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The political economy of Dutch Disease - A survey

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Abstract:

The neo-classical model of Dutch Disease sees the resource sector as a booming sector. Today a resource sector is normally a small enclave in the economy that mainly "produces" a resource rent which is appropriated by the state as a tax paid by the rest of the world. The resource thus causes an inflow of foreign exchange to the state. What happens thus depends crucially on the reactions of the state. However, the new income flow raises expectations and thus decreases the labor supply. It also forces the state to spend the resource rent, so the booming sector is the public one. These two effects are the main effects of the resource, and they are political reactions to the rent and have little to do with the sector itself.

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Keywords: Resources, real exchange rate, political economy

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The paper was inspired by the session on the origin of the Dutch Disease model and the contributions of Max Corden at the DEGIT conference in Melbourne, June 2007, where Corden was present. He made it clear that the booming sector, he had in mind, was actually a new oil sector. The paper is an attempt to introduce Public Choice into a subject, where it has been sadly missing. The article is termed a survey, as it covers subjects that have often been discussed, but which seem not to have been put together in a simple way.

1. Introduction: The enclave version of Dutch Disease

It is well known that most resource rich countries become wealthy in the short run, but grow less than other countries in the longer run, so that the long-run effect is ambiguous. This is illustrated in Section 3 which looks at OPEC countries. The standard explanation is that even though *resource-rich countries* get a high income, they come to suffer from Dutch Disease that generates low and often erratic growth. The "disease" element is defined as follows: *Dutch Disease is the resource induced revaluation of the real exchange rate.*

The best-known theory of Dutch Disease is found in a couple of unusually lucid papers by Max Corden,[2] who considers the resource sector as a *booming sector* in the economy. Like Corden, we take oil to be the archetypical resource. This article changes the theory to take the development in technology and scarcities into account: Today, a resource sector (notably an oil sector) is a small international *enclave* in the economy. Sometimes it is even offshore. It is normally run by international firms using expatriate experts and specialized, highly capital-intensive technologies to extract the resource. They also process it and transport it to the world market, where it is sold. The production uses few domestic workers, and the firms involved finance their real capital by borrowing on the world capital market. Most of the value added is not really "produced." It is *resource rent.*

The government of the country can – and surely will – try to appropriate the *resource rent.* A full appropriation of the rent will happen when a perfect world market exists for the resource, and there is perfect competition between the international firms extracting, processing and transporting it to the market. There are always small imperfections on such markets, so the appropriation may only be almost full.

It is arguable from economic theory that the government should appropriate the resource. Normally, competition creates efficiency, but the competition to acquire and keep a resource rent is a waste for society, except so far as it ensures that firms search diligently for more. Compared to other taxes, a tax on resource rent is consequently a good tax.

The resource rent accrues almost fully in foreign currency. Thus, the effect of the resource is due to the *foreign exchange* inflow to the *government*. How the economy reacts, depends upon the political decision processes set into movement by the inflow. Such processes are known to have large endogenous elements which are affected by two factors:

2. The main papers are from around 1980, see e.g. Corden (1982, 1984) and Corden and Neary (1982). It can be considered a special case of the Rybczynski theorem (from his 1955), see Feenstra (2004, p 20). The roots are thus quite deep. The name "Dutch Disease" came from newspaper articles about the natural gas discoveries in Northern Holland in the 1960s.

(A) The resource find will be known to everybody and generate great expectations.

(B) The expectations will be only partly fulfilled, so expectations will be disappointed.

The key to the analysis is the enclave nature of the resource sector, the appropriation of the resource rent as a resource tax paid by the rest of the world, and the political nature of the reaction. These features bring the analysis close to the old analysis of the *transfer problem* considering the effects of international transfers between governments:[3] The transfer problem is the key to understanding the dubious effect of development aid and of international borrowing on economic development.[4]

A closely related subject is dealt with in the *resource curse* body of literature, see e.g. Sachs and Warner (1995) and Gylfason, Herbertson and Zoega (1999). It is generated by various attempts to measure the amount of resources per capita in the countries of the world. Once such a measure has been made, it is interesting to study how it is related to the income and the growth rate of countries. It appears that these relations are very weak. If anything, the growth rate is negatively correlated to resource richness. Several explanations have been explored, and the Dutch Disease discussion pursued at present is one such explanation.

The discussion will proceed as follows: Section 2 presents the basics of the Dutch Disease model, while Section 3 looks briefly at the OPEC countries and concludes with a stylized picture of one resource find. Section 4 discusses the policy reactions of people and the government to a resource find. Section 5 contains a few concluding remarks.

3. Here, the most well-known analysis is probably the one of J.M. Keynes of the effects on Germany of the compensations it had to pay according to the Versailles Treaty after the First World War. A good survey of the old literature on the transfer problem is Iversen (1936).

4. However, the transfer problem is rarely mentioned in the aid effectiveness literature, as shown in the survey of the 105 papers of the literature in Doucouliagos and Paldam (2009). The only exceptions we found were Younger (1992), Paldam (1997) and Elbadawi (1999).

