

Natural Resources: Could Ever Be a Blessing?

The Russian Case

Giovanni Covi

Abstract The debate on the best way to achieve economic development for a country rich of natural resources has been a matter of discussion and disagreements. In this paper a possible solution has been provided. Through a case study an in-depth analysis on the Russian economy will prove that a unique reliance on a single sector - energy sector - is a twofold mistake. The Dutch Disease model developed by Corden and Neary as well as the Gabaix's theory of Granular Origins of Aggregate Fluctuations will dig into the Russian economic structure in order to develop a complete and a complementary perspective. The main results of the paper state that the long-term consequences of this strategy outweigh the initial achieved economic improvements. The natural resource curse is a real economic problem and it is only a matter of time before the concealed symptoms display and spread throughout the whole industrial organization of the country damaging inexorably the manufacturing sector - the real source for a stable and sustainable economic development.

Keywords Economic Development - Natural Resource Curse - Dutch Disease Oil - Industrial Policy - Russian Economy - Dualistic Development

JEL Classification E52 - P28 – O11 - Q32 - Q33 - Q43

Russia provides a dramatic case in which the government has received but a pittance for the country's most important asset - its inheritance of natural resources.

Joseph E. Stiglitz (2007: p. 37)

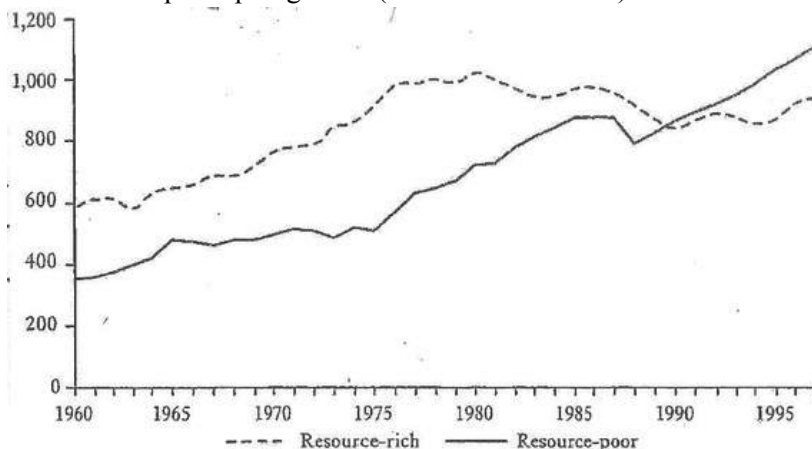
Giovanni Covi (✉)

Department of Economics and Finance, University of Verona, Italy
Market Operations Analysis, European Central Bank, Frankfurt Am Main
e-mail: giovanni.covi@univr.it; giovanni.covi@ecb.europa.eu

1. Introduction

Economists have identified a rather strange phenomenon called resource curse, term coined by Richard Auty¹: natural resource-rich countries often make worse in the field of economic development than resource-poor countries. There is something counterintuitive in the fact that rich endowments of oil or other mineral can be a bridle rather than a spur to rapid economic growth. The case of the four Asian Tigers (Hong-Kong, Singapore, Taiwan, Korea) are the best proof that rapid economic growth and a competitive manufacturing export sector can be built by countries lacking at all of natural resources. On the other hand, it has been proved (Sachs and Warner, 1995) that many natural resources-rich countries fail to reach a take-off into a sustainable development if not lose out true growth collapses².

Figure 1 Median GDP per capita growth (constant 1995 US \$)



Source: World Bank, 1999

A broad framework of explanations can be applied to solve the paradox. The first could be the classical Hirschman's concept of enclave production (1958): a type of production that does not need to have any kind of linkage - forward or backward - with other sectors of the economy and with complex strategies of development. The second relevant aspect is that the large difference between the costs of extraction of non-renewable resources and their market value is usually very large, giving strong incentive to *rent-seeking* behaviors by politicians and private corporations. This aspect often spins out of economic sector the negative effects of the resource curse:

1 R.M. Auty, *Industrial Policy Reform in Six Large Newly Industrializing Countries: the Resource Curse*, *World Development* 22, 1994, pp.11 – 26. Also see: R.M. Auty, *Resource Abundance and Economic Development*, Oxford University Press, Oxford, 2001.

2 The research, based on 97 developing countries heavily reliant on natural resources exports, discovered that real GDP growth per capita for these economies was negatively correlated to the ratio of resource exports on GDP during 1970-1989.

into the domain of corruption, authoritarian regimes and civil war (Sala-i-Martin and Subramanian 2003, Ross 2001). The third explanation is the Dutch disease³, so called because the discovery of the natural gas in the North Sea, in the 1970s, brought negative effects on the Netherlands' manufacturing sector through an appreciation of the real exchange rate. Often these three aspects are interconnected neatly, and escalate up to a point of no-return where long-term consequences outweigh initial economic improvements.

Since then, a growing literature has sought to uncover new evidence to solve the paradox. But these studies have had so far controversial results. The disagreement ranges over a number of issues starting from the conceptually correct measure of resource abundance: natural resource exports as a share of GDP (Sachs and Warner 1995, 1997a, 1997b, 1999, 2001) or natural resource exports as a share of total exports (Sachs and Vial 2001, Lederman and Maloney 2007) or net exports of resources per worker (Leamer 1984). And once identified the dimensions of the resource abundance, the channels the impact spreads in the economy may vary widely with the measures of policy eventually implemented.

As a result of these complications, some econometric research states a positive impact of natural resources abundance on the welfare of a nation (Graham 1995, Stijins 2005) leading Lederman and Malony to affirm that at the very least we should abandon the stylized fact that natural resource abundance is somehow bad for growth (2007: p.32). Similar conclusions reach Brunnschweiler and Bulte (2007). In their empirical study analyzing almost 80 countries between 1970 and 2000, they found that: a) resource abundance, constitutions, and institutions determine resource dependence b) resource dependence does not affect growth c) resource abundance positively affects growth and institutional quality.

In light of these objections, this paper tries to re-examine the Dutch disease model - its etiology, its symptoms and course - from the perspective of a case study of a very resource-rich country like the Russian Federation and the policy measures adopted since Putin came to power in august 1999.

From 2000 Putin started a campaign of re-nationalization with whichever means were in his power, often not following - let's say - a *civilized way*. The Ministry of Natural Gas acquired 51 % of Gazprom shares, so that it passed in 2005 under a total state-control. Therefore Gazprom (renamed Gazpromneft) started to control a big part of the oil production, in addition to the gas monopoly. Putin did not limit his purchases to the oil and gas sector, taking control over industries such as aircraft, aviation, heavy machinery, telecommunication, electricity, diamonds and exports, obviously acquiring the majority stake according to the capitalist system,

3 The Economist, The Dutch Disease, November 26th 1977. Ellman (1981) found that the real problem in that case for Netherland was not the real appreciation of the exchange rate, but the rising government's expenditures on public services which were not sustainable.

giving birth to the so-called *state capitalism*.

It is reasonable to think that the case of the Russian economy fits with the explanations suggested above by Brunnschweiler and Bulte. Indeed, Russia has started to recover from recession and the default of August 1998 thanks to the recovery of oil production and to the oil-price increase in the 2000s. Moreover, when Putin came to power, his policy determined the country's dependence on natural resources, as well as the energy industry reunification under the state's control to boost the economic growth. Given this, we could say that in this specific case, the institutions determined the dependence from natural resources.

This is a crucial point because, according to the empirical study of Mehlum, K. Moene, R. Torvik (2006), if a country owns bad institutions, on one hand, these can transform the natural resource abundance in a curse for the country's economic growth; on the other hand, depending on the revenues derived from exporting natural resources may also worsen the quality of these institutions, thereby leading to a vicious circle or a doom-loop⁴.

On what has been said so far, natural resources seem to represent more of a blessing than a curse. However, certain phenomena such as the increasing oil-export's dependence, the rising rents' revenues and widening inequalities shed light on the potentially negative path that Russia is pursuing.

