ECONOMIC THEMES (2024) 62(3): 367-387

DOI 10.2478/ethemes-2024-0020

EFFICIENCY OF FISCAL POLICY STABILIZATION MEASURES IN EUROPEAN UNION COUNTRIES

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UDC 336.02: 338.124.4 (4-672EU)

Review paper

Received: 17.08.2024
Accepted: 30.09.2024

Abstract: For decades, macroeconomists have analyzed the role of fiscal policy in stabilizing economic trends in theory and practice. However, there is no general consensus on the efficiency of fiscal policy in stabilizing economic flows. Historically, fiscal policy has generally been considered stabilizing, but its flexibility in modern conditions can also have a developmental effect on the specific national economy. Macroeconomic instability can be caused by various shocks. First of all, this paper will discuss the basic postulates of stabilization fiscal policy in modern conditions and the macroeconomic signals of when and how to initiate stabilization through fiscal policy. It will also address the perennial dilemma of the effectiveness of automatic stabilizers versus discretionary fiscal policy measures for stabilization purposes. The essence of the paper is the analysis of the efficiency of fiscal policy stabilization measures in European Union countries, specifically the effects of public revenues and public expenditures on the output gap of the EU countries..

Keywords: fiscal policy, stabilization, The European Union

JEL classification: E620

Introduction

The question of whether fiscal policy increases or decreases fluctuations in the economy is of great importance for the conception of economic policy. Theory suggests that fiscal policy should be countercyclical to contribute to economic stabilization. In practice, however, fiscal policy can prove to be procyclical (McManus & Ozkan, 2015). Thus, fiscal policy makers must answer whether

decisions on taxes and spending dampen or intensify cyclical development, whether fiscal policy plans are more countercyclical than the actual results, how cyclical fiscal policy behavior varies across countries and periods, and whether fiscal rules or economic policy cycles affect fiscal policy cyclicality. These questions have been at the center of many studies even a decade after the global economic crisis (Aizenman et al., 2019; Gootjes & De Haan, 2022; Mawejje & Odhiambo, 2022).

Experience shows that when a discretionary fiscal stimulus is not timely, targeted, and temporary, it can have negative implications in the medium and long term. Regarding timeliness, fiscal policy is characterized by long delays in the design, decision-making, and the implementation of measures. In an uncertain economic environment, there is a risk that by the time the fiscal impulse starts to generate effects on economic trends, the measures taken are no longer timely and could prove procyclical. Historical evidence of the procyclicality of fiscal measures indeed exists, especially in Eurozone countries (Turrini, 2008). Prolonged fiscal expansion that increases the budget deficit can imply higher domestic interest rates and generate unjustified effects on private investment, which can then negatively impact long-term economic growth (Fatás & Mihov, 2003).

The paper will analyze the basic postulates of stabilization fiscal policy. It will consider the historical aspect of using fiscal policy for stabilization purposes, from the early uses of fiscal stabilization measures during the Great Depression of the 1930s, the post-war period, and the modern economic crisis at the end of the first decade of the 21st century. The possibility of designing a stabilization program to address macroeconomic instability will also be presented, along with identifying destabilizing factors in the national economy and appropriate types of stabilization programs. Special attention will be given to discretionary fiscal policy and automatic stabilizers.

The stabilization effect of public revenues and public expenditures on the output gap is an important aspect of fiscal policy, which will be discussed in the last part of the paper concerning the efficiency of fiscal policy stabilization measures in European Union countries. EU governments use various fiscal tools to counteract economic fluctuations and minimize the harmful effects of the output gap. By adjusting tax policy and public spending, governments aim to stabilize aggregate demand and reduce the negative effects of the output gap. The efficiency of these measures depends on factors such as fiscal multipliers, the state of the economy, and the timing of policy interventions. Policymakers must carefully analyze these factors to apply the appropriate fiscal measures that promote economic stability and sustainable growth. Therefore, this section will examine the effects of public revenues and public expenditures on the output gap in the EU countries.

1. Postulates of stabilization fiscal policy

Given the history of the application of fiscal and monetary policies, it can be highlighted that stabilization fiscal policy in the context of relatively continuous economic expansion in the last decade of the 20th century became unnecessary, and most economists considered it undesirable. Developed countries found a way to create an environment of relatively low inflation rates and a long-term trend of falling interest rates by applying monetary rules. The global economic crisis of 2008 significantly influenced a shift in the application of stabilization fiscal policy. Before the global financial crisis, the prevailing view on fiscal policy among economists could be summarized in a few stylized postulates:

Discretionary fiscal policy is inefficient compared to the application of monetary policy due to time lags in the adoption, introduction, and implementation of these measures and resistance to later removal of discretionary fiscal stimuli. Even if fiscal policymakers manage to choose an appropriate moment to implement measures, discretionary fiscal stimuli are inefficient due to rational expectations of economic participants, who respond to increased government spending not by increasing personal consumption but by increasing savings (the so-called Ricardian equivalence) or are partially inefficient due to, for example, rising interest rates and crowding out private investments. Fiscal stabilization should be avoided, meaning that the priority of fiscal policy should be a long-term fiscal balance.

Policymakers who ignore the previous postulates should ensure that fiscal stimuli are exclusively short-term, aimed at stimulating economic growth in the short term, with the activation of monetary policy to minimize harmful fiscal effects in the long term.

