

The effects of discretionary fiscal policy on macroeconomic aggregates

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The evidence on the practice and effects of discretionary fiscal policy, particularly in the context of recent efforts to stimulate the economy, is reviewed where two main conclusions are drawn. First, policy interventions have increased in this decade pre-dating the 2009 stimulus. Second, despite huge economic literature on the topic, the state of theory and evidence is not as "shovel ready" as one would like. Although consumption and investment clearly respond to tax incentives and structural vector auto-regressions show that lower taxes and higher government purchases can boost output, it is difficult to apply the findings in the current context, in part because multipliers and policy lags are likely to vary with economic conditions. This paper considers theoretical predictions and recent empirical Vector Autoregression (VAR) evidence on the short-run effects of discretionary fiscal policy on macroeconomic aggregates.

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Introduction

The effectiveness of a fiscal policy in stimulating the real economy is an ongoing intellectual debate in prominent academic journals and columns with high-profile, starting from the time when Keynes wrote his revolutionary work *The General Theory of Employment, Interest, and Money* (1936), whose inspiration was just the economic crisis of 1929 that failed to ignite the biggest debates, but the passion of whom is felt today. It succeeded in refuting the economic theory, which proposed that the economy was free from the control of the state arguing that an economic depression should either increase the level of private investment or create public substitutes as a temporary replacement of necessary private investment. Can an expansive fiscal policy increase production and consumption through increases in state spending or tax cuts? If yes, by how much? These are not the key issues in macroeconomics and public finance only, but also the issues that policymakers often face. Recent fiscal stimulus packages that were adopted by many leading economies were seen as a necessary prescription for alleviating the impact of the current global economic crisis. (IMF, 2008; 2009).

Economic theory has offered more than one prediction depending on the characteristics of the economy taken into consideration: Is it "neo-classical" or "Keynesian" world? Are consumers "Ricardians" or "Non-Ricardians"? Whether is it a closed or open economy? Modern dynamic stochastic general equilibrium models have different implications from that of conventional Keynesian theory. Responses vary not only in terms of the extent of the effect, but also, in some cases the direction of the effect. It seems that the theoretical debate failed to reach a consensus because of the lack of conclusive empirical evidence. Econometric studies that use "Vector Autoregression" (VAR) analysis have offered

combined support. A key problem with this view is the identification of effects of changes in fiscal policy at the time when all other effects are isolated.

A brief summary of fiscal policy models

After the Great Depression and the Second World War as well as the Keynesian revolution victory, macroeconomics takes a new course and expands economic knowledge through the application of the model of Léon Walras, who made the first attempt at making models that would cover many aspects of the real economy. Walras was a follower of a neoclassical school or general equilibrium model that included multiple markets, until those of Keynes and monetarists for business cycles (Patinkin, 1982). With the publication of the revolutionary work of Keynes *General Theory of Employment, Interest and Money* in 1936 and its strong echo in economic public, Nobel Laureate Sir John Hicks (Sir John Hicks) developed the well-known IS-LM model as a general framework for macroeconomic analysis in a closed economy using the ideas of Keynes in 1937. The name of this model comes from two basic conditions of equilibrium: investment, I , must equal savings, S , and that the demand for money, L , must be equal to the money supply, M .

Keynesian model was primarily created during the Great Depression when economists were trying to explain the global decline of the economy and create policies that would help the economy to return to the normal condition. Early Keynesians emphasized that fiscal policy, the decision of the state regarding public revenue, and public expenditure could significantly affect output and employment levels. Overall in macroeconomics there are two basic theories of business cycles (recession and expansion): classicists and policy Keynesians.

According to Classicists prices and wages are assumed to adjust quickly and that markets are always in a general equilibrium. They believe that business cycles represent the best response for disturbances in the economy, such as the productive shocks, where there is little justification for state intervention to mitigate business cycles. Opposite of that, Keynesians are less optimistic regarding the ability of the free market (free-market economies) to respond quickly and effectively to shocks. One of the central ideas of Keynes is that prices and rents are rigid and do not adapt quickly to the level of "cleaning markets", i.e. balancing three core markets in the economy: the market of goods and services (as shown through the IS curve), money market (shown by LM curve) and the labor market (as shown by FE curve). Rigidity of wages and prices shows that the economy can be far from the level of general equilibrium for a period of time. Therefore, the deep recession is not an optimal free market response to external shocks, but despite this, it is a state of imbalance in which high unemployment shows that labor supply is greater than demand for labor. Keynesians believe that the state should intervene to eliminate or at least minimize the periods of low output and high unemployment.

