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Estimating Belarus' Structural Fiscal Balance

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Executive Summary

Safeguarding the macroeconomic stability of the country implies an appropriate fiscal position. This is especially true in situations when anti-cyclical policies are needed to contain an overheating ("boom-bust") economy. The estimation of a structural fiscal balance can be considered an important tool for policy makers in this respect, as they can gain additional insights from removing cyclical and one-off factors from overall revenues and expenditures. This approach helps them to better identify the fiscal stance of the country and its impact on the overall macroeconomic situation.

In this policy paper, we proceed with the estimation of the structural fiscal balance for Belarus during the period 1995–2011. We first adjust revenue and expenditure data by one-off factors, before adjusting for the business cycle. In order to do so, we estimate first the output gap, i.e. the difference between actual and potential output by means of statistical filtering techniques (unobserved components model, based on Kalman filter). The second stage of the structural balance estimation process is the assessment of the elasticity of revenues to the output gap, as expenditures are believed not to be influenced by the business cycle, but rather determine it. The final stage of this procedure gives us the structural fiscal balance.

The result of our estimations can be interpreted as follows. During the sample period, there were at times significant deviations between the overall (official) budget balance and the estimated structural balance (e.g. 1996-98, 2008-09). This suggests that during those times cyclical and one-off factors dominated the economic situation, i.e. factors which cannot be considered by definition sustainable. A simple look at overall balances would not have been able to identify the correct fiscal stance of the country, and thus not delivered the right signal in terms of an adequate policy response in this particular situation.

As usual with empirical research, a number of caveats apply. The estimation is based on econometric and/or time-series models, and thus dependent on the right choice of models and data quality and availability. Also the adjustment for one-off factors is more of an art than a strict science and depends very much on the prior knowledge and the experience of the expert. This means that the results obtained must be interpreted with care.

What are the implications of these results for policy makers? In our view, they should concentrate their efforts to develop their own estimation approach to calculate the structural balance of Belarus, and monitor the results continuously. The estimation and analysis of the structural balance may be an important additional tool to improve the conduct of fiscal policy in the country with a view of sustaining macroeconomic stability.

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1. Introduction

Observers are often puzzled about the role and the stance of fiscal policy in the overall conduct of economic policy in Belarus. While everybody agrees that its importance is huge, this cannot easily be proved by empirical data. One reason for this is the significant amount of quasi-fiscal activities, especially by banks, which form an important instrument of economic policy. Data for these activities are not easily obtained, and thus their economic impact cannot be assessed. Another reason is significant limitations and gaps in official statistics, which make it very difficult to correctly assess the fiscal position of the country. This is also mirrored by the fact that despite very low official fiscal deficits (even surpluses), public debt has rapidly increased. As a result, there is little empirical evidence how public finances influence the macroeconomic stance.

In order to provide more clarity to the latter question, the estimation of structural, i.e. cyclically adjusted fiscal balances should provide important policy insight into the relationship between fiscal and economic policy in Belarus. This is in line with international practice, where the estimation of structural balances has gained prominence in the process of fiscal austerity, which is currently underway in many developed countries. The introduction of “debt brakes” in many countries (Germany, Switzerland, Poland, rest of EU, and others) is also closely related to this concept.

The structure of the paper is as follows. We will provide some theoretical and methodological background regarding the concept of structural fiscal balances in chapter 2. The following chapter 3 describes the fiscal position of Belarus in more detail. Chapter 4 is then devoted to the empirical estimation of the structural balance of Belarus. We conclude with some policy recommendations in chapter 5.

2. Adjusting fiscal balances: Theoretical and methodological considerations

One of the reasons for the currently vague prospects of the global economy is the fact that many developed and emerging market economies have to deal with the challenge of managing skyrocketed public debt without undermining fragile economic growth. Recent IMF reports suppose that a number of EU economies will not be able to handle this situation, facing either recession or high risk of debt crisis (IMF (2012a, 2012b)). Such circumstances illustrate forcefully the importance of fiscal policy analysis. One of its key aspects is the estimation of cyclically-adjusted and structural fiscal balances that are able to cast more light upon the underlying fiscal stance of the economy.

Why is such an analysis needed? The overall fiscal balance, as published in official statistics, may not correctly describe the fiscal policy of a country. For instance, the global economic crisis leads to increase of public expenditures due to inbuilt automatic stabilizers, such as unemployment and social security benefits. The growth of these expenditures is then determined by the macroeconomic situation, and thus it cannot be viewed as the result of discretionary fiscal policy. Consequently, the overall fiscal deficit may not imply a softening of fiscal policy, but rather just indicate falling economic activity. In the opposite case, an overheated economy may be characterized by neutral or even positive fiscal balance, as the budget benefits from additional revenues, arising from a growing tax base. However, this increase is only temporary, as the economy will inevitably return to its equilibrium path. Hence, the revenue side of the budget should be adjusted to take into account automatic stabilizers; in order to identify the true fiscal policy stance independent from the business cycle. Often, a positive overall fiscal balance in boom period is associated with a negative cyclically-adjusted balance and a procyclical fiscal policy stance.

Cyclically-adjusted balances thus take into account the influence of business cycle fluctuations on public revenues and expenditures and provide a more realistic picture of underlying fiscal policy trends. However, there might be a situation when the balance is determined not only by the business cycle, but also by one-off transactions – from the revenue or expenditures side – external factors like world prices, a boom in real estate prices, and so on (Joumard, et al. (2008)). The balance adjusted for these factors is called a structural one.

The estimation of cyclically-adjusted budgets first of all implies an estimation of the output gap, which is usually done by means of statistical filters or a production function approach.

Afterwards, public revenues and expenditures are adjusted to the output gap. This adjustment can be done separately for different types of revenues and expenditures, or on aggregated basis. The revenues adjustment is usually a two-step process which is based on elasticities: First, the elasticity of the tax base to the output gap is estimated, and second the elasticity of the tax revenues to the tax base is defined. The same procedure is applied to expenditures, but they are largely believed to be neutral to the business cycle (see Larch, Turrini (2009)). The line which needs adjustment is usually unemployment benefits or other type of expenditures that have a nature of automatic stabilizers.

For the estimation of the structural balance, prior to the described cyclical adjustment, revenues and expenditures should be cleared from one-offs and effects related to changes in commodity or real estate prices. One-offs represent revenues and expenditures that have a short-term nature, which occurred due to some unique circumstances. For instance, expenditures related to overcoming the consequences of a natural disaster or deposit insurance schemes are regarded as one-offs. Examples of such one-offs from the revenues side may be income from providing licenses or additional revenue due to changes in tax periods (Bornhorst, et al. (2011)).

Not paying attention to a boom in commodity or real estate prices may lead to short-term increase of revenues, so even a cyclically adjusted balance may be misleading while interpreting current fiscal policy (Turner (2006)). However, it is quite possible that the business cycle coincides with commodity or real estate prices cycles. If this is the case, there is no need for additional adjustment as correction on output gap will include correction on prices boom as well.

Furthermore, the structure of economy should be taken into account while making cyclical or commodity price adjustments. A reorientation of the economy from domestic to external demand, or vice versa, may imply that output gap elasticities are inappropriate (Bornhorst, et al. (2011)). An export driven economic boom will hardly result in the same rates of revenue growth as a domestic consumption-driven boom. To cope with this problem, elasticities are estimated in relation not to output gap, but gaps in consumption, import or export.

The structural balances received after all these adjustments allow for more accurate analyses of the fiscal policy stance. On the one hand, it is possible to see whether the government takes any active policy measures to react to the economic situation, and what is the scale of these measures compared to passive measures, inbuilt in public policy in the form of automatic stabilizers. On the other hand, the structural balance is a useful instrument to analyse the role of fiscal policy in the economy, e.g. whether it is used to stimulate economic growth and whether it corresponds or contradicts to the business cycle. Furthermore, it can be used for the conduct of a fiscal sustainability analysis.

Nevertheless, the interpretation of the structural balance should be done rather cautiously, as its estimation procedure implies a lot of approximation. The IMF experts write in a technical note on structural fiscal balance that "there is no single way of adjusting fiscal balances; the appropriate adjustment should take into account the purpose of the analysis, data availability, the fiscal regime, and the economic structure, but will ultimately reflect analytical judgment" (Bornhorst, et al. (2011)). The majority of the estimations in practice is done based on the adjustment of aggregate expenditures and revenues, applying elasticities from economic literature (Girouard, Andre (2005)).

Conclusion 1: The analysis of structural, i.e. cyclically and one-off adjusted fiscal balances offers much deeper policy insights than a simple look at overall balances.