However, after the global financial crisis, there was a shift in thinking. Countries worldwide resorted to traditional Keynesian recipes to combat the crisis: increased government spending, increased public investments, reduced tax rates, and expansive monetary policy. In this environment, it was once again shown that stabilization fiscal policy can achieve significant effects in the short term, as evidenced by a significant increase in GDP rates in most countries by the beginning of the second half of 2009, although this growth slowed significantly in subsequent years. The impact on reducing the unemployment rate was not as pronounced, as the return to pre-crisis unemployment rates in most developed countries was achieved only in 2017. Numerous studies have recognized the positive effects of fiscal expansion, and some even claim that premature entry into the phase of fiscal consolidation significantly contributed to the slow pace of reaching full employment levels, especially in Eurozone countries (Ball et al., 2017; Romer, 2011).

Several postulates of this new view on fiscal policy can be presented as follows (Furman, 2016). Fiscal policy is useful in situations of pronounced recession for

conducting effective countercyclical policy as a complement to monetary policy. Discretionary fiscal stimuli can be highly effective and, in some circumstances, can lead not to crowding out but to an increase in private investments due to increased optimism in investment expectations. In an environment of low interest rates, fiscal policy can be even more effective than when interest rates are relatively high. To the extent that fiscal expansion leads to higher interest rates, it can represent a positive effect in an economy with a significant output gap but low-interest rates. Higher interest rates can create space for more successful monetary policy implementation, which is significantly limited by the presence of the zero lower bound on interest rates. Fiscal expansion can increase inflation expectations, reducing the real interest rate and increasing private investments.

Fiscal space for implementing stabilization policy is greater than generally believed. The pressure on deteriorating public debt sustainability in the medium and long term due to fiscal expansion is a valid argument, but much of this concern can be attributed to failures of poorly implemented fiscal policy throughout history. Economic growth resulting from fiscal expansion can improve fiscal sustainability because the measure of sustainability is not the absolute level of public debt but the relative ratio to GDP (to the extent that fiscal expansion increases aggregate demand, nominal GDP will also grow). The effects of GDP growth can come not only from the demand side but also from the supply side if government investments are well-designed and aimed at increasing productivity in the long term.

More sustainable fiscal incentives, especially in the form of effectively targeted investments that expand aggregate supply, can be desirable in the long run in an environment of continuously inadequate demand, low interest rates, and slow economic growth.

Coordinated fiscal actions at the level of multiple countries can generate significantly greater benefits, as aggregate demand shocks spill over much faster, which can particularly be caused by fiscal consolidation not accompanied by corrective monetary policy actions.

2. Descending (Crisis) Trajectory of Macroeconomic Indicators - A Signal for Conceptualizing and Implementing Stabilization Policy

When a country enters a phase of macroeconomic instability, the question arises whether the state should respond by implementing economic policy measures. Before the global economic crisis, the conduct of stabilization fiscal policy was not focused on the application of discretionary measures; rather, fiscal policy was primarily aimed at automatic stabilizers and maintaining an adequate budget deficit and debt position. In this context, one of the basic recommendations aimed at long-term public finance sustainability is the absence of discretionary fiscal measures,

i.e. the packages of measures that states discretionarily prescribe deepening recession trends as a response. However, the global economic crisis has practically shown that countries are oriented towards using discretionary measures, especially in the USA, Great Britain, and Japan. The USA used a range of discretionary measures to combat recessionary trends, including tax rate reductions, expanded tax reliefs, increased public spending, and discretionary fiscal stimulus packages aimed at social protection for the most vulnerable, increased unemployment benefits, investments in health, infrastructure, job creation, and small business protection.

Although recognizing the crisis trajectory of macroeconomic indicators and subsequent reaction seems like a relatively straightforward process, the practical application of stabilization measures is complex. The main drawback of discretionary fiscal policy lies in time lags. In other words, in the first step, it takes time for economic policymakers to become aware of the existence of recessionary trends or an inflationary gap, known as the recognition lag. This delay arises from the difficulties in timely collecting economic data, especially for large economic systems. For example, the 2008 recession was officially recognized and confirmed only in October 2008, and subsequent data showed that the recession began in December 2007. After recognizing the presence of crisis trends, conceptualizing discretionary measures involves implementation lags. These delays arise because the adoption of measures in the form of new government spending programs or tax rate reductions involves a complicated process of adjusting legal solutions, adopting them through legislative procedures, and finally determining which ministries will be responsible for implementing individual programs and how. In the final step, the implemented measures need to generate certain effects, i.e., growth in personal and investment consumption and ultimately aggregate demand, which also requires time (impact lag). A famous example often cited to confirm these lags is the tax rate reduction proposed by economic advisors to the US President Kennedy in 1960 to end the recession of that year, where the rate reduction entered Congress only in 1962, and the final legal solution was adopted in 1964, three years after the recession had already ended (University of Minnesota Libraries, 2016).

Such and other examples have led many economists to advocate refraining from applying discretionary policy even in the case of clear signals for response. However, the proponents of fiscal policy argue that there have been no pronounced macroeconomic instabilities in global frameworks over a longer period. The most serious recession before the 2008 global economic crisis was the early 1980s recession (1981-1982), caused by rising oil prices, which affected many developed countries simultaneously. It is important to note that this period also saw significant inflation and high unemployment rates. After that, shocks occurred but generally did not have such a pronounced impact until the end of 2007. The recessionary trends were also present during the 1990s and the early 21st century

(dot-com crisis), but developed countries relatively quickly emerged from these periods of instability. In an environment of less pronounced macroeconomic fluctuations, most countries refrained from applying discretionary fiscal policy, with a greater emphasis on monetary policy targeting the inflation rate within a certain range.