In accordance with this introduction, the rest of the paper reviews the Russian economy on the basis of data analysis and at the light of the Dutch disease model. Next section 2 will focus on the Dutch disease classic model of Corden and Neary (1982) and Corden (1984). Section 3 deals with statistical evidence of the dimensions of the Russian dependence on natural resources. Following the sequencing of the model, section 4 deals with the effects on the ruble and on its real exchange rate with the U.S. dollar. Section 5 tries to assess if there has been an impact, and its eventual dimension, on the others sectors (services and manufacturing) of the economy as well as on the deepening of inequalities among wages and incomes. Section 6 deals with the microfoundations of the macrodevelopments investigated in the previous sections, i.e., the linkages between the concentration of output growth at firm level and GDP fluctuations. Ultimately the last section is dedicated to an overview of the current and future possible scenarios Russia has been facing.

4 This last effect is caused directly by a fight to control the resource rents, and indirectly by removing incentives to reform, improve infrastructure, or even establish a well-functioning tax bureaucracy. (T. Harford, M. Klein, Aid and the Resource Curse, The World Bank Group, Private Sector Development Vice Presidency, Note #291, Washington, DC, 2005)

2. The Dutch Disease Model: Symptoms, Causes and Effects

For the purposes of the present analysis, and to have a guide for choose the most significant economic data for Russian economy, I have adopt the core model of Corden and Neary (1982) that closely limit the larger framework of the resource curse telling to the interplay of the economic phenomena acting in a dynamics of causes and effects. The model divides the economy in three main sectors: the energy sector (the booming sector B), the manufacturing (or lagging sector M), and the service sector (or the non-tradable sector S).

According to Corden and Neary (1982) the main analysis concerns an extractive sector, a natural resource, even if it could be applicable to any other sector that shows a boom caused by technological improvements. The core model is the basic model on which many other more specific models can be built, and it will be used to understand how the effect of an energy boom affects the other two sectors of the economy, the manufacturing and services.

The boom in the extractive sector can be caused by three main factors, which lead to similar but not identical effects. The first is an exogenous technical improvement, which leads to a shift in the production function, and will therefore be used as the main tool to analyze the core model. The second one is a discovery of a new supply of natural resources (as in Russia, the rich Siberian oil fields), and the last, but not least, is an exogenous rise in the price of the energy sector in the world market (the well-known *oil-shocks*, for example).

According to these assumptions, the model works as follows. Thanks to one of the reasons above explained, the energy sector (booming-B) undergoes a boom of output, which in turn lead to an increase of the aggregate incomes of the employees in that sector. This can lead to two types of effect:

The *Resource Movement Effect*: due to the rise in the marginal product in the Booming sector, the demand for labor in B rises, thereby drowning out labor force from the manufacturing sector and from the service sector into the Booming one.

The *Spending Effect*: this effect can be direct or indirect, that is, caused either by the employees and the owners of the Booming sector, or by the government through tax revenues which increase the public spending on services⁵. Given a positive income elasticity for the service sector, the prices of the services related to the tradable sectors rise, bringing a real appreciation of the currency⁶. Therefore, this

5 This indirect effect is very important for the reallocation of the resources inside the economy. It is crucial to analyze on which commodities the tax's revenues is spent, because it can worsen the effects of the Dutch Disease. According to Oomes and Kalcheva, an increase about 1% of the Russian government's consumption leads to an approximate 1,5 % real appreciation of the Ruble. (IMF Working Paper, April 2007, p.13)

6 This is one of the most important consequences for the analysis. It is due to the fact that the prices of the tradable sector, energy and manufacturing, are exogenous, so an increase of the price in the

ratio can be considered as an approximation of the real exchange rate, so that it is possible to forecast a real appreciation of the domestic currency and a corresponding shift of the labor force into the non-tradable sector from the tradable one.

These two effects combined together lead to an important consequence following two different paths.

The first is a *direct de-industrialization* and implies a movement of the labor force from the lagging sector into the booming sector so as to reduce the output in the former. This effect does not involve the service sector and it does not require an appreciation of the real exchange rate. We will assume that this process is not relevant for the case of Russia because the energy sector employs a very small part of the population (only about 1 million people).

The second one is an *indirect de-industrialization*. It is due to the fact that there is an excess of demand for the service output created by the spending effect thereby improving the real appreciation. This draws the labor force from the lagging sector to the service one, thereby leading to the so-called indirect de-industrialization effect.

As a conclusion, the main consequence of an increase of the extractive-oil sector output is a decline of the tradable sector's output. This is caused by the change in the income distribution, that is, the decrease of the real rent of the specific factor-capital in the lagging sector. This is the essence of the so-called Dutch Disease.

So we assume that in Russia only the *Spending effect* acts on this mechanism, leading to a real appreciation of the exchange rate, so that de-industrialization occurs in an indirect way. Thus, eventually, the output of the manufacturing sector declines while it increases in the service sector.

In the specific case, it is therefore possible to conclude that the Russian economy could fit - if proved by data - the theoretic scenario involving the Dutch Disease explained by the enclave model.

Finally, it was also pointed out that the result of this process is a positive growth of the booming sector and a possible increase of output of the service sector, against only one loss: the slow-down of the manufacturing sector. Given these considerations, one might wonder why the Dutch disease, despite bringing to a huge wind-fall of revenues, continues to be considered such a negative phenomenon.

The relevant reasons for which this economic disease continues to be dreaded are:

1. *Macroeconomic Instability*. For a country that is so reliant on the exports of natural resources with volatile prices, this consequence is caused by the effect that these revenues have on the exchange rate, trade balance and public debt.

service sector lead to an increase in the ratio: $(P_{non-tradeable} / P_{tradeable})$, so as creating a real appreciation of the currency.

For example an exogenous fall in the price of crude oil may lead to a strong depreciation of the Ruble, a huge deficit of the current account as well as of the public finances. Vice versa, an exogenous increase in the oil price may lead to a real appreciation of the currency thereby exacerbating the Dutch disease (van Wijnbergen, 1984).

2. A higher level of social and regional inequalities (Fetisov, 2007: p.54). This symptom is due to the problem of a sharp rise in incomes of a small part of the population, the owners of natural resources (and the workers in the sector), as compared to the majority of the population which conversely is subject to a lower income growth, if not to an income stagnation process.
3. The trend is not reversible. The irreversibility of the trend is the most important consequence in terms of growth sustainability. According to the Dutch disease model, an energy boom draws resources from the manufacturing and service sectors into the energy sector, and from the manufacturing into the service one. However, in addition to this, two variables prove to be crucial to understand the real impact of the disease on the economy - the *size* and the *duration* of the transfer. According to Krugman, a key factor is the role of the learning curves, that is, the existence of economies of scale in which cumulative past output determines current productivity. In this model the comparative advantage is created by the dynamics of learning rather than from national characteristics (1987: p.47). As a dramatic consequence, even when the external shock ends, not only the manufacturing industries do not come back, but most importantly the economy will face a permanent reduction of its home country's market share and of its relative wages. As Krugman writes (1987: p.41) like a river which digs its own bed deeper, a pattern of specialization, once established, will induce relative productivity changes which strengthen the forces preserving that pattern.

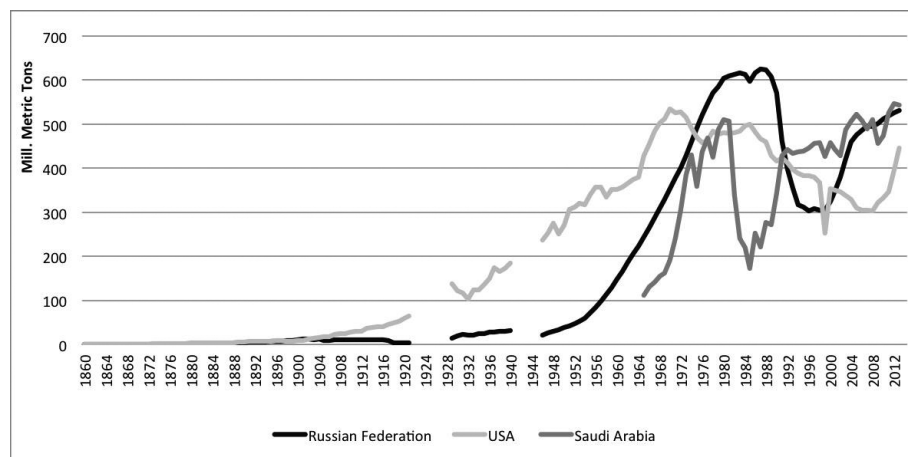
In the next sections we will investigate whether the model here examined fits the Russian case, that is, if in the Russian economy there is any evidence of the structural changes mentioned so far. For the purpose of a better control of the good match between theory and data, our analysis has to satisfy the model's conditions specified in the following questions.