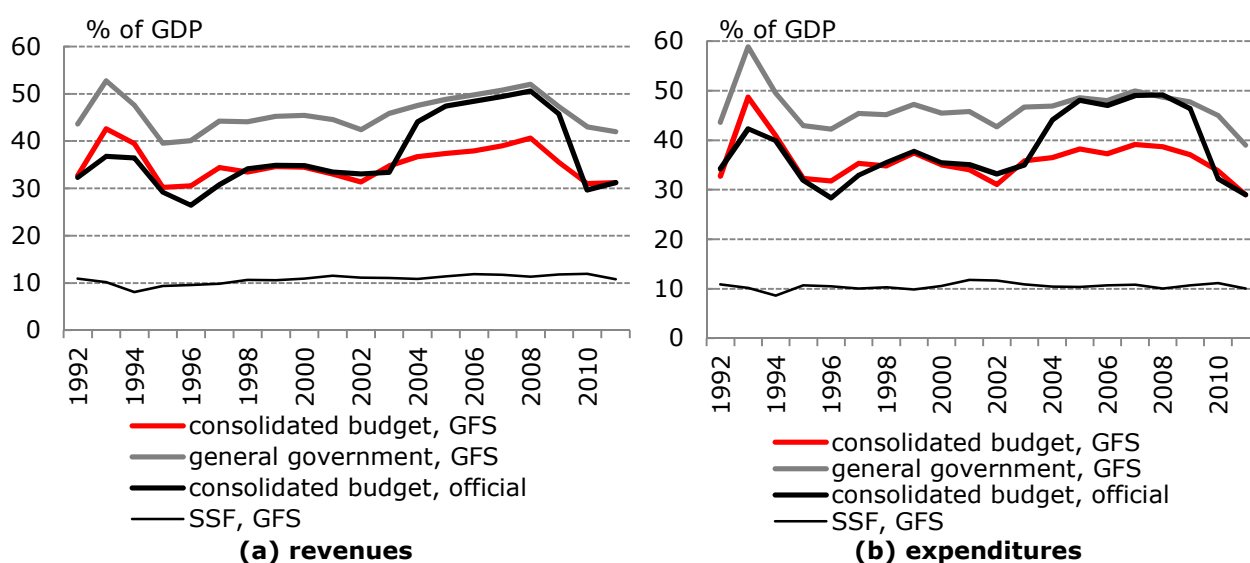
3. The fiscal situation in Belarus: Description of the overall balance

Public finances play an important role in Belarus economy, as up to 50% of GDP is redistributed via budgets of different levels of public administration, including the Social Security Fund (SSF). Fiscal policy in Belarus is designed to meet two important goals: To sustain a high level of social equality and to stimulate economic growth via financial support to state owned enterprises. However, the quantitative analysis of fiscal policy is a challenge, as it is impeded by an unstable structure of the public finance sector. There are regularly changes in the budget classification due to the introduction and elimination of different funds, their unstable status as budgetary or extra-budgetary as well as regular reforms of the tax system. As a result, official

statistics do not provide consistent time series of public finance indicators, and thus an analysis based on them may be misleading.

To give an example, Figure 1 provides the dynamics of consolidated budget revenues and expenditures, retrieved from Belarus' statistical yearbooks. They fluctuate within a wide range from 25 to 50% of GDP. Obviously, these up and downs do not illustrate the true stance of fiscal policy in Belarus, being largely the result of changes in budget accounting. For example, the peak of 2005–2009 is partly related to the inclusion of the SSF and innovation funds into consolidated budget. More informative data are provided by the IMF in its Government Financial statistics (GFS) database, as it follows a strict structure of budget levels. Figure 1 presents parameters of the general government budget, estimated based on the GFS database¹ as well. Compared to consolidated budget official data, their dynamics is much more stable. Revenues and expenditures of the general government, which include central and local government budgets, SSF and extra-budgetary funds are kept within the bound of 40–50% of GDP. Statistics of the early transition years (1992–1994) can be ignored, as it is not very trustworthy due to absence of firm rules of statistic accounting in that period, and the transitory status of the Belarusian ruble.

Figure 1. Public finance indicators



Source: Belstat, Statistical yearbooks; GFS (2003–2010), estimates based on GFS (1992–2002), estimates based on Ministry of Finance and SSF (2011).

However, an analysis of fiscal policy on the general government level is not the best solution. It includes the SSF that is characterized by structural surpluses. The only exception is the period of 2001–2002, when parts of social contributions were accumulated not in the SSF, but in central and local government budgets. In 2002, the SSF missed revenues of 1.5% of GDP that were mostly accumulated in local government budgets. Taking this sum into account, the SSF would have generated a surplus in 2002 as well. Reasons for a positive SSF balance are rooted in pension system parameters – pension age, replacement rate and dependency ratio. However, keeping them unchanged, these parameters will lead to a structural deficit of the SSF in just a couple of years (World Bank (2011); Chubrik, Shymanovich (2008)). Still, pension system reform is a separate issue of economic policy and we will not cover it further in this analysis. Instead, we will concentrate on the “consolidated” budget², calculated based on the general government budget, net of SSF (see Figure 1).

¹ IMF GFS database provides general government level data for Belarus only for 2003–2010. Expenditures and revenues for 2011 are estimated based on Ministry of Finance data (http://minfin.gov.by/data/gsf/2011/general_eng_2011.xls, <http://minfin.gov.by/i/budget/yd11.pdf>) and SSF data (http://ssf.gov.by/priside/about/cerrent_fond/budget/formation/formation_2011, http://ssf.gov.by/priside/about/cerrent_fond/budget/execution/execution2011). Data for 1992–2002 is calculated based on GFS database as a sum of consolidated central government and local government net of transfers.

² Here and afterwards the term “consolidated budget” is referred to the general government budget, excluding the SSF.

Its dynamics illustrates that, on the one hand, consolidated budget was rather balanced starting from 2000. The public finance sector faced a substantial deficit only in 2009 and 2010, which was the result of the global financial crisis and economic policy of domestic demand stimulation before the elections of 2010. Afterwards, the need for macro stabilisation forced the government to run a consolidated budget surplus in 2011. On the other hand, there were significant changes in the volume of revenues and expenditures, proving that public intervention in the economy varied across time. The volume of funds transmitted through the consolidated budget grew steadily starting from 2002 until 2009. Afterwards, the volume of the consolidated budget resources shrank rapidly during 2010–2011 down to the level of 2002, which may signal about reforms in the public sector and tighter fiscal policy. Closer look at the structure of public sector revenues and expenditures will reveal if it was indeed so. Moreover, reduction of fiscal activities may be accompanied of grown quasi-fiscal activity, which is a vital problem for Belarus (World Bank (2012)).

Revenue side

Consolidated budget revenues are formed by three main tax groups – taxes on goods and services, taxes on income and profit, and taxes on international trade – and non-tax revenues (see Annex A, Table A1). Most of them are highly unstable, with the exception of taxes on income and profit. Furthermore, most of the tax groups show a declining trend. An especially sharp reduction occurred within taxes on goods and services (see Figure A1). This group was formed by numerous taxes that were gradually abolished by 2010 (for details see Kruk, Shymanovich (2011)). Nowadays this group consists of two main taxes only – VAT and excises – forming more than 90% of the tax group revenues (see Figure A1). In 2003 their share was just 55.4%. So we can attribute a reduction of the revenue from taxes on goods and services to the simplification of the tax system, designed to improve business environment in Belarus. Public costs of this simplification were partly compensated by an increased VAT rate in 2010 up to 20%. It resulted in the growth of related revenues by 1.0% of GDP. A comparable growth took place only in 2005, when Belarus and Russia began to collect VAT based on the country of destination principle within bilateral trade.

Another tax group that has gained high importance recently is taxes on international trade. Related public revenues rocketed in 2007–2009 (see Figure A3) due to the oil trade agreement with Russia. According to this agreement Belarus, levied export duties on oil refinery products. However, a significant part of the revenues was channeled to Russia via subsidies to oil importers. The volume of the subsidy, in turn, was determined by the duty on oil, which was levied by Russia on oil supplied to Belarus' oil refinery plants. The next surge of revenues from taxes on foreign trade occurred in 2011, and it was caused by provisions of the custom union agreement with Kazakhstan and Russia. It allowed Belarus to export the oil, collecting the export duty, and benefiting from redistribution of import duties within the union. So, the dynamics of revenues from this tax group is mainly determined by external factors, while the role of fiscal policy measures seems to be negligible, especially in export duties dynamics.

Revenues from taxes on profit and income display just moderate fluctuations, associated with the profit tax (see Figure A2). Its rate has been stable until 2012, so falling or increasing public revenues should be largely explained by economic activity. Income tax revenue is the most stable one, which is explained by constant share of wages in GDP (see Zaretsky (2012)), and a flat tax rate, introduced in 2009. Short-term dynamics is affected by the political business cycle, as wages and income tax revenue, respectively usually grow in the year of important political events.

Besides, there is a group of "other taxes", which formed a significant part of consolidated budget revenues until 2009. Later on, tax system simplification caused their reduction.