Global financial challenges in the last two decades have renewed interest among economists and policymakers in early warning indicators that could be useful in predicting the onset and costs of various forms of economic crises. Previous literature on early warning indicators reflected the experience of past decades where crises were mainly associated with emerging and developing economies. When global disruptions in 2008 showed that developed economies could also be significantly affected by crises, it became clear that previously observed signals needed to be re-examined and re-conceptualized. In this sense, important challenges remain. Some of these challenges include measuring the frequency of crises or finding useful early warning indicators.

3. Automatic Stabilizers Vs. Discretionary Fiscal Policy Measures

Automatic stabilizers are elements of fiscal policy that mitigate output fluctuations without discretionary government actions. However, it should be noted that automatic stabilizers are not limited to certain categories of government revenues and expenditures but are a broader concept that includes all aggregates that react countercyclically to changes in gross domestic product.

Not all forms of taxes have a stabilizing character; only those whose collected revenue is sensitive to changes in the tax base level. This means that with a 1% change in income, there will be a relatively larger percentage change in the collected tax revenue. If national income decreases by one percent during a recession, certain categories of tax revenues will decrease by more than one percent. Thus, although pre-tax income has decreased, there will be a larger decrease in tax revenues, meaning the relative decline in post-tax income (disposable income) should be smaller than the pre-tax income decline (Congressional Budget Office, 2010).

What elements should be introduced into taxation to achieve such effects? In short, it is necessary to introduce progressivity into the tax system. This means that progressive tax forms have the character of automatic stabilizers. Specifically, every progressive tax has defined tax brackets with corresponding marginal tax rates, meaning different parts of income or profit of taxpayers are taxed at different rates. As income moves upward through tax brackets, marginal tax rates rise, and consequently, the effective average tax rate also rises.

The overall magnitude of actual changes in taxes and spending due to automatic stabilizers is often much greater than the impact of proposed discretionary changes. Both types of changes in taxes and spending affect aggregate demand, but automatic stabilizers are more predictable and act faster than discretionary measures. Also, the size of automatic stabilizers is not determined by cyclical factors but by non-cyclical factors such as the progressivity of the tax and public transfer systems. The size of automatic stabilizers can change over time, but it is a reasonable assumption that they can be taken as given factors onto which the impact of discretionary fiscal policy measures can be built (Taylor, 2000).

The most commonly used automatic stabilizer is the personal income tax. Automatic changes in effective tax rates occur because progressive income taxation is embedded in modern tax systems. When the economy enters a recession, taxpayers' incomes decrease due to reduced employment, moving them into lower tax brackets where marginal tax rates are lower. Therefore, the effective tax rate, or tax liability of individual taxpayers, decreases, and the stabilizing effect of taxes means that tax revenue should decrease relatively more than the percentage decrease in pre-tax income. In this way, post-tax income will record a smaller percentage decline than pre-tax income, which is the stabilizing effect of personal income tax.

On the other hand, in conditions of heightened expansion or overheated demand, sooner or later prices rise, and through the inflationary spiral, incomes increase. If the tax system is progressive, with rising incomes, taxpayers automatically move into higher tax brackets where marginal tax rates are high. As a result, the total sum of tax revenues will increase. This means that the state takes a larger portion of taxpayers' income, leaving them with less money for consumption (Nam & Zeiner, 2015). Since personal consumption is the most significant component of aggregate demand, aggregate demand will also decrease automatically, which should lead to a reduction in inflation and a return of the economy to an equilibrium level of full employment. For this scenario to materialize, the fiscal policy must function in combination with restrictive monetary policy. The same can be said for a progressive corporate tax system, which affects changes in investment demand because corporate profits are taxed.

Discretionary fiscal policy measures include measures available to executive authorities at any time, usually undertaken in synchronization with other policies, particularly monetary policy. Essentially, these measures involve changes in tax rates, application of tax incentives, and other fiscal instruments. Depending on whether the economy is in a phase of expansion or recession, the state can apply discretionary measures of restrictive or expansive fiscal policy. Discretionary fiscal policy measures aimed at fine-tuning, the economy can have stabilizing effects, but the magnitude of the effect tends to vary depending on many factors (timing of measures, time lags, credibility of policymakers, etc.).

Successful application of discretionary fiscal measures also requires respecting certain theoretical arguments. Most economists believe that personal consumption follows the criteria set by the life-cycle theory and permanent income hypothesis. This theory suggests that people wish to maintain a smooth consumption path throughout their lives. Thus, consumers will not be willing to increase or decrease consumption in response to income changes unless they believe that change will persist. In other words, consumption responds to permanent changes in income, not short-term changes. Applying this theory to tax changes, we conclude that consumers are more likely to change their consumption if they believe the tax change is permanent. For example, a permanent reduction or increase in the income tax rate incorporated into tax law should have a greater effect on consumption (per unit of lost tax revenue) than a one-time change.

Another theoretical component regarding the relationship between tax changes and consumption is the premise that consumers are forward-looking. This premise suggests that consumers not only distinguish between permanent and temporary tax changes but also anticipate the impact of tax changes on their income before they take effect. Thus, consumers may begin adjusting their consumption immediately after a tax change is enacted into law, provided they believe it is a long-term legal change. If consumers are forward-looking, then current changes in tax laws should influence their consumption decisions more at that moment or shortly before it rather than when taxes are actually paid.

