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STRUCTURAL BUDGET BALANCE AND FISCAL POLICY INDICATORS IN RUSSIA

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This paper studies fiscal policy in Russia 2004–2010 with the aid of structural budget balance and fiscal impulse measures. To check for robustness several methods estimating the potential GDP are employed. The research suggests a hypothesis that the output in Russia is subject to two types of shocks: persistent outward shocks and short-term internal shocks. In 2004–2010, fiscal policy coped with the internal shocks but could not smooth outward instability. Fiscal policy in Russia is procyclical; it does not stabilize the output.

Key words: fiscal policy, automatic stabilizers, structural budget balance.
JEL classification: E62, H60.

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Данная работа изучает фискальную политику в России в 2004–2010 гг. с помощью структурного баланса бюджета и измерителей фискального импульса. Для получения робастных результатов используется несколько методов оценивания потенциального ВВП. Выдвигается гипотеза о том, что выпуск в России подвержен шокам двух типов: персистентных внешних и краткосрочных внутренних. В 2004–2010 гг. фискальная политика сглаживала внутренние шоки, но не могла погасить влияние внешних шоков. Фискальная политика проциклична и не стабилизирует выпуск.

Ключевые слова: фискальная политика, автоматические стабилизаторы, структурный баланс бюджета.
Классификация JEL: E62, H60.

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1. Introduction

Since the financial crisis of 2007–2008 the stabilizing power of monetary policy has become limited, so the authorities have been looking for other instruments. The question of whether fiscal policy is counter-cyclical, that is whether it can stabilize the economy, is of a great importance today. While fiscal policy in advanced economies is not procyclical, there is sufficient evidence from emerging economies that in these countries fiscal policy is procyclical. Ilzetzki & Vegh (2008), p. 2, state that "the idea that fiscal policy in developing countries is procyclical has all but reached the status of conventional wisdom". The problem is that both fundamental and empirical papers do not satisfy the economists, as developing countries have their peculiar features, which cannot be incorporated into a single analysis. For Russia, moreover there is little evidence on the procyclicality of fiscal policy. This paper aims to fill this gap. The paper shows that fiscal policy in Russia is indeed procyclical, and explains why. For these purposes the structural budget balance is employed.

Any analysis on fiscal policy should distinguish between discretional changes in fiscal stance, caused by the decisions of the authorities, and cyclical changes, caused by changes in the phase of the business cycle. During the upward phase of the business cycle the rate of employment and output are expanding, personal incomes and profits are increasing, and consequently budget revenues are increasing as income and corporate taxes are growing. At the same time government expenditure goes down since unemployment benefits are contracting. Ceteris paribus, all this leads to a budget surplus. During the downward phase the situation is opposite, and the budget balance can be negative (i.e. be in deficit). Hence, the budget balance is subject to business cycle fluctuations and cannot be regarded as a 'good' indicator of discretional fiscal policy.

The budget balance can be presented as the sum of the two components: the first one reflects discretional changes in the fiscal stance, while the second component captures the effect of built-in, or automatic, stabilizers. Personal income taxes, corporate taxes, unemployment benefits among others usually fall into the category of built-in stabilizers. They automatically stimulate the economy during recessions and suppress it during booms; thus, they automatically stabilize the economy without any government intervention. This is why built-in stabilizers should not be considered when analyzing discretional changes in the fiscal stance. The budget balance without built-in stabilizers effects is usually referred to as the structural budget balance, or the cyclically adjusted budget balance. One can define the structural budget balance as the budget balance which would prevail in the absence of output fluctuations, i.e. when the output is

at its potential level. Nowadays many organizations (e.g. the IMF, the OECD, and the ECB) use it for the analysis and planning of fiscal policy.

This research studies the fiscal policy in Russia 2004–2010 and examines, whether it stabilized the economy during this period of time. The structural budget balance can be obtained by subtracting the cyclical components from budget revenues and expenditure; this result is analyzed. In compliance with IMF's methodology, potential GDP and GDP gap (to check for robustness three methods are employed), and budgetary elasticities are estimated and the structural budget balance is calculated. The structural fiscal impulse measures are calculated to examine the stabilizing effect of the fiscal policy; interconnections between the fiscal impulse measures and the output gap are studied via regressional analysis. Moreover, the constant-oil-price fiscal impulses are used as an alternative indicator for structural fiscal impulses.

The paper is organized as follows. Section 2 revises IMF's methodology and discusses advantages and disadvantages of the particular methods. Section 3describes some peculiarities of the Russian economy which affect the analysis. Section 4 presents the methodology of this research and discusses the results of calculations. Section 5 concludes the paper. In the Appendix the statistical properties of the estimated models and additional descriptive statistics are provided.

2. Structural Budget Balance

There are several algorithms to calculate the structural budget balance. All of them determine techniques for division of the actual budget balance (denoted B) between its structural component (B^S) which reflects changes in discretional fiscal policy and the cyclical one (B^C) which captures the effects of built-in stabilizers:

$$B = B^S + B^C. \tag{1}$$

The structural and cyclical components are not observable; hence, they have to be estimated. The dynamics of the output gap can reveal the dynamics of these components. However, the output gap has to be estimated too. A general methodology consists of two independent steps: (a) estimating the potential output calculating the output gap; (b) estimating the budgetary elasticities and the structural budget balance. IMF's methodology (e.g., see Hagemann, 1999) is widely used.

In order to work out the potential GDP one can calculate a GDP trend. The Hodrick – Prescott filter (HP-filter) is a filter which produces a non-linear trend of a time series. Simplicity of implementation and intuitively clear visual results are among the advantages of this approach.

However, the HP-filter has no economic grounds: there is no precise economic meaning in the obtained series. Moreover, the recommended values of the smoothing parameter are given only for business cycles in developed countries and cannot be used for the analysis of the transformational recession (see Section 3). Finally, Cogley & Nason (1995) demonstrated that the HP-filter tends to generate spurious cyclical dynamics for difference-stationary time series (for example, for random walk time processes).

Estimating the production function gives economically grounded potential output estimates which are based on potential (natural) rates of unemployment and of capital utilization (e.g. NAIRU and NAICU respectively). Another possible interpretation of the fitted model is to consider GDP estimates as the potential output, and residuals as cyclical components. Bessonov (2002) argues that a production function, which is linear in production factors, can describe actual GDP well, since any non-linear production function can be approximated by a first-order Taylor function.

