

Fiscal Policy and the Business Cycle*

György Molnár – Gábor Dániel Soós – Balázs Világi

After the 2007–2008 financial crisis and the subsequent prolonged, deep recession, the question of whether fiscal policy can be applied to stimulate the economy came into focus, as conventional tools of monetary policy became ineffective. Accordingly, the related research also received a new boost. The purpose of our paper is to present the new research results, which mainly focus on whether fiscal policy can be applied to influence business cycles. Although there is still much debate, the claim that the effects of fiscal policy are not constant, but rather depend on the state of the business cycle, has been supported by numerous theoretical models and empirical results: in prolonged, deep recessions, and especially in the case of a liquidity trap, the multiplier of government expenditures is high, while in the case of booms it is relatively low.

Journal of Economic Literature (JEL) codes: E62, E52, E21, E12

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1. Introduction

Over the last eighty years the position of economics on the applicability of fiscal policy has changed significantly. Owing to the works of Keynes, it became the prevailing opinion in the 1930s that fiscal policy is suitable to boost the economy during times of recession, and from a more general approach, to influence business cycles. In the 1970s new classical economics formulated the exact opposite of this view, and the doubts about the fiscal policy gradually reshaped economic thinking.

After the 2007–2008 financial crisis and the deep, prolonged recession that followed it, fiscal policy came into focus again, as the traditional tools of monetary policy reached their constraints. As a result, the related theoretical and empirical research also received a new boost, and the purpose of our paper is to present these new research results.

* The views expressed in this paper are those of the author(s) and do not necessarily reflect the official view of the Magyar Nemzeti Bank.

György Molnár was an analyst at the Magyar Nemzeti Bank at the time of writing the study. E-mail: gyorgy.molnar@ogresearch.com

Gábor Dániel Soós is a senior economic analyst at the Magyar Nemzeti Bank. E-mail: soosg@mnbb.hu
Balázs Világi is a Head of Department at the Magyar Nemzeti Bank. E-mail: vilagib@mnbb.hu

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Although there is still much debate about the applicability of fiscal policy, the view that the impacts of fiscal policy are not constant, but rather depend on the state of the business cycle, has become increasingly common. Fiscal expenditures are capable of influencing the movement of real GDP, to a higher extent during recessions and to a lesser extent during booms.

Since our paper mainly focuses on the presentation of new research, and the new research efforts primarily deal with the circumstances under which fiscal policy is suitable to affect the business cycles, in this study we do not consider the long-run effects of fiscal policy and only touch on the problem of government debt sustainability. We do not deny the importance of these problems, but also with a view to volume constraints, we have intentionally narrowed the subject of our paper and focused primarily on the new research which has not yet found its way to the broader community of professionals.

The study is structured as follows: In *Section 2* we review how the theory of fiscal policy has changed since Keynes and the current position of economics on this subject. In *Section 3* we discuss the problem of the empirical identification of the effects of fiscal policy and present empirical results. *Section 4* deals with the implication of the above in economic policy, and *Section 5* concludes.

2. Theory

The subject of the paper is the assessment of whether fiscal policy is capable of influencing business cycles. Therefore, we disregarded other issues belonging to fiscal policy, such as the role of the state in the creation of public goods or how the investments of the state influence the long-term growth potential of the economy.

The degree of efficiency at which fiscal policy is capable of influencing business cycles is characterised by the magnitude of the so-called expenditure multiplier. The expenditure multiplier measures how many units real GDP will be raised by a raise of one unit of real government expenditure.

If the value of the multiplier is zero, then each unit of the increase in public spending will reduce private consumption or investments by the same amount. In other words, public spending will crowd out private spending. In extreme cases the multiplier may even be a negative number, in such cases one unit of public spending will crowd out more than one unit of private expenditure. In such cases fiscal spending will not increase and might even reduce real GDP; therefore if this happens, the fiscal policy is entirely ineffective.

If the expenditure multiplier is between 0 and 1, then government expenditures will only partially crowd out private expenditures, and an increase in public spending by one unit will reduce private consumption and investments by less than one unit. In this case, it is possible to increase real GDP by fiscal spending. However, in this case in parallel with the increase in GDP social welfare could decrease, if the government spending crowds out a significant volume of private consumption, or it may decrease long-run growth, if it crowds out important private investments. Therefore, in such a case the application of fiscal policy to boost the economy requires substantial caution, and the benefits and costs should be carefully assessed.

If the value of the multiplier is 1, then fiscal policy no longer crowds out private expenditures at all, and if it is higher than 1, then government expenditures not only do not crowd out private spending, they even generate additional private income. In such cases fiscal policy should clearly be used to boost the economy. In the remaining part of the study, when we use the term *fiscal policy is effective*, we refer to cases when the value of the expenditure multiplier is higher than 1.

Our paper primarily focuses on the magnitude of the expenditure multiplier, since after the crisis the main debated matter was whether the increase in government spending is able to mitigate the recession. In addition to the expenditure multiplier, the literature deals with the negative multiplier effects of various taxes in detail. We only assess this matter partially, primarily in the context of the extent to which various forms of funding for government expenditures could reduce the effect of the expenditure multiplier.

2.1. The Keynesian theory of fiscal policy

Today, Keynesian theory is an essential part of macroeconomic textbooks. For example, the system of IS-LM curves and its implications for fiscal policy are dealt with in detail in *Chapter 2* of the textbook of *Benczes and Kutasi (2010)*. Precisely because of that, following overview is not intended to convey new knowledge; our purpose is merely to prepare the presentation of new theories discussed later. The purpose of the following section is not to provide a formal presentation of the IS-LM curves, but rather to clarify the key assumptions of the Keynesian theory from which its results applying to fiscal policy are derived.

Before the 1930s it was the prevailing opinion that fiscal policy has no effect on GDP, since government spending crowds out private expenditures.¹ After the recession of 1929–1933, it was the works of Keynes that changed the majority opinion on that matter.

¹ Nevertheless, classical theory did not completely reject the idea of accumulating deficits; in extraordinary cases, such as during wartime, it was considered acceptable.

According to Keynes, one unit of real expenditure by the government raises real GDP by more than one unit. The arguments of Keynes are well known from introductory level macroeconomics textbooks. One unit of government spending will increase GDP by one unit² in the first round, but this is not yet the end of the process. The increase in GDP will raise the incomes of households, and since according to Keynes, consumption moves closely in parallel with current incomes, the consumption of households and consequently, aggregate demand will also increase, which will further boost GDP, as a result of which the consumption of households will increase, and so forth (see *Figure 1*).

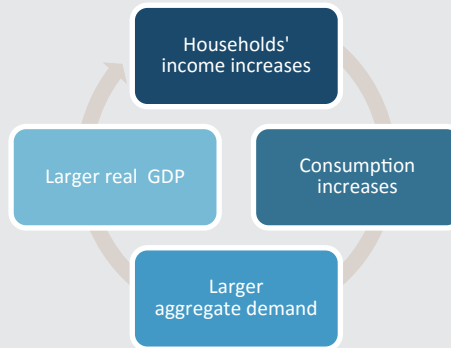
The relationship between the current income and consumption of households is captured by the *marginal propensity to consume*. This shows how many units of consumption are increased by one unit of current income. If we mark marginal propensity to consume with c , $0 < c < 1$, then according to Keynes one unit of government expenditure will increase GDP by $1/(1-c)$. We call this latter formula the Keynesian expenditure multiplier, since c is positive and lower than 1, the Keynesian multiplier is higher than 1, furthermore, the higher the marginal propensity to consume, the higher the value of the multiplier.

The co-movement of current income and consumption is of key importance in Keynesian theory, but we also need other conditions to demonstrate that fiscal policy is capable of efficiently increasing economic activity.

Essentially, Keynesian theory is the theory of aggregate demand, and assumes that the development of aggregate demand determines GDP. In other words, supply does not respond to increasing aggregate demand by raising prices, but rather by quantitative expansion. To express this in the language of macroeconomics, the aggregate supply curve is horizontal: therefore, as a result of a shift in the aggregate demand curve, in the new equilibrium output will be higher while price level will remain unchanged.

² To make the essence of this argument more accessible, following the simplification generally applied in the literature of macroeconomics, in this paper we presume all along that government expenditures include government consumption and government investments. We disregard household and corporate transfers, which are also part of government expenditures in practice.