The global economic environment has changed significantly since 2008. With the acceleration of negative effects on the US mortgage market, spilling over into the banking sector and then into the real sector globally, the need for discretionary fiscal measures has become more pronounced. Countries worldwide responded to these developments by lowering interest rates as a conventional way to stimulate the investment activity. However, short-term interest rates were already relatively low, especially in the USA, where the reduction in interest rates resulted from stimulating a demand for mortgage loans to solve the housing issue for lower-income groups. By further lowering short-term nominal interest rates to zero by the end of 2008, open market operations as a standard monetary policy instrument were not powerful enough to achieve the desired stabilization of aggregate demand. In a situation where the monetary policy is ineffective, discretionary fiscal policy was accepted as an option that could have an appropriate stabilization role.

By mid-2009, however, the crisis events had entered a second phase where national policymakers realized that the financial shock was greater than expected and price adjustments were occurring much more slowly than predicted. Consequently, exiting the liquidity trap could not be realized in 2010 but much later. This raised the question of whether expansive discretionary fiscal policy could have a medium-term role, not just a short-term one.

Medium-term constraints on expansive fiscal policy relate to the fact that in an environment of rising interest rates due to an increased investment demand by the state, private investment consumption can be crowded out. The increased issuance of government bonds in a relatively short period leads to an increase in the supply of public debt, which amortizes public and private debt, thereby crowding out private investments that would otherwise be financed by private borrowing. In this sense, if there is no strong belief that the central bank will act on interest rates promptly to prevent such crowding out, this medium-term stabilization channel through expansive fiscal policy is generally considered undesirable in the relevant literature.

However, in most of Europe, as well as in the USA and Japan, there was no increase in interest rates. Even extraordinary increases in public debt did not lead to higher long-term interest rates. In this sense, there was no crowding out of private investments; rather, the effect was the opposite (DeLong & Tyson, 2013).

4. Effects of Fiscal Policy Stabilization Measures in European Union Countries

4.1. Conceptual Framework of Research

One of the most important questions for economists and policymakers is the assessment of the alignment between actual gross domestic product (GDP) and potential GDP. This assessment is crucial for measuring the output gap, which represents the disparity between the actual production achieved by the economy and the level of production that could be achieved under ideal conditions. Potential GDP encompasses the maximum amount of goods and services an economy can produce when operating at full capacity and optimal efficiency, i.e, it is the long-term path around which actual GDP fluctuates under the influence of other factors (Arsić, 2016).

A positive output gap occurs when actual GDP is higher than potential GDP, indicating that the economy is functioning at a level above its sustainable capacity. This scenario suggests that the economy may be over-utilizing its resources, leading to imbalances such as inflationary pressures, infrastructure strain, and labor market stress (Grdić, 2022). A negative output gap occurs when the actual GDP is lower than potential GDP, indicating that the economy is operating below its optimal level and not fully utilizing its resources. A negative output gap is usually associated with economic downturns characterized by high unemployment rates, underutilized production capacities, and similar issues (Halebić & Halilbašić, 2021).

The stabilization effect of public revenues and expenditures on the output gap is an important aspect of fiscal policy. Governments use various fiscal tools to counteract economic fluctuations and minimize the harmful effects of the output gap. By adjusting public revenues and expenditures, policymakers aim to stabilize aggregate demand, mitigate business cycles, and promote economic stability.

Public revenues, primarily from taxes, play a crucial role in fiscal stabilization. During periods of economic expansion and a positive output gap, governments can increase tax rates or expand the tax base to reduce excessive aggregate demand and curb inflationary pressures. This serves as a counter-cyclical measure to prevent the economy from overheating. Conversely, during recessions and a negative output gap, policymakers may consider lowering tax rates or providing tax incentives to stimulate aggregate demand and boost economic activity.

Public spending, which includes government expenditure on various programs and initiatives, also significantly contributes to stabilizing the output gap. During economic downturns and a negative output gap, governments can increase public spending to stimulate aggregate demand and boost economic activity. This can involve investments in infrastructure projects, increased social spending, or expansive fiscal policies aimed at economic revitalization (Blanchard et al., 2010). Conversely, during the periods of economic expansion and a positive output gap, policymakers may consider reducing public spending to prevent the economy from overheating and controlling inflationary pressures. By applying fiscal constraints and controlling spending, governments aim to prevent excessive aggregate demand that could lead to imbalances and instability in the economy (Blanchard et al., 2010).

The stabilization effect of public revenues and expenditures on the output gap is an important aspect of fiscal policy. By adjusting tax policy and public spending, governments aim to stabilize aggregate demand and reduce the negative effects of the output gap. The effectiveness of these measures depends on factors such as fiscal multipliers, the state of the economy, and the timing of policy interventions. Policymakers must carefully analyze these factors to apply appropriate fiscal measures that promote economic stability and sustainable growth.

Accordingly, the effects of public revenues and expenditures on the output gap will be examined in the following sections. The study will test the following hypotheses:

- *Hypothesis 1: There is a statistically significant effect of public revenues on the output gap in the EU countries.*
- *Hypothesis 1a: There is a statistically significant effect of public revenues on the output gap in the EU countries in the long term.*
- *Hypothesis 1b: There is a statistically significant effect of public revenues on the output gap in the EU countries in the short term.*
- *Hypothesis 2: There is a statistically significant effect of public expenditures on the output gap in the EU countries.*
- *Hypothesis 2a: There is a statistically significant effect of public expenditures on the output gap in the EU countries in the long term.*
- *Hypothesis 2b: There is a statistically significant effect of public expenditures on the output gap in the EU countries in the short term.*

4. 2. Data and methods of research

In order to examine the effectiveness of fiscal policy stabilization measures in the EU, the effects of public revenues and public expenditures on the output *gap* in the EU countries were examined. Therefore, the research used data for the period from 2011 to 2022 for 27 EU countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden). Data for GDP, the share of public revenues in GDP and the share of public expenditure in GDP are taken from the Eurostat database.

