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## **A Macroeconomic Model of CETA's Impact on Austria**

**Fritz Breuss**

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The Comprehensive Economic and Trade Agreement (CETA) between the European Union and Canada is the most ambitious (new generation) free trade agreement the EU has ever negotiated. It is a "mixed" agreement with EU and member countries competences. Most elements of the agreement for which the EU has "exclusive competence", including the chapter on tariffs and non-tariff barriers (the dismantling of all barriers to trade in goods and services and market access to foreign direct investment) can – after the European Parliament gave its consent on 15 February 2017 – be applied provisionally in spring 2017. With a specifically constructed macroeconomic trade and growth model for Austria, we simulate the impact of CETA on Austria. CETA will add 0.3 percent to Austria's real GDP in the medium run and will stimulate bilateral trade and FDI. Our model is a small prototype model and can easily be applied to other foreign trade agreements the EU is planning. A comparison shows that TTIP – which is "politically" dead now – would have the biggest impact (real GDP +1.7 percent). The almost finished negotiated EU-Japan foreign trade agreement would result in an increase of Austria's real GDP by 0.4 percent in the medium run.

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# **A macro-economic model of CETA's impact on Austria**

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29 March 2017

## **Abstract**

The Comprehensive Economic and Trade Agreement (CETA) between the European Union (EU) and Canada is the most ambitious (New generation) free trade agreement the EU has ever negotiated. It is a “mixed” agreement with EU and member states competences. Most elements of the agreement for which the EU has "exclusive competence", including the chapter on tariffs and non-tariff barriers (the dismantling of all barriers to trade in goods and services and market access to foreign direct investment) can – after the European Parliament gave its consent on 15 February 2017 - be applied provisionally in Spring 2017.

With a specifically constructed macro-economic trade and growth model for Austria, we simulate the impact of CETA on Austria. CETA will add to Austria's real GDP 0.3 percentage points in the medium run and will stimulate bilateral trade and FDI. Our model is a small prototype model and can easily be applied to other FTAs the EU is planning. A comparison shows that TTIP – which is “politically” dead now – would have the biggest impact (1.7% more real GDP). The almost finished negotiated EU-Japan FTA would result in an increase of Austria's real GDP by 0.4% in the medium run.

**Keywords:** Free trade agreement, European Union; open-economy macroeconomics.

**JEL Classification:** CF10, F14, F15, F17.

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## **1. Introduction**

In times of increasing criticism of globalization, the advocacy for free trade has a difficult position. People are afraid of further adjustments, which inevitably trigger globalization. Not only the professional globalization critics, such as Attac, Global 2000, Greenpeace and other NGOs, have long been worried about free trade. By choosing Donald Trump as the new US president, the free-trade opponents have even received support from the highest political level. Since the multilateral liberalization of world trade has slowed down in the WTO (Doha Round) since 2011, the major players in the world trade, the EU and the US are increasingly closing bilateral and multilateral free trade agreements with third countries. However, the whole burden of anti-globalization criticism has only been unloaded at the TTIP, the transatlantic trade and investment partnership between the EU and the USA. The negotiations on CETA, the comprehensive economic and trade agreement between the EU and Canada, have long been ignored. It was only towards the end of the negotiations that globalization criticism also jumped over to CETA.

At the end of 2016, the CETA Treaty was signed and, as the European Parliament has also agreed, CETA will be provisionally applied from spring 2017 onwards. The second great trade project of the EU, TTIP was already politically dead before Donald Trump took office as new US president.

After a short presentation of the CETA Treaty we take a look in the literature. Different methods deliver a big variety of study results on CETA. Then we demonstrate the economics of EU's free trade agreements (FTAs) in the case of CETA graphically. In order to evaluate the impact of CETA on the Austrian economy a macroeconomic model is developed. This allows to simulate several scenarios of the CETA arrangement over time. The CETA model for Austria is not only applicable to CETA, but it is a prototype model and can easily be adjusted to be applied to further EU FTAs, like those of EU and Japan and in the end TTIP.

## **2. CETA**

Because of the deadlock in the Doha round, the EU has launched a new trade strategy since 2006/07: "Global Europe". While emphasizing the support for negotiations in the WTO, the EU wants to boost its economy via more trade through a "new generation" of free trade agreements (FTAs). The first such agreement was concluded with South Korea (2011 applied provisionally, fully in power since December 2015). Other agreements have already been signed (EU-Singapore) or are in the finish line (e.g. EU-Japan). CETA and TTIP are also

included in this category. The "New Generation" of Free Trade Agreements (FTAs) of the EU are so comprehensive that they cover not only parts of the common trade policy (for which the EU has "exclusive competence" (EU-only FTAs) but also include components, where the EU has only a "shared competence". Such "mixed agreements" must be ratified by the EU institutions as well as the EU Member States together.

Due to the poor experience in the negotiations on TTIP (lack of transparency), the EU renamed its trade strategy in "Trade for All" at the end of 2015. It is now about a more responsible trade and investment policy in response to the shortcomings so far. These include three pillars: trade policy should be more effective and transparent, and the values (sustainability) should be taken more into account.

### *2.1 The CETA Treaty*

On 24 April 2009, the European Council gave the mandate for CETA (Comprehensive Economic and Trade Agreement) negotiations with Canada to the European Commission. The negotiations lasted about five years (from 10 June 2009 to 1 August 2014). After the Commission had tabled a new proposal for a specific Tribunal for investors protection (Article 8.27), renegotiations resulted in the final Treaty as of 5 July 2016.

After the German Federal Constitutional Court gave the green light to the German government on October 13, 2016 and Belgium (after the end of the blockade of Wallonia) gave its consent to sign the CETA Treaty on October 28, 2016, the European Council adopted a written procedure (signing the CETA Treaty, its provisional application and the request to the European Parliament to approve the provisional application)<sup>1</sup>. The EU-Canada summit, scheduled for October 27, 2016, was then carried out on October 30th. Canada's Prime Minister Justin Trudeau, Commission President Jean-Claude Juncker, President of the European Council Donald Tusk and Council President Robert Fico signed the CETA Treaty (see Breuss, 2017).

After the European Parliament gave its consent on 15 February 2017, CETA can be applied "provisionally". As soon as Canada has completed their internal legislative requirements necessary for provisional application, the European Commission can start provisional application. This is expected for Spring 2017. Article 30.7(3) of the "mixed" CETA Agreement provides for the possibility of provisional application of the Agreement. This

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<sup>1</sup> The decision of the EU governments in the European Council to sign CETA on 28 October 2016 includes a comprehensive package consisting of the CETA Treaty, the Joint Interpretations of the Treaty ("Package Leaflet"), and the "Strategic Partnership" (a political dialogue and co-operation between The EU and Canada in the areas of human rights, international peace and security, economic and sustainable development, justice, freedom and security) (see: <http://www.consilium.europa.eu/en/press/press-releases/2016/10/28-eu-canada-trade-agreement/>)

implies that most elements of the agreement for which the EU has "exclusive competence" (EU-only FTAs), including the chapter on tariffs and non-tariff barriers (the dismantling of all barriers to trade in goods and services and market access to foreign direct investment) can be applied provisionally. The following areas of the CETA agreement shall not be provisionally applied<sup>2</sup>: provisions of Chapter Thirteen of the Agreement (Financial Services) in so far as they concern portfolio investment, protection of investment or the resolution of investment disputes between investors and States (Tribunal). However, CETA can only enter fully into force once the national (and partly also regional) parliaments of EU member states have ratified the Agreement. This could mean that a total of some 38 parliaments must ratify the CETA Treaty. National approval procedures may take several years. For instance, national ratification of the less ambitious EU-Korea FTA took over four years.

The CETA Treaty consists of 30 chapters and contains 1598 pages (Treaty: 454 pages; annexes: 1144 pages, including 870 pages of exceptions and reservations from EU Member States, Canada and Canadian provinces). CETA provides for a complete elimination of customs duties on industrial goods (in the agricultural sector, the cut of customs duties consists of transitional arrangements). The non-tariff barriers (NTBs) and standards are gradually being adjusted and the service trade is harmonized in many areas. Mutual direct investment (FDI) is facilitated and protected by a special investment court (Tribunal) established in a clear move away from the current system of arbitration (ISDS - Dispute Settlement, resident at the World Bank). A forum has been agreed in the CETA Treaty for regulatory cooperation. The CETA Treaty is also accompanied by a "Strategic Partnership".

## *2.2 Little importance of Canada for Austria*

Austria's economic relations with Canada are very modest. Goods exports amount to only 0.8% of total exports. The Canadian import share is – with 0.3% - even smaller. Similar relations prevail also for services trade and FDI relations (see Table 1).

Austria exports primarily industrial products to Canada (see Annex: Table A1). 98% of total exports to Canada are manufactured goods, only 1.5% are agricultural goods. Machinery, transport equipment (cars) and chemicals dominate the manufacturing exports to Canada. Austria imports somewhat more crude materials and mineral fuels (15% of total imports) than agricultural products (only 2%) from Canada. The share of manufactured goods imports from Canada amounts to 83%.

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<sup>2</sup> See: Council Decision (EU) 2017/38 of 28 October 2016 on the provisional application of the CETA between Canada, of the one part, and the European Union and its members States, of the other part.

**Table 1:** The importance of the Austria-Canada economic relations (2015)

	<b>Exports</b>	<b>Imports</b>	<b>Balance</b>	<b>Exports</b>	<b>Imports</b>
	<b>Mio.€</b>			<b>Share in % of total</b>	
Goods	1027.0	440.4	586.6	0.78	0.33
Services	222.0	179.0	43.0	0.42	0.42
FDI, stocks	882.0	1878.0	-996.0	0.47	1.25

Sources: WIFO/FIW, OeNB, OECD: Statistics on International Trade in Services, Paris 2016.

