PARAMETERS OF KAZAKHSTAN'S FISCAL POLICY

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Contents

List of Abbreviations and Acronyms

BNS ASPR RK	Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan
GDP	gross domestic product
SSIF	the "State Social Insurance Fund" JSC
PIT	personal income tax
CIT	corporate income tax
IMF	International Monetary Fund
MF RK	Ministry of Finance of the Republic of Kazakhstan
NBK	National Bank of Kazakhstan
RK	Republic of Kazakhstan
ST	social tax
SFB	structural fiscal balance
USA	United States of America
OECD	Organization for Economic Cooperation and Development
AR(1)	the first-order autoregressive model
ARDL	autoregressive distributed lag model
HP-filter	Hodrick-Prescott filter

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Abstract

In recent years, especially in the light of global crises, the fiscal policy analysis using the concept of structural balance has become increasingly popular. Some countries, in order to overcome the problem of pro-cyclicality and fiscal volatility, have begun to consolidate the legal framework for fiscal rules based on structural balance. The essence of this is that the rules-based fiscal policy allows automatic stabilizers to function freely through the cycle and build up budget surpluses in "good" times. However, the estimation of structural balance is associated with a number of methodological problems, including the degree of uncertainty in the estimation.

This paper is devoted to the study of fiscal policy of the Republic of Kazakhstan during 2010 – 2022 by estimating the cyclically adjusted fiscal balance, non-oil fiscal balance and structural fiscal balance in order to analyze the nature of Kazakhstan's fiscal policy, also taking into account the raw-material orientation of our economy. The estimation results point to a trend towards a pro-cyclical fiscal policy. The estimates provided in this paper can be used for further in-depth study of the nature of Kazakhstan's fiscal policy using other methods, as well as by the fiscal authorities in order to consolidate fiscal rules based on the structural fiscal balance.

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1. Introduction

In achieving macroeconomic stability, along with monetary and macroprudential policies, a special role is assigned to fiscal policy. An effective fiscal policy contributes to the optimization of state revenues and their rational spending, smoothing out cyclical fluctuations in output and ensuring stable economic growth, high employment and moderate inflation. However, what is meant by an effective fiscal policy and how should it be assessed? Do the fiscal policy indicators differ depending on the level of country's development or the structure of the economy?

The necessity and relevance of studying fiscal policy issues intensified in the 20th century, when public finance began to play an important role in ensuring a stable economic growth. In the literature, among other things, there are two opposing views that come from the basic Keynesian and Ricardian theories. In the simple Keynesian world of "rigid" prices, output is determined by the aggregate demand, consumption depends on current income, and an increase in government spending has a multiplicative effect on the economic growth. On the contrary, according to the Ricardian theory, fiscal policy does not have a significant impact on aggregate demand, since economic agents are prudent and aware that current stimulus will be followed by tightening and will not increase current consumer spending.

In the modern world, the importance of government spending and taxes in ensuring macroeconomic stability has increased, especially in the light of global shocks of the past two decades. This is evidenced by the unprecedented anti-crisis measures of governments in most countries of the world in order to overcome the consequences of global crises for the economy. However, the costs of unwise and inconsistent fiscal policies in some countries are high inflation, unsustainable public budgets, and the reduced or absent economic growth.

Fiscal policy for oil-exporting countries is especially important, as macroeconomic management in such economies faces specific challenges. Revenues from oil sector, which constitute a significant part of the budget, are characterized by exhaustibility, instability, uncertainty and are largely driven by external demand. These specific features of oil revenues pose challenges in the long term with respect to intergenerational equity and fiscal sustainability, and in the short term with regard to macroeconomic stabilization and fiscal planning.

This paper provides an analysis of Kazakhstan's fiscal policy for the period between 2010 to 2022 using various fiscal indicators proposed by modern literature. Thus, cyclically adjusted, non-oil and structural fiscal balances of Kazakhstan's state budget were estimated and compared with the output gap in order to determine the nature of fiscal policy in certain years.

The work has been organized as follows. The second section presents a literature review describing the evolution of the theory of the fiscal policy's stabilization function and the theoretical aspects of assessing fiscal indicators. The third section describes the methodology and data used to calculate Kazakhstan's fiscal indicators, and the fourth section presents the estimation results. In the conclusion section, findings and recommendations for accounting and application in the analysis of Kazakhstan's fiscal policy of are presented.

2. Literature Review

The stabilization function of fiscal policy was first enshrined at the beginning of the 20th century by J. M. Keynes, who proposed using the fiscal policy to smooth fluctuations in business cycles (Keynes, 1936). The key concept of Keynesian fiscal policy is its countercyclical nature, that is, when the economy is below full employment, fiscal stimuli in the form of direct government spending, transfer payments, or tax cuts can create additional demand and ensure economic growth. The Keynesian theory was widely used during the Great Depression, World War II and after the war in the USA and Europe.

Later, stabilization capabilities of government policy were studied and developed by the followers of Keynes, until the economy faced the consequences of fiscal stimulus such as the rising inflation and the crowding out of private investment by public investment. Then the monetarists came to the fore, who argued that the most important task of the government is to control inflation and minimize fiscal incentives, since they do not affect the real sector in the long term (Friedman (1957), Woodford (1999)).

Supporters of the neoclassical approach and the theory of real business cycles joined the arguments about the fiscal policy inefficiency. They believed that economic agents, being rational, are fully aware of intertemporal budget constraints. Consumers know that today's tax cuts or an increased government expenditure will be financed by higher taxes or spending cuts in the future, and so they will not increase consumption, and therefore the output will not change. This theory is known as the Ricardian equivalence (Ricardo (1951), Barro (1974), Lukas (1976), Buchanan (1976)).

In the years to follow, the "new" Keynesians returned with the "rigidity" of prices and wages in combination with the theory of real business cycles (the new neoclassical synthesis) and focused on market imperfections that could be corrected by government participation. However, unlike the "old" Keynesians, the "new" ones give priority to monetary policy instruments due to shortcomings in fiscal policy, such as a significant time lag, corruption factor, crowding out effect and a negative effect in terms of inflationary consequences and the buildup of public debt. At the same time, neither the "new" Keynesians nor the new neoclassical synthesis categorically reject the possibility of temporary fiscal stimulus to stabilize the economy (Blanchard, Fisher (2014)).

Modern macroeconomists, while mentioning the lower effectiveness of fiscal measures compared to monetary ones, recognize the need to use discretionary fiscal policy measures in recession, especially when monetary policy measures may turn out to be ineffective for various reasons. This is evidenced by the unprecedented anti-crisis fiscal measures taken by a large number of countries during the global crises of the last two decades (Ostapenko (2015), Deb et al. (2021)).

Thus, the stabilization function of the countercyclical fiscal policy, when the government stimulates economic activity during the periods of recession and restrains it during the periods when the economy is "overheating", is relevant to this day. At the same time, there are also non-Keynesian effects of fiscal policy in history, when GDP decreased with an expansionary fiscal policy, or vice versa. Empirical studies by Giavazzi and Pagano

(1996), Sutherland (1997), Giavazzi et al. (1999, 2000), Burger (2006), Bakalova (2012) show that non-Keynesian effects arise under certain conditions, for example, under strong and persistent fiscal impulse, with high levels of debt and its rapid growth.

In the literature, a lot of works are devoted to the study of the cyclical nature of fiscal policy in different regions and countries across the globe. Thus, the conclusion of most studies is that fiscal policy in developing countries, including commodity-exporting countries, is generally pro-cyclical compared to high-income countries (Gavin and Perotti (1997), Kaminsky et al. (2005), Stiglitz et al. (2006), Ilzetzki and Végh (2008), Alesina et al. (2008), Villafuerte and Lopez-Murphy (2010)). At the same time, the pro-cyclical nature of fiscal policy exacerbates rather than softens the business cycle.