Arsić, Nojković and Randjelovic (2013) use the Hodrick-Prescott filter (HP filter) to calculate potential GDP as a common method for calculating this indicator. The Hodrick-Prescott Filter (HP-Filter) is a method used to separate short-term fluctuations from long-term trends in a time series of data. The HP filter is usually applied to the time series of gross domestic product (GDP). The result of the application of HP filters is the separation of the time series into a trend component and a cyclic component. The trend component represents the long-term growth of the economy, while the cyclical component represents fluctuations above or below the long-term trend. In this paper, the production gap was calculated according to the formula given by Arsić, Nojković and Ranđelović (2013):

$$output\ gap = \frac{(BDP_t - BDP_t^*)}{BDP_t}$$

where is the real GDP, the potential GDP.$BDP_t BDP_t^*$

According to the stated goal of the research and hypotheses, the model shown by the following equation is tested in the paper:

$$output\ gap_{it} = c + JPu_{it} + lnJRu_{it} + \varepsilon \qquad (1)$$

where is – the output gap in the country $output\ gap_{it}$ *and* in period *t* , – the share of public revenues in GDP in the country JPu_{it} *and* in period *t* , – the share of public expenditure in GDP in the country JRu_{it} *and* in period *t* , – constant, – residual, $c\varepsilon$ *t = 2011, ..., 2022; i = 1, 2, ..., 27.*

Statistical software Stata 15.1 was used to analyze the data using statistical-econometric techniques such as descriptive statistics (arithmetic mean, standard deviation, maximum and minimum values), unit root test, panel data interdependency and ARDL (Auto Regressive Distributed Lag) model.

To test the existence of interdependencies between panel data, the Pesaran CD test was used (Pesaran, 2004). The null hypothesis in this test is that the interdependence of the panel data does not exist, while the alternative hypothesis indicates the existence of interdependencies. If there is an interdependence of the data panels, second-generation unit root tests are used to test the stationarity of the time series, otherwise first-generation unit root tests are used.

Time series stationarity is a property that indicates that the series moves along a recognizable trajectory over time, while retaining unchanged characteristics. When we talk about stationarity, we mean that the properties of the time series do not change significantly over time (Mladenović, 2010). One way to test the stationarity in time series is to analyze the presence of the unit root. If a time series has a unit root, then it is not considered to be stationary. To test the stationarity in time series in this paper, the Im, Pesaran and Shin tests of the second generation unit root were used.

Pesaran et al. (1999) developed a model based on the autoregressive armature arrangement (ARDL) that is used to analyze data when variables of different order of integration. This model is especially useful when the variables in the analysis have an integration order of I(0) or I(1), but no variable has an integration order of I(2). The ARDL model allows the analysis of variables of different order of integration, making it a flexible tool in econometric research. This model allows researchers to model the interdependence between the variables of different order of integration. The ARDL model also allows for the estimation of short-term and long-term effects.

4. 3. Research results

Table 1. clearly shows that the average output gap in the EU countries between 2011 and 2022 is 0.04 and ranges from -0.19 (Malta 2011) to 0.35 (Ireland 2015). The average share of public revenues in GDP is 42.95 and ranges from 22.30 (Ireland 2020) to 56.40 (Denmark 2014). The average share of public expenditure in GDP is 45.52 and ranges from 21.38 (Ireland 2022) to 62.78 (Greece 2013).

Table 1. Descriptive statistics

Variable	N	Arithmetic mean	Standard deviation	Minimum	Maximum
Output gap (%)	324	0.04	0.06	-0.19	0.35
Public revenues (% of GDP)	324	42.95	6.56	22.30	56.40
Public expenditures (% of GDP)	324	45.52	7.16	21.38	62.78

Source: Authors in Stata 15.1

Austria, Belgium, Bulgaria, Denmark, Estonia, Finland and France have a positive output gap for most of the observed period, indicating stability and that real GDP is higher than potential GDP. Greece had a negative output gap for most of the period under review, indicating economic instability and a decline in real GDP relative to potential GDP. However, there is a slight recovery in 2022 (Figure 1).

