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ASSESS_TTIP: Assessing the Claimed Benefits of the Transatlantic Trade and Investment Partnership (TTIP)

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The views expressed in this report are those of the authors, and do not represent any official view of the GUE/NGL group or of the European Parliament.

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CONTENTS

- SUMMARY OF MAIN RESULTS..... IV
- EXTENDED SUMMARY OF THE STUDY V
- I. INTRODUCTION 1
- II. MAIN FINDINGS OF STUDIES ON TTIP 3
 - a. Overview of Results..... 3
 - b. Trade Flows..... 4
 - c. GDP and Household Income 7
 - d. Sectoral Effects 10
 - e. Real Wages and Employment 12
- III. ADJUSTMENT COSTS AND REGULATORY CHANGE 14
 - a. Macroeconomic adjustments costs 14
 - b. The social costs of regulatory change 19
 - c. Other neglected issues 21
- IV. LESSONS FROM OTHER TRADE LIBERALIZATION VENTURES – THE EXAMPLE OF NAFTA.... 23
- V. TECHNICAL CRITIQUE OF TTIP IMPACT ASSESSMENT STUDIES 29
 - a. Origins and development 29
 - b. The Quantification of Non-tariff measures..... 31
 - c. Two CGE models, a common heritage: GTAP and MIRAGE 37
 - d. Bertelsmann/ifo: A different approach 44
 - e. A Note on Foreign Direct Investment 47
- REFERENCES..... 50
- ANNEX 57
- ABOUT THE AUTHORS 58

LIST OF ABBREVIATIONS

AVW	Anderson and van Wincoop
BMWT	German Federal Ministry for Economic Affairs and Technology
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CEPR	Centre for Economic Policy Research
CETA	Comprehensive Economic and Trade Agreement (between EU & Canada)
CGE	Computable General Equilibrium
CUFTA	Canadian-US Free Trade Agreement
DG	Directorate-General
EU	European Union
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNI	Gross National Income
GTAP	Global Trade Analysis Project
ifo	Leibnitz Institute for Economic Research at the University of Munich
ISDS	Investor-to-State Dispute Settlement
LIC	Low-Income Country
LDC	Less-Developed Countries
MIRAGE	Modeling International Relationships in Applied General Equilibrium
NAFTA	North American Free Trade Agreement
NTB	Non-Tariff Barrier
NTM	Non-Tariff Measure
OECD	Organisation for Economic Co-operation and Development
PCD	Policy Coherence for Development
ROW	Rest of the World
SAM	Social Accounting Matrix
SMD	Sonnenschein-Mantel-Debreu
TTIP	Transatlantic Trade and Investment Partnership
US	United States

LIST OF FIGURES

Figure 1: Estimated percentage change in bilateral exports	5
Figure 2: Estimates percentage change in total exports	5
Figure 3: Estimated percentage change in real GDP.....	7
Figure 4: CEPR scenario results for Exports and GDP.....	8
Figure 5: Comparison of total exports and GDP changes (in %).....	8
Figure 6: GDP changes in EU-27 countries.....	10
Figure 7: Results of ex-ante simulations for NAFTA	25
Figure 1-A: Comparing BMWT/ifo and Bertelsmann/ifo	57

LIST OF TABLES

Table 1: Overview on basic assumptions and findings	4
Table 2: Possible trade diversion effects of TTIP	6
Table 3: Real GDP Change by Income Groups (according to World Bank classification)	9
Table 4: Increasing and decreasing output by sectors and regions	11
Table 5: Macroeconomic adjustment costs – a rough calculation (in €, 2012 prices).....	18
Table 6: Simulation results of most cited ex-ante studies	25
Table 7: Summary of most cited ex-ante CGE studies on NAFTA.....	28
Table 8: NTM coverage ratio.....	33
Table 9: Tariff equivalents of trade costs, and their sensitivity to the assumed elasticity of substitution	34
Table 10: Price elasticities and tariff equivalents of NTMs.....	43
Table 11: Selected parameters and results from BMWT/ifo simulations.....	47

SUMMARY OF MAIN RESULTS

What are the economic effects of TTIP? In the public debate, a few selected studies, mostly commissioned by the European Commission, have set the tone, suggesting that effects are positive on both sides of the Atlantic. The studies are from Ecorys (2009), CEPR (2013), CEPPI (2013) and Bertelsmann/ifo (2013). In this review, we critically assess these findings and their underlying methodologies. In addition, we discuss some issues, which are frequently neglected by trade impact assessments, but are nevertheless important from our point of view. In a nutshell, we see **limited economic gains, but considerable downside risks**. The results of our assessment are as follows:

1. The estimated gains from TTIP are very small: All four studies report small, but positive effects of TTIP on GDP, trade flows and real wages in the EU. GDP and real wage increases are estimated by most studies to range from 0.3 to 1.3 %. EU unemployment will either remain unchanged (by assumption), or will be reduced by up to 0.42 %-points, i.e. roughly 1.3 million, which however appears unrealistic. EU exports will increase by 5 – 10 %. All of these changes are long-term, i.e. will accrue only over a transition period of 10 to 20 years.

