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Is Russia suffering from Dutch Disease? Cointegration with structural break

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ABSTRACT

This paper examines whether Russia suffers from "Dutch Disease" by investigating the real appreciation of the Russian ruble and the relative de-industrialization in the post Soviet Union-era. According to UNDP Russia Report (2009) the Russian economy has indeed exhibited some typical symptoms of "Dutch Disease" in recent years as upward movements in oil prices are accompanied by a reduction in the share of manufacturing output and an increase in service prices. Furthermore, the report claims that these developments may trigger a recession in Russia in the future. Using Gregory and Hansen (1996a, 1996b) and Arai and Kurozumi (2007) structural break cointegration frameworks, our results indicate that the Russian economy exhibits some typical symptoms of "Dutch Disease". Although the diagnosis is not certain, the risk is evident. Hence, policies that would make the Russian economy more robust to shocks in the oil price need to be carefully designed and implemented.

Introduction

Natural resources account for over 20% of the world trade, yet the geographic distribution of natural resources on the earth is uneven. Some countries are dominant in resource production while others produce none. More than 90% of known oil reserves are located in 15 countries, and natural resources constitute more than 80% of exports for 21 countries (Ruta and Venables, 2012). Endowments of natural resources might at first be considered advantageous. However, Krugman (1987) indicated that the discovery of tradable resources (e.g., oil) in a country leads to a real appreciation of its exchange rate and crowds out other tradable sectors of its economy.

What is interesting is that in conventional trade models this would not be regarded as a problem, and countries would simply be advised to specialize in the area in which they have a comparative advantage. In practice, however, the contraction of a country's manufacturing sector following natural resource discoveries causes a great deal of concern because of the fear that the lost manufacturing sectors will not come back when the natural resources run out (Krugman, 1987). Thus, countries abundant with natural resources might suffer from "Dutch Disease", defined as the new discovery of natural resources or the increase in the price of natural resources, which leads to the appreciation of the real exchange rate, a decline of manufacturing, and an increase in real wages. A case in point is the Netherlands, where the competitiveness of Dutch manufacturing was clearly hurt by natural gas discoveries. The term 'Dutch Disease' was in fact first used by *The Economist*, in reference to the adverse impact of North Sea natural gas discoveries on the Dutch manufacturing sector (Corden, 1984). The case is not limited to the Netherlands but has been supported by a number of other examples. Natural resource-poor economies such as Japan, Switzerland and Singapore have outperformed natural resource-rich countries such as Mexico, Venezuela, and Russia. Sachs and Warner (1995) showed that 97 developing countries with a high ratio of natural resource exports to GDP tend to have low growth rates for the period of 1971–1989.

One noteworthy country "blessed" with a variety of vast resources is Russia, which owns the world's largest natural gas reserves, the second largest coal reserves, and the ninth largest oil reserves. Russia is also the world's largest natural gas exporter and the second largest oil exporter. Its share in world natural resource exports is over 10%; and over 70% of its export revenues come from natural resources (Ruta and Venables, 2012).

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Table 1
ADF and KPSS unit root tests.

Variables	ADF						KPSS	
	Model A		Model B		Model C			
	k	t_τ	k	t_μ	k	t	η_μ	η_τ
(yman/yserv)	0	−3.71**	0	−0.50	0	0.55	1.26***	0.15**
reer	1	−2.59	1	−1.84	1	0.79	0.90***	0.18**
prod	1	−1.42	1	−1.45	1	−0.81	0.57**	0.22***
rpoil	2	−3.30*	2	−0.70	2	1.15	0.94***	0.10
d(yman/yserv)	0	−7.98***	0	−8.05***	0	−7.97***	0.18	0.07
dreer	1	−5.67***	1	−5.72***	1	−5.66***	0.06	0.06
dprod	1	−10.77***	1	−10.83***	1	−10.91***	0.26	0.05
drpoil	1	−6.46***	1	−6.48***	1	6.33***	0.07	0.03
Critical (***)	1%	−4.06		−3.50		−2.59	0.74	0.21
Values (**)	5%	−3.46		−2.89		−1.95	0.46	0.14
(*)	10%	−3.15		−2.58		−1.61	0.34	0.11

Models A, B, and C for the ADF tests include a constant and a linear trend, a constant, and none, respectively; k denotes the number of lags. Lags are selected according to AIC, allowing a maximum number of 8 lags. The bandwidth length for the KPSS tests is $T^{(1/3)}$.

