A Note on Automatic Stabilizers in Austria: Evidence from ITABENA

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Abstract

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In the Great Recession market income of the households in Austria has been reduced and unemployment increased. In this paper we examine the impact of automatic stabilizers on cushioning such income losses. We use ITABENA, an Austrian tax-benefit model, to analyze how shocks on market income and employment are mitigated by taxes and transfers. In the case of a proportional income shock 46 percent of the shock will be absorbed by automatic stabilizers in Austria. For the unemployment shocks automatic stabilizers absorb 68 percent. Automatic stabilizers increase the redistributive effects of the Austrian tax benefit system. We find that recent changes in the income tax code have almost no impact on the size of automatic stabilizers in Austria.

Keywords

Keywords: automatic stabilization, microsimulation, tax reforms

JEL Classification

E32, E63, H2, H31

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1. Introduction

The Great Recession had a considerable impact on the Austrian Economy. GDP fell by almost 4 % and employment decreased by 1.5 %. Fiscal policy measures have been used to combat the crises. Apart from stimulus packages automatic stabilizers contributed to the stabilization of disposable income in Austria. Estimates of the budgetary sensitivity of the government budget are often used to infer the size of automatic stabilizers (see Fedelino et al. 2009). According to the EU commission a cyclical drop in GDP in Austria leads to a rise in the fiscal deficit ratio by 0.45 (see Deroose et al. 2008). This ratio is slightly below the average of the Euro area countries (0.47).

Automatic stabilizers are budgetary items which vary counter-cyclically with the income or spending of household stabilizing disposable income after a macroeconomic shock. They vary with GDP by design, no discretionary policy adjustments are necessary. Apart from budgetary sensitivity estimates, the literature on automatic stabilizers uses time series techniques and microsimulation models to examine their size. According to the time series approach, stabilization effects for disposable income of 30 % to 40 % are estimated for the USA (see Sachs and Sala-i-Martin 1992 and Bayoumi and Masson 1995). Studies with microsimulation models compute effects of 25 % to 35 % for the USA (see e.g. Auerbach 2009). Mabbett and Schelkle (2007) compute stabilization effects of 32 % to 58 % for the countries of EU-15. Dolls et al. (2009) also show that stabilization effects in Europe (38 %) are stronger than in the USA (32 %). They find a considerable heterogeneity within Europe. In Continental and Northern European countries the automatic stabilizers are higher as in Eastern and Southern European countries.

In this paper we follow the strand of the literature which uses microsimulation techniques to analyze the impact of income and employment shocks on disposable income and income distribution (see Dolls et al. 2009, 2010). We use ITABENA, an Austrian tax-benefit model, to investigate the role of the tax-benefit system to cushion macroeconomic shocks. First we simulate a proportional income shock, assuming that market income drops by 5 percent. Additional to the standard way of examining macroeconomic shocks, we investigate the effect of an unemployment shock. We estimate a probit equation to identify the workers with the highest probability to become unemployed. We simulate the effect of an increase in unemployment such that aggregated market income is also reduced by 5 percent. Note that the unemployment shock leads to higher costs for the public budget by design.

We find that 46 percent of the income shock and 68 percent of the unemployment shock, respectively, are absorbed by the automatic stabilizers. Automatic stabilizers increase the redistributive effects of the tax and benefit system. In Austria a tax reform was part of the stimulus package to combat the financial crises. In general the size of automatic stabilizers depends on the progressivity of the tax system (see e.g. Baunsgaard and Symansky 2009).

Therefore, we extend the literature by examining the effects of recent income tax reforms on the size of automatic stabilizers. Our simulations show almost no effects. The paper is structured as follows. Section 2 presents our scenarios and methodical remarks. In Section 3 the results of our simulations are shown. Section 4 concludes.

2 Scenarios and methodical remarks

The two most prominent budgetary items which act as automatic stabilizer are progressive tax codes and unemployment benefits. The measures for automatic stabilization considered here are explicitly based on the impact of taxes and transfers on the household sector. We use ITABENA to simulate taxes, benefits and disposable income under different scenarios for a representative micro-data sample of Austrian households. ITABENA is a tax-benefit microsimulation model for Austria. It entails a model of the Austrian tax-benefit system and primarily calculates the disposable income of Austrian households. For this purpose it makes use of a representative micro-data set, the Austrian part of the EU-SILC (EU-Community Statistics on Income and Living Conditions), containing detailed information on gross income as well as a wide range of other household characteristics. The information from the EU-SILC is used to calculate, step by step, the elements of the Austrian tax-benefit system for every household. There are modules for income tax, social insurance contributions, family allowances, parental leave benefits and so forth. ITABENA accounts for every tax or transfer which is relevant for the composition of the disposable income from a household or an individual perspective. When disposable income is calculated, a detailed representation of a given household's income components can be delivered.