Orphanides & van Norden (2002) demonstrate that the above-listed methods do not produce robust estimates of the GDP gap in real time. When data is revised, output estimates change insignificantly in the middle of the time series but are unstable at the end of the series (so called tail wiggling effect). It leads to the impossibility of obtaining reliable estimates of the current structural budget balance, thus it is impossible to plan and forecast fiscal policy in the short term. This problem is not so pressing when long time series are available, but is very important for Russia: the existing output series of 20 years does not allow us to find an explicit tendency, so each new point plays an important role in determining the trend.

Rennison (2003) agrees that output gap estimates are highly sensitive to the method of potential GDP calculation. He concludes that the most robust estimates can be obtained by combining the Blanchard – Quah structural VAR and the multivariate HP-filter. This approach is data demanding and not feasible for Russia. Moreover, there are no a priori given values for the smoothing parameters which are required.

The general methodology for structural budget balance can be found in Hagemann (1999). It is supposed that each budget item has its own elasticity with respect to GDP gap which does not have to coincide with other budgetary elasticities. Denote Y and Y^* as the actual and the potential output respectively; the actual budget revenues and the budget expenditures are R_i for the i-th item and G_j for j-th item respectively; the superscript S stands for structural variables. Then the following relations hold for any time period:

$$\frac{R_i^S}{R_i} = \left(\frac{Y}{Y^*}\right)^{E_i^R}, \tag{2}$$

$$\frac{G_j^S}{G_j} = \left(\frac{Y}{Y^*}\right)^{E_j^G}, \tag{3}$$

where E_i^R and E_j^G denote the budgetary elasticities with respect to output gap. Their values are obtained as estimates of linear coefficients from the following regressional equations[1]:

$$\log R_{it} = \alpha_i^R + \beta_i^R \log\left(\frac{Y_t}{Y_t^*}\right) + u_t, \tag{4}$$

$$\log G_{jt} = \alpha_j^G + \beta_j^G \log\left(\frac{Y_t}{Y_t^*}\right) + w_t. \tag{5}$$

Blanchard (1990) argues that the structural budget balance is based on a set of explicit and implicit assumptions which are rather controversial. Firstly, it is supposed that the output fluctuates around its potential level – its trend. However, the GDP tends to follow a random walk, which is not a mean-reverting process. Furthermore, according to Blanchard, the structural balance describes the fiscal policy incompletely, leaving many factors and determinants aside, because the general approach is based only on the deviation of actual output from its potential level and does not take into account the rate of inflation, interest rates, exchange rates, financial and money indicators, etc. Blanchard's conclusion is that the structural budget balance should not be the only means for fiscal policy analysis.

Finally, Murchison & Robbins (2003) find that OLS estimates of fiscal equations (4) and (5) tend to be biased toward zero because of simultaneous impacts of fiscal policy on the economy and of the economy on fiscal policy. Neglecting it results in underestimation of the cyclical component. Therefore, more advanced techniques of estimation are required. Again 20 years does not provide sufficient data for Russia.

3. The Russian Economy's Peculiar Features

Some peculiar features of the Russian economy should be taken into account. Firstly, Russia is an export-oriented country. According to the Rosstat, the exports-to-GDP ratio fluctuated around 30-35% in 2001–2010. Thus, the internal state of the economy depends on the

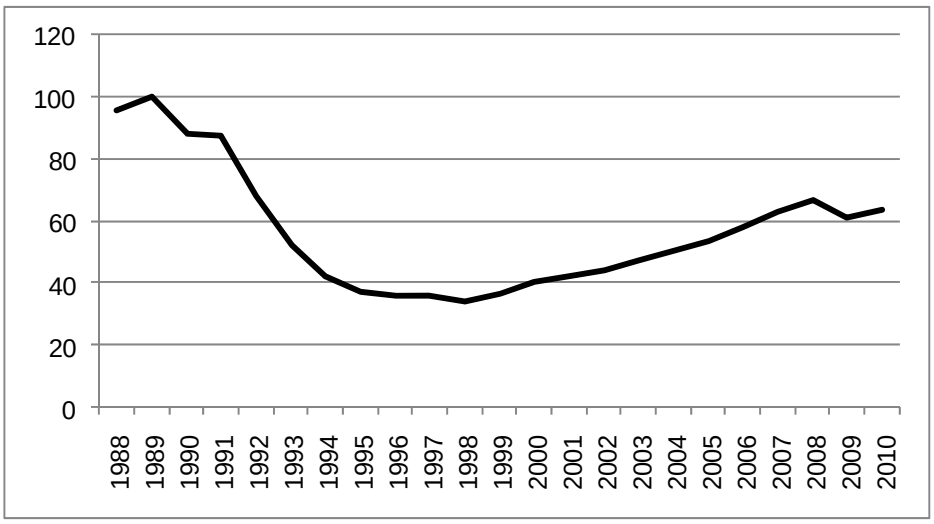
[1] It is assumed that the elasticities are constant, i.e. they are dependent on neither time nor business cycle phase. However, for instance, Brandner et al. (1998) demonstrated that their volatility is high over the business cycle, so the elaboration of the models with inconstant budgetary elasticities is required. These models tend to be too data demanding and thus not feasible for Russia.

state of the world oil and gas markets. Therefore, it is necessary to determine, which shifts are caused by changes in the world markets state and which changes are the result of internal changes. Secondly, the Russian economy is transitory; it fell into the transformational crisis in the early 1990s and now is recovering. Consequently, many institutions in Russia work in another way, compared with the analogous institutions in the developed countries. It imposes some constraints on using methods of analysis. These suggestions are discussed further in detail.

Balassone (2006) argues that countries which are oriented on resource exports are subject to the resource price fluctuations. As the main budget revenue flow consists of export revenue taxes, the budget balance is highly affected by the state of the world markets. This makes it necessary to account for export revenues (referred to Russia – oil revenues) to analyze fiscal policy stabilizing function, i.e. to study the non-oil budget revenues and the non-oil budget balance. If the budgetary statistics is not detailed enough, the budget balance at constant oil prices is a good tool to obtain discretional changes in fiscal stance.