Summing up, consolidated budget tax revenues can be divided into three groups, determined i) by discretionary fiscal policy, aimed during the last decade at tax system simplification; ii) external factors, which may be partly treated as one-offs; and iii) the stance of the business cycle. Profit tax, income tax, import duties (accounting for custom union), excises and VAT (accounting for two reforms) can potentially be attributed to the third group. Moreover, non-tax revenues should also be determined by the business cycle, as they are constituted by interests, dividends, income from entrepreneurial activity and fines, all items that should correlate with economic ac-

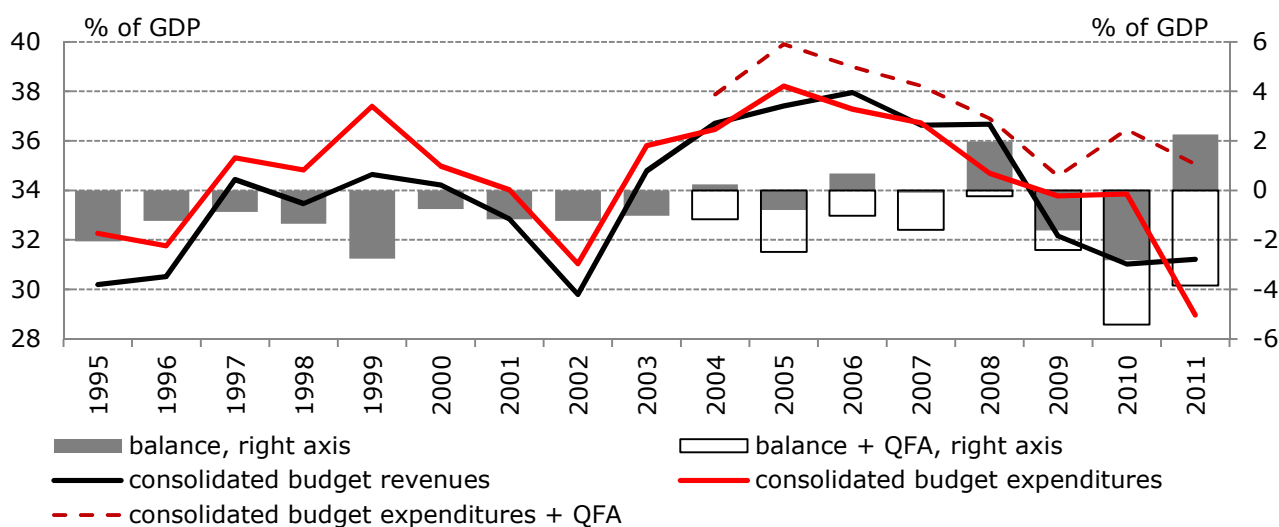
tivity. This group of revenues can be viewed as automatic stabilizers and thus should be adjusted to the stance of the business cycle, if the true stance of fiscal policy is required.

Expenditure side

The structure of public sector expenditures is relatively stable and does not suffer so many changes, compared to revenues. According to the functional classification, most of changes occur within the lines "economic affairs" and "general public services" (see Figure A4). These changes are explained either by economic policy directed at accelerating economic growth via subsidies and public investments (see Figure A5) or external factors, such as the oil and petroleum products trade agreement with Russia in 2007–2009. Social expenditures, including also expenditures on healthcare and education, are very stable. They consist by-and-large by remuneration of employees, which follows productivity in the long-run. In the short-run, their dynamics is correlated with the political business cycle (see Chubrik, Shymanovich (2012)), and thus being one of the instruments by which the government accelerates domestic demand. Hence, these expenditures do not depend on the economic cycle, but rather determine it.

There is hardly any expenditure line that may be viewed as an automatic stabilizer in Belarus. It is explained by the peculiarities of social policy. Its provisions cover mainly children and elderly, while working-age population is "supported" via labor market regulation, which targets maximum employment, and low wage differentials (see Shymanovich, Skriba (2011)). Moreover, unemployment benefits are negligible, in order to minimize incentives for unemployment. The only instrument of social policy that is designed to support social vulnerable groups is targeted social assistance. Public expenditures on it should have grown rapidly in times of economic turmoil. However, this instrument has not yet become that effective (World Bank (2011)), and public expenditures on it are around 0.1% of GDP.

Figure 2. Consolidated budget, adjusted to one-offs and quasi-fiscal activity



Note: 1. QFA – expenditures, related to quasi-fiscal activity, including (i) banks recapitalization program, (ii) expenditures on guaranteed debt servicing. Net credit to financial organizations, that should have been also added to QFA according to IMF (2012d) methodology, is not included due to absence of regular data.

2. One-offs included oil importers subsidies and respected amount of export duties, social security revenues, absorbed by consolidated budget.

Source: GFS (for 2003–2010), estimates based on GFS (for 1995–2002), Belstat (for 2011) for public sector indicators, Haiduk (2012) for oil import subsidies, World bank (2012), Haiduk (2012) and IMF (2012d) for QFA.

Another key feature of fiscal policy in Belarus is the wide use of quasi-fiscal activities (QFA). The practice of directed lending by state banks causes the need for their regular recapitalization, which is done by operations below the line. For example, in 2010 and 2011 these expenditures were equal to 1.3 and 5.3% of GDP³. Furthermore, the public sector bears expenses on guarantees on loans provided by banks to the real sector, which are also accounted for below

³ For quasi-fiscal activity data see World Bank (2012) and IMF (2012d).

the line. The amount of these guarantees that came due in 2011 was 0.8% of GDP, which means that in practice there was a significant budget deficit in 2011 (see Figure 2). It was even higher if one takes into account lending under state programs, which amounted to 5.5% of GDP (IMF (2012c)).

Figure 2 provides information on consolidated budget parameters that are adjusted to a) hidden transfers from the Belarusian to the Russian budget regarding export duties on petroleum products during 2007–2009, b) SSF revenues accumulated in central and local government budgets in 2000–2002, and c) quasi-fiscal activities. It reveals that the consolidated budget balance has been mainly slightly negative, before quasi-fiscal activities are taken into account, and significantly negative after quasi-fiscal activities adjustment. Still, the true stance of fiscal policy can only be identified after a cyclical adjustment of certain consolidated budget revenue items.

Conclusion 2: A thorough analysis of public finances in Belarus is challenged by the fact that there are frequent budget reclassifications and tax changes. Furthermore, there is little empirical evidence how public finances influence the macroeconomic stance.

4. Estimating the consolidated budget structural balance in Belarus

Prior to the estimation of the structural balance it is important to eliminate one-offs. This has been implemented by the exclusion of social contributions from the consolidated budget and duties on petroleum products. Other changes in revenues and expenditures seem to be related either to discretionary fiscal policy or cyclical factors of economic environment. The identification of cyclical factors is the purpose of this section. The first stage of this process is the estimation of the cyclical component of GDP, i.e. the output gap.

4.1. Calculating the output gap

The output gap represents the difference between actual and potential output. Potential output is determined by existing technology, economic institutions and available resources, including human and physical capital. In the long-run, the economy tends to grow with the rates complying with potential output. In the short-run, a deviation of growth rates from the long-term trend is possible due to e.g. economic policy measures. For instance, the stimulation of domestic demand may lead to an acceleration of economic growth above its potential level and, subsequently, increased risk of overheating the economy. The key issue in this regard is the accurate estimation of potential growth rates, as a wrong understanding of the economy potential may result in inadequate and devastating economic policy measures.

There are several ways of estimating long-term equilibrium growth rates and the output gap. For instance, it may be based on the production function, where residuals represent the output gap in the form of an error correction mechanism (see Castle (2003)). Besides, the output gap can be assessed by different statistical filters. In case of Belarus, both these technics have been applied (Kruk (2010); Demidenko, Kuznetsov (2011a, b)) and the results happened to be contradicting each other. In this analysis, we will stick to statistical filters, as there is the need to compare the output gap with the cyclical component of other variables that may influence public revenues, and those can be estimated only by filters. Such variables as household consumption, imports, and oil prices should be analyzed additionally, as their cycles may cause deviations in such tax revenues as VAT (household consumption, imports), profit tax (oil), and import duties (imports).

The output gap and cyclical components of other macroeconomic variables were estimated by means of an unobserved components model realized in the STAMP software package, which applies the Kalman filter procedure, and provides maximum likelihood estimates of the parameters. The specification of the model included a fixed level, a stochastic trend slope, short-term 5 year cycle and an autoregressive AR(1) process. This specification was used for all 4 variables: real GDP, real household consumption, real imports, and an oil price index⁴. The time series have been priory seasonally adjusted by means of the Census X12 procedure incorpo-

⁴ Quarterly real GDP, household consumption and import time series were calculated based on national accounts data in 2009 prices.

rated in the EViews software, and transformed into logarithmic form with the exception of the oil price index. The cycles obtained are presented in Annex B.

The output gap (See Annex B Figure B1) has a reasonable form⁵ and corresponds to one, presented in Chubrik, Shymanovich, Zaretsky (2012). It illustrates the overheating of the economy that was especially sharp at the end of 1997, in 2008 and at the end of 2010. The gap exceeded 2% of GDP during those times, which inevitably developed into an economic crisis later on. Potential GDP is also presented in Figure B1, and it almost coincides with the actual GDP of the second quarter of 2012, highlighting the low economic growth potential of Belarus' economy. Cycles of other variables are graphically similar to the output gap (Figures B4-B6), which means that they are correlated. Correlation coefficients and Spearman tests on the existence of correlation are presented in Table B1. The most correlated are the output gap and the real imports cycle, especially at the end of the sample. Hence, revenues from import duties can be tested on dependence with the output gap instead of import cycle, which has more economic policy implications. The same is true for the household consumption cycle, so the output gap will be solely used as explanatory variable for VAT revenues. The oil prices cycle is less volatile than other cycles within the period analyzed. The cycle accelerates only in 2008 and repeats afterwards the output gap. From this we can conclude that the output gap takes already into account factors like the boom in oil prices in 2008 and their restoration in 2010. Thus, a separate analysis of the revenues elasticity to oil prices must not be conducted for Belarus.

4.2. Elasticity of tax revenue to the output gap

The second stage of the structural balance estimation process is the assessment of the elasticity of revenues and expenditures to the output gap. In section 2 we have distinguished several tax groups and non-tax revenues that may be influenced by cyclical factors. This hypothesis should be tested regressing revenues on the output gap. A statistically significant coefficient at the output gap means that the respected revenue line is influenced by cyclical factors. Moreover, the estimated coefficient at the gap represents the elasticity of revenue to the output gap, which is the core parameter for the cyclical adjustment of the budget.

