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A Prototype Model of European Integration

The Case of Austria

Fritz Breuss

465/2014

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WIFO Working Papers, No. 465

March 2014

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Post-war European Integration is a succession of regime changes: customs union in the 1960s, Single Market and EMU in the 1990s and EU enlargement in the 2000s. Since 1995 Austria as an EU member takes part in the deepening of EU integration (Single Market, EMU and Monetary Union) and participates in the enlargement process of the EU. 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, 10 years since the start of the EU enlargement towards Eastern Europe. With the Croatian accession in 2013, the EU now counts 28 member countries. In order to capture the 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 countries. Overall, the participating in all integration steps since 1989 has added about 1% to Austria's real GDP per year.

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2014/083/W/0

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A Prototype Model of European Integration: The Case of Austria

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Abstract

Post-war European Integration is a succession of regime changes: customs union in the sixties; Single Market and EMU in the nineties and EU enlargement in the twenties. Since 1995 Austria as an EU member takes part in the deepening of EU integration (Single Market, EMU and euro) and participates in the enlargement process of the EU. 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

In the early stage post-war European Integration was divided. On the one hand six countries (Belgium, France, Germany, Italy, Luxembourg and the Netherlands) founded the European Economic Community (EEC) in 1958 and formed a customs union in 1967. On the other hand the remaining Western European countries (Austria, Denmark, Norway, Portugal, Sweden, Switzerland, the United Kingdom and Northern Ireland) formed the European Free Trade Association (EFTA) in 1960 culminating in the completion of a free trade zone in 1966. In parallel with the first EC enlargement in 1973 by Denmark, Ireland and the United Kingdom Free Trade Agreements between the European Community (since 1967 called EC, after the institutional merger of the ECSC¹, the EAEC and the EEC) and the EFTA countries entered into force, and hence an EC-EFTA free trade area was realized by the year 1977.

After this first round of European Integration dealing primarily with the elimination of tariffs and hence creating free trade between member states of the EC and EFTA via the creation of a customs union and a free trade area, the integration policy took a long break.

Only about twenty years later the second round of European integration led to a real deepening of the EU integration (Single Market project in 1993 and Economic and Monetary Union (EMU) in 1999 with the introduction of the euro in 2002) and to six enlargements (in 1973 by Denmark, Ireland and the UK; in 1981 by Greece; in 1986 by Portugal and Spain; in 1995 by Austria, Finland and Sweden; the biggest enlargement step was set in 2004 (by 8 former Eastern European countries plus Cyprus and Malta) and 2007 by Bulgaria and Romania. Since the accession of Croatia in 2013 the EU encompasses 28 member states, 18 of which have also introduced the euro. An EU with 40 members in the near future is not out of reach! In parallel to the enlargement of the EU, the EFTA shrank from 10 (Iceland became member in 1970, Liechtenstein in 1991, and Finland in 1986) to four countries (Liechtenstein, Iceland, Norway and Switzerland) – of which three are integrated with the EU via the European Economic Area (EEA) Agreement and Switzerland is linked to the EU via two bilateral agreements.

The deepening of EU Integration – Single Market and EMU – has been achieved with several treaty changes: 1993 Maastricht Treaty² (Single Market and EMU), 1999 Amsterdam Treaty,

¹ ECSC = European Coal and Steel Community; EAEC = European Atomic Energy Community.

² Since the Maastricht Treaty the EU consists (legally speaking) of two integration entities: the European Union (EU) with its political dimension and the European Community (EC) with its economic dimension. The Lisbon Treaty consists of two treaties: the TEU = Treaty on European Union; and TFEU = Treaty on the Functioning of the European Union.

2003 Nice Treaty (EU enlargement) and 2009 Lisbon Treaty (replacement of the failed Treaty establishing a Constitution for Europe – TCE – in 2005). The global financial and economic crisis (GFC) in 2008/09 which led to the Great Recession in 2009, followed by the so-called Euro crisis in 2010 made it urgently necessary to repair the asymmetric policy design of EMU. Since the crisis the EU and in particular the Euro area operates on the basis of a New Economic Governance structure (see Breuss, 2013A, 2013B).

In the 21st century, European Integration reached already a very complex stage. In the “customs union” times in the sixties only the impact of tariff reduction on foreign trade stood in the focus of integration research (see Viner, 1950 and many others). The qualitative jump in European Integration took place when the EU evolved from a pure customs union into the Single Market and the EMU with the euro. The complexity of this important regime changes implied also a much greater challenge for theoretical and empirical integration research than before (see Breuss, 2003A, 2006; Jovanovic, 2011; Badinger and Breuss, 2011).

Around the years 2014 and 2015 Austria celebrate 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 paper an integration model for Austria is developed in order to estimate empirically the integration effects since 1989. It captures 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 possible effects of EU enlargement in 2004/07. This econometrically estimated small integration model for Austria could also serve as a prototype model for other member states of the EU.

2. European Integration: complex reality vs simple theory

The theory of integration has a long tradition. It developed partly ahead of the respective integration moves in Europe (e.g., the theory of customs union by Viner³ in 1950; see also Kennan and Riezman, 1990), and partly accompanied the steps towards deeper integration (Single Market, EMU and EU enlargement). While the theoretical explanation of customs union effects (trade creation via enlargement of the integration area, trade diversion due to intensification of intra-area trade at the expense of trade with third countries) is relatively straightforward, complexity increases with integration becoming closer.

³ For an overview, see Jovanovic (2011) and Breuss (2012).

