A case study of an advanced Dutch disease: The Russian oil

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THE RUSSIAN OIL

ABSTRACT

The paper aims at investigating the dependency of the Russian economy on natural resources, underlining the causes and the possible consequences of this growth model. The analysis tries to evaluate if the Russian manufacturing has contracted the "Dutch Disease", that is, if a boom in the oil and gas industry has led to a process of de-industrialization, directly through the resource movement effect and indirectly through the spending effect. In this investigation it will be emphasized the role played by the learning curves as a crucial factor in determining the comparative advantages of a country, and why an excessive reliance on exports of a single product may reduce the welfare of a nation in the long run.

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1. Introduction

The term Natural Resource Curse was used for the first time by Richard Auty in 1994[1], and referred to the theory that resource rich economies show a reduced economic growth and development compared to those poorer of natural resources.

The main, but not the exclusive, explanation found by economists has been the so called "Dutch Disease". The term was coined for the first time in 1977 in an article of The Economist, and it referred "to the adverse effects on Dutch manufacturing of the natural gas discoveries of the nineteen sixties, essentially through the subsequent appreciation of the Dutch real exchange rate"[2].

Since then, several studies have been carried out to uncover any evidence of this issue in those economies rich of natural resources. However, these studies so far have given contrasting outcomes. Indeed, while someone states a positive impact of natural resources abundance on the welfare of a nation, others claimed these lead to a negative impact.

One of the most important empirical researches that investigated the resource curse theory and its impact was carried out by Sachs and Warner in 1995[3]. They discovered that resource-rich countries on average have a slower growth rate than resource-poor countries[4]. Specifically, they calculated that resource-abundant countries experienced a de-growth of 0,39 % per year, almost 7 % of the GDP per capita in 20 years.

In contrast with this analysis, Crhista Brunnschweiler and Erwin Bulte recently investigated the same topic suggesting however a completely different scenario[5].

In their empirical study analyzing almost 80 countries between 1970 and 2000, they found that:
1. Resource abundance, constitutions, and institutions determine resource dependence.
2. Resource dependence does not affect growth.
3. Resource abundance positively affects growth and institutional quality.

In this paper we try to re-examine the resource curse literature (and the symptoms of the Dutch Disease) from the perspective of a case study of a very resource-rich country like Russia and the policy measures adopted since Putin came to power in august 1999. In particular, the focus will be on how Russia has experienced a high level of dependency on natural resources, and how it is facing the threat of the Dutch Disease and rising inequalities.

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

[2] The Economist, "The Dutch Disease", November 26th 1977, pp. 82-83. However later Ellman (1981) found that the real problem in that specific case was not the real appreciation, but the rising government's expenditures on public services which were not sustainable.

[3] J. D., Sachs and A. M. Warner, "Natural Resource Abundance and Economic Growth", *NBER Working Paper* 5398, 1995

[4] This research, based on 97 developing countries as for example Nigeria and Venezuela, strong oil-producing economies, and heavily reliant on these 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.

[5] They mainly focused on three different concepts that are necessary to explain to understand why some resource-rich economies grow and others de-grow. According to this paper an important distinction has to be done. Usually there is an overlapping of meanings between resource abundance, resource rents, and resource dependence, but they are not equivalent. In fact as Brunnschweiler and Bulte write "exists a discrepancy between the theory behind the curse, and the empirical work used to support it. While abundant resource rents are a crucial element in the theory, most previous analyses rely on a measure of resource dependence, and our analysis suggests that resource dependence may not be a proper exogenous variable. Treating resource dependence as endogenous, we find it to be insignificant in growth regressions, with no effect on institutional quality. While we find resource abundance to be significantly associated with both growth and institutional quality, the association runs contrary to the resource curse hypothesis: greater abundance leads to better institutions and more rapid growth ". (C. N. Brunnschweiler and E. H. Bulte, "The resource curse revisited and revised: a tale of paradoxes and herrings", *Journal of Environmental Economics and Management*, 2008, p. 261). Also see: C.N. Brunnschweiler, "Cursing the Blessings? Natural Resource Abundance, Institutions, and Economic Growth", *World Development*, 36, No. 3, 2007, pp.399 – 419.

As a first approximation, it is reasonable to think that the case of the Russian economy fits with the second explanation suggested above by Brunnschweiler and Bulte. Indeed, Russia has started to recover from recession thanks to the recovery of oil production and to the oil-price increase in 2000. 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[6]. 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 empirical studies[7], 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 cycle[8].

Therefore, based 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 next paragraphs will focus on the Dutch Disease phenomenon as the main cause of the Natural Resource Curse, and will examine whether the actual short-run advantages may prove to be greater than the disadvantages in the long-run.

2. The Dutch Disease Hypothesis: Theory, Causes and Consequences

The present analysis is based on the core model presented by Max Corden and Peter Neary in 1982, which divides the economy in three main sectors: the energy sector (also known as the booming sector (B), the manufacturing or lagging sector (M), and the service sector or the non-tradable sector (S) [9].

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[6] In 2000 Putin started a campaign of re-nationalization with whichever means were in his power, often not following a "civilized way". The Ministry of Natural Gas acquired 51 % of Gazprom shares, so that it passed in 2005 under a total state-control. This acquisition has been easily implemented due to the fact that Gazprom was only a single entity. A harder challenge was to re-take the control on the oil industry, which had been dismembered in lot of entities. Moreover, the "oligarchs" were not ready to let them go back to its previous owner. Conversely, in December 2004 Yugansneftgaz passed under Rosneft, a state-owned enterprise. Likewise, Yukos was dismembered and englobed, after a judicial war that brought the CEO, Mikhail Khodorkovsky and many other general managers in jail. Sibneft, another oil company, owned by the famous oil baron Abramovich, was sold (72 % of the share) to the SOE Gazprom in 2005, even though there were many other Western companies as Chevron-Texaco, Shell and Total that would have paid much more than 13 $ billion. Therefore Gazprom was renamed in Gazpromneft and started to control also 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.

[7] H. Mehlum, K. Moene, R. Torvik, "Institutions and the resource curse", *The Economic Journal*, 116 (2006) 1–20.

[8] 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)

[9] According to Corden and Neary ("Booming sector and De-industrialization in a Small Open Economy", *The Economic Journal*, Vol. 92, No. 368, December 1982, pp. 825-848) the main analysis is made on an extractive sector, even if it is 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' one. The main assumptions of the model are the following: 1)The model is closed and real, and ignores monetary aspects; this implies that only relative prices are determined, and domestic output and expenditures are always equal. 2) There are no distortions in factor market, that is, real wages are perfectly flexible and full employment is always maintained. 3) The booming sector and the lagging sector must face fixed world prices, while the service sector does not . 4) Output in each sector has both an immobile sector-specific factor, i.e. capital, and a mobile factor - i.e. labor - which equalizes the wage rate in the three employment sectors. 5) Factor prices are flexible and all factors are internationally immobile.

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[10], 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[11], and the last, but not least, is an exogenous rise in the price of the energy sector in the world market[12].

According to these assumptions, the model works as follows.

Thanks to 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 Spending Effect and the Resource Movement Effect.

The Resource Movement Effect: due to the rise in the marginal product in the Booming sector[13], 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 services[14]. Given a positive income elasticity for the service sector[15], the prices of the services related to the tradable sectors rise, bringing a real appreciation[16]. Therefore, this 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 labour 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.

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.

The side effect on the service sector's output is ambiguous, as it has been showed. Indeed, it was proved to be positively correlated to the spending effect, but negatively or positively to the resource

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[10] In the Russian case, the technological improvement went always from outside, thanks to Western companies that owned better technologies. Usually the Russian/Soviet governments attracted them showing the possibilities of huge revenues, but always after gathering what they were searching for, the technology, they used some legal expedient or unconventional methods to push them again out of the country.

[11] As in the Russian case the rich Siberian oil fields.

[12] This seems to be a clear trend of the last decade as for the future.

[13] At a constant wage in terms of tradable.

[14] 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)

[15] The marginal propensity to consume services is crucial to understand the weight of the spending effect on the real appreciation of the Ruble.

[16] 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 service sector lead to an increase in the ratio: (*P non-tradeable / P tradeable)*, so as creating a real appreciation of the Ruble.

movement effect. Therefore, if the spending effect tends to be stronger, the result will be an increase in the service sector output and a stronger real appreciation[17].

The final effect on the real wages is also ambiguous; it is positive correlated to the resource movement effect, but both, negative and positive, on the Spending effect.

Usually in the case of extractive industries as the oil sector, it is assumed that the resource movement effect is small or irrelevant because it employs a very small part of the employed population[18].

Based on this, the case examined here is the so called "enclave ", whereby the labor force can only move between the manufacturing and the service sector. It is worth reminding that the specific factor - capital - is always fixed, thus enabling only the mobile factor - labor - to move between sectors. Therefore, as Neary suggests, according to this new model the booming sector does not participate in domestic factor markets[19].

This could be a suitable model to refer to the present analysis in the Russian case.

In line with this new model, the Resource Movement effect no longer applies, so the labor force is not drawn into the booming sector from the manufacturing and the service sectors. In other words, the direct de-industrialization process is no longer present. 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[20].

To understand how the Dutch Disease can affect the economy and which forms it can take, it is important to underline that the assumption on factor mobility, both for labor and capital, are crucial for this analysis.

It is also important to understand another case, in which all the factors, both capital and labor, are mobile across all the three sectors. The results will be dependent on which sectors are capital-intensive. Indeed, according to Corden and Neary "only in the case in which the capital-labor ratio in the manufacturing sector is intermediate between those in the other sectors is the de-industrialization the assured outcome"[21].

This last specific case can also be suitable for the Russian model because, as explained above, the energy sector and the oil industry in particular, are both heavily dependent on the level of technology. The exploitation of oil-wells in offshoring zones is getting harder and harder to obtain

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[17] This has been deepened in Corden and Neary, which demonstrated that there is a correlation also between the resource movement effect and the spending effect. In fact when the income distribution changes, and it is assumed that the marginal propensity to spend on the service sector is identic and positive between all the factors, then the spending effect is not correlated to the resource movement effect and it will be always positive. But in the case in which the marginal propensity differs, the spending effect will depend on the resource movement effect by income distribution, and it could result, if the initial losers own a big share of the expenditure, in a final negative spending effect.

[18] In the Russian economy the mining and quarrying sector, according to the Federal State Statistics, employs around 1,5 % of the total employment in 2010, almost 1 million of people. Even more if we count only the oil and the gas sectors, this is still lower, almost 1 %. In addition in the Russian economy, and in the specific case of the extractive sector, there is a high rigidity of the labor market. This is due to the fact that the oil industry is located in Regions as Tyumen and Siberia, which present an environment adverse to human development, and even more a big shares of the new discoveries and oil fields are in the extreme North, which to be exploited required offshoring platforms that are practicable only few months per year cause of the artic climate. This can let us state that the Resource Movement Effect is irrelevant in our case.