2.1 Scenarios

We compare two scenarios. In the first scenario market incomes are proportionally reduced by 5 percent for all households (income shock). In the second scenario we simulate an idiosyncratic shock where some workers are made unemployed and therefore lose all their labor earnings (unemployment shock). Unemployment is increased such that market income decreases again by 5 percent. The effects of the unemployment shock depend on the modeling of which income group is hardest hit by unemployment[1]. We use the EU-SILC for Austria to estimate probabilities of becoming unemployed[2]. Then we select the individuals with the highest unemployment probabilities (see Appendix A1) and make them unemployed.

The size of automatic stabilizers depends on the progressivity of the tax system. Tax reforms could influence the stabilizing impact of the tax system. Therefore, we examine the effects of recent income tax reforms on the size of automatic stabilizers. We consider the recent tax

[1] Dolls et al. (2009, 2010) simulate a decrease of 5 % of total household income and model the increase of the unemployment rate through reweighting the sample.
[2] See e. g. Bell and Blanchflower 2010 for estimating probabilities of becoming unemployed.

legislation (L-2009), the tax legislation before the tax reform 2008 (L-2008), and before the tax reform 2004 (L-2003).

2. 2. Theoretical framework

Doll et al. (2009, 2010) suggest the income stabilization coefficient τ^I, which measures the sensitivity of disposable income Y_i^D, with respect to market income Y_i^M as a measure for automatic stabilization. Disposable income Y_i^D is defined as Y_i^M minus net-taxes G_i (taxes and social insurance contributions minus monetary transfers). τ^i is computed as the arithmetic change (Δ) in the ratio between total disposable income ($\Sigma_i \Delta Y_i^D$) and market income ($\Sigma_i \Delta Y_i^M$) based on micro level information:

$$\sum_i \Delta Y_i^D = (1 - \tau^I) \sum_i \Delta Y_i^M$$

$$\tau^I = 1 - \frac{\sum_i \Delta Y_i^D}{\sum_i \Delta Y_i^M} = \frac{\sum_i \Delta G_i}{\sum_i \Delta Y_i^M}.$$

The coefficient can be decomposed in its components, which include taxes, social insurance contributions and monetary transfers:

$$\tau^I = \sum_f \tau_f^I = \tau_T^I + \tau_S^I + \tau_{MT}^I = \frac{\sum_i (\Delta T_i + \Delta S_i - \Delta MT_i)}{\sum_i \Delta Y_i^M}$$

The income stabilization coefficient can be computed for different income groups. The income stabilization coefficient for decile d is defined as:

$$\tau_d^I = 1 - \frac{\sum_{d,i} \Delta Y_{d,i}^D}{\sum_i \Delta Y_i^M} = \frac{\sum_{d,i} \Delta G_{d,i}}{\sum_i \Delta Y_i^M}.$$

Note that the sum of the ten decile stabilization coefficients adds up to the overall stabilization coefficient.

3. Results

3. 1. Distributional consequences of shocks and automatic stabilizers

First we discuss the distributional consequences of the two macro shocks. As in other European countries (see Dolls et al. 2010) the tax- and benefit system leads to a significant redistribution in Austria. The Gini coefficient shows that market income (0.334) is less equally distributed as disposable income (0.248). A proportional income shock implies a (small) reduction in inequality in market income; the consequences of an unemployment shock are theoretically less clear. If mainly low income earners are hit by unemployment, inequality will increase. However, if also middle or upper income groups are affected, inequality could also decrease. We find that the income shock causes a marginal reduction in inequality of market income (0.002). However, the unemployment shock leads to higher inequality (0.022).

Table 1 examines the effect of the shocks on market income and the amount of redistribution achieved by the tax- and benefit system. Row 1 shows the percentage change of the Gini coefficient based on market income between the unemployment shock scenario and the baseline. The increase in inequality amounts to 6.7 %. The last two rows show how the differences between the Gini coefficients based on disposable and market income have changed due to the income shock and unemployment shock, respectively. The negative values indicate that both shocks lead to higher differences between the Gini coefficients based on disposable and market income. Therefore, automatic stabilizers increase the redistributive effects of the tax benefit systems in Austria. The redistribution effect is considerably stronger in the case of the unemployment shock.