2.1 The dream of a GUT of EU Integration and its limits

Due to the complexity of EU's integration (from customs union to Single Market and EMU) one dreams of finding a "Grand Unified Theory" (GUT) of European integration like in theoretical physics. In the case of regional economic integration, Baldwin and Venables (1995) stylized such a GUT for the case of a (fictitious) country entering a regional integration agreement (RIA) and by Kohler (2004) for the case of an incumbent country (Germany) if the EU is enlarging. In the following we evaluate how much one can derive from such a GUT in the case of a small country (Austria) joining the EU. Baldwin and Venables (1995, p. 1691) suppose an approach of an integration GUT which encompasses the main elements connected with the formation of a customs union and some elements of the Single Market project. However, it leaves out many aspects (like factor movements and the political aspects of EMU).

Based on the proposition of Baldwin and Venables (1995) the welfare of a representative consumer in the new EU member state (Austria) at the time of acceding the EU can be represented by an indirect utility function $V(p+t, n, E)$, where p is the vector of border prices, t is a vector of trade costs including the tariff equivalent of import barriers (NTBs like border controls), n is a vector of the number of product varieties available in each industry, and the scalar E is total spending on consumption. Expenditure of a new EU member state is equal to the sum of factor income, profits, and rent from trade barriers that accrues to domestic agents (including the government), minus investment plus income out of the EU budget under the title of structural funds transfers:

$E = wL + rK + X[(p+t) - a(w, r, x)] + \alpha t m - I + SF$. Total factor income is $wL + rK$, where L and K are the country's supply of labour and capital and w and r are factor prices. The third term on the right hand side is total profit. It is the inner product of the economy's production vector X and the gap between domestic prices and average costs $a(w, r, x)$, where average cost in each sector depends on factor prices and production per firm in that sector, x . Domestically accruing trade rents amount to αm , where m is the net import vector (positive elements indicate imports) and α is a diagonal matrix that measures the proportion of the wedge t that creates income for domestic agents; $\alpha = 1$ for a tariff or other barrier with domestically captured rent (DCR) and $\alpha = 0$ for a barrier where no trade rent is captured domestically (nonDCR). For example, t may represent real trade costs or a quota or voluntary export restraints (VER) under which foreigners capture the quota rents or in the case of integrating into the single market the trade costs of border control. Finally, I denotes investment and SF net income from structural funds transfers out of the EU budget.

By totally differentiating $V(p + t, n, E)$ and dividing through by the marginal utility of expenditure V_E Baldwin and Venables (1995, p. 1601 and Appendix A) derive an equation (here slightly extended) of welfare change which can be interpreted as a stylized GUT for a new EU member state in the process of EU enlargement:

$$\begin{aligned} dV/V_E = & \alpha t dm - md[t - \alpha t] - m dp \\ & + [p + t - a]dX - xa_x dx + (V_n/V_E)dn \\ & + (\tilde{r}/\rho - 1)dI \\ & + dSF \end{aligned} \quad (1)$$

A GUT of enlargement (e.g. the EU accession of a new country) should be able to explain at least three major effects of regional integration: *allocation of resources* (static “trade effects”, “scale effects”), *accumulation or growth effects* and *location effects*⁴ inclusive *factor movements*. Equation (1) involves the following integration effects:

- i) “Trade effects” of a Customs Union and EU’s Single Market: The first row includes static welfare effects of models with *perfect competition*. The first term is the “trade volume” effect. The trade volume changes subject to the wedge created by DCR trade barriers, αt . The second term is the “trade cost” effect, measuring the change in costs generated by changes in the nonDCR elements of trade barriers. The third is the “terms of trade” effect. The last effect occurs only if the acceding country is a large country having the possibility to influence world trade prices. In the case of a small country, like Austria joining the EU, it cannot influence world trade prices, and hence the third term is zero⁵. Prior to EU accession, Austria already abolished tariffs in trade with the EU member states in the context of the (EFTA) Free Trade Agreements, coming into effect in 1973. After EU accession Austria participated in EU’s single market program. That meant, on the one hand, a downward adjustments of the national external tariff to EU’s CET and the abolishment of border controls. Hence, the remaining trade costs were eliminated. Interpreted with equation (1), in the pre-accession period (with $\alpha = 1$) the reduction of

⁴ Location effects are discussed by Baldwin and Venables (1995, pp. 1616 ff.) in the context of the insights of models of “economic geography”, pioneered by Krugman (1991). This model category also considers factor movements from one location to the other, from the “periphery” to the “centre” or vice versa.

⁵ Baldwin and Venables (1995, pp 1604-1605) discuss in the context of an RIA with “large” countries the case of three countries, in which countries 1 and 2 form the RIA and country 3 remains outside. The members of the RIA can influence the terms of trade, and hence, the third term of equation (1) becomes relevant. The theoretical analysis of three-country problems (with three goods) becomes easily intractable or delivers ambiguous results (Lloyd, 1982). The Kemp-Wan theorem (Kemp and Wan, 1976) gives a powerful and beautiful answer to the question what configuration of trade policy (towards non-members) would result in a necessarily welfare improving CU. The Kemp-Wan theorem gained further attraction in alternative interpretations (Richardson, 1995) and extensions of free trade areas (Ohyama, 2004; Bond et al., 2004).

tariffs (t) contributed negatively to welfare (first term), whereas after accession (with $\alpha = 0$) the elimination of border controls and hence reduction of trade costs (t) contributed positively to welfare (second term)⁶.

