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HARNESSING HYDROCARBON REVENUES: REFLECTIONS ON RUSSIA

Economies, like Russia, blessed with resource abundance, do not usually perform well during the period of commodity price boom. The optimal policy of managing resource revenues prescribes to commit the permanent income rule to smooth the resource dividend in efficiency units and to smooth the real exchange rate. During the commodity price boom, Russia followed partially this prescribed policy, but the situation changed after the crash of oil and gas prices in 2014. Possible ways to overcome the consequences of low oil and gas prices are discussed, paying particular attention to the lack of economic complexity and the need for diversification and capabilities for growth and development of the Russian economy. Refs 29. Figs 3.

Keywords: natural resource curse, managing resource revenues, permanent income rule, real exchange rate, coping with low commodity prices, diversification, economic complexity.

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ИСПОЛЬЗОВАНИЕ ДОХОДОВ ОТ УГЛЕВОДОРОДОВ: РАЗМЫШЛЕНИЯ О РОССИИ

Экономики стран, богатых ресурсами, к которым относится и Россия, зачастую оказываются неэффективными в период бума цен на сырьевые товары. Оптимальная политика управления ресурсными доходами предполагает использование правила постоянного дохода, по-

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звolyющего сгладить колебания ресурсных доходов и реального валютного курса. Во время бума цен на сырьевые товары Россия в целом придерживалась этой предписанной политики, но ситуация изменилась после падения цен на нефть и газ в 2014 г. В статье обсуждаются возможные пути преодоления последствий низких цен на нефть и газ, особое внимание уделено проблеме невысокого уровня экономической сложности, анализируются необходимость диверсификации и существующие возможности для роста и развития российской экономики. Библиогр. 29 назв. Ил. 3.

Ключевые слова: ресурсное проклятие, управление ресурсными доходами, правило постоянного дохода, реальный валютный курс, преодоление низких цен на сырьевые товары, диверсификация, экономическая сложность.

Introduction

Following oil, gas or mineral bonanzas economies often do not fare well. The reasons for this so-called natural resource curse are by now well known (e. g., [Guriev and Sonin, 2008]). First, appreciation of the real exchange rate and the decline in non-resource exports depress growth as the traded sectors like the export industries are the engines of economic growth, not the non-traded sectors such as construction, services, and government. This is what is sometimes rather ungratefully referred to as the Dutch disease. Second, the notorious volatility of oil, gas and commodity prices wrecks economies, especially if financial markets are underdeveloped. It is difficult to plan ahead and to disentangle changes in the real and nominal cost of production factors. Due to these mistakes output is less than what it would be otherwise. Furthermore, volatility of such an important revenue stream makes it more likely that countries are credit constrained and cannot finance crucial innovations which will hamper growth projects. Clearly, these negative effects are particularly severe if the banking sector is not well developed and firms are unable to hedge against this type of uncertainty. Third, it has been established in many developing countries that large income from selling oil and gas revenue has led to rent seeking by the political elite and to worsening of institutions but if institutions are good enough this occurs much less. There is also a danger that politicians are focused on winning the next election and therefore might lose sight of value-for-money policies in order to have a result before the election. This implies that windfalls are not used in the most efficient way. For example, there are plenty of examples in developing countries where oil and gas revenues has been spent on unproductive prestige investment projects (so-called “white elephants”) rather than harnessed for economic growth and development.

Empirical evidence indicates that the curse is worse if countries have bad institutions, the poor rule of law and fragmented financial systems and are ethnically diverse and landlocked. Various surveys go into more details on the theoretical and empirical aspects of the natural resource curse [van der Ploeg, 2011; Frankel, 2012]. Crucial is to understand that the curse is not cast in stone. If institutions, the rule of law and financial markets are sufficiently well developed and societies are not ethnically fragmented too much, the curse can be transformed into a blessing for economic growth and development.

Section 2 discusses the benchmark advice of how to smooth consumption and the real exchange rate in the face of volatile natural resource revenue. Section 3 then offers various reasons why such a permanent income rule may damage growth and development especially in developing economies. Section 4 discusses how best to respond to a crash in commodity prices. The discussion in sections 2, 3 and 4 is based on the analysis of van der Ploeg [2016], where further details can be found. Section 5 discusses the experience

of Russia before and after the commodity price crash, and what reforms including diversification and the need to develop capabilities to improve the complexity of the economy and boost growth and development of non-gas oil traded sectors are needed. Section 6 concludes.

1. The permanent income rule for managing resource bonanzas

The permanent income hypothesis implies that all generations are given an equal increase in consumption in efficiency units. This so-called resource dividend for each citizen thus increases with the trend rate of productivity of the economy. This dividend is the annuity value of the natural resource revenue and starts as soon as the resource is discovered even when the resource is not being mined or the gas is not being pumped yet. The standard policy advice for managing such windfalls is the permanent income rule. This requires putting the revenue in an independently managed sovereign wealth fund that only invests abroad and smooths the resource dividends over time. Furthermore, this policy ensures in an open economy that the real exchange rate is smoothed over time and thus sharp swings in the intersectoral allocation of production factors are avoided. Rather than having a big *temporary* contraction in the traded sector and expansion of the non-traded sector, the policy thus ensures that there is a small *permanent* contraction of the traded and expansion of the non-traded sector. Since the dividend is smoothed over time as well, the windfall is thus invested for the benefit of future and current generations.

