

# A Prototype Model of European Integration: The Case of Austria

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## Abstract

Austria as an EU member state since 1995 has taken part in all subsequent European integration steps: *deepening* of EU integration via the Single Market and the Economic and Monetary Union (EMU) with the introduction of the euro and *enlargement* of the EU, in particular by the grand enlargements of the EU since 2004. Around the years 2014/15 Austria celebrates several anniversaries: 25 years of the fall of the Iron Curtain and hence expansion of new market opportunities through the opening-up of Eastern Europe; 20 years of EU and 15 years of EMU (euro) membership; 10 years since the start of the big EU enlargement towards Eastern Europe. With the Croatian accession in 2013, the EU now counts 28 members. In order to capture the integration effects of the last 25 years of Austria's integration into Europe, an integration model for Austria is estimated. It is able to reproduce the main integration effects theoretically expected from the regime changes since 1989. In this respect, the Austrian integration model could also serve as a prototype for other EU members states. Overall, the participating in all integration steps since 1989 has added about 1% to Austria's real GDP per year.

**Keywords:** European Integration; Model simulations; country studies

**JEL Classification:** F15; C51; O52.

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## 1 Introduction

Austria as an EU member state since 1995 has taken part in all subsequent European integration steps: *deepening* of EU integration via the Single Market and the Economic and Monetary Union (EMU) with the introduction of the euro and *enlargement* of the EU. Since the accession of Croatia in 2013 the EU encompasses 28 member states, 19 of its member states introduced the euro.

Around the years 2014 and 2015 Austria celebrated numerous anniversaries in connection with European Integration: 25 years of the fall of the Iron Curtain and hence the opening-up of Eastern Europe in 1989; 20 years of EU membership (in 1995); 15 years of Austria's EMU membership (in 1999) and 10 years of EU enlargement (starting in 2004).

In this contribution an integration model for Austria is developed in order to estimate empirically the integration effects since 1989. It is an econometrically estimated macro model, capturing the main features of European Integration since the opening-up of Eastern Europe in 1989, namely the effects of EU accession in 1995 and the participation in EMU in 1999 as well as the effects of EU enlargement since 2004. This small integration model for Austria could also serve as a prototype model for other member states of the EU.

## 2 Austria's integration into Europe

At the beginning of each integration step, in the EU and also in Austria several studies were carried out to estimate *ex-ante* the possible integration effects (for an overview of such studies, see Breuss, 2012, p. 43). In the Austrian studies by the Austrian Institute of Economic Research (WIFO), simulations were carried out by means of the at the time actual version of the WIFO macroeconomic model<sup>1</sup>. The present study evaluates by means of an integration macro model *ex-post* the integration effects Austria has realised since the opening-up of Eastern Europe in 1989 and in particular the economic impact of the EU accession in 1995.

Over the last decades, European integration has systematically progressed from a customs union (completed in 1968) towards the Single Market, EMU and the big EU enlargements. Integration theory was either ahead of the actual implementation like in the case of EC's custom union (see Viner, 1950) or had to catch up with European integration as it progressed

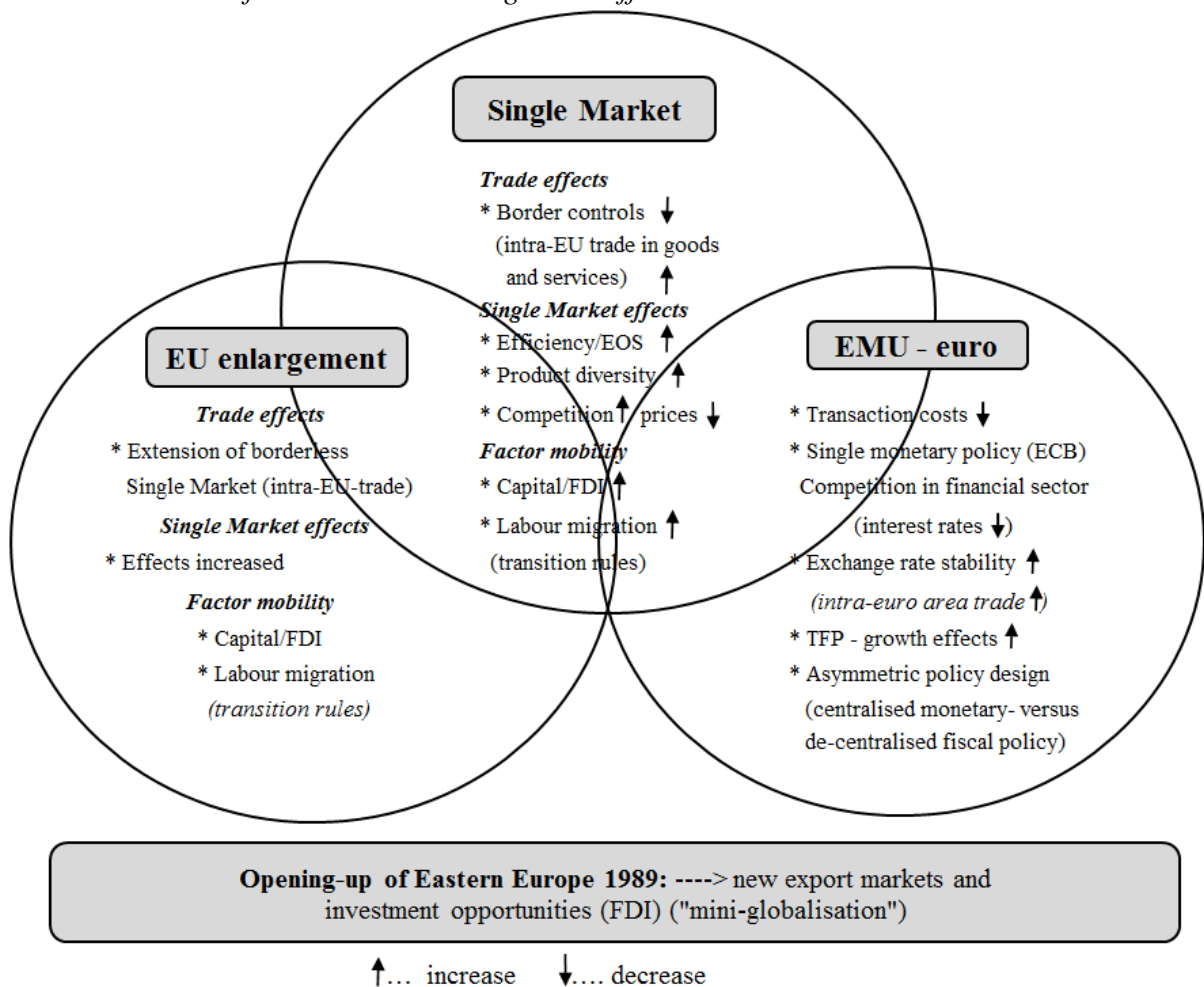
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<sup>1</sup> In a comprehensive *ex ante* study Breuss, Kratena and Schebeck (1994) estimated the potential macroeconomic and sectoral effects of Austria's EU accession with the WIFO macro cum input-output model. Keuschnigg and Kohler (1996) estimated also *ex ante* the possible Austrian integration effects of EU accession with a single-country dynamic general equilibrium model (sectoral and macroeconomic results).

towards the Single Market and the EMU projects (see Baldwin and Venables, 1995; Breuss, 2003A; or a survey in Jovanovic, 2011).

