

SHORT-TERM MACROECONOMIC EFFECTS OF THE FISCAL STIMULUS MEASURES IN AUSTRIA

Serguei Kaniovski and Margit Schratzenstaller**

Like most industrialized countries and many developing countries, Austria has taken measures to stabilise financial markets and to mitigate the sharp decrease in economic activity caused by the recent financial crisis. These measures amount to 4.2 per cent of 2008 GDP. Model simulations show that, together with fiscal measures adopted in the 10 major trading partner countries, the national stimulus packages may have slowed the decrease in Austrian real GDP by a cumulative 2.1 percentage points in 2010, preserving 41,500 jobs.

1 Introduction

The financial crisis of 2008 has triggered the deepest recession since the Great Depression of 1930s. The Austrian economy has been adversely affected by the financial and economic crisis, albeit somewhat less severely than the euro area on average. Other than in the wake of the Great Depression, economic policy responded to the global financial and economic crisis in a determined and timely manner. In November 2008, the Austrian federal government adopted measures to stabilize the banking sector and to cushion the economic downturn, which are gradually being implemented.

Part of the federal government's stabilisation programme is the carrying-forward of income tax cuts into 2009, supplemented by two fiscal stimulus packages, a rescue package for the banking sector, and two labor-market packages. In addition, the Länder have adopted own programmes that focus on infrastructure investment.

This paper presents simulations of the short-term effect of the domestic fiscal stimuli and of those set by Austria's most important trading partners on output and employment in Austria (Breuss, Kaniovski and Schratzenstaller, 2009). The effect of the national packages is estimated using the Macromod, a macroeconomic model of the Austrian economy developed at WIFO. The spill-over effect of the stimuli adopted by Austria's ten most important trading partners on the Austrian economy is estimated using the Oxford World Macroeconomic Model (OEF). Our discussion of the results focuses on the GDP multipliers of the revenue and expenditure measures. The calculations rest upon the assumption that all measures are actually implemented as planned, *i.e.*, there is no implementation lag. The time horizon for the simulations is 2010.

In most industrialized countries, the fiscal response to the imminent economic recession has been swift and coordinated, which poses the question of the size of spill-over effects on the national economy. This question is especially important for small open economies such as Austria with imports and exports in 2009 being, respectively, 46 and 51 per cent of the nominal GDP. An assessment of spill-over effects for several large industrialized countries has been undertaken in OECD (2009). Model simulations by the OECD (2009, Table 3.7) show that for the USA this effect is about half as high as the effect of the US fiscal measures. For the average of the Euro area the effect is smaller.

In order to obtain the total effect of fiscal packages on the Austrian economy we have linked the OEF World model with a model of the WIFO model of the Austrian economy that is more detailed than the model for Austria supplied with the OEF. In addition to the demand effect, our simulations take account of changes in terms of trade, interest rates and the Euro/US Dollar

* Austrian Institute of Economic Research (WIFO).

exchange rate that cannot be fully implemented in a national model, and thus would not be fully accounted for. Our simulations for Austria show this effect to be about half as high as the effect of the fiscal measures taken on the national level. This confirms the importance of including the spill-over effects in assessment of the effectiveness of fiscal policy measures taken in response to the recent financial and economic crisis.

2 Stimulus programmes adopted by the main trading partners

In late March 2009, *OECD* (2009) published an overview of volume and timing of stimulus programmes implemented or planned by the 30 OECD member countries as of 24 March 2009. The volume is defined as a cumulated net effect on the general government balance over the period from 2008 to 2010, as percent of 2008 GDP, disaggregated to broad expenditure and revenue measures within the national account framework. The main findings were:

- Fiscal stimuli have been set in almost all OECD countries. The budgetary effect of these programs is typically smaller than that of the automatic stabilisers or other discretionary fiscal measures. The volumes differ markedly across countries. An unweighted average of the stimulus packages in the OECD countries (*i.e.*, those sets of measures giving a positive impulse to growth) cumulated over the period 2008 to 2010 amounts to 2.7 per cent of GDP, of which 1.6 per cent of GDP is due to tax cuts and 1.1 per cent of GDP to spending increases. The largest package has been adopted by the USA (5.6 per cent of GDP), the smallest by Switzerland (0.5 per cent of GDP). In five countries (USA, Australia, Canada, Korea and New Zealand), they exceed 4 per cent of 2008 GDP, while four countries (Italy, Ireland, Iceland and Hungary) assume a neutral or restrictive fiscal policy stance.
- Estimates based on the crisis-induced low fiscal multipliers suggest a growth effect of around 0.5 per cent of GDP in the OECD. The largest US package is expected to raise the US GDP by more than 1 per cent (2009: 1.3 per cent, 2010: 1.5 per cent). This estimate does not include international spillovers.
- The more effective the automatic stabilisers, the smaller are the national discretionary stimulus packages. On average, the impact of the automatic stabilisers is three times as high as that of the discretionary measures.
- Most OECD countries outside the G-7 focus on tax cuts, whereas tax cuts are less dominant among the G-7. Priority is given to cuts in personal income tax against cuts in business taxes. Almost all OECD countries resort to additional public investment or to the carrying-forward of planned projects. In many cases, transfers to private households are being increased, particularly for low-income earners. Some countries also increased subsidies to firms.
- Most OECD countries planned the bulk of their stimulus programmes for the year 2009.

