

Balázs Krusper and Gábor Pellényi: Impacts of fiscal adjustments in Western European countries on the Hungarian economy*

In the wake of the Greek debt crisis, concerns about the sustainability of public debt have intensified. As a result, from the summer of 2010 several euro area member states announced fiscal austerity measures. These adjustments have a significant impact on the economic outlook of the euro area and, indirectly, Hungary. Over the short term, the spending cuts will reduce demand and restrain inflation in the euro area, resulting in restricted export opportunities for the Hungarian economy. Fiscal adjustments in Western Europe cutting public expenditures by a total of 1 percent of GDP for a period of two years could lower the growth rate of the Hungarian economy by 0.2 percentage points each year. In the context of declining import prices and a downturn in domestic demand, inflation is expected to moderate, albeit to a negligible extent. Somewhat stronger effects should be expected if the debt crisis of the euro area's peripheral countries escalates further, and the increasing domestic debt burden driven by rising risk premia undermine domestic demand more markedly over the short term.

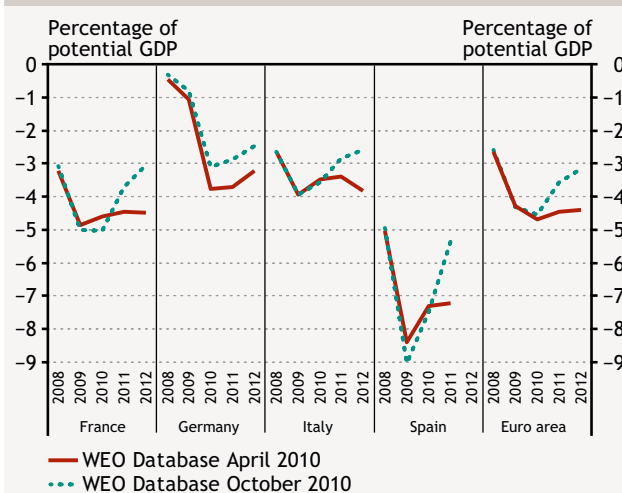
INTRODUCTION

The global financial crisis starting in 2008 led to a global economic recession on a scale not seen since World War II. In an effort to dampen the economic slowdown, several countries responded to the crisis with countercyclical fiscal policies. In 2009 and 2010 respectively, fiscal expansion amounted to 0.7-0.8 percent of GDP in the euro area.¹ As a result, the structural budget balance of euro area member states² deteriorated significantly between 2008 and 2010 (see Chart 1).

Government efforts to boost demand contributed to the stabilisation of demand. While the fiscal stimulus packages were intended to be temporary, growing public deficits foreshadowed deteriorating debt dynamics in several euro area member states. Risks related to public debts were further exacerbated by the government guarantees undertaken with a view to protecting the financial system. The intensification of the Greek debt crisis in early 2010 aggravated investors' concerns about the sustainability of the public debt of other European countries. Thus an increasing number of governments announced adjustment plans from the middle of the year in the euro area countries.

Chart 1

Changes in the structural budget balance forecasts of major euro area economies



Source: IMF World Economic Outlook Database, April 2010 and October 2010.

This is also reflected in the budgetary position forecasts of the euro area: according to the forecast of the IMF, deficit reduction measures may improve the structural balance of

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

¹ The United States and Asia saw an even larger expansion by 2 percent of GDP; see Coenen et al. (2010).

² The structural balance indicates the budgetary position as a percentage of potential GDP excluding temporary effects (e.g. business cycle). The method of filtering the effects of the business cycle is described, for example, by P. Kiss and Reppa (2010).

the euro area by more than 1 percentage point by 2012 (see Chart 1).

Changes in fiscal policy can significantly influence macroeconomic developments. Understanding and quantifying these changes is an intriguing issue in itself, and all the more so as the euro area is the most important export market for Hungary. Therefore, the fiscal tightening envisaged for our trade partners may have a considerable influence on Hungary's domestic growth and inflation outlook over the monetary policy horizon. In this article we make an attempt to estimate this effect as well.