Austria took part in all integration steps since the opening-up of Eastern Europe in 1989: 1995 EU membership, 1999 EMU membership and as an EU member it participated in the EU enlargements since 2004. An overview of the possible theoretical integration effects<sup>2</sup> in case of Austria's EU integration is illustrated in Fig. 1.

**Fig. 1:** Effects of Austria's EU integration  
*Overview of the theoretical integration effects*



EOS . . . economies of scale; FDI . . . foreign direct investments; TFP . . . total factor productivity.

Economies of scale (EOS) play an important role at the stage of creating the Single Market, as well as competition effects via the harmonisation of competition rules on a common legal base. Liberalisation of certain sectors and privatisation are also part of the Single Market Programme. There are other effects deriving from the implementation of the Common

<sup>2</sup> A detailed overview of integration theories applicable for the several steps of European integration can be found in Badinger and Breuss (2011) and in Breuss (2014).

Agricultural Policy (CAP), the common foreign trade policy (as a consequence of the customs union and the dismantling of border controls) and the harmonisation of other policies like regional or structural policy. There is also the EU budget which finances the different policy areas with a view to the aspect of solidarity between member countries, implying a redistribution of funds from "rich" EU members (net contributors) to "poor" ones (net recipients). Overall, the Single Market is supposed to boost intra-EU trade and, via gains in efficiency and productivity, lead to stronger economic growth. Across the large number of existing integration studies, Single Market effects are estimated using different methods and approaches: macroeconomic models and/or microeconomic models; for individual countries (country studies with single-country models) and/or for several countries (multi-country models). Among the model approaches there are macro models or general-equilibrium models. Within the modern theory of endogenous growth there are special derivations for the growth effects of integration (see Breuss, 2003A).

One step more complicated is the assessment of the integration effects originating from EU's Economic and Monetary Union (EMU) and the introduction of the euro as a common currency. In this respect, theory is virtually entering uncharted waters. Relatively well developed is the theory of "optimal currency areas" (OCA) that explores which countries would be in a sustainable position to share a common currency. Early studies arrived at the conclusion that in Europe only a small OCA were able to survive (see Breuss, 2006). As the current euro-area crisis painfully demonstrates, the project of the euro was driven by political considerations rather than on the basis of sound economic criteria.

Shortly before the fourth round of EU enlargement by Austria, Finland and Sweden in 1995, the EU – confronted with historical events like the collapse of communism and the fall of the Iron Curtain – was virtually forced to integrate the former Soviet satellite countries of Eastern Europe. Those countries were then gradually integrated into the EU Single Market, first by Europe Agreements and later by formal EU accessions starting in 2004.

The effects of the three integration steps, the Single Market, the EMU and EU enlargement overlap as illustrated in Fig. 1. Austria, then still a member of EFTA benefitted already from the opening-up of Eastern Europe towards the West in 1989. This event suddenly facilitated the access to eastern markets that hitherto had been severely constrained by the "Iron Curtain", offering new opportunities for export and foreign direct investment. Since the opening of Eastern Europe, Austria has to a greater extent than before taken part in globalisation ("mini-globalisation") as it has moved from a marginal position into the centre of Europe. Austria's accession to the EU in 1995 and to the EMU in 1999 augmented the

already received benefits of the opening-up of new markets via the 1989 revolution. These effects were reinforced again by the EU enlargement rounds of 2004 and 2007. Austria's ever deeper integration into the EU has, via the operation of the manifold integration effects, in almost all cases led to higher economic growth and greater prosperity.

### 3 An integration model for Austria

In order to evaluate quantitatively *ex-post* the integration effects Austria has realised in the past an integration model is designed for this purpose. The integration effects derived in this way represent the deviations of actual economic developments in Austria from a hypothetical path that the economy would have followed if Austria had stayed aside of all integration moves since 1989. The integration model for Austria applied here is a small macro-model econometrically estimated with EViews 7.0 for a data set over the period 1960 to 2015. The detailed set of equations can be found in Appendix A. This integration model for Austria could also be used as a prototype model for other EU member states to evaluate their integration effects<sup>3</sup>.

#### 3.1 Four integration steps since 1989

We evaluate the integration effects of Austria's European integration with reference to the major variables of the macro model, in particular to the impact on real GDP. Real GDP per capita is our final "welfare" measure.

The four steps of Austria's deep integration into Europe since 1989 is evaluated in scenarios (see Table 1).

##### 3.1.1 Opening-up of Eastern Europe in 1989

The opening-up of Eastern Europe in 1989 increased Austria's markets potential for direct trade and foreign direct investment (FDI) and implied a net inflow of migrants. Scenario 1 therefore takes into account two effects:

- *Trade and FDI effects*: In order to capture the trade and FDI effects we introduce a "regime change" variable<sup>4</sup> ("Regime change T+FDI" or the dummy "D\_1989\_2015" in the

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<sup>3</sup> In order to estimate *ex post* the integration effects of Austria's EU membership in earlier occasions, a similar small country macro model approach was applied (Breuss, 2010A, 2013C). In the case of a comparison of the integration performance of Austria, Finland and Sweden in the EU (Breuss, 2003B) and for the evaluation of the EU accession of Bulgaria and Romania (Breuss, 2010B) small macro integration models of a similar type as the present integration model were estimated to simulate the specific integration features of these countries.