Gurvich et al. (2009) come to the conclusion, that in oil exporting countries there are quasi-business cycles: there are output fluctuations and fluctuations of other macroeconomic variables, caused by instability of oil and gas prices. The authors mark out a set of channels through which the situation on the international oil market influences output, the budget balance, etc, both in nominal and real terms. These channels can be used in further analysis of the fiscal stance.

Like many countries of the post-soviet space, Russia has been in the transformational crisis since early 1990s. Under the transformational crisis (Kornai, 1994) one should understand an output deterioration and a persistent absence of recovery (see Fig. 1), that cannot be fully explained from a macroeconomic point of view. There is no compromise between economists on the reasons of this phenomenon. On the one hand, some researchers believe that the recession can be explained by the collapse of the USSR that caused ruptures of production successions (Yassin, 2007; Blanchard et al., 1996). On the other hand, the recession may be caused by market reforms of the early 1990s and of the consequent transformation of institutions (Polterovich, 1996). The sustainability of this state in which former Soviet economies found themselves (i.e. persistent being in the ‘bottom’) can be explained with the theory of institutional traps (Polterovich, 2007).



Source: Polterovich (2007), p. 237; the Rosstat.

Fig. 1. The GDP of Russia during 1987–2010 (the GDP index, 1989 = 100)

The peculiar features of the Russian economy produce difficulties in estimating the potential GDP for Russia. Smoothing (filtering) applied to the actual output series would bring a dramatic decrease of the potential output in 1990s, which is analogous to the actual GDP trend, but there are no economic grounds for such a pattern of dynamics of the potential output (initially there was no decrease in the production possibilities of the economy; even though, cut in inputs cannot explain such a deep recession). Another approach is the production function estimation. It is established that the gross output in Russia can be described with a production function (Bessonov, 2002) but its implementation is rather complicated. Firstly, there are problems with the statistics on the capital stock as the available data does not reflect the actual production possibilities of the economy (Bessonov & Voskoboynikov, 2006). Secondly, the number of employed is weakly sensitive to changes in the aggregate demand, for instance, because of 'social responsibility' of entrepreneurs toward the employed and therefore cannot explain output variation (Kapelushnikov, 2001; Polterovich, 2007). The potential GDP could be considered as a constant magnitude, e.g. at the level of the GDP in 1989. However, this approach is not useful: it is difficult to interpret the GDP gap of 20–60% in absolute terms (these figures would appear in case of using this method).

There are no elaborated adequate methods for analysis of economies during the transformational crisis. As nothing else is available, these methods have to be used but one must be aware of limitations in interpretation which are imposed by the Russian peculiarities.

4. Research Description and Results

There is little empirical evidence on the procyclicality of fiscal policy in Russia. Spilimbergo (2005) and Vasilieva et al. (2009) analyze fiscal policy and its stabilizing function using standard techniques. They demonstrate that fiscal policy in Russia does not stabilize the economy but the policy is sustainable, i.e. there is no necessity in increasing the public debt. Gurvich et al. (2009) state that fiscal policy in Russia cannot smooth the impact of oil price fluctuations.

In Vasilieva et al. (2009) a set of simplifying assumptions is used which are rejected in the present paper (see further for details). Furthermore, the analyzed time period is too short: it includes three years from 2004 up to 2007 plus forecasts for 2008, so their conclusions does not seem to be robust. Spilimbergo studies the period of late 1990s – early 2000s, therefore his results can be irrelevant after more than a five-year break. In Gurvich et al. (2009) the analysis is based on the studying correlations between oil prices and budgetary indicators without employing the structural budget balance.

This research answers the question: does fiscal policy in Russia stabilize the economy? A complete econometric analysis is presented without 'unrealistic' assumptions concerning budgetary elasticities; potential GDP calculations are conducted using several methods to check the results for robustness. Examining fiscal policy during the Great Recession and after the crisis is of a particular interest (this period of time is not touched in the mentioned papers).

The research is organized in the following way. Firstly, the potential GDP is estimated with three methods. Then for each estimated GDP gap series structural budget balance is calculated. On its basis structural fiscal impulse is calculated and confronted to the GDP gap dynamics. At each stage the results of the three methods are compared in order to detect, whether there are qualitative distinctions and, if so, where they come from. Also the structural fiscal impulses and the constant-oil-price fiscal impulses are examined.

To estimate the potential output, the actual GDP series over 1995–2010 in current and constant prices are used (they are published by the Rosstat). For the budgetary statistics over 2003:IV-2010:IV quarterly reports of the Russian Federal Treasury are employed. All variables are seasonally adjusted with seasonal indices. Nominal variables (which are denominated in money) are deflated with the GDP deflator, published by the Rosstat; the base period is 2010.

The following methods for potential GDP estimation are employed: (a) smoothing with a quadratic trend; (b) production function[2]; (c) the HP-filter (the smoothing parameter equals 1600). Fig. 2 presents the obtained dynamics of the estimates of the output gap.

[2] The quarterly GDP significantly correlates with the capital stock and its lag. The number of the employed does not explain variation of the GDP. There is a significant correlation of the GDP with the number of the employed in 2004–2010 when the both variables had a sustained growth but the correlation disappears, when the period of 1995–2010 is examined. Nevertheless, for any time period the GDP and the labor do not cointegrate.