In addition, McManus and Ozkan (2015) based on the data on 114 countries for the period of 1950 – 2010 found out that most countries (primarily developing countries and some of developed ones) pursued a pro-cyclical fiscal policy. They also found that countries with pro-cyclical policies had lower economic growth rates, higher output volatility and higher inflation rates. In this regard, the authors note that the creation of fiscal institutions to ensure counter-cyclical fiscal policy should be a priority of macroeconomic policy.

Erbil (2011) examined the cyclical nature of fiscal behavior in 28 emerging oil-producing countries from 1990 to 2009. After testing five fiscal indicators (government spending, consumption, investment, non-oil revenues, and non-oil primary balance), the results showed that all five fiscal variables are pro-cyclical across the sample. However, the results vary across income groups: spending is pro-cyclical in low- and middle-income countries while it is counter-cyclical in high-income countries. Fiscal policy in middle- and high-income countries tends to be affected by external financing constraints. For low-income countries, the quality of institutions and political structure are more significant.

In addition, the pro-cyclical nature of fiscal policy may be stemming from the fact that governments in developing countries do not follow strict fiscal rules and the role of automatic stabilizers in the budget is relatively small, so discretionary fiscal policy can explain most of the changes in their fiscal position (Jansen (2004), Fedelino et al. (2009)).

Discretionary fiscal policy refers to targeted government measures on taxes and public spending in order to influence on the real volume of output and its growth rate, ensure full employment and control inflation. However, discretionary policy is characterized by a certain time lag, which reduces its ability to quickly respond to ongoing changes in the economy and effectively correct them. Automatic fiscal policy involves automatic changes in the volume of government revenues and expenditures and the fiscal balance, depending on the cyclical fluctuations in the aggregate output. During the periods of economic boom, cyclical revenues tend to increase and expenditures tend to decrease, which, ceteris paribus, leads to an improvement in the financial balance. The opposite would be true during an economic downturn. Since cyclical changes in the economy offset each other over time, the amplitude of cyclical fluctuations in output is automatically smoothed out, which makes it possible not to resort to frequent changes in the government's economic policy (Van den Noord (2000)). Automatic changes occur under the influence of automatic stabilizers such as income taxes, subsidies, unemployment benefits, and others.

The introduction of counter-cyclical fiscal policy and counter-cyclical fiscal rules cannot be carried out without effective analytical tools. In this regard, in order to determine

the "actual" fiscal position of the government, it is useful to evaluate its discretionary part, excluding the impact of the economic cycle on public finance, that is, to evaluate the cyclically adjusted fiscal balance. The cyclically adjusted fiscal balance reflects the government's fiscal position if GDP were at potential levels in the absence of cyclical fluctuations. Thus, in order to conduct a countercyclical policy, fiscal authorities must adjust government expenditure not in accordance with changes in actual output, but in accordance with changes in potential output.

At the same time, if for countries with diversified economies it is sufficient to assess the cyclically adjusted fiscal balance for the analysis of fiscal policy, then for oil-producing countries it is also necessary to take into account the impact of the oil price cycle. For example, a temporary increase in oil prices can increase the budget surplus, which, in turn, for various reasons, can stimulate the authorities to increase budget spending. Fiscal expansion during an economic boom, when the volume of production already exceeds its potential level, leads to negative consequences, such as rising inflation, reducing the efficiency of public investment, crowding out private investment, and others. In addition, the increase in government spending due to high oil revenues in effect masks the deterioration of the fiscal position. However, when oil prices return to their trend in the medium term, the response of the authorities will be to cut government spending, which will lead to a contraction in aggregate demand and thus negatively affect economic performance. If the authorities, due to social and political pressure, are unable to reduce spending that was inflated during the "fat years", they will have to further increase the public debt, which will inevitably lead to instability of the state budget.

Thus, since the revenue side of the state budget in oil exporting countries is characterized by high volatility and uncertainty, the analysis of exclusively traditional fiscal indicators, such as overall and primary fiscal balances, or cyclically adjusted indicators (due to the insignificance of automatic stabilizers in such countries) can lead to incomplete and potentially misleading conclusions about the direction and sustainability of fiscal policy and its impact on the economy. In this regard, Medas and Zakharova (2009) suggest that oil-exporting countries, along with traditional fiscal indicators, analyze non-oil fiscal indicators. In addition, Villafuerte and Lopez-Murphy (2010) propose to use the cyclically adjusted non-oil fiscal balance as an indicator that takes into account both cyclical fluctuations in output and excludes the impact of oil revenues on the fiscal balance.

In modern economic studies, a structural fiscal balance is proposed as an alternative indicator for establishing counter-cyclical fiscal rules. The Structural Fiscal Balance (the "SFB") is a modified version of the cyclically adjusted balance sheet, which, along with cyclical fluctuations in output, takes into account the effects of factors beyond the business cycle, such as commodity and asset prices (real estate, stocks), changes in the structure of output, and also eliminates temporary, one-off fiscal transactions. A detailed description of this approach and assessment methodology is provided in Bornhorst et al. (2011). Later, this approach to assessing the structural fiscal balance was used by Ardanaz et al. (2015) to analyze the fiscal policy of 20 countries in Latin America and the Caribbean, including those rich in oil, Galal Eid (2015) for the fiscal analysis of Saudi Arabia, and many others.

Moreover, this approach for calculating the SFB with some adjustments is used by the authorities of Chile, which is the largest exporter of copper and other minerals. Frankel (2011) in his work studied in detail the experience of Chile as a pioneer in the

implementation of counter-cyclical fiscal policy based on the rules of structural fiscal balance. The key innovation that has allowed Chile to pursue a counter-cyclical fiscal policy is not just a structural fiscal rule per se but a regime that places independent expert panels in charge of assessing long-term trends in copper prices and GDP. As early as 2006, SFB-based counter-cyclical fiscal rules began to show positive results. Thus, over the period from 2000 to 2005, Chile's public debt decreased from 13.2% to 5% of GDP due to an increase in public savings from 2.5% to 7.9% of GDP. As a result, sovereign bond spreads gradually narrowed and Chile was assigned an "A" sovereign credit rating in late 2006, which was upgraded to "A+" in mid-2010. According to some estimates, SFB-based fiscal policy reduced Chile's GDP volatility by 1/3 in 2001-2005.

In the literature, a small number of works are devoted to the analysis of Kazakhstan's fiscal policy. Among them, as part of a comparative analysis of fiscal policies in different countries, Kazakhstan is mentioned in the works of Gurvich et al. (2009), Medas and Zakharova (2009), Ahmadov et al. (2017), Erbil (2011). Among domestic authors, the works of Alpysbaeva et al. (2021), Zhuzbaev (2019), Tuleuov et al. (2021) should be mentioned. At the same time, the assessment of the SFB is given only in the works of Alpysbayeva et al. (2021), Ahmadov et al. (2017), who came to the conclusion that Kazakhstan's fiscal policy is pro-cyclical.

In this paper, we have estimated the SFB of Kazakhstan's state budget by following the methodology outlined in Bornhorst et al. (2011), Ardanaz et al. (2015) and Ahmadov et al. (2017). In addition, it was supplemented with estimates of the cyclically adjusted non-oil balance. Moreover, the expenditure side included quasi-fiscal operations, which are described in more detail in the next section. In this regard, the value of this work lies in replenishing the domestic literature with alternative estimates of Kazakhstan's fiscal position as well as in encouraging discussions and further in-depth study of this issue in relation to our country, including as part of the development and consolidation of optimal budget rules.