Table 1: Change in distribution and redistribution

$\Delta\%GINI^{Y^M}_{US-B}$	0.0665
$\Delta\left(GINI^{Y^D} - GINI^{Y^M}\right)_{IS-B}$	-0.0008
$\Delta\left(GINI^{Y^D} - GINI^{Y^M}\right)_{US-B}$	-0.0168

Source: own calculations based on ITABENA

3. 2. Stabilization coefficients

In the following we discuss the stabilizing effects of the tax benefit system. We start with the results using the most recent tax legislation (L-2009). We find a stabilization coefficient of 46

percent for the income shock, for the unemployment shock the cushioning effect amounts to 67.8 percent (see Table 2). Note that the unemployment shock must have a stronger stabilizing effect because a part of the lost market income is compensated by unemployment benefits.

Table 2: Stabilization coefficient and components (taxes, social security contributions, monetary transfers)

	TAU	TAU-T	TAU-S	TAU-MT
L-2009				
INCOME SHOCK	46.0%	31.0%	14.6%	0.4%
UNEMPLOYMENT SHOCK	67.8%	11.8%	15.4%	40.5%
L-2008				
INCOME SHOCK	46.3%	31.9%	14.1%	0.4%
UNEMPLOYMENT SHOCK	68.4%	12.6%	15.3%	40.4%
L-2003				
INCOME SHOCK	44.9%	30.6%	13.9%	0.4%
UNEMPLOYMENT SHOCK	67.6%	11.8%	15.3%	40.5%

Source: own calculations based on ITABENA

Table 2 shows that taxes and social security contributions are the dominant factors for stabilization with respect to the income shock. 2/3 of the stabilizing effect is due to the tax component and 1/3 to the social security contribution component. Monetary transfers play no role. In case of the unemployment shock the results are different. Whereas the stabilization effect from social security contributions is almost similar, the contributions from taxes are considerably lower. However, the strong increase in transfers exceeds the tax effect. Therefore, the overall stabilization effect is substantially stronger in the unemployment shock scenario.

We discuss now the stabilization effects for the different income groups. As shown in Table 3 the stabilization coefficients are an increasing function of the income deciles in the case of a proportional income shock. Dolls et al. (2010) argue that this result is due to higher changes between market and disposable income for high income groups. Even a proportional tax would yield increasing coefficients for higher deciles.

Table 3: Stabilization coefficient: proportional income shock by income groups

	L-2009	L-2008	L-2003
TAU	46.0%	46.3%	44.9%
D1	0.8%	0.9%	0.8%
D2	1.5%	1.6%	1.5%
D3	2.1%	2.1%	2.0%
D4	2.9%	2.9%	2.7%
D5	3.3%	3.3%	3.3%
D6	4.0%	4.0%	3.8%
D7	4.8%	4.9%	4.6%
D8	6.0%	6.1%	5.9%
D9	7.7%	7.8%	7.6%
D10	12.9%	13.0%	12.6%

Source: own calculations based on ITABENA

The distributional effects of the unemployment shock depend on which income group is hardest hit by unemployment. In our scenario we assume that workers with the highest unemployment probabilities become unemployed. With the exception of the highest decile, the new unemployed are relatively uniform distributed across the income distribution. Note that the share of persons working increases with income, therefore the risk of a worker to become unemployed decreases with income. In comparison to the income shock we find a much more uniform distributional effect for the unemployment shock. The strongest stabilization effects emerge in the fourth quintile of the income distribution. However, we find considerable stabilization effects also for the households in the lower part of the income distribution (see Table 4).

Table 4: Stabilization coefficient: unemployment shock by income groups

	L-2009	L-2008	L-2003
TAU	67.8%	68.4%	67.6%
D1	4.1%	3.7%	4.0%
D2	5.4%	5.6%	5.2%
D3	6.4%	6.6%	8.4%
D4	6.9%	6.9%	5.0%
D5	6.2%	6.0%	7.4%
D6	7.5%	7.7%	6.0%
D7	6.1%	6.4%	6.6%
D8	11.7%	11.7%	11.1%
D9	8.8%	8.9%	9.1%
D10	4.8%	4.9%	4.9%

Source: own calculations based on ITABENA

Table 5 presents the components of the stabilization coefficient by decile. In contrast to the proportional income shock scenario monetary transfers (unemployment benefits) have an important stabilization effect. In particular low income deciles benefit from transfers. For the

households in the first two quintiles of the income distribution approximately 70 percent of the stabilization effects are caused by transfers. Note that the lowest stabilization coefficient for transfers is found in the top centile.