How does this policy work? Upon news of a natural resource windfall, it takes from 5 to 10 years of exploitation investments before oil or gas can be pumped up¹. During this period a country should borrow on international capital markets. It also needs to borrow abroad to boost consumption. During the windfall revenue from selling natural resources pours in, the debt is repaid, assets are accumulated in a fund, and consumption is boosted.

Once the windfall ceases the country withdraws money from the fund to boost consumption and effectively acts as a rentier (see fig. 1).

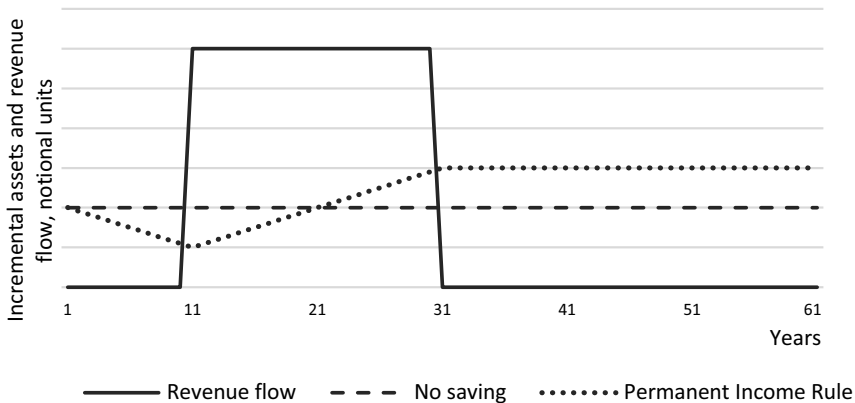


Fig. 1. Profile of Incremental Assets and Revenue Flow (schematic diagram)

¹ According to the data presented in the Lukoil Report the exploitation investments period for Russia can be much longer in some cases, up to 20 years (URL: <http://www.lukoil.ru/FileSystem/PressCenter/81403.pdf> (accessed: 20.02. 2017)).

This way of managing an *intergenerational* sovereign wealth fund ensures a steady growth in consumption per capita (the so-called resource dividend) at the rate of trend productivity growth before, during and after the windfall. This strategy makes sense for advanced countries blessed with natural resources, but can be disastrous for developing countries for various reasons [Venables, 2016; van der Ploeg, 2016].

2. Why smoothing consumption and the real exchange rate may be inappropriate

The permanent income rule for smoothing consumption in efficiency units and the real exchange rate might not be appropriate, especially for many developing economies.

First, to cope with volatile commodity prices countries should engage in prudential saving and therefore depress consumption initially to have a *stabilization* fund, especially if countries find it difficult and costly to hedge commodity price risk given the thinness of these financial derivatives markets or judge hedging to be politically risky. In contrast to the intergenerational fund, such a stabilization fund is larger if the windfall is more permanent (e. g., [Bems and De Carvalho Filho, 2011] and [van den Bremer and van der Ploeg, 2013]). Norway uses the rather conservative bird-in-hand rule, which puts all natural resource revenue in the fund and takes out a constant fraction as a contribution to the general government budget (typically 4 % of the fund value). The Norwegian policy does not use the windfall as collateral and is a pragmatic and prudent way of managing the windfall, but leads to substantial consumption volatility as consumption first rises slowly as the fund is built up and then declines eventually after the windfall as the fund is winded down.

Second, with bad access to international financial markets investment is too low and it is better to invest the natural resource bonanzas in the domestic economy (e. g., [van der Ploeg and Venables, 2012]). To put it bluntly, the return on investment in education of young girls (especially once the benefits of postponing the age at which children are born is included) is much higher than the rate on US T-bills, especially given the very meagre returns at the moment. The windfall should also be used to curb capital scarcity, and thus accelerate growth and development [van der Ploeg and Venables, 2011]. The natural resource dividends should be handed out upfront as current generations will be poorer than future generations. For example, both post-soviet countries Azerbaijan and Kazakhstan, which dispose of significant hydrocarbon reserves, during 2000–2009 invest substantial amounts of oil revenues into their domestic economies but in a different manner. Azerbaijan authorities' top priority was poverty alleviation and improving the living standards. The government of Azerbaijan launched various social programs, more specifically, targeted social assistance program, accompanied with increasing wages and in the public sector and raising pensions [van der Ploeg, Kuralbayeva and Venables, 2011]. These measures helped to reduce the number of people living below the national poverty line from 68 % in 1995 line to 19.6 % in 2006². In contrast to Azerbaijan, Kazakhstan had a better situation with living standards and invest more than Azerbaijan in domestic non-oil sectors to boost the economic growth.

² Commission on Growth and Development. 2008. The Growth Report: Strategies for Sustained Growth and Inclusive Development. Washington, DC. URL: <https://openknowledge.worldbank.org/handle/10986/6507> (accessed: 20.02.2017).

