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Fiscal policy in the EU in the crisis: a model-based approach

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Abstract

This paper uses a multi region DSGE model with collateral constrained households and residential investment to examine the effectiveness of fiscal policy stimulus measures in a credit crisis. The paper explores alternative scenarios which differ by the type of budgetary measure, its length, the degree of monetary accommodation and the level of international coordination. In particular we provide estimates for New EU Member States where we take into account two aspects. First, debt denomination in foreign currency and second, higher nominal interest rates, which makes it less likely that the Central Bank is restricted by the zero bound and will consequently not accommodate a fiscal stimulus. We also compare our results to other recent results obtained in the literature on fiscal policy which generally do not consider credit constrained households.

1. Introduction

The depth of the global recession has led to a revival of interest in discretionary fiscal policy. The current recession has proved to be the deepest and longest since the 1930s and recovery remains uncertain and fragile. But the general policy response to the downturn has been swift and decisive. Aside from government interventions dealing with the liquidity and solvency problems of the financial sector, including unconventional measures in the form of quantitative easing, the European Economic Recovery Plan (EERP) was launched in December 2008. The objective of the EERP is to restore confidence and bolster demand through a coordinated injection of purchasing power into the economy complemented by strategic investments and measures to shore up business and labour markets. Governments across the world have implemented large fiscal stimulus packages. In the European Union, the overall discretionary fiscal stimulus over 2009 and 2010 amounts to around 2% of GDP, and this is further enhanced by the workings of automatic stabilisers.

There exists widespread scepticism on the effectiveness of fiscal policy as a general instrument for stabilisation purposes, and it is frequently argued that it is best to let fiscal policy have its main countercyclical impact through the operation of automatic stabilisers. But with limited room for a stronger monetary policy response, the effectiveness of temporary fiscal measures in stabilising the economy needs reexamination. There are several reasons why a temporary fiscal stimulus can be more powerful in the current financial crisis. First, to the extent that this recession is purely demand driven, fiscal policy can be more effective than in previous recessions that were to a large extent caused by supply side factors (e.g. oil price shocks). When the economy is hit by supply shocks there is little active discretionary fiscal policy can do. A second factor that justified earlier scepticism on fiscal policy was the rapid financial liberalisation. When more and more households acquired access to financial markets and were able to smooth their consumption, fiscal policy became less powerful. The financial crisis has had a profound effect on credit conditions and led to a sharp tightening in lending practices. With the sharp increase in the share of credit constrained households, fiscal policy has become more effective. Third, for those economies where interest rates are near their zero lower bound, monetary policy can be accommodative to the fiscal expansion and the resulting increase in inflation and decrease in real interest rates form an additional indirect channel through which growth can be supported. Fourth, as the financial crisis has long-lasting consequences and the recovery is expected to be fragile and feeble, the often argued disadvantage of fiscal policy that it is not timely due to long implementation lags, seems less relevant at the current juncture.

This paper examines the effectiveness of fiscal policy measures with particular focus on the Member States in Central and Eastern Europe.[1] One particular aspect in which these economies differ from the old member states is that a larger share of household debt is denominated in foreign currencies (like e.g. in Latvia and Hungary). This can have a profound effect on household spending when the domestic currency depreciates vis-à-vis the currency in which debt is denominated. A second aspect in which many of these countries differ from the old EU15 is that monetary policy had less space to be accommodative.

We use a modern dynamic stochastic general equilibrium (DGSE) model in which collateral constraints play an important role. The main transmission channels of the financial crisis into the real economy are thought to be through higher risk premia and credit rationing for households and firms. By disaggregating households into credit constrained and a non-constrained group, along the lines suggested by the recent literature on the financial accelerator mechanism[2], we can examine the importance of tighter credit constraints on the effectiveness of discretionary fiscal policy. The presence of credit constrained households raises the marginal propensity to consume out of current net income and makes fiscal policy a more powerful tool for short run stabilisation. A second reason why fiscal policy can be more powerful with deflationary shocks like the current financial crisis is that credit constrained consumers react even more strongly to a fall in real interest rates, which as argued above can occur when monetary policy can be accommodative towards the fiscal stimulus, and allow real interest rates to fall.

The rest of the paper is structured as follows. The next section starts with a brief overview of the fiscal measures that have been undertaken by the governments in the Member States in Central and Eastern Europe. This is followed by a brief description of the QUEST III model, with particular emphasis on the household sector and collateral constrained households, and a review of the size of fiscal multipliers in this model for a range of fiscal instruments. The following section then presents simulation results for temporary fiscal stimulus for the Member States in Central and Eastern Europe.

[1] The views expressed in this paper are those of the authors and should not be attributed to the European Commission.

[2] See e.g. Kiyotaki and Moore (1997) , Iacoviello (2005), Iacoviello and Neri (2008), Monacelli (2007), Calza, Monacelli and Stracca (2007), Darracq Pariès and Notarpietro (2008).

2. Fiscal stimulus packages in the New Member States of the EU

The EU has combined structural reforms with active fiscal stimulus to address the economic downturn. Large fiscal stimulus packages have been implemented across the EU in 2009 and 2010.[3] The packages have broadly followed desirable general principles, i.e. they were differentiated according to the available fiscal room for manoeuvre and relied on measures that were targeted, timely and temporary. Tables 1 and 2 give an overview of the fiscal stimulus measures implemented in the Member States in Central and Eastern Europe, using a classification of measures in four broad categories: measures aimed at supporting household purchasing power, labour market measures, measures aimed at companies, and measures aimed at increasing /bringing forward investment. The dispersion of package sizes is considerable. On average in the EU27, the fiscal stimulus in 2009 amounted to more than 1 % of GDP and slightly less than that in 2010, with generally a strong emphasis on measures supporting household income. Many of the countries most affected by the crisis, particularly among the new Member States, have had very limited room to implement stimulus measures (and have often predominantly adopted consolidation measures with a view to avoiding a further fall-out from the crisis). In 2009, the Czech Republic, Romania, Latvia and Poland had the largest stimulus packages, for 2010 the largest stimulus announced is in the Czech Republic and Poland.

Table 1: Fiscal stimulus measures 2009 and 2010

2009	**Total stimulus measures**	***Supporting household purchasing power***	***Labour market measures***	***Measures aimed at companies***	***Increasing / bringing forward investment***
	(% of GDP)	***(% of GDP)***	***(% of GDP)***	***(% of GDP)***	***(% of GDP)***
BG	0	*0*	*0*	*0*	*0*
CZ	1.99	*0.65*	*0.56*	*0.68*	*0.1*
EE	0	*0*	*0*	*0*	*0*
LV	1.76	*1.73*	*0*	*0.04*	*0*
LT	0.05	*0*	*0.05*	*0*	*0*
HU	0.01	*0*	*0.01*	*0*	*0*
MT	0.56	*0*	*0*	*0.48*	*0.09*
PL	0.92	*0.01*	*0.75*	*0.16*	*0*
RO	1.81	*0.16*	*0.02*	*1.63*	*0*
SI	0.86	*0.04*	*0.18*	*0.3*	*0.34*
SK	0.34	*0.23*	*0.05*	*0.05*	*0.02*

[3] The European Economic Recovery Programme (EERP) is estimated to total around 2% of GDP over 2009-10, including EUR 20 billion (0.3 % of EU GDP) through loans funded by the European Investment Bank.