Table 1 gives an overview of the volume and timing of the budgetary effects in Austria's ten major trading partner countries (*OECD*, 2009, p. 111). The measures planned for the period from 2008 to 2010 range from a strong fiscal expansion (5.6 per cent of nominal GDP of 2008) in the USA to a fiscal contraction of 4.4 per cent of GDP in Hungary. Germany, Austria's most important trading partner, has adopted measures totaling 3.0 per cent of nominal GDP. In most countries the measures take effect in 2009. On average of the 11 countries, the stimulus packages for 2008 to 2010 correspond to 1.4 per cent of 2008 GDP; if the comparison is confined to those countries in which fiscal policy is expansionary, the budgetary impact is 2.2 per cent of 2008 GDP. The expenditure-increasing measures account for 0.3 per cent and 0.9 per cent of GDP, respectively, the revenue cuts for 1.1 per cent and 1.3 per cent.

According to the analysis by the OECD, the Austrian package totalling 1.1 per cent of GDP (expenditure increase 0.3 per cent, tax cuts 0.8 per cent) is both below the OECD average and

Table 1

**Size and Time Profile of the Stimulus Programmes
Adopted by Austria's Main Trading Partners**

	Net Impact on General Government Balance			Distribution 2008-10		
	2008-10			2008	2009	2010
	Expenditure	Taxes	Total			
	<i>(percent of 2008 GDP)</i>			<i>(percent share of net impact)</i>		
Germany	-1.4	-1.6	-3.0	0	46	54
Italy	-0.3	0.3	0.0	0	15	85
USA	-2.4	-3.2	-5.6	21	37	42
Switzerland	-0.3	-0.2	-0.5	0	68	32
France	-0.4	-0.2	-0.6	0	75	25
Czech Republic	-0.5	-2.5	-3.0	0	66	34
UK	0.0	-1.5	-1.4	15	93	-8
Hungary	4.4	0.0	4.4	0	58	42
Spain	-1.9	-1.6	-3.5	31	46	23
Poland	-0.6	-0.4	-1.0	0	77	23
Austria	-0.3	-0.8	-1.1	0	84	16
OECD 11						
Unweighted	-0.3	-1.1	-1.4	6	61	33
Only positive impact						
Unweighted	-0.9	-1.3	-2.2	7	66	29
G7	-1.6	-2.0	-3.6	17	43	40
OECD total						
Unweighted	-0.7	-1.2	-2.0	10	53	37
Weighted	-1.5	-1.9	-3.4	17	45	39
Only positive impact						
Unweighted	-1.1	-1.6	-2.7	9	53	38
Weighted	-1.7	-2.0	-3.7	17	45	39

Source: OECD, WIFO.

below the average for the 11 countries shown in Table 1. This may be explained by the following factors:

- the OECD study does not include off-budget measures that play an important role in Austria. Investment projects by the road financing agency (Asfinag), the Federal Real Estate Agency (BIG) and the Austrian Railways (ÖBB) belong to this category;
- although the aim of the OECD was to include all measures, the fiscal packages adopted by the Länder were omitted;
- of the permanent tax cuts enacted with the tax reform 2009, only the revenue shortfall for 2009 is taken into account. The OECD argues that the tax cuts for 2010 would have been implemented notwithstanding the crisis;

- lastly, the OECD study includes only some of the measures aimed at lowering the financing costs for businesses.¹

In quantifying the inputs for model simulations we disaggregate the measures on the revenue side into personal taxes, business taxes, consumption taxes, social security contributions and a residual category of other revenues. On the contrary, we treat the expenditures as one category. While the diversity of the measures on the expenditure side precludes their disaggregation in a manner that is consistent among the countries, their effect is essentially identical in the highly aggregated macroeconomic models used for simulations.

3 Stabilisation measures taken by Austria

3.1 *Stabilisation measures adopted by the federal government*

In line with efforts at the international level to support aggregate demand, Austria resorts to a fiscal policy mix of tax cuts and spending increases. The measures included in model simulations comprise the stimulus packages I and II, and the tax cuts carried forward from 2010 into 2009. They can be grouped into four categories (total amount 2009-10 in millions of euros):

- increase in infrastructure investment (€ 1,435 million),
- lowering of companies' financing cost (€ 2,080 million),
- increase in private household disposable income (€ 5,953 million),
- increase in public consumption and subsidies (€ 370 million).

Table 2 gives an overview of the volume and timing of these packages.² Together the two packages and the tax cuts amount to 3.5 per cent of nominal GDP, rising to 4.2 per cent of GDP if the measures by the Länder are included. This shows that Austria belongs to the group of countries that adopted large stimulus programs relative to their GDP.

The investment initiative of the federal government foresees an increase in building and infrastructure investment by € 1.4 billion in 2009 and 2010, of which € 1,015 million will have a direct budgetary impact. Asfinag and ÖBB will invest € 450 million in transportation networks. Unlike the investment by ÖBB, that by Asfinag will be financed out of current revenues and therefore not burden the federal budget, whereas a small part of the ÖBB investment will have an impact on the budget. Further plans concern investment in energy conservation for buildings owned by the Federal Real Estate Agency (BIG) as well as the construction or renovation of schools, universities and administrative facilities.

The federal government programme sets incentives for private construction investment. Budget outlays of € 50 million for energy conservation in commercial buildings and of another € 50 million for private households are to generate an additional € 300 million in non-residential and residential construction output in 2009 and 2010. In 2009, € 10 million are allocated to investment in broadband technology.