[19] W. M.Corden, "Booming Sector and Dutch Disease Economics: Survey and Consolidation", *Oxford economic Papers*, New series, Vol. 36, No. 3, November 1984, p. 362.

[20] The final effect on the real wages is still ambiguous because it depends only on the spending effect, which increases the output of the service sector, so as increasing the nominal wages, but also the price of the goods increases as well. So if the increase in the price is higher than the nominal income, the final effect will be a reduction of the real wage, if not, it will lead to an increase of the real income. This is strongly correlated to the shares of the service goods in the basket purchased by the Russian people, if they have a strong weight there is a high probability that the real income will fall.

[21] Corden W. and Neary J. P., op. cit, p. 839.

and requires huge capital investments[22]. In addition to this, it was also noted how the oil sector is low labor intensive, thus reinforcing our presumption that the oil sector is more relative capital intensive than the manufacturing one.

In the specific case under analysis, it is therefore possible to conclude that the Russian economy could fit - if proved - the theoretic scenario involving the Dutch Disease explained by the enclave model[23].

However, although the enclave could well explain the Russian case, it does not own the assumptions on free capital mobility and capital intensity. Therefore the enclave model, i.e. free labor mobility between manufacturing and service sectors with free capital mobility across the three sectors, could be better suited. This leads to deny the resource movement in the third model presented, so as to have only the spending effect in a model of free capital mobility.

Therefore, according to this model, an energy-boom will increase the output of the service sector, and the effect of the manufacturing output will be positive if and only if the ratio between capital-labor in the energy sector is intermediate between the other sectors. However, as mentioned above, this is not the case for the oil industry, and more precisely for the Russian economy.

It is reasonable to state that, theoretically speaking, the Russian economy is likely facing the consequences of the boom in the prices and in the production of the oil-gas industry. These include (for example) an increase in the service output as well as a slow down of the manufacturing sector, thus contracting the Dutch Disease.

However, it was also noted that the final 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, that is, the slow-down of the manufacturing sector.

Given these considerations, however one might wonder why the Dutch Disease, despite bringing to a huge windfall of revenues, continues to be considered such a negative phenomenon.

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

1. A higher level of social and regional inequalities.

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, as compared to the majority of the population which conversely is subject to a lower income growth, if not to an income stagnation process[24].

2. 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. For example an exogenous fall in the price of crude 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[25].

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[22] An appropriate example that emphasizes this requirement of enormous capital investments is seen in the exploitation of offshoring oil in the Atlantic sea in front of Santos (Brazil), a location much easier than the Artic one. To exploit the pré-sal oil field the brazilian government is committed to spend almost half of its current GDP over more than ten years. The possible models that can be feasible for the Russian Case are those follows: 1) The core model with fixed capital mobility and mobile labor force between the three sectors. 2) The special case of the enclave, in which the resource movement is denied towards the booming sector. 3) The last case in which there is free factors mobility between the three sectors, and in which the energy sector is relative capital-intensive.

[23] G.Fetisov, "The Dutch Disease in Russia", *Problems of Economic Transition*, Vol. 50, No. 1, May 2007, p. 54. These inequalities are still more marked on a regional level. Indeed it is often difficult for the government to redistribute the welfare in the economy. Moreover this is often done by means of the tax revenues, which are spent on public services that are not transferable from one region to another. Additionally, this causes a higher unemployment rate in those regions where the lagging sector's goods are produced, so as worsening the dualism in the economy.

[24] Contrary to when the price suddenly falls, the external shock spread throughout the economy, so as leading to exchange rate depreciation and boosting inflation. More the country's revenues is dependent on natural resources' exports, the higher are the macroeconomic disequilibria.

[25] P. Krugman, "The Narrow Moving band, The Dutch Disease, and the Competitive Consequences of Mrs. Thatcher", *Journal of Development Economics*, 27, 1987, p. 41

3. The trend is not reversible.

The irreversibility of the trend is the most important consequence in terms of growth sustainability, particularly for the Russian case.

According to the Dutch Disease theory, 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 "[26].

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: "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" [27].
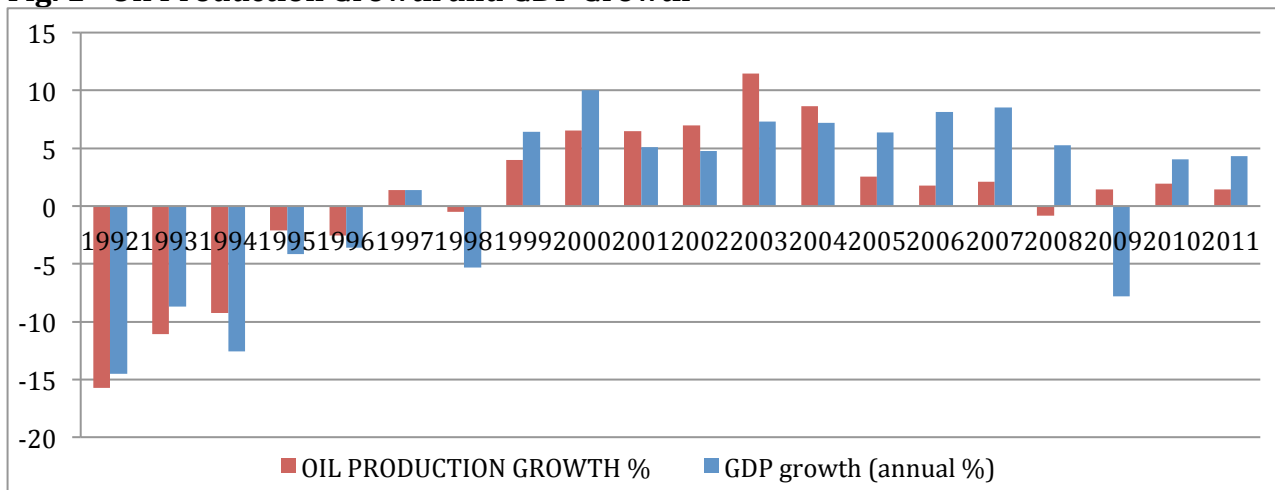
Likewise, the Russian Federation seems to be digging its own grave, without realizing what it is going to face - once its good fortune will end.

In the next paragraphs I will investigate whether the theory here examined is turned into practice, that is, if in the Russian case there is any evidence of the structural changes mentioned so far. After having analyzed the theory on which the investigation of the Dutch Disease has to be based, we can start to look for the existence of the symptoms in the Russian economy.

3. The First Symptom: Rising Dependency On Natural Resource Exports

Russia has always been reliant on natural resources, and when it has succeeded in exploiting them, it has faced long periods of prosperity. After the USSR's collapse, Russia has faced a great period of depression, and has started to recover only thanks to its most important resource.

Fig. 1 - Oil Production Growth and GDP Growth

Source: World Bank database

According to fig. 1, we can see that there is a high correlation between the Russian GDP growth and the oil production growth. The output growth or de-growth has always affected positively and

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[26]Ivi, p. 47. In this model, the main assumption is that the income earned by the resource sector is approximated by a transfer payment from the foreign to the home country.
[27] Ivi, p. 47.

negatively the Russian economy. When it touched the lowest record of -15,7 % during 1992, the GDP shrank by almost the same amount. In three years the oil production was reduced about -36 % and the GDP followed it by -35 %.

Conversely, after the devaluation of 1998 and the Russian default the economy started to recover. From 1999 to 2008, before the recent oil shock and the sub-prime crisis, the economy grew at a rate of 7 %, reaching its peak in 2000 showing a double-digit growth of 10%.

But the correlation between the production and the GDP growth is not unique. As we know from history, the production has always been boosted by rising oil prices, which makes the investments in the sector more profitable, leading to new oil-wells discovery, and improvements in the refining capacity. According to fig. 2A we can see how the crude oil price affects also the Russian economic growth. Between 2003 and 2008 the price increased on average of 26 % every year, showing the peak in 2008 with a growth of 43 %, bringing the price to 91,48 $/bbl as average of that year.

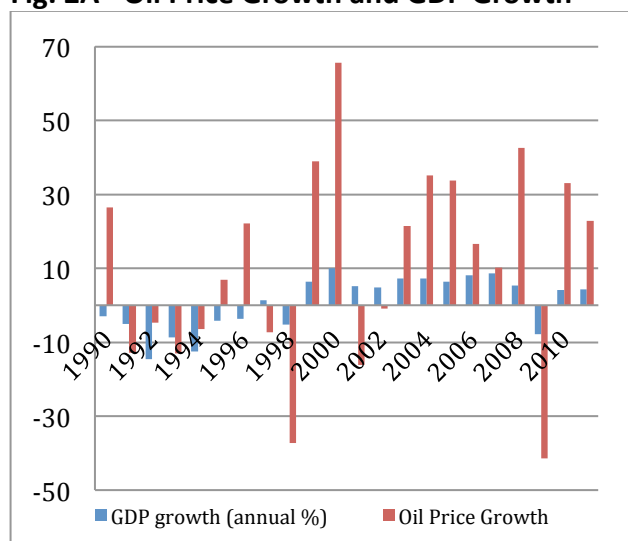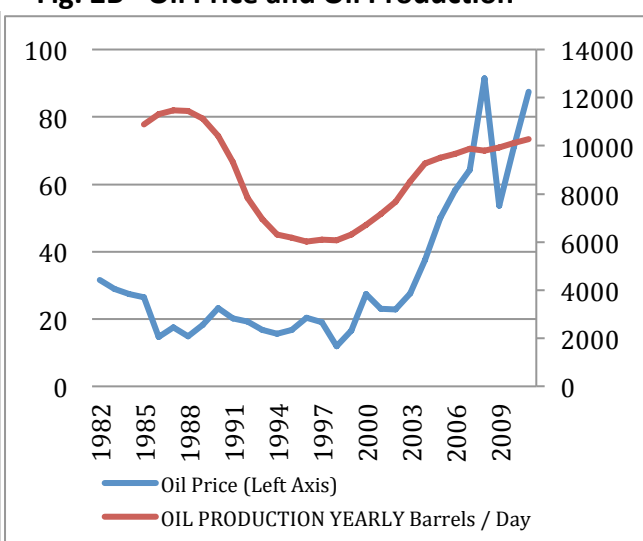**Fig. 2A - Oil Price Growth and GDP Growth**   **Fig. 2B - Oil Price and Oil Production**