After Hicks, several generations of economists have worked to improve the IS-LM model, and it was widely applied in the analysis of cyclical fluctuations and macroeconomic policy and forecasting. Although being identified with Keynesian approach, the said model can also be used to represent and discuss the classical approach to the analysis of the business cycle because of its adaptive nature. This model is equivalent to the AD-AS model with only significant difference that IS-LM model takes into account the relationship between real interest rates and output, while the AD-AS model examines the relationship between prices and output in its analysis. Because of this, IS-LM model is useful for studying the effects of various shocks on real interest rates and variables such as savings and investments, which depend on real interest rates while the AD-AS model is more practical price shocks and inflation.

Basic theoretical and scholar treatment of fiscal policy in an open economy is the Mundell-Fleming model, which was developed in the early 1960s and which is complementary to the IS-LM model. The model makes distinction between flexible and fixed exchange rates. In addition, this model can be used to study the effects of policies in terms of perfect and imperfect capital mobility. The model assumes perfect capital mobility, because this is the reality for industrial economies nowadays. Again, the model describes the short term and assumes constant prices. When the state applies fiscal expansion, it shifts the IS curve to the right and upward putting pressure on domestic interest rates, which begin to rise above the level of foreign interest rates. Then, there will be an inflow of capital that will lead to increased demand for domestic currency in the foreign exchange market.

In terms of the flexible exchange rate regime, the domestic currency appreciates undermining the competitive position of the country. Net export declines and the IS curve shifts back to its original position leaving output and consumption unchanged. In terms of the fixed exchange rate regime, the exchange rate pressure is eliminated by increasing the supply of domestic currency (money supply growth). Equilibrium output (and consumption) grows while net exports remains at the same level. Fiscal expansion leaves the aggregate demand curve to the same level in terms of a flexible exchange rate, while it shifts to the right in terms of a fixed exchange rate. Then, the adjustment mechanism similar to the above arises. Again, this model of an open economy is not based on micro-foundations and future effects of fiscal expansion in the form of accumulation of debt and higher taxes are neglected.

However, the old IS-LM model and its extension completed its work. The model was simple and the order in the meaning of its parameters was agreed by most economists. In other words, there was consensus on its meaning and application and when economists or policy makers did not agree among themselves, they, however, spoke the same language. Differences can be observed in respect of different objectives, namely in avoiding inflation versus avoiding recession or slowing economy. Consensus was subjected to an attack in 1970 and soon it was loose in academic circles. Although more sophisticated models were proposed, nothing was able to completely replace the old IS-LM model. The model that now is approaching closest in the role of a communication mean, at least in one part of the profession, is a DSGE model. However, the model and its results are very often specific to each researcher. In fact, one researcher may specify the model and may select independent parameters that are considered for analysis and come to the conclusion that the stimulus measures are effective. On the contrary, another researcher may change the structure of the model or simply erase state spending on the model and summarize that the stimulus has no effect. It is really difficult to communicate results among economists. Discussion boils down to "my model" versus "your model". Communication of findings to policy makers or to the public is even harder.

During the recession of 2007-2009, conclusions and recommendations of proponents of DSGE models were barely heard. Some economists have expressed their concern over miscommunication between academic macroeconomic researchers and the creators of macroeconomic policy. IS-LM model was taught by students in America and around the world owing to the classic Samuelson textbook. But there was a significant difference with current models. There was no dispute about the essence of models. Results and method, which provide the variation of key macroeconomic variables were of great importance for a group of people, who until then had other means of checking results. What macroeconomics needs today is more a advanced and sophisticated model with simple understanding and management as famous IS-LM model. But it could be a higher target.

When examining the transmission mechanism of fiscal policy key assumption of any model is whether or not the agents take into account the expectations for the future. In the absence of forward-looking behavior with micro fundamentals, expected changes in future have no effect on decisions made in the current period, while future-oriented consumers respond on the basis of rational expectations in the current period for expected changes to future variables. Hereinafter, the paper will provide an overview of theoretical predictions of two different models - the model with and without micro basis in anticipation of changes in future.

Theories without micro-founded forward looking behavior

In the Classical model, in which prices are fully flexible and the supply curve is vertical, there is no role for a fiscal policy. In the other boundary of the world, the Keynesian model, illustrated by the undergraduate IS-LM and Mundell-Fleming analyses, prices are sticky and current consumption depends on current income with no role for expected future income. In this world, an expansionary fiscal policy can stimulate the economy with multiple effects. The mechanism by which these effects occur depends on the degree of openness and the embraced exchange rate regime of the economy. In a closed economy, for a given level of money supply, an increase in government spending stimulates economic activity by increasing production. Given the fact that the demand depends on income, increase in production (output) increases the interest rate, which further leads to crowding out of private investment.