2. Basic supply and demand: An equilibrium revaluation

A resource find is a windfall gain that typically lasts for half a century. Section 2.1 shows the national accounting. The resource find promises everybody in the economy an income gain. However, things are not as good as they look. This follows from the simple quasistatic supply and demand analysis for foreign exchange of Section 2.2. It is followed by a few preliminary remarks on the adjustment process taking the economy from the old to the new equilibrium.

Table 1. The national account bookkeeping for the new resource sector

GDP	Identities	Definition
Y^R	$Y^R = Y_f^R + Y_d^R + R$	Value added, GDP, in economy, divided in:
Y_f^R	$s_f = Y_f^R / Y^R$	Imported production costs – enter the economy only as a formality
Y_d^R	$s_d = Y_d^R / Y^R$	Domestic production costs – the *true* production increase
R	$s_r = R / Y^R$	Resource rent – not produced: We assume $s_r > s_d + s_f$
N^R	$N^R \approx a Y_d^R$	Domestic employment effect: Assumed proportional to the share of domestic production costs. A linear production technology is used

2.1 Accounting for the rise in value added and in production

Table 1 looks at the national accounting and defines three fractions, $s_r + s_d + s_f = 1$ of the value added $Y^R = Y_f^R + Y_d^R + R = (s_r + s_d + s_f)\, Y^R$ generated by the resource.

Only Y_d^R is truly produced in the economy, and it is only a small part of the total value added of the sector, $Y_d^R << Y^R$. The imported production costs, Y_f^R, go in as an import and are then deducted as a cost, so it is a formal post in the national accounts only. The largest part of value added is the resource rent, R, which is the share of the public treasury. Formally, one can say that R is "produced", but it is more precise to say that R is a tax that is mainly paid by foreigners actually living abroad.

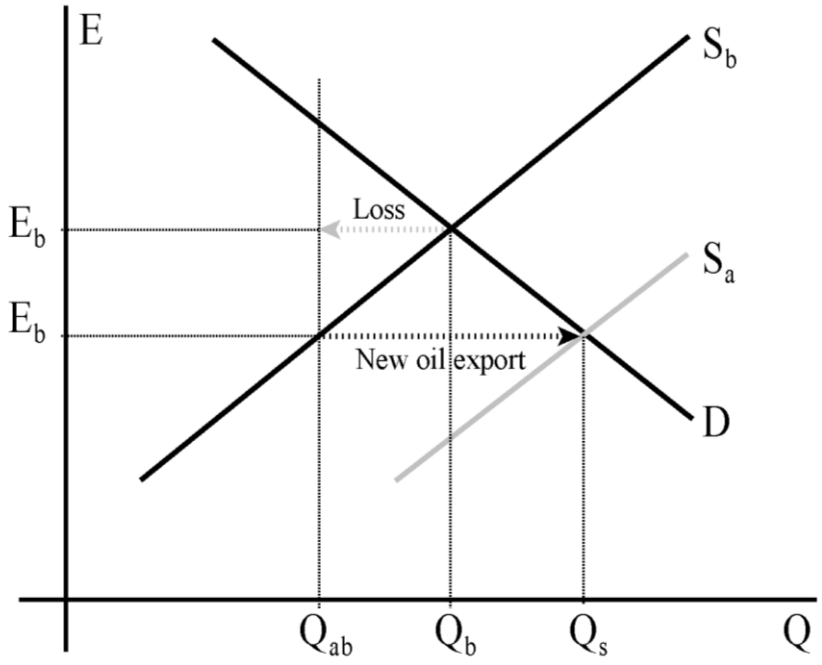
Also, it is worth to distinguish between the upstart period and the production period. Even if it is an oil find, some installation costs will have to be made. Pipelines, roads, storage tanks etc. have to be constructed. Most of the investment activity will be done by international companies using their own technology and experts, but some local workers will be employed. However, once it is done and production gets going, activity decreases.

2.2 Supply and demand for foreign exchange: Two equilibriums

Figure 1 shows demand, D, and supply, S_b and S_a, for foreign exchange in real terms before (b) and after (a) the country has acquired a large and steady new supply of foreign exchange

from the resource: The equilibrium moves from (E_b, Q_b) to (E_a, Q_a). The price of foreign exchange revalues (in real terms) from E_b to E_a.

Figure 1. Supply and demand for foreign exchange before and after an oil find



Note: The figure assumes that all foreign exchange trade is to finance international trade in goods and services.

The new resource export is $Q_{ab}Q_a \approx Y^R$. However, due to the revaluation the new equilibrium involves a reduction in the size of the old tradables sector. It is *Loss* = $Q_{ab}Q_b$ on the figure. Thus, production does not rise with Y^R, but only with $Y^R - Y^x$. However, the true production in the resource sector rises only with $Y_d = s_d Y^R$ in the resource sector. It appears most likely that Y_d^R is smaller than Y^x, so that the employment effect of the new resource sector is negative. The effect on the private production sector is thus dubious. Some production capacity is moved to the resource sector from the rest of the tradables sector.