- *Euro's pro-trade effect:* The experience with the existing Euro area so far shows that the introduction of the Euro in 2002 additionally reduced transaction costs and hence stimulated intra-euro-area trade in the range between 10% and 15% (with 9% the best estimate), depending on the method of gravity model estimates (for a critical survey, see Baldwin, 2006; Badinger, 2012; McKinsey Germany, 2012). New research suggests, however, that reduced transaction costs were not primarily responsible for the pro-trade effect of the introduction of the Euro, arguing instead that it was caused by the export of new goods to Euro zone economies. The mechanism driving this is seen in a reduction in the fixed cost of introducing new goods into Euro zone markets (for such arguments, see Baldwin, 2006, p. 87). Applying the "Casella effect" (see Footnote 8) to the introduction of the Euro Badinger and Breuss (2009) find a small country bonus: on average the Euro has led to improvement of small Euro area countries relative export performance by 3 to 9 percent. However, the "Euro crisis" has hampered to further stimulate the pro-trade effects of the Euro.
- *EU-US TTIP:* Welfare effects of trade liberalization have been estimated in partial and general equilibrium approaches in earlier steps of European Integration (see Breuss, 2003A) and are again on vogue to evaluate the increasing trend towards RIAs as a second best solution because the Doha Round with its multilateral ambition of trade liberalization is still not completed. The USA and also the EU are eager in concluding bilateral free trade arrangements (FTAs). The EU concluded a comprehensive FTA with South Korea (for an evaluation with a computable general equilibrium (CGE) model, see Breuss and Francois, 2011). The big challenge is nowadays the *Transatlantic Trade and Investment Partnership* (TTIP) between the EU and the USA, whose negotiations began in 2013. Again many studies already tried to estimate the expected welfare gains ex ante. On the one hand such studies are undertaken with CGE models with imperfect competition in order to evaluate the sectoral consequences of a comprehensive FTA between the EU and the USA (see Francois and Pindyuk, 2013; Francois et al., 2013). On the other hand the welfare

⁶ Breuss (2010B, p. 231) estimated the "static" trade and welfare effects of EU's enlarged Customs Union by the EU enlargement in 2004 and 2007. Welfare gains for the EU were modest (+0.01% of GDP); in Austria (+0.06%). The biggest winners of the CU connected with EU enlargement were the newcomers: EU10NEW +0.22%, Bulgaria (+1.10%) and Romania (+0.65%). High trade creation between the EU newcomers and the old EU-15 resulted at the expense of a small Intra-EU-15 trade decline.

implications are derived from estimated gravity equations including the features of the “New” New Trade Theory of Melitz (2003). Such an approach was chosen by Felbermayr et al (2013). They estimate gravity equations for the bilateral trade flows of 129 countries and 57 sectors. Besides the GDP variables of both trade partners, several trade distorting dummies (tariffs; NTBs etc) or trade enhancing variables (membership in FTAs, common language, common borders etc.) are included in the gravity equation in order to estimate bilateral trade flows.

As the bilateral EU-US tariffs are very low already (2.8% on average) the main trade effects (trade creation and trade diversion) will result from the abolition of non-tariff trade barriers (NTBs) in many sectors (quality standards; preferences etc.). Long-run trade creation could amount to 67%, primarily at the intensive edge (increase of already existing trade relations), but also third countries could gain from the TTIP. Welfare effects (measured in real income gains) could be considerable: the main winners are the USA (+13.4%) and the UK (+9.7%); Germany +4.7% and Austria +2.7%⁷.

In contrast to estimations of bilateral trade flows with ordinary gravity equations the study by Felbermayr et al. (2013, p. 83 ff.) also links EU-US trade liberalization by a comprehensive TTIP (including bilateral trade and FDI⁸) with macroeconomic variables on the line of the “new, new trade theory”. The basic effects run from real wage development to other macro and labour market variables. More competition leads to an exit of non-productive firms. The new export chances through TTIP leads to an entry of productive firms (increase of firm’s export participation) which exports from the EU to the USA⁹. The enhanced additional demand for labour increases real wages. This decreases competitiveness of EU firms in third markets where trade costs remain high. The TTIP will increase productivity particularly in EU firms which participate in additional trade with the USA and hence increase also productivity on average and hence increases real GDP and leads also to the creation of jobs. Productivity increase leads to more competition and hence lower prices. This latter channel from more export engagement to higher total factor

⁷ Other model simulations – with GTAP-based CGE models – like those of Francois et al (2013, p.46) produce smaller welfare gains of a TTIP. Accordingly, the estimated impact on GDP for the EU and US range only between 0.2 and 0.5 per cent, for the less ambitious and ambitious scenarios respectively.

⁸ The dispute over the proper implementation of the “Bilateral Investment Treaties” (BITs) paused the TTIP negotiations. Disputes on international investments are presently ruled by The International Centre for Settlement of Investment Disputes (ICSID) in Washington.

⁹ The essence of the “New” New Trade Theory is the insight that only the most productive firms are active in foreign trade (see Melitz, 2003; Melitz, Helpman and Yeaple, 2004; Melitz, Mayer, Ottaviano, 2014; Melitz and Redding, 2014; Helpman, 2006).

productivity (TFP) and hence higher real GDP is also included in our prototype integration model for Austria.