Figure 1. Output gap in EU countries, 2011-2022

Source: Author in Stata 15.1

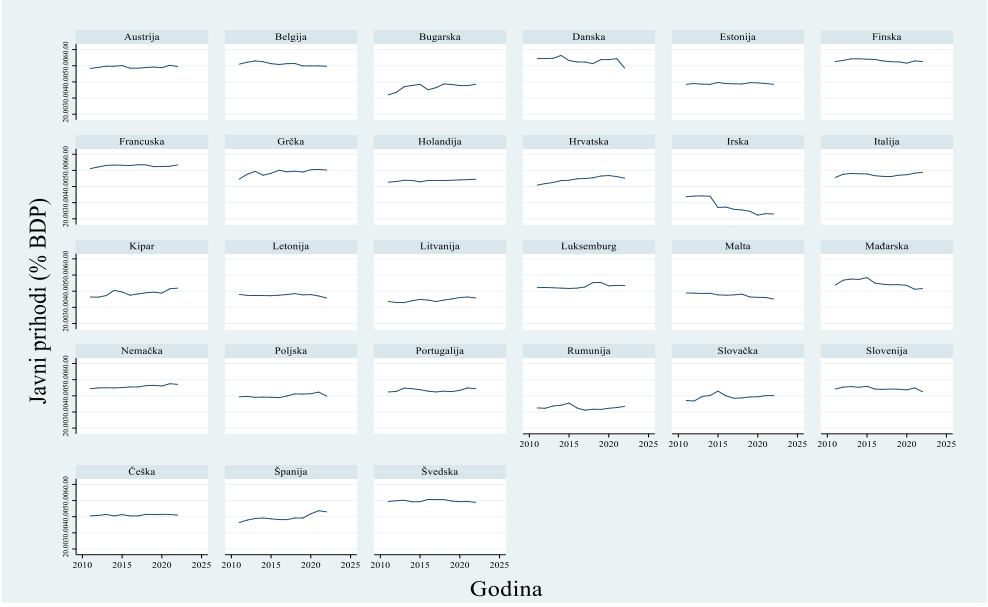
Between 2011 and 2014, Ireland had a negative output gap, indicating the country's complex economic situation and crisis. From 2015 to 2018, Ireland gradually widened its output gap, suggesting a recovery and stabilization of the economy. In 2019 and 2020, the output gap narrowed but remains positive, which may indicate slowing growth or economic challenges. In 2021 and 2022, the output gap widened again, which may be a sign of further economic recovery. Italy had a slightly negative production gap between 2011 and 2014. From 2015 to 2019, the output gap was positive, indicating a recovery and stabilization of the economy. In 2020, Italy recorded a negative production gap, which may be due to economic problems caused by the COVID-19 pandemic. In 2021 and 2022, the output gap widened again, which may be a sign of economic recovery (Figure 1).

The lowest average share of public revenues in GDP in the EU countries in the observed period was recorded in Ireland, followed by Romania and Lithuania. The highest average share of public revenues in GDP was in Denmark, followed by Finland and France. The share of public revenues in Austria's GDP has been relatively stable over the period 2011-2016, with some fluctuations. In 2017 and

2018, the share of public revenues in GDP declined. In 2019, the share of public revenues in GDP will increase again. Subsequently, there are minor fluctuations in the share of public revenues in Austria's GDP, but for the most part it remains at a similar level. The share of public revenues in Belgium's GDP has been relatively stable for most of the period under review, with little fluctuation. In 2019, the share of public revenues in Belgium's GDP declined. Since 2020, the share of public revenues in Belgium's GDP has stabilized. The share of public revenues in Bulgaria's GDP increased from 2011 to 2015. This has led to a decline in the share of public revenues in Bulgaria's GDP. In 2017 and 2018, the share of public revenues in Bulgaria's GDP declined further. Since 2019, the share of public revenues in Bulgaria's GDP has stabilized at a lower level (Figure 2).

The share of public revenues in Croatia's GDP has been increasing for most of the observed period, with some fluctuations. In 2020, there will be a slight decline in the share of public revenues in Croatia's GDP. In 2021, the share of public revenues in Croatia's GDP is increasing again, although it remains at a lower level compared to previous years. The share of public revenues in Cyprus' GDP was relatively stable between 2011 and 2014. In 2015, the share of public revenues in Cyprus' GDP declined. Thereafter, the share of public revenues in Cyprus' GDP will increase slightly until 2022 (Figure 2). The share of public revenues in Denmark's GDP has grown steadily for most of the period under review, with the exception of 2022. This indicates an increase in public revenues relative to gross domestic product for most of the period.

Figure 2. Share of public revenues in GDP in EU countries, 2011-2022

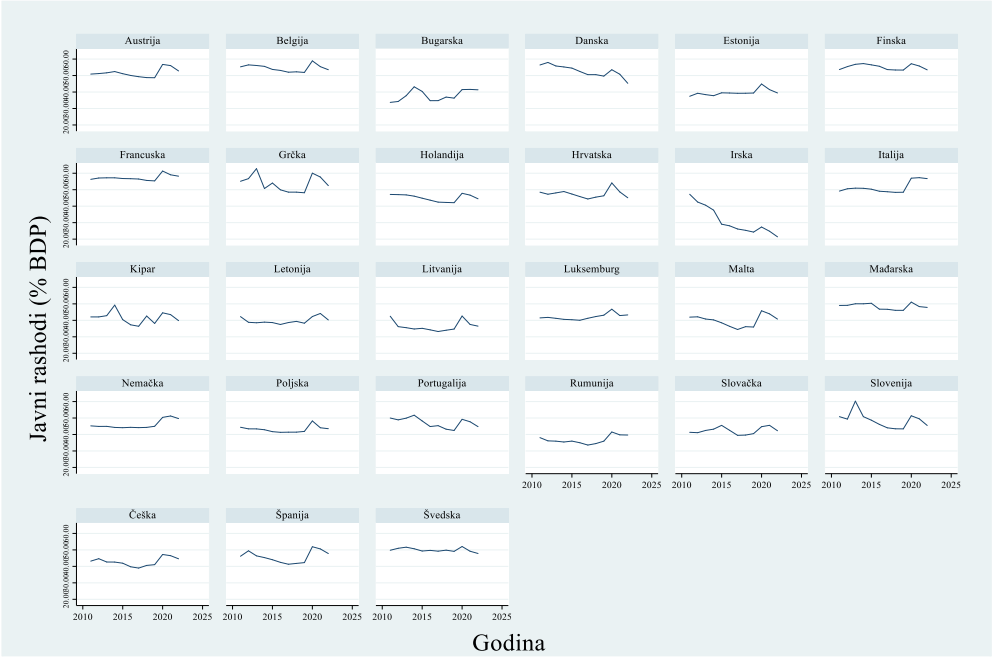


Source: Author in Stata 15.1

Although there have been a few fluctuations, a slight increase in the share of public revenues in Finland's GDP can be observed during the period under review. The share of public revenues in France's GDP also showed a tendency to grow for most of the period under review, although the changes were relatively small. The share of public revenues in Hungary's GDP has declined over the period under review, especially in recent years. This indicates a decrease in public revenues relative to gross domestic product. The share of public revenues in Latvia's GDP also showed a tendency to decline for most of the period (Figure 2).