2. The estimated gains depend on NTM reductions: with average tariff rates already at very low levels (less than 5 %), roughly 80 % of TTIP gains are derived from the elimination or alignment of Non-Tariff-Measures (NTMs), such as laws, regulations and standards. Assumptions on actionable NTM reductions in the studies are however overly optimistic. On the basis of more realistic assumptions, the economic gains from TTIP would become even smaller.

3. The social costs of regulatory change might be substantial: NTM reductions entail both short term adjustment and long term social costs, which are completely neglected in the studies. Most importantly, the elimination of NTMs will result in a potential welfare loss to society, to the extent that this elimination threatens public policy goals (e.g. consumer safety, public health, environmental safety). The analysis of NTMs in the studies, particularly Ecorys, completely ignores these problems. Instead, it is assumed that around 50 % or 25% of all existing NTMs between the EU and the US can either be eliminated or aligned to some common standard. This includes sensitive sectors such as foods & beverages, chemicals, pharmaceuticals and cosmetics or automotives. In order to arrive at its optimistic welfare estimations, the studies assume strong reductions/alignments of NTMs in precisely those sectors, where the safeguarding of public policy goals is perhaps most crucial. Though subject to considerable uncertainty, the incurred social costs of TTIP regulatory change might be substantial, and require careful case-by-case analysis.

4. Macroeconomic adjustment costs are not negligible and should be dealt with by EU policy-makers:

- Costs of unemployment, including long term unemployment, might be substantial, especially during the 10 year transition period of TTIP. Based on projected job displacement in one of the studies of 0.4 – 1.1 million, our rough (and conservative) calculation suggests implied costs of €5 – €14 billion for unemployment benefits, excluding costs for re-training and skills-acquisition. In addition, foregone public income from taxes and social contributions from unemployment might accrue to €4 – €10 billion.
- Revenue losses for the EU budget because of tariff elimination might be in the order of 2 % or €2.6 billion p.a. Cumulated over a transition period of 10 years, this might accrue to a loss of EU public revenues of at least €20 billion.

5. Other potential adverse effects of TTIP are downplayed in the study. These include:

- LDC exports to the EU will possibly suffer from TTIP, resulting in a reduction of real GDP for LDCs of up to 3 %. Though not entirely conclusive, the results warrant a detailed examination of TTIP effects on developing countries, given the EU's official commitment to eradicate poverty in LDCs.
- Intra-EU trade will decrease due to TTIP. Some studies expect a modest reduction, while one study estimates intra-EU exports to decline by 30%. This calls for further examination.

EXTENDED SUMMARY OF THE STUDY

What are the economic effects of TTIP? In the debate, a few selected studies, mostly commissioned by the European Commission, have set the tone, suggesting that effects are positive on both sides of the Atlantic. The studies are from Ecorys (2009), CEPR (2013), CEPPI (2013) and Bertelsmann/ifo (2013). In this review, we critically assess these findings and their underlying methodologies. In addition, we discuss some issues, which are frequently neglected by trade impact assessments, but are nevertheless important from our point of view. Besides, some ex-post evidence on experience with other trade liberalization ventures, in particular NAFTA is provided.

The estimated economic effects are small:

All of the four scrutinized studies report small, but positive effects on GDP, trade flows and real wages in the EU. GDP and real wage increases are however estimated by most studies to range from 0.3 to 1.3 %, even in the most optimistic liberalization scenarios. These changes refer to a level change within 10 to 20 years (!), annual GDP growth during this transition period would thus amount to 0.03 to 0.13 % at most. Unemployment in the EU will either remain unchanged (by assumption), or will be reduced by up to 0.42 %-points, i.e. roughly 1.3 million jobs, again over a 10-20 year period. This amounts to an annual reduction of 65.000 – 130.000 unemployed persons. In our view, this overly optimistic estimate rests upon questionable assumptions. Unsurprisingly, total EU exports are predicted to increase by 5 – 10 % because of TTIP. Since tariffs on transatlantic trade in goods are already at very low levels, roughly 80 % of the economic effects depend on the elimination of Non-Tariff-Measures (NTMs), i.e. the removal or harmonization of regulations, administrative procedures or standards. NTM reduction is thus key to arriving at positive effects. According to three studies, TTIP benefits will however come at the cost of reducing bilateral trade between EU Member States. In a deep liberalization scenario, intra-EU trade could fall by around 30 %. The reason for this is that these EU countries' exports will be substituted for by cheaper Extra-EU imports. In addition, diversion effects in global trade from TTIP could be harmful for developing countries – one study expects negative real GDP change of 2.8% for Latin America and 2.1% for Sub-Saharan Africa, as well as 1.4% for LICs. This could indicate a potential violation of the EU's commitment to Policy Coherence for Development.