2009	Total stimulus measures	*Supporting household purchasing power*	*Labour market measures*	*Measures aimed at companies*	*Increasing / bringing forward investment*
	(% of GDP)	*(% of GDP)*	*(% of GDP)*	*(% of GDP)*	*(% of GDP)*
EU27	1.06	*0.46*	*0.16*	*0.29*	*0.12*
EU16	0.98	*0.36*	*0.14*	*0.29*	*0.15*

2010	Total stimulus measures	*A. Supporting household purchasing power*	*B. Labour market measures*	*C. Measures aimed at companies*	*D. Increasing / bringing forward investment*
	(% of GDP)	*(% of GDP)*	*(% of GDP)*	*(% of GDP)*	*(% of GDP)*
BG	0	*0*	*0*	*0*	*0*
CZ	1.37	*0.74*	*0*	*0.57*	*0*
EE	0	*0*	*0*	*0*	*0*
LV	0.3	*0.26*	*0*	*0.05*	*0*
LT	0.01	*0*	*0.01*	*0*	*0*
HU	0.02	*0*	*0.02*	*0*	*0*
MT	1.23	*0*	*0.14*	*0.84*	*0.26*
PL	0.81	*0.02*	*0.7*	*0.09*	*0*
RO	0	*0*	*0*	*0*	*0*
SI	0.47	*0*	*0.37*	*0.1*	*0*
SK	0.45	*0.32*	*0.06*	*0.06*	*0*
EU27	0.95	*0.42*	*0.15*	*0.17*	*0.19*
EU16	1.05	*0.45*	*0.12*	*0.2*	*0.25*

3. The model

The model used in this exercise is an extended version of the QUEST III model (Ratto et al., 2009) with collateral constrained households and residential investment. A detailed description of this model can be found in Roeger and in 't Veld, (2009, 2010) and here we present a brief overview.

The model distinguishes tradable and non-tradable goods sectors as well as housing. The household sector consists of Ricardian households, who have full access to financial markets and can smooth their consumption, liquidity-constrained households who do not engage in financial markets but simply consume their entire labour (and transfer) income at each date, and a third group of households that are credit- (or collateral-)constrained, in the fashion of Kiyotaki and Moore (1997). This third group can smooth consumption over time but faces a

collateral constraint on their borrowing from Ricardian households, depended on the nominal value of their housing wealth. Adding collateral constrained households to the model adds important transmission channels of the financial crisis into the real economy through higher risk premia and credit rationing for households and firms. By disaggregating households into credit constrained and a non-constrained group, we can examine the importance of tighter credit constraints on the effectiveness of discretionary fiscal policy. The presence of credit constrained households raises the marginal propensity to consume out of current net income and makes fiscal policy shocks that directly impact on households' purchasing power a more powerful tool for short run stabilisation. It also reinforces the effects from monetary accommodation as credit-constrained consumers react even more strongly to a fall in real interest rates which occurs when the zero lower bound on nominal interest rates is binding.

Each firm produces a variety of the domestic good which is an imperfect substitute for varieties produced by other firms. Because of imperfect substitutability, firms are monopolistically competitive in the goods market and face a demand function for goods. Domestic firms in the tradable sector sell consumption goods and services to private domestic and foreign households and the domestic and foreign government, and they sell investment and intermediate goods to other domestic and foreign firms. The non-tradable sector sells consumption goods and services only to domestic households and the domestic government and they sell investment and intermediate goods only to domestic firms. Preferences for varieties of tradable and non-tradable goods can differ resulting in different mark ups for the tradable and non-tradable sector. The monetary authority follows a Taylor type rule when not constrained by the lower zero bound on nominal interest rates, while fiscal policy provides automatic stabilisation through unemployment benefits.

One specific feature in many of the Member States in Central and Eastern Europe is that many households are indebted in foreign currency. For example, it is estimated that in Latvia more than 90% of mortgage debt is denominated in euros, while in Hungary household debt is predominantly in Swiss francs. Poland and Romania have similarly high shares of foreign currency denominated debt. An alternative model specification allows for household mortgage debt being denominated in the foreign currency, making the household budget constraint dependent on the exchange rate.

The model used in this exercise consists of six regions: the Euro area, the new member states not participating in the euro, the rest of the EU, the US, emerging Asia and the rest of the world. The regions are differentiated from one another by their economic size and the model is calibrated on bilateral trade flows. Although the calibration incorporates some of the main stylised differences between the regions, it relies heavily on estimates of this model on euro area and US data (see Ratto *et al*., 2009a and 2010). The main differences between the

blocks are for the EU generally higher transfers and unemployment benefits, higher wage taxes, higher price rigidities and labour adjustment costs, and a lower elasticity of labour supply.

Concerning financial market frictions, we assume 30 percent of households to be liquidity-constrained, which corresponds closely to our estimates, and we keep this share unchanged. When we include collateral constrained households in the model we assume their share is 30 percent of households, and the remainder are all unconstrained "Ricardian" households. The loan-to-value ratio (1-χ) is set at 0.75 in all regions, calibrated to fit a mortgage debt ratio as share of GDP on the baseline of around 50 percent. Estimated Taylor rules do not point to sizeable differences in monetary policy behaviour and we set these parameters identical.

4. Fiscal instruments and their multipliers

The size of the fiscal multiplier depends on a number of factors. Table 2 shows the fiscal multipliers of various fiscal instruments in a model without collateral constraints and in the model with collateral constraints, as well as with monetary accommodation. The multipliers reported in this table are for the EU as an aggregate region. Single country results will be somewhat smaller as the degree of openness of the economy also plays a significant role. In a small open economy more of the fiscal stimulus will leak abroad through higher imports. The duration is also important and the impact of a fiscal stimulus depends crucially on whether the shock is credibly temporary or perceived to be permanent. In the latter case, economic agents will anticipate higher tax liabilities and increase their savings, leading to stronger crowding out and smaller GDP effects[4]. We only consider temporary fiscal stimulus here and focus on one year shocks of 1% of baseline GDP.

In general, GDP effects are larger for public spending shocks (government purchases and investment) than for tax reductions and transfers to households. Temporary increases in *investment subsidies* yield sizeable GDP effects since it leads to a reallocation of investment spending into the period the purchase of new equipment and structures is subsidised. *Government investment* yields a somewhat larger GDP multiplier than *purchases of goods and services*. An increase in *government wages* has a larger impact on GDP than *purchases* (but a smaller impact on private sector value-added). The multiplier of *government transfers*

is smaller, as it goes along with negative labour supply incentives. However, transfers targeted to liquidity constrained consumers provide a more powerful stimulus as these consumers have a larger marginal propensity to consume out of current net income. Temporary reductions in *value added* and *labour taxes* show smaller multipliers, but in these cases it is nearly entirely generated by higher spending of the private sector. A temporary reduction in consumption taxes is more effective than a reduction in labour taxes as forward looking households respond to this change in the intertemporal terms of trade[5]. Temporary reductions in *housing tax* has little impact for Ricardian households, who smooth their spending, but a non-negligible impact for credit constrained households. Temporary *corporate tax* reduction would not yield positive short run GDP effects since firms calculate the tax burden from an investment project over its entire life cycle.

The presence of credit-constrained agents raises fiscal multipliers significantly. The multiplier increases especially for those fiscal measures which increase current income of households directly, such as labour taxes and transfers. Credit constrained households not only have a higher marginal propensity to consume out of current income but their spending is also highly sensitive to changes in real interest rates.

There are also sizeable positive *spill-over effects* from fiscal stimuli. The effects of a global fiscal stimulus (as in the final three columns in Table 2) are larger than when the EU acts alone. In the present crisis there has been a global fiscal stimulus with large fiscal packages implemented in all G20 countries, and model simulations suggest this resulted in larger multipliers.

Fiscal policy multipliers become very much larger when the fiscal stimulus is accompanied by monetary accommodation. This is particularly relevant in the current crisis with interest rates at, or close to, their lower zero bound. Under normal circumstances a fiscal stimulus would put upward pressure on inflation and give rise to an increase in interest rates. With monetary accommodation and nominal interest rates held constant, higher inflation will lead to a decrease in real interest rates and this monetary channel amplifies the GDP impact of the fiscal stimulus (Christiano et al. 2009, Erceg and Linde 2009). This effect is even stronger when credit-constraints are taken into account. This is because the collateral constraint requires that spending must be adjusted to changes in interest payments. In other words, the interest rate exerts an income effect on spending of credit constrained households.[6]

[4] See Roeger and in 't Veld (2010).