MACROECONOMIC EFFECTS OF FISCAL POLICY

Different economic theories assess the effects of fiscal policy in various ways.³ In the traditional Keynesian framework, fiscal policy can stabilise the short-term fluctuations of economic activity and employment by regulating demand. By contrast, longer-term supply effects play a predominant role in the neoclassical theory (e.g. Baxter and King, 1993). In these models rising government expenditures deteriorate households' financial wealth as households predict that tax rates will be raised inevitably in order to finance the rising public debt (*Ricardian equivalence*). Striving to increase their savings, households are willing to work more and restrain their consumption. In the short run, the growth in labour supply increases the level of employment, investment and output.

The negative wealth effect derived in the neoclassical approach leads to a decline in consumption, which contradicts empirical observations. The situation is the same in the New Keynesian theory as well, which assumes that prices are sticky over the short term; in other words, they adjust to the changed supply-demand conditions with a lag (e.g. Linnemann and Schabert, 2003). One way to eliminate the negative response of consumption would be to assume, in addition to short-term price rigidity, that a fraction of households are unable to save and borrow (e.g. Galí et al., 2007). These households spend all of the extra income generated by the budgetary expansion, and thus the response of aggregate consumption can be positive.⁴

The effects of fiscal expansions and adjustments are typically symmetrical in the economic models. Accordingly, based on the mechanisms described above, while fiscal tightening restricts GDP and consumption over the short term, it also reduces inflation and lowers the level of real interest rates. However, it has been observed in several cases that fiscal consolidation boosts the economy even over the short term.⁵ One possible explanation for this is that a credible fiscal adjustment may significantly mitigate the risk of sovereign default, and growing confidence may lead to a more pronounced decline in interest rates, while it boosts consumption as well as investment.

In addition, fiscal policy instruments can influence the potential output of the economy through several channels (e.g. by the distorting effect of taxes).⁶ Fiscal adjustments can be expressly beneficial over the long run – for example, when the fiscal room for manoeuvre created by the curbing of public debt is used to reduce distorting taxes.

RESPONSE OF THE EURO AREA TO FISCAL SHOCKS

The macroeconomic effects of fiscal policy have been examined by a great number of empirical studies.⁷ The literature contains simulations performed both with traditional macroeconomic models and dynamic stochastic general equilibrium (DSGE) models. In our analysis we use the results of several models calibrated for the euro area, along with times series estimates which are often used as a starting point for the calibration of macro-models.

There are several differences between the models used, depending on whether they involve forward-looking expectations and on the level of detail in the presentation of fiscal policy and global economic relations (see Table 1). They share a common characteristic: the effect of fiscal policy on potential growth is not modelled.

We examine three DSGE models calibrated for the euro area, which share certain common features in that they are based on rational expectations and forward-looking behaviour; however, they contain different frictions and liquidity constraints.⁸ The GIMF used by the IMF is also a DSGE model, but covers several global economic regions.

³ For a more detailed description of theoretical effects and further references see, for example, Beetsma (2008).

⁴ The consequences will be similar if the utility of households depends on the extent to which their current consumption differs from that of the previous period (habit formation, e.g. Burnside et al., 2004). In this case, the positive consumption effect of an increase in current income could, over the short run, offset the negative effect of a decline in wealth.

⁵ The literature of this topic is summarised, for example, in Horváth et al. (2006).

⁶ See, for example, the simulations of d'Auria et al. (2009) for the EU Member States.

⁷ For a detailed overview of the relevant literature see, for example, Spilimbergo et al. (2009).

⁸ We used the models in the database of Wieland et al. (2009) to perform our own simulations.