<sup>4</sup> The literature treats "regime changes" in the context of "Regime-Switching Models" with Markov chain econometrics (e.g., see Hamilton, 2008). Generally, many economic time series occasionally exhibit dramatic

trade and FDI equations in the integration model of Appendix A) which is one until 1988, then it increases by 0.1 in each following integration step; in 1989 it increases to 1.1, remains at this level until 1994 and jumps to 1.2 in 1995; in 1999 to 1.3; in 2004 to 1.4 and in 2007 to 1.5 and remains at this level until 2015. In the simulations of the “opening-up” scenario the regime change dummy was reduced to 1 from 1989 until EU enlargement began (see Appendix B). This regime change dummy can be interpreted as a “smart dummy” (capturing price and non-price effects of trade liberalization vis-à-vis the Central and Eastern European Countries, CEECs) and is included in the estimations of the equations for real exports and imports, for FDI exports and imports. In line with the insights of the “New” New Trade Theory (see the application in the TTIP evaluation by Felbermayr et al., 2013) in our model more trade engagement translates indirectly via the R&D equation into an increase in total factor productivity (TFP) and hence has an accumulation or growth effect, leading to higher real GDP.

- *Net migration:* Besides the trade and FDI effects the opening-up of Eastern Europe in 1989 had also net migration effects. As can be seen from Appendix B, the biggest net inflow of migrants occurred shortly after the collapse of former Yugoslavia in the early nineties. In the integration model net migration inflows enter exogenously via the unemployment equation into labour supply. Migration also affects the definition of GDP per capita via the variable population (see Appendix A).

### 3.1.2 EU Membership in 1995

A new EU member must take over the *acquis communautaire* (Community *acquis*) of the Single Market project. This implies the communitisation, i.e. the transfer of competencies from former national responsibility to EU competence in many economic policy areas: the Common Agricultural Policy (the CAP), the Common Commercial Policy (CCP) by entering into the EU customs union, the common competition policy and a common regional/structural policy and many other areas where economic policy is harmonised at EU level.

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breaks in their behaviour, associated with events such as financial or other crises. In our case the breaks occurred due to four integration shocks (1989, 1995, 1999 and 2004/07) of European integration.

**Table 1:** Model inputs for simulating integration effects for Austria

Scenarios	Integration effects	Model inputs
1 Opening-up 1989	Trade and FDI Net migration	Regime change T+FDI Migration 1989-1993
2 EU member 1995	More price competition TFP-stimulating R&D Trade and FDI EU net budget position Net migration	Mark-up decreasing since 1995 Regime change R&D Regime change T+FDI Av. -0.25% GDP since 1995 Migration 1995-2015
3 EMU member 1999	More competitiveness Trade and FDI TFP-stimulating R&D	No appreciation since 1999 Regime change T+FDI Regime change R&D
4 EU enlargement 2004/07	Trade and FDI Net migration	Regime change T+FDI Migration 2004-2015

“Regime change T+FDI” = regime change dummy variable for trade and FDI; “Regime change R&D” = regime change dummy variable for Research and Development (R&D); TFP = total factor productivity. Detailed data inputs, see Appendix B.

In scenario 2 Austria’s EU membership is captured by five inputs:

- *More price competition:* Entering into the Single Market increases price competitiveness which is captured by reducing the mark-up on unit labour costs<sup>5</sup>. We assume that the mark-up in case of Austria’s EU membership has increased strong at the beginning and tapered off later. In the simulations the dummy variable for price mark-up was reduced from 1.3 to 1.2 in 1995, to 1.1 in 1996 and to 1.0 in 1997 (see Appendix B). The main result is that consumer prices decline, but the real GDP effects are negligible.
- *TFP-stimulating R&D expenditures:* EU membership has improved the opportunities for Austrian research institutions (universities and non-university institutions and firms) to participate fully at the EU research programmes (Framework Programmes). This resulted in a break in the trend of R&D expenditures in % of GDP. After EU accession the R&D trend was much steeper than in the pre-EU period. This additional R&D opportunities are captured by another “smart dummy”, namely the variable “Regime change of R&D” (or the dummy “D\_1995\_2015” in the R&D equation in the integration model; see Appendix A). Due to the participation EU’s research programmes the R&D dummy jumps in 1995 from 1 to 1.1 (see Appendix B). In our model context, more R&D stimulates total factor productivity (TFP) and hence real GDP growth.

<sup>5</sup> Badinger and Breuss (2005) analysed the sectoral change of mark-up pricing after EU accession in Austria. The result was mixed. Some sectors had pronounced markup reductions (mining and quarrying, wholesale and retail trade; financial services and real estate), in other sectors no marked markup change was found.



- *Trade and FDI:* A country entering the EU and hence the Single Market also must enter into the EU Customs Union with a common external tariff (CET). In the case of Austria, this implied a reduction in the average tariff rate from 10.5 percent to the CET level of 5.7 percent before the cut in the context of the Uruguay Round in 1995. Besides the minor reduction in import tariffs the major reduction concerned the abolishment of border controls and hence cost saving for firms engaged in foreign trade. All price and non-price (NTBs) changes in connection with EU accession should be captured with our “smart dummy” variable “Regime change T+FDI”. In the simulations the T+FDI dummy was increased from 1.1 to 1.2 in 1995 (see Appendix B). Participation in EU’s Single Market of course improves the opportunities to expand foreign trade. But this is not a one-sided affair. The opening up of borders (abolition of border controls) drives competitive importers into the market of the newcomer. On balance Austria gained from the full participation in the CAP but overall the trade balance vis-a-vis the EU deteriorated since 1995. Besides trade also the bilateral FDI flows increased after EU accession. After a phase of adjustment to the fiercer competition in the Single Market the Austria’s current account position improved.
- *EU net budget position:* Austria, as the second richest country in the EU (measured by GDP per capita in PPS) is of course a net payer into the EU Budget. On average over the period 1995-2015 it contributed 0.25% of GDP more to the EU budget than in received transfers out of the EU budget (see Appendix B).
- *Net migration:* This effect was rather modest vis-a-vis the EU. After the German unification more and more workers from Germany entered the Austrian labour market. In our simulation we considered (exogenously) the amount of net migration which was above the normal trend and interpreted this development as caused by the EU accession (see Appendix B).