¹ The difficulty of international comparisons is illustrated by a comparison of the OECD findings with those of Saha and Von Weizsäcker (2009), which cites a budgetary effect of 1.3 per cent of GDP for Austria in 2009. Also the IMF, 2009 estimates of the fiscal cost of discretionary measures by the G-20 differ substantially from those of the OECD. The volume of the Austrian stabilization measures is best reflected in an overview published in June 2009 by the European Commission (European Commission, 2009A and 2009B), according to which the Austrian stimulus measures of 1.8 per cent of GDP are second-largest in the EU. Spain's package was larger in 2009 (2.3 per cent of GDP); Germany's in 2010 (1.9 per cent of GDP).

² For the tax measures raising private disposable income of households, Table 2 refers to the respective amounts after full implementation as from the year of introduction, since it is not the budgetary effects that are relevant (which may lag due to conventions of tax collection) but the economic effect. For this reason, the data differ slightly from those presented in Schratzenstaller (2009).

Table 2

Tax Reform and Measures Included in Stimulus Packages I and II

	2009	2010	
	<i>(millions of euros)</i>		
<i>Federal level (government programme)</i>	4,702.5	5,135.0	
Infrastructure investment	690	745	
ÖBB	175	175	Stimulus package I
Asfinag	50	50	Stimulus package I
BIG	355	520	Stimulus package II
Broadband services	10	0	Stimulus package I
Energy-saving renovation	100	0	Stimulus package II
Lowering of corporate financing cost	840	1,240	
Accelerated depreciation	0	250	Stimulus package II
Profit tax allowance	0	150	Tax reform
Third-party credits EIB ⁽¹⁾	200	200	Stimulus package I
Interest-subsidised ERP credits	200	200	Stimulus package I
Higher guarantee ceiling aws	400	400	Stimulus package I
Silent participations aws	40	40	Stimulus package I
Increase in private disposable income	2,987.5	2,965.0	
Income tax cuts	2,300	2,300	Tax reform
Family “package”	510	510	Tax reform
Tax deductability of sponsoring	100	100	Tax reform
Subsidised homebuilding	20	20	Stimulus package I
Regional employment “package”	35	35	Stimulus package II
Car scrapping premium	22.5	0.0	
Government consumption	120	120	
Compulsory pre-school year free of charge	70	70	Stimulus package II
Research and development	50	50	Stimulus package II
Subsidies	65	65	
Regional employment “package”	40	40	Stimulus package II
Globalisation “campaign”	25	25	Stimulus package I
<i>Länder</i>	1,073.2	1,007.7	
Infrastructure investment	876.8	876.8	
Increase in transfers	196.3	130.9	
<i>Total</i>	5,775.7	6,142.7	

Source: Federal Ministry of Economics, Families and Youth, IHS, WIFO. - Asfinag = Autobahnen- und Schnellstraßen Finanzierungs-Aktiengesellschaft, BIG = Federal Real Estate Agency, ÖBB = Austrian Railways.

⁽¹⁾ Small and medium-sized enterprises, research and development.

The measures designed to lower financing cost and strengthen the equity base of Austrian businesses may be summarised into three groups: strengthening of the equity base through silent partnerships, interest-subsidised loans and accelerated depreciation rules.

Among the measures supporting the purchasing power of private households, the tax reform carried forward into 2009 is the most important one. The cut in tax rates will lower the tax burden on households by € 2.3 billion per year. Additional tax concessions for families will increase the disposable income by € 510 million per year. To this category includes several tax rebates that cover charities, homeowner savings and loans, measures from the employment package and the car scrappage premium.

The remaining € 370 million in additional federal spending is included partly as government consumption and partly as subsidies. Included in this category is the funding of a newly-introduced compulsory pre-schooling year and the reinforcement of funds for research by € 70 million and € 50 million for 2009 and 2010, respectively, and € 65 million per year for the regional employment package and measures aimed at increasing exports.

3.2 *Measures taken by the Länder*

The federal states are planning a series of cyclical stabilisation measures which in the simulations with the WIFO macroeconomic model are captured in a simplified way either as investment or as addition to private disposable income. The measures at the Länder level are predominantly investment programmes, notably construction; of lower importance are commercial subsidies and transfers to households. In 2009 and 2010, the Länder plan additional infrastructure investment of nearly € 880 million, respectively, and an increase in transfer payments by almost € 200 million in 2009 and € 130 million in 2010. In total, the Länder “packages” amount to € 1,073 billion in 2009 and € 1,008 billion in 2010, together € 2,081 billion.

4 **Simulation results**

For a simulation of the overall effects of the expansionary fiscal measures described above, two macroeconomic models are used: the impact of measures taken by Austria’s key trading partners on the domestic economy are estimated on the basis of the Oxford World Macroeconomic Model (OEF, 2005), the effects of the measures taken in Austria by the federal government and the Länder using the WIFO macroeconomic model (Baumgartner, Breuss and Kaniovski, 2004).

WIFO-Macromod is a medium-scale econometric model of the Austrian economy designed for medium term forecasting and economic policy simulations. We use this model to analyze the impact of global economic developments on Austria and explore both the intended and the unintended consequences of domestic fiscal policies such as tax reforms, public spending, and budget cuts. WIFO-Macromod is a structural econometric model that is based on the income-expenditure framework, with supply-side elements used for price and wage determination. We estimate a trend output using a production function and use an output gap as a proxy for the aggregate rate of capacity utilization.