The degree of crowding out depends on the sensitivity of private investment to income and interest rate. The final effect of the expansion is an increase in output, total investment and consumption. A fiscal expansion in the form of a tax cut boosts private consumption leading to an increase in aggregate demand and output. Also in this case, like the expansion of government spending, the resulting increase in the interest rate partially crowds out private investment. Hence, the effects of a tax cut are qualitatively the same as the increase in government spending. The tax multiplier, however, is smaller than the government-spending multiplier since a part of the increase in disposable income will be saved and not directly spent. In a small open economy with a flexible exchange rate regime, a fiscal expansion creates upward pressure on interest rates. If capital is perfectly mobile, and interest rates are fixed at the world level, capital flows into the economy will lead to increased demand for the domestic currency. As a consequence, the nominal exchange rate will appreciate. Because prices are fixed, the appreciation of the nominal exchange rate will be transformed to an appreciation of the real exchange rate. Consequently, net exports decline. This negative effect on the trade balance neutralizes the previous effect of expansionary fiscal policy. So, under this option, fiscal policy in small open economies with flexible exchange rate regime is ineffective. As a small and open economy cannot affect the rest of the world, the case of a large open economy is located between the two polar of a closed and small open economy.

In an open economy with a fixed exchange rate regime, fiscal expansion puts upward pressure on the exchange rate and interest rate. Money supply increases to defend the fixed exchange rate parity. The final effect is an increase in output. Hence, fiscal policy under this scenario is effective in stimulating output. In an open economy with a fixed exchange rate, a fiscal expansion puts upward pressure on the exchange rate and interest rates. Money supply increases in order to defend the fixed exchange rate parity. The final effect is an increase in output. Hence, fiscal policy under this scenario is effective in stimulating output. Modern economies are open and fully realize the importance of international trade, economic and political ties. Small economies, if necessary, are closed, if they are interested in their economic prosperity. Therefore, the analysis of the effects of a fiscal policy needs to recognize the fact that each national economy is part of the global economy.

In an integrated world, domestic fiscal policy can affect foreign economies, especially in the case of a currency union i.e a multi-country Mundell-Fleming model with a fixed exchange rate regime. Fiscal policy externalities may occur in the opposite directions. The increase in domestic output will lead to additional imports from countries that are major trading partners, which in turn will cause an increase in the income of trading partners (trade channel). At the same time, the initial upward pressure on the domestic interest rate attracts foreign capital including capital from other members of the currency union. Hence, members' interest rates are under upward pressure. As a result, the union-wide interest rate may rise. This, in turn, has a contractionary effect on output (interest rate channel). Additionally, the exchange rate of the union currency is floating with the rest of the world. If the fiscal expansion in a (large) member economy causes an appreciation to the real exchange rate with the rest of the world, as the Mundell-Fleming model predicts, the expansionary effects will be dampened due to worsening trade balance.

However, the theoretical reasoning assumes that one country implements a fiscal stimulus plan, possibly in response to a country-specific negative shock, while ignoring the policy of the rest of the world. In an environment of an international economic downturn (a common global shock), one might argue in favor of a collective fiscal effort. As mentioned above, the effects of fiscal stimuli in highly open economies can be retarded by the appreciation of the real exchange rate and the deterioration of the trade balance. Coordinated fiscal actions among trading partners can reduce the bill of the country specific fiscal stimulus and eliminate free-riding possibilities. In summary, fiscal stimulus is less effective in open economies because of the spending absorbed by imports, whose benefits are used by countries that had exported the final products through increased output and employment. This is why collective action is particularly important in times of crisis. If more countries are coordinated, the burden of a particular country will be lower. This happened in the present crisis. Countries referred to in a coordinated direction, providing a global fiscal stimulus of 2% of GDP in 2009 according to the anticipated assumptions from a year ago.