3. Methodology and Data

To date, several approaches to the calculation of SFB have been presented in the literature, which are broadly divided into two main methods: 1) "top down", which implies a direct adjustment of the actual budget balance, and 2) "bottom up", which looks at the sum of the budgetary impact of individual "discretionary" budgetary measures taken each year in terms of both revenues and expenditures in accordance with a legislative or administrative decision. In addition, international institutions such as the IMF, OECD and the European Commission have developed different methods, which are basically the same, but differ in the techniques for assessing the cyclical part, which can lead to different results.

The SFB computation consists of three main steps:
1)   in all methods, as a first step, it is necessary to estimate the output gap, that is, the deviation of the actual GDP from the potential level as a percentage of potential GDP:

$$OG = \frac{Y - Y^p}{Y^p}$$

where: OG – is the output gap, Y – actual GDP, Y^p – potential GDP. There are many

methods to estimate the output gap in the literature;

2) further, the sensitivity of the revenue and expenditure of the budget to fluctuations in the business cycle needs to be assessed, i.e. it is necessary to estimate the cyclical component, exactly where the differences in the methods are present;

3) the third step is to compute the cyclically adjusted fiscal balance by excluding the cyclical component from the actual fiscal balance .

Also, the scaling of the fiscal balance may differ between the methods: as a percentage of potential or nominal GDP. At the same time, according to most researchers, it is conceptually correct to use potential GDP as a scaling indicator.

Moreover, since budget expenditures related to debt servicing do not depend on the discretionary decisions of the government in a particular year and are more designed for the long term, it is useful to analyze the fiscal position by excluding them from the calculation of the fiscal balance and obtaining the primary SFB.

The brief descriptions of each method are provided below.

IMF's Aggregated Approach

The IMF's aggregated method for calculating SFB was first described by Hagemann (1999) and further expanded by Fedelino et al. (2009). This method is based on the "top down" approach and provides for the calculation of SFB by estimating the elasticity of aggregate budget revenues and expenditures to the aggregate output gap and adjusting actual revenues and expenditures using the resulting elasticities.

After a potential GDP is determined, the cyclically adjusted budget revenues and expenditures are computed as follows:

$$R^{CA} = R \left(\frac{Y^p}{Y}\right)^{\varepsilon_R}$$
$$G^{CA} = G \left(\frac{Y^p}{Y}\right)^{\varepsilon_G}$$

where: R^{CA} – cyclically adjusted revenues, G^{CA} – cyclically adjusted expenditures, R – total revenues, G – total expenditures, Y^p – potential GDP, Y – actual GDP, ε_R and ε_G – elasticities of budget revenues and expenditures with respect to the output gap.

Aggregate elasticities of revenues and expenditures can be assumed or obtained from the literature. Usually the values are 1 for revenues and 0 for expenditures. However, where possible, country-specific elasticities for total budget revenues and expenditures should be used, derived from existing studies or estimated from regressions.

Thus, the cyclically adjusted primary balance is calculated under the formula:

$$CAPB = R^{CA} - G^{CA}$$

where: $CAPB$ is a primary SFB, R^{CA} – cyclically adjusted revenues, G^{CA} – cyclically adjusted expenditures.

Semi-Aggregated Approach of the European Commission

The European Commission (Mourre et al. (2013)) presented an updated version of the semi-aggregated method that uses semi-elasticity parameters, updated weight parameters and data underlying the SFB calculation for European countries. This method

also applies to the "top down" approach.

The updated version differs from the previous one in that SFB figures are expressed as a percentage of potential GDP, not actual. The second improvement is the update of weight parameters such as 1) the share of specific taxes/expenditures in total taxes/ expenditures (i.e. the structure of taxes and expenditures) and 2) the size of total taxes and total expenditures as a percentage of GDP. The paper recommends using the average value over the past ten years as a benchmark period for determining the weight parameters.

The method used by the European Commission consists of two steps: calculate the cyclical component of the budget and then subtract it from the actual budget balance. In turn, the cyclical component is equal to the product of the output gap and the semi-elasticity of the fiscal balance to the output gap:

$$CAB = \frac{B}{Y} - \varepsilon * OG$$

where: CAB – the cyclically adjusted balance, B – actual fiscal balance, Y – actual GDP, ε – overall semi-elasticity, OG – output gap as % of potential GDP.

Semi-elasticity is calculated as follows:

$$Semi\ elasticity = \varepsilon = \left(\eta_R - 1\right)\frac{R}{Y} - \left(\eta_G - 1\right)\frac{G}{Y}$$

where: ε is overall semi-elasticity, η_R – weighted average elasticity of certain revenue categories (by five types of taxes) of the budget with respect to GDP, η_G – weighted average elasticity of budget expenditures (unemployment benefits) with respect to GDP, R – total budget revenues, G – total budget expenditures, Y – actual GDP. The weights of individual categories of revenues/expenditures are their shares in total budget revenues/expenditures for the benchmark period.

The difference between this method and the IMF's aggregated method is related to the choice of the basis for calculating elasticity. In the IMF's aggregated method, the elasticity of total revenues and expenditures is calculated directly to the output gap, while the European Commission method first calculates the elasticity of the individual components of revenues/expenditures given their respective macroeconomic base, and then the elasticity of the macroeconomic base to the output gap. The product of these two elasticities gives the elasticity of a particular category of revenues/expenditures with respect to output gap.

Disaggregated Approach

The disaggregated approach, sometimes referred to as the "OECD methodology", is based on a cyclical adjustment of certain categories of revenues and expenditures. This methodology, developed for the OECD member countries, is detailed in Girouard and André (2005) and further updated and expanded by Robert et al. (2015).

According to this method, the adjustment of the fiscal balance for cyclical fluctuations is made in a disaggregated form with respect to the main categories of revenues and government expenditures associated with unemployment, under the formula:

$$B^* = \left[\sum_{i=1}^{n} T_i\, (Y^p/Y)^{\varepsilon_{ti.y}} - G(Y^p/Y)^{\varepsilon_{g.y}} + X \right] / Y^p$$

where: B^* is a primary SFB, T_i – revenues from tax i, G – current primary government expenditures (i.e. government expenditures excluding interest expense related to debt servicing), X – non-tax revenues, $\varepsilon_{ti,y}$ – elasticity of tax i with respect to the output gap, $\varepsilon_{g,y}$ – elasticity of current primary government expenditures with respect to the output gap, Y – actual GDP, Y^p – potential GDP.

Cyclical adjustment of a certain type of taxes and current primary budget expenditures is made using estimated elasticities. The elasticity coefficient is estimated in two steps: 1) determining the elasticity of a particular category of tax revenues to the corresponding tax base and 2) estimating the elasticity of the corresponding tax base with respect to the output gap:

$$\varepsilon_{ti,y} = \varepsilon_{ti,tbi} {}^* \varepsilon_{tbi,y}$$

$$\varepsilon_{g,y} = \varepsilon_{g,u} {}^* \varepsilon_{u,y}$$

where: $\varepsilon_{ti,y}$ is the elasticity coefficient on tax i to the output gap, $\varepsilon_{ti,tbi}$ – elasticity coefficient of revenues on tax i with respect to the corresponding tax base, $\varepsilon_{tbi,y}$ – elasticity coefficient of the corresponding tax base to the output gap; $\varepsilon_{g,y}$ – elasticity coefficient of the current primary government expenditures with respect to the output gap, $\varepsilon_{g,u}$ – elasticity coefficient of expenditures related to unemployment with respect to unemployment, $\varepsilon_{u,y}$ – elasticity coefficient of unemployment to the output gap.