In WIFO-Macromod, Austria is modeled as a small open economy in the European Economic and Monetary Union (EMU). The repercussions of economic activity in Austria on the rest of the world are neglected and variables describing the world economic conditions, including those of European economic policy authorities, are set as exogenous. Specifically, we treat the income of Austria’s trading partners, the Euro-U.S. dollar exchange rate, short and long-term interest rates and world prices for tradable goods and services as exogenous. In the simulations of

the spillover effects these variables are borrowed from the OEF Model. In terms of the theoretical underpinning, the OEF model is very similar to the WIFO-Macromod but covers a large number of countries interconnected by trade flows and prices. The results of the simulations are summarized in Table 3.

4.1 Investment initiative

The federal government's investment initiative increases gross fixed capital formation by a cumulated 1.8 per cent above baseline, *i.e.*, a scenario without these government measures. As could be expected, investment in construction will post the strongest increase. Investment in machinery and equipment increases due to an accelerator effect. The imports increase by 0.3 per cent. The resulting cumulated increase in GDP is 0.3 per cent. The positive demand shock leads to an increase of 7,200 jobs and a decline in the unemployment rate by 0.1 percentage points. Labour productivity and real per capita wages will edge up only modestly, such that the increase in the wage bill is mainly due to the job creation. The marginal inflation-enhancing effect can be neglected.

Underlying the calculations is the assumption of timely implementation of the planned investment. In the case of delay, the macroeconomic impulse will materialize only with a lag.

4.2 Increase in private disposable income

The measures taken by the federal government raise real disposable income of households by 1.6 per cent. Since only part of the gain is used for consumption, private consumption grows by a cumulated 1.1 per cent. Because of the relatively low short-term propensity to consume of 0.34, the saving ratio goes up by 0.7 percentage points in 2009. Part of the rise in private consumption is imported. Real GDP increases by 0.4 per cent in 2009 and a further 0.2 per cent in 2010.

As a consequence of the positive demand shock, the number of people in dependent active employment rises by a cumulated 10,900 from baseline, and the jobless rate decreases by 0.2 percentage points. Per capita wages in the private sector continue to increase moderately, therefore the higher wage bill is also in this case largely due to the creation of new jobs.

4.3 The role of multipliers

The macroeconomic effects of a given fiscal policy measure are captured by multipliers, which quantify the impact of variations in government spending or taxes on GDP, employment, investment, private consumption, etc. In the focus of analyses studying the macroeconomic impact of fiscal policy are GDP multipliers. Their magnitude differs for different fiscal policy measures. Generally, the macroeconomic effect of increases in investment in public infrastructure is particularly strong since the respective measures have a direct impact and are relatively labor-intensive (particularly for the building of new structures). Moreover, the import content for construction investment is low. Cuts in income taxes have generally a more limited effect on growth than an increase in government spending, since they do not directly raise demand but rather personal disposable income. Like with most international or national macroeconomic models, the GDP multiplier is markedly higher for government expenditure than for cuts in direct taxes also in the WIFO model (Table 4). GDP increases only if the additional income is spent rapidly for purchases of domestically-produced consumer goods. Decisions on higher government expenditure will, however, exert their full effect only if the measures are implemented as planned.

Table 3

Macroeconomic Effects of the Fiscal Stimulus Programmes

	Stimulus Packages I and II, Tax Reform ⁽¹⁾								Measures by Bund and Länder ⁽¹⁾		Stimulus Programmes of Main Trading Partners		Grand Total	
	Total		Infrastructure Investment		Increase in Private Disposable Income		Lowering of Corporate Financing Cost							
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
	<i>(percent of cumulated deviation from baseline)</i>													
<i>Aggregate demand, volume</i>														
Gross domestic product	+0.9	+1.0	+0.4	+0.3	+0.4	+0.6	+0.0	+0.1	+1.2	+1.4	+0.7	+0.8	+1.9	+2.1
Consumption	+0.8	+1.1	+0.1	+0.1	+0.7	+0.9	+0.0	+0.1	+0.9	+1.2	+0.1	+0.1	+1.0	+1.2
Private households	+1.0	+1.4	+0.1	+0.2	+0.8	+1.1	+0.0	+0.1	+1.0	+1.5	+0.2	+0.1	+1.2	+1.6
Government	+0.5	+0.3	+0.1	+0.0	+0.3	+0.3	+0.0	+0.0	+0.5	+0.4	± 0.0	± 0.0	+0.4	-0.0
Gross fixed investment	+3.1	+3.1	+2.0	+1.8	+0.7	+1.0	+0.4	+0.3	+5.1	+5.1	+0.7	+0.7	+5.7	+5.7
Equipment ⁽²⁾	+2.4	+2.4	+0.8	+0.7	+1.0	+1.3	+0.5	+0.4	+3.1	+3.1	+1.1	+1.1	+4.1	+4.0
Construction	+3.8	+3.7	+3.0	+2.6	+0.5	+0.8	+0.3	+0.3	+6.7	+6.6	+0.4	+0.5	+7.0	+7.0
Exports	± 0.0	+0.1	± 0.0	+0.0	± 0.0	+0.0	± 0.0	+0.0	± 0.0	+0.1	+1.7	+1.8	+1.7	+1.9
Imports	+0.8	+1.0	+0.3	+0.3	+0.4	+0.6	+0.1	+0.1	+1.1	+1.2	+1.0	+0.9	+2.0	+2.1
Gross domestic product, nominal	+0.8	+1.1	+0.3	+0.4	+0.4	+0.6	+0.0	+0.1	+1.1	+1.5	+0.8	+1.2	+1.9	+2.6
Consumer prices	-0.1	+0.1	-0.0	+0.0	+0.0	+0.1	-0.0	+0.0	-0.1	+0.1	+0.2	+0.7	+0.1	+0.8