[5] Note that this assumes the VAT reduction is fully passed through into consumer prices. This intertemporal effect will be strongest in the period just before taxes are raised again (in t+1).

[6] For realistic magnitudes of indebtedness, the interest sensitivity exceeds the interest elasticity of spending of Ricardian households substantially, see Roeger and in 't Veld (2009).

As shown in Roeger and in 't Veld (2009), under monetary accommodation, both spending and tax multipliers are considerably larger and this effect is amplified in the presence of credit constrained households. For the case where nominal interest rates are kept constant for four quarters, the government consumption multiplier increases by about 40% with collateral constrained households, while it would only increase by about 10% without credit constraints. The latter increase of the multiplier is similar to the change of multiplier obtained by Christiano et al. for the same experiment. This amplification effect of the zero bound multiplier with credit constraints is again due to the strong response of spending of credit constrained households to changes in real interest rates.

The zero bound increases the multiplier substantially for all expenditure and revenue categories, except for labour taxes, where the increase in the multiplier is insignificant. This can easily be explained by the fact that a central mechanism which increases the expenditure multiplier at the zero bound, namely an increase in inflation is likely not be present in this case, or is even reversed because a reduction in labour taxes will at least partly be shifted onto firms and thus will end up in lower prices. Nevertheless, this result is in sharp contrast to a result obtained by Eggertson (2009), who claims that the labour tax multiplier at the zero bound will be negative. His argument is based on the assumption that a labour tax reduction will only shift the aggregate supply (AS) curve to the right in the inflation-GDP space, while the aggregate demand (AD) curve does not shift and is upward sloping in the case of a zero bound. In contrast to this analysis, in the QUEST model there is also a shift of aggregate demand associated with a tax cut (see Figure 1).

There are at least three important sources for such a shift and two of them are not present in Eggertson's model. First, there is a international competitiveness effect as a result of declining costs, which increases net external demand. Second, there is a shift in corporate investment because of an increase in the marginal product of existing capital because of an increase in employment. Both of them are not present in Eggertson's model. However, a tax reduction also shifts consumer spending either via higher net labour income or higher employment a combination of which must necessarily result from a labour tax cut. These three demand effects taken together make it unlikely that the labour tax multiplier turns negative at the zero bound.

Finally, there are also sizeable positive spill-over effects from fiscal stimuli. The effects of a joint fiscal stimulus (as in the final three columns in table 1) are larger than when acting alone. In the current crisis there has been a global fiscal stimulus with large fiscal packages implemented in all G20 countries.

Figure 1: The effect of cutting taxes at the zero bound

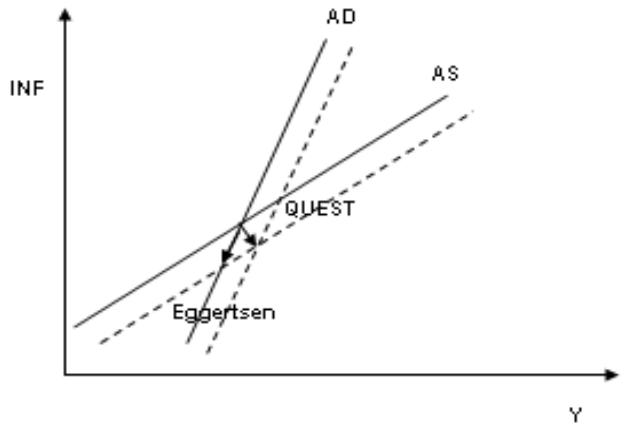


Table 2 : Fiscal multipliers

Fiscal multipliers temporary shocks

	EU alone			Global stimulus		
	Without credit constraints	With credit constraints	With credit constraints and zero interest rate floor	Without credit constraints	With credit constraints	With credit constraints and zero interest rate floor
Investment subsidies	1.5	1.6	2.0	2.0	2.1	2.6
Government investment	0.9	0.9	1.1	1.0	1.1	1.2
Government purchases	0.8	0.8	1.0	0.9	1.0	1.2
Government wages	1.1	1.3	1.4	1.2	1.3	1.5
General transfers	0.2	0.4	0.5	0.2	0.5	0.6
Transfers targetted to credit-constrained hh.	-	0.7	0.9	-	0.8	1.0
Transfers targetted to liquidity-constrained hh.	0.7	0.7	0.9	0.8	0.9	1.1
Labour tax	0.2	0.4	0.6	0.3	0.5	0.6
Consumption tax	0.4	0.5	0.7	0.5	0.6	0.8
Property tax	0.0	0.1	0.2	0.0	0.2	0.2
Corporate income tax	0.0	0.0	0.0	0.0	0.0	0.1

Note: First year impact on EU GDP (% diff. from baseline) for a temporary one year fiscal stimulus of 1% of baseline GDP.

5. Simulations of fiscal stimulus in a credit crunch

The global recession has hit the various Member States of the European Union to different degrees. Ireland, the Baltic countries, Hungary and Germany have seen the sharpest contractions, while Poland seems to have been the only country that has so far escaped an outright recession (but has also suffered a sharp slowdown in GDP growth). The financial crisis was initially driven by sharp declines in house and asset prices and a tightening of credit conditions. The extent to which the crisis has been affecting the individual Member States of the European Union strongly depends on their initial conditions and the associated vulnerabilities[7]. In particular the role of overvalued housing markets and oversized construction industries is important. Strong real house price increases have been observed in the past ten years or so in the Baltic countries, and in some cases this has been associated with buoyant construction activity. The greater the dependency of the economy on housing activity, including the dependency on wealth effects of house price increases on consumption, the greater the sensitivity of domestic demand to the financial market shock. Some Member States in Central and Eastern Europe have been particularly hard hit through this wealth channel, notably the Baltic countries.

In order to examine the role of fiscal policy in this crisis, we first create a "recession scenario". This credit crunch scenario is driven by a combination of domestic shocks, existing of a reduction in the loan to value ratio and shocks to arbitrage equations which explain business fixed investment and residential investment ("Q–equations") that capture the bursting of a bubble in these asset prices. These shocks to arbitrage equations can be interpreted as non-fundamental shocks or as bubbles, as they are shocks to the optimality conditions for investment and house prices. As a declining risk premium in the Q equation for investment indicates the building up of a bubble, a rapid rise in the risk premium indicates the bursting of a bubble. The shocks start in 2008Q1 and are calibrated such that GDP falls by about 2% in 2009. [8]