- ii) *“Scale and productivity effects” of EU’s Single Market:* The three terms in the second row capture theoretical predictions of models with increasing returns to scale and *imperfect competition*. The first term is the “output” effect, arising if there is a change in output in industries where price differs from average cost. The second term is the “scale” effect, which gives the value of changes in average costs induced by changes in firm scale¹⁰. The third term gives “variety” effects which may arise when the number of differentiated consumer products changes, like in trade models with Dixit-Stiglitz type utility functions and ingredients of the theory of monopolistic competition (Grossman and Helpman, 1991). Besides the “New Trade Theory” with increasing returns and imperfect competition (Helpman and Krugman, 1985), in the “New” New Trade Theory, initiated by Melitz (2003) productivity and exports are linked on a micro-firm level basis: the more productive a firm, the more it will engage in export business.
- iii) *“Accumulation or growth effects” of EU’s Single Market:* The term in the third row captures what is also called the “growth” effect of regional integration. It implies that a change in investment is instantaneously costly, but it also augments the capital stock with a social rate of return \tilde{r} . Discounting this at a social discount rate ρ gives the present value \tilde{r} / ρ , and a change in investment has a first-order welfare effect if this ratio differs from one. However, the growth effects of participating in EU’s Single Market is captured by equation (1) only rudimentarily. Many feed-back stimuli – from more competition and more research and development (R&D) on productivity and hence GDP growth – should also be implemented in a real GUT of economic integration.
- iv) *“Net EU budget position effects” of a new EU member:* The term of the fourth row indicates the welfare improvement of being a net receiver vis-à-vis the EU budget. Poor countries, like those of the fifth EU enlargement round in 2004/07 are all net receivers via EU accession; rich countries, like Austria are net payers into the EU budget. The latter, therefore get less transfers out of the EU budget in form of structural funds transfers than they have to pay into the EU budget.

¹⁰ A special case is the „Casella effect“. It implies that in case of trade bloc enlargement the gains from enlarging the bloc fall disproportionately on small countries, because – if economies of scale imply that firms located in large countries enjoy lower costs - the entrance of new members diminishes the importance of the domestic market and improves the small countries’ relative competitiveness (Casella, 1996). Empirically, the “Casella effect” cannot be generally verified (Badinger and Breuss, 2006).

A stylized GUT of a country joining the EU – sketched in equation (1) – leaves out many aspects of the complexity of the real EU integration (Single Market and EMU):

- *Factor movements:* The four freedoms of EU's Single Market project not only imply trade effects but also movements of capital, services and persons (migration). In particular via the big EU enlargements of 2004-2013 the EU became an unbalanced integration body consisting of rich (the old EU members) and poor (the new EU members of Eastern Europe) which induces factor movements in both directions: capital (FDI) from the West to the East and worker migration in the other direction. Such factor movement and its welfare implications are only indirectly captured in equation (1). FDI inflows in the acceding country may renew the capital stock and hence increase investment (third row). Labour migration leads to a welfare loss ("migration loss") in the sender country and to a welfare gain ("immigration surplus") in the recipient country (the old EU member states). In the context of equation (1) labour migration could be only interpreted if one assumes wage differentials in the expenditure equation E , which would induce migration.
- *Regime changes in economic policy:* When the EU entered its highest integration level, the EMU with a single currency, a new deepening of integration was necessary – economically (fixing the exchange rates and introducing a single currency) and politically (a new economic policy design). In case of EMU (and the euro) one must refer to other integration theories than exposed in equation (1), such as those of Optimum Currency Areas by Mundel (1961)¹¹.

2.2 Theory-based expectations from EU Integration

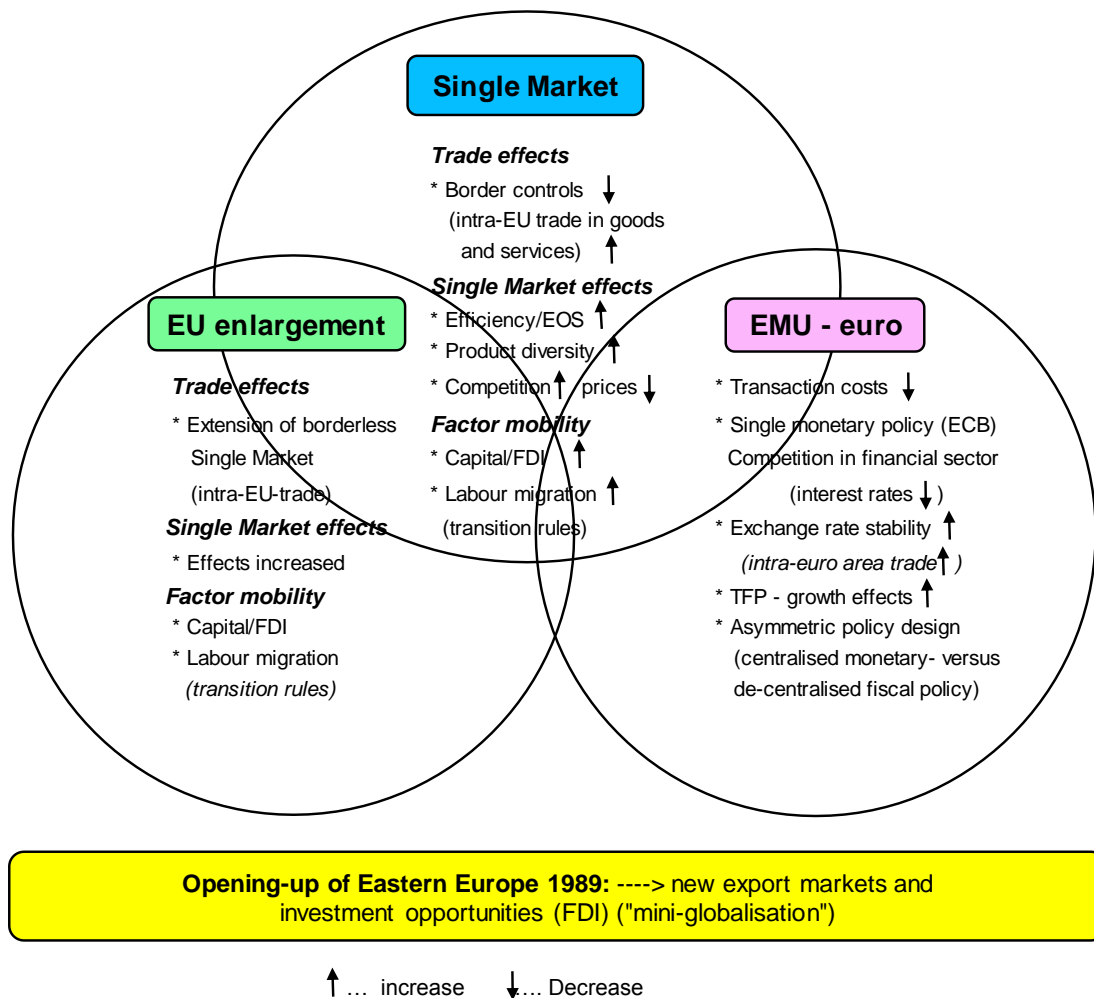
Over the last decades, European integration has systematically progressed from a customs union (completed in 1968) towards the Single Market, EMU and the big EU enlargements. Austria took part in all integration steps since the opening-up of Eastern Europe in 1989 – 1995 EU membership, 1999 EMU membership and as an EU member it participated in the EU enlargements 2004/07. An overview which theoretical integration effects in case of Austria's EU membership can be expected is given in Figure 1.