3. Is Russia Dependent on Natural Resources?

Russia is one of the biggest main historical crude oil producers, and it has been always reliant on natural resources for its economic development. The Russian oil story started in 1860. And in 1901 for the first time, and not the last, became the first world's producer with nearly 12.000 million metric tons a year, almost 2 million

higher than United States. But the Russian technique was old and very inefficient (they used wooden tools and not metal): so they couldn't drill deeper than 300 feet why the American companies were able to extract oil at more than 1800 feet deeper (Goldman, 2008: p.22). This led in few years Russia to lose its primacy and the Bolshevik Revolution of 1917 did the rest.

Figure 2 Main historical crude oil producers



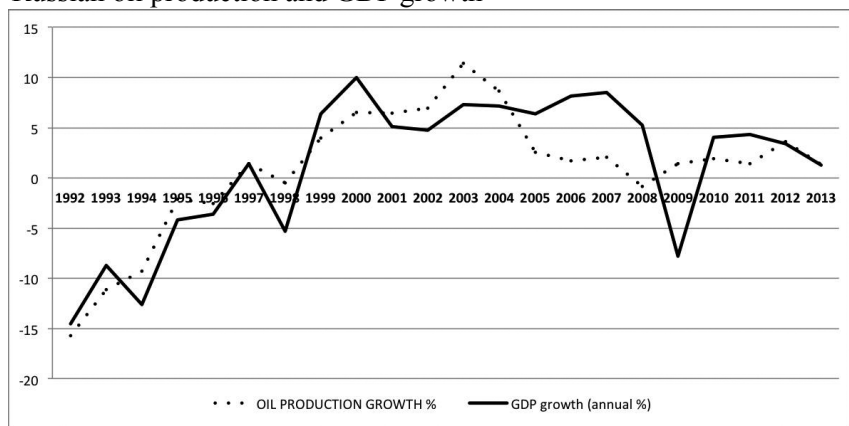
Source: British Petroleum, Statistical Review of World Energy 2014

Then, it regains the primacy among the top world producers at the mid-70s, after the first oil shock, and it kept up to the USSR's collapse in 1991, when the oil output shrank by a 30% from its peak of 12.601 bbl/day in 1987, and then attained its all time negative record of almost -50% in 1996. The impact of this productive collapse - and of the Soviet Union's disintegration - on the Gross Domestic Product was dreadful. As reported by Goldman (2008: p.56) on CIA data, while in the 80s the Soviet Union's GDP was nearly half of the United States, by 1992 the Russian GDP had fallen hardly to about 10% of the U.S. GDP.

Said this, to give a first rule of thumb to measure, at a glance, the impact of a raw material on the revenue of a country, the main economic indicators of the dependence of Russian economy from oil are reported in Fig.3.

The Russian GDP growth, or decrease, is highly correlated to the oil production growth, or decrease. In the first year after the collapse, in 1992 when the oil production touched its lowest record of -15,7%, the GDP shrank by nearly the same amount. In the following three year, 1992 -1994 oil production fell to the lowest record of -36% followed by a GDP's drop of -35%. And when from 1999 to 2008 the economy began to grow at 7% rate, it was fuelled by world oil rising price. The average increase of crude oil price between 2003 and 2008 was 26% every year and in the same period Russia had the best performance of the previous 20 years.

Figure 3 Russian oil production and GDP growth



Source: World Bank Database, 2015

The correlation holds as well in the downturn: when in the world crisis of 2008-2009 the crude oil price collapsed, it provoked in Russia much bigger recession (-7.8%) than in the average of developed economies (-3.4%) and also the average of emerging economies (+2 %) that escaped recession.

Generally, Spilimbergo (2005) calculate that government budget's revenue increases by 0.40% of GDP for every 1 \$ of price increase of an Ural barrel (over an average price of 24 \$/bbl). And Gurvits (2006) calculate that under the current Russian tax system, the fluctuations in the government's revenues related to the oil-exports swing between -4 % and +9 % of the GDP increasing the risk of sudden slow down or even worst recessions. The analysis of this development pattern prove clearly how the Russian GDP is strongly dependent on its oil production and in turn reliant on its price, which is exogenous and quite often volatile.

Figure 4 Fuel exports as % of Merchandise Trade and GDP



Source World Bank Database, 2015

To sum up the argument we can just look to the basic indicators of *dependence*: fuel exports as a share of GDP and fuel exports as a share of total merchandise exports. The weight of fuel exports on GDP passed from 9,6% in 1996 to almost 20% in 2013⁷. And the fuel exports passed from accounting almost 43% on total merchandise exports in 1996 to almost 70% in 2013, an increase of 27% of its weight. To better appreciate these data is sufficient to look at the weight of manufactures exports on GDP: from 6% in 1996 to 4,8% in 2010, reaching the bottom in 2008 with a weight of 3,1%. The presence of a single and very visible export concentration is confirmed. The answer to the question raised in this section - on Russian *dependence* - can only be positive.

4. Is Ruble a Commodity Currency?

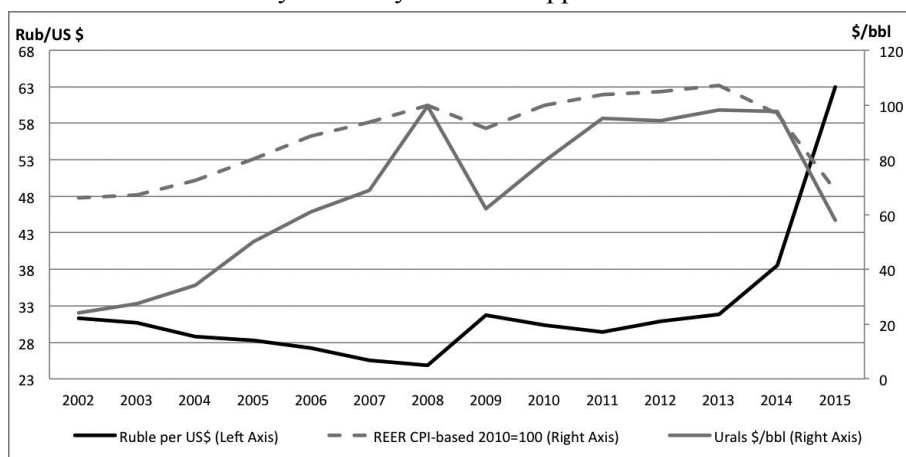
A country that relies on export of only one commodity, as Russia does, is highly prone to external shocks and to their dangerous effects. As we know from the model presented in section 2, the first vehicle with which an exogenous stimulus spreads into the wider economy is through the movements of the currency's exchange. And this happens because the currency fluctuations affect, with different intensity, a broad spectrum of prices, from the terms of trade to the prices of all the commodities and wages.

Let's start the analysis from January 1999 when the Ruble had been heavily depreciated, almost by half in real terms due to unilateral suspension of payments, which determined the Russian default. Afterwards, the recovery of oil output and its rising prices both led to an enhancement of the economic activity, thereby effacing recession. Once the recession was over, between 2002 and 2008, there was an appreciation of the Ruble against the Dollar in real terms, from 32 Rubles for 1 Dollar to 25 i.e. about 22%,⁸ while the real effective exchange rate increased even stronger.