<i>Labour market and income</i>														
Dependent active employment ⁽³⁾	+0.3	+0.6	+0.1	+0.2	+0.2	+0.3	+0.0	+0.0	+0.4	+0.8	+0.3	+0.5	+0.7	+1.3
1,000 persons	+10.7	+19.7	+4.7	+7.2	+5.4	+10.9	+0.6	+1.5	+14.7	+26.6	+9.1	+16.4	+23.5	+41.5
Labour supply	+0.1	+0.2	+0.0	+0.1	+0.1	+0.1	+0.0	+0.0	+0.2	+0.3	+0.1	+0.2	+0.2	+0.4
Unemployment rate in percent of dependent labour force ⁽⁴⁾	-0.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.0	-0.0	-0.3	-0.5	-0.2	-0.3	-0.4	-0.7
Real wage per capita of dependent employees	+0.2	+0.3	+0.1	+0.1	+0.1	+0.2	+0.0	+0.0	+0.3	+0.4	+0.0	-0.0	+0.3	+0.4
Unit labour cost, private sector	-0.4	+0.0	-0.2	+0.1	-0.2	+0.0	-0.0	-0.0	-0.5	+0.1	-0.2	+0.4	-0.8	+0.5
Average labour productivity, private sector	+0.5	+0.4	+0.2	+0.1	+0.3	+0.2	+0.0	+0.0	+0.7	+0.5	+0.5	+0.3	+1.2	+0.7
Real disposable income, private households	+1.9	+2.1	+0.3	+0.2	+1.6	+1.6	+0.0	+0.2	+2.1	+2.2	+0.4	+0.1	+2.4	+2.3
<i>Government</i>														
Expenditure	-1.5	-1.3	+0.2	+0.3	-1.8	-1.4	+0.0	-0.2	-1.2	-0.9	+0.5	+1.1	-0.7	+0.2
Revenue	+0.5	+0.6	+0.3	+0.4	+0.1	+0.2	-0.0	-0.0	+1.2	+1.3	+0.0	+0.1	+1.2	+1.4
Government balance (percent of nominal GDP)	-0.9	-0.9	-0.1	-0.0	-0.9	-0.8	+0.0	-0.1	-1.2	-1.0	+0.3	+0.5	-0.9	-0.5
Saving ratio (percent)	+0.8	+0.6	+0.1	+0.0	+0.7	+0.4	+0.0	+0.1	+0.9	+0.6	+0.2	-0.0	+1.0	+0.6

Source: WIFO.

⁽¹⁾ Including subsidies and government consumption. – ⁽²⁾ Including immaterial investment, other equipment, industrial cattle and plants. – ⁽³⁾ Excluding early child care benefit recipients. – ⁽⁴⁾ Public Employment Service Austria.

Table 4

Comparative Estimates of Fiscal Multipliers for Austria

	Government Expenditure		Wage and Income Tax	
	First Year	Second Year ⁽¹⁾	First Year	Second Year ⁽¹⁾
	Impact of 1 percent change on GDP (percent)			
OECD	0.70	1.10	0.20	0.60
OeNB	0.78	1.40	0.45	0.64
WIFO	1.19	1.31	0.40	0.56
IHS	0.96	0.98	0.29	0.41

Source: WIFO compilation.

⁽¹⁾ Cumulated.

The effectiveness of tax cuts to boost disposable income and thereby private purchasing power largely depends on the readiness of private households to increase consumption. The marginal propensity to consume is the change in consumption in response to a small variation in income. It is to an important extent determined by the overall economic environment. Sluggish income growth and heightened uncertainty may encourage precautionary saving and thus lead to a rise in the saving ratio (e.g., Bartzsch, 2006). The uncertainty about the effectiveness of fiscal measures, as reflected by GDP and employment multipliers, is higher at the present juncture than before the economic crisis or for “normal” cyclical variations. At the same time, however, various recent studies suggest that the impact of government spending may be higher in a severe recession with low/zero interest rates or a recession-induced liquidity trap.¹

Furthermore, private households’ marginal propensity to consume differs substantially by income brackets. Low-income households typically have a higher consumption/lower saving propensity than higher-income earners. Tax cuts will thus have a stronger impact on growth and employment the more they benefit the lower income brackets.

A recent study by Oesterreichische Nationalbank (OeNB) arrives at somewhat higher cumulated multipliers than the present analysis (Köhler-Töglhofer and Reiss, 2009). For government expenditure, the OECD (2009, p. 138) assumes lower multipliers for Austria than those incorporated in the WIFO model. The fiscal multipliers in the LIMA model of the Institute for Advanced Studies (Hofer and Kunst, 2004; Berger *et al.*, 2009) are lower than the other multipliers presented in Table 4. In the WIFO model, the multiplier in the first year is markedly higher than in other models for Austria. Fiscal multipliers in the range between 1.0 and 1.2 are very common in national macroeconomic models. For example, a survey of a large number of national macroeconomic models provided in OECD (2009) quotes the average public consumption multiplier of 1.2 in the first year and 1.3 in the second year. The same survey reports the average multipliers for personal income tax cuts of 0.5 in the first year and 0.8 in the second year. The corresponding multiplier in the WIFO model is slightly lower.