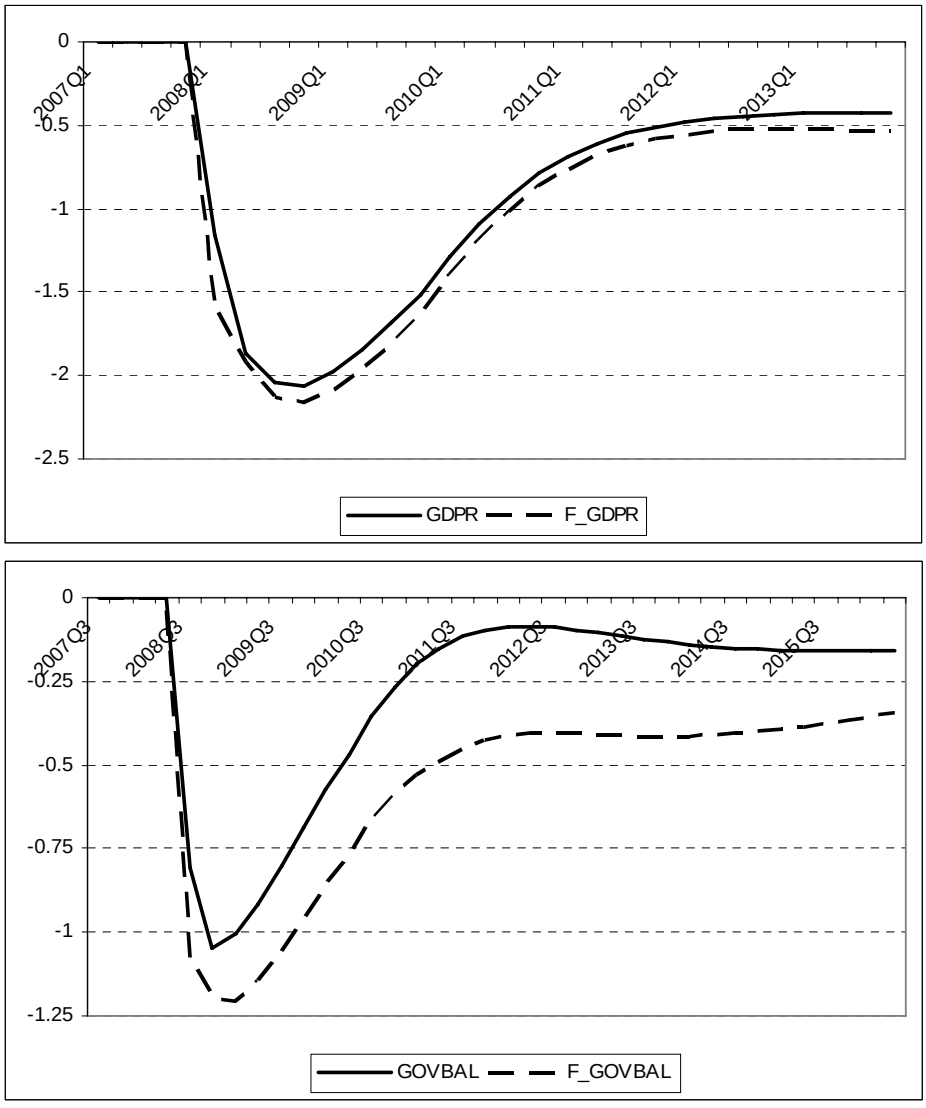
Figure 2 and Table 3 show the profile for GDP and the main macroeconomic components, both in the case of debt denominated in domestic currency as well as the case when debt is denominated in foreign currency. The shocks lead to sharp declines in corporate investment and in consumption and residential investment of in particular collateral constrained

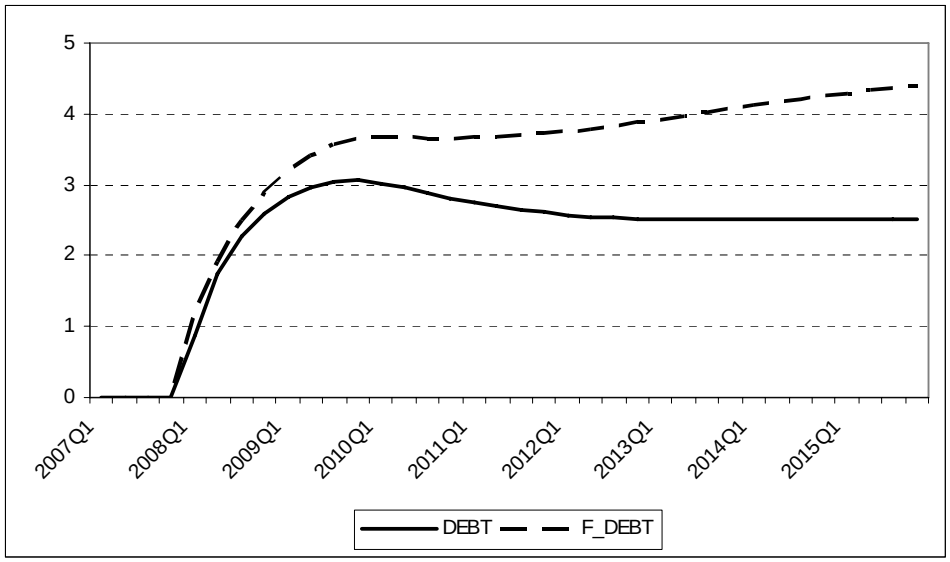
[7] See European Economy (2009), Economic Crisis in Europe: causes, consequences and responses.

[8] This scenario merely serves as an illustrative baseline against which to show the effects of fiscal policy stimulus, and the scenario is a relatively mild recession, where the slowdown in growth is dampened by higher exports growth due to the depreciating currency. The sharp fall in world growth in 2009 which prevented this cushioning channel from operating is not simulated here.

households. When household debt is denominated in euros, the further tightening of the collateral constraint caused by the depreciation vis-à-vis the euro leads to an even sharper decline in spending by these constrained households, even though the depreciation is relatively small. This negative effect on domestic demand is stronger than the boost given to export growth from the devaluation and the decline in GDP is larger. The shocks have a negative impact on tax revenues and raise unemployment benefit spending, leading to an increase in government deficits and debt.

Figure 2 : Domestic credit crunch scenario





Note: GDP percentage difference from baseline, Govbal and debt as % of GDP.
Dashed line F_: debt denominated in foreign currency.

Table 3 : Domestic credit crunch scenario

a. Debt denominated in domestic currency

	2008	2009	2010	2011	2012
GDP_PCER	-1.78	-1.76	-1.02	-0.59	-0.45
CONSUMPTION_PCER	-2.20	-1.59	-0.90	-0.50	-0.38
.CONS.RIC_PCER	1.02	1.70	1.56	1.13	0.74
.CONS.CC_PCER	-8.64	-6.83	-4.57	-2.98	-2.21
.CONS.LC_PCER	-1.94	-2.52	-1.81	-1.07	-0.63
INVESTMENT_PCER	-13.15	-13.58	-7.83	-3.59	-1.38
RESID.INV_PCER	-10.29	-12.38	-8.56	-4.90	-2.62
.RESID.INV.RIC_PCER	-5.14	-6.07	-3.64	-1.31	0.19
.RESID.INV.CC_PCER	-29.98	-36.50	-27.36	-18.60	-13.36
EXPORTS_PCER	0.75	0.71	0.42	0.14	-0.05
IMPORTS_PCER	-4.31	-3.96	-2.37	-1.13	-0.43
EMPLOYMENT_PCER	-1.37	-1.18	-0.38	0.04	0.12
EURO.EXCH.RATE_PCER	0.79	0.08	-0.78	-1.42	-1.80
NOM.INTEREST.RATE_ER	-0.55	-0.94	-0.79	-0.50	-0.26
REAL.INTEREST.RATE_ER	0.40	-0.59	-0.73	-0.55	-0.34
INFL.PC_ER	-0.87	-0.62	-0.32	-0.13	-0.02
GOV.BALANCE.GDP_ER	-0.94	-0.63	-0.24	-0.10	-0.10
GOV.DEBT.GDP_ER	1.88	2.98	2.92	2.67	2.54
CURRENT.ACC.GDP_ER	1.90	1.85	1.21	0.73	0.47

