THE EFFECTS OF FISCAL POLICY IN THE CONTEMPORARY ECONOMIC CRISIS CONDITIONS

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Abstract. Fiscal policy plays an important role in accomplishing crucial goals of economic policy in an economy, especially, production and employment increase. Acknowledgement and application of fiscal policy require differentiated attitudes in different situations. Namely, tax reduction or tax increase in certain circumstances may lead to employment increase, or demand inflation stop, while on the other hand public expenditures may influence resource allocation and production structure, thus influencing the accomplishment of specific production priorities in a country. The situation is far more complicated in the economic crisis conditions. In this paper, the authors discuss the fiscal policy model and its implications on the fulfillment of specific macroeconomic goals, especially in the contemporary economic crisis conditions.

Key Words: fiscal policy, liquidity trap, government consumption, taxes, fiscal policy model.

INTRODUCTION

Fiscal policy represents one of the basic components of economic policy by which governments can have a stimulative effect on the economic system. As the element of the aggregate demand, through fiscal policy, governments can moderate economic cycles, and thus encourage faster economic recovery. In order to achieve this and other macroeconomic objectives, the fiscal policy uses one of its two sides: public revenues and public expenditures. Resources collected in the forms of taxes, customs, contributions, excises, donations, concessions etc. are used for covering public expenditures such as: financing government administration, police, military and justice system, as well as financing services of wider social significance, i.e. health, education, culture, science and sport.
In reality, each country uses various forms of taxes in order to fill up the budget. Any tax increase, which citizens pay to the government, will lead to the reduction in the level of disposable income, and thus lead to the consumption reduction. This in turn, will lead to the decrease in the level of national income and employment, allowing for investments to be unchanged. Conversely, reduction in citizens’ tax liabilities will lead to the increase in disposable income and hence consumption, but depending on their propensity to consume. Increased consumption induces a multiple increase of national income, thus increasing employment. Therefore, in order for the fiscal policy to be effective, it is necessary to have an adequate tax structure and to understand the influence of tax change on the specific macroeconomic variables.

Additionally, it is very important to choose tax rate adequately. Namely, Laffer curve implies that when there are two tax rates which generate the same level of tax revenues, fiscal authorities should choose the lower rate, since it has stimulative effect on the economic activities and reduces tax evasion.

Modern government, by means of fiscal policy instruments and measures, participates in almost every part of social and economic life. It influences aggregate demand and supply, attempts to create the full employment conditions and moderate inflation, leads the policy of stable foreign trade balance and supports steady economic development. But, public expenditures are usually much bigger than public revenues, thus creating budget deficit. This is even more apparent in the time of crisis. Many developed countries have increased public deficit to the levels unseen in the years before crisis. For example, the fiscal deficit in the USA reached $1.4 trillion, or 10.1 percent of GDP in 2009 and $1.3 trillion, or 9.0 percent of GDP in 2010 (Pollin, 2012). The general view among economists is that deficit financing is justified only if it is short-term and supports growth and development. Once economy finds itself in the liquidity trap and monetary policy cannot do much, the fiscal policy must help economic recovery. As Krugman explained: "When the economy is depressed and monetary policy can’t set it right, the true opportunity cost of government spending is low. So let’s get those projects going" [6, p. 5].

In order to understand the influence of fiscal policy on the economic growth, we will analyze the impact of the instrumental fiscal policy variables: government spending – \( G \), autonomous taxes – \( T_a \), transfers – \( Tr \) and tax rate – \( t \).

1. THE FISCAL POLICY EFFECTS

One of the most important objectives of the macroeconomic policy is the achievement of sustainable economic growth, together with the presence of price stability and foreign trade balance [9, pp. 5-7]. In order to accomplish such growth, it is necessary to reach a high level of harmonization between monetary and fiscal policies. The effects of fiscal policy on the economy depend on the openness of the economy, the exchange rate regime and policy, as well as the manner in which monetary policy is managed.