Table 1
Presentation of models exploring the effects of fiscal shocks in the euro area

Modell		Forward-looking expectations	Detailed fiscal block	International linkages	More information
DSGE models	Adolfson et al. (2007)	Yes	Partly	Exogenous rest of the world	Wieland et al. (2009)
	Coenen et al. (2008, NAWM)	Yes	Yes	Two regions	
	Smets and Wouters (2003)	Yes	No	Closed economy	
Global Integrated Monetary and Fiscal Model (GIMF)		Yes	Yes	Multi-region	Kumhof et al. (2010)
Area Wide Model (AWM)		Partly	No	Exogenous rest of the world	Wieland et al. (2009)
OECD model		No	Yes	Multi-region	Hervé et al. (2010)

The (old) Area Wide Model developed by the ECB contains only a limited form of forward-looking expectations, while the OECD's model does not contain them at all.

Perotti (2005) estimates VAR models for five OECD countries and proceeds to identify fiscal shocks from changes in the cyclically adjusted expenditures. The impulse response of the euro area is defined as the average of the two European countries included in the sample (Germany and the United Kingdom).

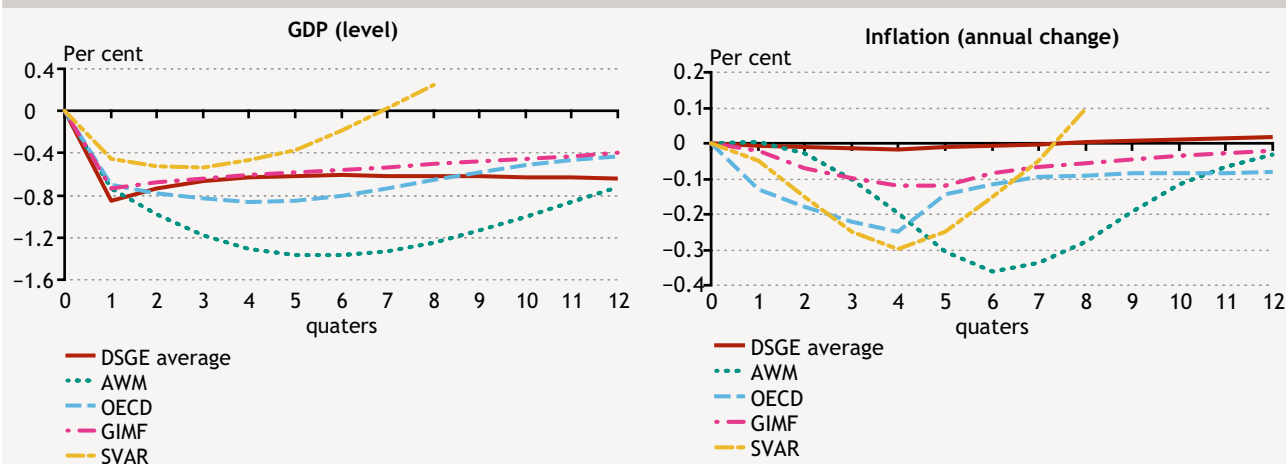
A fiscal shock is interpreted as a persistent change in (cyclically adjusted) government spending by 1 percent of GDP. The shock should be interpreted ex ante: taking account of second-round effects (those including the response of the economy), the change in GDP-proportionate spending may well be different than 1 percentage point. In

the case of the GIMF model we apply a different shock: here, with a fairly typical combination of income and expenditure side measures, the budget balance changes persistently by 1 percent of GDP (ex post).

Although this definition of shocks may be debated, after careful consideration we can conclude that our calculations may indeed yield an upper estimate for the effects of a real fiscal intervention. There may be a difference, for example, in the effect of the different fiscal policy instruments on GDP. The largest multipliers typically belong to expenditures, while in the short run, the impact of taxes and transfers on GDP may be one quarter or one half of the values presented above.⁹ According to the survey of the IMF (2010a), between 2010 and 2013 most countries intend to focus adjustments primarily on the expenditure side; therefore, the expenditure multiplier can be a useful starting point. It

Chart 2
Impact of fiscal tightening on the economy of the euro area

(quarterly impulse responses to permanent government spending cuts by 1 percent of GDP)



Note: for a description of the models, see Table 1. SVAR = Average of the estimates of Perotti (2005) pertaining to Germany and Great Britain.