Russia experienced some economical, institutional and political difficulties after the collapse of the Soviet Union in its adaptation to a free market economy model. In the process of moving towards a free market economy, Russia failed to diversify its economic structure despite increases in natural resource revenues. A boom in oil prices associated with an increase in Russian export revenues makes Russia a potential candidate for Dutch Disease. The dramatic increase in oil prices in the last decades, from $17 per barrel in the mid 1990s to circa $55 in the mid 2000s to over $110 in the early 2010s (EIA) signifies the importance of Dutch Disease for Russia even further. In the last decades, while Russia's share of natural resources in export revenues has significantly increased, its share of manufacturing output has decreased. Hence, the Russian economy depends heavily on exports of natural resources, is vulnerable to the external shocks in natural resource prices and as a natural resource-rich country Russia is a good case for the exploration of this phenomenon.

There is a great deal of literature on "Dutch Disease", including a number of studies for the Russian case. The majority of the empirical studies dealing with Dutch Disease for Russia have agreed that the country exhibits ***symptoms*** of the phenomenon; yet, they disagree on whether Dutch Disease itself is apparent for Russia. Égert (2005), Oomes and Kalcheva (2007), Ollus and Barisitz (2007), Algieri (2011, 2013), Jahan-Parvar and Mohammadi (2011) and Mohammadi and Jahan-Parvar (2012), for example, among others, reported that Russia appears to have symptoms of Dutch Disease. Spatafora and Stavrev (2003), Habib and Kalamova (2007), and Sosunov and Ushakov (2009) indicated that an increase in oil prices appreciates the ruble. The United Nations Development Program (UNDP) UNDP Russia Report (2009), further, warned that Russia might suffer from Dutch Disease in the future. Numerous studies, on the other hand, while admitting Russia's overdependence on oil and gas exports, emphasized that the symptoms were not actually extreme (Tabata, 2012); that there was no sign of de-industrialization (Dobrynskaya and Turkisch, 2010); or that de-industrialization could have been driven by factors other than Dutch Disease (Ollus and Barisitz, 2007, and Oomes and Kalcheva, 2007). Additionally, Ahrend et al. (2007) concluded that Dutch Disease was questionable for Russia but the risk was obvious, if Russia did not follow the right policies. Sosunov and Zamulin (2006) in their calibration study reported that growth of export revenues was due to both the increase in oil prices and the sheer volume of oil exports but not the price increases alone, unless the increase in prices was accepted to be permanent. Table 1 in Appendix A presents selected empirical studies, investigating Dutch Disease for Russia. The table summarizes the results of each study, including the sample period, variables used, the method and the effect of the oil price on the real effective exchange rate and relative de-industrialization.

The number of econometric studies dealing with the effects of oil prices on the Russian economy is rather limited, in part due to data issues.[1] The current study investigates the *real exchange rate appreciation* and *de-industrialization* symptoms of Dutch Disease for energy resource-rich Russia using the Gregory and Hansen (1996a, 1996b) (G–H) and Arai and Kurozumi (2007) (A–K) structural break cointegration frameworks for the 1995:Q1-2011:Q2 period. Hence, the paper improves upon the existing studies both in term of a new dataset as well as explicitly taking into account the endogenously determined structural change that might have occurred over the sample period. Given the transitional nature of the Russian economy and the span of the data, it is reasonable to expect different regimes to occur. The G–H and A–K frameworks allow researchers to see the change in the cointegration relationship in different regimes. Hence, both the G–H and A–K frameworks provide an opportunity to compare the symptoms of Dutch Disease in different regimes. To the best of the authors' knowledge this is the first paper utilizing both the G–H[2] and A–K cointegration frameworks in the Russian Dutch Disease literature, including the regime and trend shift model.

Our findings indicate that although the disease itself might not be apparent, Russia does indeed exhibit symptoms of Dutch Disease. The rest of the paper is organized as follows. The second section presents the theoretical framework. The third section discusses the empirical strategy. The fourth section presents the data. The fifth section reports empirical results and the sixth section concludes.

Theoretical framework

The first Dutch Disease model was developed by Corden and Neary (1982) and Corden (1984). The core model[3] consists of three

[1] See the discussion of data issues in the Data section below. See also Ahrend (2006) pp. 14–15 and Algieri (2011) pp. 244–245 for a discussion of data issues on Russia.

[2] Habib and Kalamova (2007) used the G–H framework for testing Dutch Disease, but they utilized only the level shift model of Gregory and Hansen (1996a).

[3] For detailed discussions of the core model see Corden and Neary (1982), Corden (1984), Krugman (1987), Sachs and Warner (1995), Algieri (2004, 2011) and the references cited therein.