### 2.3 Size and trade of CETA partners

Canada, with a population of 36 million would count as a middle-sized country within the EU. With the 510 million population in the EU, CETA will be an asymmetrical free trade agreement: a small country (Canada) meets a large (EU) whose market is more than ten times larger. Canada is, however, richer (higher GDP p.c.) than the EU-28 on average (see Table 2).

**Table 2:** The size and stage of development of CETA and TTIP partners and Japan (2015)

	<b>Population</b>	<b>GDP, nominal</b>	<b>GDP p.c.</b>
	<b>Mio.</b>	<b>bn. PPP</b>	<b>PPP</b>
EU-28	510	14702	28866
<i>EU-28 minus GB</i>	445	12644	28413
USA	322	13747	41822
Japan	127	3612	30404
Deutschland	82	2940	35833
Großbritannien	65	2058	31190
Kanada	36	1212	33147
Österreich	9	316	36909

Data source: AMECO database of the European Commission; PPP = Purchasing Power Parity.

**Table 3:** Trade relations between EU-CETA-TTIP partners and Japan (Bilateral exports in % of total exports; 2015)

	<b>EU</b>	<b>USA</b>	<b>Canada</b>	<b>Germany</b>	<b>UK</b>	<b>Japan</b>	<b>Austria</b>
EU	-	20.7	2.0	20.3	9.9	3.2	3.5
USA	19.7	-	20.1	3.3	3.7	4.2	0.3
Canada	7.5	75.7	-	0.7	3.2	1.9	0.1
Germany	58.0	9.5	0.8	-	7.5	1.4	4.9
UK	47.2	16.4	1.4	10.7	-	1.6	0.6
Japan	11.0	20.0	1.2	2.6	1.7	-	0.2
Austria	69.0	6.9	0.8	30.0	3.2	1.0	-

Sources: Eurostat, US Census Bureau, Statistics Canada, Statistisches Bundesamt, UK Office for National Statistics, Statistics Japan, FIW.

The asymmetry between the EU and Canada is also reflected in the mutual importance of both trade partners. For Canada, the EU is far more important than Canada with the EU (only



2%), with an export share of around 7%. Austria has recently exported only 0.8% of its total exports to Canada (see Table 3), but has shown a growing trade surplus for years (2015: € 590 million).

#### 2.4 EU more protectionist than Canada

The EU currently applies a duty rate of 5.3% (simple average MFN applied) on all imported goods, Canada only 4.2%. The higher tariff protection is essentially limited to non-agricultural products. For agricultural products, Canada is currently more protected by tariffs than the EU. The EU is ahead of Canada with the protection of imports with non-tariff trade barriers (NTB) or non-tariff measures (NTM; see Table 4; more details, see Appendix: Table A2).

**Table 4:** Tariffs and Non-tariff measures in EU, Canada and USA

	Tariffs on imports in %		
	EU	Canada <sup>*)</sup>	USA
Total	5.3	4.2	3.5
Agricultural products	12.2	15.9	5.1
Non-agricultural products	4.2	2.2	3.2
	Non-tariff measures (NTB/NTM) <sup>**)</sup>		
Goods sectors	30-56	20-55	20-55
Sercices sectors	20-45	17-39	17-39

Tariffs are simple average MFN applied rates.

<sup>\*)</sup> Assumption: the NTB/NTM hurdles are as high as in the USA.

<sup>\*\*)</sup> Index: 0 (no), 100 (highest) barriers.

Sources: WTO (2016) for tariffs, and ECORYS (2009) for NTB

#### 2.5 A bouquet of CETA study results

Since CETA is a free trade agreement between dissimilar partners, Canada is identified as the medium-term winner in all studies (see Table 5). This is plausible, as Canada is gaining access to a market 10 times as large as that for EU exporters on the Canadian market.

Apart from one study (Kohler-Storm, 2016), all CETA studies predict positive trade effects and therefore GDP effects. Canada is gaining always more than the EU. The bouquet of predictions ranges from 0.06% to 8% for Canada and from 0.02% to 0.39 for the EU (or Germany). In the case of Austria, which accounts for less than 1% of its foreign trade with Canada, the effects are even smaller (from 0.02% to 0.46%). Third countries are mostly losers of CETA.

The reason for the big variety of the study results is the use of different methods. While simulations with computable general equilibrium models (CGE models) usually only produce

effects below one percent of GDP, estimates with modern gravitational models show much higher effects. The latter (as in the case of Anderson et al., 2016) partly also consider the growth-driving effects through more mutual foreign direct investment (FDIs).

**Table 5:** CETA – Expected long-run GDP effects (in %)

	Canada	EU	Austria	Third countries <sup>*)</sup>	
	Partner countries <sup>*)</sup>				
Raza et al. (2016)	0.06	0.02	0.02	-	-
TSIA-CETA (2011)	0.36	0.03	-	-	-
Joint Study (2008)	0.77	0.08	-	-	-
Aichele-Felbermayr (2014)	2.97	0.22	0.30	USA	0.04
				China	-0.03
				World	0.15
Anderson et al. (2016)	8.00	0.39 (DE)	0.46	ROW	-0.02
Francois-Pindyuk (2013)	-	-	0.22	-	-
Kohler-Storm (2016) <sup>*)</sup>	-0.96	-0.49	-	ROW	-0.06

<sup>\*)</sup> Without spillovers; ROW = Rest of the world; DE = Germany.

### 3. The economics of CETA

The complex content of CETA cannot easily be captured in simple traditional trade policy diagrams which primarily deal with tariff liberalization. Nevertheless, we try – in a stylized way – to capture the main features of CETA by advancing step by step from autarky to a unilateral tariff/NTB liberalisation and then to a bilateral elimination of trade barriers like in the case of CETA. The major methods are based on standard tariff policy analysis (see Breuss, 2003, chapter 9). Firstly, we explain CETA with a graphical representation. Then a macro-economic model is constructed to study the impact of CETA on Austria.

#### 3.1 A graphical representation

In the following we analyse CETA in a three-country case (Austria (EU), Canada and the rest of the World (ROW)) with the following diagram (see Figure 1).

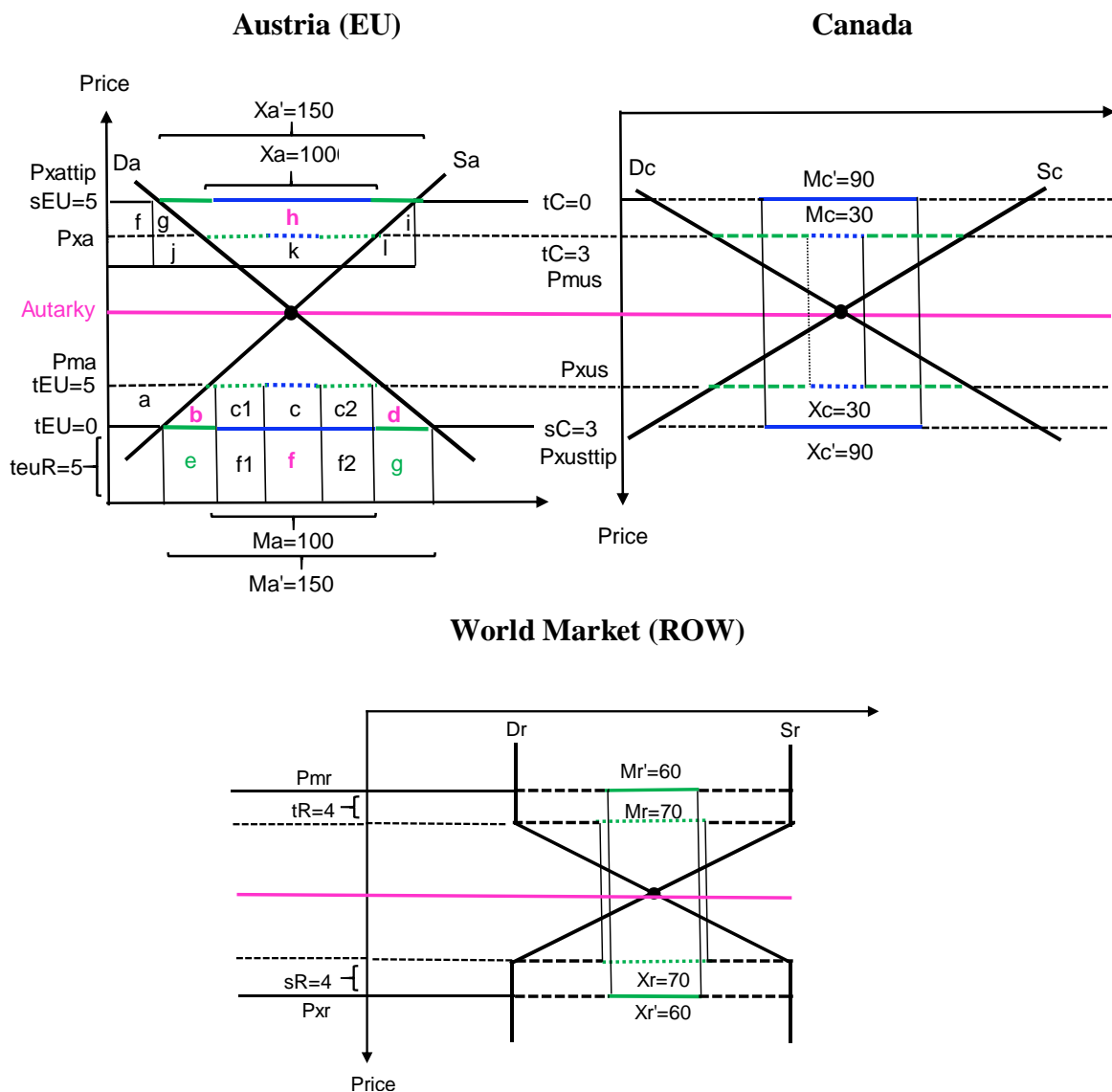
The diagrams for the three countries are constructed in such a way, that one can compare the exports (imports) of Austria (or EU) with the imports (exports) of Canada and the ROW. That means that the diagram for Austria is drawn as usual with an upward-sloping supply and downward-sloping demand curve. The diagrams for Canada and the ROW are inverted.