⁹ See, for example, Coenen et al. (2010), Spilimbergo et al. (2009).

could pose another problem that we do not reckon with the limited room for manoeuvre of monetary policy. With the current low interest rate levels there is less room for interest rate cuts, which can dampen the negative growth impact of a fiscal tightening. In our simulations, however, the interest rate level changes only marginally, by no more than 30 basis points, which may not necessarily imply an effective constraint for European monetary policy. Finally, we also ignore possible positive impacts on potential output, although they are more likely to materialise over longer horizons.

The impulse response of the euro area's GDP fundamentally depends on the assumption about how forward-looking economic agents are (see Chart 2). In the DSGE models, with forward-looking economic agents the multiplier is around 0.7 percent in the first year before dissipating slowly. If the expectations are mostly backward-looking – as in the AWM model – the value of the multiplier may remain above 1 for a duration of two years. The impulse responses of the OECD model are more moderate, owing in part to the endogenous monetary policy response, and in part to growing imports and deteriorating international competitiveness in the context of the fiscal expansion. The time series estimates appear to be closer to the results of the DSGE models. At the same time, the impulse responses of the SVAR model based on empirical observations suggest a stronger effect.

The behaviour of prices reflects the response of economic activity: the models with a greater multiplier effect have stronger impulse responses. With forward-looking expectations, the effect on prices is negligible; the inflation rate changes by a maximum of 0.1 percentage point.

Which models generate more credible impulse responses? The answer is not clear. The DSGE models may better capture a world where a fiscal adjustment leads to a more sustainable public debt path, strengthening the confidence of economic agents. At the same time, based on French data, Bouthevillain and Dufrénot (2010) argue that the short-term Keynesian effects of fiscal policy may increase at times of crisis because, for example, growing unemployment tightens consumers' liquidity constraints. This scenario may be better described by traditional

macroeconomic models that lack a forward-looking approach.

IMPACT OF EURO AREA FISCAL ADJUSTMENTS ON THE HUNGARIAN ECONOMY

We quantify the impact of the fiscal adjustment measures envisaged in the euro area on the Hungarian economy by means of DELPHI, a macroeconometric model used for the preparation of the forecast presented in the *Quarterly Report on Inflation*.¹⁰ In the following, we briefly describe the channels taken into account during the simulations.

On the one hand, exports are reduced by the decline in external demand resulting from the restrictions; on the other hand, owing to unfavourable sales prospects, firms restrain investment projects.¹¹ At the same time, due to the high import content of exports and investment, the deterioration in net exports is moderate and temporary only. With waning demand, firms' labour demand declines as well, leading to a downturn in wages and employment. The resulting shortfall in labour income reduces consumption, albeit to a lesser extent than the change in exports and investment. This generates a permanent, overall decline in GDP.

Lower wages, as well as the negative output gap resulting from the drop in demand, reduce inflation. In addition, fiscal tightening lowers inflation across the euro area, which may reduce domestic inflation as well through the pricing of imported goods.¹²

In our simulation we examine a scenario where public expenditures are cut (permanently) by 0.5 percent in two consecutive years in the euro area. The extent of the fiscal tightening is similar in magnitude to that of the adjustment plans announced in the summer of 2010 in Western Europe.