### 3.1.3 EMU Membership in 1999

Participating in EMU and hence introducing the euro further deepened economic integration. Prior to EMU the hard currency countries Germany and Austria suffered from international competitiveness insofar as the soft currency countries (in the periphery of the EU) depreciated their currencies against the DM bloc in every case of a current account deterioration. A devaluation race of course was a permanent menace for the Single Market. After the introduction of the euro this was no longer possible and hence, the international competitiveness was reversed within the Euro area. Germany and Austria gained in form of

real depreciation whereas the others revaluated and lost competitiveness. In addition to this advantage in competitiveness of the formerly hard currency countries a single currency eliminates exchange rate uncertainties and hence stimulates trade and FDI. Above all, the deeper financial integration offered new growth enhancing stimuli via TFP-stimulating R&D growth. In scenario 3 therefore the following three effects are considered:

- *More competitiveness*: The improvement of competitiveness of Austria as describe above is captured by the assumption that, beginning with 1999 EMU membership led to a stop of real appreciation (see Appendix B).
- *Trade and FDI*: Euro's pro-trade effect – described in the theoretical part above – is captured by the “smart dummy” variable “Regime change T+FDI”. In the simulations the dummy variable was increased from 1.2 to 1.3 in 1999.
- *TFP-stimulating R&D expenditures*: In addition and on top of the growth effect of the participation in EU's Single Market, also the participation in EMU is assumed to have stimulated TFP and hence real GDP growth via and additional increase of R&D because of participating even stronger in EU research programmes. In the simulations the R&D dummy was increased from 1.1. to 1.2 in 1999.

### 3.1.4 EU enlargement in 2004/07

As a member of EU Austria benefitted also from the big enlargement moves in 2004 and 2007; primarily because this involved mainly former Central and Eastern European countries (CEECs) in Austria's neighbourhood. Two main effects were encountered: by the abolition of border controls Austria could increase its trade potential in addition to the effects already happening by the opening-up of Eastern Europe in 1989<sup>6</sup>. Integration of low income country into the group of high income countries in the old EU induced of course factor movements in both directions: FDI from the West to the East, and labour migration the other way round. In order to mitigate the negative effects on the labour markets, many old EU member states, inclusive Austria applied exemption rules from the freedom of labour in form of seven years transitional arrangements. These transition periods phased out for the first round of enlargement in 2011, and in 2014 for the second round (Bulgaria, Rumania).

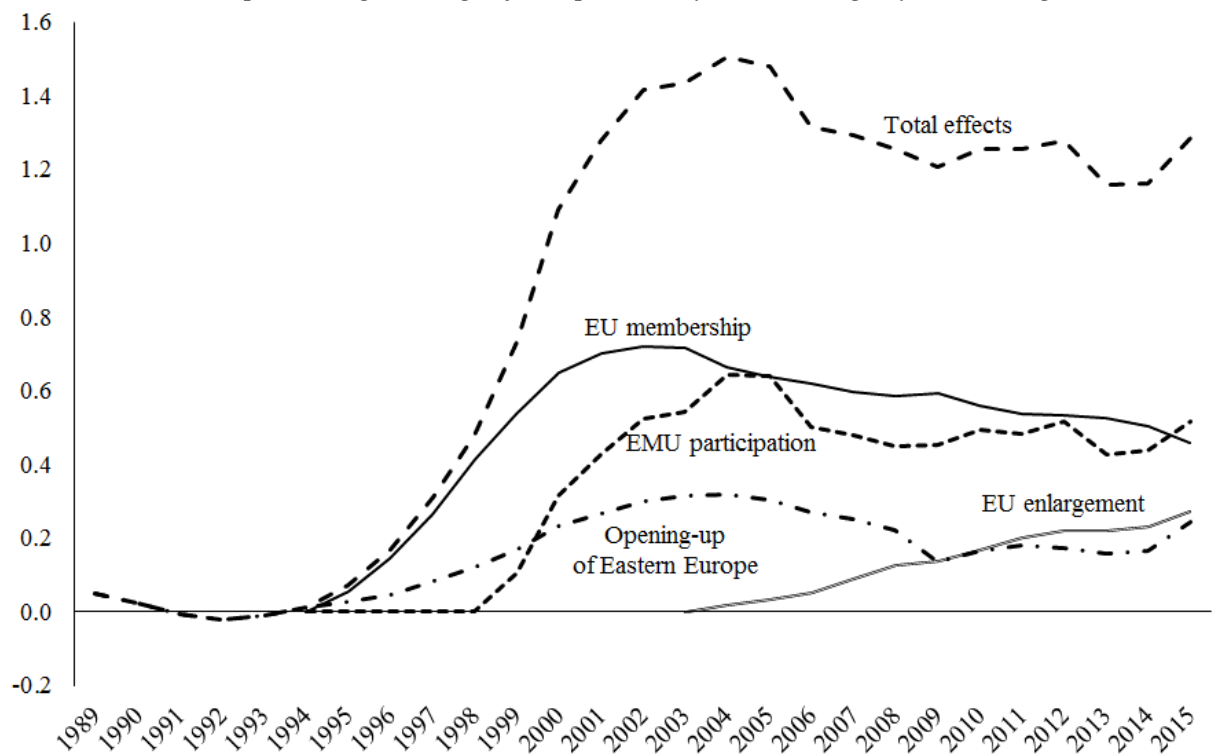
In scenario 4 we consider only two integration effects: trade and FDI and net migration:

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<sup>6</sup> Prior to EU accession, candidate countries of the 2004 and 2007 enlargement already abolished tariffs in trade with the old EU member states in the context of the asymmetric liberalization process of the Europe Agreements (EAs): the EU eliminated tariffs and NTBs on imports from the CEECS already in 1997, the CEECs did this until 2002. After EU accession the new member states entered the customs union of the EU and participate in EU's single market program. That meant, on the one hand, adjustments of the national external tariff to EU's CET and the abolishment of border controls. Hence, the remaining trade costs were eliminated.

- *Trade and FDI*: These effects are captured in the “smart dummy” variable “Regime change T+FDI”. Starting in 2004 in the simulations this dummy variable was increased from the former EMU membership value of 1.3 to 1.4; in 2007, due to the next round of EU enlargement it was increased to 1.5.
- *Net migration*: In spite of the seven years transitional exemption Austria attracted many specialised workers already at the start of the fifth EU enlargement in 2004. Therefore in the simulations we implemented (exogenously) positive net migration inflows above the normal trend already since 2004 (see Appendix B).

**Fig. 2:** Effects of Austria's participation in all steps of EU integration since 1989  
*GDP, volume, percentage changes from previous year (moving 6-year averages)*



### 3.2 Model results

The econometrically estimated integration model for Austria (Appendix A) has been carried out with EViews 7.0 over the period 1960 to 2015. The main data source is the AMECO database by the European Commission inclusive latest forecast until 2015. Only the net migration data are provided from Statistik Austria.