In the following we discuss three scenarios: (1) autarky and trade with tariffs, (2) unilateral tariff reduction in Austria (or EU) and (2) the CETA case - bilateral trade liberalization in Austria and Canada.

- *Autarky and trade with tariffs:*

In equilibrium – where the demand and supply curves intersect (the purple line) - there is autarky: no trade takes place (in case of prohibitive tariffs in all countries). In the real world, there is trade between the three countries at positive tariff rates ( $t_{EU} = 5\%$ ,  $t_C = 3\%$ ,  $t_R = 4\%$ ). At these tariff rates Austria imports ( $M_a$ ) in total 100, of which 30 stem from Canada (Canadian exports to Austria:  $X_c$ ) and 70 from the ROW ( $X_r$ ).

**Figure 1:** The Economics of CETA



- *Unilateral tariff reduction in Austria (EU):*

Austria unilaterally eliminates tariffs on imports from Canada ( $t_{EU} = 0\%$ ). The tariff vis à vis ROW remains unchanged at:  $t_{euR} = 5\%$ . Then Austria imports ( $M_a'$ ) more because the prices of imported goods and services decline, totalling 150, of which Canada exports 90 ( $X_c'$ ). The

rest of 60 is exported from ROW ( $X_r'$ ). That means that the unilateral tariff liberalization of Austria (or of the EU) has the classical Vinerian trade creation effect with the partner country (Canada) and implies trade diversion with the third country, the ROW.

The unilateral liberalization scenario leads to the following *welfare effects*:

*Consumer rent*:  $a + b + c_1 + c + c_2 + d$

*Producer rent*:  $-a$

*State*, lost tariff revenues in trade with Canada:  $-c - f$

*State*, lost tariff revenues in trade with ROW:  $e - c_1 - f_1 - c_2 - f_2 + g$  (of which  $e+g$  are tariff revenue gains, the rest are losses).

*Net welfare* in Austria:  $b + d - f - f_1 - f_2 + e + g$  (of which  $b+d$  is consumer welfare gain and  $-f-f_1-f_2+e+g$  are net revenue losses or the terms of trade effect).

- *CETA: bilateral tariff and NTB reduction:*

CETA implies bilateral tariff (and NTB) liberalization. That means not only Austria (or the EU), but also Canada eliminates its import tariffs and reduces NTB barriers. If Canada eliminates its tariffs from 3% to zero, then Austria can export more ( $X_a' = 150$ ) than in the pre-CETA situation ( $X_a = 100$ ), of which 90 go to Canada and 60 to the ROW. The additional export stimulus via the CETA arrangement operates as if Austria would subsidy its export industry, implying that the export (import) prices in Austria (Canada) increase (decline) by the assumed subsidy of  $s_{EU} = 5\%$ .

This results in the following theoretical welfare effects:

*Consumer rent*:  $-f - g$

*Producer rent*:  $f + g + h$

*State*, cost of export subsidy:  $-g - h - i - j - k - l$  (as this subsidy effect is only fictional, however, this is no burden for the Austrian state, because it may be the effect of rents of NTB beneficiaries either in Austria (the EU) or in Canada).

*Net welfare* in Austria:  $h$  (only the exporters gain an additional rent).

Whereas consumers (producers) are the winners (losers) of (unilateral) import liberalization, bilateral trade liberalization (the CETA case and generally, all bilateral EU FTAs) see producers also as winners because the home country (Austria) can export more than before. The tariff revenue losses due to the elimination of import tariffs on imports from the CETA partner, Canada and due to less tariff-ridden imports from ROW are no costs for the Austrian budget. As import tariffs are part of the traditional own resources of the EU budget, the losses are a burden for the EU budget.

Besides the welfare implication of our hypothetical three country CETA model, our model is also able to demonstrate that globalization (trade liberalization) leads to an increase of the volume of world trade. Before CETA world trade (only one direction – either exports or imports of each of the three countries) amounts to 420 (Austria 100; Canada 140; ROW 180). After CETA the volume of world trade increases to 540 (Austria 150; Canada 210; ROW 180).

What our simple 3-countries model cannot render is an explanation of the possible macroeconomic impact of the second part of CETA, namely the investment liberalization via reducing investment barriers (NTBs) for bilateral FDIs in both economies. In order to catch all elements of CETA we develop the Austrian CETA macro model in the next section.

### *3.2 The Austrian CETA model*

The following macro growth model is a mixture of estimated parameters and calibrated ones. One could call our model a hybrid trade and growth model (TGM). The model must be able to capture the major features of the trade and investment liberalization of CETA in view of the diagrammatical demonstration of the “economics of CETA” in the previous chapter. The approach is kept as simple as possible. Nevertheless, it is general enough to serve as a prototype for further EU FTAs projects, like the EU-Japan FTA and a possible new TTIP.

The present growth model is based on data for the period 1995 to 2030 supplied by the AMECO database of the European Commission. The simulations run over the period 2017 to 2030 to evaluate the dynamics of CETA liberalization. The model is calibrated, estimated and simulated with EViews 8.0.

Our dynamic hybrid CETA model is calibrated as such as to deliver more or less the medium and long-run general equilibrium results of Francois and Pindyuk (2013) and Aichele and Felbermayr (2014). Whereas their results are gained from simulations with a static CGE model (GTAP model and ifo trade model) and represent a long-run comparative static equilibrium, our model allows simulations about the impact of CETA over time up to the year 2030.

#### *3.2.1 The supply side*

The supply side of the TGM model consists of a production function, the endogenous explanation of technical progress (TFP) in the spirit of Verdoorn’s law enriched with the pro-competitive effects of trade and investment. Capital and labour demand and additional labour market as well as equations for the wage-price system conclude the supply side of the model.

The core of the macro growth model is a Cobb Douglas production function (equation (1)) with capital and labour as primary factors of production and technical progress (represented by TFP) as the main growth driver. Considering the features of endogenous growth theory TFP is endogenous. The essential block of the Austrian CETA model consists of equations for bilateral trade including liberalization variables (tariffs and NTBs) and bilateral FDIs (NTBs). The trade-FDI block should be able to reproduce the major elements of the outcome of the “economics of CETA” as demonstrated in the previous diagrammatical exposition. This model block is primarily calibrated.

The constant and error terms have been omitted in the description of the following equations. Whenever the growth rates of the variables are expressed in %, this means that they have been estimated as differences of their logs.

#### *Cobb-Douglas production function*

$$(1) \quad Y = A K^{1-\alpha} E^{\alpha} .$$

$Y$  is the level of real GDP,  $A$  is Hicks-neutral “technological progress” measured by total factor productivity (TFP),  $K$  is the level of real capital stock,  $E$  is total employment; the time index has been omitted in all variables. With the output elasticity of labour,  $\alpha = 0.75$  the real GDP is calibrated as such that the times series of the actual data for  $A$ ,  $K$  and  $E$  over the period 1995 to 2030 can reproduce real GDP ( $Y$ ).

#### *TFP*

$$(2) \quad A = 0.6 Y + 0.003 (XATCr) + 0.03(XATEUr) + 0.00001 (XATROWr) + \\ 0.001 (MATCr) - 0.01(MATEUr) - 0.00001(MATROWr) - \\ 0.0004 (FDIATCr) - 0.001(FDIATEUr) - 0.00001(FDIATROWr) + \\ 0.0003 (FDICATr) + 0.002(FDIEUATr) + 0.000001(FDIROWATr)$$

All variables in equation (2) are expressed in differences of logarithm (% changes). TFP depends on deflated (real) variables of exports ( $X_r = X/P$ ) and FDI ( $FDI_r = FDI/P$ ).

The change of technical progress, measured by the growth rate of TFP ( $A$ ) is an estimated equation à la Verdoorn’s law where TFP is driven primarily by the growth rate of real GDP ( $Y$ ). This Verdoorn approach has been augmented by TFP driving forces of globalization via more trade and more FDI integration into the world economy.

In our model, Austria’s participation into the world economy via trade and FDI is split into three regions: Canada (CETA partner), the EU-28 (Single Market integration) and the rest of the world (ROW). Exports in all three regions stimulate TFP. Import competition in the Case

of Canadian imports also helps to increase TFP. FDI activities abroad (FDI exports) reduce TFP in Austria, whereas passive FDI activities (FDI imports) stimulate TFP.

To get realistic simulation results (comparable to those of Francois and Pindyuk (2013) and Aichele and Felbermayr (2014)) the following estimated parameters of equation (2) have been calibrated downwards: Those for  $Y$  from 0.7 to 0.6;  $XATC$  from 0.007 to 0.003;  $XATEU$  from 0.04 to 0.03;  $XATROW$  from 0.01 to 0.0001;  $MATC$  from 0.003 to 0.001;  $MATEU$  (unchanged -0.01),  $MATROW$  from -0.03 to -0.00001;  $FDIAT$  from -0.001 to -0.0004;  $FDIATEU$  from -0.002 to -0.001;  $FDIATROW$  from -0.005 to -0.00001;  $FDICAT$  from 0.0006 to 0.0003;  $FDIEUAT$  (unchanged 0.002);  $FDIROWAT$  from 0.000002 to 0.000001. A similar parameter constellation is also applied for the comparison of the impact of other EU FTAs, like TTIP and the EU-Japan FTA.

#### *Demand for capital*

$$(3) \quad K\% = 0.8 K\%_{t-1} + 0.05 Y\% - 0.0006 \Delta(R - P\%)$$

The demand for capital (its growth rate  $K\%$ ) is explained by the lagged growth rate of  $K$ , the overall demand of the economy (the growth rate of real GDP,  $Y\%$ ), and reacts negatively on the change of the real interest rate ( $R-P\%$ ). The GDP elasticity has been calibrated downwards compared to the estimated one (from 0.10 to 0.05).