This trend was due to the increase in oil prices which led to a constant appreciation in nominal terms - thanks also to an accommodative stance of the Bank of Russia - till when the price of crude collapsed, reaching the value of almost 60 \$/bbl in 2009. Between 2008 and 2009 the collapse of the oil price led to a collapse of the exchange rate in nominal terms. But there is here an asymmetry: a negative shock is always heavier than a positive one in the Russian economy. The contraction of the oil price between 2008 and 2009 was almost of 36,5 %, and the collapse of the nominal exchange rate was about 27,7 %; while between 2007 and 2008 respectively the increase of the price was 40 % and the increase of the nominal exchange rate was less than 3 %.

7 I.M.F., Russian Federation: statistical appendix, IMF Country Report No. 05/378,2005. The calculations of the weights are on World Bank data.

8 World Bank database. To calculate the real exchange rate, I base my calculation on the consumer price index where 2005 = 100

Figure 5 Ruble as Commodity Currency and Real Appreciation

Source: BIS, World Bank

To sum up what has been said so far, a positive/negative shock on the oil price of almost the same percentage has a totally different impact on the nominal exchange rate: if it is positive, the appreciation is very small, but if it is negative the depreciation is huge. A plausible explanation is given by the monetary policy used by the Central Bank of Russia on occasion of a positive price shock. Indeed, it tries to offset the possible negative impact of a strong appreciation on the manufacturing and exporting industries by increasing reserves of foreign currency. A monetary policy known as the sterilization process.

This real appreciation of the Ruble is a crucial element as it squeezes profits and employment in manufacturing while the energy sector keeps on rising, benefiting from this currency appreciation. An excessive and long lasting appreciation would permanently reduce the competitiveness of the domestic industries, providing evidence of the existence of the Dutch Disease. According to the data, therefore, the scenario that Russia is facing, is precisely an increase of the relative prices of the domestic products⁹.

We can safely conclude that the real exchange rate is heavily correlated to the oil price, and this is due to the big weight that oil exports' revenues have on the Russian current account and gross domestic product. This leads to the conclusion that oil price and output are key variables in determining the fluctuations of the Russian real exchange rate, thereby we can answer positively to the initial question, and we can affirm that the Ruble can be considered as a *commodity currency*.

⁹ The appreciation of the Ruble could also, in theory, be a consequence of the Balassa-Samuelson effect, that is, the effect produced by the increase of labor productivity in the energy sector on the wages in all the economy. However, in the case of Russia, according to Egert (2007, 2013), there is evidence that the Balassa-Samuelson effect played a limited role in the case of Russian economy.

5. The Impact on the Russian Macroeconomic Structure

As consequence of the dynamics described so far, the model presented in section 2 predicts that the Russian economy should have undergone a process whereby manufacturing became the lagging sector. So the aim now is to check if this really took place: if there has been a relative reduction of the output in the manufacturing sector, in absolute or relative terms, compared with the energy and the service sectors. Accordingly, also the trend of employment and wages among sectors will be analysed.

After the Ruble's devaluation in 1999, the output started to recover, especially the energy and the manufacturing sector, while the service sector enjoyed the growth of the other sectors in the following years. On average, between 2000 and 2012, the mining sector grew yearly at 2.5% points higher than the manufacturing sector. Nevertheless the big winner, in this long period, was the service sector which outperformed, on average yearly, all the others: the mining by 1.4%, the manufacturing by 3.8% and agriculture by 7.3%. The analysis is summarized by Tab. 1 which shows the share of each sector on the Russian's gross value added.

Table 1 Share of Gross Value Added by Sector

	Service	Mining	Manufacturing	Agriculture
2000	49%	27%	18%	6%
2012	58%	26%	13%	3%

Source: United Nation, 2014

Between 2000 and 2012 the service sector increased its share of 9 percentage points passing from 49% to 58%. Manufacturing is the main loser (-5%) passing from 18% to 13%, while agriculture and mining decreased their shares respectively by 3% and 1%.

This *exploit* of the service sector, although coherent with our Dutch disease model, in that case of Russia has a second special explanation. That is during the Soviet era the development strategy was focused on the heavy industry and the services sector was totally disregarded. It began to expand only at the end of the 1990s. In fact, services were not even accounted for in the annual statistics on what in Soviet Union was called Net Material Product (NMP)¹⁰.

¹⁰ Differently from the notion of Gross Domestic Product (GDP) the value added of trade, banking, transportation, telecommunication, education, public administration etc. were designated as *unproductive* activities - following the definition first of Adam Smith and than of Marx. At the end of 1980s, before the collapse of the USSR, the service sector employed around 7 % of the work force, that is less than half of the comparable sectors in the main market economies. Distribution received in USSR usually not more than 3% of total investments (compared to 4-9 % in the countries of G-7) (IMF et alii, 1990: p.38).

These growth rate differentials among sectors can be explained as follows: a boom in the oil sector in 2003-2004, thanks to the sky rocketing trend of the oil price, and the fast pace of the manufacturing sector thanks to Ruble's devaluation in 1999, led to a rising consumption for services thereby boosting its output. More precisely, accordingly to the Dutch disease model, an increase in the oil price and therefore of the productivity of the energy sector and its relative wages compared with the other sectors, induced the government and the renters of the booming sectors to increase the consumption on services. The rise in demand for services increased employment in the sector, which, although with a small lag, adjusted its output as well.

5.1 The distribution of the employment by sectors

The de-industrialization process predicted by the model can be tested also following the movement of the labour force. According to Tab.2, the service sector owns the biggest share of employment, with 43,3 millions of employees, almost 60% of the total. The energy, mining and quarrying sectors, conversely employed a very small part of the labour force, less than 1 million, almost 1,5 %. This, as previously mentioned, leads to the conclusion that the direct de-industrialization effect, that is, the shift of the labour force from the manufacturing sector to the energy sector, can be neglected in the Russian case. The percentage change in labour in the energy sector decreased from 1,6 % in 2005 to 1,5 % in 2010, in absolute terms, around fifty thousand people.

Table 2 Employment by sectors

	2005	2009	2010
Mining	1,05	1,00	0,99
Manufacturing	11,5	10,38	10,4
Agriculture	7,38	6,58	6,5
Services	40,8	42,95	43,27

Source: Federal State Statistics

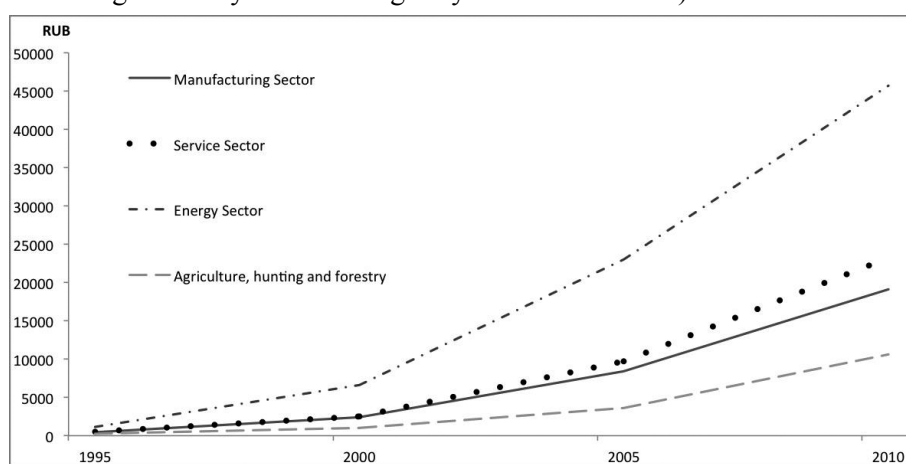
We have now to focus our attention on the other three sectors, agriculture, hunting & forestry (AHF), manufacturing and services. The AHF sector shows a decrease of its employment between 2005 and 2010, almost 1,5 %, shifting from 11,1 % to 9,6 % - around 1 million employees in absolute terms. Of utmost importance for our analysis is the decrease in the labor force in the manufacturing sector, almost 1,8 %, decreasing from 17,2 % to 15,4 % between 2005 and 2010, more than 1 million people. Taken together, the three sectors, energy (with a smallest change, only 0,1 %), manufacturing (with the biggest change) and AHF, showed a total decrease of labor force of about 3,4%. This, in turn, increased labour force in the service sector, the winner, which passed from 59,6 % in 2005 to 62,7 % in 2010, an increase of almost 2,5 million of people. Indeed, the service sector was the only one where

employment was able to increase so as to confirm the de-industrialization process under way in the Russian economy.