#### 3.2.1 Opening-up of Eastern Europe in 1989

The fall of the Iron Curtain was a windfall gift for the Austrian economy. This historic event provoked the already existing Habsburg or “k.u.k Monarchy” effect. Austria quickly used

these new opportunities for trade and FDI. In the model simulations (Fig. 2 and Table 2) the opening-up resulted in an increase of real GDP of 0.2 percentage points per year. This created additional jobs and reduced unemployment. The current account position improved.

### 3.2.2 EU Membership in 1995

The main step of EU integration was done when Austria became an EU member. The full exploitation of integration effects of participation in the Single Market resulted in an increase of real GDP of 0.6 percentage points per year. Due to fiercer competition inflation went down. 12.000 jobs could be created per year, unemployment decreased considerably. However, due to the confrontation with strong competitors from the old EU member states, the current account deteriorated.

**Table 2:** Effects of Austria's participation in all steps of EU integration since 1989  
*Selected macroeconomic indicators*

	Real GDP		CPI (inflation)	Employment total		Unemployment Rate Absolute		Current account balance	Budget balance
	Percent	Bn EUR 2005 prices	Percent	Percent	in 1.000	Percentage points	in 1.000	As a percentage of GDP	
<b><i>Opening-up of Eastern Europe 1989 - 25 years</i></b>									
1989-2015									
Cumulated	4.72	12.73	0.40	2.02	84.91	-0.52	-20.11	2.10	0.25
p.a.	0.18	0.49	0.02	0.08	3.27	-0.02	-0.77	0.08	0.01
<b><i>EU Membership 1995 - 20 years</i></b>									
1995-2015									
Cumulated	12.72	31.84	-5.07	6.06	244.7	-1.36	-49.41	-10.5	0.56
p.a.	0.58	1.59	-0.25	0.30	12.23	-0.07	-2.47	-0.53	0.03
<b><i>EMU Membership 1999 - 15 years</i></b>									
1999-2015									
Cumulated	9.30	24.00	0.80	3.86	159.18	-1.00	-38.05	-4.06	0.55
p.a.	0.53	1.50	0.05	0.24	9.95	-0.06	-2.38	-0.25	0.03
<b><i>EU enlargement 2004 and 2007 - 10 years</i></b>									
2004-2015									
Cumulated	2.44	6.71	-0.02	1.07	45.49	-0.17	-5.53	0.02	0.31
p.a.	0.20	0.61	0.00	0.10	4.14	-0.02	-0.50	0.00	0.03
<b><i>Overall integration effects since 1989 - 25 years</i></b>									
1989-2015									
Cumulated	28.55	62.65	-4.45	12.64	480.43	-2.70	-92.70	-10.23	1.44
p.a.	0.94	2.41	-0.17	0.49	18.48	-0.10	-3.57	-0.39	0.06

### 3.2.3 EMU Membership in 1999

In addition to EU membership, the participation in EMU and adoption of the euro added further 0.5 percentage points per year to real GDP.

Our results are similar but somewhat below those of McKinsey Germany (2012).

Accordingly, Austria benefitted the most from the Euro (7.8% more real GDP growth over a ten year period; or 0.8% per year), followed by Finland (6.7%) and Germany (6.4%) and the Netherlands (6.2%). The Euro zone has gained 3.6% in ten years. The McKinsey study evaluates four categories of Euro effects: i) reduction in transactions cost (low effects on GDP); ii) intra-Euro area trade effects; iii) competitiveness (this effect is high for Germany and also (as in our model) in Austria; it is negative for the soft-currency countries, like Italy) and, iv) interest rate effect (this effect is low for Germany and Austria because the common interest rate of the Euro area was based on that of Germany; it was high for the countries with high pre-EMU interest rates, like Italy and other countries in the Euro area periphery).

### 3.2.4 EU enlargement in 2004/07

EU enlargement complemented the already ongoing advantage of the opening-up of Eastern Europe for Austria. Real GDP could be increased additionally by 0.2 percentage points per year. Most studies on EU enlargement find a 1:10 rule. That means that the welfare gains of the newcomers are ten times higher than those of the incumbent EU member states (see Breuss, 2002; similarly Levchenko and Zhang, 2012<sup>7</sup>).

## 3.3 Overall effects of Austria's EU integration since 1989

Due to the processes of the opening-up of Eastern Europe, EU accession, EMU and EU enlargement running in parallel, the integration effects of the different stages partly overlap. Hence, the various integration effects do not simply add up. All in all (see Table 2), the integration stages considered here accelerated growth of real GDP (and only marginally less also real GDP per capita) in Austria by 0.9 percentage point per year (equivalent to € 2.4 billion at 2005 prices) and created around 18,000 jobs each year<sup>8</sup>. The unemployment rate shifted downwards by 0.1 percentage point per year, the rate of inflation by 0.2 percentage

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<sup>7</sup> Levchenko and Zhang (2012) estimate welfare gains due to European trade integration since 2000 in the West (average +0.14%; (Austria with +0.39% is the biggest winner) and in the East (+7.94%). The biggest winners are Estonia with +17.25%, Latvia +11.93% and Bulgaria +10.57; the welfare gains of the other CEES are below 10%.

<sup>8</sup> The detailed results for the four scenarios and also the overall results are quite similar to those of the earlier study which covered the period 1989-2011 (see Breuss, 2012, 2013C).

point. The ratio of imports to GDP increased altogether more than the export ratio. The entire integration process led to a weaker current account balance, mainly brought about by EU membership and EMU participation, but partly offset by the opening-up of Eastern Europe. The latter and EU enlargement improved Austria's opportunities to actively participate in the process of globalisation (or in "mini-globalisation" with regard to Eastern Europe). The trend of the simulated effects of Austria's integration into the EU shows that for each major integration step (EU membership in 1995 and EMU participation in 1999) the growth effects increase at the beginning and subside thereafter (see Fig. 2). Only in the case of the opening-up of Eastern Europe, there is a rather stable positive impulse on Austria's economic growth and the integration effects of EU enlargement in 2004 and 2007 did not yet diminish. The growth effects of Austria's EU membership and EMU participation have abated particularly in the wake of the Great Recession of 2009 and the euro area crisis.