#### *Long-term interest rate: Taylor rule*

$$(4) \quad R = 0.9 R_{t-1} + 0.2 (P\% - 2.0) + 0.1 (Y\% - 2.5)$$

This estimated Taylor rule assumes that the long-run nominal interest rate ( $R$ ) is determined by its lagged value and by the gap of the inflation rate ( $P\%$ ) and the ECB target of 2% and by the gap of GDP growth ( $Y\%$ ) compared to the long-run average 2.5%. Being a member of EMU the monetary policy is executed by the ECB on average for the Euro area member states. The ECB sets the short-term interest rates, the long-run are developed by the market forces in the Euro area member states.

#### *Demand for labour*

$$(5) \quad E\% = 0.3 E\%_{t-1} + 0.1 Y\% - 0.0003 \Delta(W\% - P\%)$$

Similarly, to capital the demand for labour (the growth rate of total employment  $E\%$ ) is explained by the lagged growth rate of  $E$ , the overall demand of the economy (the growth rate of real GDP,  $Y\%$ ), and reacts negatively on the change of the real wage rate ( $W\%-P\%$ ). The GDP elasticity has been calibrated downwards compared to the estimated one (from 0.3 to 0.1).

*Wage rate: Phillips curve*

$$(6) \quad W\% = 0.3 W_{t-1} + 0.08 \left(\frac{1}{U}\right) + 0.2 P\%$$

The wage rate (total wages and salaries relative to total employment) is estimated as a Phillips curve. The growth rate of nominal wages (W%) is explained by a lagged wage term, the inverse of the unemployment rate (1/U) and the inflation rate (P%).

### 3.2.2 Trade and FDI

The essential block of the Austrian CETA model consists of equations for bilateral trade including liberalization variables (tariffs and NTBs) and bilateral FDIs (NTBs). The trade-FDI block should be able to reproduce the major elements of the outcome of the “economics of CETA” as demonstrated in the previous diagrammatical exposition. This model block is primarily calibrated.

*Austrian exports to Canada*

$$(7) \quad \left(\frac{XATC}{P}\right) = YC^\alpha (1 + t_C)^{-\beta} (1 + NTB_C)^{-\gamma} CAD\text{€}^{-\delta}$$

The level of real Austrian goods exports (XATC/P) to Canada is explained by Canadian demand, represented by the level of Canada’s real GDP (YC) and by Canadian trade restrictions via import tariffs ( $t_C$ ) and non-tariff barriers ( $NTB_C$ ). The Euro exchange rate of the Canadian Dollar (CAD€) has been added in order also to catch exchange rate effects of Austrian exports to Canada. All parameters (demand:  $\alpha = 0.5$  and trade restriction and exchange rate elasticities:  $\beta = 2$ ;  $\gamma = 1$ ;  $\delta = 0.5$ ) have been calibrated.

*Austrian exports to EU-27*

$$(7) \quad \left(\frac{XATEU}{P}\right) = -0.05 + 4.2 YEU$$

The growth rate of real Austrian goods exports (XATEU/P) to EU-27 is dependent on EU demand, measured by the growth rate of real GDP of EU-28. This equation is estimated in differences of logarithms (% changes).

*Austrian imports from Canada*

$$(8) \quad \left(\frac{MATC}{P}\right) = Y^\alpha (1 + t_{EU})^{-\beta} (1 + NTB_{EU})^{-\gamma} CAD\text{€}^\delta$$

The level of real Austrian goods imports (MATC/P) from Canada is explained by Austrian Demand, represented by the level of Austria’s real GDP (Y) and by EU’ trade restrictions via import tariffs ( $t_{EU}$ ) and non-tariff barriers ( $NTB_{EU}$ ). The Euro exchange rate of the Canadian Dollar (CAD€) has been added in order also to catch exchange rate effects of Austrian imports



from Canada. All parameters (demand:  $\alpha = 0.8$  and trade restriction and exchange rate elasticities:  $\beta = 2$ ;  $\gamma = 1$ ;  $\delta = 0.5$ ) have been calibrated. As a member state of the EU Austria is subjected to EU's Common Trade Policy and hence applied EU's Common External Tariff rates on imports from third countries.

*Austrian imports from EU-27*

$$(8) \quad \left( \frac{MATEU}{P} \right) = -0.04 + 4.0 Y$$

The growth rate of real Austrian goods imports (MATEU/P) from EU-27 is explained by Austrian Demand, represented by the growth rate of Austria's real GD. This equation is estimated in differences of logarithms (% changes).

*Trade with third countries (ROW)*

As exemplified in the graphical representation of CETA, the mutual elimination of trade barriers through CETA stimulates bilateral trade between Austria and Canada (trade creation) but reduces (diverts) trade with the rest of the world (ROW) or with third countries. This feature is captured by the definition of trade with the ROW just as the difference between total trade minus exports to and imports from Canada and EU-27.

Similarly, the Austrian trade balance with Canada (EU-27) and those with ROW is defined as the respective difference of exports and imports from the total trade balance.

*Austrian FDI in Canada*

$$(9) \quad \left( \frac{FDIATC}{P} \right) = YC^\varepsilon (1 + NTB_C)^{-\varepsilon} CAD\text{€}^{-\delta}$$

The level of real Austrian FDI stocks in Canada (FDIATC/P) is explained by Canadian demand, represented by the level of Canada's real GDP (YC) and by barriers to doing business in Canada ( $NTB_C$ ). Like in the goods export equation here we also consider the Euro exchange rate of the CAD (CAD€) as a determinant of FDI's done in Canada. All parameters (demand:  $\varepsilon = 0.5$  and the NTB and exchange rate elasticities:  $\varepsilon = 1$ ;  $\delta = 0.5$ ) have been calibrated.

*Austrian FDI in EU-27*

$$(9) \quad \left( \frac{FDIATEU}{P} \right) \% = 0.01 + 1.1 YEU\% - 0.6 \left( \frac{FDIATEU}{P} \right) \%_{t-1}$$

The growth rate of real Austrian FDI stocks in EU-27 (FDIATEU/P) is explained by EU demand, represented by the growth rate of EU's real GDP (YEU) and by the lagged dependent variable. This equation is estimated in differences of logarithms (% changes).

*Canadian FDI in Austria*

$$(10) \quad \left( \frac{FDICAT}{P} \right) = Y^\varepsilon (1 + NTB_{EU})^{-\varepsilon} CAD\text{€}^\delta$$

The level of real Canadian FDI stocks in Austria (FDICAT/P) is explained by Austrian demand, represented by the level of Austria's real GDP (Y) and by barriers to doing business in Austria ( $NTB_{EU}$ ). Like in the FDI export equation here we also consider the Euro exchange rate of the CAD (CAD€) as a determinant of Canadian FDI's done in Austria. All parameters (demand:  $\varepsilon = 0.8$  and the NTB and exchange rate elasticities:  $\varepsilon = 1$ ;  $\delta = 0.5$ ) have been calibrated.

*EU-27 FDI in Austria*

$$(10) \quad \left( \frac{FDIEUAT}{P} \right) \% = 0.0001 + 2.6 Y\% + \left( \frac{FDIEUAT}{P} \right) \%_{t-1}$$

The growth rate of real EU-27 FDI stocks in Austria (FDIEUAT/P) is explained by Austrian demand, represented by the growth rate of Austria's real GDP (Y) and the lagged dependent variable. This equation is estimated in differences of logarithms (% changes).

*FDI in and with third countries (ROW)*

As in the case of trade, FDI in and with the ROW is simply the difference of total FDI minus FDI in and from Canada and EU.

*The price effects of liberalization**In Austria ...*

$$(11) \quad P = P_{t-1}^\theta \left( \frac{PC}{CAD\text{€}} \right) (1 + t_{EU})^\vartheta PC (1 + t_C)^{-\mu}$$

To simplify the price system involved in the liberalization process of CETA we only use one price index in both countries, the GDP deflator in Austria (P) and those of Canada (PC). A unilateral liberalization of Austria (the EU) vis à vis Canada lowers the prices of imported goods and hence decreases prices in Austria. A unilateral liberalization of Canada vis à vis Austria (the EU) acts in Austria like an export subsidy, increasing prices for consumers in Austria and decreases prices in Canada. This effect has been demonstrated in the graphical exemplification of the effects of an import liberalization of Canada. The respective parameters or elasticities are calibrated:  $\theta = 0.9$ ,  $\vartheta = 0.01$ ,  $\mu = 0.01$ .

*... and in Canada*

$$(12) \quad PC = PC_{t-1}^\theta (P * CAD\text{€}) (1 + t_C)^\vartheta P (1 + t_{EU})^{-\mu}$$

The impact of CETA on the prices in Canada are the mirror image to the effects on Austrian prices. The parameters have the same calibrated values as in equation (11).

### 3.2.3 The shadow side of globalization

It is general wisdom that globalization has positive welfare effects. But the shadow side of globalization is that there are also losers. We capture these negative effects by modelling the distributional consequences (wage share) and the possible effect on unemployment.

#### *Income distribution*

$$(13) \quad WS = 0.3 WS_{t-1} - 0.2 \left( \frac{XATC+MATC}{Y_n} \right) - 0.02 \left( \frac{XATEU+MATEU}{Y_n} \right) + \\ 0.03 \left( \frac{XATROW+MATROW}{Y_n} \right) - 0.02 \left( \frac{FDIATC+FDICAT}{Y_n} \right) - \\ 0.004 \left( \frac{FDIATEU+FDIEUAT}{Y_n} \right) - 0.0006 \left( \frac{FDIATROW+FDIROWAT}{Y_n} \right) - 10.1 A\%$$

In the last decades one can observe a trend towards a decrease in the wage share (WS) in most industrial countries. This decline can be explained partly by globalization and partly by technical progress. In equation (13) we estimated a wage share equation for Austria, where two globalization indicators (total trade in % of nominal GDP ( $Y_n$ ) of the three regions (Canada, EU and ROW:  $((XATC+MATC)/Y_n)$ ,  $((XATEU+MATEU)/Y_n)$  and  $((XATROW+MATROW)/Y_n)$  and total FDI activities:  $((FDIATC+FDICAT)/Y_n)$ ,  $((FDIATEU+FDIEUAT)/Y_n)$  and  $((FDIATROW+FDIROWAT)/Y_n)$  are responsible for the secular decline in the wage share. Additionally, the growth rate of TFP ( $A\%$ ) contributes negatively to this trend.