The monetary policy effects on the fiscal policy are mostly reflected through the level of interest rates, due to the fact that this has a direct impact on the country’s fiscal position, its debt servicing ability and fiscal sustainability [8, pp. 3-8]. Additionally, the monetary policy influences negatively public finances through inflation, mostly because the unanticipated high inflation rates produce the fall in the real value of non-indexed government debt and lead to the delayed collection of tax revenues.
On the other hand, fiscal policy impacts monetary policy either by the level of indirect taxes on the overall level of prices and inflation or by budget deficit financing through market instruments or foreign sources. Namely, the effects of an expansive fiscal policy may undermine price stability and neutralize the effects of monetary policy.

In addition to monetary and fiscal policy, public debt policy is also very important, primarily because of its practice of budget deficit financing. Moreover, the public debt has positive and negative implications on the economic development and which one will prevail depends on the debt size, its structure, proportion between domestic and foreign borrowing components and debt maturity [7, p. 37].

Undoubtedly, both monetary and fiscal policies have prominent roles in the pursuit of macroeconomic stabilization, especially in developing countries, but the relative importance of these policies has been a centre of a debate between the Keynesians and the monetarists. The monetarists believe that monetary policy has greater impact on the economic activity, while the Keynesians believe that the influence of fiscal policy is bigger. In general, either an increase in government spending or an expansionary monetary policy, leading to the investment increase through lower interest rate, will lead to an output increase. Therefore, there are some cases in which monetary policy works, while in others fiscal policy works.

However, if one of the links between changes in money supply and changes in investment is broken, only fiscal policy will work [1, p. 28]. This is the case with the liquidity trap – the situation in which the interest rate falls to the level at which an increase in the money supply will not reduce the interest rate any further. Hence, if the investments at this minimum interest rate are not big enough to provide expenditure equal to the full employment output, then monetary policy will fail to increase investments and restore full employment.

In this situation, fiscal policy will be effective, since the increase in government expenditure will have the complete effect on income predicted by the multiplier [1, p. 28]. This is due to the fact that interest rates do not rise at all and there is no crowding out of private investments to offset any of the effects of the increase in government expenditure.

Without diminishing the value of monetary policy, we will focus on the fiscal policy in the rest of the paper. We distinguish expansionary fiscal policy (used for coping with unemployment, leading to budget deficit) and restrictive fiscal policy (used against inflation, leading to budget surplus).

1.1. The effects of expansionary fiscal policy

The expansionary fiscal policy is used to cope with recession. The main measures of this policy are: reduction of tax rates, increase of transfer payments, increase of public expenditures, as well as combination of these measures. The impact of fiscal policy on the recession can be graphically illustrated by the aggregate expenditures model (Fig. 1).

The economy of a country is in the situation of recessionary gap, when private consumption and public investments are not enough to bring the economy in the condition of full-employment. In those circumstances low aggregate demand should be increased by public consumption, thus shifting the expenditure function (C+I) upwards and achieving new equilibrium in point B at the level of full-employment (Y*). The economy is in equilibrium when the level of aggregate demand equals the level of aggregate supply. At this time, it is necessary to point out two scenarios. In the first scenario, when the level of ag-
aggregate demand is below the level of potential domestic product, then the equilibrium is achieved below the level of full employment. In those conditions, there is a possibility to increase the employment level by increasing aggregate demand, thus activating the following Keynesians sequence:

\[
\text{Public Consumption Increase} \rightarrow \text{Aggregate Demand Increase} \rightarrow \text{Price Level and GDP Increase} \rightarrow \text{Employment Increase}
\]

![Fig. 1 Fiscal policy against recession](image)

In the second scenario, the aggregate supply increase is stimulated by tax policy. But, substantial time period should elapse before tax reductions lead to new investments and production increase. In this scenario the following sequence is activated:

\[
\text{Tax Relief, Public Expenditures Decrease, Tax Reductions} \rightarrow \text{Aggregate Supply Increase}
\]