5.2 The growing wages' differential

An unequal growth of wages is another important symptom in the framework of this analysis. The energy sector, compared to the other sectors, enjoyed a wage premium already in the '90s: its average wage was 2,3 time higher than the manufacturing sector (1.070 Rubles against 466) and 2,1 times higher than the service sector (1.070 Rubles against 505).

Figure 6 Average monthly nominal wages by sector 1995-2010)



Source: United Nations, 2014

With these strong wages differentials it was likely to expect an aggressive catching up by the manufacturing and service sectors in the 2000s. Nevertheless it didn't take place at all for the manufacturing sector, while for the service sector this slightly happened. In 2010 the nominal wage of the mining sector was still 2,1 times higher than the manufacturing and even more, if we look strictly only to the energy sector¹¹. The energy sector wages only slightly lost ground against the service sector, the one that most enjoyed the last decade of soaring oil prices and the shift from a communist to a capitalist market system. The lacking wage incentives brought the system to greater inequalities both among sector and employees, thus exacerbating the effects of the Dutch disease. An high energy price is a crucial determinant for a Consumer Price Index as well for the Russian citizens. Therefore, a fast growth of the energy sector, which, as we have seen, accounts for more than 20 % of the Russian GDP, could lead to an overheating of the economy against a big share of the population, whose wages are lower than the economy average especially for those sectors such as agriculture and the manufacturing sector. This can be called a fake

¹¹ While the mining and quarrying sector represents a gross indicator, the *energy sector* takes into account only energy related activities plus the coke and refining petroleum industry.

growth because, as we have analysed in the previous paragraph, although the GDP grows, it does only for specific sectors of the economy - energy and services - as well as for specific categories of workers.

5.3 The lack of financial resources

Empirical researches (Fasano 2000, Davis et al. 2003) support the evidence that economic logic is rarely followed in resource-rich countries because the policy makers have strong political incentives not to discipline the public overspending, not to collect but to use up windfall revenues (Humphreys and Sandbu 2007: p.213). The Russian case confirms these findings. Two points can be enlightened.

The first point is that Russian monetary policy has always tried to achieve multiple targets, trying to control the exchange rate and at the same time inflation. But, as the economy is highly prone to external shocks (the oil-price), this goal has been much more difficult to pursue than in other countries. The basic problem is that an increase of the interest rates to reduce the money supply curbs the inflation¹², producing a nominal appreciation of the exchange rate thanks to the channel of free capital mobility. Furthermore, this increment of the interest rates in turn leads to an overheating of the interest rate on loans to private citizens and firms, thus contracting the access to credit. Ultimately, this contraction of credit, combined with a low saving rate, brings the economy to grow at much slower rate than it could. If we look at the Russian lending interest rate, it has been around 12% in the last ten years, with a peak in 2009 (15,3%). Obviously this is a big disincentive to invest, and only the sector with the highest productivity, the petroleum one, succeeds in securing a loan. To stress the point let make a comparison with China, which in the last ten years has pursued an average lending interest rate around 5,8%, less than half of the Russian one, to boost its growth and investments.

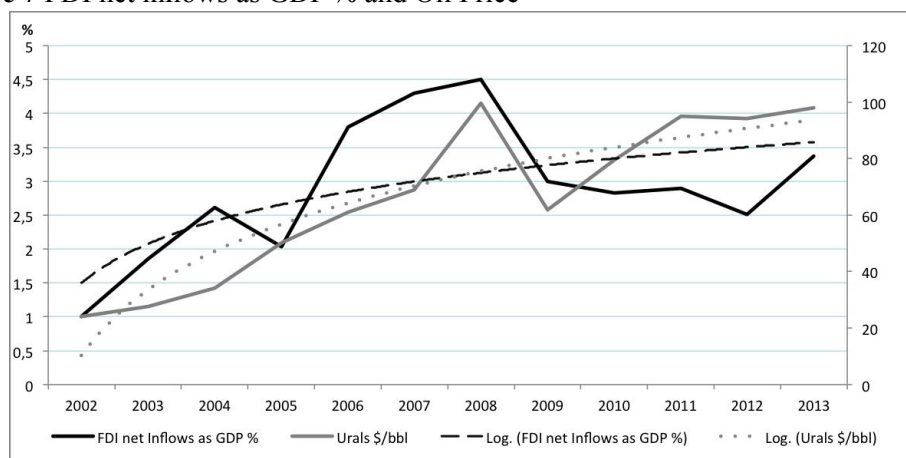
The second point concerns the tool to get access to financial resources through the foreign direct investment channel (FDI). The cumulative inflows of Foreign Direct Investments in Russia grew from \$ 3,5 billion in 2002 to \$ 278 billion in 2010 (WB Database, 2012). This obviously has contributed to boost the real appreciation of the Ruble, thereby exacerbating the effects of the Dutch Disease.

Fig.7 is very telling: when the price of crude goes up, the inflows' of FDI in percentage of GDP increases as a consequence. When in 2002 the oil price was, on average, about 24 \$/bbl, the ratio of FDI on GDP was almost 1%. Conversely In 2010, when the crude average price reached 78 \$/bbl, the ratio of FDI on GDP jumped to 3,3%, with the record in 2008 of 4,5%, when the oil price reached on average the level of 96 \$/bbl. The main collector of foreign investments is the service

12 Only in 2010 the Russian inflation was around 5%, but in the years before it has always been around 7-8%. A real appreciation of the Ruble happens only if the increase in the nominal exchange rate is higher than the decrease of inflation rate.

sector with almost 60% of the total between 2003 and 2010. The main performer categories are wholesale and commission trade, real estate, renting and business activities and financial activity, the latter alone accounting for almost 33% of the total in 2010.

Figure 7 FDI net inflows as GDP % and Oil Price



Source: World Bank

The energy industry (mining plus petroleum processing) accounts for more than 20% of the total. While this number does not seem relevant, its economic significance overturns if we look at the employment weight of the sectors. As we know from section 5.1. if we compare the energy sector in terms relative to labour force employed of the other sectors, the ratio between foreign investments and people employed is totally in favour of the energy industry. Indeed, in 2010 this ratio for the mining sector was 8 compared with 1,9 for the manufacturing sector and 1 for the service sector¹³.

The problem concerning the lack of financial resources is crucial for the growth of those sectors that do not attract foreign investors as much as the petroleum industry does. While for the manufacturing and mining and quarrying sector the common problem which restricts the increase in production is the lack of financial resources, for the service sector which is less capital intensive than the other two, the main issues are competitive imports and economic uncertainty. In the specific case of the manufacturing sector it must be highlighted that in addition to the lack of financial resources the main factor restricting the increase in production is the insufficient demand for production in the domestic market. This further emphasizes the effects of the Dutch disease which, apart from reducing the competitiveness of the manufacturing sector for the reasons previously explained, exacerbates the conflict between the local manufacturing sector and foreign competitors

¹³ Author's calculations on Federal State Statistics Service database.

6. Microfoundations of Macro Developments

In this chapter the attention will be set upon the microstructure of the Russian economy, i.e. the impact the industrial organization of Russia may have on its growth trajectory. The analysis will be based on the theory of ‘Granular Origins of Aggregate Fluctuations’ developed by Gabaix. The theory demonstrate that idiosyncratic shocks do not die out in the aggregate if firm size distribution follows a Power Law - fat tailed distribution (Gabaix, 2011, p. 735). More precisely he shows that idiosyncratic shocks to the top 100 firms in the United States can explain one-third of the fluctuations of GDP (Ivi., p. 736). Contrary, if an economy is composed by small-firms, the central limit theorem applies leading idiosyncratic shocks to cancel out in the aggregate.

This theory provides microfoundation for aggregate shocks - those up to here presented - thereby it completes the investigation made in the previous sections neatly.