Figure 1
The expenditure multiplier and current income



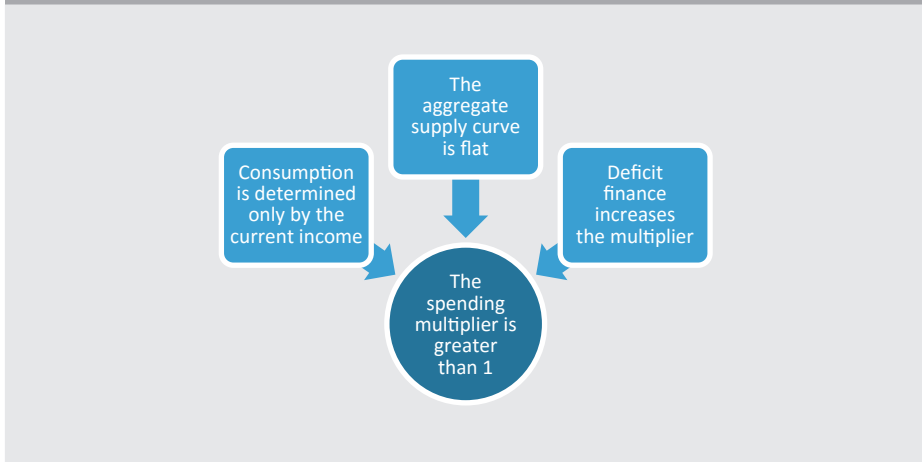
Since Keynesian theory was created as a reaction to the Great Depression of the 1930s, it was a natural assumption that supply adjustment is primarily quantitative, since the depression economy of this era was, in fact, characterised by the fact that both prices and wages were inelastic, with a significant amount of idle capacities.

In addition to supply assumptions, the assumptions about the methods of financing government expenditures also affect the rate of the multiplier. The rate of the expenditure multiplier is affected by the methods used to finance expenditures. The multiplier only reaches its maximum value of $1/(1-c)$ if the government finances budgetary expansion from debt. If the expenditures are financed partly from tax, it will reduce the rate of the multiplier, since the disposable incomes of households will be lower, and therefore consumption growth and aggregate demand will be lower. It can be acknowledged that if the expansion of government expenditures is fully financed from taxes, then the rate of the multiplier will be reduced to 1. *Figure 2* summarises the underlying factors of the Keynesian expenditure multiplier theory.

Finally, a common misunderstanding related to Keynesian theory should be clarified. According to the theory, the rate of the multiplier is independent of whether the government spends the fiscal expenditures on useless things, or on useful purposes, such as infrastructure investments or the development of human capital. Keynesian theory was not intended to explain factors determining the long-term growth of the economy, but rather meant to find a way for recovery from the depression when aggregate demand is insufficient and monetary policy is no longer capable of stimulating the economy. The key to the Keynesian theory is that government expenditure generates additional private incomes, and from this point of view it makes no difference what the targets of the initial government expenditures are

that induce private demand. Naturally, the target of the government expenditures may have an impact on the long-term growth of the economy, since efficient public spending may increase potential output for the future. However, the Keynesian theory does not consider this question, as the subject of its assessment is the short-term effects of fiscal policy.

Figure 2
The Keynesian expenditure multiplier



2.2. The criticism of Keynesian theory

As discussed in the previous section, from the aspect of the conclusions of Keynesian theory one fundamental assumption is that there is a close relationship between consumption and current incomes. However, subsequently severe criticism was formulated about the consumption theory of Keynes, with the most important challenges posed by the permanent income theory of *Milton Friedman (1957)* and the life cycle hypothesis of *Franco Modigliani (1966)*. Both authors established empirically and theoretically that when making consumption-saving decisions, households consider not only the development of their current income but also the development of their incomes in the longer term.

To put it in another way, households *smooth their consumption*, i.e. fluctuation in their income is not fully followed by fluctuation in their consumption. This is also supported by the data, as the volatility of aggregate consumption is lower than the volatility of the GDP. Smoothing consumption specifically means that when households temporarily have lower incomes, they reduce their savings and try to maintain the level of their consumption. And if their income rises temporarily, then they will not spend their total increase in income on current consumption, but rather save part of it so that they can increase their consumption in the future as well.

It follows from the above that the marginal propensity to consume is lower than had been presumed by Keynes. As noted, the rate of the Keynesian expenditure multiplier is $1/(1-c)$, if marginal propensity to consume, i.e. if c is low, then the value of the multiplier will also be close to 1.

Discarding the Keynesian consumption function also has further consequences. The Keynesian theory of consumption is basically static: current consumption is only affected by current income. By contrast, subsequent consumption models are dynamic: the household develops its optimal consumption path in consideration of a longer time horizon. Accordingly, in addition to income, the real interest rate also has a significant influence on consumption-saving decisions. Since monetary policy is capable of influencing the real interest rate, it therefore has a significant impact on both consumption and aggregate demand. As a result, monetary policy can neutralise the effect of fiscal policy. Let us assume that the decisions of the central bank can be described by the following interest rule: in the case of inflation or an increase in real GDP the central bank raises the interest rate. If fiscal expenditures increase, inflation and output will also be higher, as a result, the central bank will raise the interest rate, which will result in the increase in the real interest rate, which will in turn, reduce consumption and aggregate demand. As result, the efficiency of fiscal policy will decrease, and the expenditure multiplier might be lower than 1.

From the 1970s, Keynesian theory has been subjected to even more radical criticism from the new classical school, associated with the name of Robert Lucas. This school of economic thinkers questioned the Keynesian opinion on the behaviour of supply. In their opinion, prices and wages respond flexibly to changes in aggregate demand, and therefore the adjustment of supply is basically not quantitative. In their opinion, the aggregate supply curve is basically vertical: it only departs from vertical temporarily, if firms face unforeseen surprises (*Lucas 1973; Sargent and Wallace 1975*). As a result, if the aggregate demand curve shifts due to a predictable fiscal expansion then it will have no quantitative effect and real GDP will not change; by contrast, the price level will increase. In other words, in such a case the value of the expenditure multiplier will be zero. If the fiscal expansion takes firms by surprise, then supply will respond quantitatively as well, for a temporary period, but even in this case the growth of GDP will be much lower than the magnitude assumed by Keynes.

The views of the new classical theory on the behaviour of aggregate supply can be formally summarised by the new classical Phillips curve, which is discussed, for example, in Chapter 4 of *Benczes and Kutasi (2010)*.

The other important element of new classical criticism was the Ricardian equivalence, which was first formulated by *Barro (1977)*. It claims that if government spending is financed from deficit, it has exactly the same effect as that of tax

financing. This is supported by the following argument: According to the theory of permanent income, the consumption decisions of households are not determined by current income, but by the present value of expected lifetime income. If the consumers are appropriately rational, then they will also exactly understand that a current government deficit will imply higher taxes in the future, since government debt will have to be repaid in the future. In other words, if the fiscal expansion is not financed from current taxes, then it will be financed from future taxes. It is clear that the present value of the tax increase in the future is just as high as the current tax increase; therefore, in both cases the present value of the lifetime income will be reduced by the same extent, and accordingly, current consumption will decrease by the same amount.

It is important to underline that the Ricardian equivalence has the consequence that the rate of the expenditure multiplier is independent of the way the government expenditures are financed. However, this does not imply in itself that the value of the expenditure multiplier should be less than 1. Ricardian equivalence only claims that whatever the rate of the multiplier when the expenses are fully financed from taxes, it is not possible to increase this rate further. Therefore, the Ricardian equivalence will only corroborate the inefficiency of fiscal policy if the multiplier of expenditures financed from taxes is less than 1. For lack of the Ricardian equivalence, in such cases it could be argued that in the case of deficit financing this value could even be higher than 1, but if we accept the Ricardian equivalence, this cannot happen. Therefore, the Ricardian equivalence can only be used to support a sceptical position towards fiscal policy if we supplement it with other arguments, for example, those related to the behaviour of supply.