b. Debt denominated in foreign currency

	2008	2009	2010	2011	2012
GDP_PCER	-1.95	-1.88	-1.12	-0.66	-0.54
CONSUMPTION_PCER	-2.60	-1.75	-0.86	-0.27	-0.07
.CONS.RIC_PCER	1.05	1.76	1.60	1.13	0.70
.CONS.CC_PCER	-10.13	-7.36	-4.29	-1.89	-0.70
.CONS.LC_PCER	-2.09	-2.70	-1.96	-1.21	-0.80
INVESTMENT_PCER	-13.00	-13.31	-7.60	-3.46	-1.36
RESID.INV_PCER	-12.32	-15.71	-12.55	-9.12	-6.76
.RESID.INV.RIC_PCER	-4.73	-5.03	-2.26	0.18	1.70
.RESID.INV.CC_PCER	-41.33	-56.57	-51.85	-44.70	-39.13
EXPORTS_PCER	0.81	0.76	0.45	0.14	-0.08
IMPORTS_PCER	-4.66	-4.19	-2.48	-1.11	-0.35
EMPLOYMENT_PCER	-1.49	-1.28	-0.46	-0.04	0.03
EURO.EXCH.RATE_PCER	0.86	0.09	-0.83	-1.51	-1.90
NOM.INTEREST.RATE_ER	-0.59	-1.01	-0.84	-0.52	-0.26
REAL.INTEREST.RATE_ER	0.41	-0.63	-0.81	-0.61	-0.38
INFL.PC_ER	-0.92	-0.67	-0.33	-0.11	0.01
GOV.BALANCE.GDP_ER	-1.16	-0.91	-0.57	-0.42	-0.41
GOV.DEBT.GDP_ER	2.12	3.46	3.67	3.69	3.81
CURRENT.ACC.GDP_ER	2.06	1.96	1.27	0.74	0.45

Note: _PCER: % difference from baseline; _ER: %-points difference from baseline.

Figure 3 now shows the effect of fiscal stimulus measures in this recession scenario. As our focus is on the Member States in Central and Eastern Europe, we assume household debt is denominated in foreign currencies (euros) and consider first a one year increase in government consumption of 1% of GDP. The stimulus starts in 2009q1 and is announced as a one year shock which is believed to be credible. As the NE block in the model representing the New Member States in Central and Eastern Europe is a smaller and more open economy than the EU aggregate block for which multipliers are reported in Table 2, the fiscal multiplier is significantly smaller here (0.57 compared to 0.81). Nevertheless, the fiscal stimulus helps to cushion the impact of the recession and boost output at least for the duration of the year of the stimulus. In the following year, output falls to slightly below where it would have been in the pre-stimulus recession scenario. The temporary fiscal stimulus worsens the government budget balance and raise the debt to GDP ratio further.

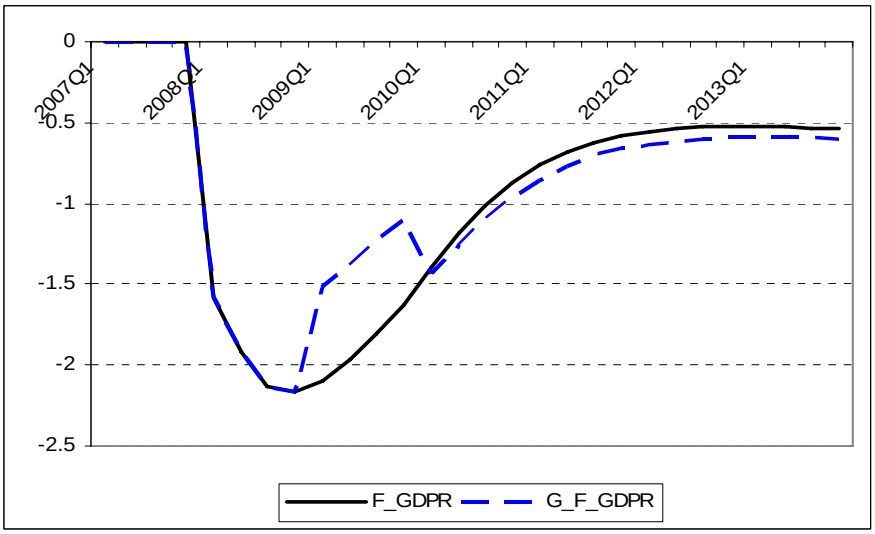
Fiscal multipliers are considerably larger when interest rates are near their zero bound as monetary policy can then accommodate the fiscal stimulus by keeping nominal interest rates unchanged and allowing real interest rates to fall due to the increase in inflationary pressures. Monetary policy in the euro area has been able to accommodate the fiscal impulse in this way but in many of the new member states monetary policy has not been able to play this supportive role as interest rates have remained high (with the exception of the

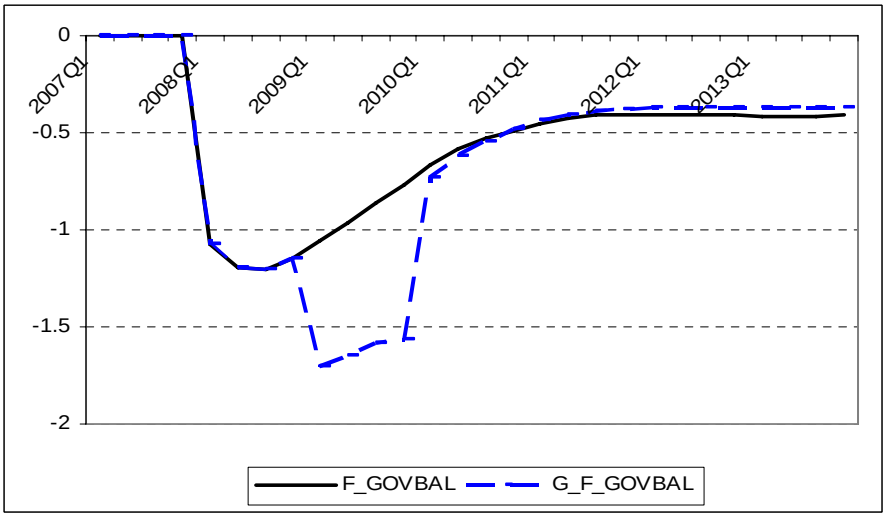
countries in the euro area Slovenia and Slovakia). Figure 4 shows the much larger effects when monetary policy can accommodate the fiscal stimulus. Note that the higher growth impact also helps to lessen the impact on government deficits and debt.

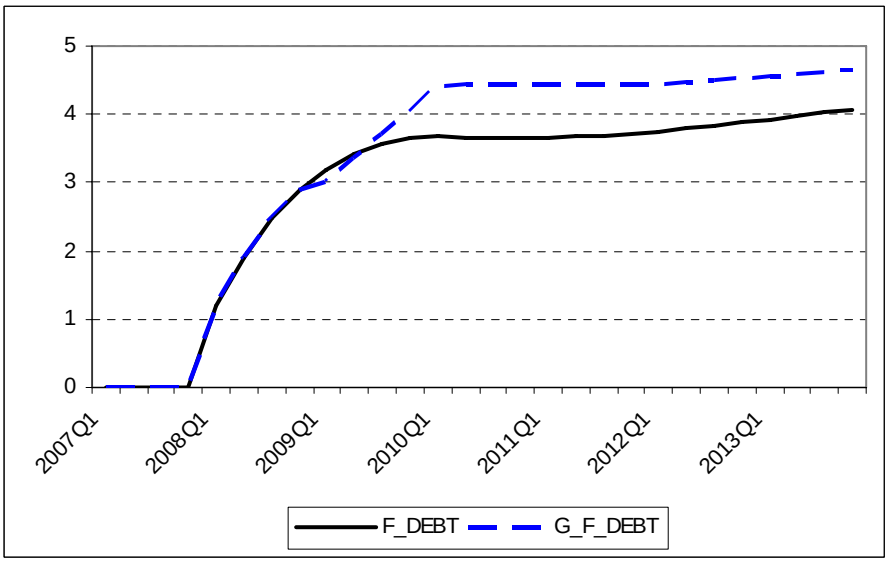
While temporary fiscal stimulus can be effective in supporting output in the short run, a more prolonged stimulus package lasting many more years does not become more powerful. Collateral constrained consumers react strongly to temporary increase in disposable income, but react more like Ricardian households to permanent income shocks, smoothing their income intertemporally. Figure 5 shows the impact of a more prolonged stimulus lasting for three years and then gradually phased out. The impact of this stimulus in the first quarter of the expansion is actually smaller then the impact of a one year stimulus and output falls in the medium term to a lower level. The government deficit now increases for a duration of more than 3 years, and the debt-to-GDP ratio increases by an additional 3 %points.