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

¹¹ For an overview of respective theoretical approaches for EMU, see Breuss (2006).

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).

Figure 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.

One step more complicated is to capture the integration effects deriving 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 economic criteria.

After the fourth round of EU enlargement by Austria, Finland and Sweden, the EU was virtually forced by historical events, i.e., the fall of communism and the Iron Curtain, to an early integration of the former Soviet satellite countries. The countries of East-central Europe were gradually integrated into the EU Single Market (first by Europe Agreements) which, by its larger dimension, offered a greater trade potential.

The effects of the three integration steps, i.e., Single Market, EMU and enlargement, are overlapping which is illustrated in a summary fashion by Figure 1. Austria has in a first stage benefited (as a member of EFTA) 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. Adding to this were the integration effects of accession to the EU Single Market in 1995 and creation of the EMU in 1999, as referred to above. These effects were supplemented and reinforced by those generated 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. The integration effects outlined here are incorporated into the following model simulations for the purpose of their quantitative measurement.

2.3 Economic performance within and outside the EU

Of course, the economic performance of a country is not only due to economic integration. Nevertheless economic integration in those countries where it happened should (theoretically) have added to overall economic growth. In Table 1 average growth rates of real GDP and real GDP per capita of those countries involved in European economic integration (EU-15,

Germany and Austria) are compared with the growth performance of countries without EU integration (USA and Switzerland).

2.3.1 Austria ahead of EU and USA

Austria's economy has grown faster in most phases since 1960, compared to those of the USA as well as those of EU-15. In the sixties and eighties this was the consequence of the necessary post-war catching-up process. The proper variable to compare is real GDP per capita, in particular because the US economy is producing its GDP with much higher labour input than the European economies. Only in the phase 1980-1990 and in the phase of the GFC 2008/09 Austria's growth of real GDP per capita was somewhat weaker than those in the USA but either similar to those of EU-15 (1980-1990) or Austria had better adjusted to the crisis during 2007 and 2015. Over the whole period 1960-2015, but particularly over the period where Austria was involved in European integration (1989-2007 – pre-crisis phase; and 1989-2015 during the whole integration phase) the economic performance was better than in the USA and in EU-15.

In all phases Austria's economy grew faster than that of Germany (1989-2015 by 0.9 percentage points) and also than that of Switzerland (by 0.8 percentage points). The advance over EU-15 amounted to 0.5 percentage points in the period 1989-2015.

Table 1: Economic performance within and outside of the EU
(Average growth rates of real GDP and real GDP pc, per year in %)

	GFC								
	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2007-2015	1960-2015	1989-2007	1989-2015
EU-15									
GDP	4.80	3.12	2.44	2.46	1.23	0.22	2.63	2.37	1.70
GDP pc	3.97	2.63	2.15	1.67	0.73	-0.13	2.07	1.68	1.12
USA									
GDP	4.22	3.17	3.34	3.46	1.64	1.49	3.10	2.97	2.52
GDP pc	2.91	2.09	2.37	2.21	0.70	0.71	2.03	1.85	1.49
Germany									
GDP	4.43	2.89	2.33	2.76	0.96	0.99	2.58	2.37	1.95
GDP pc	3.50	2.74	2.05	0.11	1.01	0.98	1.84	0.78	0.84
Austria									
GDP	4.71	3.61	2.25	2.69	1.50	0.83	2.81	2.61	2.06
GDP pc	4.11	3.49	2.08	2.25	1.06	0.52	2.46	2.12	1.63
Switzerland									
GDP	4.74	1.25	2.21	1.09	1.72	1.51	2.16	1.60	1.57
GDP pc	3.05	1.06	1.57	0.50	0.94	0.60	1.36	0.89	0.80

GFC = global financial and economic crisis 2008/09; GDP pc = real GDP per capita.

Source: AMECO data base of the European Commission.