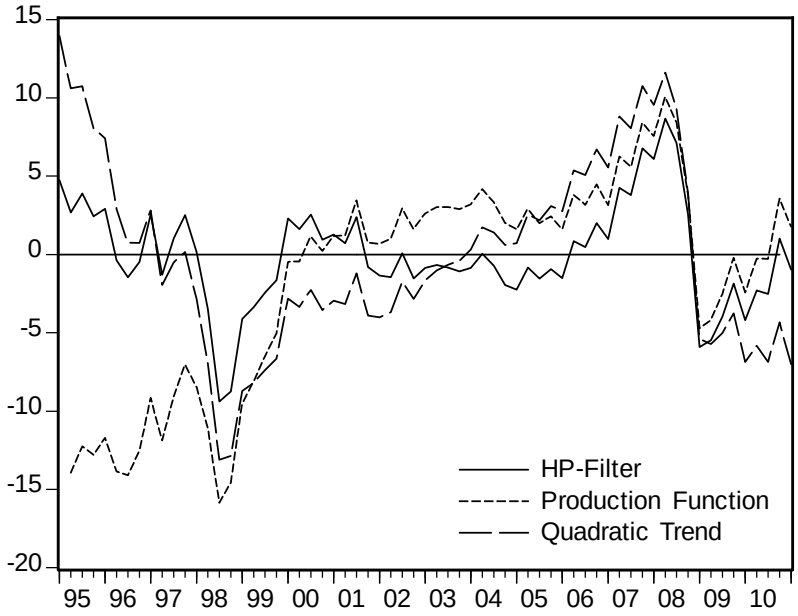


Fig. 2. The estimated GDP gap series during 1995–2010,% of the potential GDP

The GDP gap series, estimated with the HP-filter and a quadratic trend, demonstrate a similar dynamics. According to the calculations, the economy was overheated in 1995, and then there was a recession in 1998, the deepness of which is estimated from 9% up to 14% of the potential GDP. In 2000–2006, the economy fluctuated around its potential level. Before the crisis of 2007-2008 the degree of overheating accounted for 7–10%, the deepness of the crisis was up to 5–7% of the potential GDP. On the contrary, according to the production function results, in 1995 the GDP was lower than its potential level, and the output gap contracted from -14% to 0% in 2000. During the crisis of 1998 the output gap was –15%. After 2000 the dynamics of the GDP obtained with the production function method is similar to the dynamics of the HP-filter and quadratic trend estimates.

Mid-1990s overheating of the economy (see the HP-filter and quadratic trend GDP gap estimates) is a statistical ‘mirage’ and is a result of so named edge effect. This overheating is controversial to the fact that the economy was at the ‘bottom’ of the transformational recession around 1995. It does not make a problem since this period of time is not included in the analysis of fiscal policy.

The following conclusions concerning the output gap dynamics can be made. In 1998 a crisis happened; with the actual GDP lower than 7–15% of its potential level. In the early 2000s the output was rather stable and was fluctuating near its potential level. The international financial crisis of 2007–2008 led to a fall in the GDP; it was 5% lower than its potential level.

In Vasilieva et al. (2009) a decomposition of budgetary elasticities is used. They perform elasticities of tax revenues with respect to output gap as a product of tax revenues

elasticity with respect to taxable base[3] and elasticity of taxable base with respect to output gap. As the majority of taxes in Russia are proportional, the first multiplier is set equal to unity. This assumption does not seem to be fair since it can be rejected[4] when estimating tax elasticities with respect to their taxable bases (see Table A1, Table A2 in the Appendix for details). The significant budget revenues elasticities with respect to GDP gap can be found in Table 1.

Table 1. Estimated elasticities of some tax revenues with respect to the GDP gap

Tax Revenues	HP-filter	Production Function	Quadratic Trend
Corporate tax	6.398 (< 0.001)	6.525 (< 0.001)	3.243 (0.009)
Personal income tax	0.388 (0.025)	0.419 (0.012)	0.297 (0.008)
Charge for the regular natural resources usage	1.602 (0.011)	1.401 (0.028)	2.632 (< 0.001)
Charges for the usage of natural resources	4.311 (0.015)	4.904 (0.006)	3.512 (0.001)

Note: The table contains only significant elasticities. The full list of budgetary elasticities with some detailed information can be found in Table A5, Table A6, Table A7. *P*-values are given in parentheses.

The estimates of the structural budget balance, obtained by the three methods of estimation of the potential GDP are presented in Fig. 3, Fig. 4, and Fig. 5 respectively. Following Vasilieva et al. (2009), only budget revenues are adjusted for GDP fluctuations, since the unemployment benefits constitute little to total budget expenditure. Note that it is useless to compare the actual balance and the estimates of the structural balance with the constant-oil-price-balance suggested by Balassone (2006), because the values of the constant-oil-price balance series depend on the level of the fixed oil price. However, it makes sense to compare structural fiscal impulses with the constant-oil-price fiscal impulses.

[3] As no exact data on taxable bases is available, they use proxies.

[4] The rejection of the null hypothesis that the elasticities of the tax revenues with respect to the taxable base equals unity may take place, because there are used proxies for taxable bases instead of actual taxable bases.

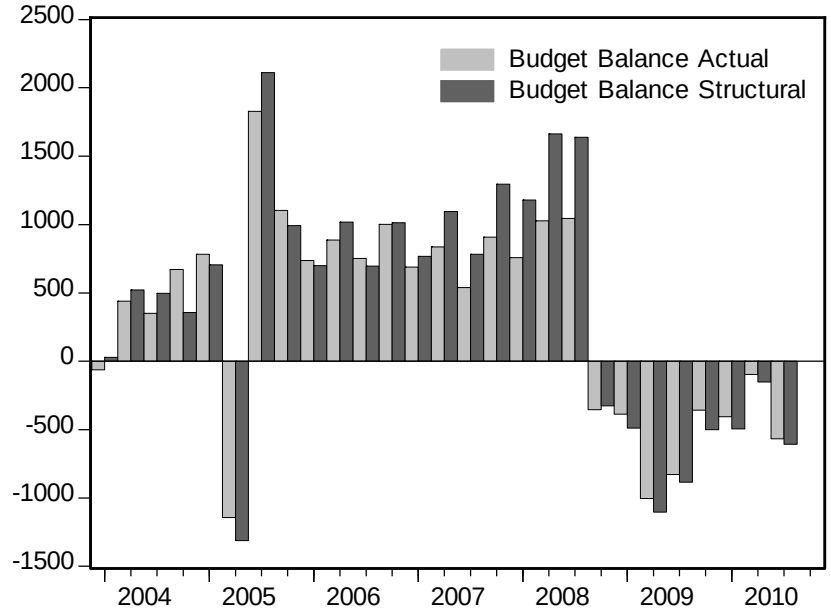


Fig. 3. The real actual budget balance and the real structural budget balance estimates (by the HP-filter) during 2004–2010, mln rub