Third, developing countries suffer severe absorption constraints in education, health, and infrastructure. It takes years before enough teachers, nurses and doctors have been trained, and they cannot all be imported from abroad. Also, the more roads and railways are in place, the more productive new roads and railways are. These investments are mostly produced in non-traded sectors, which are squeezed already by the boost to the demand for non-tradables. The relative price of non-tradables must thus rise (i. e., the real exchange rate must appreciate) for a prolonged period of time to ensure that these parts of the economy can slowly expand. With biting absorption constraints it is important to set up an *investment* fund, where natural resource revenue is temporarily parked until the supply side of the economy is sufficiently strong to absorb the spending efficiently on education, health and infrastructure [Collier, van der Ploeg, Spence, Venables, 2010].

Fourth, managing natural resource windfalls should take account of the non-neutrality of government debt. Timing of handing back the windfall to citizens matters, especially in developing countries with poorly developed financial markets. Households prefer dividends to be handed back upfront, since they may not be alive to receive them in the far future and Ricardian debt neutrality does not hold. The permanent income rule then leads to overshooting of the real exchange rate and consumption, since households run down assets and the current account eventually turns into surplus. Households temporarily get more upfront and thus save if the natural resource bonanza is immediately handed to them but borrow under the permanent income rule. Households thus have to save more if the government fails to smooth withdrawals from the fund. This is a direct consequence of Ricardian debt neutrality failing to hold, especially in most developing economies. Such a case can be observed in Kazakhstan during the period of high oil prices. Motivated by expectation of the further rapid growth banking sector launched rapid expansion of the financial sector primarily by foreign borrowing. Private sector enjoyed in their turn cheap borrowed funds and provoked property bubble, that burst in 2007. This also leads to costly bail out of banking sector and putting at risk the country's growth potential [van der Ploeg, Kuralbayeva, Venables, 2011]. Partially for these reasons, Aliyev [2013] argues that despite robust economic growth in 2000–2008, the effect of resource abundance adversely affects the economic growth in Kazakhstan as there are significant structural, social and territorial disparities, low international competitiveness even in commodity markets.

Finally, even though managing natural resource windfalls can be a question of decades, it is important to take account of real and nominal wage rigidities and the short-run effects on unemployment. We will discuss this in the next section when considering the best response to a commodity price crash. More long-term structural issues and needed reforms are discussed in section 4.

3. How to respond to the crash in oil, gas and other commodity prices?

But what to do if oil and commodity prices plummet as has been the case in recent years? Would the curse not simply be reversed? Looking at oil- and gas-rich countries such as Russia, Algeria, Nigeria, and Brazil their experience during the recent bust is not too good either. They have been facing spiralling government deficits with governments having to cut government spending and raise revenue from elsewhere. Preventing currency depreciation and the consequent erosion of living standards, requires buying up one's own currency and thus running down foreign reserves until the currency can no

longer be defended. If authorities are unlikely, the market may stage a speculative attack just before the central bank runs out of foreign reserves. Alternatively, if countries have been prudent enough to build up a sovereign wealth fund during the commodity price boom, they can dip into their fund to prevent falls in consumption and the real exchange rate. Unfortunately, most of these countries have not been so prudent and do not have such funds. So if the real exchange rate finally sharply depreciates the hope is that Dutch disease effects turn into reverse and that growth-enhancing, non-resource traded sectors of the economy grow while bloated non-traded sectors contract again. This is likely to occur with significant inflation costs and erosion of real living standard in the short run before the economy has fully adjusted to the new normal of low and sustained commodity prices.

If real wages respond sluggishly to unemployment and non-tradables production is intensive in structures, a crash in commodity prices causes transient periods of unemployment and more so if the whole natural resource bonanza is immediately spent instead of the authorities following the permanent income rule or Norwegian's bird in hand rule. The reason is that spending the windfall upfront causes sharper depreciations of the real exchange rate. This can be avoided if part of the windfall is saved.

If nominal wages are sluggish in the short run, a monetary policy response is required to mitigate unemployment and inflation. The well-known and celebrated Taylor policy rule raises the nominal interest rate when inflation is high and unemployment is low. This rule performs better than a nominal exchange rate peg, especially if the fiscal authorities implement a 'tighten your belt' rule instead of a permanent income rule. Given that a nominal exchange rate peg severely constrains monetary policy's ability to respond to demand shocks including global shocks to commodity prices, it is puzzling that three quarters of resource-rich countries still have a nominal exchange rate peg.

If the central bank steps in during a crash in commodity prices to prevent rapid nominal depreciation of the currency and inflation, foreign reserves will be rapidly depleted and as mentioned above may eventually lead to a speculative attack on the currency. Governments in developing economies may find it tough to cut spending or raise non-resource taxes to make up for the drop in resource revenue, even though this is needed if the crash is expected to last a long time. Fund wealth is then rapidly depleted and government debt escalates until the market is no longer willing to buy more debt. This myriad of short-run macro misery highlights the importance of sound medium- and long-run management of natural resource wealth to cope with the inevitable volatility in both natural resource production and commodity prices.