#### *Unemployment*

$$(14) \quad U = -0.2 (Y\% - 2.5) + 0.9U_{t-1}$$

The unemployment rate (U) for Austria is estimated as a version of Okun's law with a reducing effect if real GDP growth ( $Y\%$ ) surpasses the long-run average of 2.5%. Additionally, we include the lagged unemployment rate to consider its dynamic.

### 3.2.4 Welfare effects

As demonstrated in the diagrammatical demonstration of "the economics of CETA" trade liberalization involves always at least three players: consumers, producers and the state.

#### *Consumers welfare*

$$(15) \quad YD = 0.8 YD_{t-1} + 0.1 Y$$

Consumer welfare (rent) is measured by the level of nominal net disposable income of households (YD). This is simply explained by the lagged YD and by the actual development of the level of real GDP (Y). In order to get real net disposable income (YDr) we deflate YD

by the GDP deflator (P). By including P, we capture the increase in purchasing power of consumers by eliminating tariffs.

### *Producer welfare*

The welfare (rent) of producer is measured by the development of real GDP of equation (1). The drivers of GDP are - primarily – TFP, capital and labour. The latter via the price effects of trade liberalization. TFP is driven by liberalizing trade and FDI as described above. Total welfare is measured by real GDP per capita.

### *The state and the budget*

The third player in the trade liberalization game is the state. Eliminating tariffs through CETA means a loss in tariff revenues.

### *Loss of tariff revenues*

In our model, we have two components of tariff losses. On the one hand, there are losses by the elimination of tariffs on imports from Canada. On the other hand, there are losses of tariff revenues in the ROW trade. Because there is a trade diversion through CETA, trade with the ROW is reduced and hence also tariff revenues, although the tariff rate on imports from the ROW does not change.

We calculate losses of the tariff revenues simply by multiplying imports either from Canada or from the ROW with the EU external tariff rate ( $t_{EU}$ ). The losses, however are no burden for the Austrian budget but those of the EU. The reason is that tariff revenues of EU member states are one of the “traditional own resources” of the EU Budget.

In 2015 Austria paid into the EU budget under the title “traditional own resources” (customs duty) € 259.7 million<sup>3</sup>. The cumulative tariff revenue loss due to CETA is about € 97 million in 2030. The trade diversion effect with the ROW results in an additional cumulative tariff revenue loss in trade with ROW of around € 77 million in 2030.

### *Austria's net lending*

$$(15) \quad B = 0.6 B_{t-1} + 0.31 Y\%$$

The Austrian budget (Net lending in % of GDP: B) is estimated as a function of the lagged B plus the growth rate of real GDP (Y%).

### *3.3 CETA scenarios*

CETA is the most comprehensive free trade agreement the EU has ever concluded with a third country. It consists of the immediate elimination of import tariffs (with transitional

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<sup>3</sup> See European Commission, DG Budget: [http://ec.europa.eu/budget/figures/interactive/index\\_en.cfm](http://ec.europa.eu/budget/figures/interactive/index_en.cfm)

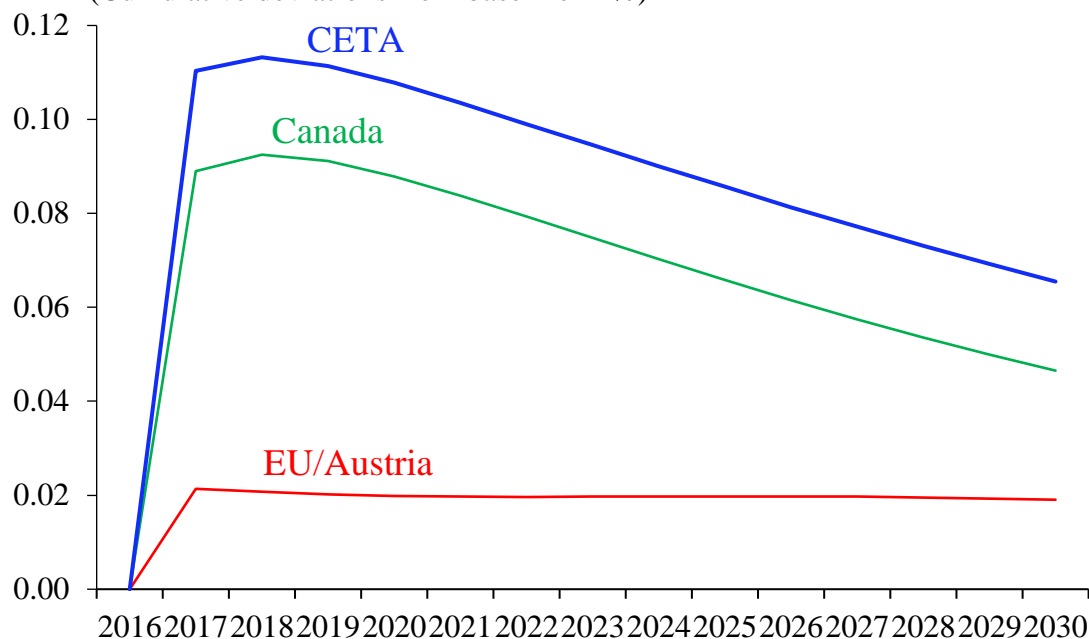
arrangements for agricultural products) and a gradual elimination and harmonisation of NTBs. The gradual mutual adjustment of NTBs not only affects trade of goods and services positively, but it also improves the chances of doing business in both markets which may stimulate FDIs.

### 3.3.1 Tariff and NTB liberalization

#### *Tariffs*

The import tariffs are eliminated immediately after the provisional application of CETA. Therefore, we implement the immediate total elimination of import tariffs in Canada and in the EU already in 2017. The effects are relatively modest (see Figure 2).

**Figure 2:** GDP effect in Austria of CETA's tariff liberalization  
(Cumulative deviations from baseline in %)



The advantage of our macro-model is that it allows a forecast of the possible time path of CETA liberalization. Our model simulations run until 2030.

Figure 2 shows that the “producer rent”, measured in the development of real GDP is realized immediately, when Canada eliminates its import tariffs. After the peak in 2018 with a GDP effect of 0.09% the GDP impact declines gradually. If the EU (and hence Austria) eliminates its import tariffs this has only a slight positive effect of GDP of 0.02% in 2017. The total GDP effect in Austria (“producer rent”) of the full CETA tariff liberalization amounts to 0.11% in 2018 and is declining afterwards.

Our dynamic GDP results of CETA are somehow supported by those of the static GTAP simulations (see Box: CETA in GTAP). Canada gains more than the EU or Austria.

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**Box: CETA in GTAP**

We compare our macro model results concerning only the tariff elimination part of CETA with those simulated in a computable general equilibrium model, the GTAP 9 model<sup>4</sup>. GTAP 9 works with the database of 2011. The GTAP model only considers tariffs but has the advantage of covering 140 countries and 57 goods/sectors. For our purpose, we have aggregated the model to cover 14 countries/regions (USA, CAN, MEX, EU\_25, UK, GER, AUT, China, Japan, CH, RUS, Turkey, KOR, ROW) and 11 sectors (Grains and crops, meat, extraction, processed food, textiles, cars, light manufacturing, heavy manufacturing, construction, transport/commerce, other services) as well as 5 factors of production (capital, unskilled and skilled labour, natural resources and land).

For our purpose, we cut out only those countries which are relevant for CETA: Canada, EU\_25, UK, Germany, Austria as well as two third countries: USA and Japan.

*Trade effects: Trade creation and trade diversion*

Eliminating all import tariffs on bilateral EU-Canada imports in the eight non-services sectors in GTAP 9 results in a clear picture (see Appendix, Table A3): Trade between partners of CETA increase (trade creation) while those with non-CETA countries decline (trade diversion). An interesting side-result is the trade diverting effect within the EU. As we split the EU-28 into EU-25 and three member states we can detect this effect of a slight decline in trade within the EU single market. The results in the GTAP simulations must be interpreted as the long-run equilibrium gap between the liberalization path compared to those of non-liberalization.

Austria can expect the largest increase in trade with Canada after the tariff liberalization through CETA in the sectors meat, processed food, textiles and cars (see Appendix: Table A4).

*Welfare and GDP effects*

The complete elimination of tariffs on bilateral EU-Canada trade results in welfare and GDP gains in the CETA partner countries and welfare losses in the third countries, also in the NAFTA partner USA. The dimension is, however, very modest. Canada would gain welfare of only 0.04% of GDP, real GDP could increase by 0.02%. The EU-25 and its member states UK, Germany and Austria gain even less (see Appendix: Table A5).