Source: World Bank database

At the same time, the economy showed its best performance in the last 20 years. During the crisis of 2009 the price collapsed and this provoked a still harder recession for the Russian economy, which had a growth rate of -7.8 %, much lower than the average of developed economies -3,4 %, and also than the average of emerging markets that escaped recession, and only reduced their growth rate to + 2 %. If we look at the comparison with 2008, Russia had a change in absolute value of 14 percentage points.
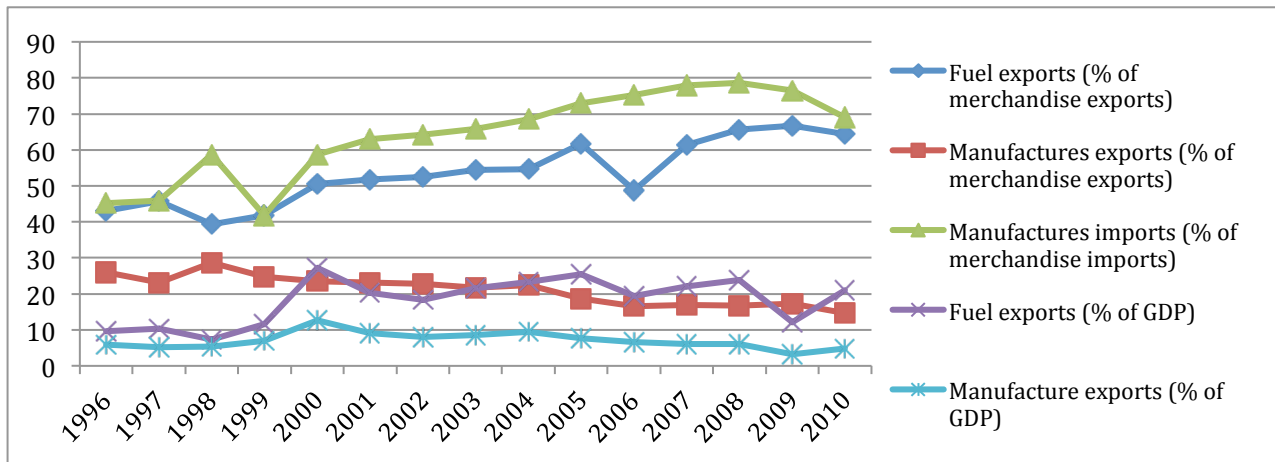
According to fig. 2B we can observe that the graph verifies the positive relation between oil price and the oil output. When the price started to decrease in 1982, halving in 1986, the production simultaneously started to collapse and its recovery have been seen only in 1999 when the price started to increase again.

These three graphs prove clearly how the Russian GDP is strongly dependent to its oil-production, and as so, in turn, reliant on the price, which is exogenous and quite often volatile[28].

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[28] The correlation between oil price and government budget surplus is still more evident. In 2009 the central government debt was + 8,7 % of GDP. The government budget's revenue increase by 0,40 % of GDP by an increase of 1 $ in the price of a barrel of Ural (over an average price of 24 $/bbl). (A. Spilimbergo, *Measuring the performance of the fiscal policy in Russia*, 2005, IMF WP/05/24). This affects heavily the growth's sustainability in the long run, making the economy and the fiscal balance totally prone to external shocks. In addition according to Gurvits, this fragility is still bigger because he found that under the current 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 (E. Gurvits, *Fiscal and monetary policy in the conditions of unstable international cyclical situation*, Вопросыэкономики №3, 2006).

A second perspective that has to be taken into account is the weight that the natural resources exports have on the GDP and on the trade balance.

Fig. 3 - Fuel & Manufacture's exports as % of Merchandise Trade and GDP

Source: World Bank database

According to fig. 3 we can see that the fuel exports passed from accounting almost 43 % in 1996 to 64 % in 2010, an increase of 21 % of its weight on the merchandise trade.

As the figure shows, the impact of natural resources exports on GDP passed from 9,6 % in 1996 to 21 % in 2010[29]. Notably important is to see how this value fell in 2009 when the oil price collapse. We can say that keeping fixed the oil production and its quantity exported, a decrease in the price of 41 %, led to a 11,5 % lower impact of the oil exports revenues on the GDP in 2009, almost 12 % compare to 24 % in 2008.

This figure gives also a complementary perspective on the manufacturing exports weight on GDP and on the merchandise trade. We can say that it passed from having 26 % of the weight on the merchandise trade in 1996 to have 14,5 % in 2010. Also looking at GDP weight we can appreciate such negative trend, passing from 6 % in 1996 to 4,8 % in 2010, reaching the bottom in 2008 with a weight of 3,14%.

We can also see a side effect, loosing importance the domestic manufacturing sector, the foreign one has gained shares; in fact the imports of manufacturing products passed by having 45 % of the total merchandise imports to 69 % in 2010, reaching a peak of 79 % in 2008.

This simple data analysis of the Russia' economic structure let us understand that a country that rely on export of only one commodity, as Russia does, is highly prone to external shocks and to their dangerous effects.

4. The Second Symptom: The Ruble As a Commodity Currency

But there is a second symptom: the appreciation of the currency is already at work.
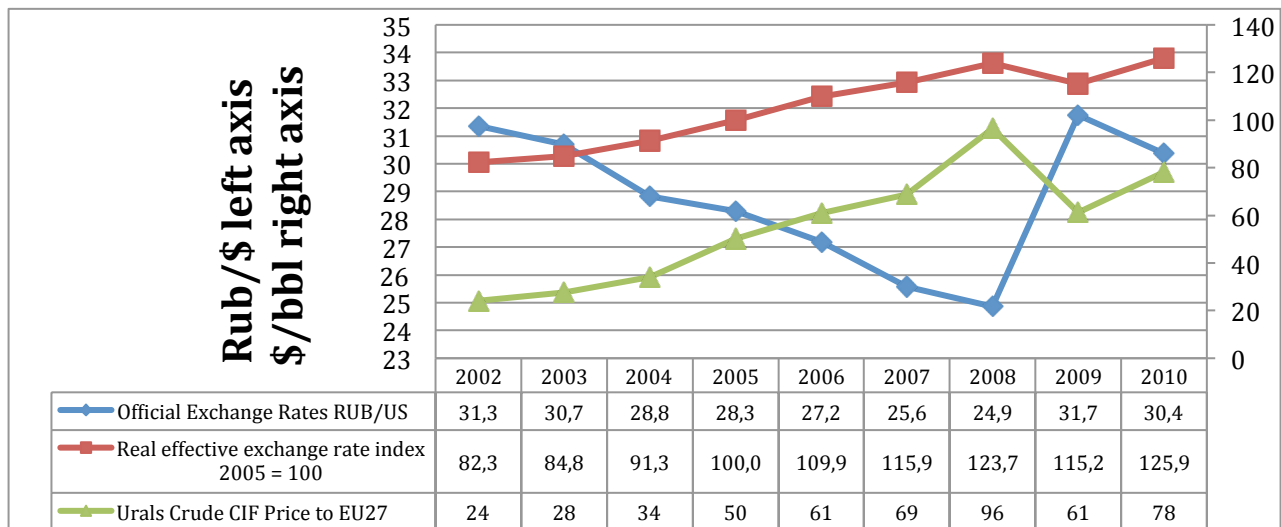
In January 1999 the Ruble had been heavily depreciated, almost by half in real terms due to unilateral suspension of payments, which determined the Russian default. After that, the recovery of oil output and the rising prices both led to an enhancement of the economic activity, thereby effacing recession.

From a first look at fig.4, we can clearly notice that, after the recession was over, between 2002 and 2010 there was an appreciation of the Ruble against Dollar in real terms, from 40 Rubles for 1 Dollar to 20,8, i.e. about 48 %[30].

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[29] International Monetary Fund, "Russian Federation: statistical appendix", IMF Country Report No. 05/378,2005. The calculations of the weights are on World Bank data.

[30] World Bank database. To calculate the real exchange rate, I base my calculation on the consumer price index where 2005 = 100. So $Er = E[CPI(USA)/CPI(RUS)]$ where Er is the real exchange rate, E is the nominal exchange rate,

Fig. 4 – Ruble as Commodity Currency and Real Appreciation between 2002 and 2010

Rub/$ left axis $/bbl right axis	2002	2003	2004	2005	2006	2007	2008	2009	2010
Official Exchange Rates RUB/US	31,3	30,7	28,8	28,3	27,2	25,6	24,9	31,7	30,4
Real effective exchange rate index 2005 = 100	82,3	84,8	91,3	100,0	109,9	115,9	123,7	115,2	125,9
Urals Crude CIF Price to EU27	24	28	34	50	61	69	96	61	78

Source: World Bank database

As the figure shows, this is due to the increase in oil prices which brought to a constant appreciation in nominal term, thanks to a partial accommodation policy of the Bank of Russia, and in real terms till 2009, when the price of crude collapsed, reaching the value of less than 60 $/bbl. Therefore, between 2008 and 2009 the collapse of the price led to a collapse of the exchange rate in nominal terms. Indeed, a negative shock is always heavier than a positive one in the Russian economy. We can see that 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 %.

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. Indeed, 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.

Another effect that can be captured by the graph, is that the real effective exchange rate (REER[31]) is less conditioned than the real exchange rate concerning the Ruble against the Dollar. Indeed, during the negative and the positive shocks the change is smoother. The appreciation of the Real Effective Exchange Rate aims at emphasizing that the Ruble has experienced an appreciation against a basket of foreign currencies and not only against the Dollar.

The real appreciation of the Ruble can be attributed to two possible reasons, the nominal appreciation of the currency, and the rate of the domestic inflation. Usually the two effects have
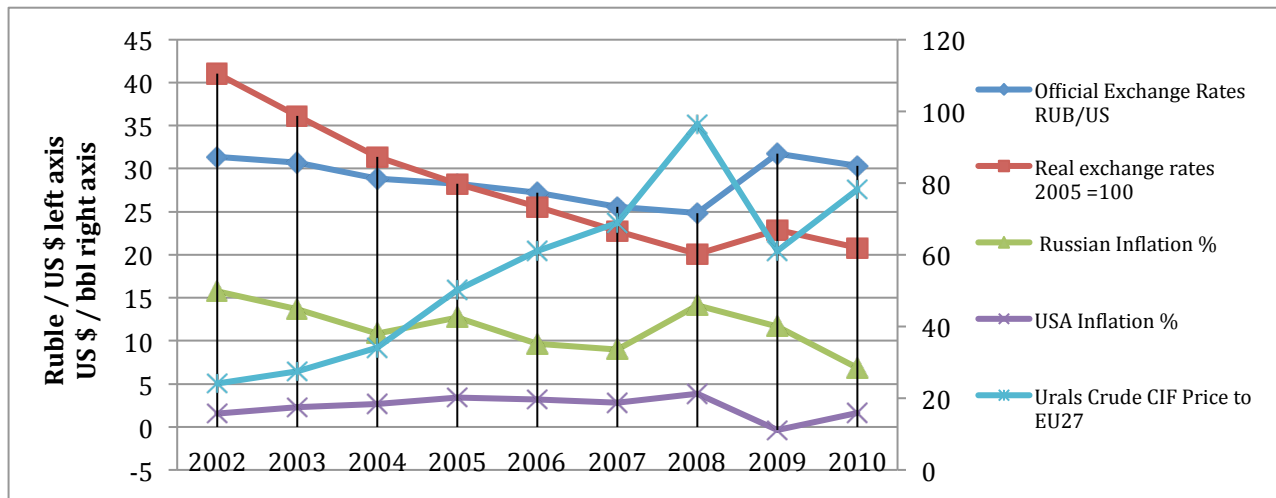

CPI(USA) is the American consumer price index, and CPI(RUS) is the Russian Consumer price Index. Given almost a fixed nominal exchange rate, we have that the greater increase of the Russian consumer price index (cause of a greater inflation, positive differential for Russia) compare with that of USA, leads to a reduction of Er that means less Rubles for 1 Dollar, a real appreciation.