However, a longer lasting fiscal stimulus can be significantly more effective if it is accompanied by an accommodative monetary policy. Figure 6 shows the results for this case, when nominal interest rates are kept unchanged. As the fiscal stimulus is longer lasting, more inflationary pressures build up and with unchanged nominal interest rates, real interest rates decline by more. This additional real interest rate effect has a strong impact on output and the combination of the fiscal and monetary stimulus helps to almost offset the effect of the credit crunch shocks. This real interest rate channel is effective in the euro area and the US, where interest rates are at or close to their lower zero bound, and central banks can keep nominal interest rates unchanged. Note also that at least in the short run the strong growth effects in this scenario also help to reduce the deterioration in government balances.

Figure 3 : Temporary fiscal expansion

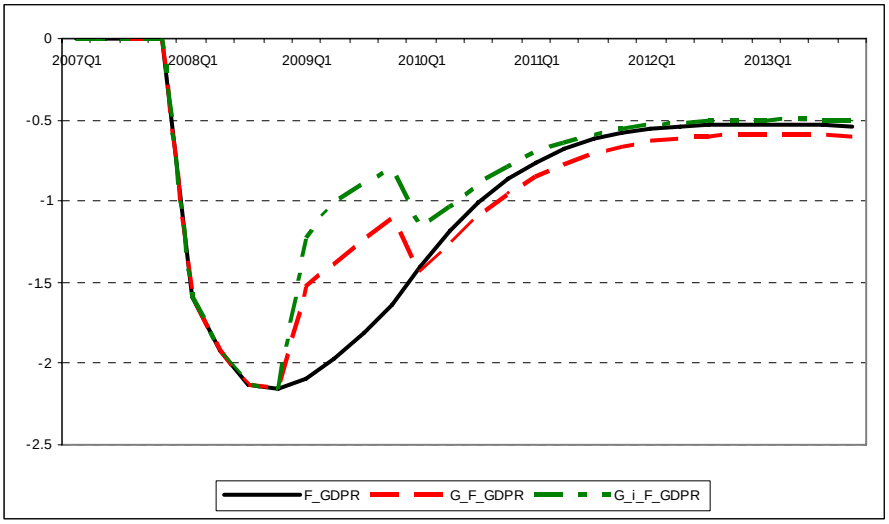


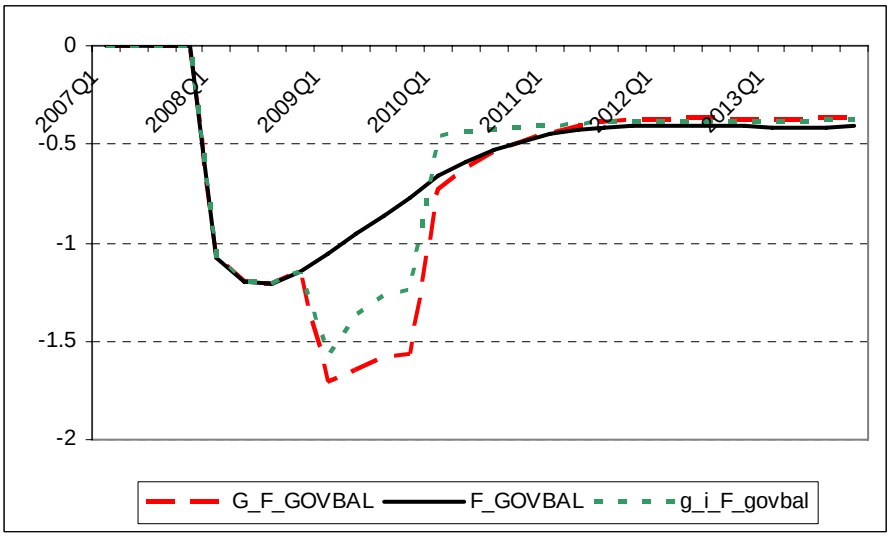


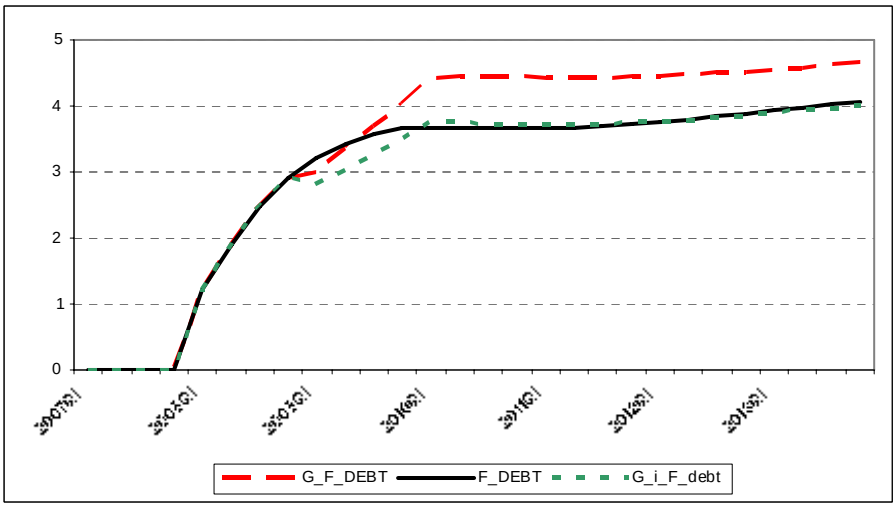


Note: GDP percentage difference from baseline, Government balance and debt as % of GDP.
Bold line: credit crunch scenario; Dashed line: with temporary fiscal expansion