The disaggregated approach defines 4 categories of taxes that are sensitive to the business cycle: personal income tax (PIT), corporate income tax (CIT), social tax and social contributions (ST), indirect taxes. The relevant tax bases are: for PIT and ST, the overall payroll fund of employees; for CIT – income before tax and gross mixed income; for indirect taxes – gross consumption.

The elasticity of tax revenues to the tax base is determined on the basis of information from the tax code: for a proportional system it is equal to 1, for a progressive system it is more than 1, for a regressive system it is less than 1. The elasticity of the tax base to the output gap is estimated empirically.

The disaggregated method, while requiring more data and calculations, generally has advantages over the aggregated approach in terms of stability and a better understanding of the cyclical response of various tax and expenditure items.

Modified Structural Fiscal Balance

As mentioned above, modern studies use a modified SFB, which, along with cyclical adjustments, takes into account the effects of factors beyond the business cycle, such as commodity and asset prices (real estate, stocks), changes in the output structure, and also excludes temporary, one-off fiscal operations. The estimation methodology of modified SFB is described in Bornhorst et al. (2011) and is schematically presented in Figure 1.

Adjustment of fiscal balance for factors beyond the business cycle is required when their impact on the fiscal balance is significant. For example, for oil-exporting countries,
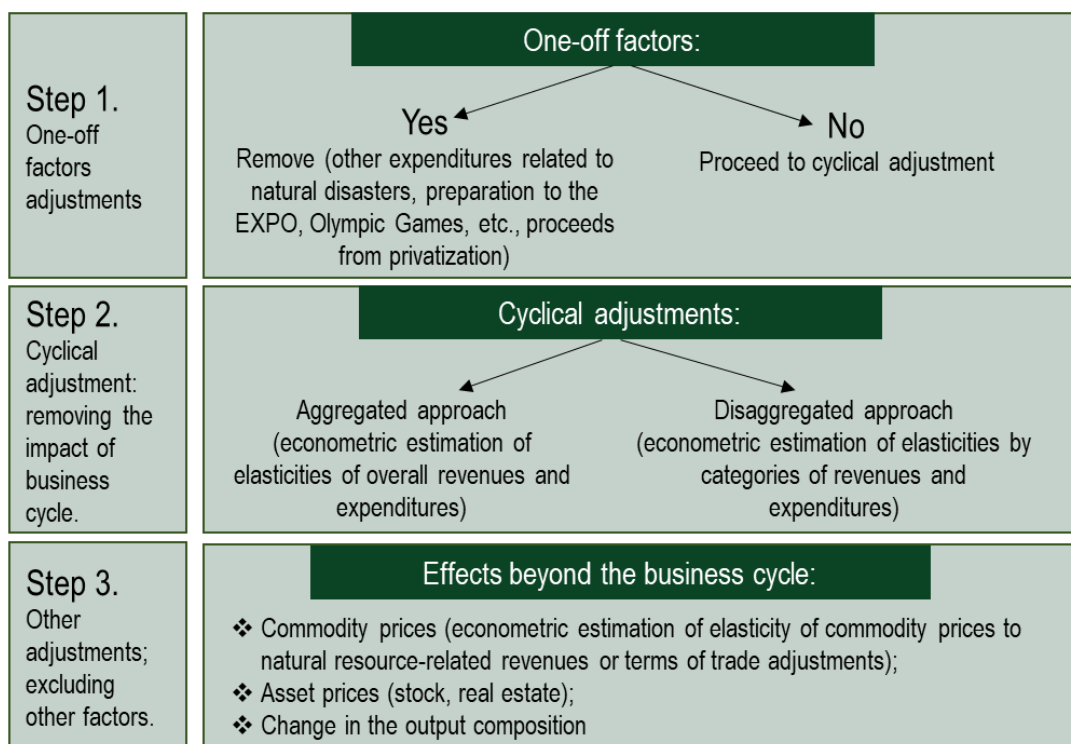
the impact of changes in world oil prices on the country's fiscal position is significant.

For more details regarding the elimination of the impact of fluctuations in oil prices on the fiscal balance, see Ardanaz et al. (2015), who use the following equation to calculate and the SFB:

$$B_t^S = \sum T_i \left(\frac{Y^p}{Y}\right)^{\varepsilon_{t_i,y}} + R^{NRR} \left(\frac{P^{LR}}{P}\right)^{\alpha} - G\left(\frac{Y^p}{Y}\right)^{\varepsilon_{g,y}}$$

where: T_i – revenues from tax i, Y – actual GDP, Y^p – potential GDP, $\varepsilon_{t_i,y}$ – elasticity of revenues from tax i with respect to the output gap, R^{NRR} – non-renewable resource revenues, P – weighted average of principal commodity price, P^{LR} – long-term weighted average of the main commodity price, α – elasticity of non-renewable resource revenues with respect to their price, G – total government expenditures, $\varepsilon_{g,y}$ – elasticity coefficient of current primary government expenditures with respect to the output gap.

Figure 1. Main Steps of Structural Fiscal Balance Computation

Step 1. One-off factors adjustments	**One-off factors:** **Yes** ← → **No** Remove (other expenditures related to natural disasters, preparation to the EXPO, Olympic Games, etc., proceeds from privatization) / Proceed to cyclical adjustment
Step 2. Cyclical adjustment: removing the impact of business cycle.	**Cyclical adjustments:** Aggregated approach (econometric estimation of elasticities of overall revenues and expenditures) / Disaggregated approach (econometric estimation of elasticities by categories of revenues and expenditures)
Step 3. Other adjustments; excluding other factors.	**Effects beyond the business cycle:** ❖ Commodity prices (econometric estimation of elasticity of commodity prices to natural resource-related revenues or terms of trade adjustments); ❖ Asset prices (stock, real estate); ❖ Change in the output composition

Source: Bornhorst et al. (2011)

The long-term weighted average price or structural price (P^{LR}) is unobservable. The methodology for calculating the structural price in different countries is fixed in different ways. For example, in Chile, the structural price for copper and molybdenum is determined by a panel of independent experts. Also, there are 4 alternative scenarios for estimating the structural price in the literature:
- moving average 15 years of historical data;
- forward-looking 5 years;
- moving average of historical data for 12 years and projected 4 years;
- the average of all above scenarios.

The adjustment is defined as the ratio of the structural price to the actual price of
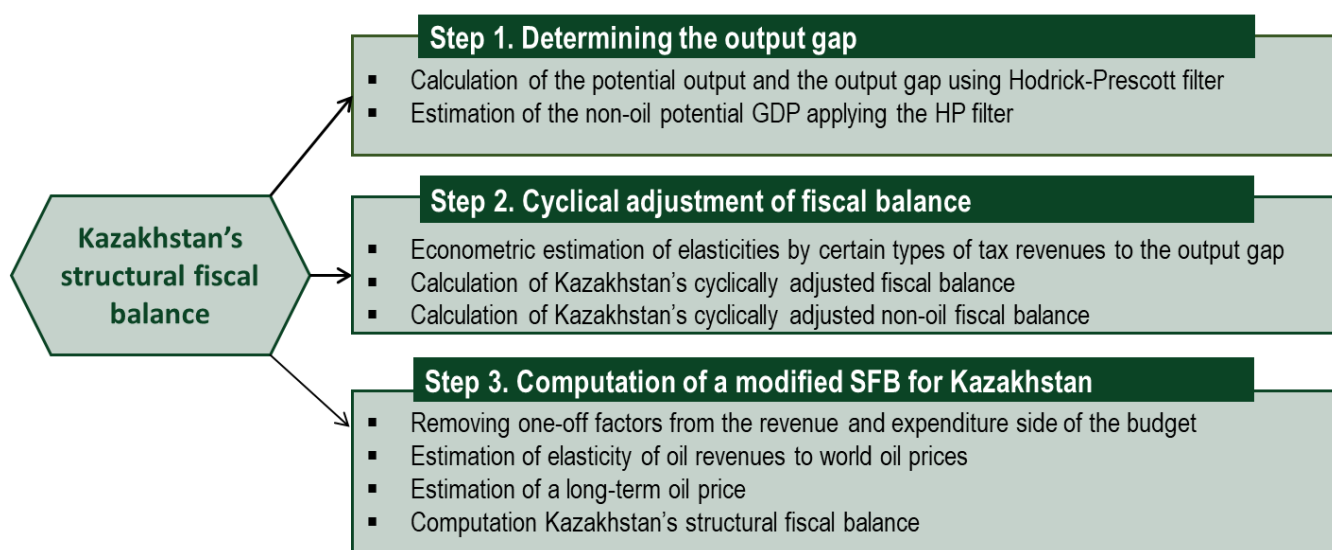
commodities raised to the power of the coefficient of elasticity. The elasticity of revenues from non-renewable resources with respect to their price is estimated empirically.