Contrary to the Corden model, it is not the resource sector that is the booming sector; but the public sector that receives *R*. If it does not expand, unemployment increases.

2.3 The speed and mechanics of adjustment: The assumption of a fixed exchange rate

The quasistatic analysis says nothing about the speed of adjustment and the mechanisms whereby it happens. If the country has a freely floating exchange rate, one may imagine that the market will react quickly to the find and go to the new rate.

From now it is assumed that the exchange rate is fixed.[5] For a country with a fixed exchange rate, we know that balance-of-payments surpluses and deficits normally last several decades, so the period of adjustment from the old to the new equilibrium rate is long.

It is even possible to think of cases where there is no adjustment: The government may choose to place all the money on a special account abroad and keep them there, using only the real rate of return as the permanent income gain. Stories have even been told about dictators who have put a major part of the resource revenue on their personal account abroad.

2.4 Rising expectations and the pressures for public spending

Central to the political economy of the resource rent/tax story is the fact that the resource find cannot and will not be kept secret. It is a major event in the history of any country that oil (or some such resource) has been found. Everybody in the country will soon know that the country is rich. The news media will be full of figures with so many zeroes that few will know what they mean, except that they are huge. This will raise expectations dramatically.

The logic of the Dutch Disease is that wealth has increased, though not by as much as it seems at first. And as employment does not rise, there will be pressure on the government to spend more money. Thus, two consequences of the resource find will occur:

(A) The government is faced with a population that has *big expectations*.

(B) These expectations are *partly disappointed*.

(C) This generates *strong pressures on the government to spend*.

We shall return to the consequences of these points in Section 4, but first we shall look at the growth path of the oil countries, which illustrates the points made till now.

5. It is not clear what a fixed exchange rate means in a world where e.g. oil prices are quoted in US$ and the $ is floating. This will not be discussed at present. It is just assumed that the exchange rate is somehow fixed.

3. A look at the growth paths of the OPEC countries

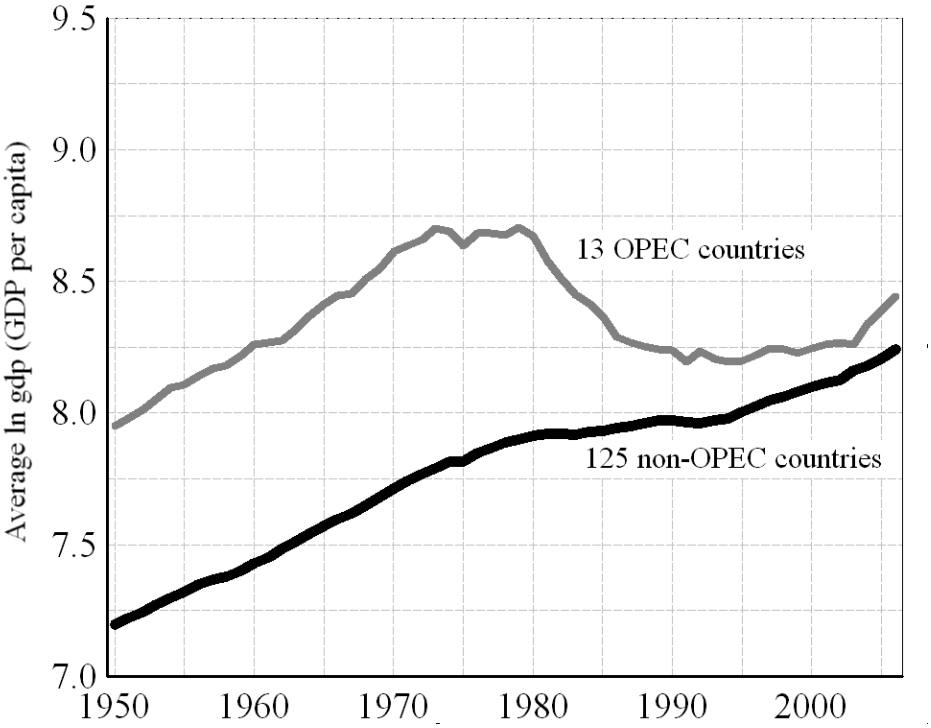
The purpose of this section is to look at the typical growth path of a resource rich country, taken to be an oil country. The impressions gained are used in the stylized story of Section 4. Growth paths are drawn as the natural logarithm to *gdp*, which is GDP per capita. All data are from Maddison (2003) updated to 2006. The comparisons presented are defined in Table 2.

Table 2. The country groups shown on Figures 2 to 4

Figure 2	OPEC [a]: Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, UAE and Venezuela Non-OPEC: An unweighted average of the remaining 125 countries with full data
Figure 3	Arab OPEC: Algeria, Iraq, Kuwait, Libya, Qatar, Saudi Arabia and UAE Arab non-OPEC: Bahrain, Egypt, Jordan, Lebanon, Morocco, Oman, Syria, Tunisia and Yemen
Figure 4	Three main Latin American oil countries: Ecuador, Mexico and Venezuela compared with the USA

Note: Source: Maddison homepage. The GDP per capita series, in natural logarithms.
a. Gabon used to be member and Indonesia was suspended in 2009, but is included on Figure 2.