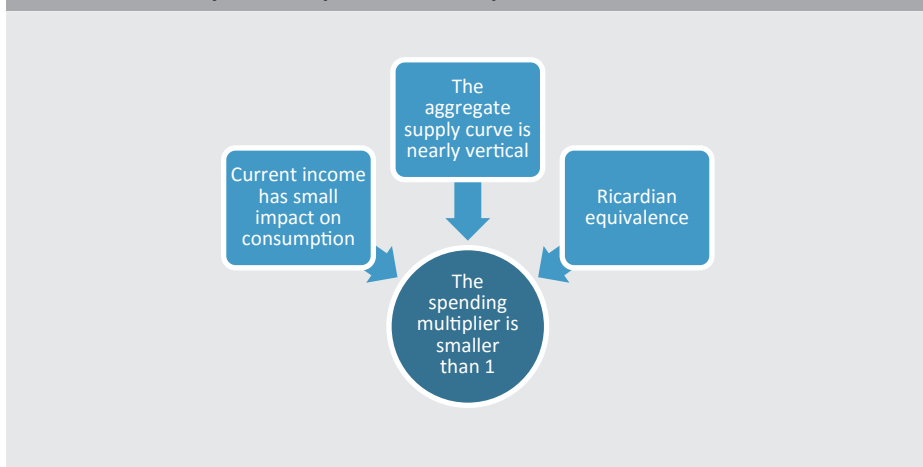
The critiques above are summarised in *Figure 3*. They were fundamentally intended to demonstrate that fiscal policy is not efficient and that fiscal spending of one unit will increase real GDP by less than one unit, because it crowds out private expenditures. But there are also counter-arguments related to the practical implementation of fiscal policy, which we review in the following section.

One frequent counter-argument is that monetary policy serves to smooth the volatility of the economy much more efficiently than does fiscal policy. This argument posits that monetary policy is capable of responding quickly and efficiently to changes in the economy: the decision-making body of a central bank can meet at any time and make a decision on the policy rate within a few hours, while the discretionary fiscal policy supplementing the automatic fiscal stabilisers³ is the result of a slow and sluggish legislative process, and therefore it is only able to respond to developments in the economy with long delays.

³ We refer to automatic fiscal stabilisers when the budget balance changes automatically whenever the business cycle enters a new stage.

Furthermore, it not only takes a long time for a decision to be made, there is also a long time between the decision and the implementation of the fiscal project. Therefore, it can take several years until the effect of fiscal policy is realised, whereas in the case of monetary policy new interest rates can be implemented practically instantly after an interest rate decision. All of this can have the consequence that if we try to boost the economy by fiscal policy during a recession, the recession may well be over by the time results start to appear. This was considered an especially important problem in the two decades preceding the crisis, at the time of the so-called *Great Moderation*, when the depth of business cycles' volatility and the length of recessions decreased significantly in developed economies.⁴

Figure 3
Criticism of the Keynesian expenditure multiplier



2.3. Post-crisis view

So far we have summarised the opinion of economics on the efficiency of fiscal policy before the crisis. These results are known to the wider professional community. Our purpose with the review was to prepare the discussion of new research results and put these in context. Much of this research applies the stochastic dynamic framework of modern macroeconomics, and because this framework is technically demanding they still have not found their way into introductory textbooks or to the wider professional community. In the following section we attempt to present these results in an accessible way.

⁴ The idea that discretionary economic policy should not be pursued, owing to delayed effects, among others, can be traced back to Milton Friedman.

The crisis of 2007–08 and the recession that followed it forced the profession to reconsider its views on the role of fiscal policy. As a result, the profession now has much more complex opinions on the possibility of applying fiscal policy than previously.

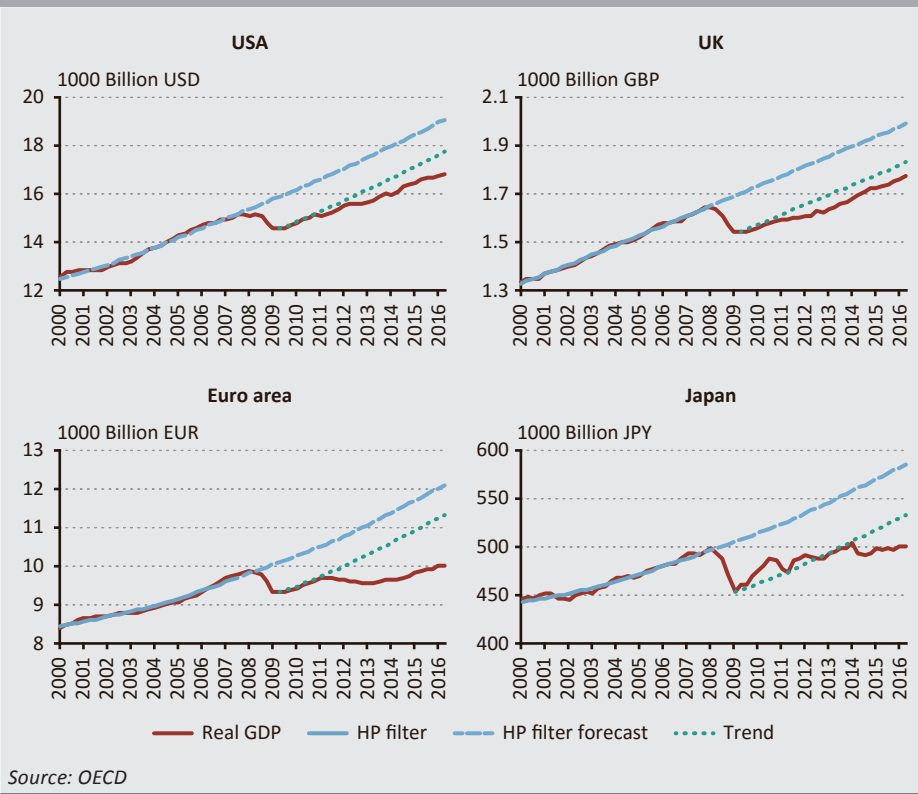
It is not like the pendulum has swung back from one extreme view into the other direction. The Keynesian theory is no longer acceptable today in its original form, but it has become clear that many of its elements can be once again relevant, under certain conditions. It has become clear that the applicability of fiscal policy is not a timeless property, but rather something that depends on the state of the business cycle. In this part, we overview this process of reconsideration.

First, we detail how the opinion of the profession has changed on the practical applicability of fiscal policy. On the one hand, it has been proven that monetary policy is not efficient in every situation. Keynes realised back in the 1930s that in a severe recession and in a low interest environment monetary policy becomes ineffective; this is what he called a liquidity trap. The liquidity trap is a rare phenomenon, which is why the profession did not take it seriously, although the long recession of Japan in the 1990s could have been a warning sign. However, after the crisis both the euro area and the United States found themselves in a liquidity trap, when the natural rate of interest, i.e. the real interest rate consistent with the natural rate of output, became negative, and monetary policy could not replicate this negative real interest rate, since – given the low inflationary environment – it would have required a significantly negative nominal interest rate, which is not feasible. Although it was possible to simulate the economy to some extent using unconventional tools, monetary policy basically reached its limits. In such a situation, the application of fiscal policy as an alternative tool was naturally raised.

Starting from the 1980s, the rate of economic volatility was lower than ever before. As mentioned, this period is called the Great Moderation in the literature. By contrast, since the Great Depression of the 1930s there has not been such a deep, prolonged recession in the developed world as the one that followed the year 2008. *Figure 4* shows the recession that unfolded in four developed economies. As illustrated in the figure, the economic downturn following the crisis was persistent and deep in all four countries. In addition, the post-crisis situation can be characterised by the concept of hysteresis: the economy grows on a lower trend line than before the crisis, or the growth rate even becomes lower than previously.⁵ Based on the above, it can be concluded that the argument formulated at the time of the Great Moderation, i.e. that owing to the short duration of recessions fiscal policy should not stimulate the economy, does not apply.

⁵ See the study of *Blanchard et al. (2014)* on hysteresis.

Figure 4
The recession of developed economies after 2008



Revaluation of the extreme views of new classical economics on the aggregate supply curve began long before the crisis. This process was not motivated by thinking about fiscal policy, but rather by that view of new classical macroeconomics that monetary policy has no effect on the real economy, which ran counter to both the empirical results of academic research and to the practical experiences of central bankers.

From the 1990s, in most macroeconomic models the behaviour of supply has been described by the New Keynesian Phillips curve (see its formal presentation in the advanced textbook of *Galí (2008)*). The New Keynesian Phillips curve is associated with the new classical Phillips curve discussed in the previous section only in name and is based on an entirely different concept. While in new classical theory the transitional frictions of supply can be explained by the imperfect information of

firms and households, the New Keynesian Phillips curve is based on *Calvo's (1983)* theory of sticky prices.⁶

The New Keynesian Phillips curve describes the behaviour of supply in a much more balanced way than the new classical school does. As a result of the assumption of sticky prices, some firms respond to an increase in demand by raising their prices, while another parts respond with quantitative expansion. As a result, the aggregate supply curve is rising, not horizontal, as in the original Keynesian theory, or vertical, as in the new classical models. Therefore, if aggregate demand shifts as a result of a fiscal expansion, then it will cause both the price level and real GDP to increase. The flatter the curve, the higher the quantitative shift is. Compared to the original Keynesian approach, the GDP effect and the expenditure multiplier will be lower, but if the slope of the New Keynesian Phillips curve is not too high, then the expenditure multiplier is higher than 1. This conclusion is radically different from the arguments of the new classical school, which state that fiscal expansion will only have a real impact if it is introduced by surprise, but even that impact will be transitional and negligible.