[31] Real effective exchange rate refers to the weighted average exchange rate of the local currency vis-à-vis a basket of foreign currencies adjusted for inflation rate differentials with a country's trading partners. This is simply the Rouble's nominal exchange rate (NEER) multiplied with the ratio of the domestic price index to the weighted price index of the countries whose currencies comprise the NEER basket: REER = (NEER x Pj)/Pw where Pj is the domestic price index and Pw is the world price index. (See Tamàs Borkò, "The Suspicious of Dutch Disease in Russia and the Ability of the Government to counteract", *Working Paper* No.35, ICEG European Center, December 2007, pp.1-22).

opposite signs, as a higher domestic inflation rate should depreciate the local currency while a higher nominal exchange rate appreciates it. However, this is not the case here.

In our case the real appreciation is correlated to both effects. As discussed earlier, the real appreciation has been linked to a nominal appreciation, but also to a spread of inflation rate, as shown in fig. 5.

Fig. 5 - Nominal and Real Exchange Rate, Russian and American Inflation

Source: World Bank database

The differential of inflation between Russia and the USA was of almost 9,3 percentage points between 2002 and 2009. Only in the last year did it get smaller, almost 5,1 differential percentage points in 2010; nevertheless, the Ruble appreciated.

This real appreciation 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 product.

This effect could also 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, we can safely state it is unlikely that this effect plays a key role.

According to Egert, who carried out a research examining Russia, Turkey and three countries of Eastern Europe, there is evidence that the Balassa-Samuelson effect played a limited role for overall inflation and real exchange rate determination[32]. In addition he also confirmed that inflation differentials, oil price shocks, cyclical factors and differences in growth rates, catching-up in tradable, regulated-administered prices, and the credibility of economic policy, can be crucial variables in determining the real exchange appreciation[33].

Moreover, fig.6 shows that the productivity level of Russia was one of the lowest in Europe among Eastern European Countries, at the same stage as Romania and Bulgaria, almost less than 40% of the German one. Likewise, the gross wage relative to productivity is very low; Russia was at the same level of Ukraine, Lithuania and Slovakia, almost 40 % of the Austrian gross wage.

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[32] B. Égert, "Balassa Samuelson Meets South-Eastern Europe, the CIS and Turkey: a Closer Encounter of the Third Kind?", *The European Journal of Comparative Economics*, Vol.2, No.2, 2007, p. 222. See also: B. Egert, "Dutch Disease in the Post-Soviet Countries of Central and South-West Asia: How Contagious is it?", CISifo Working Paper No.4186, April 2013.

[33] B.Egert, ivi.
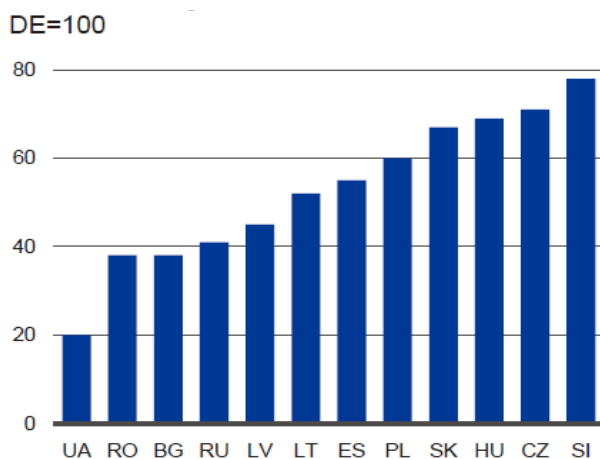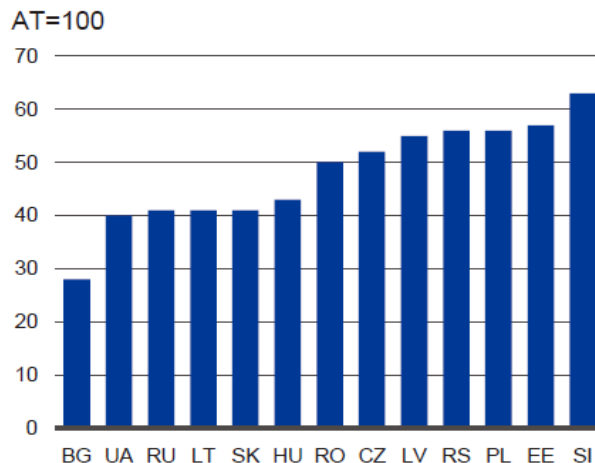
Fig. 6A Russian Productivity Level[34] **Fig. 6B Russian Unit Labor Costs[35]**

Source: Deutsche Bank Research (September 2010, p. 24)

Both these considerations highlight how the level of productivity cannot affect the real exchange rate. The last consideration is 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 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 affirming that the Ruble can be considered as a *commodity currency*.

5.The Third Symptom: The Declining Manufacturing Sector and Growing Service Sector

In this paragraph the output growth, the employment's composition and nominal wages' growth will be analyzed. Even though theoretically the Russian economy should have been experiencing a process of de-industrialization of the manufacturing sector, the crucial point is to check if the manufacturing sector's output and wages slowed down and the employment in the sector decreased in absolute and relative terms. This section aims at discovering whether there has been a relative reduction of the output in the manufacturing sector compared with the energy and the service sectors. Accordingly the last part will focus on the analysis of the growth of the wages across the three sectors. This is useful to verify when exactly Russia has contracted the Dutch Disease.

The first thing that we can see according to figure 7A is that after the Ruble's devaluation in 1999, the output of the four sectors – agriculture, mining, manufacturing and services - started to recover. The manufacturing sector shows a rate of growth around 10 % in 1999 and 2000, while the agriculture sector did even better with a cumulative growth of almost 40% between 1999 and 2001.

The mining and quarrying sector did also quite well, 6 % and 7 % growth rate respectively in 1999 and 2000. The service sector, on the other hand, didn't benefit from the currency devaluation in 1999, but it enjoyed the growth of the other sectors in the following years since 2000.
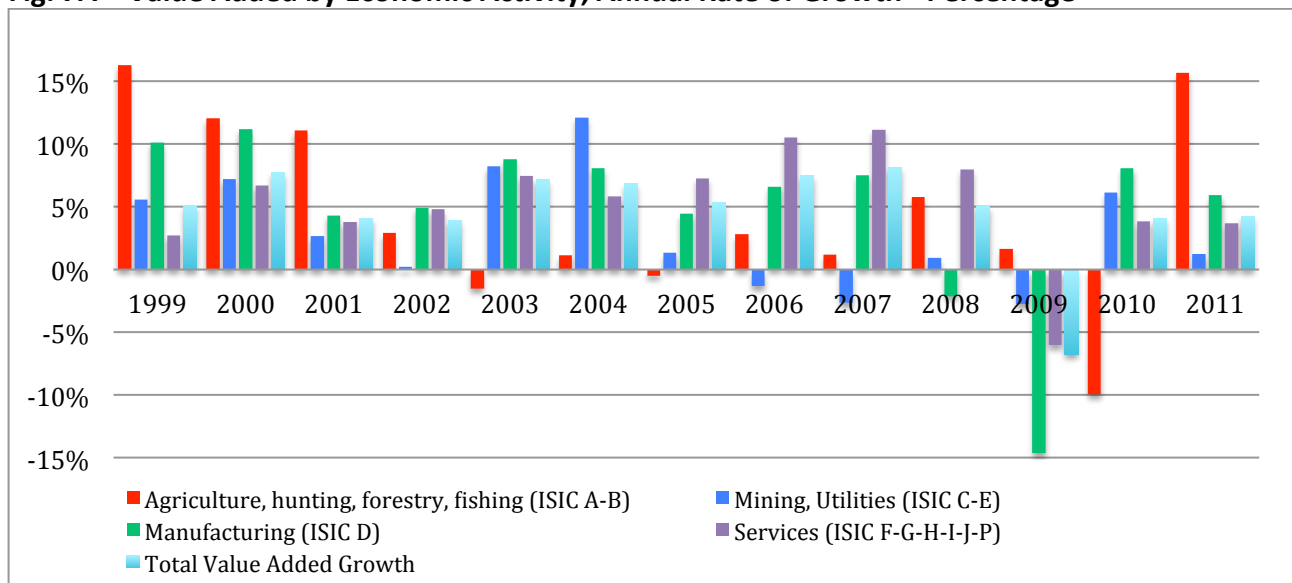
However in 2001 and 2002, the output of the manufacturing sector started to grow at a slower rate and in 2004 the mining sector outperformed the manufacturing sector with 4 % points of growth differential. Between 2003 and 2004 the mining and quarrying sector's output grew cumulative around 20 % thanks to the strong oil price increase. Given that, the service sector did even better than the energy sector. It experienced a constant strong growth between 2000 and 2008, in fact it shows the highest cumulative growth within all the four sectors, almost 70 % between 1999 and

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[34] Where DE is Germany and AT is Austria.
[35] Gross Wages in EUR relative to labor productivity.

2011. Even more we can see that the service sector outperformed the manufacturing sector for four consequent years between 2005 and 2008.

Fig. 7A – Value Added by Economic Activity, Annual Rate of Growth - Percentage

Source: United Nation Statistics (2011)

Note: The output growth of the mining sector has been calculated together with the electricity, gas and water supply sector (ISIC E). The latter has experienced a slower growth rate than the mining and quarrying sector between 1999 and 2011. This implies that the output growth of the mining sector as shown in the graph is under estimated.