4. Russian experience of managing oil and gas revenues

In many ways the Russian economy is an advanced economy with good access to international capital markets. If we also abstract for the time being from the obvious absorption constraints facing the Russian economy and the use of gas and oil revenues for non-productive purposes, it seems reasonable to argue that a permanent income rule is appropriate for Russia. Such a rule should be designed to smooth the real exchange rate and to let the oil and gas dividend or the contribution to the general government budget per Russian citizen grow at the trend rate of growth of the economy.

Malova and van der Ploeg [2016] show that, if the new normal is sustained and the world price of oil stays low at \$40 per barrel, Russia needs to tighten its fiscal stance by 4.6%-points of GDP if it adheres to a permanent income rule. This requires that the government either raises taxes and/or cuts spending by substantial amounts. Furthermore, if Russia wants to meet the 2 degrees Celsius global warming commitment agreed on at the Paris Summit, it needs to lock up 59% of its gas reserves and 19% of its oil reserves [McGlade and Ekins, 2015]. The consequent drop in oil and gas sales to the rest of the world worsens government finances and therefore the government needs to tighten its fiscal stance by a further 0.9%-points of Russian GDP. If the commitment is to 1.5 degrees Celsius the fiscal stance needs to be tightened even more.

In the remainder of this section we first show in section 4.1 how such a permanent income rule compares with what Russia has actually done during the boom in oil and gas prices and then show in section 4.2 how Russia reacted to the crash in the world price of oil. Section 4.3 then wraps up with a discussion of what Russia can do to diversify its economy away from gas and to develop the right type of capabilities to improve economic complexity and boost the non-gas, traded sectors of the economy.

4.1. Period of high oil and gas prices 2002–2008

4.1.1. Selected issues of fiscal and monetary policies

At the beginning of 2000, one of the main aims of the Russian government and the central bank of Russia was to accumulate foreign reserves and curb existing public debt. Anticipating high oil and gas prices in 2002, the government modified and raised the taxation of the oil and gas sector. The government implemented severance taxes for oil and gas production (crude oil, flammable gas and gas condensate) and export duties for oil and gas selling (oil, gas and goods produced from oil). Before 2002 oil and gas companies were taxed independently from the market price of the commodity and thus they were the main beneficiaries of a hike in the world price of oil; and conversely, they would bear all risks in case the world price of oil crashes. Reforming the taxation legislation, the Russian government linked the tax to the development of oil and gas prices and thus took all the benefits and risks of commodity price volatility. So when during 2002–2004 oil and gas prices rose, the government could use the extra oil and gas revenue for substantial public debt reduction (see fig. 2(b) dark shaded region) as well as the total reserves of the country and the net assets grown rapidly (see fig. 2(a) dark shaded region). Extra oil and gas revenues were also used to boost consumption of different groups of citizens through the growth in pension benefits and salaries in public sector.

However, the significant increase in oil and gas prices led to the appreciation of the national currency that forced the central bank in 2004 to change its policy goals. To avoid worsening of competitiveness associated with Dutch disease effects, the central bank of Russia switched its policy from accumulation of foreign reserves to control over the exchange rate. To limit the speculative inflow of cash, the central bank also limited movements in the financial account. These restrictions were in force till 2007 [Lomivorotov, 2015].

Despite all the efforts made by the central bank in stabilizing the nominal exchange rate, the real effective exchange rate strengthened approximately 1.5 times during the period of 2002–2008 (see fig. 3, dark shaded region) due to the high inflation rate. As a result, there was rapid growth of imports and a slowdown in economic production.