Macroeconomic adjustments costs could be substantial:

Adjustment costs are mostly neglected or downplayed in the TTIP studies. This refers in particular to macroeconomic adjustment costs, which can come in the form of (i) changes to the current account balance, (ii) losses to public revenues, and (iii) changes to the level of unemployment.

Ad (i): Trade agreements by their very purpose lead to changes in trade as well as capital flows. If, for instance, imports rise disproportionately vis-à-vis exports immediately after trade liberalization, a trade deficit might emerge. Strong FDI inflows might lead to a structural drain on the current account due to profit repatriation. Short-term speculative capital in- and outflows might lead to balance of payments problems. While for the EU *in toto* this will arguably present no major problem, for individual member states such occurrences might prove problematic.

Ad (ii): The elimination of all or most of the remaining tariffs due to TTIP will unavoidably lead to losses for the public budgets of the EU and its member states. During the transition period of 10-20 years the lower bound for these public revenue losses will be at close

to 2 % of the EU budget, i.e. €2.6 billion p.a. Thus, the EU will receive less income from its traditional own resources, a loss that only gradually might be compensated for by an increase of its GNI resources. We would thus estimate cumulated income losses to be in the order of €20 billion over a period of 10 years, also depending on tariff exemptions and phase-in periods for sensitive goods.

Ad (iii): All four studies reject the idea that TTIP will lead to permanent unemployment. Either employment is assumed to remain constant (by three studies), or estimated to be reduced by TTIP. Any persons in import-competing sectors who lose their jobs because of TTIP are assumed to be reemployed instantaneously, i.e. with only negligible effects on their incomes and costs to the public budgets due to retraining expenses etc. According to one study (CEPR), between 430.000 and 1.1 million workers will be temporarily displaced. Other empirical studies however suggest that (i) most displaced workers will earn lower wages in their new jobs, (ii) retraining expenses particularly for less-skilled workers might be substantial, and (iii) a fraction of the displaced workers, in particular older and less-skilled persons, will in all likelihood remain unemployed for a long time, thus inferring substantial costs on national unemployment benefit schemes and social spending. These adjustment costs will be generally higher during times of economic crisis and low levels of labor mobility. Both of these conditions apply to the current situation in the EU. EU unemployment is at record heights. Labor mobility in the EU is generally low, though somewhat rising recently as a response to the economic crisis. A rough calculation yields annual expenses for unemployment benefits of between €0.5 – €1.4 billion during a TTIP implementation period of 10 years. Thus a cumulative €5 – €14 billion might be necessary to finance a part of the adjustment costs on the labor market, with additional costs for re-training and skills-acquisition not included in this amount. To this amount, a further loss of public revenue from foregone tax income and social security contributions between €4 - €10 billion has to be added.

The social costs of regulatory change can be substantial, but have been neglected:

Another type of costs ignored refers to the regulatory change resulting from TTIP. All studies, but particularly the Ecorys study, assume that a reduction of NTMs is welfare-enhancing. This ignores that NTM such as laws, regulations and standards pursue public policy goals. They correct for market failures or safeguard collective preferences of a society. As such they are themselves welfare-enhancing. The elimination or alignment of an NTM thus will imply a social cost for society. This applies equally to NTM elimination, harmonization and mutual recognition. Firstly, harmonization of NTMs, e.g. technical standards, will imply both a short-term adjustment cost for public institutions and for firms required to align their administrative procedures, production processes and products to the new standards. Secondly, mutual recognition of regulations and standards will increase information costs for consumers, since the latter will be confronted with a more complex and potentially less transparent multiplicity of permissible standards, e.g. on consumer goods and services. Thirdly, the elimination of NTMs will result in a potential welfare loss to society, in so far as this elimination threatens public policy goals (e.g. consumer safety, public health, environmental safety), which are not taken care of by some other measure or policy. The analysis of NTMs in the Ecorys study completely ignores these problems. Instead, it is assumed that around 50 % or 25% of all existing NTMs between the EU und the US are actionable, i.e. can be eliminated or aligned to some international standard, while CEPR assumes a 25% actionability level. This includes sensitive sectors such as foods & beverages, chemicals, pharmaceuticals and cosmetics or automotives. In order to arrive at its optimistic welfare estimations, strong reductions/alignments of NTMs in precisely those

sectors are necessary, where the safeguarding of public policy goals is perhaps most crucial. It is highly doubtful that such high levels of actionability could be implemented without any losses to the quality of regulation in the public interest. Though subject to considerable uncertainty, the incurred social costs of TTIP regulatory change might be substantial, and require careful case-by-case analysis.