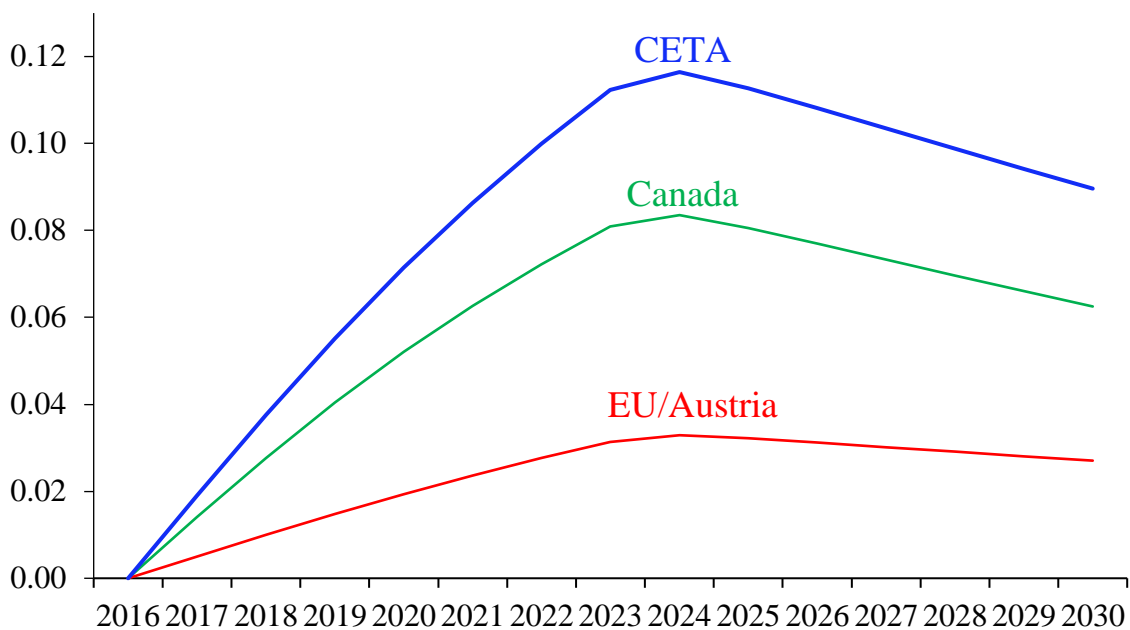
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<sup>4</sup> Francois and Pindyuk (2013) estimate CETA effects with tariff and NTB liberalization with GTAP 8 (database 2007).

### NTB

The measurement of non-tariff barriers (NTB) or non-tariff measures (NTM) is a difficult task it has been done in the case of TTIP by ECORYS (2009). They constructed an index of NTB running from 0 (no NTB) to 100 (high NTB). In the case of Canada there are no such indices available. Therefore, we assume that the NTB indices in Canada are more or less the same as in the USA (see Table 1). In the Case of EU NTBs we have taken those of ECORYS (2009).

**Figure 3:** GDP effect in Austria of CETA's NTB liberalization  
(Cumulative deviations from baseline in %)



In contrast to the elimination of tariffs we assume a gradual elimination of NTBs in Canada and the EU over time but no complete elimination. Starting with an NTB index value of 25 for Canada (EU: 35) in 2016 we reduce it in 2017 to 23 (33) and input a decline of these values by 2 pts each year so that we arrive for Canada (EU) at an index of 10 (20) in the years 2024. The indices then remain at these values until 2030.

Due to the gradual elimination of NTBs and the modelling of the impact of NTB on trade and FDI and hence via TFP on real GDP we get a respective GDP impact over time<sup>5</sup>. The GDP impact of CETA reaches a peak in 2024 (0.12%) mostly due to the elimination of NTBs in Canada (see Figure 3). Afterwards – because we assume no further reduction in NTB hurdles – the cumulative GDP effects in Austria tapers off.

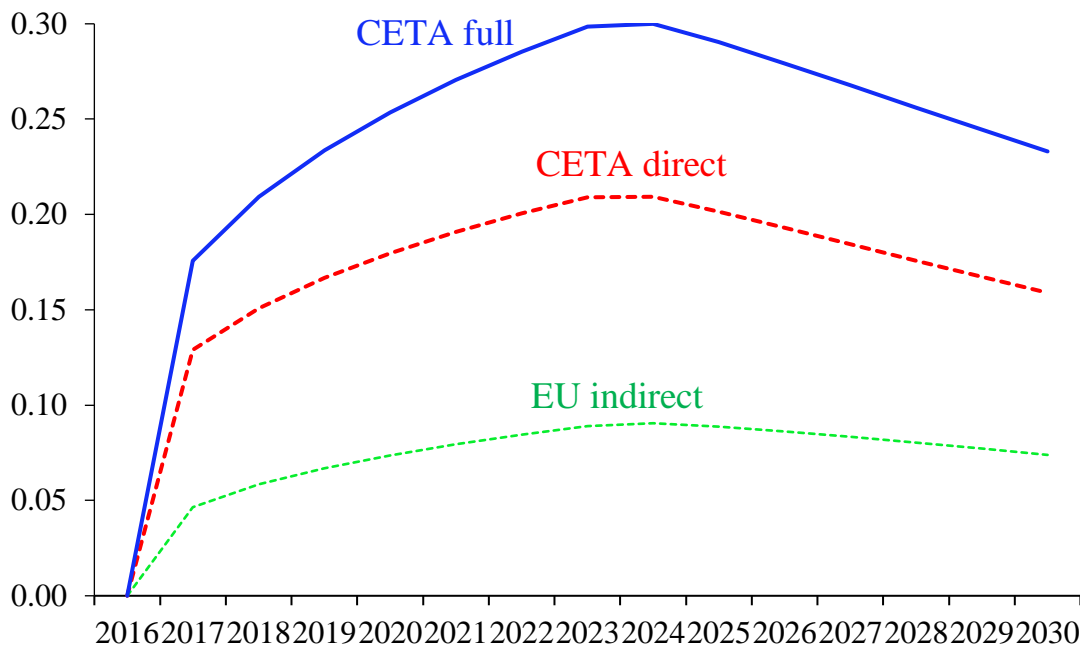
<sup>5</sup> Francois and Pindyuk (2013, page 9, Table 7) also implement in their GTAP simulations only a partial reduction of NTB (NTM). NTMs for goods are reduced by around 5.6% in Canada and by 6.2% in the EU, for services they reduce NTMs by 7.3% for both countries.

### 3.3.2 Indirect CETA effect via EU's Single Market

CETA is an agreement between Canada and the EU. With our macro-economic CETA model we estimate primarily the direct impact of CETA on the Austrian economy. However, as Austria exports mostly to the EU (69%; see Table 3) also the indirect effects – the additional export and FDI possibilities to the EU if CETA has a positive impact on the EU – must be implemented. For this purpose, we assume that EU's real GDP is increased by the same amount as the direct GDP effect for Austria. Therefore, EU's real GDP is increased by cumulative up to 0.2% in 2024 (see Figure 4). CETA increases the volume of EU's Single Market and hence, increases Austria's export chances.

The CETA full effect for Austria's GDP is therefore the sum of the CETA direct GDP effect plus EU's indirect (Single Market) effect (see Figure 4).

**Figure 4:** Direct and indirect GDP effect of CETA in Austria  
(Cumulative deviations from baseline in %)



### 3.3.3 The full CETA liberalization

CETA's comprehensive liberalization approach should have not only an impact on trade but also on FDI<sup>6</sup>. Our simple TGM model for Austria aims at explaining the trade and FDI aspects of CETA.

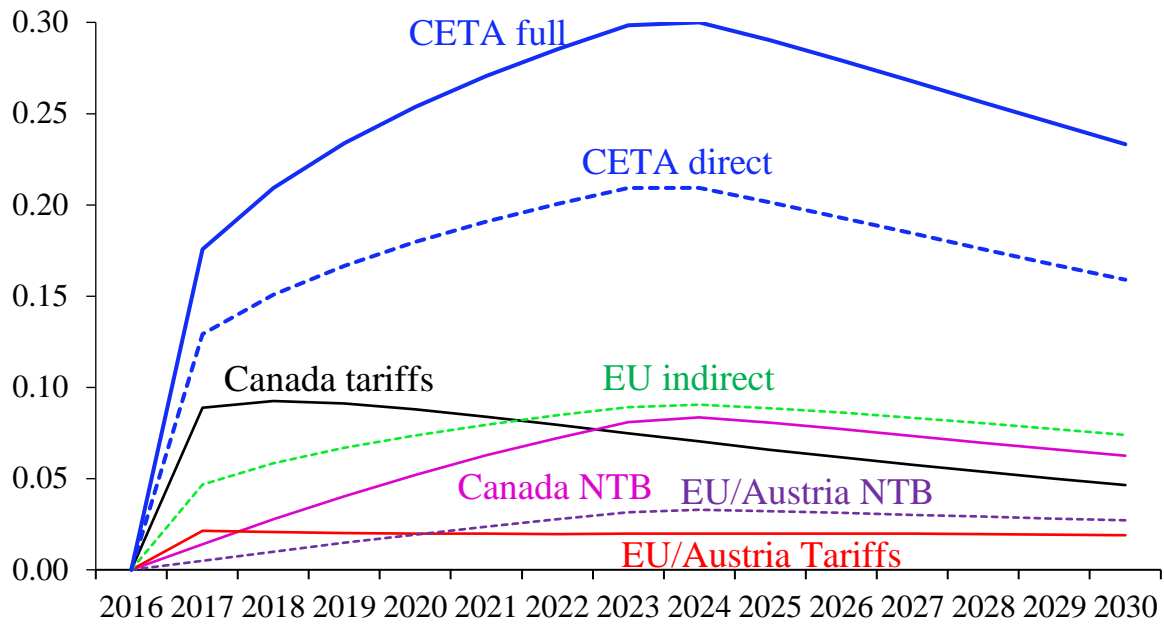
The full CETA liberalization results in a cumulative increase of real GDP in Austria of 0.3% (with a peak in 2024). Of which 0.1 percentage points are due to the indirect EU Single

<sup>6</sup> Most CETA studies only cover the trade aspect. Francois and Pindyuk (2013) implement FDI by assuming that the capital stock in the CETA partner increases. Anderson et al. (2016) consider in their dynamic gravity model capital building via FDI.



Market effect of CETA. The most important GDP effects stems from the opening of the Canadian markets (see Figure 5).