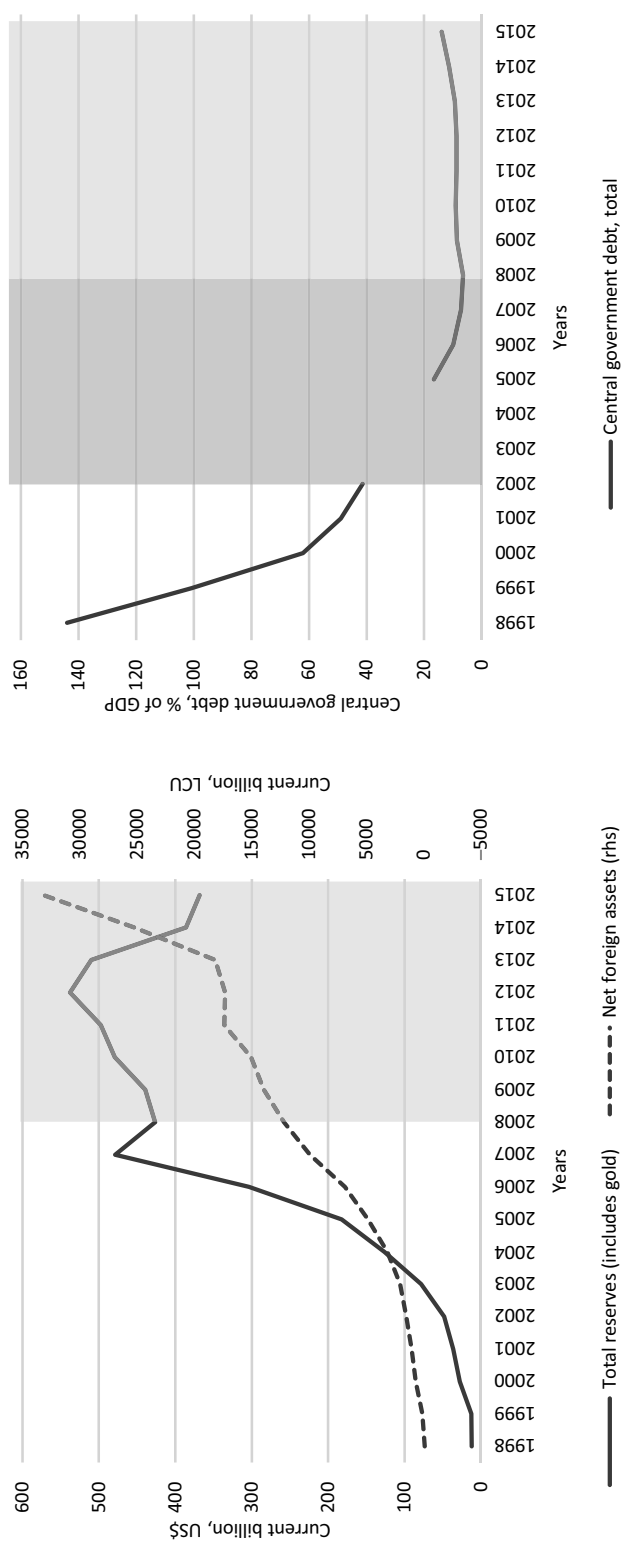


Fig. 2. Government Foreign Reserves and Debt

Note: Dark shadowed region — boom period, light shadowed region — bust period.

Source: World Bank Development Indicators. URL: <http://data.worldbank.org/indicator/FL.RES.TOTL.CD?locations=RU>; <http://data.worldbank.org/indicator/FM.AST.NFRG.CN?locations=RU>; <http://data.worldbank.org/indicator/GC.DOD.TOTL.GD.ZS?locations=RU> (accessed: 20.02. 2017).

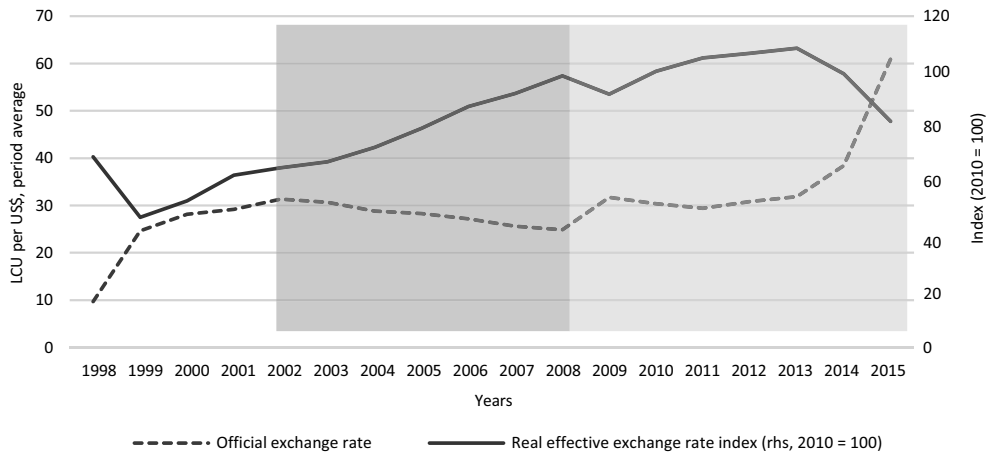


Fig. 3. Real Exchange Rate and Nominal Exchange Rate

Note: Dark shadowed region — boom period, light shadowed region — bust period.

Source: World Bank Development Indicators. URL: <http://data.worldbank.org/indicator/PA.NUS.FCRF?locations=RU>; <http://data.worldbank.org/indicator/PX.REX.REER?locations=RU> (accessed: 20.01.2017).

4.1.2. Dealing with extra revenues: funds and domestic investments

The stabilization fund was founded in 2004 to manage the volatile stream of oil and gas revenues. Oil and gas revenues exceeding the threshold price (this threshold price has changed several times since 2004) were channelled to the stabilization fund. The main purpose of the stabilization fund was to accumulate resource revenues so as to cope with resource revenue volatility and to make economic development more stable [Kudrin, 2013].

The size of the stabilization fund reached 11.6% of GDP in 2007 at which time the government decided to split up the stabilization fund into two funds: the Reserve Fund and the National Wealth Fund³. The Reserve Fund inherited functions of the Stabilization Fund and had to cope with volatility in oil and gas revenues while the National Welfare Fund was aimed to ensure an equal access to oil and gas wealth for both current and future generations. Both funds were replenished properly only in 2008, The National Welfare Fund accounted for 3.9% of GDP that time.