The largest share of public expenditure in GDP in EU countries in the period 2011-2022 was recorded in France, followed by Finland and Belgium (more than 50%), while the smallest share was held by Ireland, followed by Lithuania and Romania. The share of public expenditure in Austria's GDP ranged from 48.67% in 2019 to 56.78% in 2020. After that, participation decreased to 56.05% in 2021 and to 52.80% in 2022 (Figure 3).

Figure 3. Share of public expenditure in GDP in EU countries, 2011-2022



Source: Author in Stata 15.1

The share of public expenditure in Belgium's GDP is relatively high, ranging from 51.90% in 2019 to 58.92% in 2020. In 2021, the share decreased to 55.41% and in 2022 to 53.55%. The share of public expenditure in Bulgaria's GDP was relatively stable between 2011 and 2019. However, in 2020, participation increased to 41.49% and maintained a similar level until 2022. The share of public

expenditure in Croatia's GDP decreased from 48.51% in 2011 to 44.37% in 2017, after which it gradually increased to 48.67% in 2021. The share of public expenditure in Cyprus' GDP is relatively stable and ranges between 36.41% (2017) and 44.58% (2020). In 2021, participation decreased to 43.47% and in 2022 to 39.81%. The share of public expenditure in the GDP of the Czech Republic was relatively stable, ranging between 38.98% (2017) and 47.22% (2020). In 2021, the share decreased to 46.51% and in 2022 to 44.59%. The share of public expenditure in Denmark's GDP decreased from 56.43% in 2011 to 49.67% in 2019 and then increased to 2020. In 2021, the participation decreased to 50.80%, and in 2022 (Figure 3).

The share of public expenditure in Estonia's GDP has been relatively stable for most of the period, with fluctuations between 37% and 41%. However, there was a significant jump in 2020 and then a decline in 2021 and a further decline in 2022. The share of public expenditure in Finland's GDP has also been relatively stable over the period under review, with a slight decline from 55% (2012) to around 53% (2017). After that, the share of public expenditure is maintained at around 53% until 2022. In France, the share of public expenditure in GDP is also stable, with a slight decline in 2018. Then there was an increase in 2020 and a decrease in 2022. The share of public expenditure in Germany's GDP has been relatively constant, ranging between 44% and 51% over the period under review, with the highest share recorded in 2021. Greece saw a significant decline in the share of public expenditure in GDP during the financial crisis. After a peak in 2013, participation gradually declined and decreased in 2019. However, in 2020, there was an increase in participation again, followed by a decrease in 2021 and 2022 (Figure 3).

According to the results of the Pesaran CD test shown in Table 2, for all time series, the null hypothesis was rejected and it was concluded that there is an interdependence of the data panels. Therefore, changes in the output gap, the share of public revenues in GDP and the share of public expenditure in GDP that occur in any of the observed EU countries also affect other countries. The results obtained further define the use of second-generation unit root tests that allow the existence of data panel interdependencies (Pesaran, 2007).

Table 2. Results of the CD test

Variable	t-statistics
Output gap	46.22***
Public revenues (%GDP)	6.54***
Public expenditures (%GDP)	33.79***

*** p < 0.01; ** p < 0.05; * p < 0.10

Source: Author in Stata 15.1

According to the results of the Pesaran CD test shown in Table 2, for all time series, the null hypothesis was rejected and it was concluded that there is an interdependence between the data panels. Therefore, changes in GDP, public revenues, public expenditure, GDP growth rates, the share of public revenues in GDP and the share of public expenditure in GDP that occur in any of the observed EU countries also affect other countries. The results obtained further define the use of second-generation unit root tests that allow the existence of interdependencies between data panels (Pesaran, 2007).

The results of the second-generation CIPS test (CIPS - cross-section Im, Pesaran, and Shin) showed that the variables share of public revenues in GDP and the share of public expenditure are stationary in the first differential, while the original variable production gap is stationary. Therefore, the variables are of different levels of integration (Table 3).

Table 3. CIPS test results

Variable	Intercept	Intercept and trend
Output Gap	-3.98***	-4.32
Public revenues (%GDP)	-1.41	-2.38
D(Public Revenues (%GDP)	-3.06***	-3.16***
Public expenditures (%GDP)	-1.71	-2.95***
D(Public expenditures (%GDP))	-3.59***	-3.70***

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Source: Author in Stata 15.1

Given that the time series share of public revenues in GDP and the share of public expenditure are stationary at level I(1), while the time series production gap is stationary at level I(0), and that no time series is stationary at level I(2), the ARDL (AutoRegressive Distributed Lag) model will be used for data analysis.

The results of the panel ARDL model showed that there is no statistically significant positive effect of the share of public revenues in GDP on the output gap in the long term in the EU countries ($p > 0.05$). Furthermore, there is no statistically significant positive effect of the share of public expenditure in GDP on the output gap in the long term in the EU countries ($p > 0.05$) (Table 4).