As noted above, Villafuerte and Lopez-Murphy (2010) propose to exclude commodity revenues from cyclically adjusted budget revenues.

Thus, the main existing methodologies for calculating SFB are described. A common drawback of these methodologies is the need to use "unobserved" (estimated) variables, such as potential GDP and the output gap to estimate elasticities, structural price and elasticity of commodity revenues, and others that are associated with an estimation error. In addition, it is often difficult to take into account structural shifts in the economy, the impact of shocks, quasi-fiscal operations. In this regard, it may be useful in future works to model different SFB results under different assumptions about "unobserved" variables, using different methods for estimating them, thereby creating a reasonable range of values for each parameter and assessing the degree of estimation uncertainty around SFB, as it was done in the work of Ardanaz et al. (2015).

The methodology for calculating the modified SFB formed the basis for calculating the SFB for Kazakhstan. Figure 2 provides a step-by-step description of our estimation of the structural fiscal balance.

Figure 2. Computation of Kazakhstan's Structural Fiscal Balance

Step 1. Determining the output gap
- Calculation of the potential output and the output gap using Hodrick-Prescott filter
- Estimation of the non-oil potential GDP applying the HP filter

Step 2. Cyclical adjustment of fiscal balance
- Econometric estimation of elasticities by certain types of tax revenues to the output gap
- Calculation of Kazakhstan's cyclically adjusted fiscal balance
- Calculation of Kazakhstan's cyclically adjusted non-oil fiscal balance

Step 3. Computation of a modified SFB for Kazakhstan
- Removing one-off factors from the revenue and expenditure side of the budget
- Estimation of elasticity of oil revenues to world oil prices
- Estimation of a long-term oil price
- Computation Kazakhstan's structural fiscal balance

Step 1. Determining the Output Gap. The potential GDP and output gap for Kazakhstan was estimated using the univariate Hodrick-Prescott filter (HP filter) (Hodrick and Prescott, 1997), which is one of the widely used methods for decomposing a time series into a trend and a cyclical component. The main advantage of this tool is its ease of use for subtracting the impact of shocks from the GDP dynamics and the most understandable interpretation from a visual point of view (Platonov (2012)). However, many experts question the results obtained using the HP filter, since it has no economic justification, and also the end points of the series are very sensitive to the addition of new data.

In order to overcome these problems of applying the HP filter, empirical calculations of the potential GDP and the output gap were made on a quarterly GDP data expressed in

constant prices of 2005 for the period of 2005-2022. Plus, as suggested by Bornhorst et al., the following step-by-step data transformation was performed:

(i)   a series with the quarterly data was seasonally adjusted using the Census X-12 tool in the EViews 12 package;

(ii)   7 forecast points were added to the main series. For forecasting, a first-order autoregressive model AR(1) was used, in which all identified coefficients were statistically significant, and the model itself met the adequacy criteria.

(iii)   The series was estimated using the univariate HP filter with a smoothing parameter of 1600.

The obtained results on the output gap were compared with the results of the estimates of the IMF experts, who used alternative methods to estimate the output gap of Kazakhstan, such as the production function, the Harvey-Jaeger decomposition and the HP filter (IMF Country Report, No. 22/368, (2022)). The models largely interpret trend and cycle similarly, although one interesting difference in the mixed frequency version is higher fluctuations in the GDP trend.

The HP filter was also used to estimate the non-oil potential GDP. Data on the share of the non-oil sector in Kazakhstan's GDP is available on the BNS ASPR RK website for the period from 2010 to 2021.

To scale fiscal figures as a percentage of potential GDP and non-oil potential GDP, GDP figures were presented in annual terms by adding the results for the 4 quarters of a particular year.

Step 2. Cyclical Adjustment of Fiscal Balance. For cyclical adjustment of the revenue part of Kazakhstan's state budget, a disaggregated method was used according to the OECD methodology and the elasticities to the output gap for PIT, CIT, ST and indirect taxes were estimated.

Since Kazakhstan mainly uses a proportional taxation system, the elasticity coefficients for the above types of taxes to the corresponding tax bases is taken as 1.

Estimation of the elasticity of the tax base to the output gap was done using an autoregressive distributed lag (ARDL) model, which was also applied by Ahmadov et al. (2018). The advantage of the ARDL model is the ease of implementation and the ability to choose the most appropriate lag length for the variables included in the model, as well as to use a combination of I(0) and I(1) data. The equation that formed the basis of this model is as follows:

$$\Delta^1 \left(\frac{T_{Base_t}}{Y_t^p} \right) = \varepsilon_0 + \varepsilon_1 \Delta^1 \left(\frac{Y_t}{Y_t^p} \right) + \theta_t$$

where: T_{Base_t} − is a tax base at time t, Y_t^p − potential GDP, Y_t − real GDP, Δ^1 − first-order differential, ε_1 −elasticity coefficient of the tax base to the output gap, θ_t − other unaccounted errors and omissions in the model.

Thus, the elasticity of tax revenues to the output gap is equal to the coefficient of elasticity of the tax base to the output gap.

According to most of the works cited, in the expenditure side of the state budget, only expenditures related to unemployment are cyclically sensitive. Since in Kazakhstan unemployment benefits are paid from the "State Social Insurance Fund" JSC (the "SSIF"),

which is accounted for in the consolidated budget, but not in the state budget, the elasticity of public expenditures is taken as "0", meaning that public expenditures are insensitive to fluctuations in the business cycle. It should be noted that the share of unemployment benefits in the total amount of social benefits from the SSIF is also insignificant and amounted to 1-2% in 2010-2019, increased to 6.1% in 2020 due to the pandemic, and decreased to about 4.5% in 2021-2022. Thus, the impact of automatic stabilizers on the fiscal balance of Kazakhstan in terms of expenditures is also insignificant and the amount of government expenditures is determined mostly by a discretionary decision of the Government.

The cyclically adjusted fiscal balance was computed under the formula:

$$B_t^C = [\sum\nolimits_{i=1}^{n} T_i \left(\frac{Y^p}{Y}\right)^{\varepsilon_{t_i,OG}} - G + X]/Y^p$$

where: T_i – revenues from tax i, G – government expenditures, X – non-tax and other revenues, Y – actual GDP, Y^p – potential GDP, $\varepsilon_{t_i,OG}$ – elasticity of revenues from tax i with respect to the output gap.

Additionally, by excluding transfers from the National Fund of the RK and export customs duties on crude oil from the state budget revenues, we obtained a cyclically adjusted non-oil fiscal balance.