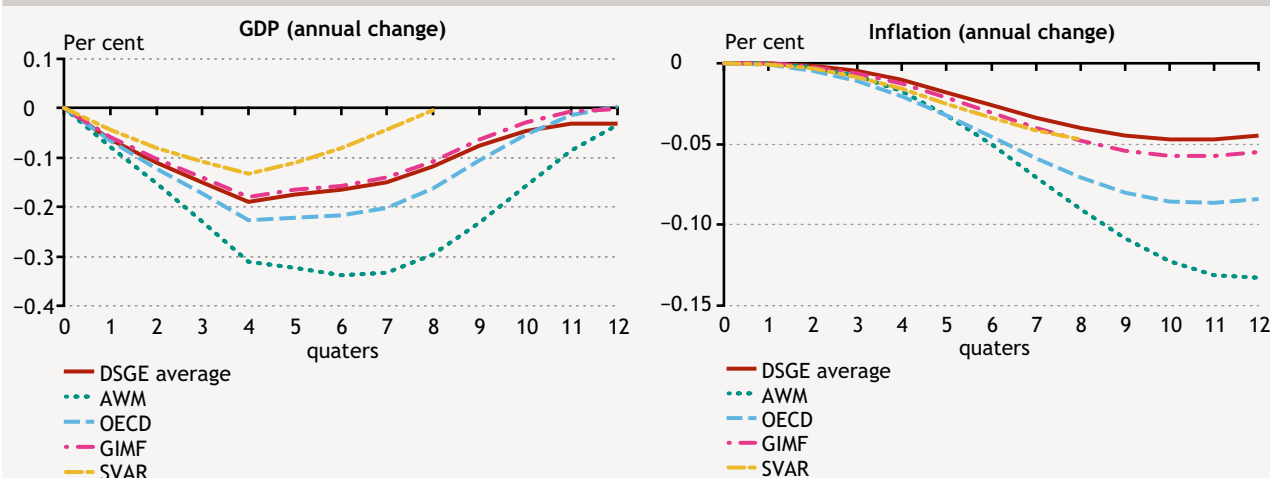
Over the monetary policy horizon, the adjustments deteriorate our growth outlook perceptibly, while they lower inflation only slightly. The domestic GDP shortfall could amount to one half of that observed in the euro area; European adjustments may lower Hungarian GDP growth by

¹⁰ For the main characteristics of the DELPHI model, see Box 3-1 of the June issue of the *Quarterly Report on Inflation* (MNB, 2010a). A complete description of the model will be published shortly in an *MNB Working Paper*.

¹¹ In the DELPHI model we capture the developments in global economic activity by the import of our foreign trade partners. Since Hungarian exports are not limited to the euro area, we first use the GDP change of the euro area to define changes in the aggregate output of our foreign trade partners. In the second step, based on this figure we calculate the response of our foreign trade partners' aggregate import: If the shock originates in domestic demand, this may amount to around 1.5 times the impulse response of GDP (see, for example, Fagan et al., 2005 and Stirböck, 2006).

¹² The proxy variable of global market prices in the price equation of the DELPHI model is the price index of the euro area's traded goods. We assume that they change in line with the total consumer price index. This assumption does not modify the results notably.

Chart 3

Impact of the envisaged euro area fiscal tightening on the Hungarian economy*(quarterly impulse responses to permanent government spending cuts by 0.5-0.5 percent of GDP for two consecutive years)*

around 0.2 percentage points in the next two years (see Chart 3). This is not surprising: as a small, open economy, the growth prospects of Hungary are closely related to the business conditions of its foreign trade partners.

In the context of lower import prices and waning domestic demand, inflation may also slacken somewhat. Since the fiscal adjustment lowers euro area inflation only moderately, the main driving force behind the developments in Hungarian inflation is the downturn in domestic demand. As such, relative to the effect on GDP, the decline in inflation materialises with a lag. Inflation may decline by less than 0.1 percentage point overall, primarily from the second year following the adjustment (see Chart 3).

Although the adjustments taken thus far are not expected to push the Hungarian economy back into recession, the short-term risks are on the downside. The debt crisis in the peripheral countries of the euro area is far being over, and most recently, Ireland announced that it would need loans from the international organisations to finance its public deficit. If the crisis spills over, further fiscal tightening can be expected in other European countries as well, leading to a more pronounced downturn in international economic activity. In this environment an even graver consequence could be a possible deterioration of Hungary's risk assessment in view of its large public debt and the uncertainties surrounding its fiscal policy. Growing debt service burdens, in turn, could directly restrain domestic demand as well.¹³

The longer-term effects are more uncertain. Fiscal adjustment measures could increase the potential growth of the euro area. To achieve this, deficit reduction should be combined with structural reforms designed to prevent the re-accumulation of the deficit and to improve employment and investment sentiment. This could imply additional growth for Hungary as well. However, there is no guarantee that deficit reduction increases potential output. For example, an adjustment based on corporate income taxes may lead to a downturn in investment projects, deteriorating long-term growth prospects.