### 1.2. The effects of restrictive fiscal policy

The restrictive fiscal policy is used to cope with inflation. Restrictive fiscal policy implies tax increase and decrease of all forms of public expenditures. In the circumstances when the economy is in the state of full-employment, any further increase of aggregate demand will have no effect on the production increase, but will lead to the inflation increase. In such circumstances, if aggregate demand continues to grow, this will lead to the situation called "demand overheating". In order to reduce inflation the following sequence is activated:

\[
\text{Public Expenditures Decrease or Tax Increase} \rightarrow \text{Aggregate Demand Decrease} \rightarrow \text{Inflation Decrease}
\]
The impact of fiscal policy on the inflation is shown in Fig. 2. Inflationary gap at the level of full-employment represents the distance between the expenditure function (C+I) and 45-degree line. In those circumstances, restrictive fiscal policy decreases consumption, thus shifting the expenditure function (C+I) downwards and new equilibrium is achieved in point B.

2. THE FISCAL POLICY MODEL IN CLOSED ECONOMY

In order to analyze the impact of fiscal policy on the real income (GDP) through the change in demand and liquidity, the model of closed economy should be extended to incorporate government spending. In the closed economy the following equation stands:

$$\text{National Income} = \text{Aggregate Demand} = \text{Demand for Domestic Products}$$

Thus, real income in the closed economy, i.e. aggregate demand, can be expressed in the subsequent manner:

$$AS = AD = Y = C + I + G$$

where $AS$ – aggregate supply, $AD$ – aggregate demand, $Y$ – national income,

$C$ – consumption spending, $I$ – autonomous investment spending,

$G$ – government spending.

The incorporation of government spending has lead to the increase of the aggregate demand, ceteris paribus, thus resulting in the increase of the equilibrium level of national income (Fig. 3). Namely, before incorporating investment and government spending, the equilibrium national income was at the level of $Y_1$, and then by incorporating investment spending the equilibrium national income increased to the level of $Y_2$, and finally by incorporating government spending the equilibrium national income increased to the level $Y_3$. Therefore, by introducing new components of autonomous spending to the aggregate
demand the equilibrium level of national income increases: \( Y_3 > Y_2 > Y_1 \), but only to the level of the potential national income. As a result, the government spending multiplier is equal to the investment spending multiplier [2, p. 198]:

\[
\frac{dY}{dI} = \frac{dY}{dG} = \frac{1}{1 - c_1}
\]

where \( c_1 \) – marginal propensity to consume and \( c_1 < 1 \).

Fig. 3 The national income equilibrium model
Source: [2, p. 197]

2.1. Tax function

The basic assumption is that investment and government spending are exogenous variables, i.e. do not depend on the other variables in the model, while consumption is the linear function of the disposable income [5, p. 320]:

\[
C = c_0 + c_1 (Y - T)
\]

where \( T \) – public revenues (taxes).

By incorporating equation (3) in the equation (1), the national income is equal to [12, p. 127]:

\[
Y = c_0 + c_1 (Y - T) + I + G
\]

Hence, we can conclude that fiscal policy influences national income and aggregate demand through government spending (expenditures) and taxes. In the state of balanced budget, public revenues (taxes) are equal to public expenditures (government spending), i.e. \( T = G \). When \( T > G \) we have budget surplus, and when \( T < G \) we have budget deficit. In the long run, a balanced budget should be achieved.

Since taxes represent an important part of public revenues, it is necessary to identify the tax function [2, p. 198]:
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\[ T = T_a + tY \]  
(5)

where \( T_a \) – the sum of taxes independent of the national income level, 
\( tY \) – the sum of taxes dependent of the national income level.