The effects presented in Table 2 (cumulated and annual averages) blur to some extent the "true" profile of the integration effects, by suggesting that the average growth effects cited would last permanently at that level. In reality, economic integration, i.e., the accession of a country to an integrated community (EU), gives rise to initial positive growth incentives (mainly due to a necessary adjustment and productivity shock) which gradually fade. We therefore observe, as a rule, "falling marginal returns" to integration. Even after the growth effects have faded away, the level of income (real GDP) has been raised cumulatively by 29 percent (or by €63 billion at 2005 prices) as a result of participation in all integration steps during the 25 years since the opening-up of Eastern Europe. In the same time real GDP per capita (welfare) increased cumulatively by 28 percent or by €7.000. However, the welfare gain brought about by participation in European integration is defined not only by the level and growth of GDP per capita: it also includes the increase in the variety of goods and services supplied and in options for individual action (free movement and the Schengen Agreement facilitate labour mobility and travel, the latter also benefiting from the common currency), as well as the modernisation of the political system by introducing the European dimension. Moreover, full participation in the EU Single Market implies permanent downward pressure on prices and raises private household purchasing power. This effect is prolonged and reinforced by each round of EU enlargement and the accompanying extension of the Single Market. Unlike suggested by some authors of the New Growth Theory of Foreign Trade, integration has no permanent effects on growth rates, but provides one-off incentives to economic growth which raise the level of GDP, but ebb thereafter.

According to the calculations for the present study, Austria has benefited economically from all stages of integration (opening-up of Eastern Europe, EU membership, EMU participation and EU enlargement). The integration effects derived from model simulations for Austria's participation in all EU integration moves are in the order of ½ to 1 percentage point of additional GDP growth per year. However, not all groups of the Austrian economy have profited equally from EU integration. The primary winners are companies which are heavily engaged in the new EU member states. An indication is the decline in the wage share since the eighties. The “mini globalisation” has obviously exerted pressure on wages (see Breuss, 2010C).

The plausibility of these model results is confirmed when Austria's economic performance is compared with that of other countries inside or outside the EU. Thus, Austria's growth advantage vis-à-vis Germany and Switzerland roughly corresponds to the above-cited integration effects. This "growth dividend" is difficult to explain, if at all, when abstracting from the integration effects of Austria's participation in all EU policy moves.

#### **4 Conclusions**

The euro area crisis has confronted the EU with new challenges. The previous governance architecture of EMU did not withstand the test of the crisis. To prevent the euro area from breaking up, the governance of EMU has been readjusted in order to be more resilient to future shocks. High on the agenda are the convergence of competitiveness among euro countries (monitored and steered by the new procedure for "excessive macroeconomic imbalances" within the framework of the Six-Pack and Two-Pack - ideally heading towards a homogeneous European business cycle) and in particular the longer-term reduction of the (in some periphery countries) unsustainably high government debt, coupled with the containment of the debt dynamics through instruments of the Six-Pack (reform of the Stability and Growth Pact) and accompanying measures provided for by the Fiscal Compact (e.g., debt brakes at national level). Beyond the tools for closer coordination and centralisation of fiscal policy, the EU and notably the euro area have the European Stability Mechanism (ESM) at their disposal and are ready to start with the "Banking Union" (see Breuss et al., 2015) with common bank supervision, resolution and deposit guarantee at EU level. Whether the EU will move even further (as suggested in the plans to reform EMU by Barroso and Van Rompuy) into the direction of centralisation ("Political Union" or the "United States of Europe") is still open (see more in *Breuss*, 2013A, 2013B). For some member countries such development may go

too far and would provoke their early withdrawal (e.g., the UK), or the rifts within the EU and the euro area that have emerged since the crisis may grow even further.

In any case, all historical studies on the reduction of public debt do not bode well for Europe in a medium- and longer-term perspective. All measure to slash government debt by means of fiscal austerity (expenditure cuts and tax increases, as foreseen by the Six-Pack and the Fiscal Compact) may dampen medium- and long-term economic growth (see the extremely negative results in Greece).

Due to these negative perspectives, the "growth dividend" that Austria enjoyed in the past, benefiting from its strong involvement in the Eastern European "emerging markets", may gradually wane. As already signalled by current medium-term projections, also the new member countries in Eastern Europe may move to a slower growth path, as they will be indirectly affected by the euro area crisis and the negative side effects of its resolution (notably the collective de-leveraging) and ad hoc break-out of political crises, like that in the Ukraine and the following tensions between the EU and Russia.

### **Appendix A:** The estimated integration model for Austria

Real GDP (Cobb-Douglas production function; bn. EUR, 2005 prices)

$$\text{GDPR} = (\text{TFP}) * ((\text{K}^0.26) * (\text{EE}^0.74))$$

Total factor productivity (TFP)

$$\text{DLOG}(\text{TFP}) = -0.0117597194657 + 0.975350400527 * \text{DLOG}(\text{AP}) + 0.00368866066045 * \text{RAD} + 0.000364739422324 * \text{D}(\text{XQUOTA})$$

Research & Development: R&D in % of GDP

$$\text{RAD} = -0.771758304314 + 0.0900123360683 * \text{LOG}(\text{GDPR}) + 0.918022689413 * \text{RAD}(-1) + 0.450963636885 * \text{D}_{1995\_2015}$$

Private consumption deflator

$$\text{DLOG}(\text{PCN}) = 0.974494644295 * \text{DLOG}(\text{CPI}) - 0.0100090054202 * \text{D}_{2002}$$

Private consumption index: national definition

$$\text{DLOG}(\text{CPI}) = 0.00685148354097 + 0.210308218697 * \text{MARKUP} * \text{DLOG}(\text{ULC}) + 0.232379177613 * \text{MARKUP} * \text{DLOG}(\text{PM}) + 0.407094518941 * \text{DLOG}(\text{CPI}(-1)) + 0.014977340126 * \text{D}_{1984}$$

Harmonized index of consumer prices: HICP

$$\text{DLOG}(\text{HICP}) = 0.974397164556 * \text{DLOG}(\text{CPI})$$

GDP deflator

$$\text{DLOG}(\text{PGDP}) = 0.883285761406 * \text{DLOG}(\text{CPI}) + 0.432199804412 * \text{DLOG}(\text{PX}) - 0.275658593485 * \text{DLOG}(\text{PM})$$

Wage per employees (Phillips curve)

$$\text{DLOG}(\text{WE}) = -0.00688732197519 + 0.658922532489 * \text{DLOG}(\text{CPI}) + 0.439378457835 * \text{DLOG}(\text{AP}(-1)) + 0.0643927893279 * 1 / U - 0.059812308921 * \text{D}_{1980}$$