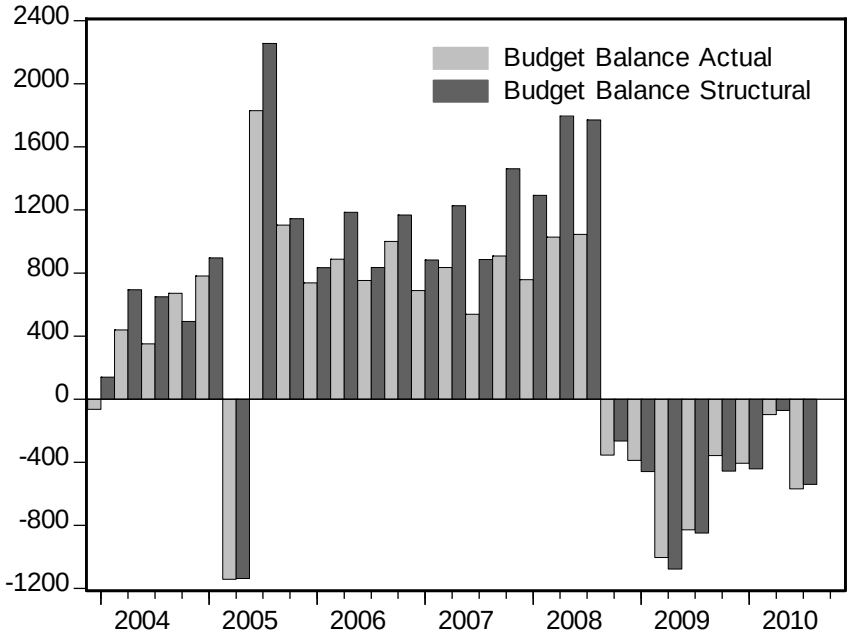


Fig. 4. The actual budget balance and the structural budget balance estimates (by the production function) during 2004–2010, mln rub

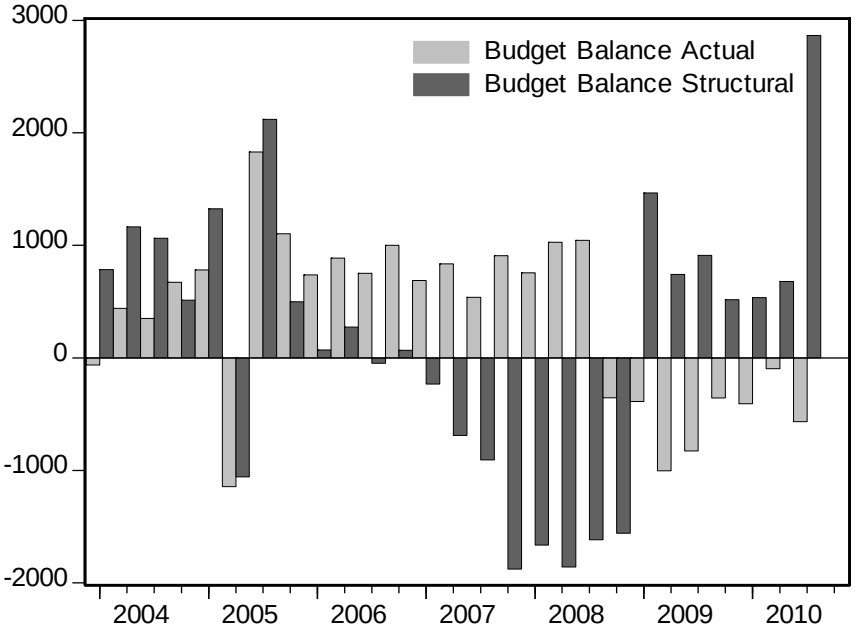


Fig. 5. The actual budget balance and the structural budget balance estimates (by quadratic trend) during 2004–2010, mln rub

To compare the actual budget balance and the estimates of the structural budget balance, one can run a regression of the form

$$B_t = \alpha + \beta B_t^S + \varepsilon_t \tag{6}$$

and test the null hypothesis H_0: $\alpha = 0$ и$\beta = 1$ simultaneously against H_A: $\alpha \neq 0$ or$\beta \neq 1$. In Table A3, Appendix, the results of this exercise are given.

According to Table A3, the actual budget balance series and the estimated series do not coincide, so that cyclical component is significant. It stresses the importance of the cyclical adjustment of the budget balance. It means that the built-in stabilizers effects (as for Russia, income taxes and natural resources export taxes fall in this category) are strong enough.

The estimates of the structural budget balance obtained with the HP-filter and production function estimation coincide with the actual balance in sign and in the value. The effect of the automatic stabilizers is significant, but small.

The quadratic trend structural budget balance estimates demonstrate strictly opposite dynamics. Since 2006, the fourth quarter, and up to 2008, the second quarter (i.e. the beginning of international financial crisis in Russia), the structural balance was negative, whereas the actual balance was in surplus. In 2009–2010, the situation was opposite. According to these estimates, the effect of the automatic stabilizers highly affects the budgetary statistics and overall performance of the fiscal policy.

The total fiscal policy effect on aggregate demand can be measured by the fiscal impulse measures:

$$FIM_t = \frac{B_t^S - B_{t-1}^S}{Y_{t-1}^*}. \quad (7)$$

The fiscal impulse measure shows how large fiscal impulse would be created by the fiscal authorities in the period *t*, were the output at the potential level of the previous period. The actual fiscal impulse (FIM_t^{act}) based on the actual statistics can be defined in the same way. The calculated fiscal impulses are presented in Fig. 6. In Table A4, Appendix, results of estimation of the following regression are given:

$$FIM_t^{act} = \varphi + \gamma FIM_t + \xi_t. \quad (8)$$

The results show that there is a high significant correlation between the actual and the structural fiscal impulses, but they do not coincide. This proves again that the built-in stabilizers effects matter. Based on the constant-oil-price balance fiscal impulse estimates give qualitative dynamics, which is similar to the structural impulses dynamics. Hence, one need not estimate the structural budget balance to obtain the structural fiscal impulses since the same can be done in an easier way with the help of the constant-oil-price budget balance. In the middle term all the approaches to estimating the potential GDP, except the quadratic trend approach, lead to consistent structural fiscal impulses. Thus, these methods can be considered as substitutes.