Step 3. Computation of a Modified SFB for Kazakhstan.

The adjustment for the impact of oil prices fluctuations was carried out according to the formula specified in Ardanaz et al. (2015). The elasticity of oil revenues to world oil prices was estimated empirically using the ordinary least squares method based on quarterly data according to the equation:

$$lnR_t^{OR} = \alpha_0 + \alpha_1 lnP_{t-3} + \theta_{i.t}$$

where: R_t^{OR} – tax revenues from the oil sector to the National Fund of the RK and export customs duties on crude oil, P_{t-3} – Brent oil price three quarters before time t, α_1– elasticity of oil revenues to Brent oil price.

The SFB for Kazakhstan, taken to account the adjustment for the impact of oil price fluctuations , is computed under the formula:

$$B_t^S = \left[\sum T_i \left(\frac{Y^p}{Y}\right)^{\varepsilon_{t_i,y}} + R^{OR} \left(\frac{P^{LR}}{P}\right)^\alpha + X - G\right]/Y^p$$

where: T_i – revenues from tax i, X – non-tax and other revenues, G – government expenditures, Y – actual GDP, Y^p – potential GDP, $\varepsilon_{t_i,y}$ – elasticity of revenues from tax i with respect to the output gap, R^{OR} – revenues from oil resources, P – price for the barrel of Brent oil, P^{LR} – long-term price of Brent oil, α – elasticity of oil revenues to Brent oil price.

The long-term oil price was calculated as the average of the following alternative scenarios: 1) moving average for 10 historical years; 2) moving average of forward-looking five years; 3) moving average of 10 historical years and 5 forecast years.

In order to achieve macroeconomic stabilization, in coordination with the monetary policy, the growth rate of aggregate demand and the impact of government expenditures on it should be taken into account. In this context, it is necessary to analyze the direction of fiscal policy, namely, whether it is contractionary or stimulating compared to the previous

year. A generally accepted indicator showing the direction of fiscal policy is the fiscal impulse, which is the difference between the fiscal balances of two adjacent years:

$$FIM_t = \frac{B_t^S - B_{t-1}^S}{Y_t^p}$$

where: FIM_t – is a fiscal impulse at time t, B_t^S – SFB at time t, B_{t-1}^S – SFB at time t-1, Y_t^p – potential GDP at time t.

Comparing the dynamics of fiscal impulse with the output gap dynamics allows determining the fiscal policy character.

Data

The study used quarterly data from the BNS ASPR RK website on nominal and real GDP, annual data on the share of the non-oil sector, annual MF RK data on the state budget, annual data from the BNS ASPR RK website on the total payroll fund, gross profit and gross mixed income, on total household consumption, quarterly data on world prices for Brent oil taken from the website of the World Bank. Government expenditure figures are presented without debt service costs.

In addition, one-off factors were excluded from the revenue and expenditure sides of the budget and quasi-fiscal expenditures were taken into account, such as the issuance of money by the National Bank of Kazakhstan to participate in government programs and programs to improve the financial sector stability. Such spending also increases aggregate demand and creates inflationary pressure. Over the period under review, the volume of quasi-fiscal expenditures exceeded 5 trillion tenge.

Quarterly data, except for oil price data, were seasonally adjusted. All data used for econometric models were reduced to a real expression and to a stationary form.

4. Discussion of Results

Output Gap

The output gaps in Kazakhstan's overall and non-oil sectors reflect almost opposite business cycles (Figure 3). A possible explanation is the presence of signs of Dutch disease. Thus, the inflow of oil dollars during years of high oil prices led to an appreciation of the real exchange rate, which, in turn, had a negative impact on other tradable sectors, reducing their competitiveness. As a result, the non-oil output gap appeared in the negative zone, while the total GDP gap was zero or in the positive zone. In the years of low oil prices, the non-oil sector got the opportunity to develop by increasing competitiveness.

Figure 3 also demonstrates the deeper deviations of non-oil GDP from its potential level compared to the deviations of total GDP from its potential level. It follows from this that global shocks have a stronger impact on the non-oil sector of the economy, indicating its vulnerability.

Figure 3. Overall and Non-Oil Output Gaps in the RK
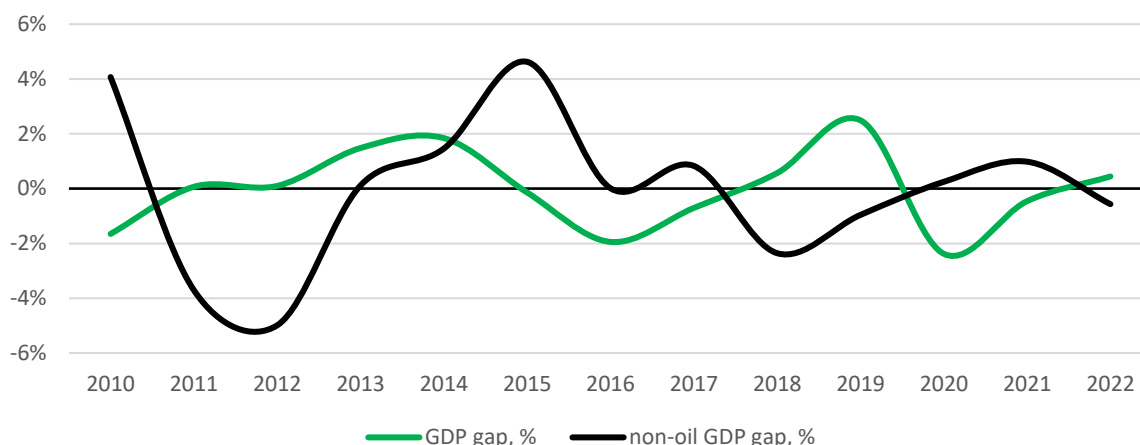
Source: BNS ASPR RK, the authors' computations

Elasticities Estimation

Table 1 shows elasticities to the output gap estimated according to the disaggregated method.

Table 1. Elasticities by Types of Revenues and Oil Revenues

Tax Type	Kazakhstan					Average Tax Elasticity in 20 Countries of Latin America
	Average Share of Tax in Revenues	Tax Elasticity to the Tax Base	Elasticity of the Tax Base to the Output Gap	Tax Elasticity to the Output Gap	Elasticity of Oil Revenues to Oil Price	
CIT	0.17	1.00	1.11	1.11**		1.80
PIT	0.07	1.00	0.60	0.60***		2.00
ST	0.06	1.00	0.60	0.60***		1.70
Indirect taxes	0.19	1.00	1.55	1.55**		1.80
Oil revenues					1.50***	

*Note. *** p-value < 0,01 ** p-value < 0,05, * p-value < 0,1*
Source: BNS ASPR RK, MF RK, NBK, the authors' computations, Ardanaz et al. (2015)

The overall elasticity for non-oil revenues of the state budget calculated by weighting the elasticities for the above taxes and non-tax revenues was 0.69. This indicator is higher than that calculated by Ahmadov et al. (2017) and equal to 0.26. As already noted by Ahmadov et al. (2017), the lower the elasticity index, the lower the sensitivity of budget revenues to cyclical fluctuations, which indicates, among other factors, a low level of tax administration as well as poor tax collection, including due to a significant share of the non-observed economy. Nevertheless, our estimates of the elasticity indicator for the total state budget revenues may indicate an improvement in the situation for the above factors over the past 5 years (not covered in the study by Ahmadov et al. (2017)) The empirical evidence of this tendency may be the subject of a separate study. However, the still low value of elasticities by categories of the state budget revenues of Kazakhstan, compared to similar elasticities estimated, for example, for the countries of Latin America and the Caribbean (Ardanaz et al. (2015)), most of which are exporters of minerals and/or oil and gas, points to a low role of automatic stabilizers in Kazakhstan.