It is obvious from the above that the lower the slope of the New Keynesian Phillips curve, the higher the expenditure multiplier will be. In recessions, when there is low capacity utilisation, the significance of price adjustment is reduced, and consequently, the slope of the curve will also be lower. All of this supports the argument that in crises, if a fiscal expansion is capable of efficiently increasing aggregate demand, then much of it will be ultimately reflected in GDP growth, and the inflationary effect will be minimal.

There is also an extensive body of empirical literature that deals with the process that during recent decades the slope of the Phillips curve had significantly decreased long before the crisis, which is discussed in the review of *Szentmihályi and Világi (2015)*. The flattening of the Phillips curve started long before the crisis, but during the crisis this phenomenon intensified, because of the downward rigidity of wages and low capacity utilisation.

As discussed in the previous section, if consumption is affected not only by income, but also by the real interest rate, then it neutralises fiscal expansion to a significant extent. On the other hand, if during a crisis the economy falls into a liquidity trap, then monetary policy will reach the zero lower bound of nominal interest rates and the interest rates of the central bank will stabilise at around zero for a longer time. In such a case, monetary policy does not neutralise fiscal expansion. *Christiano et al. (2011)*, *Woodford (2011)*, and *Erceg and Linde (2016)* demonstrate that in a liquidity trap, if the nominal interest rates are unchanged, the expenditure multiplier will

⁶ See also the study of *Szentmihályi and Világi (2015)* on the new classical and New Keynesian Phillips curve.

be significantly higher than 1 even if the behaviour of households is described not by the Keynesian, but rather by the permanent income theory. In contrast with the static approach of Keynes, these papers present dynamic models, which shed light on channels increasing the multiplier that are lacking from the original Keynesian theory: according to these models, expected fiscal expansion will increase inflation expectations, as a result of which the real interest rate will decrease, which, in turn, raises current consumption and aggregate demand, and therefore the magnitude of the expenditure multiplier.

The importance of these studies cited above lies in the fact that these results are based on the dynamic stochastic general equilibrium (DSGE) models of modern macroeconomics. Typically, prior to the crisis the literature on DSGE was sceptical concerning the applicability of fiscal policy. However, the above authors demonstrated that in the case of a liquidity trap even the standard DSGE models imply the efficiency of fiscal policy.

In the following part, we present new results that are also derived using the stochastic, dynamic framework of modern macroeconomics, but extend the standard DGSE models. While in the standard models the only constraint to the indebtedness of households is their expected lifetime income, the studies presented now take into account that in reality, and especially at the time of crises, debt constraints are much stricter than that.

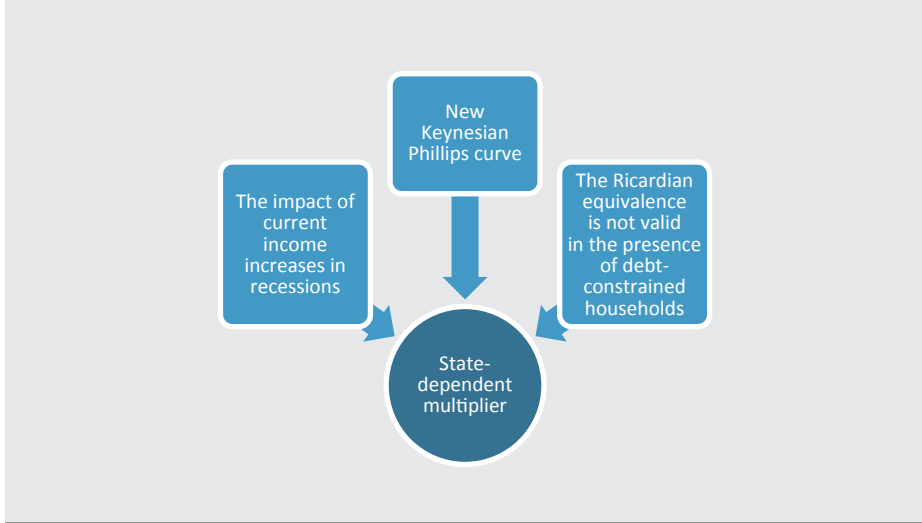
The studies of *Eggertsson and Krugman (2012)*, and *Eggertsson and Mehrotra (2014)* reconsider the relationship between current income and consumption: the authors point out that after financial crises, since the debt constraints become more stringent, households are not capable of smoothing their consumption, and therefore the permanent income theory does not work in the case of indebted households. Consequently, in a post-crisis recession the effect of current income on consumption will increase, i.e. the Keynesian consumption function becomes a good approximation of the behaviour of aggregate consumption. Based on that, the authors demonstrated that in a deep recession and liquidity trap the behaviour of the economy will become similar to that outlined in the original Keynesian theory, and therefore in such a case fiscal policy is effective and the value of the expenditure multiplier is higher than 1. Furthermore, the above studies highlight that if consumers with debt constraints exist, then the Ricardian equivalence will certainly not be valid, accordingly, it is possible to increase the magnitude of the multiplier if government expenditures are financed not from taxes, but rather by increasing the deficit.

Summarising the above points, although a significant portion of the criticism of the Keynesian theory of fiscal policy is justified, in deep, post-crisis recessions the major conclusions of Keynes are still valid. In such a case the economy falls into a

liquidity trap, which renders monetary policy ineffective; on the other hand, the effects of fiscal expansion will be strengthened, partly because these effects are not neutralised by the inefficient monetary policy, and partly because owing to the indebted consumers, consumption will be correlated with current incomes to a higher extent than in a normal situation. Furthermore, in a recession, due to slack, the downwardly rigid wages, the reaction of supply is also primarily quantitative.

Figure 5

The post-crisis position: a state-dependent expenditure multiplier



If we compare the above arguments to the conclusions of the criticisms of Keynesian theory, it is safe to say that – according to the current position of macroeconomic theory – the efficiency of fiscal policy and the expenditure multiplier are state-dependent. During booms the expenditure multiplier is lower than 1, and therefore fiscal policy is not effective, but there is no need to apply it since the business cycle can be appropriately controlled by monetary policy. By contrast, in recessions after crises the value of the expenditure multiplier is higher than 1, and therefore in such situations fiscal policy is an efficient tool to stimulate the economy and is necessary in this case, because the conventional tools of monetary policy become ineffective. The above train of thought is summarised in *Figure 5*.

2.4. Small open economies

The theoretical framework presented so far has been created fundamentally for the analysis of large economies, only open to a small degree, such as the USA. In order for this framework to be applicable to small, open economies, we must add some more considerations to the analysis presented so far. In a small, open economy

there are two important factors which have not yet been discussed so far, which influence the rate of the multiplier.

On the one hand, in an open economy if domestic production needs imported inputs, then part of the incomes primarily and additionally generated by fiscal expenditures will “leak” abroad. If the domestic economy is large enough, then the income generated abroad is capable of increasing foreign GDP significantly, which could increase foreign demand for domestic products, and this could partly compensate for the leaked income. However, if the economy is small, then this compensatory effect does not exist, because in this case the income leaking from the domestic economy is not sufficient to exert a meaningful influence on the foreign economy. Therefore, in the case of a small open economy the rate of the expenditure multiplier decreases owing to the import needs of the economy. For example, if we apply the original argument of Keynes to a small open economy, then the value of the expenditure multiplier with deficit financing will be determined by the following formula: $1/(1-c+m)$, where c means marginal propensity to consume, and m stands for marginal propensity to import. If the demand for imports of the economy, i.e. the value of m is high, then the rate of the multiplier will be significantly lower than in the case of a closed economy.

On the other hand, the magnitude of the multiplier is not independent of the exchange rate regime. The effects of fiscal policy in the case of small open economies were first analysed by *Fleming (1962)* and *Mundell (1963)*. Chapter 2 of *Benczes and Kutasi (2010)* contains a formal presentation and discussion of the Mundell–Fleming model.