Table 5: Stabilization coefficient by income groups and components L-2009

	TAU-T	TAU-S	TAU-MT
INCOME SHOCK			
D1	0.3%	0.4%	0.10%
D2	0.7%	0.7%	0.00%
D3	1.1%	1.0%	0.04%
D4	1.6%	1.2%	0.04%
D5	1.9%	1.3%	0.06%
D6	2.4%	1.6%	0.00%
D7	3.0%	1.8%	0.00%
D8	4.0%	2.0%	0.01%
D9	5.3%	2.4%	0.03%
D10	10.8%	2.0%	0.13%
UNEMPLOYMENT SHOCK			
D1	0.3%	0.9%	2.9%
D2	0.4%	1.0%	3.9%
D3	0.7%	1.4%	4.3%
D4	0.8%	1.5%	4.6%
D5	0.8%	1.4%	3.9%
D6	1.3%	1.8%	4.4%
D7	1.1%	1.4%	3.6%
D8	2.6%	2.8%	6.3%
D9	2.1%	2.2%	4.6%
D10	1.8%	1.1%	1.9%

Source: own calculations based on ITABENA

3. 3. The effect of tax reforms

We now turn to the impact of changes in the tax legislation on the size of automatic stabilizers. An increase in the progressivity of the tax system should enhance the stabilization effect. We compare the recent tax legislation (L-2009), with the tax legislation before the tax reform 2008 (L-2008) and the tax reform 2004 (L-2003), respectively. The income and wage tax has four tax brackets. Marginal tax rates are increasing gradually with taxable income. In 2009 the marginal tax rates are as follows. Until € 11.000 the marginal tax rate is zero. Between € 11.000 and € 25.000 the marginal tax rate is 36.5 %. In the tax bracket between € 25.000 and € 60.000 the marginal tax rate is 43.2 %. The top marginal rate is 50 %. The tax reform 2008 lead to tax cuts of approximately 2.1 billion €, where 1.9 billion € were due to tax reductions (see Federal Ministry of Finance 2009 for details). The

entry tax rate was reduced from 38.3 % to 36.5 %, and the middle tax rate from 43.6 % to 43.2 %. The tax thresholds for the lowest and highest income segment have been increased. The annual income tax free income threshold increased from 10.000 to 11.000 €. Before 2005 the tax scale had five tax brackets with marginal rates of 0 %, 21 %, 31 %, 41 % and 50 %. A general tax credit, depending on the taxable income, had a maximum € 1.264 and lead to non-systematic development of effective marginal tax rates (see Breuss et al. 2004 for a comparison of effective marginal tax rates before and after 2005).

As can be seen from Table 2 the stabilization coefficient is only marginally changed by the tax reforms. We find that the size of automatic stabilizers increased slightly since 2003. The increase is caused by the tax and social security components. The tax reform 2004 resulted in a steeper tax progression, which triggered the slight increase in the tax coefficient. The reform in 2009 lead to a decrease in the stabilization coefficient as the tax progression was slightly reduced. A part of this reduction has been compensated by the increase in the stabilization effect of social insurance contributions. Overall, the effect of the recent tax reforms on the size of automatic stabilizers is very modest.

4. Conclusions

The global economic crisis has increased the interest in automatic stabilizers. We use ITABENA, a microsimulation model for Austria, to examine how the tax-benefit system cushions macroeconomic shocks. We analyze a proportional income shock and an unemployment shock. We find that 46 percent of the income shock is absorbed by automatic stabilizers. Simulating a proportional reduction in market income, may lead to an underestimation of the effects of automatic stabilizers. For the unemployment shock we find a stabilization coefficient of 68 percent.

Automatic stabilizers increase the redistributive effects of the Austrian tax-benefit system. In the case of the proportional income shock the stabilization effect increases with income as the tax contribution dominates. For the unemployment shock scenario the distributional effects are more uniform. In particular low income households could benefit from monetary transfers. We find the highest stabilization effect in the fourth quintile. The top and the bottom deciles show the lowest stabilization effects.