Average tax rate is determined by dividing the equation (5) by the national income, and it represents the average tax burden of one unit of national income:

\[ \frac{T}{Y} = \frac{T_a}{Y} + t \]  
(6)

Differentiating the tax function (5), we get the marginal tax rate, indicating the tax revenues increase as a result of the national income unit increase:

\[ \frac{dT}{dY} = t \]  
(7)

If we divide the marginal tax rate (7) with the average tax rate (6), we get tax elasticity, representing the percentage tax increase resulting from a 1% income increase:

\[ \varepsilon_{T,Y} = \frac{\frac{dT}{dY}}{\frac{T}{Y}} \]  
(8)

Based on this elasticity, taxes can be divided into progressive (when \( \varepsilon_{T,Y} > 1 \)), proportional (when \( \varepsilon_{T,Y} = 1 \)), and degressive (when \( \varepsilon_{T,Y} < 1 \)).

2.2. Consumption function

Due to the fact that in the previous closed economy models, government spending and taxes were introduced, consumption spending is no longer the function of the total national income, but the function of the disposable income. Disposable income \((Y^d)\) is the amount left after taxes have been deducted and transfers \((Tr)\) added [2, p. 199]:

\[ Y^d = Y - T + Tr \]  
(9)

whereas consumption function is:

\[ C = f(Y^d - T + Tr) \], i.e. \[ C = c_0 + c_1(Y^d - T + Tr) \]  
(10)

and by substituting (5) in (10) we get:

\[ C = c_0 + c_1(Y - T_a - tY + Tr) \]  
(11)

by rearranging we have:

\[ C = c_0 + c_1(1-t)Y - c_1T_a + c_1Tr \]  
(12)

Since the government spending financed through taxes is determined by the proportion of income \(-t\), then the marginal propensity to consume is:
\[
\frac{dC}{dY} = c_i(1-t) \\
\]

and according to the assumption: \( 0 < t < I \), hence \( 0 < I - t < I \), and thus:

\[
c_i(1-t) < c_i,
\]

Therefore, we can conclude that by introducing taxes the marginal propensity to consume is reduced by \( tc_i \), thus leading to the multiplier reduction:

\[
\frac{1}{1-c_i} \geq \frac{1}{1-c_i(1-t)}
\]

From the above mentioned we can conclude that by introducing government spending the national income increases, while by introducing taxes the national income decreases.

**2.3. Fiscal policy model**

Starting with the equation (1) and substituting equation (12) in the equation (1), we get the simplified form of the model in which \( I, Tr, Ta \) and \( G \) are exogenous variables and \( Y \) and \( C \) are endogenous variables:

\[
Y = \frac{1}{1-c_i(1-t)}(I + G + c_0 + c_iTr - c_iT_e)
\]

\[
C = \frac{1}{1-c_i(1-t)}[c_i(1-t)(I + G + c_0 + c_iTr - c_iT_e)]
\]

In order to better understand the impact of taxes and government spending, a numerical example will be presented. Suppose the following macroeconomic model:

\[
Y = C + I + G \\
C = 100 + 0.7(Y - T) \\
T = 0.15Y
\]

where tax rate is 0.15, investment and government spending 100 and 150 units respectively.

By introducing tax rate of 0.15 the multiplier is reduced by 0.86:

\[
\frac{1}{1-c_i(1-t)} = \frac{1}{1-0.7(1-0.15)} = \frac{1}{1-0.405} \approx 2.47 < \frac{1}{1-c_i} = \frac{1}{1-0.7} \approx 3.33
\]

By increasing government spending by 1 unit, the national income increases by 2.47 units, and consumption spending by 1.47 units:

\[
\frac{dY}{dG} = \frac{1}{1-c_i(1-t)} = \frac{1}{1-0.7(1-0.15)} = \frac{1}{1-0.405} = 2.47
\]

\[
\frac{dC}{dG} = \frac{c_i(1-t)}{1-c_i(1-t)} = \frac{0.7(1-0.15)}{1-0.7(1-0.15)} = \frac{0.595}{0.405} = 1.47
\]
Finally, investment spending of 100 units and government spending of 150 units, will lead to the national income level of 864.5 units and consumption spending of 614.5 units.

\[
Y = \frac{1}{1 - c_t(1 - t)}(I + G + c_y) = \frac{1}{1 - 0.7(1 - 0.15)}(100 + 150 + 100) = 2.47 \times 350 = 864.5
\]

\[
C = 1.47 \times 250 + 2.47 \times 100 = 614.5
\]

3. The Impact of Fiscal Policy on National Income

In order to study the influence of fiscal policy on the national income and employment, the analyses of the impact of change in exogenous variables of the given macroeconomic model will be presented, i.e. \(G, T, Tr\) and \(t\).