According to the Mundell–Fleming model, in the case of a fixed exchange rate regime, fiscal expansion will increase output more efficiently. The reasoning is the following: if fiscal policy raises demand, then interest rates will rise, and the higher interest rate will put the domestic currency under pressure for appreciation. In the case of a fixed exchange rate regime, the central bank will respond to this with intervention, to mitigate (or terminate) the appreciation by easing the monetary stance; therefore, ultimately monetary policy will support the boosting of the economy. By contrast, in the case of a flexible exchange rate regime, the central bank does not respond exclusively to the movement of the exchange rate, and if it does not boost the economy or only boosts it to a smaller extent compared to the fixed exchange rate regime, then the more appreciated exchange rate will mitigate the increase in output via more restricted export performance, and ultimately the impact of the fiscal spending will be smaller. *Farhi and Werning (2016)* analyse the effects of fiscal expansion in a modern dynamic stochastic model framework in open economies, but their fundamental conclusions are in harmony with the results of Fleming and Mundell.

There is another very important element that is missing from the fiscal theory developed for large economies, which is of key importance for small economies: the issue of the sustainability of the deficits related to fiscal expansion, see, e.g. Chapter 3 of *Benczes and Kutasi (2010)* or the study of *D’Erasmus et al. (2016)*. In the case of some large economies – such as that of the USA or Germany – there is practically no constraint to increasing public debt: even in the case of a relatively high public debt-to-GDP ratio the financial markets regard the funding of the public debt as a risk-free investment. The financing practice of small economies is in sharp contrast with that. In these economies, an increase in public debt will raise the risk premium of the debt, and beyond a certain threshold this premium may even rise at an extreme pace. Furthermore, it is possible for the debt to reach a level when the sources of financing dry up completely.

The above factors have a significant impact on the effectiveness of fiscal policy. When the public debt is appropriately high, a fiscal expansion financed from deficit would increase the public debt and the burdens of financing to such an extent that it would no longer stimulate the economy and instead would have a contractionary effect. If the burdens of financing are extremely high, sooner or later the government will have to introduce such fiscal austerity, which will result in a significant growth sacrifice. How quickly the contraction of the economy occurs depends on how rational the expectations of the relevant economic agents are. But regardless of the timeframe, if we do not regard the problem statically, then with a high public debt the increase of fiscal expenditures will ultimately not increase, but rather lower real GDP.⁷

3. Empirical research

3.1. Identification

The empirical identification of expenditure multipliers is fundamentally difficult,⁸ since their value depends on several other factors, including interactive effects. The fiscal multiplier depends on the state of the business cycle, the expectations of economic agents, the reaction function of economic policy, i.e. in general on several structural parameters, the accurate measurement of which poses a challenge to the analyst. The main problem lies in the fact that it is not sufficient merely to divide the changes in GDP over time by the changes in the fiscal instrument that occurred over the same period, using actual data, in order to find out the change that a change of one unit in the fiscal variable causes in GDP. This is particularly true because the level of activity in the economy is affected by several other factors as well. In

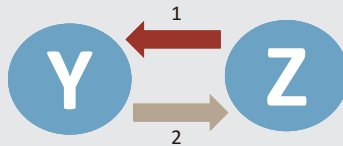
⁷ The study of *Baksa et al. (2014)* discusses in detail in what way expectations affect the multiplier. At the same time, this model does not assess the impacts of fiscal policy in the case of a liquidity trap, and therefore they find low multiplier values.

⁸ This is generally true for other kinds of fiscal multipliers, such as tax multipliers.

the identification, we want to know what the ultimate exclusive effect of the fiscal instrument is on output. A two-way causal relationship may exist between the two variables. On the one hand, changing fiscal expenditures affects GDP, as this is the channel which practically identifies the fiscal multiplier itself (*Figure 6*, arrow no. 1). On the other hand, economic policy may and does also respond⁹ to changes in GDP, for example, exactly by the stimulation or possibly by the restraint of public sector spending (*Figure 6*, arrow no. 2). Therefore, the so-called identification problem lies in whether or not we only capture the first channel. Therefore, in terms of the causal relationships we look for the effect of the one that is exerted by the governmental instrument on economic growth and not vice versa.

As a solution, there are two major and widely used methods in the literature,

Figure 6
A stylised presentation of the problem of identification



Note: Legend: Y means output, Z is the fiscal instrument in question. Channel 1 is the exclusive effect of public sector spending and changes in taxes on the output, while channel 2 is the response of the government to changes in GDP.

which we discuss later on in more detail. One approach identifies the fiscal shocks by a structural vector-autoregressive model (SVAR), and based on that, it becomes possible to determine the multiplier values. This method was first applied by *Blanchard and Perotti (2002)* for estimating the fiscal multipliers. In this case, the condition of identification is usually the requirement that the change in GDP should not affect public sector spending in the given period. This assumption is not only a simplifying methodological condition necessary for the SVAR simulations, but also an approach defined based on economic considerations. The GDP of the given period is not known to start with, and naturally, its exact value will be known only later on, at least one quarter later; on the other hand, owing to institutional features, the steps of economic policy can also not necessarily be immediately ascertained.¹⁰

⁹ Either by direct steps, or through the automatic fiscal stabilisers. We explain this latter in more detail in the part titled *4. Implications on economic policy*.

¹⁰ For example, major changes in taxation or expenditures are preceded by social, professional, parliamentary debates concerning the effects of the fiscal measure, which could, by necessity, generate some subsequent actual response.

The other approach builds on the search for a fiscal variable that is presumably independent of the fluctuation in GDP. The first cases in point concerning such a variable are those of *Barro (1981)*, and then *Ramey and Shapiro (1998)*, in which the authors identified fiscal shocks by relying on figures on military expenditures. They simply used information taken from reports on planned military expenditures as a shock variable. Changes in military expenditures are independent of domestic growth and mainly depend on external factors (a period of wars), therefore from the aspect of identification using that figure is a good choice.

Among the empirical methods used to assess the impacts of other, fiscal shocks, we should also mention the one in which the authors use full econometric models. However, the development of these models is not exclusively aimed at estimating the fiscal impulses and owing to their econometric structures they are suitable for creating simulations, enabling the exploitation of these opportunities.¹¹ In addition, another approach is when the authors use a New Keynesian macroeconomic model, the major parameters of which are estimated and then the fiscal multiplier can be calculated using the estimated parameters, based on simulation.¹² The empirical strength of this latter practice is fundamentally weakened – in addition to the usual estimation properties of the Bayesian estimation, characteristic of complex models – because the applied models result in strong theoretical restrictions in themselves, and therefore they provide much less room for information deriving from the observed data.

The methods are presented in detail, and several methodological, literature references are given in: *Chinn (2013)*, and *Spilimbergo et al. (2009)*. In the following, we will mainly focus on the first two methods and on investigations where the authors specifically analysed the factors affecting the value of the fiscal multipliers.

3.2. Results – an overview of the literature

The study of *Ilzetzki et al. (2011)* contains a detailed analysis of the multiplicative effects of public sector spending, in which over forty countries were assessed in the period between 1960 and 2007. They were merely seeking answers as to what is the impact of the most important economic properties on the effect of the fiscal stimulus. Of the factors determining the rate of the multiplier, the authors assessed the following: level of development (developed or emerging), the exchange rate regime (fixed or flexible), the openness of the economy and indebtedness.

They prepared their estimate using a panel SVAR model, with the structural condition that the GDP of the given quarter has no impact on governmental consumption, only one quarter later.¹³ They assessed both short-term and long-

¹¹ See e.g.: *Horváth et al. (2006)*

¹² See e.g.: *Zubairy (2010)*

¹³ The SVAR model included the following endogenous variables: governmental instrument (e.g. government consumption), base interest rate of the central bank, GDP, current account, real exchange rate. In their estimates, they used four lags uniformly. The various lags did not significantly affect their conclusions.

term effects, and furthermore, whether the difference between the multipliers of public-sector consumption and public investments are significant. We summarise their results in the following table.

	Short-term multiplier		Long-term multiplier	
	Government consumption	Government investment	Government consumption	Government investment
Developed economies	0.37	0.41	0.8	1.15
Developing economies	-0.21	0.57	0.18	0.75
Fixed exchange rate	0.09	0.36	1.5	1.42
Flexible exchange rate	-0.28	0.46	-0.41	0.16
Closed economy	0.02	0.46	1.29	0.7
Open economy	-0.28	0.51	-0.75	-0.23

Source: Ilzetzki et al. (2011)

In general, they conclude that the multiplier of government investments is higher than that of government consumption, but at the same time, in several cases there is no statistically significant difference between the two. In relation to the level of economic development, the multiplier is much higher for developed economies. In emerging economies, the long-term, demand-stimulating effect of governmental consumption is, in fact, not significantly different from zero, while that of government investments is a positive figure and is substantially higher. *Estevão – Samake (2013)* and *Kraay (2012)* estimate similarly lower multiplier values for developing economies.