Data are collected from Bloomberg for Russian firms with revenues larger than \$50 millions for the period ranging from 2005-2014. Table 3 underlines the principal statistics concerning the share of GDP for top firms in the economy. Firms with aggregate revenues higher than \$50 millions passed from accounting 42% of GDP in 2005 to almost 59% in 2014. Moreover firms concerning natural resources in the top 30 accounted for 26,3% in 2014, while the top 3 bucket represented by Gazprom, Rosneft and Lukoil - exclusively energy firms - accounted for 21% of GDP alone.

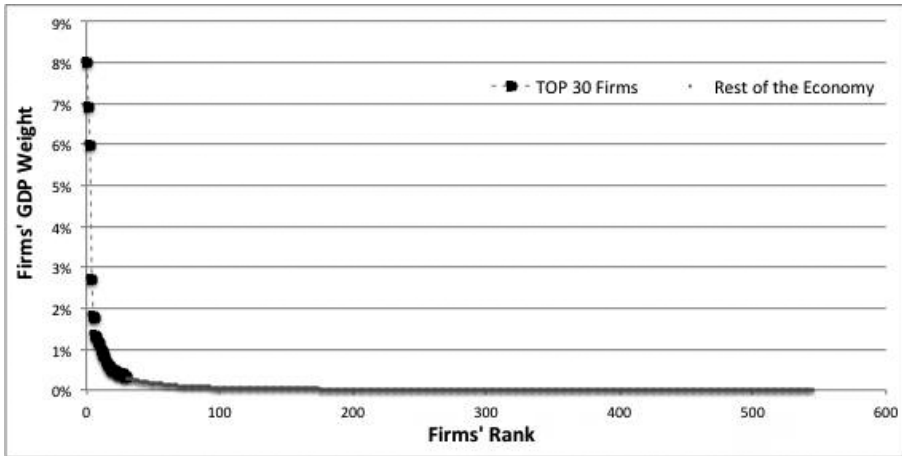
Table 3 Firms’ Revenues as Share of GDP and Distribution of Firms

	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
GDP growth Costant 2005	0,6%	1,3%	3,4%	4,3%	4,5%	-7,8%	5,2%	8,5%	8,2%	
Full sample GDP share	58,8%	57,8%	55,6%	56,8%	55,4%	53,1%	50,6%	47,5%	46,5%	41,8%
Top 50 GDP Share	47,6%	46,9%	44,4%	45,9%	44,2%	41,8%	40,1%	37,9%	37,5%	33,9%
Top 30 GDP Share	43,2%	42,5%	40,1%	41,5%	40,2%	38,3%	36,1%	34,5%	34,0%	30,6%

Top Energy GDP share	26,3%	25,8%	23,7%	25,2%	23,2%	22,5%	23,3%	21,5%	22,9%	21,9%
TOP 3 GDP Share	20,9%	20,4%	18,2%	18,9%	17,5%	17,0%	17,9%	16,1%	16,8%	15,5%
No. of Firms Revenues >\$50 M	545	542	520	494	457	421	423	387	317	260
No. of Firms Revenues <\$2.5 Bn	481	477	456	439	410	383	376	349	288	239

The first step of the analysis to apply Gabaix's theory consists in verifying if the distribution of firm size in the Russian economy follows a Power Law distribution. As we can see by figure 7 and by the statistics here presented there is a strong concentration of GDP creation in the top 30 firms for the full period considered, thereby letting us presume a distribution with fat tails.

Figure 8 Firms' Concentration: 2014



Source: Bloomberg

By dividing the data sample in buckets of magnitude of \$100 millions, I obtain 1650 buckets for the year 2014, ranging from \$50 millions up to \$165 bn of revenues for Gazprom, the highest contributor¹⁴. Then by equalizing the number of firms (Y) to the revenues segmented in buckets (X) equation (1) and by applying logarithmic

¹⁴ The same methodology is applied to the periods up to 2006. A fewer number of buckets are present in the previous years since the highest contributor experienced lower revenues.

properties to equation (2) I can now obtain by regressing the value of buckets on the number of firms specific to each bucket, the alpha coefficient - the exponent of the distribution (3)¹⁵.

1. $Y = X^{-a}$

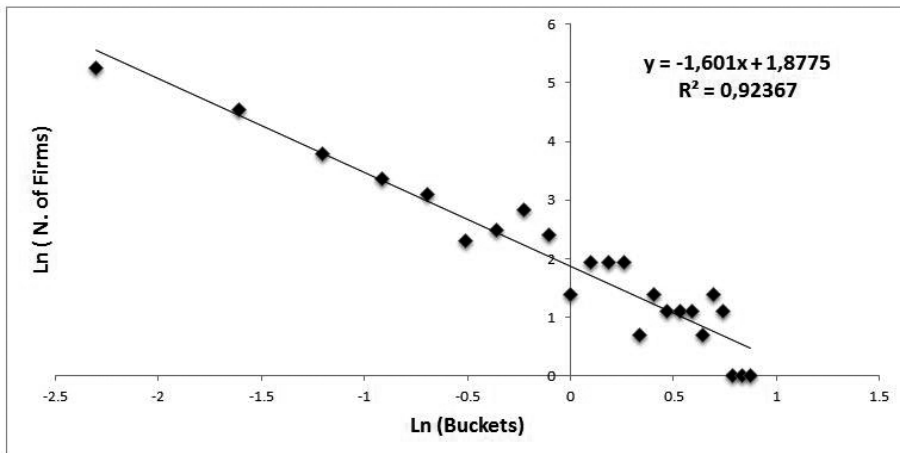
2. $\ln(Y) = \ln(X^{-a})$

By applying logarithmic properties it follows:

3. $\ln(Y) = -a \ln(X)$

If the alpha coefficient lies within the interval $1 < a < 2$ the distribution is Power Law - fat tailed (Gabaix, 2011, p. 740).

Figure 9 Power Law Distribution of Firm Size: 2014



Source: Bloomberg, Own Computation

Note: The power law distribution is computed for the threshold of firm revenues < \$2.5 bn.

By computing the exponent for the time ranges 2014-2006, as shown in figure 9, the alpha coefficient for each year lies within this interval, stating that the firm size distribution for the Russian economy is a Power Law.

Given this result we can now move on to compute the Granular Residuals for the natural resource firms among the top 30 firms so as to appraise the impact of idiosyncratic shocks on GDP fluctuations. The methodology here applied replicates likewise the one of Gabaix. First of all we compute the revenue growth rate for the 13 energy firms in the top 30 for each year ($K=13$). Then we subtract to each firm's revenue growth rate the GDP growth rate of the same year ($g_{i,t} - \bar{g}_t$).

¹⁵ The regression is not applied to the full sample, but takes into consideration all the firms with revenues higher than \$50 millions and lower than \$2.5 bn. By looking at table 3, last row, we can appreciate the number of firms lying within this interval for each year. The interval has been selected in order to have only few data points with empty buckets.

This can be interpreted as the differential growth speed between a firm and the economy average¹⁶. Then we multiply this value by the weight on the GDP of the firm's revenue $S_{(i,t-1)}/Y_{(t-1)}$ so as to obtain the granular residual of each firm for each year (Gabaix, 2011, p. 750).

$$4. \Gamma_t = \sum_{i=1}^K \frac{S_{i,t-1}}{Y_{t-1}} (g_{i,t} - \bar{g}_t)$$

$$5. \bar{g}_t = \beta \Gamma_t + \alpha$$

By summing up the granular residuals of all the 13 energy firms - equation 4 - we get the time series of the energy sector's granular residuals for the time period 2014-2006. At this point by regressing the granular residuals on the GDP growth rate - equation 5 - we obtain that the energy sector's idiosyncratic shocks explain almost 65% of variations in output growth as clearly depicted in figure 10¹⁷. Although the existing shortcomings concerning the length of the time series may rise some doubts on the precise impact of the energy sector's idiosyncratic shocks on GDP fluctuations, the Russian industrial structure is fat tailed distributed, therefore they matter. \

This result can be better understood if we think an idiosyncratic shock as a shock to the output volume or to the output price. A manufacturing/service firm may have a bad year because the demand for the product it produces drastically diminishes for whatever reason or because a cheaper version has been started to sell in the market. Therefore its revenues experience a downfall. However not all the firms belonging to the same sector will experience the same bad luck, others may gain market shares and increase output price. However in a sector like the energy sector where the price of output - natural resources - as well as its volumes are exogenous and highly correlated to the global demand, a positive/negative shock is likely to take place for the whole sector simultaneously. Therefore given the extraordinary contribution of the energy sector to the Russian GDP, it is reasonable that idiosyncratic shocks to the energy sector explain almost 65% of the GDP fluctuations. This further investigation stresses an additional weakness of the Russian growth model, i.e., the highly fat-tailed industrial structure amplifies instead of softening the negative effects of external shocks both at firm level and sector level. Idiosyncratic shocks it has been demonstrated do not cancel out in the aggregate thereby contributing to amplify the amplitude of business cycle's swings.