3.1. The change in government spending

Suppose that government spending increases by \(\Delta G\), in the situation when the economy is functioning below the level of full-employment. The impact of this increase can be seen in Fig. 4.

Namely, the increase of government spending from \(G_1\) to \(G_2\) alters the process of determining equilibrium and shifts the total expenditure function upwards. The equilibrium output is determined by the intersection of the total expenditure function (now \(C + I + G_2\)) and the 45-degree line. From Fig. 4, we can conclude that the change in income and output is much larger the initial spending change, due to the multiplier effect. Hence, the government spending multiplier:

\[
\frac{dY}{dG} = \frac{1}{1 - c_t(1 - t)} = \frac{1}{1 - c_t + c_t t}
\]

indicates that the government spending increase by 1 unit will lead to the income increase by \(1 \frac{1}{1 - c_t + c_t t}\).

![Fig. 4 The Impact of government spending increase on the national income](Source: [11, p. 28])
In order to determine how much the government spending needs to be increased to eliminate unemployment, the following equations are derived from (18):

\[ \Delta Y = \frac{1}{1 - c_1 + c_t} \Delta G \quad \text{and} \quad \Delta G = \frac{\Delta Y}{1 - c_1 + c_t} \]  

(19)

meaning that the increase of government spending \( \Delta G \) must be equal to the difference between potential and equilibrium level of national income divided by the size of the multiplier.

Starting from the model example in part 2.3., where the level of equilibrium national income is 864.5 units, and assuming that the level of potential national income is 1000 units, we have to increase the government spending by 54.86 units to achieve full-employment:

\[ \frac{864.5 - 1000}{1 - 0.7 + 0.7 \times 0.15} = \frac{135.5}{2.47} = 54.86 \]

3.2. The change in taxes

Suppose the government decides to increase personal income taxes in order to finance its spending plans. The initial impact of this action is the reduction of disposable income, thus leading to the consumption spending decline. Hence, the ultimate impact of taxation is a downward shift of the consumption function, which, in turn, will cause a downward shift of the total expenditure function (Fig. 5). The new equilibrium level of output is determined by the intersection of the total expenditure function (now \( C_2 + I + G \)) and the 45-degree line. From Fig. 5 we can conclude that the national income reduction is much bigger than the consumption decline, due to the tax multiplier:

\[ \frac{dY}{dT} = \frac{-c_1}{1 - c_1 + c_t} < 0 \]  

(20)

Since the marginal propensity to consume is less than 1, then the government spending multiplier is bigger than tax multiplier:

\[ \frac{dY}{dG} > \frac{dY}{dT} \]  

(21)

By adding tax multiplier to the government spending multiplier we have:

\[ \frac{1}{1 - c_1 + c_t} - \frac{c_1}{1 - c_1 + c_t} = 1 \]  

(22)

known as Haavelmo balanced budget theorem [3, p. 99].
3.3. The change in tax rates

The change in the tax rate has an impact on the part of the taxes dependent on national income, and hence tax rate increase as a result has national income decline, and vice versa. So, in the situation of unemployment, tax rates should be reduced, while in the inflation periods, tax rates should be increased in order to reduce disposable income and consumption.