As for the assessment of various exchange rate regimes, they found that the value of the fiscal multiplier is higher in the case of a fixed exchange rate regime compared to a flexible exchange rate regime. *Born et al. arrived (2013)* at a similar conclusion: in the case of a fixed exchange rate regime they measured a multiplier effect that is 2 or 3 times higher compared to a flexible exchange rate regime. Underlying this conclusion is the intuition that – in the case of a fiscal shock – a flexible exchange rate regime enables faster implementation of mechanisms that initiate economic adjustment.

In assessing the openness of economies, the authors usually found a higher fiscal multiplier for closed economies, in accordance with the results of *Flemming (1962)* and *Mundell (1963)* cited above.

The study of *Ilzetzki et al. (2011)* uses a sample that lasted until 2007, i.e. the period preceding the crisis, and primarily supports the sceptical approach to fiscal policy. Studies that also considered the post-crisis period in the estimations arrived at significantly different results.

Of these, it was the study of *Blanchard and Leigh (2013)*, two researchers at the IMF, that attracted the most attention. They came to the conclusion that the value of the fiscal multiplier is higher than 1 after the crisis, which was much higher than assumed previously. This study stirred up quite a storm when it was published, since up to that point the IMF had taken a rather sceptical approach. In making their estimates, they used the following considerations. They estimated the following equation:

$$\text{forecast error of growth} = \alpha + \beta \cdot \text{forecast of fiscal consolidation} + \epsilon$$

In the equation, they regressed the forecast error of GDP growth from one year to the next by the forecast of the change of fiscal consolidation. The structural balance of the government is contained on the right side. With rational expectations and assuming that an appropriate model was used for the forecasts, the value of β should be zero. The investigation was conducted for the 2010–2011 period, on a sample of 26 countries.¹⁴ They arrived at a significantly negative value as the value of the estimated β . A large number of robustness tests were carried out, with different specifications, and although different results were obtained in several cases, in total, significantly negative values were estimated for this parameter. For example, certain countries were left out from the estimate, the outliers were treated by different statistical procedures, the above equation was extended by various additional explanatory variables (e.g. CDS, fiscal balance, initial debt, debts of households, current account balance, actual fiscal measures instead of planned fiscal steps); in addition, the sample was expanded for the period between 2009 and 2012. Furthermore, the estimate was also performed for the pre-crisis period (1997–2008), and a significantly zero β value was found.

The results were robust for the various specifications and revealed that the current fiscal multiplier values are higher than believed previously. Although the definition of the exact multiplier values that were used for earlier forecasts is unclear, since it fundamentally depends on the structure of fiscal consolidation and on economic conditions, it was a general opinion based on the results of several studies that in respect of developed economies the value of the multiplier is about 0.5 for two years. For example, in IMF (2008) a multiplier value of 0.5 was estimated for 21 developed economies for the period between 1970 and 2007; furthermore, the IMF (2010) also estimated an average value of about 0.5 on average for 15 developed economies for the period between 1979 and 2009. In light of the above, the authors conclude that based on the results of their estimates currently the value of the multiplier is above 1. At the same time, they note that the results should be treated with caution, particularly because fundamentally there is not one single multiplier value for every economy, for every fiscal shock. The value of the multiplier may vary

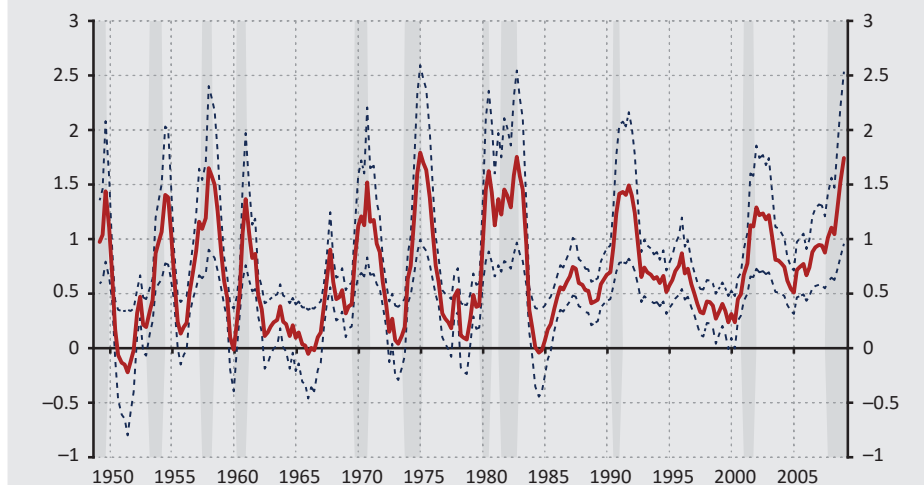
¹⁴ Basically, it was the EU27, however, there were no data on the structural fiscal balance for Estonia, Latvia, Lithuania and Luxembourg in the WEO of April 2010. On the other hand, they added three developed European economies – Iceland, Norway, Switzerland – to the sample and thus carried out the test on a total of 26 countries (27–4+3).

by country and by period of time, and furthermore, as economies recover from a crisis, their multiplier values will presumably return to pre-crisis levels.

Applying the methods outlined above, *Mohlmann and Suyker (2015)* also conducted the estimate for later periods. On the one hand, they refreshed it: they used a version of the database of *Blanchard and Leigh (2013)*, that was updated 3 years later. They also found a similarly significant negative β value for the periods between 2009 and 2010 and 2010 and 2011, but the coefficient is no longer significant for 2011–2012. They estimated a value close to zero for later years.¹⁵

Based on the empirical results reviewed so far, it can be understood that the value of the expenditure multiplier is not constant and that it depends on the state of the business cycle. This is clearly underpinned by the studies of *Auerbach and Gorodnichenko (2012, 2013)*. The authors estimate fiscal multiplier values of about 1.0–1.5 by estimating a regime-changing model for a recession environment, while for a boom the estimate is around 0.0–0.5. Therefore, according to their main conclusion, fiscal expansion is much more efficient in a period of recession compared to a period of expansion.¹⁶ The results are summarised in *Figure 7*.

Figure 7
Development of the expenditure multiplier in the United States



Note: Shaded regions are recessions defined by the NBER. Blue dashed lines are 90 per cent confidence interval.

Source: *Auerbach – Gorodnichenko (2012)*

¹⁵ The authors note that, naturally, this result could also reflect that the forecasters of the IMF have “learned their lessons” from the crisis, and for the later periods indicated they already used higher multipliers compared to the pre-crisis period.

¹⁶ They also assessed to the various fiscal expenditures and typically arrived at higher values for military expenditures and government investments, in contrast to the less powerful demand-stimulating effect of government consumption.

The above results are confirmed by the study of *Huidrom et al. (2016)*, demonstrating that in a period of recession the stimulating effect of fiscal expenditure is significantly higher. While in a period of recession multipliers of around 1.5–2 are obtained for a time horizon of 1–2 years, the values estimated for periods of expansion are statistically typically not different from zero.

Nonetheless, the value of the fiscal multiplier is not only affected meaningfully by the cyclical state of the real economy, the level of indebtedness of the given country may also affect it. According to the study of *Ilzetki et al. (2011)*, the level of indebtedness of the given economy significantly affects the efficiency of fiscal spending. Excessive indebtedness substantially mitigates the growth effect of fiscal expansion. In proportion to GDP, in the case of economies with a level of indebtedness exceeding 60 per cent a negative fiscal multiplier is arrived at, which is a strong indication and also a serious challenge concerning the recovery from the crisis of economies with an excessive level of indebtedness. In their assessment of robustness, the authors found that indebtedness exceeding broadly the threshold of 60 per cent will result in an insignificant multiplier. *Huidrom et al. (2016)* obtained similar results. The authors assessed 34 countries (of which 19 were developed and 15 emerging) for the period between 1980 Q1–2014 Q1, with the application of the so-called IPVAR.¹⁷ model. In respect of the immediate effect, fiscal multiplier becomes insignificant starting from an indebtedness level of roughly 65–70 per cent, and in the case of a low level of indebtedness the long-term value is close to 1.