Many domestic investments were made by the government in 2004–2008. A significant number of infrastructural projects were launched throughout the whole country from the far East to the West: viz. infrastructure for APEC Summit in Vladivostok, the Winter Olympic Games in Sochi, the Universiade in Kazan, and transportation projects across the whole country.

4.2. How things went wrong during the oil price crash 2008–2015

The global financial crisis of 2008–2009 undermined the hitherto prudent fiscal and monetary policies of the Russian government. Because of the pegged nominal exchange rate the central bank was forced to defend the local currency by buying local currency and

³ Ministry of Finance of Russian Federation, Statistical Reports on Reserve Fund. URL: <http://minfin.ru/ru/performance/reservefund/statistics> (accessed: 10.01.2017).

depleting foreign reserves. This led to an 11 % reduction in foreign reserves in 2008 relative to 2007 (see fig. 2 (a)). In addition to this the government spent approximately 60 % of the Reserve Fund's reserves to finance the budget deficit because of the global financial crisis during the period 2009–2011⁴. Furthermore, all subsequent resource revenues of 2009–2011 were spent on current public needs with nothing saved via the oil and gas funds.

After the global financial crisis, the central bank announced moved from a pegged nominal exchange rate to inflation targeting and a flexible exchange rate, since spending foreign reserves to sustain local currency and exchange rate was no longer seen to be sustainable or desirable. As a part of these reforms during the period of 2008–2014, the volume of foreign exchange interventions declined. However, the transition process took almost 7 years, and the complete shift to inflation targeting happened only in December 2014 after the crash of oil prices.

After the mitigating the consequences of the global financial crisis in 2010–2011 the government, however, did not return to the prudent fiscal policy based on saving part of oil and gas revenues. Russia continued to finance the fiscal deficit through resource revenues and the non-oil primary deficit has remained relatively large since the global financial crisis [IMF (2015)...]. Moreover, starting from 2010 the National Pension Extra Budgetary Fund was financed from the National Welfare Fund, while the amounts of financial aid were negligible relative to the size of the fund. In 2012–2013 the Reserve Fund seemed to recover a bit after the depletion that took place in 2011. However, in 2014 oil and gas revenues into the fund ceased because of the government's need to reduce the public deficit which was ballooning due to the geopolitical and economic difficulties of 2014 and 2015. This situation was exacerbated by the crash in oil and gas prices of 2014. Eder [Eder et al., 2015] predicted a consequent fall in Russian GDP in the next few years by 4 % to 15 %. However, even in such tough situations it is clear what needs to be done in emerging economies that exporters oil and gas, and, in particular, in Russia to make a step towards sustainable growth. There are various studies devoted to the resolution of this issue particularly for Russia; for instance, the study of the new model of growth for Russian economy in the environment of low hydrocarbon prices [Gurvich, Kudrin, 2015]. Avoiding constructing the model for the whole Russian economy we would like to emphasize some important aspects of fiscal and monetary policy recommended for the Russian government to cope with this tough situation.

First, it must be realized that relying on oil and gas revenues for financing unsustainable fiscal deficits is an inappropriate strategy when oil and gas prices have fallen, especially when the expectation is that these prices will stay low for many years to come. What is needed is to adjust fiscal policy by raising taxes and cutting public spending to make government finances sustainable again. Thus, the main concern is what fiscal policy adjustments are needed. If the current situation continues the government will need to tighten fiscal stance significantly to the finance budget deficit, but this decision is not very desirable. If a permanent income rule for resource revenue management policy would have been implemented fiscal tightening will not be so severe. It has been calculated that in the case of a sustained oil price of \$40 per barrel and gas price \$200 per cubic meter the re-

⁴ Ministry of Finance of Russian Federation, Statistical Reports on National Welfare Fund for years 2004–2015, available online: <http://minfin.ru/ru/performance/nationalwealthfund/statistics>, date of access January 2017.

quired tightening of the fiscal stance is 4.6 %-points of GDP if the permanent income rule is implemented [Malova, van der Ploeg, 2016]. Delaying the implementation of this rule by a decade implies that the fiscal stance needs to be tightened by a further 0.9 %-points of GDP. These findings can be compared with what is needed when the current fiscal policy is projected into the future, since then tightening of the fiscal stance to the tune of 7 %-points of GDP is required. These results are in line with IMF recommendations to Russia [IMF (2015)...], that prescribe a similar fiscal tightening if the benchmark of constant non-oil primary deficit as a 4.5 % share of GDP is pursued.

Second, a pegged nominal exchange rate can create additional pressure on the economy and a bigger need for fiscal tightening. Thus, local currency depreciation or a shift towards floating exchange rate is desirable as has been argued by Ramirez Rigo, the IMF Mission Chief for the annual Article IV Review of Russia, who appreciates the transition made by monetary authorities in Russia towards a floating exchange rate and inflation targeting⁵. For the comparison it is worth to mention that Kazakhstan is also declared the transition to floating exchange rate rather than pegged one.