¹ For a short overview of studies determining the multiplier in a liquidity trap see Erceg and Lindé (2010).

The multipliers presented here for Austria are derived from conventional demand-side oriented macroeconomic simulation models. The sizeable stimulus packages many countries have implemented to mitigate the economic downturn caused by the financial market crisis have intensified the academic discussion about the effectiveness of fiscal policy, which has been ongoing for the last two decades.² Meanwhile a number of empirical studies exist which are trying to quantify the multipliers for different fiscal policy measures for different countries and are yielding rather diverse results. These studies are mainly based on three types of models (Auerbach and Gale, 2009): (i) large-scale macroeconomic models with several equations for prices and quantities in different sectors of the economy which are trying to identify the impact of fiscal policy measures on these prices and quantities; (ii) structural vector autoregression (VAR) models identifying the macroeconomic effects of fiscal policy shocks; (iii) dynamic stochastic general equilibrium (DSGE) models using equations based on microeconomic theory. The different models used to estimate the magnitude of multipliers are one reason for the inconclusive results brought about by the existing body of literature. According to Freedman *et al.* (2009), further causes are country-specific differences in the marginal propensities to save and to import, in the responses of monetary policy, in financing constraints for the government, as well as in country size and degree of openness.

Table 5 gives an overview over the most important studies published since the beginning of 2009 inspired by the sizeable stimulus programs with which many countries reacted to the crisis. These studies try to identify the magnitude of the multipliers for various fiscal policy measures. Mostly public spending is in the focus, which is somewhat astonishing as tax measures were dominant in the majority of stimulus packages (OECD, 2009). Not surprisingly, the results for the fiscal multipliers vary considerably, depending on the models used. Generally, the more recent, neoclassical or New Keynesian models incorporating rational expectations and forward-looking behavior of firms and households and partly resting on microeconomic foundations produce smaller – and partly even negative – multipliers than the traditional macroeconomic Keynesian models, due to a crowding-out of private investment and consumption by public spending. It is important to note that all papers included in the following overview do not account for cross-border effects, *i.e.*, they only estimate the GDP multipliers for a given country resulting from its own fiscal actions, while leakages abroad or positive impulses from abroad are neglected.

Moreover, the studies reviewed here suggest that the multipliers:

- of spending measures are larger than of variations in taxes are larger in a situation with economic slack
- of contractionary and expansionary spending measures are very similar
- of spending measures are larger at low nominal interest rates or in a liquidity trap, respectively
- of spending measures are larger in traditional Keynesian models without forward-looking behavior of firms and households
- in conventional macroeconomic simulation models increase in the years after the policy shocks, while they tend to decrease in the more recent models
- vary inversely with the degree of openness of the countries regarded.

4.4 Cyclical stimulus from abroad

Particularly in Europe, one issue heavily debated was the necessity of international coordination of national stimulus programs to reinforce their effectiveness given the deep economic

² For brief reviews of the most important earlier studies (since 2002) see Giordano *et al.* (2007), Afonso and Sousa (2009) and Christiano *et al.* (2009).

Table 5

Recent Studies on the Size of Multipliers for Various Fiscal Policy Measures

Authors	Sample	Fiscal Policy Measure	Magnitude of GDP Multiplier	Specific Aspects
Barro and Redlick (2009)	US 1917 to 2006	increase in defense spending	0.6 to 0.7 for median unemployment rates 1.0 for high unemployment rates	multipliers depend positively on extent of economic slack spending multipliers smaller than tax multipliers
	US 1950 to 2006	increase in income tax	-1.1	multipliers for spending increases and decreases very close
Cogan <i>et al.</i> (2009)	US 2009 to 2012	permanent increase in government purchases	0.4	temporary increase: multiplier turns negative
Cwik and Wieland (2009)	11 largest Euro area countries 2009/10	increase in government spending in forward-looking models	-0.26 to 0.04 short-term -0.455 to -0.11 medium-term	multipliers much larger in traditional macroeconomic model without forward-looking behavior
		increase in government spending in non-forward-looking models	0.37 short-term -0.18 medium-term	
Fair (2009)	US	increase in government purchases	2.0	-
		decrease of personal income tax	1.0	
		increase in transfer payments to households	1.0	
Hall (2009)	US	increase in government purchases	0.7 to 1.0 1.7 at low interest rate	spending multipliers higher with zero nominal interest rate
Ramey (2009)	US	increase in government spending	0.6 to 1.1	-
Romer and Bernstein (2009)	US 2009 to 2012	permanent increase in government purchases	1.6	-
		permanent tax cuts	1.0	
OECD (2009)	Review of macroeconomic simulation models for various OECD countries and Euro area	increase in government purchases	1.2 to 1.3	multipliers vary inversely with degree of openness
		corporate tax cut	0.3 to 0.5	
		personal income tax cut	0.5 to 0.8	
		indirect tax cut	0.2 to 0.4	
		social security contribution cut	0.3 to 0.6	

Source: Own compilation.