Theories with micro-founded forward looking behavior

The analysis presented in the previous section is not based on micro-founded behaviors. Macroeconomic theory is increasingly being built on Dynamic Stochastic General Equilibrium (DSGE) models to derive micro-founded inter-temporal aggregate relations that explain the factors behind economic fluctuations. Typically, DSGE models incorporate forward looking agents and rational expectations. The modeling strategy is as follows: All agents in the model follow optimal plans. Consumers maximize lifetime expected utility subject to the budget constraint. Firms maximize profits subject to the available technology, and the government has to satisfy the government budget constraint. To solve the model, usually, the resulting optimization conditions together with the equilibrium conditions are brought into one line around the steady state. The economy in these models is subject to stochastic disturbances, which are named "shocks". A disturbance to a fiscal variable, government spending or taxes, is a fiscal shock. In order to study the dynamics of the variables following a shock, the model parameters are calibrated and/or estimated. Calibration means assigning values to the parameters based on micro econometric evidence or theoretical justifications. Two important assumptions distinguish between two types of DSGE models: The Real Business Cycle (RBC) model, in which prices are flexible and perfect competition prevails in all markets and the New Keynesian (NK) models with sticky prices and imperfect competition.

In order to determine which shocks have the greatest impact on cyclical fluctuations, an influential group of classical macroeconomists, led by Edward Prescott of the University of Minnesota and Finn Kydland from Carnegie Mellon University, developed a theory known as the Real Business Cycle theory, which received the Nobel Prize in 2004. According to this theory, real shocks to the economy are the main causes of the business

cycle. Real shocks are disturbances to the “real side” of the economy, such as shocks affecting the production function, the size of the people who work, the actual amount of state purchase of goods and services, and consumer decisions.

According to these economists, many economic booms occur as a result of positive productivity shocks and many recessions are caused by negative productivity shocks. In a prototypical RBC model, government spending is financed by lump-sum taxes. The forward looking consumer understands that additional government purchases in the current period have to be financed by taxes in the future. Therefore, an increase in government spending reduces the household wealth by increasing the present value of household tax liabilities (negative wealth effect). As a result, consumption declines while interest rate, saving, and labor supply increase. The response of private consumption to the increase in government spending is independent of the financing tool. Permanent income is the same with a tax-financed or a debt-financed expansion; i.e. Ricardian equivalence holds. Burnside et al. (2004) show that the effects of distortionary taxes are qualitatively and quantitatively similar to the effects of lump-sum taxes except for some differences concerning the timing of the peak response. Thus, in contrast to the Keynesian prediction, RBC models predict a negative effect of fiscal expansion on consumption, albeit a positive effect on output. Overall, their work has introduced three innovations in macroeconomics: DSGE (Dynamic Stochastic General Equilibrium Models) as a means of analyzing the overall economic phenomena, calibration as a means of quantifying the macro-models and the theory of real business cycles.

TABLE 1. THEORETICAL PREDICTIONS ON THE QUALITATIVE RESPONSE OF KEY VARIABLES

	Y	C	Ld	Ls	Real wage	Interest rate	Private investment	Trade balance	Real exchange rate
Keynesian: closed economy	+	+	+	+	-	+	-		
Keynesian: flexible exchange rate	=	+	=	=	=	=	=	-	+
Keynesian: fixed exchange rate	+	+	+	+	-	=	=	=	=
Real business cycle	+	-	=	+	-	+	+	-	+
New Keynesian	+	-	+	+	+	+	-	-	+

Source: Hebous, Shafik (2009), “*The effects of Discretionary Fiscal Policy on Macroeconomic Aggregates: A Reappraisal*”, Goethe University Frankfurt, Munich Personal PePEc Archive, MPRA

Note: The sign “+” indicates a positive effect and in the case of the real exchange rate an appreciation whereas the sign “-” indicates a negative effect and in the case of the real exchange rate a depreciation. The sign “=” indicates no effect.

* While the Keynesian model is mute on the exact transmission mechanism that occurs in the labor market following a fiscal expansion, according to the Neo-Keynesian interpretation, firms demand labor up to the point where the marginal product of labor equals the real wage. The expansionary effect increases prices, reduces *real* wages. Hence, firms hire more labor

The New Keynesian DSGE framework adopts the RBC modeling strategy of deriving micro-founded aggregate relations, but fundamentally differs in assuming monopolistic competition and nominal rigidities. Analyzing fiscal policy in a standard NK DSGE model generally gives similar predictions to those of a prototypical RBC model: an increase in output and a decrease in consumption. This is due to the negative wealth effect of a fiscal

expansion resulting from the embedded forward looking behavior of households in both types of models. The labor market reacts differently, though. As stressed by Pappa (2009), in contrast to the RBC prediction, real wages in a NK model increase after a positive shock to government consumption. This is because the resulting increase in output raises the demand for labor, which in a NK setup offsets the increase in the labor supply due to the negative wealth effect. Many NK DSGE models do not include capital (short-run models), and therefore, refrain from fully modeling private investment decisions. In models with capital accumulation, an increase in government spending raises the interest rate and crowds out private investment.