This cause-effect can be analyzed from the suggestive point of view that a boom in the oil sector in 2003, 2004 thanks to the sky rocketing trend of the oil price led to a rising consumption for services thereby boosting its output, which reached the highest growth just between 2005 and 2008 with an average double digit growth rate. More precisely, according to the theory, 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 in the service sector[36].
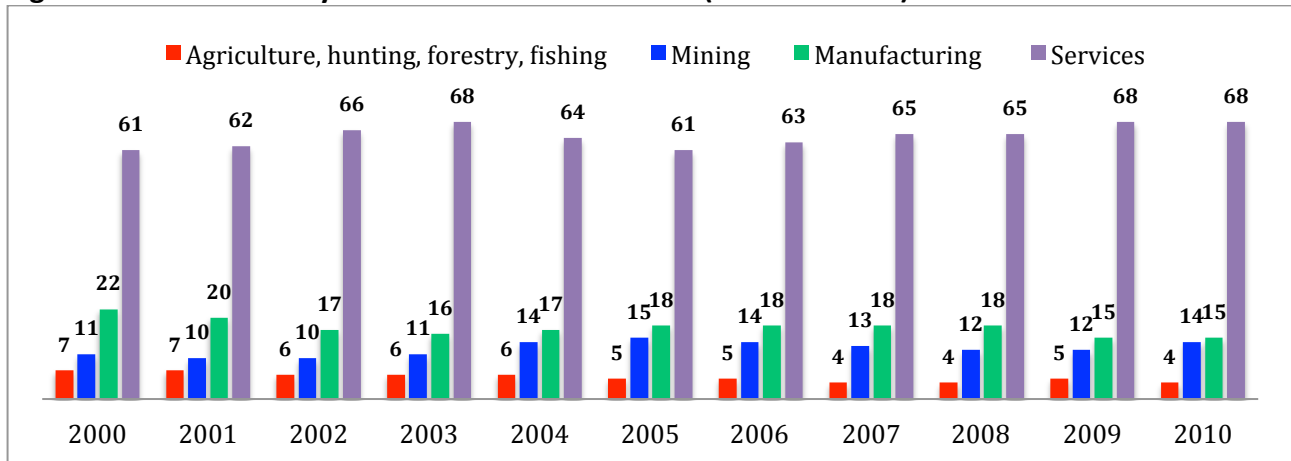
The rise in demand for services increased employment in the sector, which, although with a small lag, adjusted its output as well. This could be explained by the fact that the rising consumptions can be delayed in time, meaning that in the first period the government and the renters will spend only part of the new windfalls because they are not sure if this bull trend will last.

However, when they realized that the price increase was stable, the consumption expenditure on services grew faster. Likewise, the service sector started to feel that the trend was not temporary thereby allowing the service producers to make investments to increase production capacity. The results of these investments were visible especially in 2006, 2007 when the service sector grew at double-digit rate.

This analysis is well summarized in the figure 7B which shows the weights of the four sectors in the economy. According to the graph, we can see that between 2000 and 2010 the service sector as well as the mining and quarrying sector increased their weight as shares of GDP in the economy, respectively 7 % and 3 %, while the agriculture and manufacturing sector decreased of the same amount.

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[36] As we have explained in the theoretic model, this depends on the consumption propensity for services of the government and of the employees and renters of the booming sector. If this propensity is high, the impact on the service output will be very strong.

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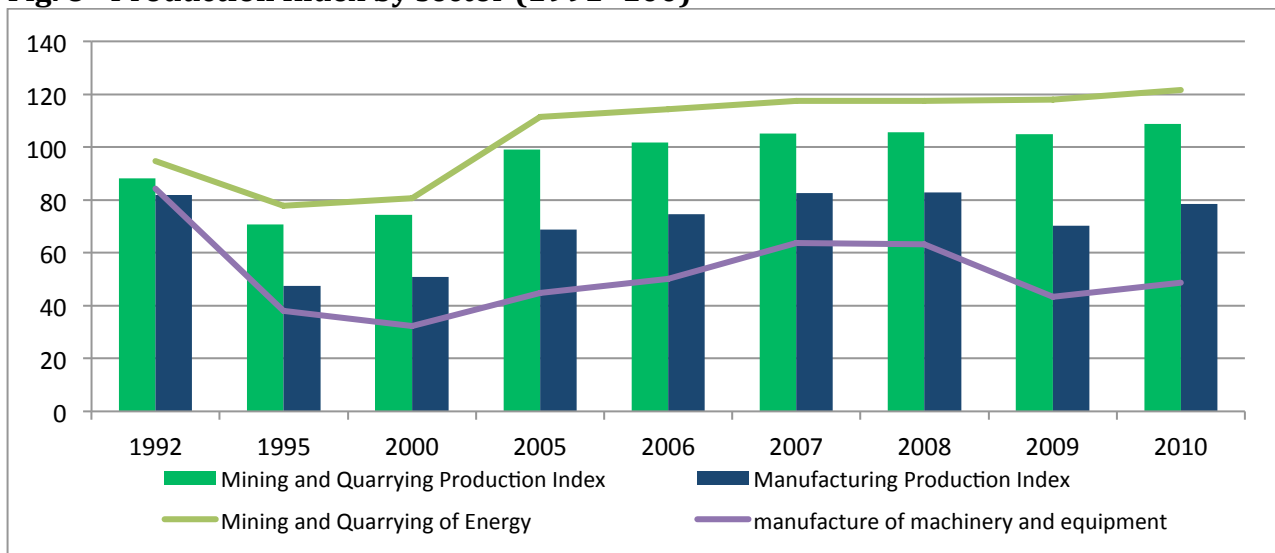**Fig. 7B – Value Added by Kind of Economic activities (Shares of GDP)**

Source: United Nation Statistics (2011)

In addition to this analysis of the output growth across the three sectors, if we look at figure 8 we can see that between 1992 and 2010 the gap measured by the production index between the mining and quarrying sector and the manufacturing one was widened.

While in 1992 the gap between the two sectors was only about 6 points, in 2000 the gap passed to 14 points, despite the depreciation, finally reaching the value of 30 points in 2010. This data is the more striking if we look at the difference between the mining and quarrying sector's production of energy and the manufacturing sector's production of machinery and equipment. In 1992 the gap in the production index was about 10 points, passing to 48 points in 2000, to reach in 2010 the value of 73 points. This confirms the previous results, that is, a loss of competitiveness in the manufacturing sector and an increase in the volume of imports of the V.I.M. product categories from abroad, mainly from EU-27, which owns a relative competitive advantage in the production of technologic goods.

Fig. 8 - Production Index by sector (1991=100)

Source: Federal State Statistics Service

The third symptom, the de-industrialization process, can be tested also following the movement of the labour force.

According to figure 9, which shows the distribution of employment by sectors, 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 labor force,
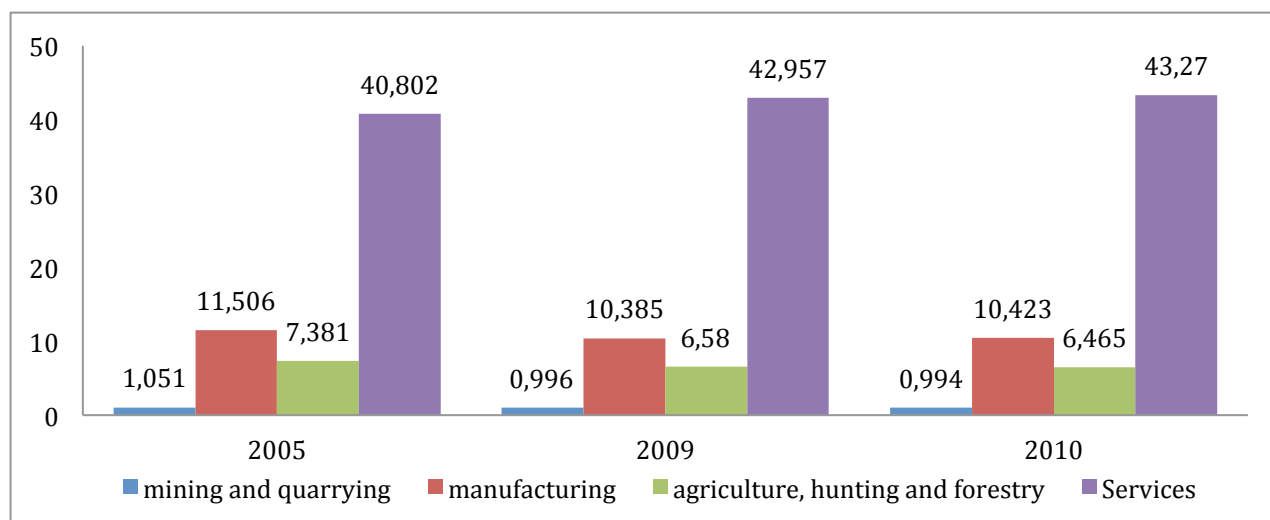
less than 1 million, almost 1,5 %. This, as previously mentioned, leads to the conclusion that the direct de-industrialization effect, that is, the shift of the labor force from the manufacturing sector to the energy sector, can be neglected. The percentage change in labor in the energy sector decreased from 1,6 % in 2005 to 1,5 % in 2010, in absolute terms, around fifty thousand people.

Having said this, we have to focus our attention on the other three sectors, agriculture, hunting & forestry (AHF), manufacturing and service. The A.H.F. 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 labor 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. Keeping in mind that it is very difficult both to divide the movements of the labor force between sectors and to address the reasons causing these movements, based on the data we can affirm that the reduction of the labor force of the manufacturing sector and of the AHF sector allowed the service sector to benefit. Indeed, the latter was the only one actually able to grow.

However this result can be also explained by the fact that the more a country moves away from its state of emerging country toward the stage of a developed one, the more the service sector should acquire increasing importance as opposed to the agricultural and industrial ones.

Fig. 9 - Employment by sectors in absolute value (values in million)

Source: Federal State Statistics Service

6. The Fourth Symptom: The Growing Wage Differential Among Sectors

This symptom, the unequal growth of wages, is very important for the purpose of the present analysis. This part focuses on which sectors in the economy own a higher relative productivity measured through the average nominal monthly wages, in order to drive the possible shifts of the labor force across sectors as well as the specific output growth.