In order to check the significance of the economic cyclical factor and estimate the elasticity of revenues to the output gap the following model will be tested:

$$\ln \frac{R_t}{Y_t^*} = c + a \ln \frac{Y_t}{Y_t^*} + \varepsilon_t, \quad (1)$$

where R – revenue, Y – actual GDP, Y^* – potential GDP, a – elasticity of revenue to the output gap, ε – error term. In policy papers, this kind of regression is usually not very wide-spread. Most of the research is done based on already known elasticities, which are calculated for, e.g. OECD and some other countries (Girouard, Andre (2005)). Moreover, the elasticity is often divided into 2 parts: the elasticity of the tax base to the output gap, and the elasticity of tax revenues to the tax base. The first one can be calculated through regressions, while the second one is assessed based on tax legislation. In case of Belarus, there are no established country-specific elasticities to our knowledge⁶. Furthermore, it is difficult to make assumptions over the elasticity of tax revenue to the tax base due to the sophisticated tax legislation with a big number of exceptions and special tax regimes. Therefore, we concentrate on the overall elasticity of tax (non-tax) revenue to the output gap and make our own estimates based on standard regressions.

The problem of this approach is a lack of consistent quarterly data on consolidated budget revenues. This imposes serious restrictions on the analysis, as the regression coefficients have to be estimated based on annual data. First, it implies a very short sample of observations. Second, the output gap in annual terms happens to be less volatile than in quarterly terms. Hence, some boom and bust phases are eliminated by this annualization, and their influence is ignored while estimating the elasticity. Despite these drawbacks, the model still can provide some general information about the existence of an interrelation between revenues and the output gap, and the elasticities obtained may have important economic policy implications.

⁵ The Hodrick-Prescott filter provides similar results (see Annex B, figure B2). However, it is considered to be less accurate, because it does not separate irregular factors from cyclical ones, and is less adequate for observations on the borders of the sample.

⁶ The World Bank (2012) used aggregated elasticity of 1.7 for revenues to output gap, and 0 for expenditures.

The model has been used to analyze tax revenues such as VAT, profit tax, personal income tax, import duties, excises⁷, and non-tax revenues that are expected to be influenced not only by discretionary economic policy, but also the economic business cycle. The model specification can be interpreted in a way that the ratio of specific public revenue to potential GDP is constant in the long-run, but in the short-run it deviates partly due to the output gap. Adjusted for this cyclical deviation, the revenue is equal to:

$$R_t^* = \frac{R_t}{\left(\frac{Y_t}{Y_t^*}\right)^\alpha} = R_t \left(\frac{Y_t^*}{Y_t}\right)^\alpha. \quad (2)$$

The estimated elasticities and final model specifications are presented in Annex C. Only four tax groups – VAT, excises, personal income tax and profit tax – appeared to depend on the output gap. Import duties and non-tax revenues are not influenced by the business cycle, i.e. their dynamics are determined mostly by discretionary policy. Moreover, cycles of oil prices, imports, and household consumption have also no influence over these revenues. Actually, additional cycles were tested for all 6 models, but they appeared to be non-significant.

The estimated elasticities of tax revenues (profit tax – 6.2, personal income tax – 4.7, VAT – 3.1, excises – 5.7) are relatively high compared to the ones that are found in OECD countries or proposed in the literature. Such elasticities are common for the expenditure side and unemployment payments in particular (Girouard, Andre (2005)). Especially striking are high elasticities for VAT and excises that are usually treated as unit elastic. In case of VAT it can be explained by changes in the economic structure that occur in periods of boom and bust. A positive output gap has been associated in Belarus with periods of accelerated domestic demand, and growing share of imports in GDP, which means additional VAT revenues. Alternatively, the economic downturn has been accompanied by increasing role of exports and, consequently, reduced VAT revenues. Higher than unit elasticity of excises may be explained by the specific taxation scheme of oil refinery in Belarus and cross-subsidization between domestic and export sales of petroleum products. In times of high oil prices, when petroleum products are exported with high profitability, part of this profit is “taxed” away by high excises levied on domestic sales⁸.

Moreover, there are several general reasons that can explain phenomenon of high revenue elasticities. First, the volatility of the output gap in annual terms is low, which increases the sensitivity of other variables to the output gap. Moreover, the unobserved components model, by means of which the gap has been estimated, included autoregressive components that significantly reduced the amplitude of the cycle compared to, e.g. the Hodrick-Prescott filter. The second factor is relatively short observation period, which makes elasticity estimates less robust. Third, the unstable tax legislation determines uncertainty over tax revenue to the tax base elasticity, which affects the overall robustness of elasticity estimates.

4.3. Calculation of the structural balance

The effect that the output gap has over the different tax revenue groups is presented in Annex D (Figures D1-D4). A significant deviation of actual revenues from cyclically adjusted ones were observed only 1996, 1998, 2008, 2009, when the output gap was characterized by a high amplitude. During other years, the effect from the output gap on separate tax groups was marginal. The combined effect is presented in Figure D5. Similar to separate tax groups, it is significant in 1996–1998 and 2008–2009. In 1996 and 2008 actual revenues were much higher than potential (cyclically-adjusted) ones, while in 1998 and 2009 there was a negative gap of tax revenues.

This has direct consequences for the analysis of the fiscal policy stance. For example, the overall consolidated budget deficit of 1996 turns now out to be a surplus after cyclical adjust-

⁷ Excise revenues of central government budget were tested due to absence of data on consolidated budget excise revenues before 2003. Still more than 90% of consolidated budget excises are accumulated in central government budget starting from 2006 (100% in 2011). So switch from consolidated to central budget should not affect overall results.

⁸ Strictly speaking, this implies that excises can be viewed as automatic stabilizer with great degree of conditionality, as they are influenced by fiscal policy decisions. Still, these decisions have a regular nature and are determined by the output gap.

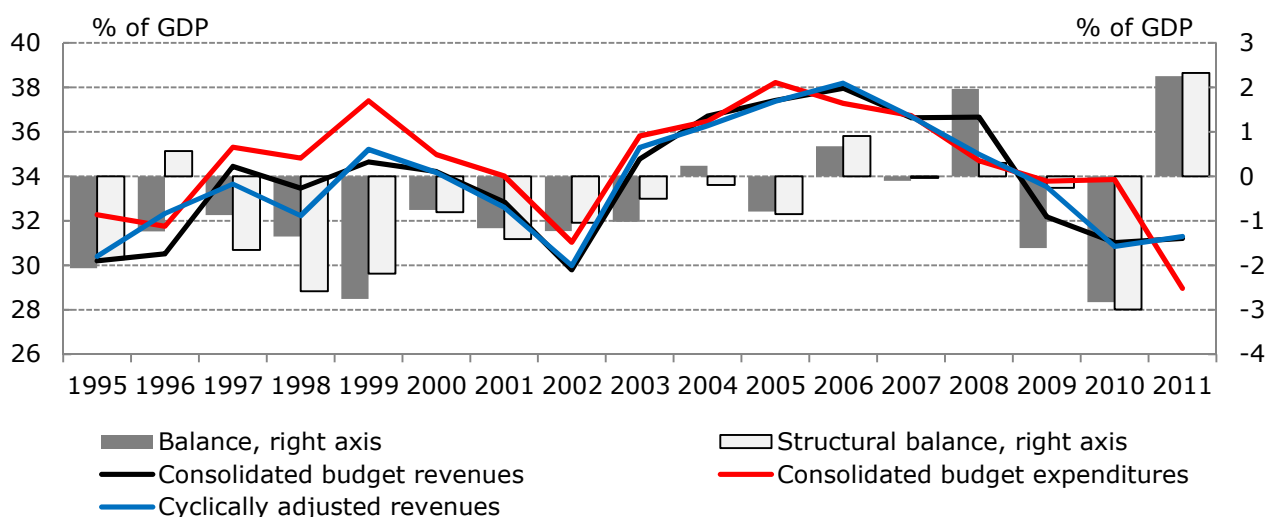
ment, which means that fiscal policy was rather tight that time. In contrast, in 1998 the cyclical adjustment aggravates the deficit, signaling very loose fiscal policy.

During the recent past, cyclical effects in the consolidated budget were also prominent. The overall balance signaled a tight fiscal policy stance in 2008, when the economy was overheating; and a loose fiscal policy in 2009, when consequences of the global economic crisis undermined economic growth in Belarus. Based on the overall balance alone, it might have been possible to conclude that Belarus ran an anti-cyclical fiscal policy at that time. However, the structural fiscal balance casts doubt on this conclusion (see Figure 3). According to the estimated balances the fiscal policy was not anti-cyclical, it was rather neutral instead. Obviously, most of economy stimulation took place in the form of quasi-fiscal activities, especially directed lending, while fiscal policy was inert.

In 2010 and 2011 the adjustment does not influence the fiscal policy stance. It was loose even according to the overall balance in 2010, as there was an active stimulation of domestic demand. During the crisis in 2011, this policy was reviewed with the aim to achieve macroeconomic stabilization, and a tight fiscal policy contributed to both, an overall and structural consolidated budget surplus. Nevertheless, this conclusion can be viewed as disputable. First, there was growth of taxes on foreign trade due to the custom union agreement with Kazakhstan and Russia. However, we cannot eliminate these revenues as they have a long-term nature and are the result of the foreign economic policy. Second, the scale of quasi-fiscal activities remained high in 2011 from a formal point of view. However, quasi-fiscal activities in 2011 consisted mainly of state bank recapitalizations, needed to overcome the consequences of the devaluation. Hence, it may be treated as a one-off, thus not affecting the fiscal policy stance.