2.3.2 Otherwise – an “Integration Puzzle”

The EU Single Market, with its "four freedoms" of goods, services, capital and labour exchange being the core element of European integration. It started on 1 January 1993 and, in conjunction with uniform competition rules, was intended to create a fair common market for about 500 million citizens and 21 million enterprises, thereby giving an impetus to economic growth. The integration and growth effects predicted by a large number of studies have, however, not materialised to full extent for the EU as a whole. In spite of a further deepening of integration through the creation of Economic and Monetary Union (EMU) with the euro as a common currency and the EU enlargement as from 2004, the hoped-for stronger momentum of EU growth has failed to materialise. Countries which did not experience such integration moves, like the USA, have as a rule enjoyed higher GDP growth than the EU on aggregate (see Table 1).

This "integration puzzle" is difficult to explain. Reasons for the theoretical integration effects not being translated into such in practice may be the still imperfect implementation of the Single Market (e.g., the Services Directive has only entered into force in 2010), the fact that not all EU member countries participate in all integration steps (Europe à la carte or multi-speed Europe), or the increase in the EU's internal heterogeneity brought about by the last round of enlargement by mostly "poor" eastern countries. In any case the succession of integration “shocks” might also contribute to explain the “Integration Puzzle” (see Breuss, 2012, p. 47).

When it was realised that the hoped-for growth stimulus through the creation of the Single Market did not occur, the EU launched in 2000 a new growth strategy under the heading of the "Lisbon Agenda" that was supposed to make the EU within 10 years "the most competitive and dynamic knowledge-based economy in the world". This goal was also not achieved. Meanwhile, all hopes rest on the new growth strategy of "Europe 2020".

3. A model-based evaluation of Austria’s integration into Europe

At the beginning of each integration step, in the EU and in Austria the Austrian Institute of Economic Research (WIFO) and many authors from other institutions (universities, European Commission, etc.) set out to estimate *ex-ante* the possible integration effects (for an overview of such studies, see Breuss, 2012, p. 43). In the WIFO studies, simulations were mostly

carried out by means of the current version of the WIFO macroeconomic model, adapted for the specific purpose¹².

The present study proceeds to an *ex-post* evaluation of integration effects realised over a longer period since the incidence of the respective integration moves. To this end, a dedicated integration model was set up to enable a quantification of possibly all theoretical integration effects referred to above. The integration effects derived in this way represent the deviations of actual economic developments in Austria from a hypothetical path that the economy had followed if Austria had stayed aside of all integration moves since 1989. This integration model for Austria (see Appendix A) could be used as a prototype model for other EU member states to evaluate their integration effects¹³.

3.1 Model inputs

We evaluate the integration effects of Austria's European integration with reference to the major variables of the macro model and lastly the impact on real GDP and 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 2).

3.1.1 Scenario 1: Opening-up of Eastern Europe in 1989

The opening-up of Eastern Europe in 1989 expanded market opportunities for Austria 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" variable¹⁴ ("Regime change T+FDI" or the dummy "D_1989_2015" in the integration model of Appendix A) which is one until 1988, then increases by 0.1 in

¹² 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).

¹³ 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.

¹⁴ 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 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.

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 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).

Table 2: 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 T+FDI
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.

3.1.2 Scenario 2: EU Membership in 1995

A new EU member must take over the *acquis communautaire* 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.

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 costs¹⁵. We assume that the mark-up in case of Austria's EU membership has increased strongly at the beginning and tapered off later (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. These 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). The original R&D dummy jumps in 1995 from 1 to 1.1 and in 1999 to 1.2. In the simulation of the EU membership effects the R&D dummy is reduced to 1 from 1995 to 1998 (see Appendix B). In our model context, more R&D stimulates total factor productivity (TFP) and hence real GDP growth.
- *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

¹⁵ 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 changes were found.

dummy” variable “Regime change T+FDI”. In the simulations the T+FDI dummy was reduced by 0.1 from 1995 to 1998 (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 Scenario 3: EMU Membership in 1999

Participating in EMU and hence introducing the euro further deepens 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) in case of current account deteriorations strongly depreciated their currencies against the DM bloc. After the introduction of the euro this was no longer possible and hence, the international competitiveness was reversed. Germany and Austria gained in form of real depreciation. In addition to this advantage in competitiveness 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 was set to 1.2 between 1999 and 2003.
- *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 reduced to 1.2 in 1999 and 2000.

3.1.4 Scenario 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 1989¹⁶. 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:

- *Trade and FDI*: These effects are captured in the “smart dummy” variable “Regime change T+FDI”. Starting with 2004 this dummy was reduced from the original value of 1.4 to 1.3 in the simulations of the T+FDI effects.
- *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).

¹⁶ 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.