Wages

$$\text{WN} = (\text{WE} * \text{E}) / 1000$$

Taylor rule for Euro area

$$\text{RSH\_EA18} = 2 + \text{DLOG}(\text{HICP\_EA18}) * 100 + 0.5 * (\text{DLOG}(\text{HICP\_EA18}) * 100 - 2.0) + 0.5 * (\text{DLOG}(\text{GDPR\_EA18}) * 100 - 1.5)$$



Interest rate, short-term

$$\text{RSH} = - 5.5262147236 + 0.667905535844 * \text{RSH\_EA18} + 0.0136803208004 * \text{LOG(CPI)} * 100 - 2.35378845633 * \text{D\_1983}$$

Interest rate, long-term

$$\text{RLH} = 0.400105575997 + 0.23428902887 * \text{RSH} + 0.152448613707 * \text{DLOG(CPI)} * 100 + 0.674036427571 * \text{RLH(-1)}$$

Capital demand

$$\text{DLOG(K)} = 0.000347597990373 + 0.000690816072569 * \text{D(BUD)} - 0.000555726084856 * \text{PRDEF} + 0.10749650936 * \text{DLOG(GDPR)} + 0.000211122052822 * \text{D(DLOG(WE)} * 100 - (\text{RLH} - \text{DLOG(PGDP)} * 100)) + 0.879984556303 * \text{DLOG(K(-1))}$$

Capital coefficient: K/Y

$$\text{KY} = (\text{K} / \text{GDPR})$$

Labour demand (total employment)

$$\text{DLOG(EE)} = 0.174447800692 * \text{DLOG(GDPR)} - 0.0646686954094 * \text{DLOG(WE)} + 0.00183780684966 * \text{D(BUD)} + 0.688076954685 * \text{DLOG(EE(-1))}$$

Labour demand (employees)

$$\text{DLOG(E)} = - 0.0020926578709 + 0.787853784774 * \text{DLOG(EE)} + 0.174748348465 * \text{DLOG(GDPR)} + 0.262099988497 * \text{DLOG(E(-1))}$$

Labour supply: Labour force

$$\text{LS} = \text{EE} + \text{US}$$

Labour productivity (total economy)

$$\text{AP} = (\text{GDPR} / \text{EE})$$

Unit labour costs

$$\text{ULC} = (\text{WN} / \text{GDPR})$$

Unemployment rate (Okun's law)

$$\text{D(U)} = 0.0856028080042 - 7.48943374025 * \text{DLOG(GDPR)} + 0.00304288354196 * \text{D(POP - MIGR\_OST89 - MIGR\_EU95 - MIGR\_EUEW04)} + 0.804600244209 * \text{D\_1982} - 0.0362182637141 * \text{BUD}$$

Unemployment, total in 1000 persons

$$\text{US} = ( (\text{U} * \text{LS}) / 100 )$$

Exports of goods and services, total, real

$$\text{DLOG(XGSR)} = - 0.0436572302437 + 2.22907387142 * \text{DLOG(GDPR\_EU28)} - 0.555430829575 * \text{DLOG(REER\_IC37)} + 0.0393558155438 * \text{D\_1989\_2015}$$

Exports of goods and services, total, nominal bn. EUR

$$\text{XGSN} = \text{XGSR} * (\text{PX} / 100)$$

Export quota: exports goods and services in % of GDP

$$\text{XQUOTA} = (\text{XGSN} / \text{GDPN}) * 100$$

Imports of goods and services, total, real

$$\text{LOG(MGSR)} = - 5.3567516112 + 1.77756769413 * \text{LOG(GDPR)} + 0.228751889216 * \text{D\_1989\_2015}$$

Imports of goods and services, total, nominal bn. EUR

$$\text{MGSN} = \text{MGSR} * (\text{PM} / 100)$$

Import quota: imports goods and services in % of GDP

$$\text{MQUOTA} = (\text{MGSN} / \text{GDPN}) * 100$$

Current account in nominal bn. EUR (AMECO)

$$\text{CA} = \text{XGSN} - \text{MGSN}$$

Current account in % of GDP (AMECO)

$$\text{CAGDPN} = ( (\text{XGSN} - \text{MGSN}) / \text{GDPN} ) * 100$$

Current account in nominal bn. EUR (OeNB)

$$\text{CA\_OeNB} = \text{CA} - \text{CA\_Diff\_to\_OeNB}$$

Current account in % of GDP (OeNB)

$$CA\_OeNBGDPN = ((CA\_OeNB) / GDPN) * 100$$

FDI outflows in % of GDP

$$FDIEX = 0.375640070717 + 1.02837425753 * D(FDISOUT)$$

FDI outward stocks in % of GDP

$$FDISOUT = -23.7147058544 + 0.883784157118 * FDISOUT(-1) + 23.3682906272 * D\_1989\_2015$$

FDI inflows in % of GDP

$$FDIIN = 0.671986218682 + 0.84990945751 * D(FDISIN)$$

FDI inwards stocks in % of GDP

$$FDISIN = -28.0471754242 + 0.810412880324 * FDISIN(-1) + 28.0293244537 * D\_1989\_2015$$

Net household disposable income, nominal (bn. EUR; OECD Economic Outlook; Macrobond)

$$YDN = 2.18851454149 + 0.11686303161 * GDPN + 0.817157924902 * YDN(-1)$$

Net household disposable income, real (bn. EUR)

$$YDR = (YDN / (PCN / 100))$$

GDP, nominal (bn. EUR)

$$GDPN = (GDPR * (PGDP / 100))$$

Real GDP per capita (in 1.000 EUR) - WELFARE measure 1

$$GDPRPC = ((GDPR * 1000) / (POP - MIGR\_OST89 - MIGR\_EU95 - MIGR\_EUEW04))$$

GDP per capita in PPS (EU-28=100) - WELFARE measure 2

$$\begin{aligned} \text{LOG}(GDPPC\_PPSEU28) &= 0.43328354923 + 0.00346210004573 * \text{DLOG}(GDPRPC) + 0.911257550549 * \\ \text{LOG}(GDPPC\_PPSEU28(-1)) &- 0.0461887756332 * D\_2001 \end{aligned}$$

Budget position: Budget balance in % of GDP

$$\begin{aligned} \text{BUD} &= -1.28851868518 + 0.354920098741 * \text{DLOG}(GDPR) * 100 - 0.594239170511 * \text{ELEC} + \\ &0.700806989349 * \text{BUD}(-1) - 2.70112458588 * D\_2004 \end{aligned}$$