4. Implications for economic policy

In this section, we provide an overview of what conclusions can be drawn based on the theory and empirical research on the operation of fiscal policy. Our purpose is not to describe an optimal rule of fiscal policy in the strict sense, but rather to consider those basic principles that are characteristics of a proper fiscal policy in our opinion.

As demonstrated in the previous sections, both the theoretical models and the empirical studies confirm that the magnitude of the fiscal expenditure multiplier is state-dependent: during booms it is relatively low, while in recessions, and especially after major crises, it is relatively high, higher than 1.

From that it follows that the proper fiscal policy is also state-dependent. It is not useful or possible to apply fiscal stimulus to the economy over the whole business cycle; at the same time, the claim that strict fiscal policy is required always and under any circumstances is not true either.

One frequent argument against fiscal policy is that it is much more difficult to implement than monetary policy; therefore, it is not recommended to be used

¹⁷ Interacted Panel Vector Autoregressive model.

for smoothing the business cycles.¹⁸ However, after the crisis of 2007–2008 it was proven that in a deep recession monetary policy can quickly reach its limits and become ineffective. In such a case, the only tool to stimulate the economy is fiscal expansion, without the application of which the economy could easily move into a state of persistent stagnation, as is demonstrated by the paper of *Eggertson and Mehrotra (2014)*. In addition, the fiscal multiplier is the highest in such a situation, and therefore fiscal policy is not only desirable, but also efficiently applicable.

At the same time, from the aspect of the sustainability of the deficit the professional literature has been traditionally sceptical about fiscal stimulus. It is believed that even with a high value of the expenditure multiplier it is impossible to implement a meaningful stimulus of the economy, since it will relatively quickly lead to an unsustainable deficit; calculations on this are included, for example, in the study of *Chand (1993)*.

By contrast, the post-crisis research supports the claim that fiscal expansion implemented in a crisis does not necessarily lead to an unmanageable deficit. *Delong and Summers (2012)* demonstrate that if the recession is so deep that it has long-term negative impacts on growth – i.e. in the case of hysteresis – with realistic parameters fiscal expansion can even be self-funding, i.e. the additional tax revenues arising from the long-run growth could cover the deficit used to finance the expansion. The empirical study of *Auerbach and Gorodichenko (2017)* is in accordance with the above results: according to their research on developed economies, projects of fiscal stimulus carried out at the time of crisis did not result in a permanent increase in debt as a percentage of GDP or that of the risk indicators.

On the whole, the above claims do not mean that in small countries that are indebted crisis management based on fiscal stimulus is necessarily a viable option, but the most recent crisis serves to demonstrate exactly that fiscal restriction also does not necessarily work in such cases. In fact, if the value of the multiplier is high, then the decrease in fiscal expenditures by one unit will probably reduce GDP by more than one unit. As a result, debt as a percentage of GDP will not decrease, but will instead rise. Therefore, the result of restriction will be the exact opposite of the original aim. A similar story was observed in Greece after the crisis.

Therefore, if an economy enters into a deep crisis and a liquidity trap in which it has no fiscal space for manoeuvre, then it has fallen into a trap from which it will not be able to escape on its own. Fiscal easing is not feasible, but tightening will also not resolve the situation. *Blanchard et al. (2016)* assessed this problem with a sophisticated DSGE model in the case of the central and peripheral countries of the euro area. According to the calculations of the authors, in such a case the fiscal

¹⁸ Naturally, here we mean such a degree of volatility in business cycles that cannot be sufficiently managed by automatic fiscal stabilisers.

expansion of the central countries may help the peripheral countries. The reason is that the increase in fiscal expenditures of the centre will increase the real GDP of the periphery countries by more than one unit.

Since the lack of space for fiscal manoeuvre in a deep recession and liquidity trap makes recovery from the crisis extremely difficult, it is very important to build up fiscal space during booms. This means that in booms strict fiscal policy is recommended. On the one hand, during such times there is no need for fiscal stimulus, stimulating an overheated economy contradicts the principle of smoothing the cycles. On the other hand, during such times the fiscal multiplier is low, and therefore increasing expenditures would not significantly stimulate the economy, but reducing them would also not cause a substantial loss in output. But the most important aspect is that during periods of booms a tight fiscal policy could serve to build up the fiscal space that is very much needed should a crisis occur.

Based on the arguments presented so far, it is safe to say that counter-cyclical fiscal policy is recommended to be pursued. However, the application of counter-cyclical policy requires great caution. It is important to estimate the state of the business cycle as robustly as possible and to carefully estimate the current value of the expenditure multiplier. The application of automatic fiscal stabilisers could significantly support the implementation of counter-cyclical fiscal policy. We call it an automatic fiscal stabiliser when the budget balance changes automatically whenever the business cycle enters a new stage. For example, in the case of a recession expenditures grow on a stable course, while revenues will fall short owing to the shrinking tax bases. An advantage of automatic stabilisers is that they provide an immediate, symmetric fiscal response to the change in the business cycle, whereas they do not influence budget sustainability over the cycle.¹⁹ The application of automatic fiscal stabilisers does not exclude the application of discretionary steps, for example, in a deep and persistent recession individual economy-stimulating fiscal programmes may also be necessary.

It should be highlighted that the opportunity of applying a counter-cyclical fiscal policy is independent of the steady state size of the public spending in a given economy.²⁰ There are various feasible regimes in the case of developed economies, the average ratio of government spending as a percentage of GDP is relatively low in the United States, for example, while in Sweden it is relatively high. Theoretically, counter-cyclical fiscal policy is feasible in both cases; from this aspect it is the cyclical position of fiscal spending that is important, rather than its average weight. The

¹⁹ As is detailed in the study of *Buti and Gaspar (2015)*, originally the automatic fiscal stabilisers were aimed at redistribution, their business cycle smoothing effect is only a beneficial by-product. Precisely because of that, the matter of automatic fiscal stabilisers should be reconsidered and their business cycle smoothing capability should be improved.

²⁰ Although this has an effect on the size of the automatic fiscal stabilisers, it is independent of the extent of the discretionary decisions that can be made.

average size of fiscal spending does not necessarily affect the fiscal space. If the weight of public expenditure is high, but together with that, the tax burdens are also proportionately high, then public debt remains manageable in terms of size and will not restrict the fiscal space.

Finally, we would like to highlight that the principle of counter-cyclical fiscal policy in itself is not a new result, it was already known before the crisis. The novelty is that since the crisis both the theory and empirical research has confirmed that the size of the fiscal multiplier depends on the state of the business cycle, which provides another strong argument for counter-cyclical fiscal policy.

5. Conclusions

In the study we explored how efficient fiscal policy is as a tool for smoothing business cycles. According to the current economic theory and the most recent empirical research, both the efficiency of fiscal policy and the magnitude of the expenditure multiplier that measures it are state-dependent. During recessions, especially prolonged and deep ones that follow financial crises, when monetary policy becomes ineffective, the magnitude of the expenditure multiplier is high. By contrast, during times of booms the value of the expenditure multiplier is low. In addition to the state of the business cycle, the structure of the economy also affects the magnitude of the expenditure multiplier: in the case of small open economies the value of the multiplier is lower than in similar, but closed economies.

Since the rate of the expenditure multiplier is state-dependent, it is recommended to pursue fiscal policy in a counter-cyclical manner. During times of recessions, when monetary policy is ineffective, fiscal expansion can be used to stimulate the economy in such a manner that no consumption or private investments will be crowded out. By contrast, during times of booms strict fiscal policy should be applied in order to build up the fiscal space that will enable the required fiscal expansion during times of crises.

References

- Auerbach, A.J. – Gorodnichenko, Y. (2012): *Measuring the Output Responses to Fiscal Policy*. American Economic Journal: Economic Policy, 4(2): 1–27. <https://doi.org/10.1257/pol.4.2.1>
- Auerbach, A.J. – Gorodnichenko, Y. (2013): *Fiscal Multipliers in Recessions and Expansions*. In: Alesina, A. – Gavani, F. (ed.): *Fiscal policy after the financial crisis*, University of Chicago Press.
- Auerbach, A.J., – Gorodnichenko, Y. (2017): *Fiscal Stimulus and Fiscal Sustainability*, Kansas City Fed.