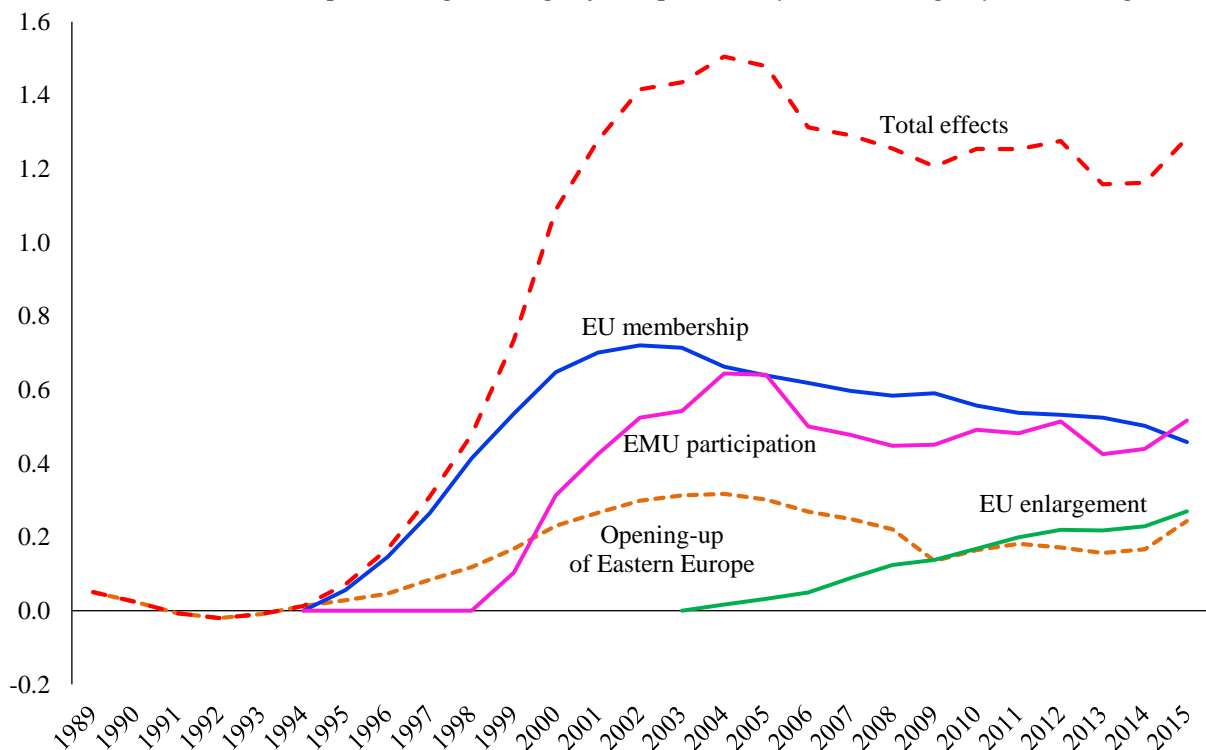
3.2 Model results

The econometric estimation of the integration model for Austria (Appendix A) has been carried out with EViews 7.0 for the period 1960-2015. 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 (Figure 2 and Table 3) 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.

Figure 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)



3.2.2 EU Membership in 1995

The main step of Austria's EU integration was set when it became 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 3: Effects of Austria's participation in all steps of EU integration since 1989
Selected macroeconomic indicators

	Real GDP		CPI	Employment		Unemployment		Current	Budget
	Percent	Bn EUR 2005 prices	(inflation) Percent	total Percent	in 1.000 in 1.000	Rate Percentage	Absolute in 1.000	account As a percentage of GDP	balance balance
<i>Opening-up of Eastern Europe 1989 - 25 years</i>									
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
<i>EU Membership 1995 - 20 years</i>									
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
<i>EMU Membership 1999 - 15 years</i>									
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
<i>EU enlargement 2004 and 2007 - 10 years</i>									
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
<i>Overall integration effects since 1989 - 25 years</i>									
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, 2012¹⁷).

3.2.5 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 3), 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 year¹⁸. The unemployment rate shifted downwards by 0.1 percentage point per year, the rate of inflation by 0.2 percentage 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 Figure 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.

¹⁷ 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%.

¹⁸ 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).

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 3 (cumulated and annual averages) blur to some extent the "true" profile of the integration effects calculated, 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 political systems 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. 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 already implemented (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 now have the European Stability Mechanism (ESM) at their disposal and are ready to start with the "Banking Union" 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 measures to slash government debt by means of fiscal austerity (expenditure cuts and tax increases, as foreseen by the Six-Pack and the Fiscal Compact) dampen medium- and long-term economic growth (see the extremely negative experience of 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.

Nevertheless, the problem countries in the euro area periphery already show encouraging signs of an improving situation: the restoration of competitiveness is making progress, with

current account imbalances diminishing. The understanding for the necessity to rein back the dynamics of government debt is growing. The unconventional intervention by the ECB is bearing fruit: interest rates on government debt have fallen markedly for the periphery countries and the euro is re-gaining strength vis-à-vis the US dollar. A recovery in the euro are is foreseen by most forecasters now.

Appendix A: The estimated integration model for Austria

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

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

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

$$\text{RSH} = -5.5262147236 + 0.667905535844 * \text{RSH_EA18} + 0.0136803208004 * \text{LOG}(\text{CPI}) * 100 - 2.35378845633 * \text{D}_{1983}$$

Interest rate, long-term

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

Capital demand

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

Capital coefficient: K/Y

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

Labour demand (total employment)

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

Labour demand (employees)

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

Labour supply: Labour force

$$LS = EE + US$$

Labour productivity (total economy)

$$AP = (GDPR / EE)$$

Unit labour costs

$$ULC = (WN / GDPR)$$

Unemployment rate (Okun's law)

$$D(U) = 0.0856028080042 - 7.48943374025 * DLOG(GDPR) + 0.00304288354196 * D(POP - MIGR_OST89 - MIGR_EU95 - MIGR_EUEW04) + 0.804600244209 * D_1982 - 0.0362182637141 * BUD$$

Unemployment, total in 1000 persons

$$US = (U * LS) / 100$$

Exports of goods and services, total, real

$$DLOG(XGSR) = -0.0436572302437 + 2.22907387142 * DLOG(GDPR_EU28) - 0.555430829575 * DLOG(REER_IC37) + 0.0393558155438 * D_1989_2015$$