16 In Gabaix's analysis $\bar{g}$ is the average revenue growth rate of top 100 firms, but for my purpose I extend Q to all firms in the economy, therefore $\bar{g}$ is the GDP growth rate as it follows from the following equation: .

17 The beta coefficient is statistically significant at 1%, since the associated p-value is equal to 0,0053.

Figure 10 Power Law Distribution of Firm Size: 2013-2006

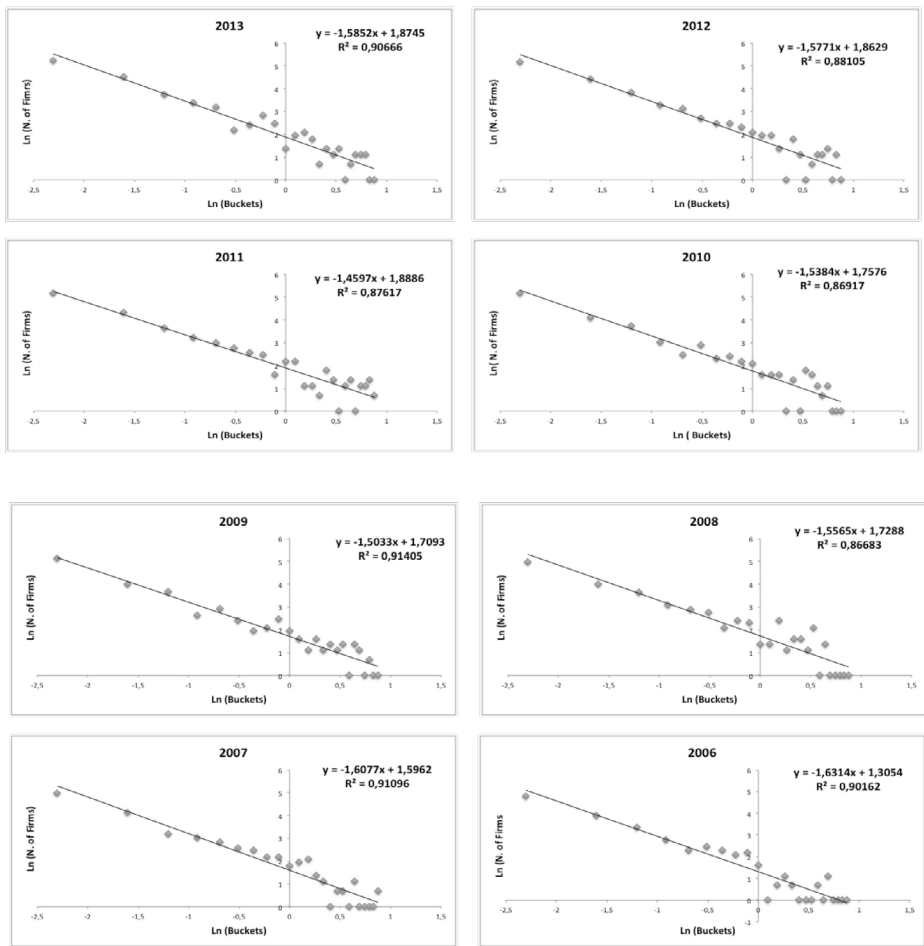
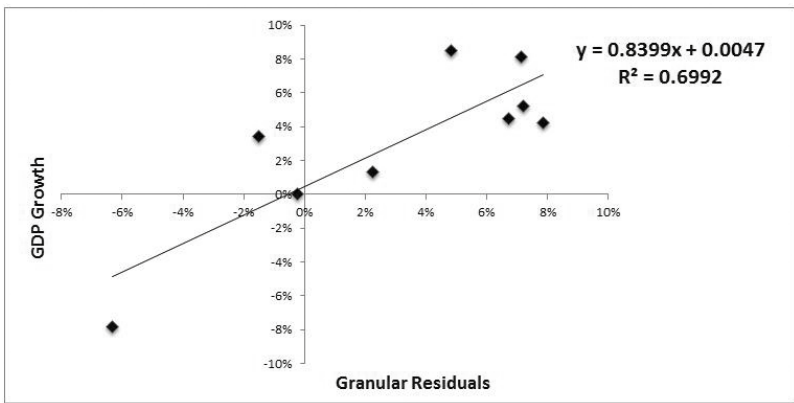


Figure 11 Energy Sector's Granular Residuals and GDP Fluctuations



Source: Bloomberg, Own Calculations
Note: The energy sector is composed of all natural resource firms in the Top 30.

This implies ultimately that the Russian economy may be able to experience only interchanging periods of shortage and bonanza as respectively took place in 1991-1998, 1999-2008, and 2009-2015.

This last period will be investigated in the next conclusive chapter so as to depict which trajectories might be still pursued by the Russian government.

7. The Curse Once Again

As emphasizes in the previous chapters the major weakness of the Russian model is the extreme vulnerability to external shocks. The first symptom was already clear by the economic crash Russia experienced during the Financial Crisis of 2009 when GDP growth shrank by 13 percentage points from +5,2 to -7,8. A deadly combination of weak global demand, low energy prices and an almost absent manufacturing sector let the economy to freely fall likewise the years following the collapse of the Soviet Union. Since 2008 Russia is almost stagnant and the invasion of Crimea only contributed to exacerbate an already compromised economic recovery. GDP growth decreased further. In 2014 the economy grew only at 0,4% and the forecast for 2015 has been revising constantly downward. The IMF's last estimates give it close to -4% although oil prices recently stabilizes around \$60 per barrel and the Ruble stops depreciating around 50 Ruble per \$ from the peak reached in February of almost 70 Roubles per \$. The State Capitalism's main achievement, i.e., the reunification of its energy superpowers through state owned enterprises, whose virtues were exalted during the Russian renaissance of 1999-2008, is showing its deepest and sickly rifts once again. The analysis here developed sheds light on Putin's double bet: concentration of GDP creation from a single source - energy exports - and from a restricted group of corporations - Gazprom, Rosneft and Lukoil. This creates the most classical doom-loop. A shock to the former immediately propagates to the latter and vice versa, without any chance of breaking the self-reinforcing process through the tools of government intervention - fiscal and monetary policy - since government finances highly depends on both. Moreover pinning high hopes on a fading manufacturing sector is clearly a utopia as we have seen in section 5. If the lack of financial resources was the major problem affecting the sector productivity, now that interest rates spiked up to 17% to curb inflation and the Ruble depreciation, the huge domestic capital flights, the negative FDI flows, and the resetting of domestic savings, the situation looks more a nightmare than a spring-blooming. The same prospects hold for the service sector which is completely reliant on the energy sector's consumption expenditures and on foreign investments to boost growth. Ultimately the energy sector is far from making a miracle. Opec is persisting with its strategy of high crude oil production to force high-cost producers out of the market

and thereby increasing market share. The collateral effect is that prices will remain low for the whole 2015 and probably 2016. Moreover the European sanctions against Russia mainly target the Russian energy giants avoiding any possible loan to these companies as well as any type of export of energy related equipment and technology necessary to further boost production. In this hopeless scenario a step off of the Russian government is only a chimera. Putin's defence spending almost doubled since 2010, up to almost 15% of GDP within 2015, over a third of the federal budget.