**Figure 5:** GDP effect in Austria of the full CETA liberalization  
(Cumulative deviations from baseline in %)



The detailed impact of CETA on the major macro variables of Austria is documented in Table 6. The CETA liberalization has three winners out of the three players: producers and consumer in Austria gain, the state is a hypothetical loser due to the loss of tariff revenues. As this loss is legally a loss in the EU budget, the Austrian state debarks from CETA neutral.

#### *Gains in trade and FDI*

Austrian exports of goods to Canada can be expected to increase in the full CETA scenario by cumulative 18% until 2023 and decline afterwards. The major impact for Austria's exports stems from the gradual elimination of Canadian NTBs. The Canadian exports to Austria, however, are expected to increase less than the Austrian exports to Canada. This asymmetric trade effect results in a further improvement of Austria's trade balance with Canada (see Table 6).

Our results concerning the increase of exports to Canada and the imports of Canada to Austria in case only of tariff elimination match quite well with the simulation results with GTAP. In both simulations, bilateral trade increases by around 7% in the medium-run (see Appendix: Table A3). In the short-run the macro-model results in a slightly higher increase of Austrian exports to Canada (see Table 6).

CETA leads via the indirect EU Single Market effect to additional trade creation for Austria. Exports to the EU increase by cumulative 0.8%, imports from the EU by 1% which results in a slight deterioration of the Austrian-EU trade balance.

**Table 6:** The impact of CETA on Austria's major macro variables

	2017	2019	2021	2023	2025	2027	2030
(Cumulative deviations from baseline)							
<b>GDP, real (%)</b>							
<b>CETA total</b>	0.18	0.23	0.27	0.30	0.29	0.27	0.23
Tariffs	0.11	0.11	<b>0.10</b>	0.09	0.09	0.08	0.07
NTB	0.02	0.06	0.09	0.11	0.11	0.10	0.09
<b>Austrian exports to Canada, nominal (%)</b>							
<b>CETA total</b>	12.59	14.91	16.69	18.00	16.49	14.38	11.72
Tariffs	10.45	9.10	7.94	6.92	6.03	5.25	4.27
NTB	1.98	5.36	8.08	10.23	9.65	8.43	6.88
<b>Austrian imports from Canada, nominal (%)</b>							
<b>CETA total</b>	11.07	12.40	13.37	14.05	12.84	11.23	9.19
Tariffs	9.55	8.35	7.30	6.38	5.57	4.87	3.98
NTB	1.32	3.59	5.41	6.86	6.49	5.69	4.66
<b>Austrian trade balance with Canada (Mio. EUR)</b>							
<b>CETA total</b>	97.89	144.81	199.97	264.49	293.61	309.48	334.89
Tariffs	79.25	83.40	87.86	92.53	97.40	102.51	110.61
NTB	17.61	57.63	105.00	160.87	183.55	193.66	209.87
<b>Austrian FDI in Canada (stocks, nominal) (%)</b>							
<b>CETA total</b>	2.49	6.75	10.17	12.87	12.14	10.59	8.62
Tariffs	-0.01	-0.03	-0.04	-0.05	-0.06	-0.06	-0.07
NTB	2.51	6.78	10.21	12.93	12.21	10.66	8.70
<b>Canadian FDI in Austria (stocks, nominal) (%)</b>							
<b>CETA total</b>	1.62	4.58	7.50	10.37	10.75	10.32	9.71
Tariffs	0.08	0.06	0.04	0.02	0.00	-0.01	-0.02
NTB	1.50	4.47	7.39	10.27	10.67	10.26	9.68
<b>Consumer welfare (real net disposable income, %)</b>							
<b>CETA total</b>	0.05	0.15	0.23	0.30	0.35	0.38	0.38
Tariffs	0.04	0.09	0.13	0.15	0.16	0.17	0.16
NTB	0.00	0.02	0.05	0.08	0.10	0.11	0.12
<b>Wage share (%)</b>							
<b>CETA total</b>	-0.29	-0.51	-0.63	-0.73	-0.76	-0.73	-0.67
Tariffs	-0.16	-0.21	-0.21	-0.20	-0.19	-0.18	-0.16
NTB	-0.03	-0.11	-0.20	-0.28	-0.31	-0.31	-0.29
<b>Tariff revenue loss in trade with Canada (Mio. EUR)</b>							
<b>CETA total</b>	-28.05	-33.94	-41.06	-49.69	-60.12	-72.75	-96.83
Tariffs	-28.02	-33.88	-40.98	-49.57	-59.97	-72.56	-96.56
NTB	0.37	1.22	2.22	3.41	3.90	4.14	4.52

CETA total = direct and indirect (EU spillover) effects; the difference between the sum "Tariffs+NTB" and "CETA total" is due to the indirect (EU spillover) effects of CETA.

As predicted in the theoretical CETA model simulations with the GTAP model as well as those with our macro model result in a trade diversion of Austrian trade with the ROW. Austrian exports to ROW decrease by cumulative 3%, imports from ROW by 3.5% which results in an improvement of the Austrian-ROW trade balance.

A similar pattern can be expected in the bilateral FDI activities. Austria will gain more than Canada. Like in trade there is also a FDI creation effect vis à vis Canada and to a smaller extent also with the EU and a FDI diversion vis à vis the ROW.

### *Consumers, unemployment, wage share and tariff revenues*

Austria's consumer will gain welfare, measured by the real net disposable income. The increase is mainly due to the increase of real GDP and the improvement purchasing power due to the price dampening effect of the tariff elimination. Total welfare (measured by real GDP per capita) increases in the CETA total scenario by 118 EUR (at 2010 prices) in the medium run.

Unemployment (not shown in Table 6) will decrease gradually in all CETA scenarios.

The shadow side of globalization is the pressure on wages. The wage share declines by around 0.7 percentage points in the peak in 2025 and hence will reinforce the already existing trend of an unequal income distribution due to globalization.

Because of the elimination of import tariffs on imports from Canada the state (the EU budget) will lose tariff revenues (see Table 6).

### *3.4 CETA in comparison with TTIP and the EU-Japan FTA*

As pointed out at the beginning our hybrid trade and growth model (TGM) of CETA's impact on Austria is a prototype model and hence easily applicable not only to the CETA case but also to further EU free trade projects.

Out of the huge range of possible future EU-FTA projects<sup>7</sup>, in the following we compare CETA with a potential TTIP and the nearly finished EU-Japan FTA (see Figure 6).

In consistency with the hierarchy of trade shares of Austria with the USA (export share 6.9%), with Japan (1%) and Canada (0.8%) one can also expect a similar ranking in the overall GDP impact (see Figure 6). TTIP would add to Austria's real GDP the most (with 1.7% additional cumulative GDP at the peak in 2024), followed by the EU-Japan FTA with 0.4%<sup>8</sup> and CETA with 0.3%<sup>9</sup>.

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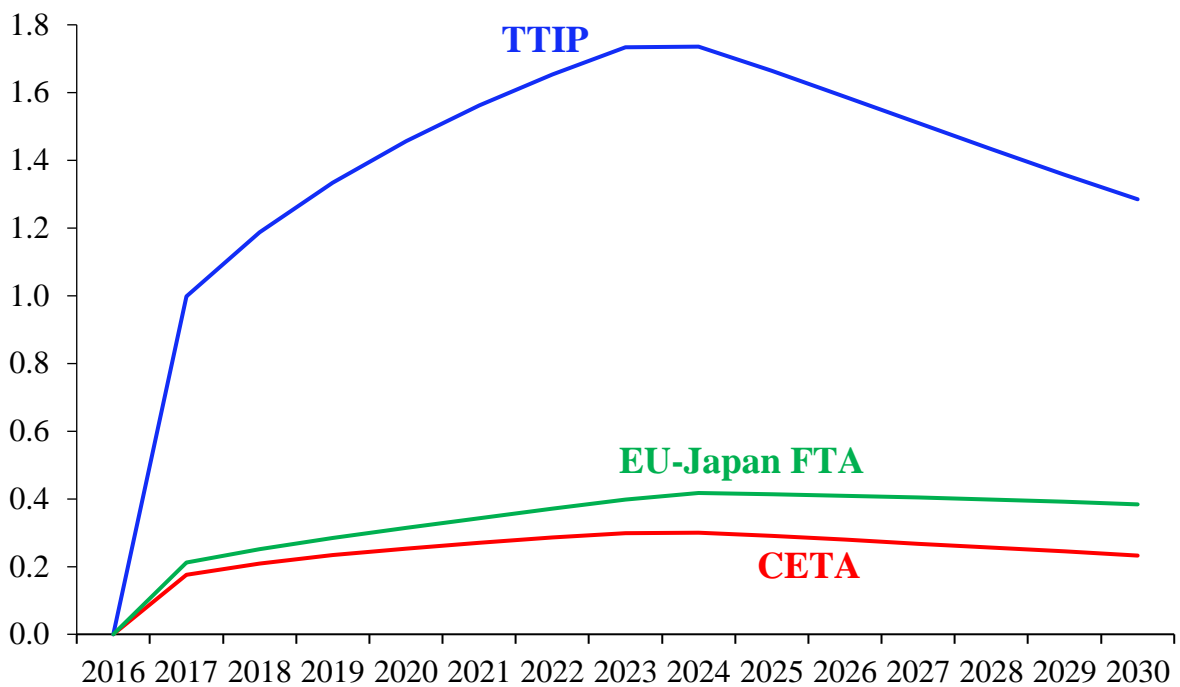
<sup>7</sup> See the actual "Overview of FTA and other Trade Negotiations" of the EU:  
[http://trade.ec.europa.eu/doclib/docs/2006/december/tradoc\\_118238.pdf](http://trade.ec.europa.eu/doclib/docs/2006/december/tradoc_118238.pdf)

<sup>8</sup> In the study of the ifo Institute on behalf of the Bertelsmann Foundation, Felbermayr et al. (2017) estimate with the ifo trade model that the EU-Japan FTA could lead to an increase of real GDP by 0.06% (conservative

In contrast to TTIP, the EU-Japan FTA is nearly concluded. TTIP – after 15 negotiation rounds the EU and US published the TTIP state of play assessment on 17 January 2017<sup>10</sup> - is “politically dead”, in particular after the anti-globalization mood of US president Donald Trump. Already in an earlier EU survey<sup>11</sup> the largest anti-TTIP mood was found in Austria (70%) and Germany (59%), whereas the Scandinavian EU member states are highly in favour of TTIP (EU average 51% pro-TTIP).