Analysis of Character of Kazakhstan's Fiscal Policy

The cyclically adjusted primary fiscal balance of the state budget of the Republic of Kazakhstan for the period from 2010 to 2022 was in negative zone, averaging about 0.5-1% of potential GDP (Fig. 4). At the same time, the cyclically adjusted non-oil primary fiscal balance was characterized by a deeper and more volatile deficit indicator (from 8% to 14% of potential non-oil GDP). This fact indicates that oil revenues smooth out the volatility of the general state budget deficit, performing a stabilization function, but at the same time masking the problem of worsening fiscal discipline in some years.

Figure 4. Cyclically Adjusted (CA) Overall and Non-Oil Fiscal Balances of Kazakhstan's State Budget

CA Fiscal impulse, %
CA Fiscal Impulse, %
CA primary fiscal balance, % of potential GDP
CA non-oil primary fiscal balance, % of potential non-oil GDP
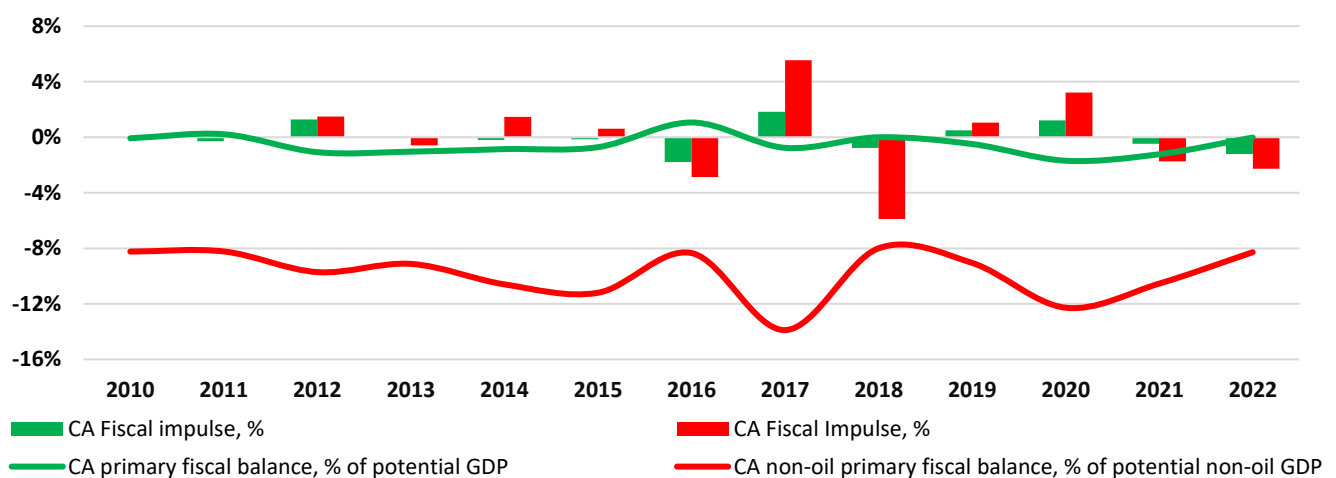
Source: MF RK, BNS ASPR RK, NBK, the authors' computations

We then compared the output gap and fiscal impulse calculated on the basis of the cyclically adjusted fiscal balance (Figure 5). As a result, 6 out of 12 observations are in the zone of counter-cyclical policy, where fiscal restriction was observed in 2013, 2014, 2018, 2022, and fiscal expansion – in 2017 and 2020. Pro-cyclical fiscal policy was pursued in 2016, 2021 (restriction during recession) and 2019 (expansion during overheating). In 2011, 2012 and 2015, the fiscal policy was neutral.

Figure 5. Character of Kazakhstan's Fiscal Policy
(based on the CA fiscal balance)
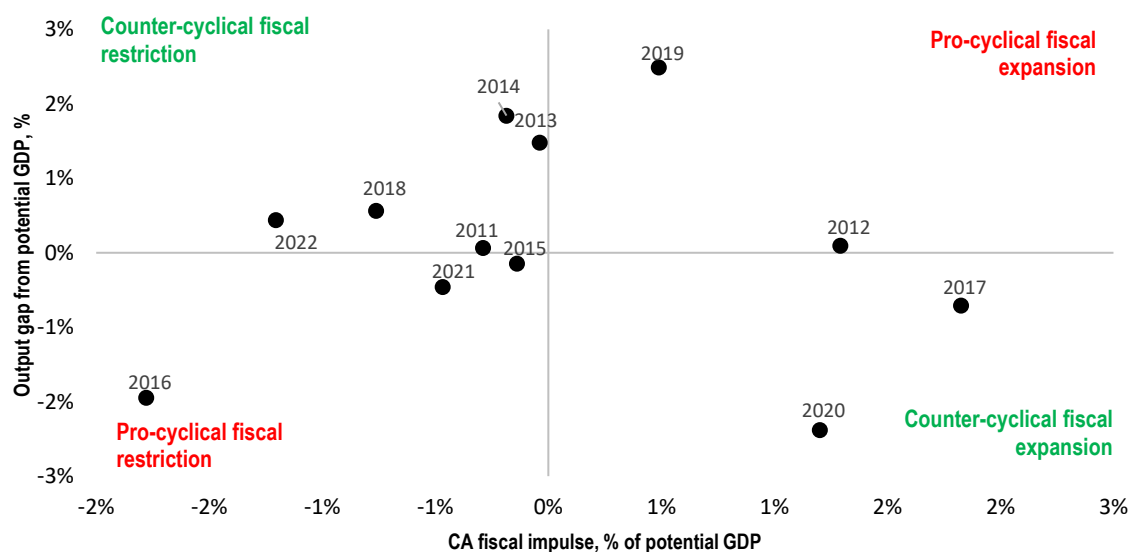
Source: BNS ASPR RK, MF RK, NBK, the authors' computations

At the same time, conclusions about the character of Kazakhstan's fiscal policy are somewhat different when considering non-oil indicators (Fig. 6). Thus, in 6 out of 12 cases, the fiscal policy was pro-cyclical: 2014, 2015, 2017, 2020 – fiscal expansion, 2018 and 2022 – fiscal restriction due to the high base of previous years in public spending, as well as due to the reduction of the NBK's quasi-fiscal spending in the form of money issuance in 2022. Only three years ended up in the counter-cyclical zone: 2012, 2019 with expansion, and 2021 with restriction. Neutral fiscal policy is observed in 2013 and 2016. In 2011, the fiscal impulse was estimated to be zero. Thus, non-oil indicators show a tendency towards the pro-cyclicality of Kazakhstan's fiscal policy.