The gloomy perspectives here presented are the natural consequence of a short-sighted economic strategy of a man that put his glory in front of the well-being of his state and his people - the crucial point raised by Mehlum, K. Moene, R. Torvik (2006) concerning the crucial role of bad institutions. This once again has proved the curse of natural resources to be painfully true and relentless.

Neglecting the manufacturing sector was a fatal error, unfortunately the point of no-return has already been overtaken.

References

- Auty RM (1994) Industrial Policy Reform in Six Large Newly Industrializing Countries: the Resource Curse. *World Development* 22: 11-26.
- Auty RM (2001) *Resource Abundance and Economic Development*. Oxford University Press, Oxford
- British Petroleum (2011) *Statistical Review of the World Energy*
- Borkò T (2007) The Suspicious of Dutch Disease in Russia and the ability of the government to counteract. ICEG European Center, Working Paper No. 35: 1-22
- Brunnschweiler C, Bulte E (2008) The Resource Curse Revisited and Revised: a Tale of Paradoxes and Herrings. *Journal of Environmental Economics and Management* 55: 248-264
- Connolly R (2008) The structure of Russian Industrial Exports in Comparative Perspective. *Eurasian Geography and Economics* 49 (5): 586-603
- Cooper J (2006) Can Russia compete in the Global Economy? *Eurasian Geography and Economics*, 47 (4): 407-425
- Corden WM, Neary JP (1982) Booming Sector and De-Industrialization in a Small Open Economy. *The Economic Journal* 92 (368): 825-848
- Corden WM (1984) Booming Sector and Dutch Disease Economics: Survey and Consolidation. *Oxford economic Papers, New series*, 36 (3): 359-380
- Davis GA (1995) Learning to Love the Dutch Disease: Evidence from the Mineral Economies. *World Development* 23 (10): 1765-79

- Davis J et al (2003) Stabilization and Saving Funds for Non renewable Resources. In Davis et al (eds.) Fiscal Policy Formulation and Implementation in Oil-Producing Countries, IMF Washington DC
- European Bank for Reconstruction and Development (2006) Strategy for the Russian Federation. London: UK EBRD
- Égert B (2007) Balassa Samuelson Meets South-Eastern Europe, the CIS and Turkey: a Closer Encounter of the Third Kind? *The European Journal of Comparative Economics* 2 (2): 221-243
- Égert B (2013) Dutch Disease in the Post-Soviet Countries of Central and South-West Asia: How Contagious is it? CISifo Working Paper 4186
- Eurostat Database, 2012
- Ellman M (1981) Natural Gas, Restructuring and Re-industrialization: the Dutch Experience of Industrial Policy. Chapter 6. Oil and Industry: Energy, Industrialisation and economic policy in Canada, Mexico, the Netherlands, Norway and the United Kingdom, Academic Press, London, New York pp. 149–166
- Federal State Statistics Service (2014)
- Fasano U (2000) Review of Experience with Oil Stabilization and Saving Funds in Selected Countries. IMF Working Paper, Washington DC
- Fetisov G (2007) The Dutch Disease in Russia. *Problems of Economic Transition* 50: 53-73
- Gabaix X (2011) The Granular Origins of Aggregate Fluctuations, *Econometrica*, Vol. 79 (3): 733-772
- Garanina O (2009) What Beyond Oil and Gas? Russian Trade Specialization in Manufactures. *Post-Communist Economies* 21 (1): 1-29
- Goldman MI (2008) Petrostate. Putin, Power and the New Russia. Oxford University Press, Oxford
- Gurvits E (2006). БЮДЖЕТНАЯ И МОНЕТАРНАЯ ПОЛИТИКА В УСЛОВИЯХ НЕСТАБИЛЬНОЙ ВНЕШНЕЙ КОНЪЮНКТУРЫ, *Вопросы экономики* No3, (Fiscal and monetary policy in the conditions of unstable international cyclical situation)
- Harford T, Klein M (2005) Aid and the Resource Curse. The World Bank Group, Private Sector Development Vice Presidency, Note #291, Washington, DC
- Hirschman AO (1958) The Strategy of Economic Development. Yale University Press, Yale
- Humphrey M, Sandbu ME (2007) The Political Economy of Natural Resource Funds. Humphrey M, Sachs JD, Stiglitz JE (eds.) *Escaping the Resource Curse*, Columbia University Press, New York, pp. 194-233
- IMF, WB, OECD, EBRD (1990) The Economy of the USSR. A Study Undertaken

- in Response to a Request by the Huston Summit. World Bank, Washington
- International Monetary Fund (2005) Russian Federation: statistical appendix. Country Report No. 05/378 IMF: Washington
- Krugman P (1987) The Narrow Moving Band, the Dutch Disease, and the Competitive Consequences of Mrs. Thatcher. *Journal of Development Economics* 27: 41-55
- Lederman D, Maloney F (2007) Trade Structure and Growth. In Lederman D., Maloney F. (eds) *Natural Resources. Neither Curse nor Destiny*, Stanford University Press and World Bank, Stanford, pp. 15-39
- Leamer E (1984) *Sources of International Comparative Advantage: Theory and Evidence*. The MIT Press, Cambridge, MA
- Markandya A, Averchenkova A (2001) Reforming a Large Resource-Abundant Transition Economy: Russia. In Auty R.T. (ed), *Resource Abundance and Economic Development*, Oxford University Press, Oxford, pp. 277-295
- Mehlum H, Moene KO, Torvik R. (2006) Institutions and the Resource Curse. *The Economic Journal* 116 (508): 1-20
- Leamer E (1984), *Sources of International Comparative Advantage: Theory and Evidence*, Cambridge, Ma: MIT Press
- Neary Peter and Van Wijnbergen Sweder, Can Oil Discovery Lead to a Recession? A comment on Eastwood and Variables, *The Economic Journal*, Vol. 94, June 1984, pp. 390-395
- Oomes N, Kalcheva K (2007) Diagnosing Dutch Disease: Does Russia have the symptoms? International Monetary Fund, WP/07/102: 1-34
- Ross ML (1999) The Political Economy of Resource Curse. *World Politics* 51: 297-322
- Sachs JD, Vial J (2001) Can Latin America Compete? In Vial J., Cornelius P. (eds) *The Latin America Competitiveness Report 2001-2002*, Cambridge, MA, Center for International Development, 10-29
- Sachs JD, Warner A (1995) *Natural Resource Abundance and Economic Growth*. NBER Working Paper 5398, Cambridge, MA
- Sachs JD, Warner A (1997a) *Natural Resource Abundance and Economic Growth - Revised*. Center for International Development, Working Paper, Harvard University, Cambridge, MA
- Sachs JD, Warner A (1997b) Fundamental Sources of Long-Run Growth. *American Economic Review, Papers and Proceedings*, 87 (2): 184-188
- Sachs JD, Warner A (1999) The Big Push, Natural Resource Booms and Growth. *Journal of Development Economics* 59: 43-76
- Sachs JD, Warner A (2001) The Curse of Natural Resources, *European Economic Review*, 45 (4-6): 827-838

- Sala-i-Martin X, Subramanian A (2003) Addressing the Natural Resource Curse: An Illustration from Nigeria. NBER Working Paper 9804
- Spilimbergo A (2005) Measuring the Performance of the Fiscal Policy in Russia. International Monetary Fund, WP/05/241
- Stijns JPC (2005) Natural Resources and Economic Growth Revisited. *Resource Policy* 30: 107-130
- Stiglitz JE (2007) What Is the Role of the State? in Escaping the Resource Curse, Humphreys M, Sachs JD and Stiglitz JE (eds.) New York, Columbia University Press, pp. 23-53
- The Economist (1977) The Dutch Disease, November 26th
- The Economist (2012) The Rise of State Capitalism, January 21st
- United Nation Database, 2013
- Van Wijnbergen S (1984) Inflation, Employment and the Dutch Disease in Oil Exporting Countries: A Short-run Disequilibrium Analysis. *Quarterly Journal of Economics* 99(2): 233-250
- World Bank (1999) World Development Indicators 1999. Washington DC
- World Bank Database, 2012