Figure 2. Development in OPEC vs non-OPEC countries (see Table 2)



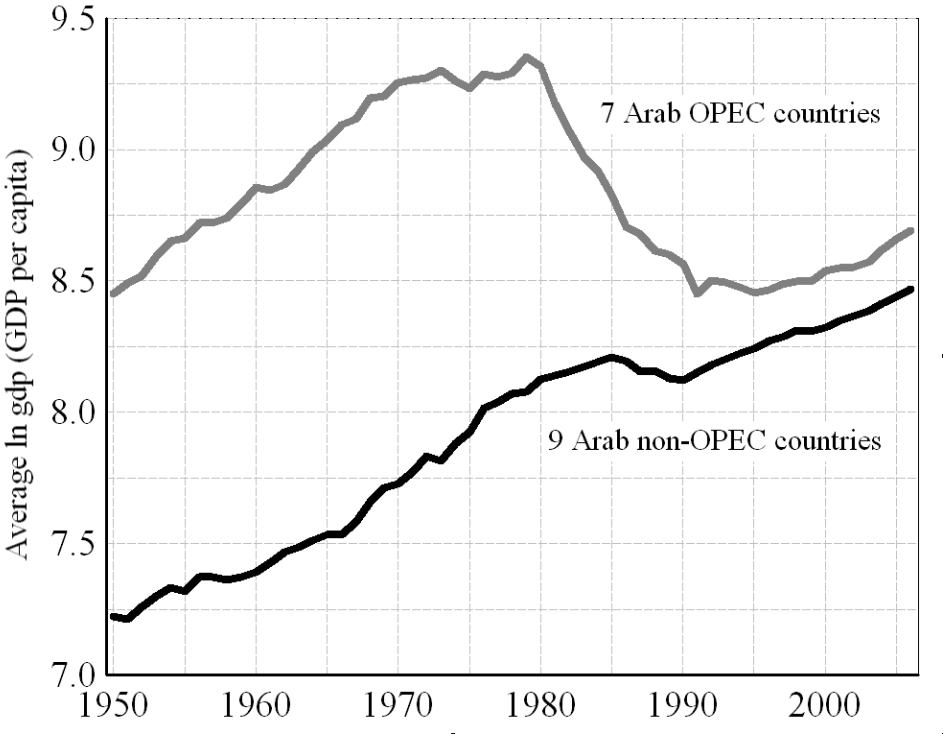
3.1 Pictures of the growth paths of OPEC vs non-OPEC countries: 1950-2006

Figure 2 compares the development of the 13 OPEC-countries and the 125 non-OPEC countries. This is *all* remaining countries with full data 1950-2006. Figure 3 makes the same

comparison for Arab countries only.[6] The two figures tell the same story. I have tried to move some non-OPEC oil producers such as Brunei, Mexico and Norway into the oil group, but this has a marginal effect on the picture only.

The curves show that oil countries did become very wealthy relatively during the big oil-price boom 1973-80, but have developed rather poorly since that, while other countries caught up. Part of the poor development 1980-2000 is due to falling oil-prices, but it is still amazing to see the magnitude of the catch up by the non-oil countries.

Figure 3. Development in Arab OPEC vs Arab non-OPEC countries (see Table 2)