CONCLUSIONS

The global financial crisis led to a severe global economic recession. Wherever it was possible, in an effort to mitigate the extent of the downturn, governments deployed fiscal policy instruments as well. However, the economic stimulus and the efforts to bail out the financial system imposed a large debt burden on the countries concerned. In the wake of the Greek debt crisis, concerns about the sustainability of public debt have intensified. As a result, from the summer of 2010 several euro area member states announced plans for fiscal austerity.

In our article we presented the short-term economic effects of the fiscal adjustments envisaged in the euro area, and the resulting impact on the economic growth and inflation prospects of Hungary. According to the economic theories, short-term growth effects originate from changes in actual

¹³ The possible effects of this scenario are illustrated by one of the risk scenarios in the November issue of the MNB's *Quarterly Report on Inflation* (MNB, 2010c).

demand on the one hand, and changes in household wealth, on the other hand.

We quantified the effects of the adjustments on the economies of Western Europe using several macroeconomic models and time series estimates. We applied the MNB's forecasting model to analyse the domestic effects.

The new adjustment plans announced from the summer of 2010 could markedly decelerate growth in the euro area. Since Hungary is a small, open economy, more subdued foreign economic activity inevitably restricts our own growth prospects. Adjustments in the euro area may lower Hungarian GDP growth by around 0.2 percentage points in the next two years, with a slight impact on inflation. These effects have already been taken into account in the baseline forecast of the August issue of the MNB's *Quarterly Report on Inflation* (MNB, 2010b).

If the debt crisis of peripheral euro area countries escalates, we should expect even more severe effects than presented here. To a smaller extent, this is due to the fact that the new round of tightening would restrict our export opportunities even further. The more significant – and more difficult to assess – effect is related to the vulnerability of the Hungarian economy. The risk perception of Hungary is very sensitive to changes in global investor sentiment. An increase in risk premia raises the debt burden of the private sector and the government, which may lead to a more pronounced contraction in domestic demand. One of the risk paths of the inflation forecast drawn up in the November issue of the MNB's *Quarterly Report on Inflation* (MNB, 2010c) presents a similar scenario.

For the time being, we have no information on the longer-term impact of the adjustments. The potential output of the euro area may increase if balance improvement is accompanied by structural reforms. This could imply additional growth for Hungary as well. However, there is no guarantee for these effects: their extent and direction depend on the type of the deficit reduction measures.