Budget position: Budget balance in % of GDP incl. Net contribution to EU budget

$$\text{BUDNET} = \text{BUD} + \text{NETEU}$$

Austria-EU Budget position absolute values in bn EUR

$$\text{NETEUABS} = (\text{NETEU} * \text{GDPN}) / 100$$

Public Debt dynamics: Gross public debt in % of GDP (DEBT = DEBT(-1) - PD + (r-g)\*DEBT(-1) + SF (Stock flow))

$$\text{DEBT} = \text{DEBT}(-1) - \text{PRDEF} + \text{SNOW} + \text{SF}$$

Primary budget balance in % GDP

$$\text{PRDEF} = \text{BUD} - \text{INTEREST}$$

Interest payments in % of GDP

$$\begin{aligned} \text{INTEREST} &= 0.187508058025 + 7.27693766331 * (\text{RLH} / 100) * ((\text{DEBT}(-1)) / \text{GDPN}(-1)) + 0.893137557651 \\ &* \text{INTEREST}(-1) \end{aligned}$$

Snow-ball effect

$$\text{SNOW} = 0.276597903339 + 0.00796005959488 * (\text{RLH} - \text{DLOG}(\text{GDPN}) * 100) * \text{DEBT}(-1)$$

Wage share: wages in % of GDP ("Globalization" reduces LQ)

$$\begin{aligned} \text{LQ} &= 15.1699479237 - 0.0316886728056 * (\text{XQUOTA} + \text{MQUOTA}) - 0.00942994300939 * \text{D}(\text{FDISOUT} + \\ &\text{FDISIN}) + 0.791815264509 * \text{LQ}(-1) + 3.87639625065 * D\_1975 \end{aligned}$$

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DLOG(Variable) = percentage change operator. Estimation with EViews 7.0 for the period 1960-2015. Data source AMECO database of the European Commission; PX (PM) = deflators of exports (imports) of goods and services; D\_1989\_2015 = "smart" dummy "Regime change T+FDI"; D\_1995\_2015 = "smart" dummy for "Regime change R&D"; FDI = Foreign direct investment; OeNB = Austrian National Bank.

**Appendix B: Quantitative model inputs of four integration scenarios***(Additional effects compared to the baseline scenario without EU integration)*

	Scenario 1			Scenario 2				Scenario 3			Scenario 4	
	<i>Open-1989</i>			<i>EU-1995</i>				<i>EMU-1999</i>			<i>EU-Enlarg-2004/07</i>	
	T+FDI	MIGR	Mark-up	R&D	T+FDI	EU-Budg	MIGR	REER	T+FDI	R&D	T+FDI	MIGR
1989	1.1	40	1.3	1.0	1.1	0	0	103.91	1.1	1.0	1.1	0
1990	1.1	55	1.3	1.0	1.1	0	0	103.07	1.1	1.0	1.1	0
1991	1.1	73	1.3	1.0	1.1	0	0	102.55	1.1	1.0	1.1	0
1992	1.1	67	1.3	1.0	1.1	0	0	103.77	1.1	1.0	1.1	0
1993	1.1	30	1.3	1.0	1.1	0	0	110.06	1.1	1.0	1.1	0
1994	1.1	0	1.3	1.0	1.1	0	0	112.70	1.1	1.0	1.1	0
<b>1995</b>	1.1	0	1.2	1.1	1.2	-0.44	-2	114.80	1.2	1.1	1.2	0
1996	1.1	0	1.1	1.1	1.2	-0.15	0	113.43	1.2	1.1	1.2	0
1997	1.1	0	1.0	1.1	1.2	-0.43	-2	108.09	1.2	1.1	1.2	0
1998	1.1	0	1.0	1.1	1.2	-0.34	4	106.82	1.2	1.1	1.2	0
<b>1999</b>	1.1	0	1.0	1.1	1.2	-0.32	15	107.00	1.3	1.2	1.3	0
2000	1.1	0	1.0	1.1	1.2	-0.21	13	107.00	1.3	1.2	1.3	0
2001	1.1	0	1.0	1.1	1.2	-0.26	33	107.00	1.3	1.2	1.3	0
2002	1.1	0	1.0	1.1	1.2	-0.10	29	107.00	1.3	1.2	1.3	0
2003	1.1	0	1.0	1.1	1.2	-0.15	36	107.00	1.3	1.2	1.3	0
<b>2004</b>	1.1	0	1.0	1.1	1.2	-0.16	14	107.00	1.3	1.2	1.4	33
2005	1.1	0	1.0	1.1	1.2	-0.11	14	107.00	1.3	1.2	1.4	26
2006	1.1	0	1.0	1.1	1.2	-0.12	14	107.00	1.3	1.2	1.4	6
<b>2007</b>	1.1	0	1.0	1.1	1.2	-0.21	14	107.00	1.3	1.2	1.5	7
2008	1.1	0	1.0	1.1	1.2	-0.13	14	107.00	1.3	1.2	1.5	7
2009	1.1	0	1.0	1.1	1.2	-0.15	14	107.00	1.3	1.2	1.5	0
2010	1.1	0	1.0	1.1	1.2	-0.24	14	107.00	1.3	1.2	1.5	3
2011	1.1	0	1.0	1.1	1.2	-0.27	14	107.00	1.3	1.2	1.5	13
2012	1.1	0	1.0	1.1	1.2	-0.35	14	107.00	1.3	1.2	1.5	26
2013	1.1	0	1.0	1.1	1.2	-0.35	14	107.00	1.3	1.2	1.5	20
2014	1.1	0	1.0	1.1	1.2	-0.35	14	107.00	1.3	1.2	1.5	30
2015	1.1	0	1.0	1.1	1.2	-0.35	14	107.00	1.3	1.2	1.5	30

*Scenarios:* 1 = Opening-up of Eastern Europe 1989; 2 = EU membership 1995; 3 = EMU membership 1999; 4 = EU enlargement 2004/07; T+FDI = dummy for “regime change” in trade and FDI (original values: 1 until 1888; starting with 1989 in each integration step 0.1 points higher: 1989 = 1.1; 1995 = 1.2; 1999 = 1.3; 2004 = 1.4; 2007 = 1.5; MIGR = net migration (in 1.000 persons) due to respective integration step; Mark-up = dummy for mark-up pricing, decreasing due to fiercer competition when participating in EU’s Single Market; R&D = dummy for “regime change” in research & development (R&D) policy due to EU/EMU membership; EU-Budg = Net payer position (in % of GDP); REER = real effective exchange rate (entering EMU has stopped the previous trend of appreciation; i.e. the increase in REER).

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