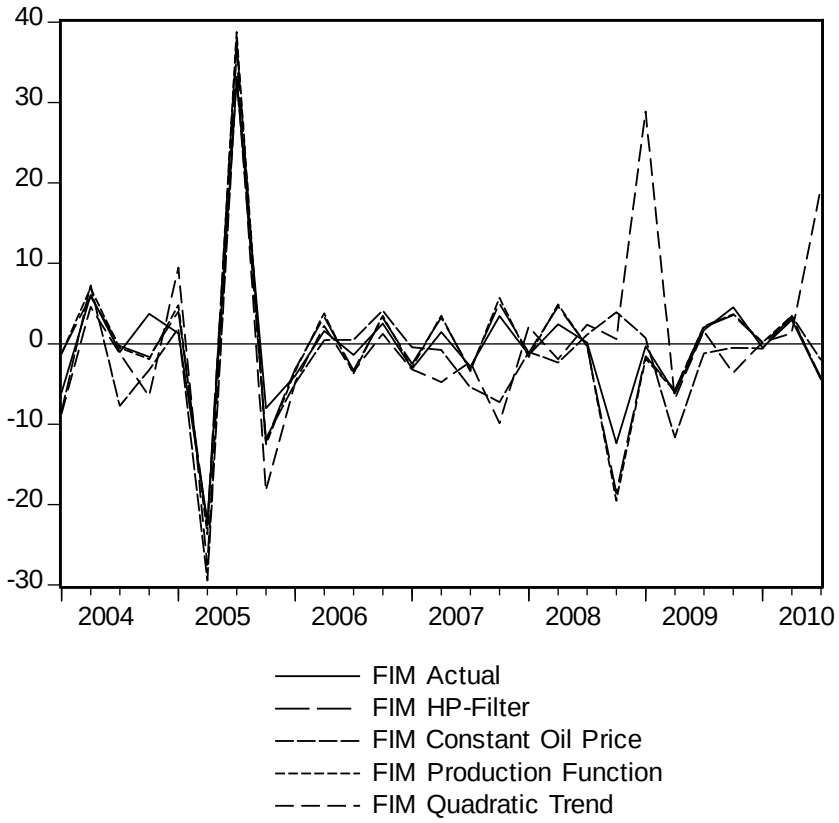


Fig. 6. Fiscal impulse measures dynamics, % of the potential GDP of the previous quarter

In 2005, two outstanding impulses could be observed. The first one occurred in the second quarter and was positive and constituted to +40%[5] of the potential GDP; the second impulse happened in the next quarter and was negative (approximately –25%), so the overall fiscal impulse was suppressive. In 2005, the government reviewed already accepted budget balance and amended it. In 2006–2008, fiscal policy was inactive, and fiscal impulseeviated up to 10% from 0% and usually compensated the previous impacts. In the beginning of the financial crisis the effect of the measures undertaken by the authorities were rather vague. The quadratic trend structural fiscal impulse was about +30%, so the government suppressed the economy, increasing deepness of the recession. However, the other estimates demonstrate that the structural fiscal impulse was – 15–20%, so the government moderately stimulated the economy but after this action no other anticrisis measures were imposed. In 2010 fiscal policy was inactive.

Fiscal policy stabilizes the economy (or the GDP) if the GDP gap negatively correlates with the fiscal impulse. The question of whether fiscal policy in Russia is stabilizing can be examined with the help of the following estimated equations: the output gap is regressed on the fiscal impulse and its lags. The estimates are presented in Table 2.

[5]As it follows from (7), positive fiscal impulse means contractionary fiscal policy, while negative impulse means expansionary policy.

All regressions are adequate; the regressors are significant (at the level of significance of 8%). The residuals are stationary and uncorrelated. However,R^2-s are rather low. The purpose of these regressions is to capture correlations between GDP gap and fiscal impulses. Since the coefficients are significant, R^2-s are not of a great importance.

Table 2. Examining the stabilizing function of fiscal policy in Russia

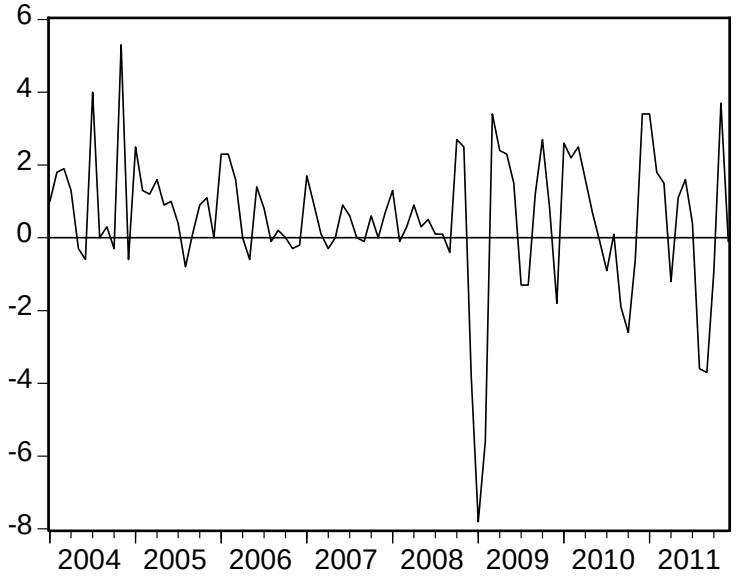
	HP-filter	**Production Function**	**Quadratic Trend**
Fiscal Impulse	0.0010 (1.843)	0.0010 (1.895)	–0.0010 (–2.697)
Lagged Fiscal Impulse	0.0011 (1.978)	0.0010 (1.992)	Insignificant
R^2	0.172	0.176	0.225
DW	2.172	2.228	1.793
SE	0.024	0.024	0.023

Note: The table presents coefficients of linear regressions of increase in GDP gap on fiscal impulses for each method of estimation. Dependent variable: $\Delta gap_t = gap_t - gap_{t-1}$. *t*-statistics of the coefficients are given in the parentheses under the estimates. The table contains only significant lagged fiscal impulses.

Based on these equations, the result concerning the stabilizing effects of fiscal policy is controversial. According to the HP-filter and production function estimates, discretionary fiscal policy destabilizes the economy as it stimulates the economy to deviate from its potential level. The quadratic trend estimates produce the opposite result: fiscal policy is definitely stabilizing. The key to this problem lies in the way of estimating the GDP gap. The HP-filter and production function estimation resemble the trajectory of actual GDP. The differences between actual GDP series and potential GDP estimates (i.e. GDP gap estimates) are small. On the contrary, the quadratic trend calculation gives a 'rough' smoothing of actual GDP; the differences between actual values and trend are significant.