Figure 4 :Temporary fiscal expansion with monetary accommodation

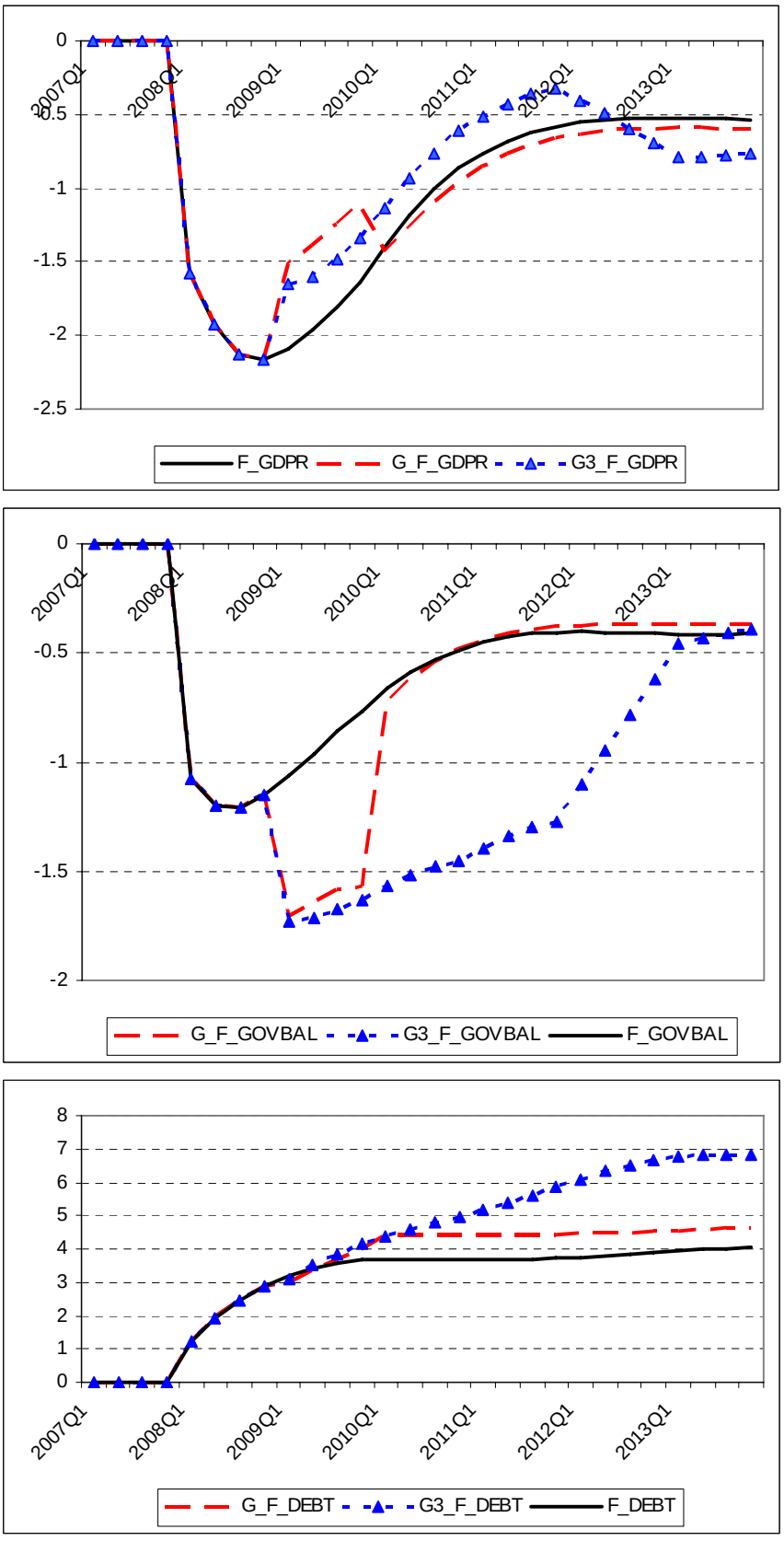






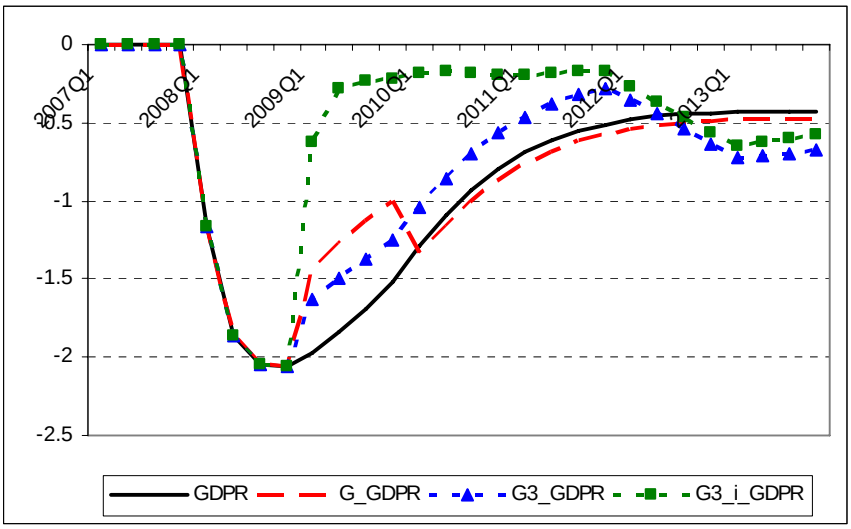
Note: GDP percentage difference from baseline, Government balance and debt as % of GDP.
Bold line: credit crunch scenario; Dashed line: with temporary fiscal expansion; Dotted line: with temporary fiscal expansion and monetary accommodation (ZLB)

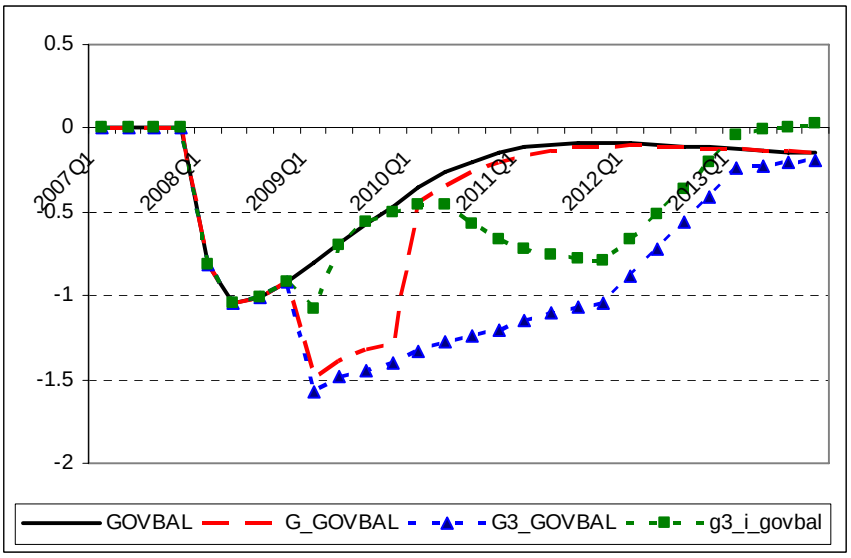
Figure 5 :Temporary vs. prolonged fiscal expansion

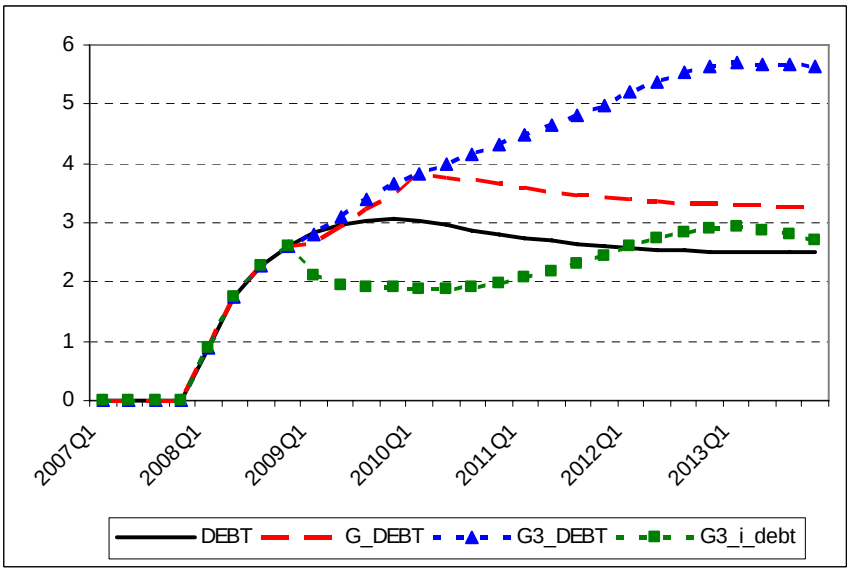


Note: GDP percentage difference from baseline, Government balance and debt as % of GDP.
Bold line: credit crunch scenario; Dashed line: with temporary fiscal expansion; Marked line: with prolonged fiscal expansion

Figure 6 :Temporary vs. persistent fiscal expansion with monetary accommodation







Note: GDP percentage difference from baseline, Government balance and debt as % of GDP.
Bold line: credit crunch scenario; Dashed line: with temporary fiscal expansion; Marked line-triangles: with prolonged fiscal expansion; Marked line-blocks: with prolonged fiscal expansion and monetary accommodation (ZLB)

6. Concluding remarks and implications for exit strategies

Discretionary fiscal policy becomes more effective in the presence of credit constrained households. Rising credit constraints, and in many countries interest rate hitting their zero lower bound, made fiscal policy a more powerful tool in the recent credit crisis. However, many Member States in Central and Eastern Europe had very limited room to implement stimulus measures and often had to adopt consolidation measures with a view to avoiding a further fall-out from the crisis. Higher interest rates also meant that temporary fiscal stimuli in these countries were less effective than in countries where monetary policy could accommodate the fiscal impulse. However, as shown here, even when monetary policy cannot accommodate the fiscal impulse, well-designed fiscal stimulus measures can still help to soften the impact of the crisis and mitigate the detrimental effects on (potential) growth.