The 17<sup>th</sup> round of negotiations on a Free Trade Agreement between the EU and Japan took place in Brussels in September 2016. There are some points to clarify and Commission officials expect that this FTA can be finalized until the end of 2017<sup>12</sup>.

**Figure 6:** GDP effect in Austria of CETA, TTIP and EU-Japan FTA (total effects)  
(Cumulative deviations from baseline in %)



Both, TTIP and the EU-Japan FTA are of the same type of the “new generation” comprehensive EU FTAs and are qualitatively similar to CETA. Interestingly, however, is

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scenario like the EU-Korea FTA) to 0.29% (comprehensive FTA) for the EU-28, 0.11% to 0.69% for Germany, 0.23% to 1.63% for Japan and 0.05% to 0.34% for Austria.

<sup>9</sup> In our simulations, we tried to reproduce the medium to long-run results by Francois and Pindyuk (2013; page 14, Table 9) for TTIP and CETA. For TTIP they find a long-run increase of Austria’s real national income by 1.74%, for CETA by 0.22%.

<sup>10</sup> See the EU Commission’s DG trade website on USA:

<http://trade.ec.europa.eu/doclib/press/index.cfm?id=1613>; TTIP website of the EU Commission:

<http://ec.europa.eu/trade/policy/in-focus/ttip/>

<sup>11</sup> Eurobarometer, 85, May and July 2016.

<sup>12</sup> See the EU Commission’s DG trade website on Japan: <http://ec.europa.eu/trade/policy/countries-and-regions/countries/japan/>

that all the critics is directed only on CETA and TTIP but hardly anyone of the globalization critics is interested in the EU-Japan FTA.

#### **4. Conclusions**

The CETA treaty will be applied provisionally in Spring 2017 after the approval of the parliaments in Canada and the European Parliament. There are already a lot of studies evaluating the possible economic impact of CETA for both partners and third countries. With one exception, all studies forecast positive trade and welfare gains for both partners and sometimes trade diversion with third countries. Canada – the junior partner in CETA - is gaining always more than the EU. The bouquet of predictions ranges from 0.06% to 8% for Canada and from 0.02% to 0.39 for the EU (or Germany). In the case of Austria, which accounts for less than 1% of its foreign trade with Canada, the effects are even smaller (from 0.02% to 0.46%). Third countries are mostly losers of CETA.

In this study, we made the attempt to evaluate CETA for Austria with a small macro-economic model. The model is partly estimated, partly calibrated and hence is a hybrid trade and growth model (TGM). We calibrate the model in order to deliver GDP effects in the medium to long-run similar to those of Francois and Pindyuk (2013) and Aichele and Felbermayr (2014). That means the full CETA liberalization (import tariff elimination plus gradual decline of NTBs) plus indirect EU Single Market effects result in a medium-term increase of real GDP of cumulated 0.3%. There is strong trade creation with Canada, amounting to an export potential with Canada of around 18%.

Our TGM model is a prototype model, primarily designed for CETA. However, it is also applicable easily to other EU-FTAs, like the presently “politically dead” TTIP and the EU-Japan FTA which will be finalized until the end of 2017. A first comparison of CETA with TTIP and the EU-Japan FTA shows that the GDP gains for Austria correlate with the importance as trade partners for Austria: in the medium-run TTIP would add to Austria’s real GDP cumulatively 1.7%, the EU-Japan FTA only 0.4%. In comparison, CETA should improve Austria’s real GDP by 0.3%.

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## Appendix

**Table A1:** Austria's goods trade with Canada by commodity (2015)

<i>Product groups</i>	SITC	<b>Exports Mio.€</b>	<b>Imports Mio.€</b>	<b>Balance Mio.€</b>
Food and live animals chiefly for food	0	9.46	9.46	0.00
Beverages and tobacco	1	5.96	0.13	5.84
Crude materials, inedible, except fuels	2	1.91	67.06	-65.15
Mineral fuels, lubricants and related materials	3	0.04	0.31	-0.26
Chemicals and related products, nes	5	89.12	25.70	63.42
Medicinal and pharmaceutical products	54	70.69	17.56	53.13
Manufactured goods classified chiefly by materials	6	208.77	77.06	131.71
Machinery and transport equipment	7	618.73	174.24	444.49
Machinery	71-74+77	453.44	30.80	422.63
Motor vehicles (cars)	7132+7139+781+784	187.16	10.98	176.18
Car co-supply	Cars - Passenger cars	139.46	7.30	132.16
Passenger cars	7812	47.70	3.69	44.01
Miscellaneous manufactured articles	8	92.91	41.89	51.02
Commodities not classified elsewhere in the SITC	9	0.06	44.54	-44.48
<i>Aggregate product groups</i>				
Agricultural products	0+1+4	15.49	9.60	5.89
Crude materials and mineral fuels	2+3	1.95	67.36	-65.41
Manufactured goods	5-9	1009.60	363.44	646.16
<b>Total trade</b>		<b>1,027.0</b>	<b>440.4</b>	<b>586.6</b>

Source: WIFO

**Table A2:** Import tariffs of the EU and Canada  
(MFN applied average in %)

	<b>EU</b>	<b>Canada</b>
Agricultural products	12.2	15.9
Non-agricultural products	4.2	2.2
Total	5.3	4.2
	Product groups	
Animal products	17.7	24.6
Dairy products	42.1	248.9
Fruit, vegetables, plant	10.9	3.3
Coffee, tea	6.1	10.4
Cereals & preparations	14.9	21.4
Oilseeds, fats & oils	6.8	4.0
Sugars and confectionery	25.2	3.8
Beverages & tobacco	20.7	3.9
Cotton	0.0	0.0
Other agricultural products	3.6	3.0
Fish & fish products	12.0	0.9
Minerals & metals	2.0	1.0
Petroleum	2.5	0.9
Chemicals	4.5	0.8
Wood, paper, etc.	0.9	0.9
Textiles	6.5	2.6
Clothing	11.4	16.5
Leather, footwear, etc.	4.1	3.8
Non-electrical machinery	1.9	0.4
Electrical machinery	2.8	1.1
Transport equipment	4.3	5.8
Manufactures, n.e.s.	2.6	2.5

Source: WTO (2016).

**Table A3:** The tariff liberalization of CETA in GTAP model simulations  
(Bilateral export values, changes in %)

	<b>USA</b>	<b>Canada</b>	<b>EU-25</b>	<b>UK</b>	<b>Germany</b>	<b>Austria</b>	<b>Japan</b>
<b>USA</b>	-	-1.06	0.23	0.11	0.22	0.24	0.12
<b>Canada</b>	-0.21	-	<b>7.38</b>	<b>5.72</b>	<b>6.61</b>	<b>8.14</b>	-0.32
<b>EU-25</b>	-0.19	<b>13.13</b>	-0.05	-0.18	-0.06	-0.03	-0.15
<b>UK</b>	-0.12	<b>4.31</b>	0.01	-	0.01	0.03	-0.09
<b>Germany</b>	-0.19	<b>12.95</b>	-0.05	-0.16	-	-0.02	-0.13
<b>Austria</b>	-0.16	<b>6.96</b>	0.00	-0.11	0.00	-	-0.10
<b>Japan</b>	-0.06	-1.02	0.11	-0.02	0.11	0.14	-

Source: Own simulations with GTAP 9 (database 2011)



**Table A4:** Austria's trade with Canada, EU and ROW by commodity after CETA tariff liberalization in GTAP model simulations  
(Values, changes in %)

	<b>Canada</b>		<b>EU-25</b>		<b>ROW</b>	
	Exports	Imports	Exports	Imports	Exports	Imports
Grains and Crops	0.00	0.00	0.01	0.01	0.00	0.00
Meat	33.33	33.33	0.01	0.01	-0.10	-0.18
Extraction	12.50	0.00	-0.06	-0.09	0.00	0.00
Processed Food	165.25	106.79	-0.07	-0.07	-0.08	-0.08
Textiles	81.08	65.88	0.01	0.02	-0.13	-0.13
Cars	24.62	19.43	0.00	0.00	-0.08	-0.09
Light Manufacturing	8.43	7.06	0.00	0.00	-0.10	-0.10
Heavy Manufacturing	1.71	1.41	-0.02	-0.02	-0.09	-0.09
Construction	0.00	0.00	0.05	0.05	-0.05	-0.05
Transport/Commerce	0.12	0.12	0.03	0.03	-0.04	-0.04
Other Services	0.15	0.15	0.04	0.04	-0.04	-0.04
<b>Total</b>	<b>6.96</b>	<b>5.85</b>	<b>0.00</b>	<b>0.00</b>	<b>-0.08</b>	<b>-0.08</b>

Source: Own simulations with GTAP 9 (database 2011)

**Table A5:** Welfare and GDP effects of CETA in GTAP model simulations

	<b>Welfare</b>		<b>GDP, %-change</b>	
	Mio.USD	in % of GDP	nominal	real
<b>USA</b>	-1033	-0.0067	-0.0428	-0.0003
<b>Canada</b>	660	0.0371	0.0382	0.0232
<b>EU-25</b>	852	0.0076	0.0369	0.0015
<b>UK</b>	102	0.0041	0.0225	0.0019
<b>Germany</b>	204	0.0056	0.0296	0.0003
<b>Austria</b>	4	0.0008	0.0190	0.0010
<b>Japan</b>	-50	-0.0008	-0.0066	0.0000

Source: Own simulations with GTAP 9 (database 2011)