⁽¹⁾ Mean values; first and second year multipliers.

integration of national economies. To avoid leakages and thus to reinforce the effectiveness of domestic fiscal measures, and to respond adequately on a global/European level to the global/European crisis, supranational bodies – in particular the IMF and the European Commission – strongly advocated internationally coordinated stimulus measures. Few studies, however, exist to date on the extent of the cross-border impact of fiscal policy. IMF economists themselves (Freedman *et al.*, 2009) undertook simulations with the IMF's Global Integrated Monetary and Fiscal Model (GIMF) to assess the size of GDP multipliers for a global fiscal stimulus, differentiating for a situation with and without monetary accommodation. Not surprisingly, multipliers are considerably higher with monetary accommodation, and there are significant cross-border spillovers. These findings are corroborated by simulations done by the OECD (2009) and by Corsetti, Meier and Müller (2009) who show in addition that cross-border spillovers are particularly large when a credible medium-term consolidation regime is announced simultaneously.

Besides estimating the macroeconomic effects of the domestic stimulus measures on the Austrian economy, the present study also quantifies the impact of stimulus packages adopted by Austria's main trading partner countries on the domestic economy. Therefore the increase in Austria's foreign markets has been estimated using the OEF model. For this purpose, the tax-related measures have been taken into account to the same degree of detail as presented in OECD (2009). The additional government expenditure has entirely been counted as public consumption. Such simplification is deemed warranted since in the OEF model the GDP and employment multipliers are of similar magnitude for public investment and consumption. Both aggregates exhibit rather low import content in comparison with other demand components.

Table 6 shows the impact of fiscal stimulus programs on real GDP of Austria's main trading partners and Japan.³ Weighted by the each country's export share in Austria's overall exports, demand on Austria's foreign markets is boosted from baseline by 0.8 per cent each for 2009 and 2010.

The spillover effect on the Austrian economy is estimated using the WIFO macroeconomic model (Table 3). The increase in demand abroad leads to a cumulated gain in Austria's exports by 1.8 per cent from baseline in 2010. The higher exports trigger a positive income effect leading to an increase in private consumption and investment mostly in 2009. As imports will rise at the same time, the gain in real GDP is 0.8 per cent from the baseline. These transmission effects are consistent with simulation results in OECD (2009, p. 133) for the euro area where a fiscal impulse of the order of 1 per cent of GDP in all industrialized countries lifts euro area real GDP by 0.76 per cent, of which 0.24 percentage points are due to transmission effects from abroad.

Table 7 summarizes the respective size as well as GDP and employment effects of the measures taken by the federal government and the Länder and of the stimulus programs adopted by Austria's main trading partners.

5 Concluding remarks

Model simulations suggest that the fiscal stimulus measures implemented in Austria may have dampened the downturn by a cumulated 2.1 per cent of GDP in 2009 and 2010. Almost half of the fiscal impulse is generated by the fiscal packages I and II and the tax cuts introduced at the federal level, 0.4 percentage points by measures taken by the Länder and 0.8 percentage points by the stimulus programs implemented by Austria's main trading partners. The total impact on GDP secures 41,500 jobs and holds the rise of the unemployment rate by 0.7 percentage points (in each

³ Japan's fiscal package has been included in order to illustrate more explicitly its effect on the euro/yen exchange rate.

Table 6

Impact of Stimulus Programs Adopted by Austria's Major Trading Partners

	Percentage Share in Austrian Exports 2007	Gross Domestic Product (<i>volume</i>)		
		2008	2009	2010
		Cumulated Deviation from Baseline (<i>percent</i>)		
Germany	30.0	+0.1	+0.9	+1.0
Italy	8.9	± 0.0	± 0.0	- 0.3
USA	5.0	+0.6	+2.3	+3.6
Switzerland	3.9	+0.1	+0.5	+0.1
France	3.6	± 0.0	+0.2	- 0.2
Czech Republic	3.6	± 0.0	+0.8	+0.6
UK	3.5	+0.1	+0.4	- 0.4
Hungary	3.5	± 0.0	- 0.5	- 1.0
Spain	2.9	+0.8	+1.2	+0.5
Poland	2.6	± 0.0	+0.7	+0.3
Japan	1.0	± 0.0	+0.8	+0.1
Other countries	31.4	+0.2	+1.0	+1.2
Export markets total ⁽¹⁾		+0.2	+0.8	+0.8

Source: OECD, WIFO.

⁽¹⁾ Impact on GDP, weighted by Austrian export shares.

Table 7

Overall Economic Effects of Stimulus Measures by Category

Item	Size ⁽¹⁾		Deviation from Baseline ⁽¹⁾	
			GDP (<i>volume</i>)	Dependent Active
	(<i>millions of euros</i>)	(<i>percent of 2008 GDP</i>)	(<i>percent</i>)	(<i>persons</i>)
<i>Total</i>		4.2	+2.1	41,500
Measures by Bund and Länder	11,918.4	4.2	+1.4	26,600
Infrastructure investment	1,435	0.5	+0.3	7,200
Lowering of corporate financing cost	2,080	0.7	+0.1	1,500
Increase in private disposable income	5,952.5	2.1	+0.6	10,900
Measures taken by the Länder	2,080.9	0.7	+0.4	6,900
Stimulus programmes of main trading partners			+0.8	16,400

Source: WIFO.

⁽¹⁾ Cumulated over 2009 and 2010.

case from a baseline without government measures). Inflation picks up moderately. According to the simulations, the federal government balance weakens in 2010 by an amount of 0.5 per cent of GDP.

Infrastructure investment at the federal level raises GDP by 0.3 per cent and employment in 2010 by a cumulated 7,200 persons. The measures to lower corporate financing cost boost GDP by 0.1 per cent and employment in 2010 by a cumulated 1,500.