Goldberg and Knetter [1997] define ERPT as the sensitivity of local currency import prices to changes in the exchange rate between exporting and importing countries, i. e., by how much %-points a 1 %-point change in the exchange rate affects the local currency price of imported good. For emerging economies, like Russia, the ERPT is higher than in advanced economies and varies over time [IMF(2015)...]. Hence, monetary authorities should take into account the influence that changes in the exchange rate via pass-through may have on inflation and how they can exacerbate inflation's growth.

Third, Russia's financial sector is relatively deep, accessible and efficient, but financial institutions (especially banks) can be improved [IMF(2015)...]. Developing financial institutions through centralization, liquidation of ineffective banks and promoting possibilities for small and medium-sized enterprises to be better catered for by large banks can potentially yield up to an additional 1 %-point in Russia's GDP growth [Sahay, 2015].

Fourth, development of the non-oil and -gas sectors and diversification away from oil and gas are needed [Husain et al., 2015]. Development of the financial sector with prudent monetary policies enables growth of the non-oil and -gas sectors of the economy, which can yield a substantial boost to non-oil fiscal revenues. Nekipelov [2015] also argued that authorities should also pay attention to the importance of building an effective mechanism or resource revenue usage for achieving the strategic priority of modernization of Russian economy. Possible directions of diversification and modernization in Russian economy are considered further in section 4.3.

4.3. Russia's need to diversify and develop non-gas sectors of the economy

The need to develop non-gas sectors of Russian economy is in line with the critique in section 3 about applying the permanent income rule to developing countries due to capital scarcity and absorption constraints. Making investments in a few sectors, combined with significant oil, gas or mineral bonanzas can lead to high volatility and unstable business environments, especially in the case of developing countries. Possible ways for Russia to develop its non-resource sectors of the economy are the subject of

⁵ Rigo R., Habermeier K. Russia: Adjusting to Lower Oil Prices. What is staff advice on monetary and fiscal policy? International Monetary Fund Survey 2016, Washington D. C. URL: <https://www.imf.org/en/News/Articles/2016/07/13/13/05/NA071316-Russia-Adjusting-to-Lower-Oil-Prices> (accessed: 09.01.2017).

debate in the academic literature and business press (e.g., [Atnashev, 2016; Taganov, 2016]). What is needed to avoid the resource curse and boost growth and development is to diversify the Russian economy away from gas and oil. Previous literature suggests that diversification can yield the following benefits. First, diversification limits so-called boom and bust cycles and can act as a buffer against commodity price volatility. Second, diversification can boost human capital and thus help in dealing with poor education and health systems as well as the overall infrastructural environment. Direct benefits from this will also aid the extraction industries since it would help them to make a shift from being low marginal primary exporters to high marginal industrial exporters. Other benefits of diversification are the building of institutional capital and raising international investment attractiveness. Diversification and adequate fiscal policy can, in the long run, lead the economy and institutional environment to the level where oil and gas revenues can be fruitfully absorbed, and negative impact on the economy can be avoided. Since the late 2000s, Russian authorities routinely stated the necessity to diversify the economy away from commodities. In Russia, modernization and diversification have been an essential element of the economic strategy in the years of Medvedev's Presidency⁶. It was the period when Russia was trying its best to increase its investment attractiveness and become recognized as a developed country. During that time Russia was ready to take advantage of opportunities, including funding for investments in infrastructure, human capital, institutions.

It is not clear how to measure the level of diversification and the effectiveness of policies designed to its achievement (e.g., [Alsharif et al., 2016]). Measuring GDP and its growth have traditionally been one of the primary ways to assess the underlying quality and progress of the economy. However, this indicator does not allow one to evaluate the needed versatility for the development of the economy. The concept of diversification is closely linked with the notion of economic complexity since the diversification of a country can be considered as the number of different products a country is able to make [Hausmann et al., 2011]. Measuring the economic complexity of an economy provides a more accurate and detailed look at how improvements in institutions directly affect numerous industries and can be a better barometer for the health of a developing, resource-rich economy.

Although there is a correlation between GDP growth and the increase in economic complexity, the dependence is one-sided: increases in economic complexity boost GDP. Specializing in simple technologies can not result in the sustainable growth and development. This observation highlights the plight of oil- and gas-rich developing economies, whose oil and gas sectors are not only geographically separated from much of the rest of the country but also economically segmented from much of the rest of the economy. Specializing in the capabilities needed for oil and gas is not helpful for diversification since the non-oil and non-gas sector require different capabilities.

Although recognizing the importance of economic complexity as an indicator, there is no unified measure used by the academic community, the OECD, World Bank or other international organizations. The most cited research in this area is the joint project of Harvard and MIT named The Atlas of Economic Complexity [Hausmann et al., 2011]. The authors use data from more than 100 countries and estimate the Economic Complexity

⁶ URL: <http://www.vedomosti.ru/library/news/2009/06/03/dmedvedev-zadacha-diversifikacii-yavly-aetsya-vazhnejshoj> (accessed: 09.01.2017).

Index (ECI) based on the statistics of international trade (the data is transparent, and the classification is multipurpose).