In order to determine the tax rate necessary to achieve potential national income, we rearrange the equation (16):

\[
t = \frac{1}{c_1} \left[ \frac{I + G + c_a - c_1T_a + c_1Tr}{Y_{\text{max}}} - 1 + c_1 \right]
\]

(23)

This can be illustrated by the following example:

\[
Y = C + I + G \\
C = 100 + 0.7Y_d \\
Y_d = Y - T + Tr \\
T = 0.2Y \\
I = 100, \ G = 150, \ Y_{\text{max}} = 850
\]

What we want to determine is how much the tax rate should be increased or decreased in order to achieve the equilibrium national income \(Y = Y_{\text{max}} = 850\).

\[
t = \frac{1}{c_1} \left[ \frac{I + G + c_a - c_1T_a + c_1Tr}{Y_{\text{max}}} - 1 + c_1 \right] = \frac{1}{0.7} \left[ \frac{150}{850} - 1 + 0.7 \right] = 0.1573 = 15.73\% 
\]
The results suggest that it is necessary to decrease the tax rate from 20% to 15.73% in order to achieve the equilibrium national income to be equal to the potential national income.

3.4. The change in transfers

The change in transfers has a direct impact on the change in disposable income. In the situation, when transfer payments to citizens are reduced, the level of national income will increase, thus suggesting that in the unemployment conditions transfer payments to citizens should be increased, while in the inflation conditions transfer payments should be decreased. This can be illustrated in the following manner:

\[ \frac{dY}{dTr} = \frac{c_i}{1 - c_i + c_i t} > 0 \]  

By comparing (18) and (24) we have:

\[ \frac{dY}{dG} = \frac{1}{1 - c_i + c_i t} > \frac{dY}{dTr} = \frac{c_i}{1 - c_i + c_i t} \]

meaning that the unit change in the government consumption has stronger effect on the change in national income than the unit change in transfers.

4. CONCLUSION

Each country uses the fiscal policy measures in order to achieve specific macroeconomic and microeconomic objectives, especially, production and employment increase, inflation decrease, price stability etc. Due to the importance and impact of the fiscal policy on the normal functioning of the economy, constant efforts are made to find possibilities for modeling the mentioned macroeconomic variables reactions on the fiscal policy. This has become imperative with the global economic crisis which emphasized the significance and possibilities of fiscal policy. The main aim of fiscal policy modeling is to acknowledge its effects and then, based on the constructed model to perform particular, in great extent, reliable projections. In the large number of cases, the subject of the analysis is the change and impact of taxes and government spending on the equilibrium national income, the change and impact of tax rate as well as transfer payments on the national income of a country.

Although the presented fiscal policy models are extremely simplified, the main purpose of their existence is to help better understanding of the fiscal policy impact on the economy. In that respect, great efforts are made in discovering new possibilities of fiscal policy modeling and quantifying its impact on the economy. Consequently, there are numerous generalizations and elaborations of these models, ranging from investment endogenization, domestic financial market inclusion, foreign-trade flow inclusion, capital flows inclusion etc. The fundamental question, always present in modeling of fiscal policy impact on the economy, is the reality of the basic assumptions of the specific model.
REFERENCES


DOMETI FISKALNE POLITIKE U USLOVIMA SAVREMENE EKONOMSKE KRIZE

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Fiskalna politika igra važnu ulogu u ostvarivanju ključnih ciljeva ekonomske politike jedne zemlje, posebno, povećanj proizvodnje i zaposlenosti. Poznavanje i primena fiskalne politike zahteva diferencirani stav u različitim situacijama. Naimenje, smanjenje ili povećanje poreza u određenim okolnostima može dovesti do povećanja zaposlenosti ili zaustavljanja inflacije tražnje, dok na drugoj strani javni rashodi mogu da utiču na alokaciju resursa i strukturu proizvodnje, na taj način utičući na postizanje izabranih prioriteta u proizvodnji jedne zemlje. Situacija je složenija u uslovima ekonomske krize. U ovom radu, autori diskutuju model fiskalne politike i njegove domete u ostvarivanju specifičnih makroekonomskih ciljeva.

Ključne reči: fiskalna politika, zamka likvidnosti, državna potrošnja, porezi, model fiskalne politike.