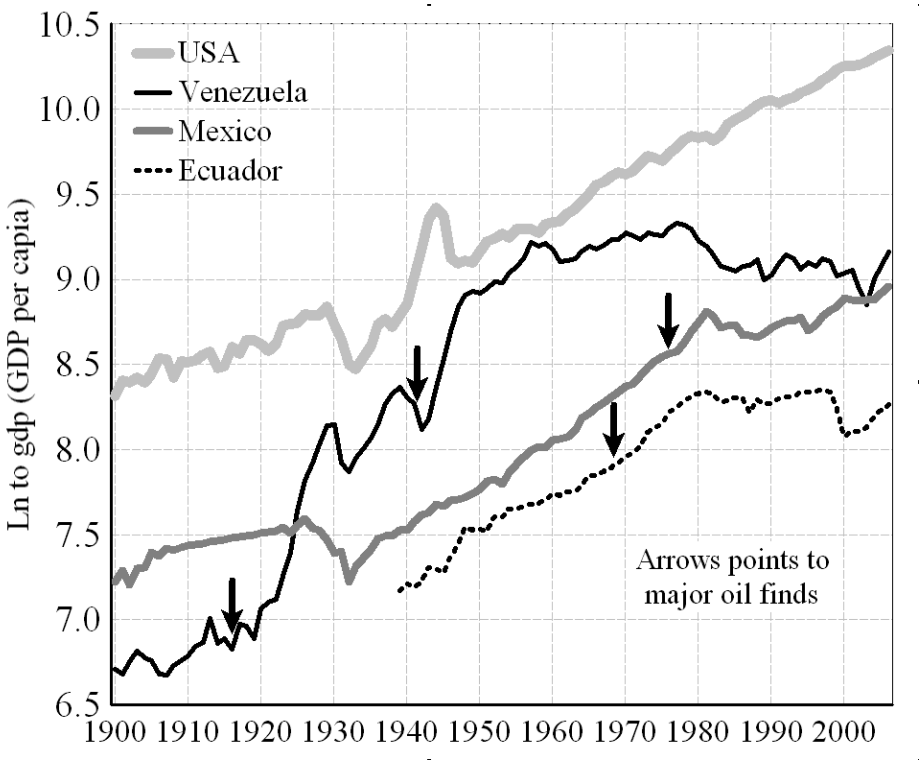


3.2 The three main Latin American oil countries and the USA, 1900-2006

Figure 4 shows the paths of three oil countries, where a longer time perspective is available. We have indicated major oil finds with 4 arrows. It is difficult to do precisely, as big finds are normally accompanied by many smaller ones. Fields get into production and new techniques allow much more oil to be extracted from old wells, etc. Figure 4 adds some flesh to Figures 2 and 3. It makes it clear that oil finds do increase income rather nicely in the country, but then cause low growth.

6 The transitory growth wave 1975 to 1990 in the non-oil Arab countries is commonly attributed the Arab development aid program run by the oil-countries to help their non-oil brother Arabs. The wave indicates that the aid-wave gave extra consumption, but not extra growth.

Figure 4. Three Latin American oil producing countries and the USA compared



Especially the development of Venezuela is a dramatic illustration. In 1950 to 60 Venezuela had almost the same income as the USA; but since then income has stagnated. Also it is important to note that the 60 years of low growth in Venezuela has made the country rather volatile politically, even by Latin American standards. Also Mexico has become more volatile both economically (with more inflation and currency crises) and politically after it became a major oil exporter.

The next section is an attempt to stylize the findings based on the graphs and other studies, and to make the link to the Dutch Disease theory.

4. An interpretation

The actual cases have multiple finds, exogenous price movements and lags between finds and production etc. The stylized story is about one big resource find, which is quickly put into production.

The steady state growth rate is a function of technological development relative to the level of GDP. The resource find causes the denominator to jump upward, so the rate of growth falls. Also, is will be argued below that the resource causes people to choose more leisure, which also causes growth to taper off.

4.1 An interpretation: The good story of a Gain

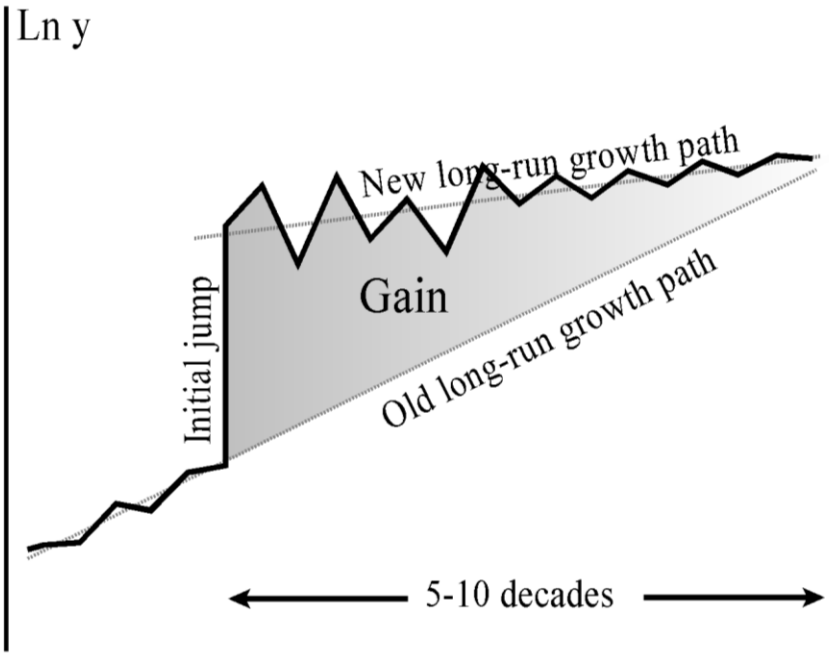
Figures 5a and b are two presentations of the stylized case. Before the find, the country grew around a steady growth path with *normal* fluctuations. After the resource find, the development has the following three features:

(f1) An initial upward jump to a new and higher growth path, due to the resource. It gives a *Gain* to the economy as shown on Figure 5a.

(f2) The natives expect *Gain* to be permanent, but the new growth path has a lower growth rate. This gives a *Loss*, relative to expectations, as shown on Figure 5b.

(f3) The jump causes *larger* fluctuations. They get smaller, but only slowly.