A hypothesis can be stated that GDP in Russia is actually subject to shocks of two kinds: long outward oil price shocks and short internal shocks. The idea is as follows. The quadratic trend approach is the most inflexible one of the employed methods as it attributes the same weight to each observation (this is one of properties of OLS), thus the quadratic trend potential GDP series is the smoothest one because it eliminates both internal and outward shocks. The other methods let long outward shocks 'penetrate' into the potential GDP as they cannot be detected by these methods. The properties of the methods of estimation of the potential GDP described above produce the controversial results. The stated hypothesis is consistent with the following interpretation of equations in Table 2. The government can smooth internal shocks as their impact is low, but it cannot smooth outward shocks which are more persistent and affect

the GDP in a stronger way. The inability of the government to cope with outward shocks can be reasoned by risk of the ruble appreciating (see Fig. 7). However, this question requires a separate investigation.



Note: Positive values mean real appreciation of ruble against other currencies.

Source: Central Bank of Russia.

Fig. 7. Increase of real effective exchange rate of ruble, % to the previous month

5. Conclusions

The procyclicality of fiscal policy in developed countries is a well-recognized fact. Russia is not an exception. However, there is little evidence on the procyclical fiscal policy in Russia. This paper documents this fact and states a hypothesis which would explain this pattern of fiscal policy. For these purposes the structural budget balance is estimated.

The analysis demonstrates that income taxes (i.e. personal income taxes and corporate taxes) turned out to be sensitive to changes in the GDP gap. Charges for extracting natural resources (primarily oil and gas) are sensitive to GDP fluctuations, too. This evidence is consistent with the concept of built-in stabilizers. It can be stated, that in the Russian economy built-in stabilizers exist and their effect is significant.

The employed methods of the estimation of the potential GDP produce results, which can be interpreted in the following way. The shocks in the economy can be divided into two types: persistent outward shocks (mainly caused by oil price fluctuations), and short-term internal shocks. Fiscal policy analysis demonstrates that discretional fiscal policy copes with smoothing internal fluctuations but cannot eliminate the impact of long-lasting outward shocks,

so it cannot smooth the impact of international instability. The overall effect of discretional fiscal policy on the economy is destabilizing, fiscal policy in Russia is indeed procyclical.

This conclusion is especially interesting in the light of the international financial crisis of 2007–2008. The measures undertaken were not effective enough to boost the output during the crisis.

The obtained results do not contradict to a stylized fact according to which in oil producing countries fiscal policy tends to be procyclical rather than countercyclical, i.e. is not stabilizing and does not smooth GDP fluctuations.

Since only short time series are available, the question of the reliability of the results can arise. As there are only a few observations, the only way to examine these results for robustness is to employ a set of methods that was undertaken in the present research. With the current degree of the development of the economy, economics and statistics it is too early to make any quantitative conclusions and use structural budget balance for quantitative forecasts. Leaving technical problems aside, the main question is: what should be meant under the potential GDP in an economy in a transformational recession? This paper applied different approaches which produced qualitatively consistent results.

References

Бессонов В.А., Цухло С.В. (2002) Анализ динамики российской переходной экономики. М.: Институт экономики переходного периода.

Бессонов В.А., Воскобойников И.Б. (2006) О динамике основных фондов и инвестиций в российской переходной экономике // Экономический журнал ВШЭ. № 2. С. 193–228.

Васильева Е.А., Власов С.А., Пономаренко А.А. (2009) Анализ стабилизационной функции и устойчивости государственных финансов Российской Федерации. // Экономический журнал ВШЭ. № 3. С. 383–402.

Гурвич Е.Т., Вакуленко Е.С., Кривенко П.А. (2009) Циклические свойства бюджетной политики в нефтедобывающих странах // Вопросы экономики. № 2. С. 51–70.

Капелюшников Р.И. (2001) Российский рынок труда: адаптация без реструктуризации. М.: Издательский дом ГУ ВШЭ.

Полтерович В.М. (1996) Трансформационный спад в России // Экономика и математические методы. Т. 32. № 1. С. 54–69.

Полтерович В.М. (2007) Элементы теории реформ. М.: Экономика.

Ясин Е.Г. (2007) Модернизация и общество: доклад к VIII Международной научной конференции. М.: Издательский дом ГУ ВШЭ.

Balassone F. (2006) Measuring Fiscal Performance in Oil-Producing Countries // Available at SSRN: http://ssrn.com/abstract=2005008 or http://dx.doi.org/10.2139/ssrn.2005008.

Blanchard O.J. (1990) Suggestions for a New Set of Fiscal Indicators //OECD Working Paper No. 79.

Blanchard O.J., Kremer M. (1996) Disorganization // Quarterly Journal of Economics. No. 112 (4). P. 1091–1126.

Brandner P., Diebalek L., Schuberth H. (1998) Structural Budget Deficits and Sustainability of Fiscal Positions in the European Union // OECD Economics Department Working Papers, No. 15.

Cogley T., Nason J. (1995) Effects of the Hodrick – Prescott Filter on Trend and Difference Stationary Time Series: Implications for Business Cycle Research // Journal of Economic Dynamics and Control. No. 19. P. 253–278.

Hagemann R. (1999) The Structural Budget Balance: the IMF's Methodology // Working Papers of the International Monetary Fund, WP/99/95.

Ilzetzki E., Vegh C.A. (2008) Procyclical Fiscal Policy in Developing Countries: Truth or Fiction? // NBER Working Paper No. 14191.

Kornai J. (1994) Transformational Recession: the Main Causes // Journal of Comparative Economics, 19, 39–63.

Murchison R., Robbins J. (2003) Fiscal Policy and the Business Cycle: a New Approach to Identifying the Interaction // Department of Finance Canada Working Papers, No. 2003–06.

Orphanides O., van Norden S. (2002) The Unreliability of Output – Gap Estimates in Real Time // The Review of Economics and Statistics. No. 84(4). P. 569–583.

Renisson A. (2003) Comparing Alternative Output-Gap Estimators: A Monte Carlo Approach // Bank of Canada Working Paper, No. 2003–08.

Spilimbergo A. (2005) Measuring the Performance of Fiscal Policy in Russia // IMF Working Paper, WP/05/241.