- Baksa, D. – Benk, Sz. – Jakab, Z. (2014): *Léteznek "a" költségvetési multiplikátorok? Fiskális és monetáris reakciók, hitelesség és költségvetési multiplikátorok Magyarországon (Does "the" fiscal multiplier exist? Fiscal and monetary reactions, credibility and fiscal multipliers in Hungary)*. Szigma, 45(1–2): 57–83.
- Barro, R.J. (1974): *Are government bonds net wealth?* Journal of Political Economy, 82(6): 1095–1117. <https://doi.org/10.1086/260266>
- Barro, R.J. (1981): *Output effects of government purchases*, Journal of Political Economy, 89: 1086–1121. <https://doi.org/10.1086/261024>
- Batini, N. – Eyraud, L. – Forni, L. – Weber, A. (2014): *Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections*. Fiscal Affairs Department, IMF, Technical Notes and Manuals, September 2014.
- Benczes, I. – Kutasi, G. (2010): *Költségvetési pénzügyek (Fiscal Finances)*. Akadémiai Kiadó.
- Blanchard, O. – Perotti, R. (2002): *An Empirical Characterization of The Dynamic Effects of Changes in Government Spending and Taxes on Output*. The Quarterly Journal of Economics, November.
- Blanchard, O. – Leigh, D. (2013): *Are We Underestimating Short-term Fiscal Multipliers?* American Economic Review.
- Blanchard, O. – Cerutti, E. – Summers, L. (2014): *Inflation and Activity – Two Explorations, and Their Monetary Policy Implications*. ECB Forum on Central Banking 2014.
- Blanchard, O. – Erceg, C.J. – Linde, J. (2016): *Jump-Starting the Euro Area Recovery: Would a Rise in Core Fiscal Spending Help the Periphery?* Manuscript.
- Born, B. – Jüßen, F. – Müller, G.J. (2013): *Exchange rate regimes and fiscal multipliers*. Journal of Economic Dynamics & Control, 37: 446–465. <https://doi.org/10.1016/j.jedc.2012.09.014>
- Buti, M. – Gaspar, V. (2015): *Designing Fiscal Policy for Steady Enduring Growth*, <http://voxeu.org/article/fiscal-policy-enduring-growth>
- Calvo, G. (1983): *Staggered Prices in a Utility Maximizing Framework*. Journal of Monetary Economics, 12(3): 383–398. [https://doi.org/10.1016/0304-3932\(83\)90060-0](https://doi.org/10.1016/0304-3932(83)90060-0)
- Chand, S.K. (1993): *Fiscal Impulse Measures and Their Fiscal Impact*. In: Bléjer, M.I. – Cheasty, A. (ed.): *How to Measure Fiscal Deficit*, International Monetary Fund.
- Chinn, M. (2013): *Fiscal Multipliers*. The New Palgrave, Dictionary of Economics. https://doi.org/10.1057/978-1-349-95121-5_2859-1
- Christiano, L. – Eichenbaum, M. – Rebelo, S. (2011): *When Is the Government Spending Multiplier Large?* Journal of Political Economy, 119(1): 78–121. <https://doi.org/10.1086/659312>

- Delong, J.B. – Summers, L.H. (2012): *Fiscal Policy in a Depressed Economy*. *Brookings Papers on Economic Activity*, Spring: 2332–2374. <https://doi.org/10.1353/eca.2012.0000>
- D’Erasmus, P. – Mendoza, E.G. – Zhang, J. (2016): *What is a Sustainable Public Debt?* In: Taylor, J. B. – Uhlig, H. (ed.): *Handbook of Macroeconomics*, Volume 2, Chapter 32: 2417–2492.
- Eggertsson, G.B. – Krugman, P. (2012): *Debt, Deleveraging and the Liquidity Trap: a Fisher-Minsky-Koo Approach*. *Quarterly Journal of Economics*, 127(3): 1469–1513. <https://doi.org/10.1093/qje/qjs023>
- Eggertsson, G.B. – Mehrota, N.R. (2014): *A Model of Secular Stagnation*, NBER WP, 20574.
- Erceg, C. – Linde, J. (2012): *Is There a Fiscal Free Lunch in a Liquidity Trap?* *International Finance Discussion Papers*, 1003, Board of Governors of the Federal Reserve System.
- Estevão, M. – Samake, I. (2013): *The Economic Effects of Fiscal Consolidation with Debt Feedback*. *IMF Working Paper 13/136*. <https://doi.org/10.5089/9781484304488.001>
- Farhi, E. – Werning, I. (2016): *Fiscal Multipliers: Liquidity Traps and Currency Unions*. In: Taylor, J. B. – Uhlig, H. (ed.): *Handbook of Macroeconomics*, Volume 2, Chapter 31: 2417–2492.
- Friedman, M. (1957): *A Theory of the Consumption Function*. Princeton University Press.
- Fleming, M.J. (1962): *Domestic financial policies under fixed and floating exchange rates*. *IMF Staff Papers*. 9: 369–379.
- Galí, J. (2008): *Monetary Policy, Inflation and the Business Cycle*, Princeton University Press.
- Horváth, Á. – Jakab, M.Z. – P. Kiss, G. – Párkányi, B. (2006): *Myths and Maths: Macroeconomic Effects of Fiscal Adjustments in Hungary*. *Magyar Nemzeti Bank Occasional Papers*, OP 52.
- Huidnrom, R. – Kose, M.A. – Lim, J.J – Ohnsorge, F.L. (2016): *Under The Cloud Of Cycles: Linkages Between Fiscal Multipliers And Positions*. *Policy Research Working Paper*, Wps7724, World Bank Group.
- Ilzetzki, E. – Mendoza, E.G. – Végh, C.A. (2011): *How Big (Small?) are Fiscal Multipliers?* *IMF Working Paper*.
- Keynes, J.M. (1936): *The General Theory of Employment, Interest, and Money*, New York: Macmillan.
- Kraay, A. (2012): *How Large is the Government Spending Multiplier?* *Evidence from World Bank Lending*, The World Bank.
- Lucas, R.E. (1979): *Some International Evidence on Output-Inflation Trade-offs*. *American Economic Review*, 63(3): 326–334.

- Modigliani, F. (1966): *The Life Cycle Hypothesis of Saving, the Demand for Wealth and the Supply of Capital*. Social Research, 33(2): 160–217.
- Mohlmann, J. – Suyker, W. (2015): *An update of Blanchard's and Leigh's estimates in 'Growth Forecast Errors and Fiscal Multipliers'*. VOX, CEPR's Policy Portal, 01 December 2015.
- Mundell, R.A. (1963): *Capital mobility and stabilization policy under fixed and flexible exchange rates*. Canadian Journal of Economic and Political Science, 29(4): 475–485. <https://doi.org/10.2307/139336>
- Owyang, M.T. – Ramey, V.A. – Zubairy, S. (2013): *Are Government Spending Multipliers Greater During Periods of Slack? Evidence from 20th Century Historical Data*. Federal Reserve Bank of St. Louis, Research Division, Working Paper 2013-004A.
- Ramey, V.A. – Shapiro, M.D. (1998): *Costly capital reallocation and the effects of government spending*. Carnegie-Rochester Conference Series on Public Policy, 48(1): 145–194. [https://doi.org/10.1016/S0167-2231\(98\)00020-7](https://doi.org/10.1016/S0167-2231(98)00020-7)
- Ramey, V.A. (2011): *Identifying Government Spending Shocks: It's All in the Timing*. Quarterly Journal of Economics, 126 (1): 1–50. <https://doi.org/10.1093/qje/qjq008>
- Riera-Crichton, D. – Vegh, C.A. – Vuletin, G. (2016): *Tax multipliers: Pitfalls in measurement and identification*. Journal of Monetary Economics, 79: 30–48. <https://doi.org/10.1016/j.jmoneco.2016.03.003>
- Sargent, T. – Wallace, N. (1975): *Rational Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule*. Journal of Political Economy, 83(2): 241–254. <https://doi.org/10.1086/260321>
- Spilimbergo, A. – Symansky, S. – Schindler, M. (2011): *Fiscal Multipliers*. IMF Staff Position Note, SPN/09/11.
- Szentmihályi, Sz. – Világi, B. (2015): *The Phillips curve – history of thought and empirical evidence*. Financial and Economic Review, 14(4): 5–28. <http://english.hitelintezetiszemle.hu/letoltes/1-szentmihalyi-vilagi-en.pdf>
- Woodford, M. (2011): *Simple Analytics of the Government Expenditure Multiplier*. American Economic Journal: Macroeconomics, 3: 1–35. <https://doi.org/10.1257/mac.3.1.1>
- Zubairy, S. (2010): *On Fiscal Multipliers: Estimates from a Medium Scale DSGE Model*. Bank of Canada Working Paper 2010-30, November 2010.