According to figure 10, in 1995 the energy sector already presented a higher nominal wage average than that of the other sectors, manufacturing and service. It was almost double the amount, with 1.000 Rubles against 450 of the manufacturing sector and 500 of the service sector.
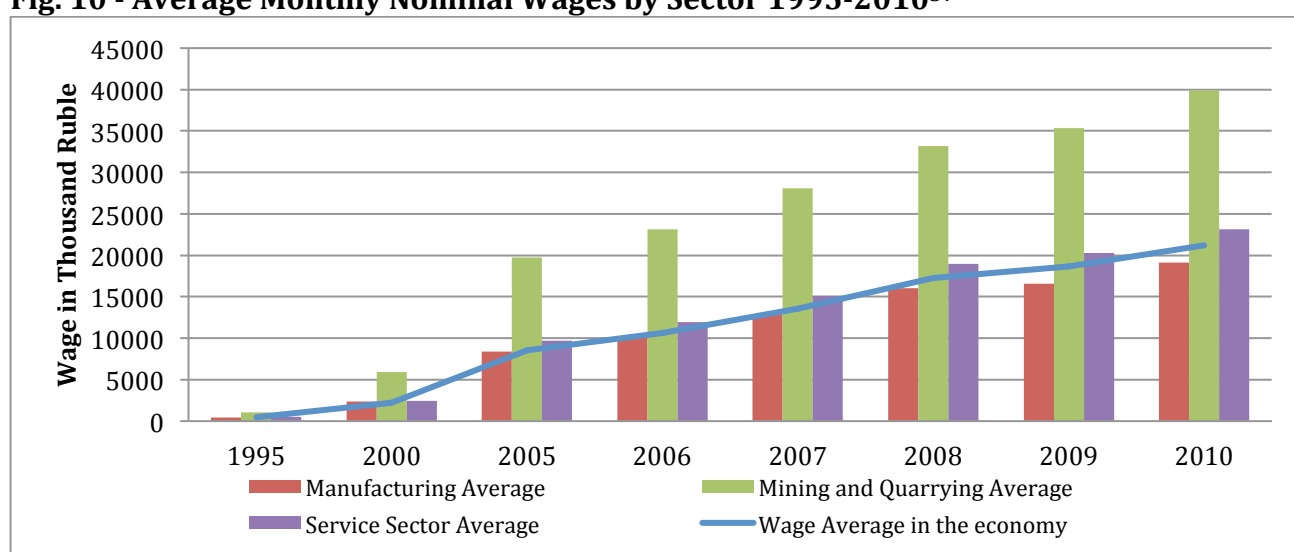
In 2000, there are two elements which are worth to stress. On one hand, the growth of the energy sector was much faster than that of the other sectors. On the other hand, both the manufacturing and

the service sectors grew fast. Indeed, the nominal monthly wage reached 5.940 Rubles in the energy sector, 2.365 Rubles in the manufacturing sector and 2.470 Rubles in the service sector respectively. An important turning point was reached in 2005 when the wage growth in the energy sector widened the gap between the latter and the other two sectors. This also created a gap between the service sector and the manufacturing one.

The nominal wage reached 19.700 Rubles in the energy sector, 8.400 Rubles in the manufacturing sector, and 9.700 in the service one.

Graph 10 shows how in 2010 the only average nominal wage lower than the blue line representing the average wage in the economy is that of the manufacturing sector. In real values, this gap is shown by the shift from 19.700 Rubles in 2005 to 39.800 Rubles in 2010 for the energy sector, from 9.700 Rubles in 2005 to 23.100 Rubles in 2010 for the service sector, and from 8.400 Rubles in 2005 to 19.100 Rubles in 2010 for the manufacturing sector.

Fig. 10 - Average Monthly Nominal Wages by Sector 1995-2010[37]

Source: Federal State Statistics Service

The nominal monthly wage in the mining and quarrying sectors producing energy was the second highest in the economy after the financial sector with an average of 46.300 Rubles in 2010. This value has to be compared with the mining and quarrying sector which shows a wage average of 28.000 Rubles in 2010, with the exception of energy production. Therefore, the gap between the manufacturing sector on one hand and the mining and quarrying sectors producing energy on the other is even wider, reaching almost 27.200 Rubles. In other words, an employee working in the mining and quarrying sector producing energy earns more than double than an employee working in the manufacturing sector.

Moreover, if we look at the difference in monthly nominal wage among the kind of activities in the manufacturing sector, we can see that the specific sector that increased the average wage of the manufacturing sector is the manufacture of coke-refined petroleum products. Indeed, this sector has, on average, a nominal monthly wage of 42.000 Rubles, which classified itself as third in the ranking of the highest wages by economic activities. In comparison to other manufacturing activities, the petroleum refining sector shows a nominal wage four times higher than textile manufacture (10.100 Rubles) and lather manufacture (11.000 Rubles) in 2010. The wage gap is equally wide when compared to higher competitive sectors such as manufacture of chemicals products and manufacture of machinery and equipment, with wages of 19.000 Rubles and 22.000 respectively.

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[37] Price Fixed in 1991.

In conclusion we can say that in the manufacturing sector the activity that has the highest productivity is almost totally linked to extraction and production of oil and its derivatives. This provides further evidence of the strong incentives given to employees in working in the petroleum activities, both mining and quarrying producing energy and manufacture of coke-refined petroleum products.

This unproductive system of wage-incentives exacerbated the effects of the Dutch Disease by bringing the economy to greater inequalities both between sectors and between employees. This happens for the former category – i.e. sector - because the wage gap brings the most qualified people to specialize and work for the specific sector with the highest nominal monthly wage, in this case the petroleum sector. For the latter category – i.e. employee - who does not work in the petroleum industry has therefore a much lower nominal wage compared to the employees of oil and related sectors, thereby destabilizing the unstable economic climate even more.

Concerning this last issue, the high energy price and the volatile food prices, which both depend on incontrollable cyclicalities, are crucial determinants for the Consumer Price Index as well as for the Russian citizens. Therefore, a faster 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 the majority of the population, whose wages remain either constant or grow at a lower rate than inflation[38]. This can be called a fake growth because although the GDP grows, it does only for specific sectors of the economy, as well as for specific categories of workers.

7. The Fifth Symptom: The Lack of Financial Resources

This situation is worsened also by the fact that Russian monetary policy has always tried to achieve multiple targets, trying to control the exchange rate and at the same time the inflation rate. However, because Russian economy is highly prone to external shocks, 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 inflation, producing a nominal appreciation[39] 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[40] to private citizens and firms, thus contracting the access to credit. Ultimately, this contraction of credit, combined with a low saving rate which is the only other domestic way to finance investments, 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 that reached 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. This is evident if we 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 other possible way to get access to financial resources, which has been used as main investment-tool in the last decade, is through the foreign direct investment channel.

According to the World Bank statistics the cumulative inflows of Foreign Direct Investments shifted from $ 3,5 billion in 2002 to $ 278 billion in 2010[41]. This obviously has contributed to boost the real appreciation, thereby exacerbating the effects of the Dutch Disease.

Fig.11 is particularly interesting in the way it shows the FDI trend and that of the oil price. The tendency curves suggest that when the price of crude goes up, the inflows' volume of FDI in

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[38] Only in 2010 the inflation was around 5 %, but in the years before it has always been around 7-8 %, and also in 2011 and 2012, with the stable growth of oil price the inflation shows a trend back to the previous value of 2010.

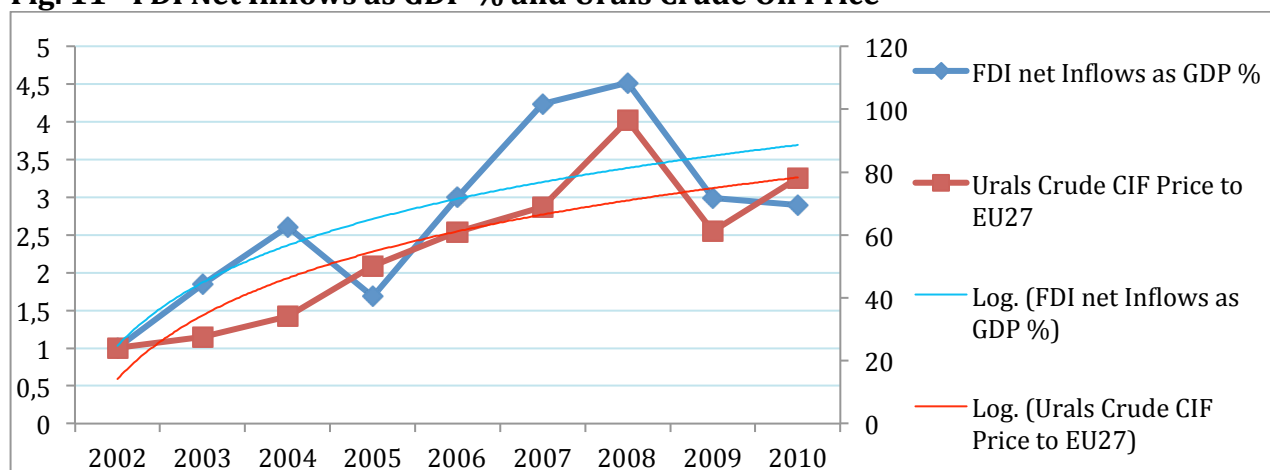[39] A real appreciation happens only if the increase in the nominal exchange rate is higher than the decrease of inflation rate. The Bank of Russia always tried to pursue both targets, making interventions on the foreign exchange market, buying foreign currency, so as offsetting the nominal exchange appreciation.

[40] The lending rate of the commercial banks to the no- banks private sector.

[41] World Bank database 2012.

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 highest peak recorded in 2008, when the oil price reached on average the level of 96 $/bbl and the ratio of FDI on GDP reached the level of 4,5 %.

Fig. 11 - FDI Net Inflows as GDP % and Urals Crude Oil Price

Source: World Bank database

In order to understand whether these elements are only a fascinating coincidence, the following section will delve deeper into the issue by looking at the subdivision of these FDIs by kind of economic activities.
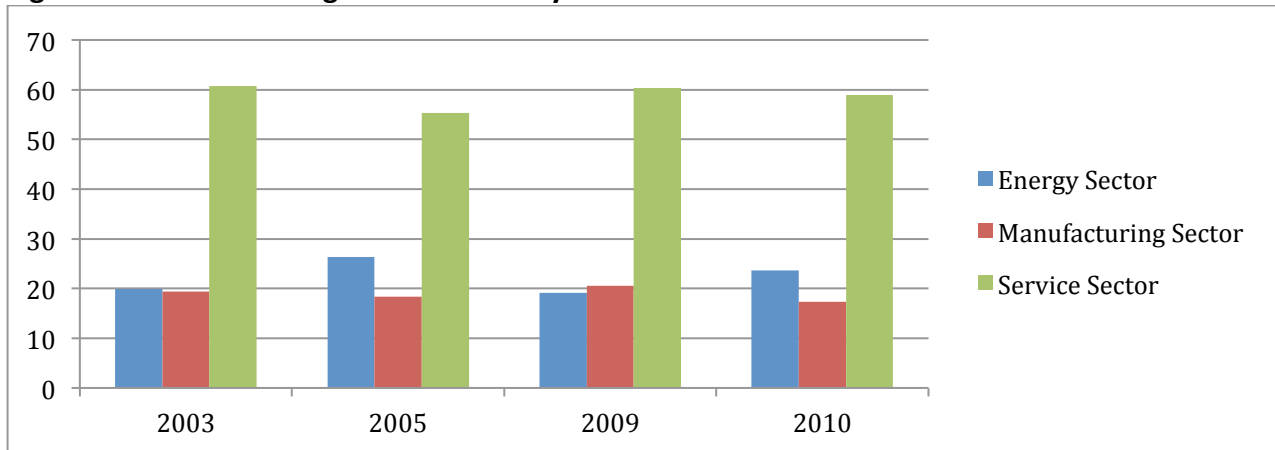
Fig. 12 shows that the main collector of foreign investments is the service sector with almost 60 % of the total between 2003 and 2010. The main performer categories are wholesale and commission trade, real estate, renting and business activities and financial activity, the latter alone accounting for almost 33 % of the total in 2010.