Table 4. Results of the ARDL Model

Variable	Coefficient	Std. Error	t	p
Long Run Equation				
JPu	0.002	0.002	0.85	0.398
JRu	0.001	0.002	0.18	0.858
Short Run Equation				
ECT	-0.84	0.05	-17.84	< 0.001
D(JPu)	-0.001	0.02	-0.34	0.732
D(JRu)	-0.009	0.001	-9.23	< 0.001
C	-0.05	0.08	-0.60	0.546

Source: Authors in Stata 15.1

In the short term, there is no statistically significant positive effect of the share of public revenues in GDP on the output gap in the EU countries ($p > 0.05$). The results showed that there is a statistically significant negative effect of the share of public expenditure in GDP on the output gap in the short term in the EU countries ($p < 0.001$). This means that as the share of public expenditure in GDP increases, the output gap in the EU countries narrows in the short term (Table 4). The adjustment coefficient (ECT) is negative and statistically significant and shows that the rate of adjustment towards equilibrium is 84.00% per annum, i.e. that the output gap in EU countries adjusts to changes in public revenues and public expenditure at a rate of 84.00% per annum. These results show that the system will be back in equilibrium in more than a year.

According to the results of the analysis, public revenues do not have a statistically significant effect on the output gap in either the long or short term. Hypothesis 1 has been rejected. Further, public expenditure has no statistically significant effect on the output gap in the long term, while in the short term there is a statistically significant negative effect on the output gap. Therefore, Hypothesis 2a was rejected and Hypothesis 2b was confirmed.

Conclusion

Recent macroeconomic history is based on the view that from the mid-1980s to the present, developed countries have entered a period of relative stability, during which macroeconomic fluctuations have been significantly reduced. It should be noted that this stability was partly due to the relative absence of significant economic shocks, but also partly due to better-formulated economic policies. Faith in economic stability was seriously challenged by the crisis that peaked in 2009 and put emphasis on the financial component of the economic system, as it was responsible for creating shocks and amplifying fluctuations.

The challenge of fiscal policy during an economic crisis lies in the implementation of countercyclical measures in the context of lower tax revenues, while protecting certain expenditures (for education, social protection and infrastructure), which are vital to avoid increased poverty and to lay the foundations for future growth. Although countries have the ability to strengthen the economy through fiscal interventions, in practice, fiscal space varies from country to country, due to the different fiscal positions of countries. State intervention also depends on pre-formed reserves, the rigidity of spending, the duration of the crisis, and room for prudent borrowing. The economic crisis has put the public finances of many countries in a complicated situation. On the one hand, fiscal revenues have been significantly reduced, due to lower levels of business activity. On the other hand, countries are implementing fiscal stimulus and measures to compensate for the costs of the crisis.

Both positive and negative output gaps are considered undesirable because they indicate that the economy is operating at an inefficient rate (Grgurić, Jelić & Pavić, 2021). Ideally, the economy should strive to achieve a balance in which actual GDP is aligned with potential GDP, indicating an optimal use of resources and efficiency. Policymakers and economists should keep a close eye on the output gap and use it as a tool to assess the overall state of the economy. This allows them to create appropriate measures to address imbalances and steer the economy towards sustainable growth and stability.

Analyzing the effects of stabilizing fiscal policy on the production gap of the European Union countries, it was concluded that in the short term there is no statistically significant positive effect of the share of public revenues in GDP on the production gap in the EU countries. The results showed that there is a statistically significant negative effect of the share of public expenditure in GDP on the production gap in the short term in the EU countries, which means that with an increase in the share of public expenditure in GDP, the production gap in the EU countries decreases in the short term. The results show that the system will be back in equilibrium in more than a year.

The analysis further shows that public revenues do not have a statistically significant effect on the output gap in either the long or short term. Public expenditure does not have a statistically significant effect on the output gap in the long term, while in the short term there is a statistically significant negative effect on the output gap of the observed countries, which speaks volumes in favor of the fact that an effective discretionary fiscal policy in the short term is desirable as a stabilizing one.

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EFIKASNOST STABILIZACIONIH MERA FISKALNE POLITIKE U ZEMLjAMA EVROPSKE UNIJE

Rezime: Makroekonomisti već decenijama analiziraju ulogu fiskalne politike u stabilizovanju ekonomskih trendova u teoriji i praksi. Ne postoji, međutim, opšti konsenzus u vezi sa pitanjem efikasnosti fiskalne politike u stabilizovanju ekonomskih tokova. Bez obzira na to što se, istorijski gledano, fiskalna politika generalno posmatrala kao stabilizirajuća, njena fleksibilnost u savremenim uslovima može imati i razvojni efekat na konkretnu nacionalnu ekonomiju. Makroekonomska nestabilnost može biti izazvana raznovrsnim šokovima, a jedan od najočiglednijih pokazatelja nestabilnosti jeste povećani proizvodni jaz privrede. U radu će najpre biti govora o osnovnim postulatima stabilizacione fiskalne politike u savremenim uslovima, kao i o makroekonomskim signalima kada i kako započeti stabilizaciju fiskalnom politikom. Govoriće se i o večitoj dilemi koja se odnosi na delovanje automatskih stabilizatora naspram diskrecionih mera fiskalne politike u stabilizacione svrhe. Suština rada je analiza efikasnosti stabilizacionih mera fiskalne politike u zemljama Evropske unije, konkretno - efekti javnih prihoda i javnih rashoda na proizvodni jaz zemalja Evropske unije.

Ključne reči: fiskalna politika, stabilizacija, Evropska unija

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Maja Marjanović is a doctoral student at the Faculty of Economics in Niš, majoring in finance and banking. Since 2006, she has been employed at *Banca Intesa*, where she has held various positions until now. During her doctoral studies, she published works in Serbia, Macedonia and Poland. In addition to finance and banking, the subject of her scientific interest is also the problems of economic policy, as well as the problems of economic structure and structural transformation.

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