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

$$XGSN = XGSR * (PX / 100)$$

Export quota: exports goods and services in % of GDP

$$XQUOTA = (XGSN / GDPN) * 100$$

Imports of goods and services, total, real

$$LOG(MGSR) = -5.3567516112 + 1.77756769413 * LOG(GDPR) + 0.228751889216 * D_1989_2015$$

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

$$MGSN = MGSR * (PM / 100)$$

Import quota: imports goods and services in % of GDP

$$MQUOTA = (MGSN / GDPN) * 100$$

Current account in nominal bn. EUR (AMECO)

$$CA = XGSN - MGSN$$

Current account in % of GDP (AMECO)

$$CAGDPN = ((XGSN - MGSN) / GDPN) * 100$$

Current account in nominal bn. EUR (OeNB)

$$CA_{OeNB} = CA - CA_{Diff_to_OeNB}$$

Current account in % of GDP (OeNB)

$$CA_{OeNB}GDPN = ((CA_{OeNB}) / GDPN) * 100$$

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
 $LOG(GDPPC_PPSEU28) = 0.43328354923 + 0.00346210004573 * DLOG(GDPRPC) + 0.911257550549 * LOG(GDPPC_PPSEU28(-1)) - 0.0461887756332 * D_2001$

Budget position: Budget balance in % of GDP
 $BUD = -1.28851868518 + 0.354920098741 * DLOG(GDPR) * 100 - 0.594239170511 * ELEC + 0.700806989349 * BUD(-1) - 2.70112458588 * D_2004$

Budget position: Budget balance in % of GDP incl. Net contribution to EU budget
 $BUDNET = BUD + NETEU$

Austria-EU Budget position absolute values in bn EUR
 $NETEUABS = (NETEU * GDPN) / 100$

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

Primary budget balance in % GDP
 $PRDEF = BUD - INTEREST$

Interest payments in % of GDP
 $INTEREST = 0.187508058025 + 7.27693766331 * (RLH / 100) * ((DEBT(-1)) / GDPN(-1)) + 0.893137557651 * INTEREST(-1)$

Snow-ball effect
 $SNOW = 0.276597903339 + 0.00796005959488 * (RLH - DLOG(GDPN) * 100) * DEBT(-1)$

Wage share: wages in % of GDP ("Globalization" reduces LQ)
 $LQ = 15.1699479237 - 0.0316886728056 * (XQUOTA + MQUOTA) - 0.00942994300939 * D(FDISOUT + FDISIN) + 0.791815264509 * LQ(-1) + 3.87639625065 * D_1975$

 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.

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

	Scenario 1 <i>Open-1989</i>			Scenario 2 <i>EU-1995</i>				Scenario 3 <i>EMU-1999</i>			Scenario 4 <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	40.00	1	1	1.1	0	0	103.91	1.1	1	1.1	0
1990	1	55.00	1	1	1.1	0	0	103.07	1.1	1	1.1	0
1991	1	73.00	1	1	1.1	0	0	102.55	1.1	1	1.1	0
1992	1	67.00	1	1	1.1	0	0	103.77	1.1	1	1.1	0
1993	1	30.00	1	1	1.1	0	0	110.06	1.1	1	1.1	0
1994	1	0.00	1	1	1.1	0	0	112.70	1.1	1	1.1	0
1995	1	0.00	1.1	1	1.1	-0.44	-2	114.80	1.2	1.1	1.2	0
1996	1	0.00	1.2	1	1.1	-0.15	0	113.43	1.2	1.1	1.2	0
1997	1	0.00	1.3	1	1.1	-0.43	-2	108.09	1.2	1.1	1.2	0
1998	1	0.00	1.3	1	1.1	-0.34	4	106.82	1.2	1.1	1.2	0
1999	1	0.00	1.3	1.2	1.3	-0.32	15	107.00	1.2	1.1	1.3	0
2000	1	0.00	1.3	1.2	1.3	-0.21	13	107.50	1.2	1.1	1.3	0
2001	1	0.00	1.3	1.2	1.3	-0.26	33	108.00	1.2	1.2	1.3	0
2002	1	0.00	1.3	1.2	1.3	-0.10	29	108.50	1.2	1.2	1.3	0
2003	1	0.00	1.3	1.2	1.3	-0.15	36	109.00	1.2	1.2	1.3	0
2004	1.4	0.00	1.3	1.2	1.4	-0.16	14	109.50	1.4	1.2	1.3	33
2005	1.4	0.00	1.3	1.2	1.4	-0.11	14	110.00	1.4	1.2	1.3	26
2006	1.4	0.00	1.3	1.2	1.4	-0.12	14	110.50	1.4	1.2	1.3	6
2007	1.5	0.00	1.3	1.2	1.5	-0.21	14	111.00	1.5	1.2	1.3	7
2008	1.5	0.00	1.3	1.2	1.5	-0.13	14	111.50	1.5	1.2	1.3	7
2009	1.5	0.00	1.3	1.2	1.5	-0.15	14	112.00	1.5	1.2	1.3	0
2010	1.5	0.00	1.3	1.2	1.5	-0.24	14	112.50	1.5	1.2	1.3	3
2011	1.5	0.00	1.3	1.2	1.5	-0.27	14	113.00	1.5	1.2	1.3	13
2012	1.5	0.00	1.3	1.2	1.5	-0.35	14	113.50	1.5	1.2	1.3	26
2013	1.5	0.00	1.3	1.2	1.5	-0.35	14	114.00	1.5	1.2	1.3	20
2014	1.5	0.00	1.3	1.2	1.5	-0.35	14	114.50	1.5	1.2	1.3	30
2015	1.5	0.00	1.3	1.2	1.5	-0.35	14	115.00	1.5	1.2	1.3	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 (in case of non-EU membership it would have increased respectively); 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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