However, the most relevant data concerns the energy industry which includes the mining and quarrying sector and the manufacture of petroleum. They account on average for more than 20 % of the total. While this number does not seem relevant if we take into consideration the absolute value, our initial impression changes once we consider this figure in relative terms.

Comparing the energy sector with the wide service and manufacturing sectors, which in 2010 employed 62,7 % and 15,4 % of the labor force respectively, the ratio between foreign investments and people employed is totally in favor of the energy industry. Indeed, this ratio for the mining and quarrying sector was 8 in 2010 compared with 1,9 for the manufacturing sector and 1 for the service sector[42].

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[42] Federal State Statistics Service database, based on own calculations.

Fig. 12 - Inflows of Foreign Investments by Kind of Economic Activities in %

Source: Federal State Statistics Service

Furthermore, if we look at the investments in fixed capital, the manufacturing sector is slowing down and the energy industry is going up, thereby widening the existing gap. It is also worth noticing that none of the principal manufacturing categories can be compared with mining and quarrying sectors in terms of fixed capital investments.

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 restrict 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.

This latter issue concerns all three sectors and represents the main factor restricting the increase in production. Indeed, as discussed previously, the Russian economy is heavily dependent both on exports and imports, which in turn depend on the foreign demand for oil and gas and on the foreign supply of technology. This macroeconomic instability not only makes the Russian economy highly prone to external shocks, it also rebounds on the very fragile microeconomic environment, which for this reason cannot pursue a medium-long run strategy of investments. This consequently acts as a deterrent for a stable growth.

In the specific case of the manufacturing sector it must be highlighted that in addition to the lack of financial resources and to the uncertainty of the economic environment, the main factor restricting the increase in production is the insufficient demand for production in the domestic market.

These data show two possible related problems. First, the inconsistency of the purchasing power of the domestic demand, which does not own nominal income enough to afford huge expenditures in goods consumption. Secondly, the higher propensity of the domestic demand toward consumption within the service sector, which benefits mostly from this consumers' behavior.

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.

8. Overview of the Dutch Disease Effects on the Russian Economy

The present investigation has led us to verify whether the theory of the Dutch Disease defined by Corden and Neary is feasible for the Russian case.

According to the model described in point 2, it is assumed that there is no effect of resource movement, due to the fact that the oil sector employs a small part of the labor force and due to the low labor mobility in the economy. Therefore, the only effect that works in the model proposed here

is the spending effect[43]. Based on this, theoretically the Russian economy should have faced four main consequences of the oil price boom:

1. A real appreciation of the exchange rate caused by the relative increase in the prices of the service sector against those of the tradable sectors, which are exogenous.
2. A slow-down of the output of the manufacturing sector, an increase of the services' output and a likely increase in the output of the energy sector[44].
3. An increase of employment of the service sector against a decrease of employment in the manufacturing sector.
4. An increase of nominal wages, but a possibly different effect on the real ones, depending on whether the prices of services increase at a higher rate than that of nominal wages, and on whether the increase in oil price is partially absorbed by government's intervention.

Based on table 1, which summarizes the symptoms emphasized by the analysis done so far, we clearly understand the final result driven by the bull oil-price trend started in 2000, and by the resulting output and exports' recovery of crude oil.

Table 1 - Overview of the Dutch Disease Effects on the Russian Economy
D= Denied; / = No change; + = Positive Effect; - = Negative Effect

Boom in Oil Price	Output	Employment	Nominal Wage	Price	FDI
Resource Movement effect					
Oil Sector	**D or +**	**D or +**	+	**Exogenous**	+
Manufacturing Sector	**D -**	**D or -**	+	**Exogenous**	/
Service Sector	**D or -**	**D or -**	+	+	/
Spending Effect					
Oil Sector	+	/	+	**Exogenous**	+
Manufacturing Sector	-	-	+	**Exogenous**	+
Services Sector	+	+	+	+	+
Real Appreciation Effect					
Oil sector	/	/	+	**Exogenous**	-
Manufacturing Sector	-	-	+	**Exogenous**	-
Service Sector	/	/	+	+	-
Total Effect					
Oil Sector	+	/	+	**Exogenous**	+ + -
Manufacturing Sector	- -	- -	+	**Exogenous**	+ -
Services Sector	+	+	+	+ + +	+ -

By looking at the last row of the table, we can see that the combination of the spending effect and of the real appreciation effect leads to seven empiric conclusions:

1. The Real Exchange rate of the Ruble has appreciated, shifting from almost 41 Rubles/$ in 2002 to 21 Rubles/$ in 2010.
2. The price of services increased in relation to the prices of the manufacturing and energy sectors[45].

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[43] So if the spending effect tends to be stronger than the resource movement effect, like in this case, the result will be an increase in the service sector output and in a stronger real appreciation of the currency.

[44] The increase in price pushes up the production because there are more incentives to invest and exploit new oil fields which at the previously price were too much expensive, but conversely the increase in price reduce also the foreign demand. Indeed, the latter is almost rigid and tries to substitute oil with new more convenient types of sources. By contrast, the internal demand subsidized by the government's intervention that controls the ceiling price to prevent an overheating of the economy, usually does not change. Therefore, ultimately the output can increase or remain constant, but it is not likely to decrease.

[45] Even if, out of the model's criteria, the price of oil continued to grow.

3. The manufacturing output grew slower than that of the energy sector from 1992 till 2010, and when the price of oil increased, almost an annual average growth of 27% between 2003 and 2006, the slow-down of the manufacturing sector became even more evident.
4. The service sector benefited from the spending effect driven by the government and oil renters' new revenues, showing a good output performance.
5. Employment shifted from the manufacturing to the service sector, going respectively from 17,2 % to 15,4 % and from 59,6 % to 62, 7 % between 2005 and 2010.
6. The level of nominal wages ranked the mining and quarrying sector producing energy as the main winner with an average of 46.300 Rubles per month, followed by the service sector with an average of 23.100 Rubles and in last position by the manufacturing sector with an average of 19.100 Rubles[46].
7. The direction of the FDI inflows toward the energy sector emphasizes the increasing gap between the three sectors, which is further increased by the rising productivity of the oil sector driven by sky-rocketing oil price[47].

However, after having investigated the symptoms that appear in Russian economy, it is difficult to determine which mechanisms have played a crucial role in providing this result more than others.
This detailed analysis of the symptoms of the Dutch Disease and of its related issues led us to the conclusion that rather than a threat, it is a real problem affecting the Russian economy, especially its manufacturing sector.

9. The Worst Scenario: The Depletion of Russian Oil Resources

Russia has been ranked as seventh for oil proven reserves[48] in 2010, owning almost 5,6 % of the total. But on the other hand Russia is ranked as first in the production of oil, almost 10.270 thousand barrels daily. The Russian scenario, not showing huge reserves, and the highest level of production, is not going to last forever.

Table 2 - Oil Reserves World Ranking

Country 2010	POR Tmb[49]	Total Share	R/P Ratio Years	Reserves Per Capita	Production Tbd	Oil Consumption Tbd
1) **Saudi Arabia**	264	19,1 %	72,4	9,6	10.007 (12 %)	2812 (3,1 %)
2) **Venezuela**	211	15,3 %	> 100	7,3	2.471 (3,2%)	765 (0,9 %)
3) **Iran**	137	9,9 %	88,4	1,85	4.245 (5,2 %)	1.799 (2,1 %)
4) **Iraq**	115	8,3 %	> 100	3,6	2.460 (3,1 %)	/
5) **Kuwait**	101	7,3%	> 100	37,4	2.508 (3,1 %)	413 (0,4 %)
6) **UAE**	97,8	7,1 %	94,1	7.5	2.849 (3,3 %)	682 (0,8 %)
7) **Russia**	77,4	5,6 %	20,6	0,54	10.270 (12,9 %)	3.199 (3,7 %)
11) **US**	30,9	2,2 %	11,3	0,1	7.513 (8,7 %)	19.148 (21,1 %)
13) **China**	14,8	1,1 %	9,9	0,01	4.071 (5,2 %)	9.057 (10,6 %)

Source: BP Statistical Review of World Energy, Report 2011

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[46] In this value it is comprehended the manufacture of the petroleum derivatives, which brings up the average of the sector.
[47] In 2010 the main investors in Russia throughout the FDI channel were United Kingdom with $ 41 billion, Netherlands with $ 11 billion and Germany with $ 10 billion, all together accounted for almost 55 % of the total. They were also the main importers of oil from Russia between 2009 and 2010.
[48]BP definition: " Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions".
[49]Proven Oil Reserves, thousand million barrels.

Looking at Tab.2 (fourth column), reserves to production ratio[50], we can notice that Russia has the lowest position between the major oil reserves countries, with a length of time of only 20,6 years. This number compared with the others main oil-rich countries is quite small: Venezuela, Kuwait and Iraq show a value higher than 100 years, and United Arab Emirates, Saudi Arabia and Iran show respectively, 94,1 years, 72,4 years and 88,4 years. All of them own a reserve to production ratio higher 4-5 times than the Russian one.

Inserted in an economy already weakened by the Dutch Disease, this is a scenario of raising threats to growth sustainability. Beyond the necessary efficiency improvement in exploitation and recovering techniques, Russia needs to decrease its level of consumption, which is one of the highest in the World relative to the size of the GDP. According to the International Association for Energy Economics, Russia consumes 2.5 times more than China and 9 times more than U.S.A relative to GDP[51]. This is due to three major factors: respectively, 45 % for the heavy energy-intensive industry of the previous Soviet era, 35 % for the long distances, and 20 % for the harsh climate and other factors .

A possible energy saving strategy would be to pass simply to technologies existing in the Western World. This saving is estimated to be around 45 % of Russia's total consumption, almost 15 % of the EU 27's total consumption[52]. Reducing the domestic energy consumption would be the fastest way to overcome the critical situation represented by the continuous depletion of oil reserves. This strategy would allow Russia to keep stable the export flows in the short term even if the reserves will be replaced only in the medium-long term. According to this Russia could be able to maintain its current level of growth and wealth in the short-term.

On the other hand, we have also to underline that, concerning oil exports, the main source of the Russian GDP, Russia used only 30 % of its oil output for domestic consumption, so that there are not so big margins to improve this consumption efficiency[53].