Summing up, the high volatility of public sector parameters is predominantly explained by an active government stimulation of the economy, which can be interpreted as a discretionary fiscal policy. The cyclical factor plays an important role only when the amplitude of the output gap becomes relatively high (around 2% of GDP). The cyclical effect is transmitted only through selected taxes, such as profit tax, personal income tax, VAT, and excises. However, their elasticities to the output gap are high, determining a significant positive effect on the overall balance in periods of accelerated growth. Expenditures do not have features of automatic stabilizers, as they are used to stimulate the cycle, not to react on it. The structural balance proves that the fiscal policy stance – with exception of some years – has been rather moderate.

Figure 3. Consolidated budget structural deficit and cyclically adjusted revenues



Note: Revenues and expenditures are adjusted to one-offs.

Source: Own estimations.

Conclusion 3: The estimation of the structural fiscal balance for Belarus reveals that during the years 1996-98 and 2008-09, there was significant deviation of the overall balance from the structural one, as cyclical and one-off factors were prominent during those years.

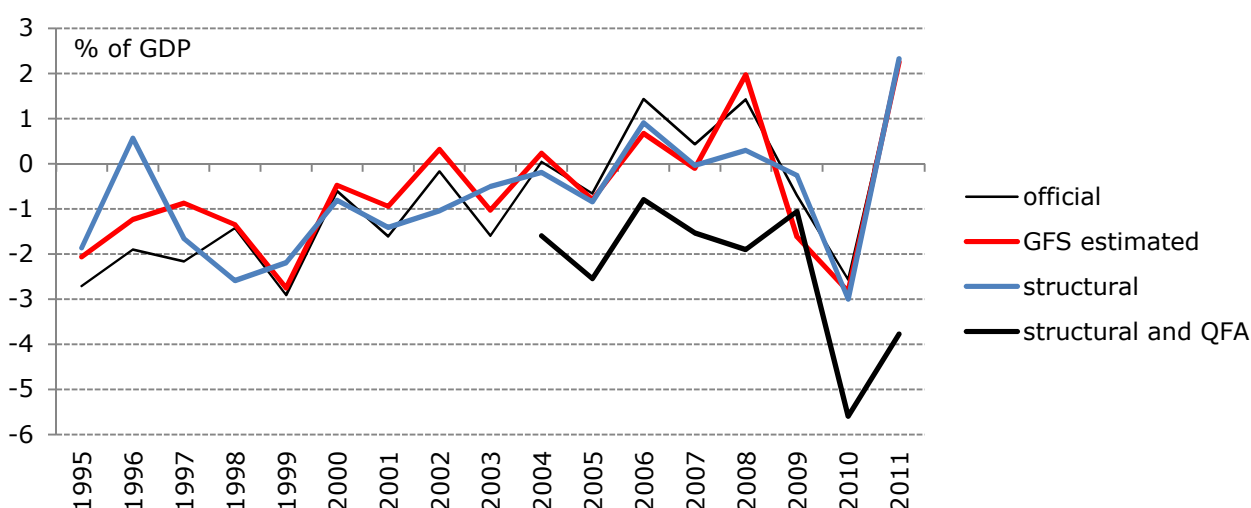
5. Concluding remarks

Safeguarding the macroeconomic stability of the country implies an appropriate fiscal position. This is especially true in situations when anti-cyclical policies are needed to contain an overheating (“boom-bust”) economy. The estimation of a structural fiscal balance can be considered an important tool for policy makers in this respect, as they can gain additional insights from removing cyclical and one-off factors from overall revenues and expenditures. This approach helps them to better identify the fiscal stance of the country and its impact on the overall macroeconomic situation.

In the present paper, we estimate the structural fiscal balance of Belarus during 1995-2011. The results of this exercise are summarized in Figure 4 below. It reveals that at times, significant deviations between the overall (official) budget balance and the estimated structural one have been recorded. This suggests that during those times cyclical and one-off factors dominated the economic situation, i.e. factors which cannot be considered by definition sustainable. The picture becomes especially clear when quasi-fiscal activities are added; this deteriorates in general the fiscal situation.

Of course, a number of caveats are of order: The estimation of structural balances is based on econometric and/or time-series models, and thus dependent on the right choice of models and data quality and availability. Also the adjustment for one-off factors is more of an art than a strict science and depends very much on the prior knowledge and the experience of the expert. This means that the results obtained must be interpreted with care, as is usually assumed in empirical economics. Since this analysis is rather new for Belarus, more research on that topic is clearly needed.

Figure 4. Consolidated budget balances



Source: Own estimations.

Thus, policy makers should concentrate their efforts to develop their own estimation approach to calculate the structural balance of the country, and monitor the results continuously. This may be an important tool to improve the conduct of fiscal policy in the country.

References

- Bornhorst, F., Dobrescu, G., Fedelino, A., Gottschalk, J., Nakata, T. (2011). When and How to Adjust Beyond the Business Cycle? A Guide to Structural Fiscal Balances, *IMF Fiscal Affairs Department Technical note*.
- Castle, J. (2003). Measuring Excess Demand and its Impact on Inflation, *M.Phil Thesis in economics*, Nuffield College, University of Oxford.
- Chubrik, A., Shymanovich, G. (2008). Vliyanie demograficheskikh tendentsiy na ustojchivost raspredelitelnoj pensionnoj sistemy Belarusi [Demographic trends influence on Belarus PAYG pension system sustainability], *IPM Research Center Working paper WP/08/03*.
- Chubrik, A., Shymanovich, G. (2012). Otdacha na obrazovanie i ocenka chelovecheskogo kapitala v Belarusi [Return on education and human capital assessment in Belarus], *IPM Research Center Working paper WP/12/07*, forthcoming.
- Chubrik, A., Shymanovich, G., Zaretsky, A. (2012). Srednesrochnye perspektivy ekonomiki Belarusi posle krizisa platezhnogo balansa [Middle-term prospects of Belarus economy after balance of payments crisis], *IPM Research Center Working paper WP/10/07* (available only in Russian).
- Demidenko, M., Kuznetsov, A. (2011a). Estimation of potential real GDP level by means of Hodrick- Prescott Filter, *Bankausky Vesnik (NBRB)*, 1(510), 19–26 (available only in Russian).
- Demidenko, M., Kuznetsov, A. (2011b). Estimation of potential real GDP level by means of production function, *Bankausky Vesnik (NBRB)*, 4(513), 42–46. (available only in Russian).
- Fedelino, A., Ivanova, A., Horton, M. (2009). Computing Cyclically Adjusted Balances and Automatic Stabilizers, *IMF Fiscal Affairs Department Technical note*.
- Girouard, N., André, Ch. (2005). Measuring Cyclically Adjusted Budget Balances for OECD Countries, *OECD Economics Department, Working Paper No. 434*.
- Hagemann, R. (1999). The structural budget balance. The IMF's Methodology, *IMF Working Paper 99/95*.
- Haiduk, K. (2012). Sistema biudgetnoj podderzhki predpriyatij v Belarusi [System of Budget Support to Enterprises in Belarus], *IPM Research Center Policy discussion paper PDP/12/02* (available only in Russian).
- IMF (2012a). Global Prospects and Policy Changes, *IMF G-20 NOTE*, prepared for the November 4–5, 2012 meeting of the Group of Twenty Finance Ministers and Central Bank Governors in Mexico City.
- IMF (2012b). Coping with High Debt and Sluggish Growth, *World Economic Outlook*, October 2012.
- IMF (2012c). Republic of Belarus: Selected Issues, *IMF Country Report 12/114*.
- IMF (2012d). Staff Report for the 2012 Article IV Consultation and Second Post-Program Monitoring Discussions, *IMF Country Report 12/113*.
- Joumard, I., Minegishi, M., André, Ch., Nicq, Ch., Price, R. (2008). Accounting for One-off Operations when Assessing Underlying Fiscal Positions, *OECD Economics Department Working Papers*, No. 642.
- Kruk, D. (2010). Vliyanie krizisa na perspektivy ekonomicheskogo roste v Belarusi [Crisis Influence on Belarus Long-term Growth Prospects], *IPM Research Center Working paper WP/10/07* (available only in Russian).
- Kruk, D., Shymanovich, G. (2011). Public Expenditures on Education and Health in Belarus before and during the Global Crisis, *CASE Network Report 102*.
- Larch, M., Turrini, A. (2009). The cyclically-adjusted budget balance in EU fiscal policy making: A love at first sight turned into a mature relationship, *European Commission Directorate-General for Economic and Financial Affairs Economic Paper 374*.
- Shymanovich, G., Skriba, A. (2011). Rynok truda v Belarusi: osnovnye vyzovy [Labour market in Belarus: main challenges]. In: Silitsky, V. (ed.) *Belarus: challenges of social-economic development*, BISS, Minsk.

- Turner, D. (2006). Should Measures of Fiscal Stance be Adjusted for Terms of Trade Effects, *OECD Economic Working Paper* No 519.
- World Bank (2011). Belarus Public Expenditure Review: Fiscal Reforms for a Sustainable Economic Recovery. Volume 1. *World Bank Report* 63566-BY.
- World Bank (2012). Belarus Country Economic Memorandum: Economic Transformation for Growth. *World Bank Report* 66614-BY.
- Zaretsky, A. (2012). Poisk optimalnogo variant monetarnoj politiki v Belarusi: rezultaty prostoj DSGE modeli [Search for optimal monetary policy design in Belarus: simple DSGE model results], *IPM Research Center Working paper* WP/12/06.