Figure 5a. A country with one big resource find: The good story of a gain



The Corden model covers (f1) and (f2), and parts of (f3), but gets the effects from the claim that the resource sector booms and attracts domestic resources. Below, we get it from the policy reactions. Figure 5a is the good story (f1) of the gain: Incomes jump upward, and the old growth path is replaced by a new and higher one.

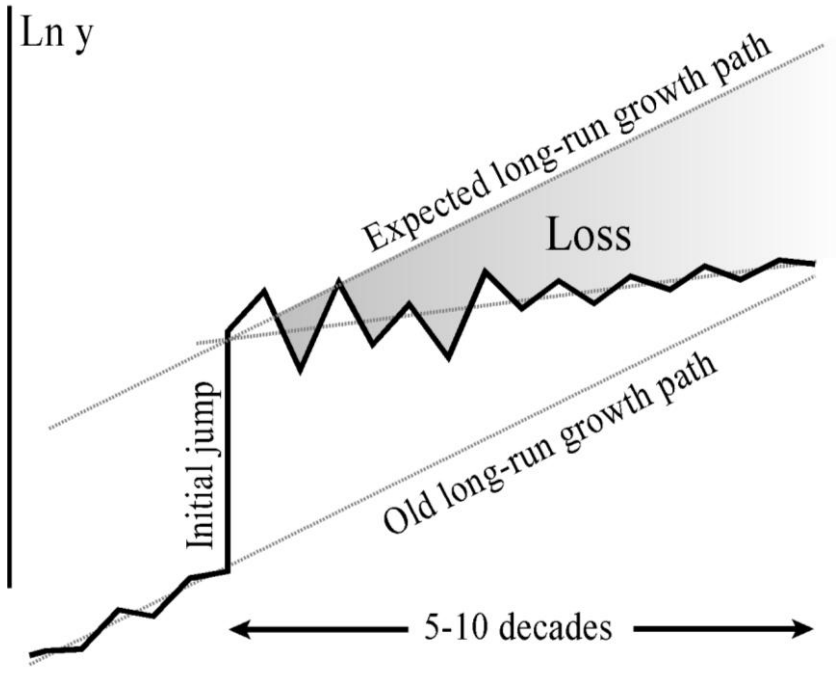
It is often noted that the resource does give a large *Gain* which is the light gray area on the graph, and that it hence gives a welfare increase. People may well *like* this disease.

4.2 The corresponding bad story of the Loss

Figure 5b gives the corresponding bad story (f2). Many may expect that all that the resources find causes a onetime jump, and then a continuation of the old growth at the new level as shown by the expected path on the figures. They are disappointed and suffer the *Loss* shown on the figure.

The reason for the increased volatility (f3) after the upward jump is precisely that the processes whereby the unrealistically high expectations are gradually made realistic is likely to be associated with industrial conflict, inflationary waves, and political turmoil.

Figure 5b. A country with one big resource find: The bad story of a loss



4.3 The arithmetic of the disease

We can calculate the net present value of both the gain, *NPG*, from Figure 5a, and the loss, *NPL*, from Figure 5b, at the time of the find, $t = F$:

(1) $NPG = \int_F^{\infty} Gain \cdot e^{-\rho t} dt$ and $NPL = \int_F^{\infty} Loss \cdot e^{-\rho t} dt,$

We presume that the rate of discount ρ is so high that both NP-expressions are finite.

(2) The net gain is then $ENPG = NPG - NPL$

The Dutch Disease effect, δ, is:

(3) $\delta = NPL / ENPG$, which is a ratio $0 < \delta < 1$.[7]

Since we have argued that the Dutch Disease works through the actions/reaction of governments, we expect that competent and strong governments may manage to keep the δ-ratio low, while incompetent and weak governments cause the δ-ratio to become high.

The δ-ratio can be understood in one more way: It is a measure of extent to which the expectations of the population are disappointed, and thus of the *frustrations* of the population – that is item (B) from the introduction. People know that the country is rich, but somehow the actual gain becomes (much) smaller than expected. This is an important point to keep in mind when we turn to the political economy.

Finally, it should be mentioned that it will not be discussed what happens when the two trends intersect. This is typically so far into the future that it is futile to discuss.

7. It is possible to think of cases where δ is outside the interval given, but such cases appear unreasonable.

5. The political reactions to a large inflow of rent

Consider the situation where a government from a certain day starts to receive a large long-run inflow of rent from abroad. This is well known to everybody in the country. The media and the rumor-exchange will be full of reports about the huge amounts of money that has fallen in the hands of the government.[8] The effects are likely to be somewhat different in a DC (developed country) and an LDC (less developed country).

5.1 Classifying the effects

When everybody knows that the state is rich, this will change the political game in the country. In particular, it will greatly whet the appetite of every group in the country. This will lead to new spending for three reasons:

(a) The government is likely to choose to spend more for its own reasons. (a1) It may genuinely want to create more welfare, or (a2) it may spend to build support.
(b) It may be forced by voters and other powerful groups to spend more.
(c) The expectations of the population may lead to adjustments in the economy that force the government to spend.