The *ex ante* simulation results rest on the assumption of the measures decided being fully implemented in 2009 and 2010. In addition, some measures - such as the introduction of a compulsory pre-school year free of charge - and the active employment policy in general have a direct positive impact on employment which cannot be captured by the kind of models used. Hence, the results presented here should be taken as the lower limit of the overall employment effects generated by the fiscal stimulus programs. A more precise estimate of these effects would require a more sophisticated analysis.

REFERENCES

- Afonso, A. and R.M. Sousa (2009), "The Macroeconomic Effects of Fiscal Policy", ECB, Working Paper, No. 991.
- Auerbach, A.J. and W.G. Gale (2009), "Activist Fiscal Policy to Stabilize Economic Activity", NBER, Working Paper, No. 15407.
- Barro, R.J. and C.J. Redlick (2009), "Macroeconomic Effects From Government Purchases and Taxes", NBER, Working Paper, No. 15369.
- Bartzsch, N. (2006), "Precautionary Saving and Income Uncertainty in Germany - New Evidence from Microdata", Deutsche Bundesbank, Discussion Paper, No. 44.
- Baumgartner, J., F. Breuss and S. Kaniovski, (2004), "WIFO-Macromod - An Econometric Model of the Austrian Economy", in Oesterreichische Nationalbank (ed.), *Macroeconomic Models and Forecasts for Austria*, Workshop Proceedings of OeNB Workshops, Vol. 5, No. 12-13, pp. 61-86.
- Berger, J., T. Hanappi, H. Hofer, S. Müllbacher, U. Schuh, W. Schwarzbauer, L. Strohner and K. Weyerstraß (2009), "Konjunkturbelebende Maßnahmen der Österreichischen Bundesregierung und der Bundesländer: Abschätzung der volkswirtschaftlichen Effekte", Institute of Advanced Studies, Vienna.
- Breuss, F., S. Kaniovski and M. Schratzenstaller (2009), "Gesamtwirtschaftliche Auswirkungen der Konjunkturpakete I und II und der Steuerreform 2009", WIFO, Vienna, available at: http://www.wifo.ac.at/wwa/jsp/index.jsp?fid=23923&id=36361&typeid=8&display_mode=2
- Christiano, L., M. Eichenbaum and S. Rebelo (2009), "When is the Government Spending Multiplier Large?", mimeo.
- Cogan, J.F., T. Cwik, J.B. Taylor and V. Wieland (2009), "New Keynesian Versus Old Keynesian Government Spending Multipliers", CEPR, Discussion Paper, No. 7236.
- Corsetti, G., A. Meier and G. Müller (2009), "Cross-border Spillovers from Fiscal Stimulus", CEPR, Discussion Paper No. 7535.
- Cwik, T. and V. Wieland (2009), "Keynesian Government Spending Multipliers and Spillovers in the Euro Area", CEPR, Discussion Paper, No. 7389.
- Erceg, C. and J. Lindé (2010), "Is There A Fiscal Free Lunch in a Liquidity Trap?", CEPR, Discussion Paper, No. 7624.
- European Commission (2009a), *Public Finances in EMU 2009*, Brussels.
- (2009b), "The EU's Response to Support the Real Economy During the Economic Crisis: An Overview of Member States' Recovery Measures", *European Economy*, Occasional Paper, No. 511, Brussels, July.
- Fair, R.C. (2009), "Possible Macroeconomic Consequences of Large Future Federal Government Deficits", Cowles Foundation, Discussion Paper, No. 1727.
- Freedman, C., M. Kumhof, D. Laxton and J. Lee (2009), "The Case for Global Fiscal Stimulus", IMF, Staff Position Note, No. SPN/09/03.
- Giordano, R., S. Momigliano, S. Neri and R. Perotti (2007), "The Effects of Fiscal Policy in Italy: Evidence from a VAR Model", *European Journal of Political Economy*, No. 23, pp. 707-33.
- Hall, R.E. (2009), "By How Much Does GDP Rise If the Government Buys More Output?", NBER, Working Paper, No. 15496.

- Hofer, H. and R. Kunst (2004), “The Macroeconometric Model LIMA”, in Oesterreichische Nationalbank (ed.), *Macroeconomic Models and Forecasts for Austria*, Workshop Proceedings of OeNB Workshops, Vol. 5, No. 12-13, pp. 87-116.
- IMF (2009), *The State of Public Finances: Outlook and Medium-Term Policies After the 2008 Crisis*, Washington (D.C.).
- Köhler-Töglhofer, W. and L. Reiss (2009), “Die Effektivität fiskalischer Wachstums- und Konjunkturbelebungsmaßnahmen in Krisenzeiten”, *Geldpolitik und Wirtschaft*, No. 1, pp. 83-106.
- OECD (2009), *Fiscal Packages Across OECD Countries: Overview and Country Details*, Paris.
- OEF (2005), “The Oxford World Macroeconomic Model: An Overview”, *Oxford Economic Forecasting*, Oxford.
- Ramey, V.A. (2009), “Identifying Government Spending Shocks: It’s All in the Timing”, NBER, Working Paper, No. 15464.
- Saha, D. and J. Von Weizsäcker (2009), “Estimating the Size of the European Stimulus Packages for 2009 – An Update”, Bruegel Policy Contribution, No. 2, Brussels.
- Schratzstaller, M. (2009), “Steuerreform 2009/10”, WIFO-Monatsberichte, Vol. 82, No. 9, pp. 687-702, available at: http://www.wifo.at/wwa/jsp/index.jsp?fid=23923&typeid=8&id=36768&display_mode=2