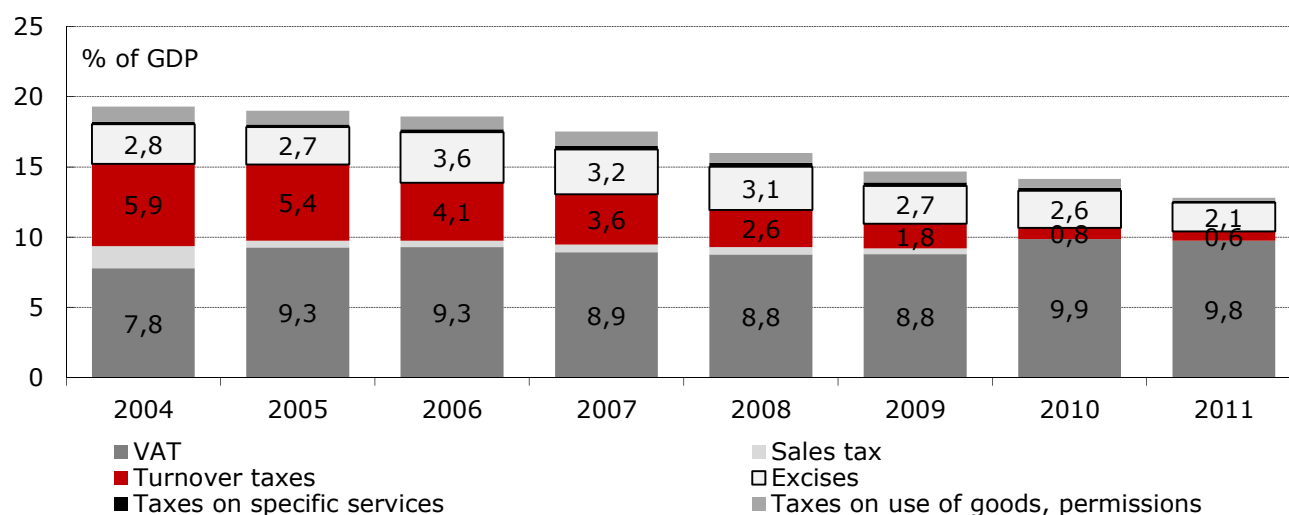
Annex A. Consolidated budget revenue and expenditure structure

Table A1. Consolidated budget revenues

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Revenue	34.8	36.7	37.4	38.0	39.0	40.7	35.5	31.0	31.2
Taxes	33.8	33.6	34.3	34.0	35.2	37.7	30.1	27.3	26.8
Taxes on income, profits, and capital gains	6.3	7.0	7.6	7.8	7.7	8.6	7.0	7.2	6.8
Taxes on payroll and work-force	1.0	1.0	0.8	0.9	0.0	0.0	0.0	0.0	0.0
Taxes on property	2.0	1.9	1.8	1.6	1.6	1.5	1.2	1.1	0.9
Taxes on goods and services	19.5	19.1	18.6	18.6	17.5	16.0	14.7	14.1	12.8
Taxes on international trade and transactions	2.6	2.2	2.6	2.6	6.5	8.2	5.8	3.5	5.5
Other taxes	2.4	2.4	3.0	2.6	2.0	3.3	1.4	1.3	0.8
Other revenue	1.1	3.2	3.1	4.0	3.8	3.0	5.4	3.7	4.4

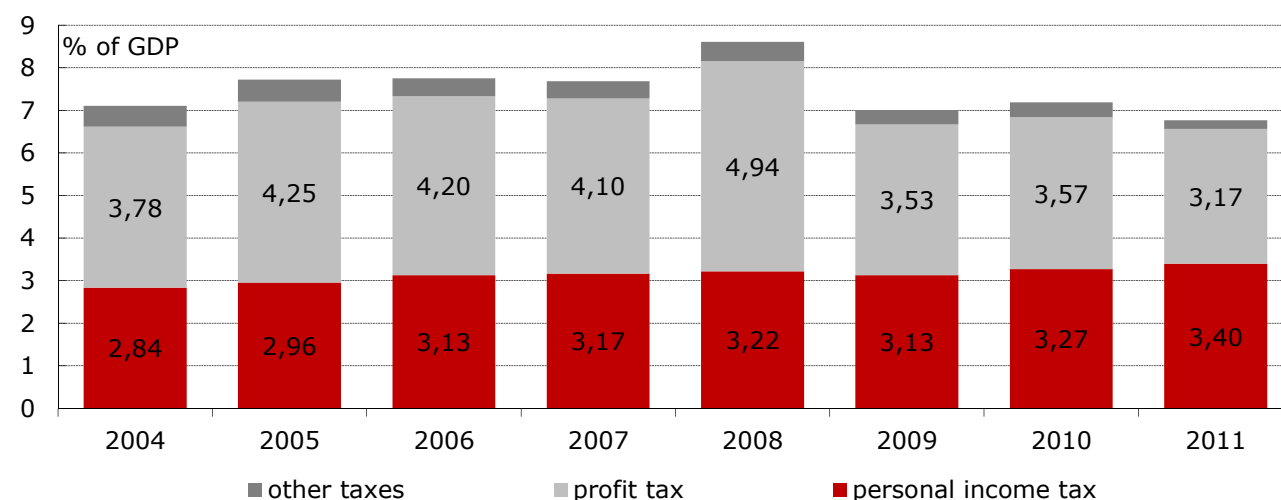
Source: GFS (for 2003–2010), estimates based on Ministry of finance (for 2011)⁹.

Figure A1. Taxes on goods and services



Source: GFS (for 2003–2010), estimates based on Ministry of finance (for 2011).

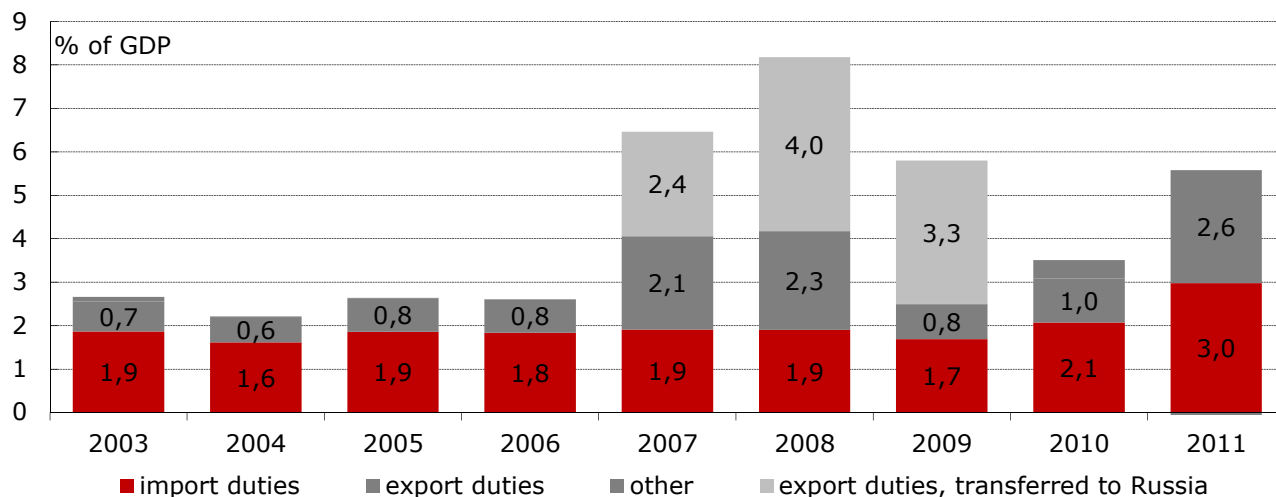
Figure A2. Taxes on profit and income



Source: GFS (for 2003–2010), estimates based on Ministry of finance (for 2011).

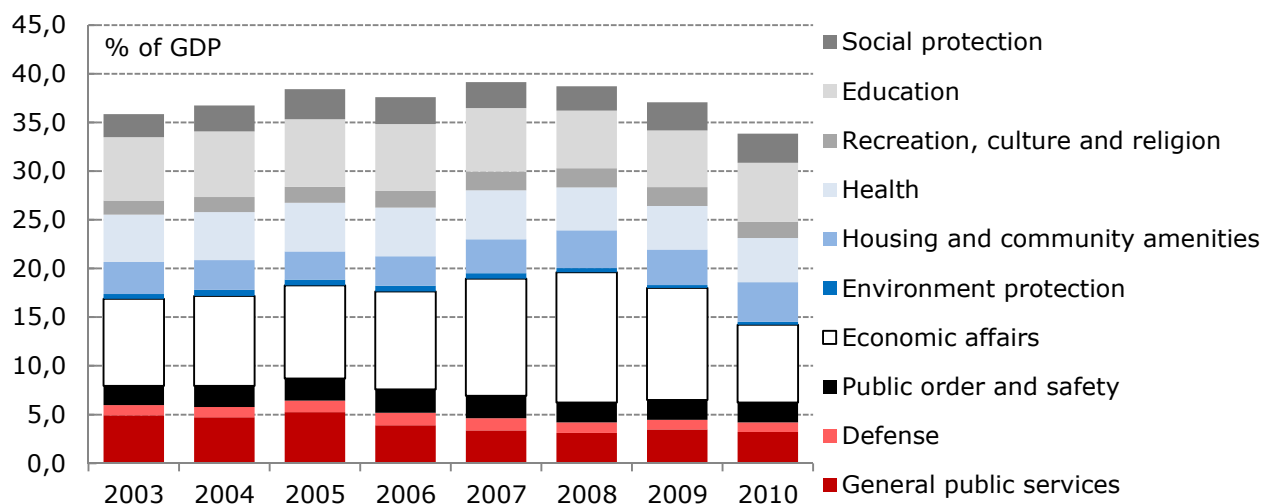
⁹ http://minfin.gov.by/data/gsf/2011/general_rus_2011.xls, http://minfin.gov.by/data/gsf/2010/year_rus_2010.xls