Figure 6. Character of Kazakhstan's Fiscal Policy
**(based on the non-oil fiscal balance)**

Source: ASPR BNS RK, MF RK, NBK, the authors' computations

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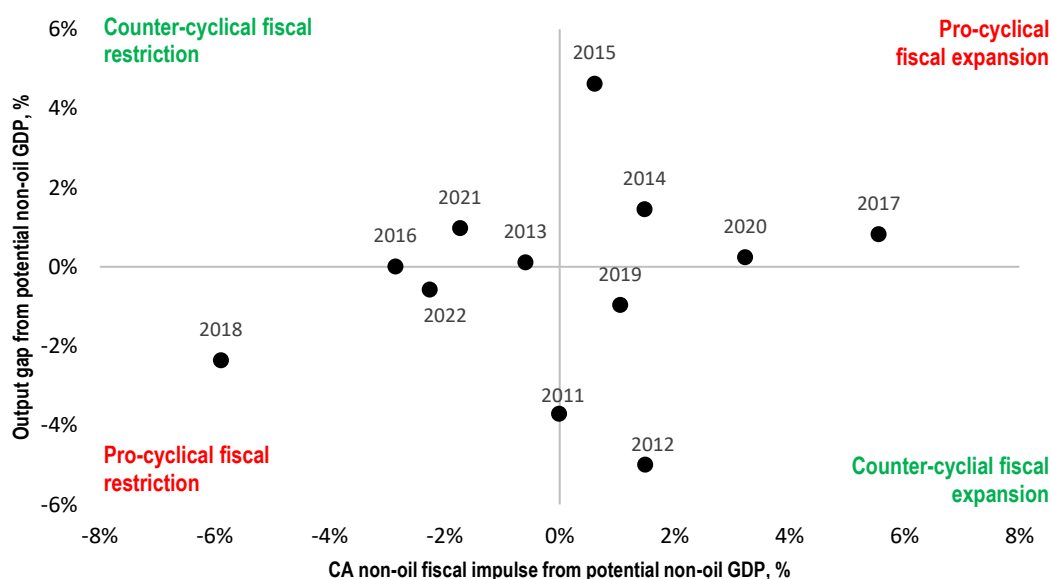
The nature of fiscal policy, assessed on the basis of the SFB, as shown in Figure 7, also tends to be pro-cyclical. Thus, in 7 of the 12 years under review, a pro-cyclical policy was pursued: expansion in 2011, 2012, 2018, 2022; restriction in 2015, 2016 and 2020. In 2013 and 2019, there was a counter-cyclical fiscal restriction, and in 2017 and 2021, there was a counter-cyclical fiscal expansion. Fiscal impulse is close to zero in 2014. Since, by definition, the SFB is the fiscal balance of the budget in the absence of cyclical fluctuations in GDP and oil prices at the level of a long-term trend, which, according to our estimates, is $ 72-80, the results on the SFB can be interpreted as follows.

The years of 2015, 2016 and 2020 were in the fiscal restriction zone, which is explained by record low oil prices ($42-55) in these years. That is, if oil prices in these years were at the level of a long-term trend ($72-80), then, taking into account the actual withdrawals from the National Fund of the RK and actual government expenditure, the state budget balance would have been in surplus, which was exactly shown by the SFB. This means that it was during these years that significant transfers from the National Fund of the RK were justified. However, despite low oil prices ($54), as well as significant withdrawals from the National Fund of the Republic of Kazakhstan in 2017, the fiscal position turned out to be in the expansion zone, thus indicating a significant increase in government spending, more than required.

Figure 7. Character of Kazakkhstan's Fiscal Policy (based on the SFB)
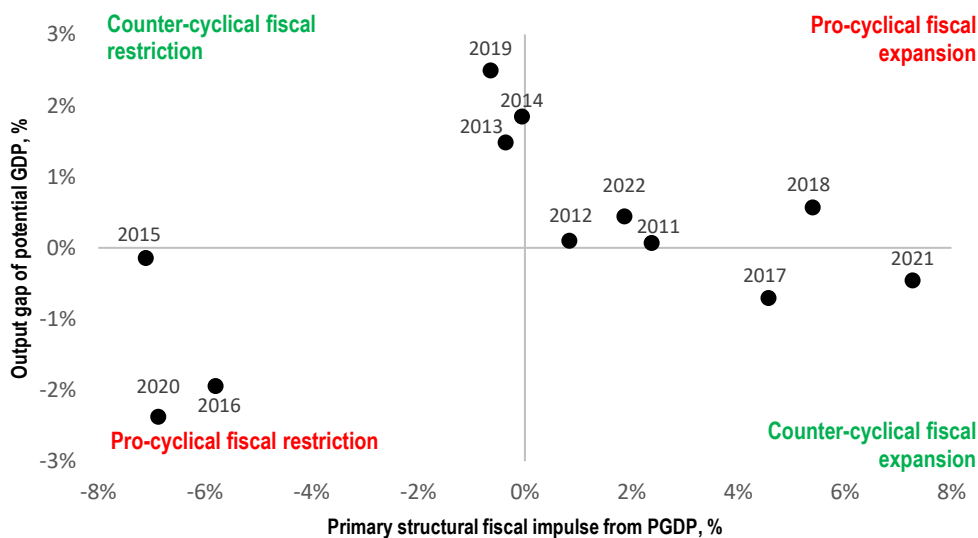
Source: ASPR BNS RK, MF RK, NBK, the authors' computations

5. Conclusion

The experience of not only developed countries but also developing countries shows that a reasonable and consistent counter-cyclical fiscal policy in the long term is able to ensure a balanced budget, including reducing dependency on commodity revenues. A clear example of this is the experience of Chile, which legislated counter-cyclical fiscal rules based on the concept of structural balance. At the same time, an important innovation of

Chile is that forecasts and estimates of the output gap, the long-term price of main export commodities are carried out by independent experts, since official forecasts can be overly optimistic.

The introduction of counter-cyclical fiscal policy and counter-cyclical fiscal rules cannot be carried out without effective analytical tools. In order to analyze the "actual" fiscal position and direction of a country's fiscal policy, the existing literature highlights the advantages of calculating the structural fiscal balance. However, the calculation of the structural fiscal balance is subject to estimation uncertainty because its formula requires the estimation of unobservable variables such as potential output and the output gap, and parameters including fiscal revenue and expenditure elasticities. In addition, for countries exporting oil and other commodities, additional uncertainty is created by high volatility in commodity prices. In this regard, some authors propose to calculate the non-oil fiscal balance.

In our opinion, both indicators are useful for understanding the stabilization opportunities of fiscal policy, as well as identifying and managing fiscal risks. In this paper, we analyzed the character of Kazakhstan's fiscal policy for 2010-2022 by calculating and comparing cyclically adjusted, non-oil cyclically adjusted and structural fiscal balances and fiscal impulses with the output gap. An analysis based on the non-oil cyclically adjusted balance and structural balance indicates more episodes of pro-cyclicality than counter-cyclicality of Kazakhstan's fiscal policy over the period under review, although there are periods of counter-cyclical policy when the Government actively increased the volume of transfers from the National Fund of the RK to exit the recession. In order to overcome the pro-cyclicality of fiscal policy, and taking into account the significant impact of world oil prices on the country's fiscal position, it is proposed to enshrine counter-cyclical fiscal rules at the legislative level that target the non-oil or structural fiscal balance.

Also, it follows from the analysis that when adjusted only for cyclical fluctuations in the output, the fiscal balance indicator does not differ significantly from the actual one. This is an evidence of weak role of automatic stabilizers in the state budget of Kazakhstan and the need for reforms to strengthen them, such as improving the efficiency of tax administration, introducing a progressive scale of the tax system, improving tax collection, and others.

Another important conclusion of this paper is that there is no single way to adjust the fiscal balance: depending on the method chosen, the tool of the econometric model, the given assumptions for the data and other conditions, the results of estimating the fiscal position may differ significantly. In this regard, the chosen method should take into account the purpose of the analysis, data availability, fiscal regime and the structure of the economy, but will ultimately reflect analytical judgment. When consolidating countercyclical fiscal rules, it is important for fiscal and monetary authorities to adhere to consistency in the choice of method and tools to ensure an objective assessment and justification of political decisions.

In future studies, it is desirable to pay more attention to other methods for calculating the cyclical sensitivity of the fiscal balance, as well as estimating the potential GDP and the output gap. This will create a reasonable range of values for each parameter and assess the degree of estimation uncertainty around the structural fiscal balance, thereby increasing the value of this indicator for assessing the country's fiscal policy.

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