The items (a) and (b) will often be difficult to distinguish in practice. So to span the possibilities, we consider three effects of the rent *R*:

(i) An increase in transfers to natives causing an upward shift in the labor supply and in the demand for labor due to the increased demand for goods.
(ii) An increase in public consumption causing an upward shift in the demand for labor.
(iii) A reaction in the market, giving an upward shift in the labor supply curve. People know that the country can afford to give them a higher income. Hence they demand it!

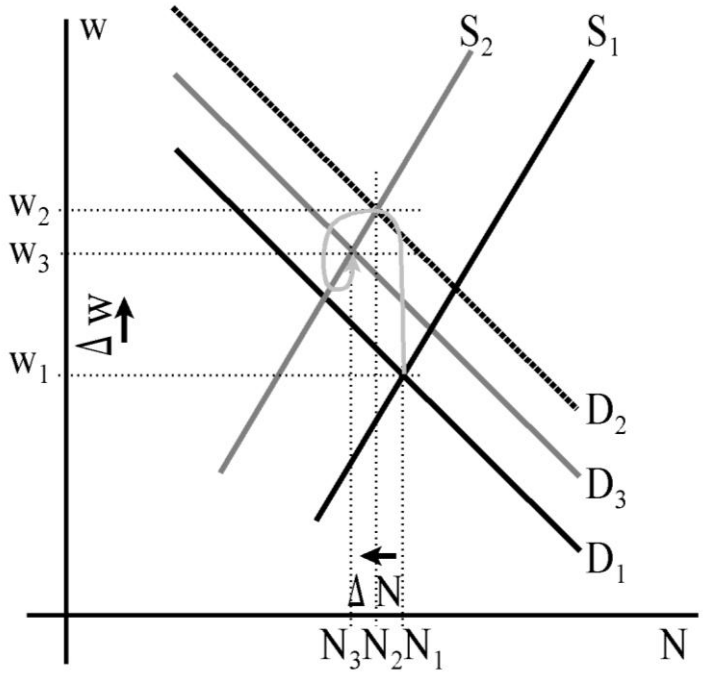
The three effects are analyzed using a basic framework of aggregate equilibrium on the labor market. It is simple indeed, and it catches the first round effects only. Note that the two effects in (ii) and (iii) are different from (i); but they reinforced (i). If we understand (i), it is easy to treat (ii) and (iii), by increasing the effect.

8. The author worked as an economic advisor to one of the states of the Nigerian Federation during 1973 and 74, when the oil revenue of the federation went up 7 times. Nigeria had a military government, and my state was quite far from the capital and had no newspapers and no television. Nevertheless, "everybody" knew.

5.2 (i) An increase in transfers to natives

Imagine that the outcome of the political process is a subsidy (or a set of subsidies) to the natives. For simplicity, imagine that the government gives all natives a state pension, ω, which is substantially relative to prior wages w_1. Figures 6a and b give the basic effects. We distinguish between the primary effects where the curves move from (S_1, D_1) to (S_2, D_2) and the secondary effects which are sketched only. Here, D_2 moves to D_3.

Figure 6a. Labor market effect of an increase in transfers: The DC case



Primary effects: The labor supply function shifts upwards, and the demand for labor goes up with the increase in domestic demand due to the income subsidy. Both of these effects give a *wage rise*, $\Delta w > 0$, but they affect employment both ways, so that the net effect on ΔN is ambiguous.

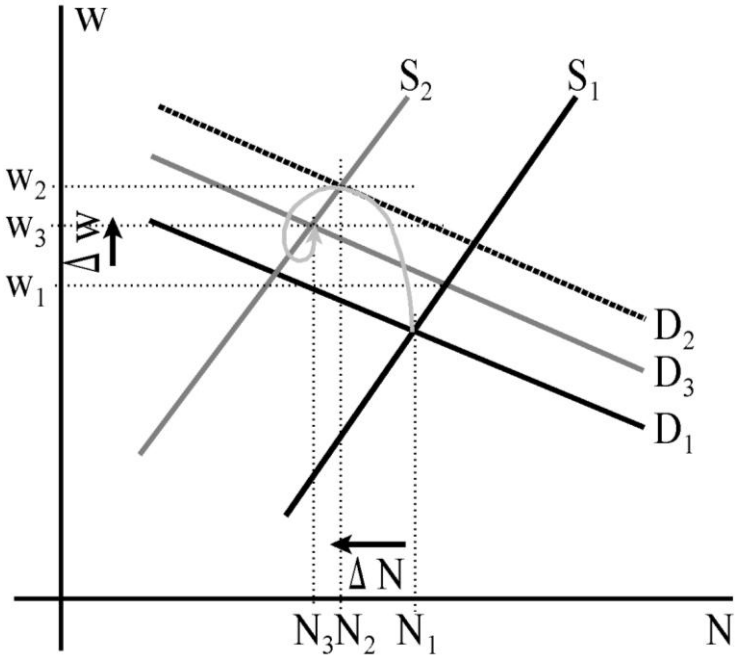
In the DC case, the labor supply curve,[9] *S*, is steep (the slope is large), and as the production structure is complex, we imagine that the tradables sector is large so that the labor demand curve, *D*, has a numerically smaller slope. Also, *S* is affected by the entire subsidy, and *D* is affected by the increase in demand for domestic goods only, so it is likely that the effect on Δw is a fairly large increase, and the net effect on ΔN is a small decrease.