Figure A3. Taxes on foreign trade



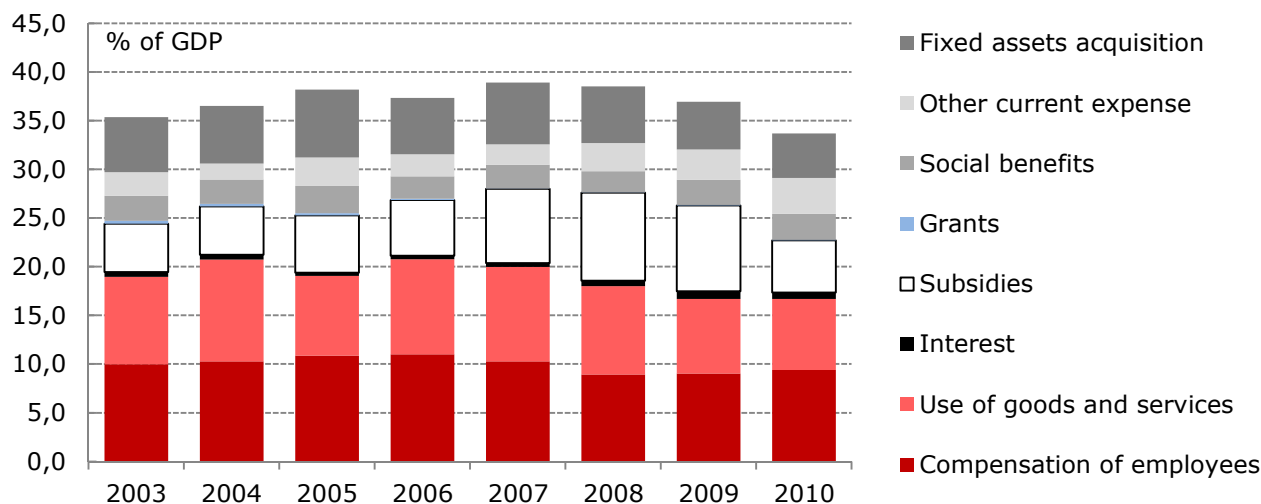
Source: GFS (for 2003–2010), estimates based on Ministry of finance (for 2011), Haiduk (2012).

Figure A4. Consolidated budget expenditures, functional classification



Source: GFS (2003–2010).

Figure A5. Consolidated budget expenditures, economic classification



Source: GFS (2003–2010).

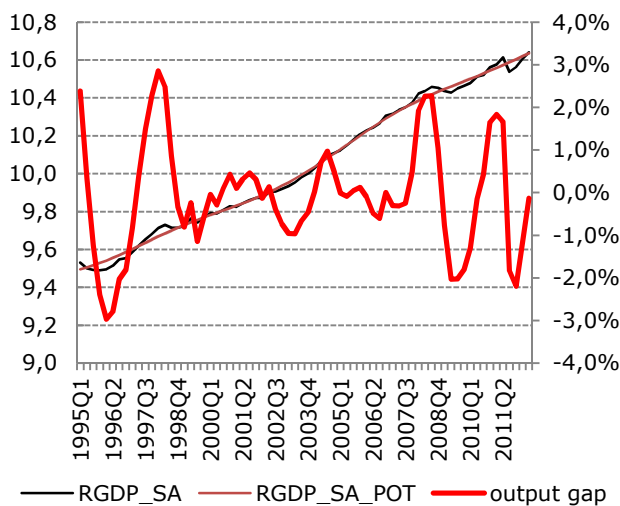
Annex B. Output gap

Table B1. Correlation between cycles and output gap

	Correlation coefficient	Pearson test T-statistics	p-value	Correlation coefficient, 2002-2012 sample
oil price index cycle	0.334	2.920	0.005	0.535
real household consumption cycle	0.489	4.623	0.000	0.720
real import cycle	0.528	5.126	0.000	0.626

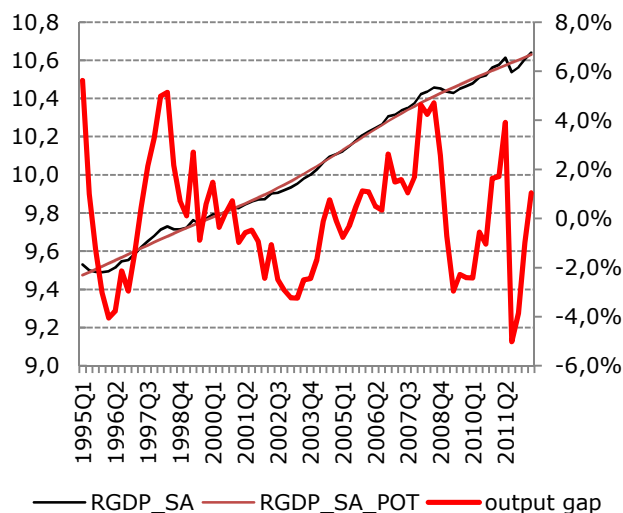
Source: own estimates.

Figure B1. Output gap: unobserved components model (STAMP)



Note: Output gap – right axis. Left axis – logarithmic scale.

Figure B2. Output gap: Hodrick-Prescott filter



Note: Output gap – right axis. Left axis – logarithmic scale.

Figure B3. Output gap: unobserved components model in annual terms

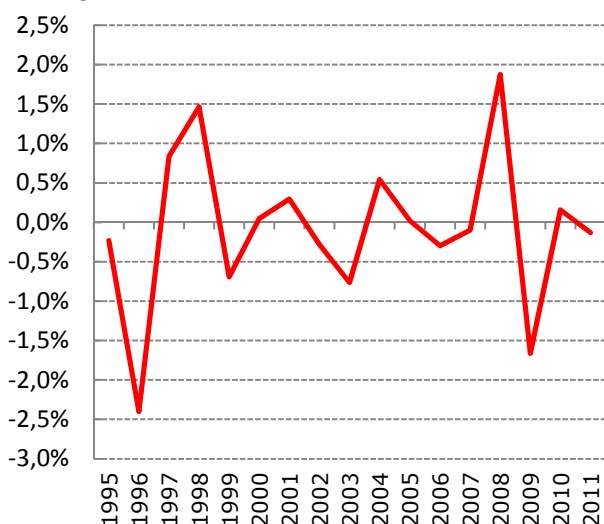


Figure B4. Output gap and real household consumption cycle

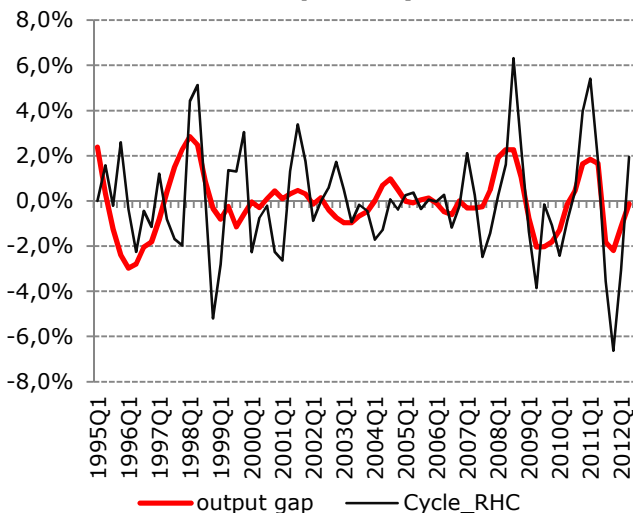


Figure B5. Output gap and real import cycle

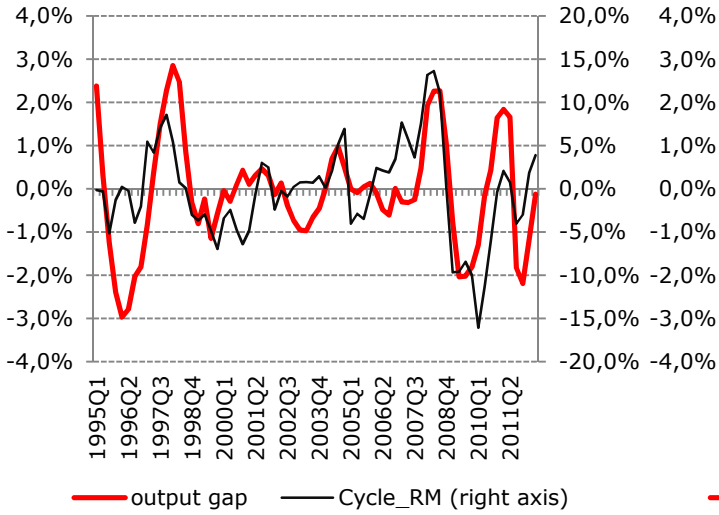
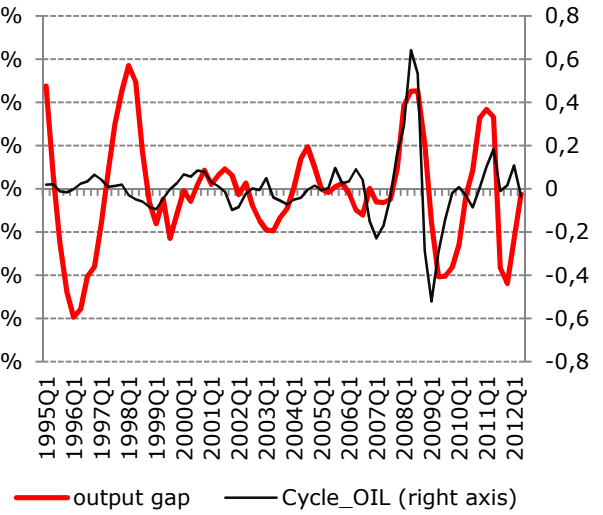


Figure B6. Output gap and oil prices cycle



Source: own estimates.