The analysis has also important implications for an appropriate exit strategy. As shown in this chapter, fiscal policy was a powerful instrument in supporting growth in the economic crisis due to two main factors: the significant tightening of credit conditions, and the zero lower bound on nominal interest rates. Just as these two factors make fiscal multipliers larger, they also make the cost of a withdrawal of the stimulus higher. The multipliers shown here also indicate the loss in output that will occur when these measures are withdrawn, and this will similarly depend on the instruments used, the presence of credit constraints, monetary accommodation and on whether the stimulus (withdrawal) is global or one region acting alone.

As long as credit conditions remain tight and more households face a binding collateral constraint on their borrowing, the costs of a withdrawal of fiscal stimulus will be larger. An important implication of this is that it would be better to wait with a fiscal exit till credit conditions have returned to pre-crisis levels. Fiscal policy multipliers are also enhanced by monetary accommodation when interest rates are at their lower zero bound. One could argue that this also has important implications for the optimal timing of a withdrawal. As long as interest rates remain low, monetary policy might be less likely to support a fiscal tightening by reducing interest rates. An early withdrawal of fiscal stimulus, while monetary policy remains at the zero lower bound, risks a much sharper contraction in output than when the exit is delayed till monetary conditions have returned to normal. Finally, there are also sizeable positive spill-over effects from fiscal stimuli. If fiscal stimuli are withdrawn in all countries at the same time, output losses are likely to be larger.

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Annex 1

Table Fiscal stimulus measures 2009

2009	Total stimulus measures	A. Supporting household purchasing power	B. Labour market measures	C. Measures aimed at companies	D. Increasing /bringing forward investment	Estimated GDP impact if measures are		
	(% of GDP)	(% of GDP)	(% of GDP)	(% of GDP)	(% of GDP)	permanent	temporary	Temporary +mon.acc.
BE	0.94	0.38	0.03	0.20	0.00	0.38	0.62	0.90
BG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CZ	1.99	0.65	0.56	0.68	0.10	0.89	1.27	1.79
DK	-0.08	0.00	0.00	-0.08	0.00	-0.03	-0.06	-0.09
DE	1.71	0.62	0.22	0.46	0.41	0.89	1.25	1.74
EE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IE	0.54	0.40	0.00	0.14	0.00	0.23	0.34	0.49
EL	0.19	0.12	0.05	0.01	0.00	0.08	0.11	0.15
ES	0.79	0.33	0.11	0.35	0.00	0.33	0.50	0.73
FR	0.65	0.14	0.11	0.27	0.14	0.33	0.48	0.67
IT	0.57	0.20	0.16	0.21	-0.01	0.24	0.35	0.49
CY	1.22	0.89	0.04	0.29	0.01	0.51	0.76	1.08
LV	1.76	1.73	0.00	0.04	0.00	0.75	1.06	1.48
LT	0.05	0.00	0.05	0.00	0.00	0.02	0.03	0.03
LU	1.90	1.50	0.34	0.06	0.00	0.83	1.12	1.55
HU	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.01
MT	0.56	0.00	0.00	0.48	0.09	0.26	0.43	0.63
NL	0.88	0.00	0.11	0.27	0.16	0.43	0.66	0.95
AT	1.39	1.09	0.23	0.02	0.04	0.62	0.84	1.15
PL	0.92	0.01	0.75	0.16	0.00	0.43	0.52	0.69
PT	0.29	0.00	0.16	0.09	0.03	0.14	0.19	0.25
RO	1.81	0.16	0.02	1.63	0.00	0.71	1.25	1.89
SI	0.86	0.04	0.18	0.30	0.34	0.50	0.69	0.95
SK	0.34	0.23	0.05	0.05	0.02	0.16	0.22	0.30
FI	1.29	1.04	0.02	0.23	0.00	0.54	0.79	1.12
SE	0.73	0.17	0.56	0.00	0.00	0.34	0.40	0.53
UK	1.72	1.35	0.07	0.28	0.02	0.73	1.07	1.50
EU27	1.06	0.46	0.16	0.29	0.12	0.49	0.69	0.97
EUR16	0.98	0.36	0.14	0.29	0.15	0.46	0.66	0.92
Fiscal space:								
large	1.38	0.52	0.21	0.32	0.27	0.68	0.94	1.31
medium	0.92	0.46	0.14	0.26	0.04	0.40	0.58	0.82
small	0.54	0.15	0.03	0.36	0.00	0.22	0.36	0.53
PM								
US	1.99					0.98	1.69	2.23

Table Fiscal stimulus measures 2010

2010	Total stimulus measures	A. Supporting household purchasing power	B. Labour market measures	C. Measures aimed at companies	D. Increasing/ bringing forward investment	Estimated GDP impact if measures are		
	(% of GDP)	(% of GDP)	(% of GDP)	(% of GDP)	(% of GDP)	permanent	temporary	temporary +mon.acc.
BE	0.75	0.42	0.03	0.00	0.00	0.31	0.48	0.70
BG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CZ	1.37	0.74	0.00	0.57	0.00	0.54	0.84	1.22
DK	0.11	0.00	0.00	0.11	0.00	0.04	0.08	0.12
DE	2.42	1.30	0.23	0.35	0.54	1.26	1.73	2.37
EE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IE	0.68	0.45	0.00	0.24	0.00	0.28	0.43	0.62
EL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ES	0.59	0.00	0.03	0.08	0.48	0.45	0.58	0.77
FR	0.25	0.01	0.00	0.17	0.07	0.13	0.20	0.29
IT	0.49	0.00	0.22	0.15	0.12	0.26	0.35	0.48
CY	0.98	0.67	0.01	0.29	0.02	0.41	0.62	0.89
LV	0.30	0.26	0.00	0.05	0.00	0.13	0.19	0.26
LT	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.01
LU	1.65	1.44	0.00	0.22	0.00	0.70	1.01	1.43
HU	0.02	0.00	0.02	0.00	0.00	0.01	0.01	0.01
MT	1.23	0.00	0.14	0.84	0.26	0.61	0.93	1.35
NL	0.83	0.00	0.10	0.20	0.17	0.41	0.63	0.90
AT	1.61	1.33	0.23	0.04	0.00	0.69	0.95	1.32
PL	0.81	0.02	0.70	0.09	0.00	0.38	0.45	0.59
PT	0.12	0.00	0.00	0.12	0.00	0.05	0.08	0.13
RO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SI	0.47	0.00	0.37	0.10	0.00	0.21	0.26	0.35
SK	0.45	0.32	0.06	0.06	0.00	0.19	0.27	0.38
FI	2.06	1.51	0.02	0.52	0.00	0.86	1.28	1.83
SE	1.32	0.73	0.59	0.00	0.00	0.59	0.75	1.01
UK	0.61	0.39	0.16	0.04	0.01	0.27	0.36	0.50
EU27	0.95	0.42	0.15	0.17	0.19	0.47	0.65	0.89
EUR16	1.05	0.45	0.12	0.20	0.25	0.53	0.74	1.01
Fiscal space:								
large	1.90	1.01	0.21	0.27	0.35	0.93	1.28	1.77
medium	0.50	0.13	0.12	0.12	0.11	0.26	0.35	0.48
small	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01
PM								
US	1.80					0.90	1.54	2.03