Automatic stabilizers have contributed to cushion the macroeconomic shock of the Great Recession in Austria. The question how recent tax reforms influenced the size of automatic stabilizers is also examined. We find very modest effects. Enhancing the automatic stabilizers by increasing the progressivity of personal income taxes seems not very effective and could reduce economic efficiency.

Appendix

In this appendix we present our procedure for selecting the individuals which become unemployed in our simulation. The increase in unemployment is modeled through estimating an unemployment equation, showing the characteristics that determine the risk of becoming unemployed.

We use the 2004-2009 pooled Austrian part of the EU-SILC for estimating a probit equation where the dependent variable is one if the individual is unemployed, zero if employed. The following variables are used in the unemployment equation: gender, age, city size, education, state, marital status, family type, disability, and occupation. Year dummies are also included. Table A1 shows the unemployment equation. The unemployment risk is higher for males, younger and less qualified workers. Being disabled, having no children and living in a big city also increase the probability of unemployment.

In the simulation we select the employed individuals with the highest unemployment probabilities; we reduce their employment income to zero and use ITABENA to calculate unemployment benefits for this group.

Table A1: Probit Unemployment equation

	Average marginal effect	Standard Error	z-Value
Gender (Female)			
Male	.0066653	.003051	2.18
Year (2004)			
2005	.0177462	.0045995	3.86
2006	.0213522	.0045171	4.73
2007	.0388154	.0045749	8.48
2008	.0326785	.0047282	6.91
2009	.0425173	.0047480	8.95
Age (16 to 24 years)			
25-30	.0485499	.0059830	8.11
31-35	.0505317	.0058231	8.68
36-40	.0346253	.0053648	6.45
41-45	.0238515	.0053081	4.49
46-50	.0009947	.0052532	0.19
51-55	-.0008712	.0055816	-0.16
56-60	-.0149451	.0056784	-2.63
61-65	-.0211213	.0094225	-2.24
City size (Above 100,000 inhabitants)			
0-10,000	-.0130764	.0053977	-2.42
10,001-100,000	-.0077236	.0064219	-1.20
Schooling (High school dropout)			
Compulsory	-.0279672	.0150145	-1.86
Apprentice	-.0393544	.0149188	-2.64
BMS	-.0687326	.0151532	-4.54
AHS	-.0768892	.0154554	-4.97
BHS	-.0653792	.0155023	-4.22
College	-.0487867	.0169561	-2.88
University	-.0697996	.0156773	-4.45
State (Burgenland)			
Carinthia	.0143367	.0090936	1.58
Lower Austria	-.0024480	.0077663	-0.32
Upper Austria	-.0155710	.0076967	-2.02
Salzburg	.0151074	.0090491	1.67
Styria	.0033226	.0079574	0.42
Tyrol	.0052323	.0086159	0.61
Vorarlberg	-.0132802	.0094181	-1.41
Vienna	.0090596	.0094167	0.96

Table A1 (continued)

Marital status (Single)			
Married	-.0068744	.0044236	-1.55
Cohabiting	-.0006555	.0053348	-0.12
Widowed	-.0411097	.0100918	-4.07
Divorced	.0278773	.0062969	4.43
Family type (Without children)			
Single parent	.0087960	.0069994	1.26
One child	-.0145145	.0038255	-3.79
Two children	-.0275510	.0040036	-6.88
Three and more	-.0249743	.0052583	-4.75
Disability (None)			
Little	.0472713	.0046499	10.17
Strong	.0951159	.0087074	10.92
Occupation (Unknown)			
ISCO0	-.4250387	.0177043	-24.01
ISCO1	-.4247887	.0101092	-42.02
ISCO2	-.4238961	.0101811	-41.64
ISCO3	-.4119240	.0096672	-42.61
ISCO4	-.4093912	.0096532	-42.41
ISCO5	-.3782130	.0097063	-38.97
ISCO6	-.4304207	.0102339	-42.06
ISCO7	-.3708763	.0100852	-36.77
ISCO8	-.3719569	.0112625	-33.03
ISCO9	-.3482208	.0102020	-34.13

Log likelihood = -10072.098
Pseudo R2 = 0.2120
Number of observations = 39501

Notes: medium-level secondary technical and vocational colleges (BMS); academic secondary school (AHS); higher-level secondary technical and vocational colleges (BHS); ISCO0-9 (armed forces; legislators, senior officials and managers; professionals; technicians and associate professionals; clerks; service workers and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations)

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