Annex C. Elasticities estimation

Table C1. Parameters of the profit tax to GDP ratio model

	Coefficient	Standard Error	<i>t</i> -value	<i>p</i> -value
Constant	-3.110	0.022	-140.00	0.000
Output gap	6.202	2.006	3.09	0.010
D2002	-0.231	0.083	-2.77	0.018
D2003	-0.203	0.084	-2.41	0.035
D2011	-0.277	0.083	-3.33	0.007
	Test statistics	<i>p</i> -value		
AR 1-1 test	0.058	0.815		
ARCH 1-1 test	0.108	0.747		
Normality test	0.575	0.750		
Hetero test	0.286	0.757		
RESET23 test	1.357	0.305		

Note: Dependent variable – the ratio of consolidated budget profit tax revenue to potential GDP. Parameters were estimated for the 1996–2011 sample in PcGive software package by OLS with dummy saturation procedure. D2002, 2003, 2011 – dummies for respected years.

Source: own estimates.

Table C2. Parameters of the personal income tax to GDP ratio model

	Coefficient	Standard Error	<i>t</i> -value	<i>p</i> -value
Constant	-3.487	0.016	-216.00	0.000
Output gap	4.659	1.632	2.85	0.012
	Test statistics	<i>p</i> -value		
AR 1-1 test	1.084	0.370		
ARCH 1-1 test	0.139	0.714		
Normality test	0.006	0.997		
Hetero test	0.145	0.867		
RESET23 test	0.177	0.840		

Note: Dependent variable – the ratio of consolidated budget personal income tax revenue to potential GDP. Parameters were estimated for the 1995–2011 sample in PcGive software package by OLS with dummy saturation procedure (no dummies introduced).

Source: own estimates.

Table C3. Parameters of the VAT to GDP ratio model

	Coefficient	Standard Error	<i>t</i> -value	<i>p</i> -value
Constant	-2.453	0.014	-175.00	0.000
Output gap	3.071	1.337	2.30	0.039
D2010+	0.124	0.041	3.04	0.009
D2004-2005	0.090	0.038	2.33	0.036
	Test statistics	<i>p</i> -value		
AR 1-2 test	0.1555	0.858		
ARCH 1-1 test	0.001	0.974		
Normality test	3.518	0.172		
Hetero test	0.883	0.524		
RESET23 test	1.427	0.281		

Note: Dependent variable – the ratio of consolidated budget VAT revenue to potential GDP. Parameters were estimated for the 1995–2011 sample in PcGive software package by OLS with dummy saturation procedure. D2010+ is a shift dummy for 2010–2011 describing increased tax rate. D2004-2005 is a transitory dummy capturing change in VAT payment regime in Belarus-Russia bilateral trade.

Source: own estimates.

Table C4. Parameters of the excises to GDP ratio model

	Coefficient	Standard Error	<i>t</i> -value	<i>p</i> -value
Constant	-3.589	0.026	-137.00	0.000
Output gap	5.650	2.646	2.14	0.047
	Test statistics	<i>p</i> -value		
AR 1-2 test	1.888	0.191		
ARCH 1-1 test	1.027	0.327		
Normality test	1.6332	0.442		
Hetero test	0.512	0.610		
RESET23 test	0.457	0.643		

Note: Dependent variable – the ratio of *central* budget excises revenue to potential GDP. Trend (with -0.0446 slope) and shift dummy for 2006–2011, capturing increase of excises share accumulated in central government budget, were removed from the dependent variable time series. Parameters of final regression were estimated for the 1996–2011 sample in PcGive software package by OLS with dummy saturation procedure (no dummies introduced).

Source: own estimates.

Annex D. Cyclically adjusted tax revenues of consolidated budget

Figure D1. Profit tax to GDP ratio, actual and seasonal adjusted

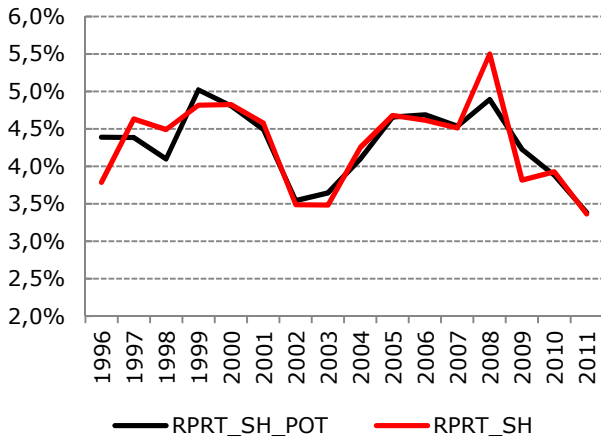


Figure D2. Personal income tax to GDP ratio, actual and seasonal adjusted

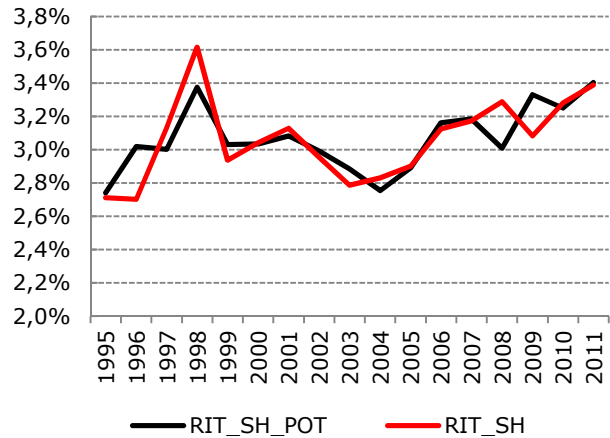


Figure D3. Excises to GDP ratio, actual and seasonal adjusted

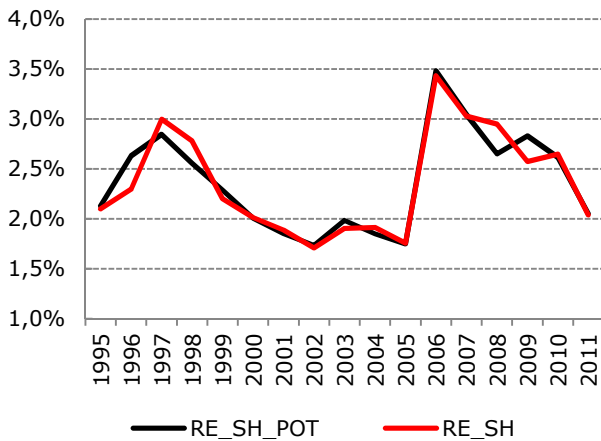


Figure D4. VAT to GDP ratio, actual and seasonal adjusted

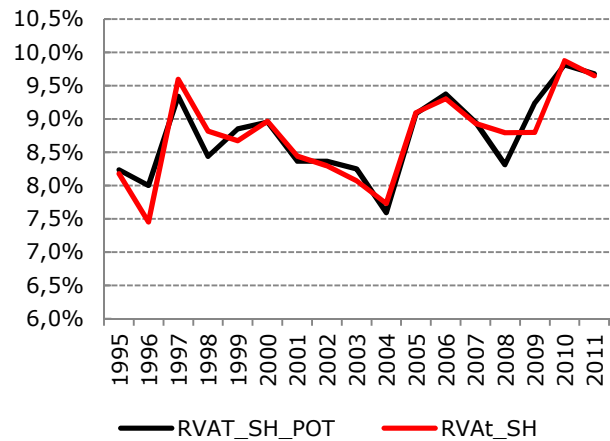
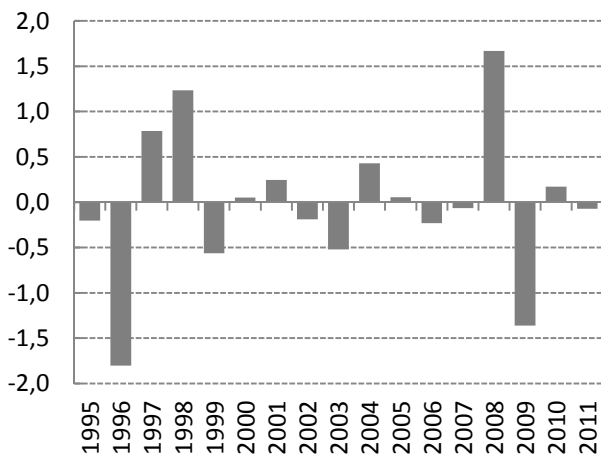


Figure D5. Total cyclical adjustment by 4 tax groups, % of GDP



Note: POT denotes cyclically adjusted revenue. Excise revenues are central government budget revenues. Source: own estimates.