However to really find a way out, we have to focus the attention on its natural gas reserves: Russia is ranked as first for natural gas proved reserves, owning almost a quarter of the world total. In addition it has a production of 588 billion metric cubic, around 20 % of the World's natural gas production and it consumes around 13 % of the total, showing the second position only after the United States.

This data is crucial because if we compare the quantity of gas consumed by Russia with USA and their relative GDP, we can see that Russia owns a much higher value, emphasizing its inefficiency. According to this, the natural gas reserves represent the key point for the future of the Russian economy. It could be the turning point to compensate for a possible oil depletion so as to sustain the Russian growth path. On the other hand, we have to say that the natural gas exports revenues are only one third of the oil export revenues so that a possible oil depletion will not be totally compensated by the scenario with the current level of gas production and the reduction of domestic consumption.

We can draw the following conclusions. If Russia would shape its destiny, keeping constant at high rate its level of economic growth in the short-medium term, it has to replace the oil revenues with higher level of gas exports. To smooth this transition process, there are two possible ways: the increase in exploitation efficiency of oil to reduce the speed in which oil reserves are depleted and the decrease of the domestic gas consumption through the elimination of price subsidies, combined with an increase in gas production. In addition Russia will also need to reduce the price of gas in order to face more easily the rising competition, even if this will reduce its marginal revenues. However as we have seen this possible solution will be really difficult to implement cause of the

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[50]BP definition: "If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that rate".
[51]L. Solanko, *Why Energy Efficiency Is Vitally Important for Russia?,* International Association for Energy Economics, 2011, p. 20
[52]Ibidem.
[53]BP Statistical Review of World Energy, report 2011.

trickiness of the energy market and the uncertainty concerning current global reserves, production and prices, always in change.

On the other hand we have seen that this strategy has also a negative side, it will exacerbate the effects of the Dutch disease going in the opposite direction of the Russian Energy Strategy planned in 2009, that is, to reduce the energy sector to less than 20 % of the Russian GDP. To keep on enjoying this economic growth and to maintain the achieved level of wealth, Russia has to continue in specializing in its relative comparative advantages, the natural resources. Contrary if Russia would try to change its pattern of specialization, by diversifying, it will need to pursue a long term strategy, accepting slower growth, but for a more stable and sustainable macroeconomic environment.

However this said, we have also to underline that the Russian government seems to pursue neither the first strategy nor the second. Even more, the "natural resource curse" is becoming always more a real danger. On the peak of the iceberg is the lack of property rights and the persistent state monopoly in the energy sector, which, playing a key role for the international powers games of Russian nomenclature, will not be left to the rules of the free market. This is the reason why the energy sector will pursue none of the two possible ways out: exploitation efficiency and consumption reduction. The state, not aiming at enhancing companies' competitiveness and free market behavior, and striving only for the country's control and political power, is not implementing the necessary policies to bring a wind of change in the Russian economy, so as to avoid a possible economic crisis.

10. Conclusions

A growing Dutch Disease has been able to grow inexorably and strengthen its roots in Russia and in its economic system. By analysis of the five symptoms we think to have proved it existence. The macroeconomic disequilibria produced by this phenomenon has been underlined, emphasizing the impossibility of coming back on track if the effects last for a long period, leading to a permanent loss in the level of the Russian manufacturing competitiveness.

As we have seen the output growth of the manufacturing sector started to decline compare to the energy sector and service sector in 2001. Even more the production index for the specific sectors "mining and quarrying of energy " and " manufacture of machinery and equipment " that had a gap of only 10 points in 1992, in 2010 reached the level of 73 points.

The level of employment decreased in the manufacturing sector of 1 million between 2005 and 2010, while the service sector's employment increased about 2.5 million. Also the level of wages emphasizes the same trend, in fact an average wage in the mining and quarrying sector is two times higher than one in the manufacturing sector, respectively 39.800 Rubles and 19.100 Rubles in 2010. About the service sector, its average wage has grown faster than the manufacturing sector since 1995, and the latter is the only sector with an average wage lower than the economy's average.

This underlines how the structure of the Russian economy has been built to favor the energy industry instead of the manufacturing one. This strategy has strengthened the comparative advantage that Russia enjoyed in natural resources, so as to reduce the return on investment in the manufacturing sector, which has had to struggle also with the constant appreciation of the exchange rate. This, in the end, has produced the so called de-industrialization process, which has transformed Russia into a service-based economy.

The problem resulting from this is that, when a shock happens, the economy is no more able to soften its effects. To absorb the shock, it is necessary a higher government's expenditure or switching to a higher level of unemployment, producing instability and volatility in the country.

This process is clearly visible analyzing the composition of the Russian GDP and its balance of trade as it has been investigated in paragraph 2 (first symptom).

The exports revenues of the energy industry in the Russian economy keeps on growing and now counts almost 20-25 % of its GDP; contrary the manufacturing sector keeps on decreasing till

reaching 4.8 % in 2010. Even more the fuel exports as % of the merchandise trade have passed from counting 43 % in 1996 to 64 % in 2010, and on the other hand the manufactures exports decreased from 26 % to 14 %.

At the same time also the composition of imports changed; in fact the imports of manufacturing products increased, passing from 45 % to 69 % in 2010, showing a peak before the financial crisis of 79 %.

Thanks to this data, we can understand that the economic wealth gained by the oil and gas exports is spent to import those goods that are not produced in the country, almost the whole range of technologic products and luxury goods. Almost 94% of European imports from Russia comprehend mineral products, stating that in the other sectors of the economy Russia doesn't enjoy any comparative advantages. On the other hand almost 60 % of the European goods exported to Russia is constituted by machineries, chemical products and vehicles, emphasizing that the Russian production in these sectors is backward and doesn't satisfy the domestic demand and its growing purchasing power.

The core of the Russian problem (and the essence of the "Natural Resource Curse") is that the concept of richness has changed since the first industrial revolution. Now the focus is put on who owns the technical knowledge to produce the goods, and not on who owns the goods[54].

Furthermore there is an additional issue, i.e. the Russian growth's model "export to import" is unsustainable in the long run because the oil depletion is close and its replacement with natural gas is highly difficult as we have seen in point 8. Therefore this model ends to enrich only the owners of this knowledge, not the buyers of these products so that this level of wealth can be affordable only in the short run, making this bonanza only temporary and illusory.

The economic policy pursued in 2000 has only brought Russia to postpone the problems, which will turn up still harder cause of the void of the manufacturing sector. Instead of sustaining the manufacturing sector with investments boosted with the oil revenues and building up an environment more prone to innovation and business, the basis for the technical development and sustainable growth, the Russian government has pursued the opposite path. The Kremlin has, for more than one decade, dismantled the core of its industry, specializing totally in the production for which it enjoys a comparative advantage, the natural resources. This has been a fatal error because the comparative advantages are in continuous change so that a reduction of the oil price under a certain threshold, or a reduction of the global demand for this commodity, will lead to drastic change in the growth sustainability of the Russian economy. Tying its own destiny to a commodity so volatile such as the crude oil is, without any possibility of managing its price, which is exogenous, has been a really risky move.

All these structural features concerning the Russian growth path are typically symptoms that can be interpreted as specific of the Dutch Disease theory as we have discussed in point 2.

This analysis is strengthened if we move from the disequilibria of the real economy to the financial sector which, as we have seen in point 4 (second symptom), are strongly interconnected. In fact investigating the fluctuations of the oil price and the monetary policy of the Bank of Russia we have discovered a positive correlation between the price of the Urals Crude and the appreciation/depreciation of the currency. This has been the proof that the Ruble behaves as, and therefore is, a commodity currency. These two effects, real and monetary, which are the spending effect and the indexed currency to the oil price lead to an overheating of the exchange rate, so as producing the de-industrialization process by the indirect channel.

After that Russia has contracted the Dutch Disease and has manifested all its weaknesses to external shocks as the financial crisis demonstrated, the Russian government has realized that neglecting manufacturing has been a mistake. According to this, Putin recently affirmed that thanks to his

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[54]L. Pasinetti, *Structural Change and Economics Growth: a theoretical essay on the dynamics of the wealth of nations*, Cambridge University Press, 1981, p. 314

factory-friendly policies will create 25 million skilled jobs and will build the first Russian Silicon Valley, Skolkovo, a high tech cluster out of Moscow[55].

This new path seems however an utopia. As we have seen during this analysis the crucial factor making the Dutch Disease such a negative phenomenon is that the de-industrialization process is not reversible. After more than one decade the symptoms have become chronic. The learning curves have been lost, and even worse, the economic framework necessary to the manufacturing sector to develop and flourish has fallen into a doze. The entrepreneurial culture is still alive, but the business environment has not changed in these years, keeps on promoting red tapes and corruption. Thanks to these intrinsic and chronic features of the Russian business environment the western companies are always less involved and prone to invest in Russia so that the velocity in which the mobility of technical knowledge, the real richness, moves from West to East is still slow.

In the end, the Russia's entry in the World Trade Organization, in September 2012 and that will be implemented within 2018, is going to be more a curse than a blessing. In fact Russia will have to phase out most of its trade barriers, but not those covering the energy industry, which are not ruled by WTO. Given this, the situation concerning the oil and gas exports will remain the same, only the manufacturing sectors will have to adapt. The problem here arises, in fact without any protection and cause of the technological backwardness of its domestic industries, the Russian manufacturing sector will have to face the competition of the world's best. This easily will lead to a crash of the weak Russian manufacturing sector, which will not be able, after a lasting Dutch Disease, to bear the impact of the rules of free and fair trade.

So we can conclude that the Russian development model, basing on our analysis, shows clearly all the symptoms of the so called Dutch Disease.

But there is an additional theoretical reference scheme that may be useful to interpret the growth path undertaken by Russia (and the heuristic vitality of the "Resource Curse" hypothesis).

We are referring to the theory of the international trade called "Vent for Surplus". This famous theory, conceptualized by Adam Smith and later on revised by Hla Myint in the 1960s, remarks that a country specialized in a specific sector - natural resources - with the goal of exporting its excess of production capacity is vulnerable to any type of external shocks[56].

In addition a corollary of this theory states that in the short run only few people benefit from the exports revenues. In fact in Russia the regional inequalities and the Gini coefficient kept on increasing since 2002, going to favor only the oligarchs and a small part of all the labor force, the workers in the energy sector. Even more in the long run the corollary also affirms that the export-oriented specialization may create a situation of *enclave* in the economy, so as impeding the structural transformation of the economic system towards a more diversified and sustainable growth. In the end Mynt suggests that to offset the negative effects of this one-way strategy, i.e. the continuous specialization in only one sector of the economy, it is mandatory protecting the domestic industry from the low costs of the foreign competition by implementing import duties and an import substitution policy.

We have seen that the Russian government has acted in the opposite direction, signing the entry in the WTO, condemning its manufacturing sector to face even more harsh times.

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