be used for future pension payments, as in Norway), or physically, by building the infrastructure (road, power networks) and human capital that will last for decades.

In a recent publication, the International Monetary Fund summarized five prudential ways for a low-income country to manage increased foreign aid flows. The same basic principles apply to managing increased oil flows as well. Indeed, aid and oil have similar economic implications. Both are revenues that accrue to the state. Both are volatile. Both are tradable. And both are “depleting” resources, since aid flows like oil flows are likely to be temporary. Here are the five IMF recommendations (recommendations underlined) with regard to aid, with brief comments on each regarding how they apply to oil.

1. Minimize the risks of Dutch Disease. This can be done by ensuring that the oil earnings are invested in ways that enhance productivity, and thereby raise rather than lower production in the non-oil traded good sector;
2. Seek to enhance growth in the short to medium term. The oil earnings can be invested in some high-return “quick win” areas, such as improved food production, strengthened infrastructure (especially roads, power, and ports), and increased educational outlays;
3. Promote good governance and reduce corruption. The key here is transparency and reliable public information on the sources and uses of oil earnings, and the expected flow of oil earnings in the future;
4. Prepare an exit strategy. Just as increased foreign aid flows are temporary (by design), so that a recipient government must plan to substitute its own revenue base in the future as aid flows decline, so too an oil exporting country must prepare for the depletion of oil income flows.
5. Regularly reassess the appropriate policy mix. Oil earnings are highly volatile and the specific mix of appropriate fiscal, monetary, and exchange rate policies will change over time along with fluctuations in international prices, oil flows, and changes in productivity in the non-oil sectors. Evidence of serious overvaluation of the real exchange rate (e.g. an intense squeeze of profits in non-oil export sectors) should prompt policies to depreciate the nominal exchange rate, either through an outright

## **Towards a Quantitative Assessment of Oil Revenues and National Development**

All that has been said here is, of course, general. To move beyond these generalizations requires quantitative modeling of a country's specific circumstances, modeling which is beyond the scope of this paper. A typical formal analytical approach would be to maximize inter-generational wellbeing subject to the production possibilities of the economy, the time path of oil earnings, the uncertainties about world prices of oil, and the investment opportunities at hand, considering both physical investments in productive capacity and financial investments in overseas assets. The formal analysis will show how a temporary and depleting path of oil earnings can best be extended into a long-term benefit for succeeding generations. The rate at which the policy planner "discounts" the future will determine much about the time path of using oil revenues.

## **Conclusions**

Oil revenues need not be a curse. When properly managed, they can play a special and important role in overall economic development in low-income countries, especially by providing the public financing for critical investments in key public goods. As long as this is done, the fears about the Dutch Disease are likely to be exaggerated. The specific nature of the goods will vary by country and region, and notably according to the stage of economic development. For the poorest of the poor, priorities will lie in meeting basic needs and basic infrastructure. For middle-income countries, priorities will lie in expanding access to higher education, science, and advanced technologies. For high-income countries, priorities will most likely lie in meeting the commitments of social welfare spending, especially on pensions and health care. In all of these cases, there will be a likely advantage in using the oil earnings to cover priority *public* spending, rather than viewing the oil earnings as an income flow to be transferred back to households. (Of course such a conclusion begs the question of the transparency and honesty of the public sector). Given the volatility of world oil prices and

the depletion of oil over time, considerable care must be given to managing the large macroeconomic risks of oil income flows, as well as to spread the benefits of the oil earnings across generations. This is best accomplished by converting oil flows into long-lasting financial, physical, and human capital.



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<sup>1</sup> By “non-rival” I mean that one person’s consumption of the good does not take away the potential for another person to enjoy the good. By “non-excludable” I mean that it is difficult to *prevent* people from making use of the good once it is produced.