Products with a competitive advantage and that are exported from the country more than are exported from the normal country are analysed. The ECI measures how sophisticated the goods that are produced by a country are. Analysis of data analysis during the last half-century has enabled scientists to elaborate the map of the technological span. This shows the technological relation between various products. The economy of a particular country develops naturally near existing technologies, gradually domesticating adjacent technical spans.

The leaps between existing technologies and points that are far away are too risky and rarely lead to success. For example, the ECI for Germany is 1.92 (the second highest in the world), and the ECI for Cambodia is — 0.65 whose economy is wholly based on light industry. The ECI for Russia is a disappointing 0.05. This puts the Russian economy in technological space in the 98th place out of 121 in the world [Atnashev, 2016]. The most developed sectors of Russian economics are the oil and gas sectors. After that, come in terms of development coal, metals, agriculture and weaponry. Aviation, shipbuilding and IT cannot be recognized relative to other countries, so the idea of the leap towards innovative and technological economics is hardly plausible. Russian possibilities are smudged along the peripheral sides of the technical span, competitive advantage in central positions are absent. This is the key challenge for Russia.

The methodology suggested by the authors of *The Atlas of Economic Complexity* has been criticized for the excessive intricacies of the calculations and for considering only the export of goods and ignoring services. It has also been criticized for assessing the complexity of the economy solely on the export component and not taking into account the internal market and structural difference between developed and developing economies. The majority of emerging economies are very unbalanced based on the provided index; however, the index value does not mean that nothing besides several groups of goods is produced in these countries, it just means only a few types of products could be exported to other nations with economic profit. These critiques of the ECI imply that use of the ECI can result in inappropriate recommendations.

Based on ECI research [Hausmann et al., 2011] Yudaeva and Yasin [2008] state that “organic” diversification of the Russian economy may be quite tough. The authors suggest establishing governmental institutions that will support companies attempts to investment in sectors where in the future it will be possible to carry out “organic” diversification. Such investments involve greater risk and investments would not be made without proper incentives. These recommendations were completely consistent with the government plans to diversify the economy during Medvedev’s Presidency. However, unable to achieve outstanding results in diversification even after launching high-technology oriented projects like Skolkovo and establishing institutions like Commission for Modernization and Technological Development of Russian Economy, the country’s authorities had to admit that results had been quite average.

A different view on diversification of the Russian economy based on ECI analysis was presented in [Atnashev, 2016]. The author suggests that the attempt to develop shipbuilding, aviation, transportation machinery and electronics simultaneously is not very promising. The current technological situation in Russia is fragile. Resources — capital and labor — are scarce while relying on the domestic market and public companies cannot

lead to competitive output. According to Atnashev [2016], the best development potential occurs in mining, chemistry, agriculture, construction materials and transportation and agricultural machinery.

Forced to adjust the directions for economic diversification on non-extractive sectors initially focused on high technology by the trial and error method government came to similar conclusions. Despite the significant drop in commodity prices and increasing problematic nature of the international situation, the interest in diversification was supported on completely different grounds. Diversification started was considered not only as a valuable mechanism for economic development and improvement of investment attractiveness, but also became a part of the updated Russian National Security Strategy until 2020⁷. The need to diversify the economy, overcome its raw material orientation, and emphasize the transition to a new level of technological development led to the start of rational import substitution. The current trend of diversification and modernization is driven by the military-industrial complex as well as by agriculture and other industries that are considered essential in case of further aggravation of the international situation. The declared priorities for economic development are much more correlated with the recommendation obtained by applying the economic complexity approach discussed above.

Economic diversification based on the implementation of the national security strategy and focusing primarily on the domestic market will not result in a significant increase in the ECI for the reasons discussed above. This leads to the tough question of whether this type of diversification is not sustainable and whether it is beneficial in the long run, or whether it is doomed to fail. This deserves further discussion and investigation in the academic community as well as among politicians and people in business.

Conclusions

Although the substantial volatility of commodity prices, underdeveloped financial markets, absorption constraints and Ricardian debt non-neutrality require departures from the permanent income rule, as a first shot it may not be bad to use the permanent income rule for Russia. Saving oil and gas revenue and letting the contribution of the fund to general government budget grow has the trend rate of technical progress introduces calm and stability in the government finances. Furthermore, it has the considerable benefit of curbing volatility of the real exchange rate and avoiding potential Dutch disease effects. Big swings in the fortunes of the traded and non-traded sectors are thus avoided, which is good for long-term economic growth and development. Russia has, unfortunately, abandoned sound management of its oil and gas revenues and needs to do much more to diversify away from oil and gas. The growth and development of the Russian economy is in the long run not going to come from the oil and gas sectors, since they are geographic and economic enclaves. The much-needed diversification is a daunting task, since much of the complexity that is needed to realize non-oil and non-gas paths of growth and development lack in the Russian economy. The approach based on import substitution are likely to fail, since they do not contribute to developing those sectors of the economy in which Russia has a clear comparative advantage on a global scale.

⁷ URL: <https://rg.ru/2015/12/22/patrushev-site.html> (accessed: 09.01.2017).

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