In the LDC case, the labor supply curve is likely to be flatter, and as the production structure is concentrated on traditional goods with a low income elasticity, the *D*-curve is

9. I presume that the complex labor market in a DC has a higher share of exiting jobs than the more simple labor market in a LDC. Hence, more people have fun working in a DC, and consequently labor supply curves are steeper.

flatter and moves less out. The curves consequently look as shown on Figure 6b. Here, it is likely that the effect on Δ*w* is a small increase, and the net effect on Δ*N* is a large decrease.

Figure 6b. Labor market effect of an increase in transfers: The LDC case



Secondary effects: On both figures, wages rise by Δ*w*, and the labor supply falls by Δ*N*. The effect is clearly that a larger part of the supply of goods on the domestic market has to be imported, as followed from the basic Dutch Disease model on Figure 1. Then with a higher wage, the competitiveness of firms in the tradables sector is reduced, and thus the production and the labor demand are reduced to D_3 which may, as drawn, be above D_2 or even below D_1 depending on the product mix of the tradables sector. Then things quickly become too complex to handle by the simple model, but inevitably these further reactions are that the increase in Δ*w* becomes smaller, and the fall in *ΔN* stabilizes.

5.3 (ii) An increase in public consumption and (iii) a reaction in the market

An increase in public consumption can be drawn as a version of Figure 6, where labor supply stays unchanged, $S_1 = S_2$, while the labor demand rises (a lot). This has an unambiguous effect on both variables: Δ*w* and Δ*N* are both positive. When we turn to the secondary effect, it is likely that the outward movement of D_2 is so much larger than the latter inward movement of D_2 that some upward effect on Δ*N* remains. However, what is unambiguous is that employment moves from the tradables sector to the booming public sector.

(iii) Finally, imagine that people want to get a share of the new wealth. That may cause the labor supply function to shift upward. On Figure 6, this corresponds to a situation where $D_2 = D_1$, while S rises as shown. This has an unambiguous effect on both variables: Δw is positive, as it always is, and ΔN is negative. When we add the secondary effect, Δw becomes less positive, and ΔN more negative. The effect on employment becomes rather negative.

Table 3 sums up the discussion. There is little doubt that the resource rent generates a wage increase, though the size is smaller in the longer run. Also, in most cases it does generate falling employment, especially in the longer run. However, to the extent that it causes greater public consumption, the negative employment effect is reduced, and it might even turn positive.

Table 3. The effects summarized

	(i) Transfers to people			(ii) Public	(iii) Market
	Sign	DC	LDC	Consumption	reactions
Primary effects	S and D up			D up	S up
Effect on *w*	Up	Larger	Smaller	Up	Up
Effect on *N*	Down	Smaller	Larger	Up	Down

5.4 Choosing leisure

It is easy to supplement the above analysis with additional effects. Imagine that people behave as predicted by the economic textbooks and loses utility from working. A sufficiently high resource rent may thus liberate people from work. The natives, who receive the extra income, use it to employ foreigners to come and do the work. This reduces the rise in wages and generates a larger fall in native employment, but no increase in unemployment.

The result is a leisure economy with lots of guest workers – who will never become citizens – as can actually be observed in the oil countries on the Arabian Peninsula: Bahrain, Kuwait, Qatar, Saudi Arabia and UAE.[10] One may see a life of leisure as the ideal giving the highest welfare; however, the available measures of life satisfaction do not support this idea.[11]

10. The institutional arrangement in these countries, with Dubai as the main example, is sketched in Chand and Paldam (2006).
11. See Table 11 in Paldam (2009) for an analysis of the relevant questions in the World Value Survey.

6. Conclusions

The story of Dutch Disease is thus a story of a gain that becomes less favorable in practice. The key to understand the way the story unrolls today is to recognize that a modern resource sector is an enclave which mainly affects the economy through the rent – and consequently the tax flow – it causes.

It is crucial that everybody recognizes that some of the expected gain will be lost due to Dutch Disease, and that the economy is managed with the aim of reducing that loss. The most important issue probably is that the government makes sure that the population understands what the new public income means, and does all it can to reduce expectations. Also, it is important that some of the funds gained are used for public expenditures.

When it is taken into consideration that resources run out, it appears essential that the spending programs are investments with a long economic life. Thus, it is possible to do a great deal to prevent the disease element from eating the gain.

Also, it appears wise that a considerable amount of the resource rent is invested abroad with the aim of generating a permanent income stream instead of temporary resource rent.

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