REFERENCES

- ADOLFSON, M., S. LASÉEN, J. LINDÉ AND M. VILLANIA (2007): 'Bayesian estimation of an open economy DSGE model with incomplete pass-through', *Journal of International Economics*, Vol. 72 Issue 2 (July), pp. 481-511.
- D'AURIA, F., A. PAGANO, M. RATTO AND J. VARGA (2009): 'A comparison of structural reform scenarios across the EU member states. Simulation-based analysis using the QUEST model with endogenous growth', *European Economy, Economic Papers*, No. 392 (December). European Commission, Brussels.
- BAXTER, M. AND R. G. KING (1993): 'Fiscal policy in general equilibrium', *American Economic Review*, Vol. 83 No. 3 (June), pp. 315-334.
- BEETSMA, R. (2008): 'A survey of the effects of discretionary fiscal policy', *Studier i Finanspolitik*, No. 2. Swedish Fiscal Policy Council.
- BOUTHEVILLAIN, C. AND G. DUFRÉNOT (2010): 'Fiscal multipliers in times of crisis and non-crisis: are they different? The French case', *Working Paper* No. 286, Banque de France.
- BURNSIDE, C., M. EICHENBAUM AND J. D. M. FISHER (2004): 'Fiscal shocks and their consequences', *Journal of Economic Theory*, Vol. 115 No. 1 (March), pp. 89-117.
- COENEN, G., C. ERCEG, C. FREEDMAN, D. FURCERI, M. KUMHOF, R. LALONDE, D. LAXTON, J. LINDÉ, A. MOURUGANE, D. MUIR, S. MURSULA, C. DE RESEDE, J. ROBERTS, W. ROEGER, S. SNUDDEN, M. TRABANDT AND J. IN 'T VELD (2010): 'Effects of fiscal stimulus in structural models', *IMF Working Paper*, No. 10/73 (March).
- COENEN, G., P. MCADAM AND R. STRAUB (2008): 'Tax reform and labour-market performance in the Euro Area. A Simulation-Based Analysis Using the New Area-Wide Model', *Journal of Economic Dynamics and Control*, Vol. 32 No. 8 (August), pp. 2543-2583.
- FAGAN, G., J. HENRY AND R. MESTRE (2005): 'An area-wide model for the euro area', *Economic Modelling*, Vol. 22 No. 1 (January), pp. 39-59.
- GALÍ, J., J. VALLÉS AND J. D. LÓPEZ-SALIDO (2007): 'Understanding the effects of government spending on consumption', *Journal of the European Economic Association*, Vol. 5 No. 1 (March), pp. 227-270.
- HERVÉ, K., N. PAIN, P. RICHARDSON, F. SÉDILLOT AND P. O. BEFFY (2010): 'The OECD's new global model', *OECD Economics Department Working Paper*, No. 768 (May).
- HORVÁTH, Á., Z. M. JAKAB, G. P. KISS AND B. PÁRKÁNYI (2006): 'Myths and maths: Macroeconomic effects of fiscal adjustments in Hungary', *MNB Occasional Papers* 52 (May).
- IMF (2010a): *Regional economic outlook. Europe*, November 2010, International Monetary Fund, Washington D.C.

- IMF (2010b): *World economic outlook*, October 2010, International Monetary Fund, Washington D.C.
- KUMHOF, M., M. MUIR AND S. MURSULA (2010): 'The Global Integrated Monetary and Fiscal Model (GIMF) – theoretical structure', *IMF Working Paper*, No. 10/34 (February).
- LINNEMANN, L. AND A. SCHABERT (2003): 'Fiscal policy in the new neoclassical synthesis', *Journal of Money, Credit and Banking*, Vol. 35 No. 6 (December), pp. 911-929.
- MNB (2010a): *Quarterly Report on Inflation*, June 2010, Magyar Nemzeti Bank, Budapest.
- MNB (2010b): *Quarterly Report on Inflation*, August 2010, Magyar Nemzeti Bank, Budapest.
- MNB (2010c): *Quarterly Report on Inflation*, November 2010, Magyar Nemzeti Bank, Budapest.
- P. KISS, G. AND Z. REPPA (2010): 'Quo vadis, deficit? How high the tax level will be when the economic cycle reverses?', *MNB Bulletin*, October 2010, pp. 47-56.
- PEROTTI, R. (2005): 'Estimating the effects of fiscal policy in OECD countries', *CEPR Discussion Paper*, No. 4842 (January).
- SPILIMBERGO, A., S. SYMANSKY AND M. SCHINDLER (2009): 'Fiscal multipliers', *IMF Staff Position Note*, SPN/09/11 (May).
- SMETS, F. AND R. WOUTERS (2003): 'An estimated dynamic stochastic general equilibrium model of the euro area', *Journal of the European Economic Association*, Vol. 1 No. 5 (September), pp. 1123-1175.
- STIRBÖCK, C. (2006): 'How strong is the impact of exports and other demand components on German import demand? Evidence from euro-area and non-euro area imports', *Discussion paper*, No. 39, Deutsche Bundesbank.
- WIELAND, V., T. CWIK, G. J. MÜLLER, S. SCHMIDT AND M. WOLTERS (2009): 'A new comparative approach to macroeconomic modeling and policy analysis', *Working paper*, (August), Goethe University of Frankfurt.