Christiano, Eichenbaum, and Rebelo (2009) show that when zero bound of the nominal interest rate is strictly binding, the positive effect of an increase in government spending on output raises expected inflation. This in turn causes a decline in the real interest rate. In a such economy, the government spending multiplier is relatively large. Thus, in its simplest form, a NK DSGE model misses the Keynesian prediction of a positive effect of a fiscal expansion on consumption. Furthermore, Monacelli and Perotti (forthcoming) show that an increase in government spending in a standard open economy DSGE model typically causes an appreciation of the real exchange rate and worsens the trade balance.

Conclusion

Empirical and VAR techniques endeavor to clarify what an economic model should predict. These attempts are confronted with the difficult task of isolating the fiscal effect from other disturbances. The overall picture of available evidence from VAR studies can be summarized as follows: output increases following the expansionary fiscal shock; there are some exceptions though. The magnitude of the effect depends on the country under consideration and the sample period. This finding is consistent with the Keynesian and most DSGE models. Consumption increases in most studies particularly in those that tend to capture unanticipated shocks. Although this finding indicates a Keynesian effect, consumption decreases or shows no significant effect in empirical studies that tend to capture anticipated shocks in line with theories of forward looking behavior. Furthermore, employment seems to increase following an expansionary fiscal shock. The reactions of the real wage and interest rate are not clear-cut making it difficult to draw support in favor or against a particular model.

The bulk of the evidence seems consistent with an increase in government purchases or a reduction in net taxes having a short-run positive effect on economic activity and aggregate consumption. However, for government purchases an increase in the cost resulting from higher future taxes may be quite large. Moreover, there is much disagreement about the size of the short-run stimulating effect of a fiscal expansion. This may not be surprising because fiscal expansions can come in many forms and have theoretically different effects under different circumstances. Furthermore, empirical analysis has a hard time identifying truly exogenous fiscal shocks and suffers from the potential presence of anticipation effects of fiscal policy changes. There is another reason to be careful with discretionary fiscal expansions, in particular, increases in government purchases. Such expansions are almost inevitably unevenly distributed across the sectors. For example, infrastructure investment benefits the construction sector and defense expenditure benefits part of the manufacturing sector. The stimulus to these sectors may come at cost of hurting other sectors, as the above discussion has suggested. An increase in government wage consumption (attracting more workers into the public sector) likely drives up the general wage level and hurts the competitiveness of the export sector.

In view of the complications with an active fiscal policy, for lack of a better alternative the best advice may be to simply let the automatic stabilizers work. They dampen business cycle movements without any active policy intervention. If the economy slows down or falls into a recession, tax revenues from any source that is sensitive to the business cycle fall, while government transfers (in particular, unemployment benefits) increase. Both

factors protect disposable income against the slowdown of the economy. Given the empirical sensitivity of consumption to disposable income, this dampens the downward movement of the business cycle. Surely, reliance on automatic stabilizers has its disadvantages too. Automatic stabilizers (movements in tax revenues and transfers) make no distinction between the specific sources of shocks, or between whether a shock is permanent or temporary. For example, letting automatic stabilizers operate freely in case of a permanent or very persistent adverse shock (such as the one that occurred in the seventies) could lead to unsustainable budget movements. However, in that case, an automatic link between the cyclically adjusted primary deficit (taxes) and the public debt level would easily restore fiscal sustainability without having to give up the advantages of the automatic stabilizers.

During the current mortgage crisis there was widely accepted consensus among economists that the only way out from the current crisis was aggressive expansionary monetary and fiscal policies, especially the implementation of significant fiscal stimulus. Successful policy responses to the crisis were directed in two segments: 1) recovery in the financial sector, and 2) stimulating the aggregate demand. Under present conditions the main director of the IMF stressed the importance of fiscal response on the global level. Thus, we can see the effectiveness of discretionary fiscal policy in the recovery of the world economy and its positive effects on macroeconomic variables. However, what will be the effects of fiscal policy on macroeconomic variables depends on many factors, including country's economic and social conditions, the fiscal discipline in the implementation of measures, timely fiscal consolidation, which is necessary to avoid debt crises and eligible econometric models that will include several important elements in analyzing the effects of fiscal policy and will provide greater reliability in researches and analyses. In anticipation of the persuasive conclusion, the reader may ask himself/herself whether he/she is Ricardian while the investor will be interested in knowing whether or not government's fiscal expansion will crowd out the investment.

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