Appendix

Detailed Results of Estimation

Table A1. Main revenues items and proxies for taxable bases

Revenues Item	Taxable Base Proxy
Corporations income tax	Gross profit of the economy
Personal income tax	Gross salary of the economy
Social tax	Gross salary of the economy
Tax on goods sold in Russia	Nominal GDP
Tax on goods imported in Russia	Nominal GDP
Total income tax	Gross profit of the economy
Property tax	Gross profit of the economy
Charge for the regular natural resources usage	Nominal GDP
External economic activities revenue	Nominal GDP
Charges for the usage of natural resources	Nominal GDP

Source: Vasilieva et al. (2009).

Table A2. Estimated elasticities of taxable base proxies with respect to GDP gap

Taxable Base Proxy	HP-фильтр	Production Function	Quadratic Trend
Gross salary of the economy	0.629 (0.092)	0.790 (0.038)	0.380 (0.128)
Gross profit of the economy	0.337 (0.507)	0.507 (0.333)	0.401 (0.232)
Nominal GDP	0.455 (0.236)	0.471 (0.236)	0.239 (0.351)

Note: *P*-values are given in parentheses.

Table A3. Estimated parameters of regression (6) and*F*-statistics for the hypothesis H_0: $\alpha = 0, \beta = 1$ (that the actual budget balance and the structural budget balance series coincide)

Method	$\hat{\alpha}$ (*P*-value)	$\hat{\beta}$ (*P*-value)	R^2	*DW*	*F*	*P*-value
HP-filter	340.019 (0.026)	0.002 (0.372)	0.031	1.225	70434.5	< 0.001
Quadratic trend	356.572 (0.002)	–0.117 (0.337)	0.036	0.812	44.323	< 0.001
Production function	–81.394 (0.033)	0.792 (< 0.001)	0.955	1.022	37.441	< 0.001

Note: *P*-values are given in parentheses.

Table A4. Estimated parameters of regression (8) and and *F*-statistics or the hypothesis H_0: $\gamma = 0$, $\varphi = 1$ (that the actual budget balance and the structural budget balance series coincide)

Method	$\hat{\varphi}$ **(*P*-value)**	$\hat{\gamma}$ **(*P*-value)**	R^2	***DW***	***F***	***P*-value**
HP-filter	–0.141 (0.718)	0.851 (< 0.001)	0.950	2.043	7.434	0.003
Quadratic trend	–0.440 (0.735)	0.476 (< 0.001)	0.455	1.840	12.747	<0.001
Production function	–0.146 (0.717)	0.815 (< 0.001)	0.948	2.016	11.744	< 0.001
Constant-oil-price budget balance	0.898 (0.314)	0.777 (< 0.001)	0.753	1.720	4.171	0.027

Note: *P*-values are given in parentheses.

Table A5. Estimated budgetary elasticities with respect to the HP-filter GDP gap and particular parameters of the estimated models[6]

Variable	**Elasticity**	***P*-value**	R^2	***DW***	***JBP*-value**[7]
Corporate tax	6.398	< 0.001	0.384	1.182	< 0.001
Personal income tax*	0.388	0.025	0.188	2.029	0.887
Social tax	0.080	0.973	0.039	2.363	< 0.001
Tax on goods sold in Russia*	0.725	0.762	0.004	3.036	< 0.001
Tax on goods imported in Russia*	0.525	0.198	0.078	1.178	0.627
Total income tax*	0.362	0.346	0.034	2.136	0.210
Property tax	0.077	0.948	< 0.001	2.673	< 0.001
Charge for the regular natural resources usage	1.602	0.011	0.501	0.476	0.717
External economic activities revenue*	0.378	0.668	0.007	1.438	0.679
Charges for the usage of natural resources	4.311	0.015	0.242	1.351	0.438
Other taxes and charges*	2.716	0.475	1.461	1.461	0.210
Budget expenditures*	0.381	0.704	0.006	3.137	0.001

[6] $\log(T_i)$ was regressed on*gap*and constant. For taxesmarkedwithasterisk*, the dependent variable was the first difference of log of the tax, i.e.$\Delta\log(T_i)$.

[7] This column reports the *P*-values for the Jarque-Berra test for normality of residuals.

Table A6. Estimated budgetary elasticities with respect to the quadratic trend GDP gap and particular parameters of the estimated models

Variable	Elasticity	*P*-value	R^2	*DW*	*JBP*-value
Corporate tax	3.243	0.009	0.229	1.052	< 0.001
Personal income tax*	0.297	0.008	0.244	2.218	0.885
Social tax	0.743	0.607	0.010	2.422	< 0.001
Tax on goods sold in Russia*	0.438	0.651	0.009	2.400	< 0.001
Tax on goods imported in Russia*	0.259	0.331	0.045	1.160	0.579
Total income tax*	0.336	0.179	0.068	2.213	0.279
Property tax	0.239	0.760	0.004	2.677	< 0.001
Charge for the regular natural resources usage	2.632	< 0.001	0.480	0.476	0.539
External economic activities revenue*	0.256	0.658	0.008	1.450	0.681
Charges for the usage of natural resources	3.512	0.001	0.378	1.658	0.454
Other taxes and charges*	1.227	0.636	0.011	1.462	< 0.001
Budget expenditures*	0.301	0.649	0.008	3.149	0.182

Table A7. Estimated budgetary elasticities with respect to the production function GDP gap and particular parameters of the estimated models

Variable	Elasticity	*P*-value	R^2	*DW*	*JBP*-value
Corporate tax	6.525	< 0.001	0.374	1.141	< 0.001
Personal income tax*	0.419	0.012	0.197	2.072	0.984
Social tax*	0.666	0.769	0.003	2.407	0.867
Tax on goods sold in Russia*	0.617	0.800	0.003	3.306	< 0.001
Tax on goods imported in Russia*	0.642	0.118	0.112	1.219	0.552
Total income tax*	0.496	0.207	0.060	2.186	0.197
Property tax*	0.106	0.931	< 0.001	2.672	< 0.001
Charge for the regular natural resources usage*	1.401	0.022	0.440	0.426	0.724
External economic activities revenue*	0.865	0.338	0.035	1.445	0.337
Charges for the usage of natural resources	4.904	0.006	0.300	1.457	0.476
Other taxes and charges*	1.855	0.636	0.011	1.456	0.188
Budget expenditures*	0.426	0.681	0.007	3.137	0.001

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