In connection to this, any future regulatory act would be under the threat of being challenged under investor-to-state dispute settlement (ISDS), if the negotiating partners stick to their intention to include such a mechanism in TTIP. Thus, a social cost might be implied for society in two distinct forms: firstly, governments might abstain from enacting regulation or change it according to investor interests, for fear of being challenged under ISDS; and secondly, in case of litigation, compensation payments issued against governments would have to be financed out of public budgets, aka from taxpayers' money.

Ex-ante & ex-post assessments of similar trade liberalization ventures strongly differ:

The NAFTA agreement between the US, Canada and Mexico is often cited as a role-model for the kind of agreement that is negotiated between the EU and the US. Its conclusion was justified on the grounds of ex-ante assessments that claimed considerable economic benefits for the participating countries. Ex-post analysis of the impacts of NAFTA however suggests that ex-ante impact projections substantially overestimated the economic effects. Most of these ex-ante assessments were based on the kind of CGE-modeling, which is also used for TTIP, though in a more sophisticated way. While ex-ante studies projected net gains for all NAFTA parties, but particularly for Mexico and Canada, with real GDP increases up to 11 %, employment gains of up to 11 %, and real wages increases of up to 16 %, ex-post assessments conclude that for the US NAFTA impact on welfare and GDP were negligible. For Mexico, a number of studies suggest that NAFTA had negative effects on GDP, real wages and the distribution of income. Those few studies that do find positive effects of NAFTA are well below the estimations of ex-ante studies. On jobs, ex-post studies found US labor displacement in the range of 600.000 – 1.2 million jobs because of NAFTA, i.e. up to 10 % of total job losses in the US between 1993 and 1999. For Mexico, net job gains in manufacturing appear to be small, mainly because of increasing productivity, while job losses in agriculture amount to up to one sixth of the total workforce, with roughly 1 million jobs lost in corn production in the first ten years after NAFTA's entry into force. Though, of course, ex-ante studies were performed on the basis of assumptions about the results of negotiations, their bias to overestimate positive impacts remains, even if one controls for the difference between scenario assumptions and actual negotiation results.

Methodology is based on unrealistic and flawed assumptions:

a. Methodological critique of Ecorys, CEPR and CEPIL in a nutshell:

- Even 25 – 50 % “actionable”, i.e. reducible NTMs of Ecorys's estimates (as assumed by Ecorys and CEPR) are likely too high to be realistically achievable.
- The CGE models assume full employment and balanced budgets, and thus cannot speak to key macroeconomic variables of interest.
- All models concern the long run. Possible adverse effects in the short and medium run are neglected.
- Price elasticities, which determine the quantitative reaction of demand and supply in the models used are high, typically double the size compared to the macroeconomic literature. High elasticities, however, drive the gains from trade, i.e. the higher the assumed values for the elasticities, the higher the estimated gains in exports, output and income.

- All put together, the assumptions underpinning NTM estimation and modeling likely bias the projected gains from TTIP upwards.

b. Quantification of Non-Tariff Measures:

How NTMs are defined and estimated matters greatly. Simply put: The higher the NTM to be removed, the higher the potential gain from 'free trade.' Broadly conceived, NTMs are trade policy instruments other than tariffs. NTMs can be decomposed into policy barriers, meaning those related to regulations and procedures pertaining to the sale of a product across borders, and inferred barriers, meaning those related to different languages, cultures, currencies, etc. In TTIP only the former are potentially subject to removal. An authoritative study of trade costs by Anderson and van Wincoop suggests that NTMs related to border policy barriers between industrialized countries add on the order of about 3 % (or so) to cost of production, whereas inferred barriers average – roughly – 30 %. In the study by Ecorys, in contrast, NTMs are defined to include any regulatory divergence, and indices are built on firms' perceptions about the restrictiveness of these. Ecorys's estimates show an unweighted average of 17 % tariff cost equivalent, and thus are a multiple of the 3 % (or so) of Anderson and van Wincoop. Ecorys, CEPR and CEPII assume removal of 25 - 50 % of Ecorys's NTMs in their CGE scenarios, which has to be considered very optimistic. Hence, a vast overestimate of removable NTMs has very likely been fed into the models.

c. CGE models and closure assumptions used in the studies:

The CGE models used are GTAP (Ecorys, CEPR) and MIRAGE (CEPII, as well as a chapter by IFO). Both models are standard neoclassical models of production and trade. The key assumptions of the models include (i) full employment of factors, including labor, (ii) price clearing markets and (iii) a constant government deficit. These assumptions are unrealistic. As such, these models cannot speak to aggregate employment, aggregate demand or fiscal effects of trade policy changes. Rather, the respective reports highlight microeconomic modeling detail. These concerns do not, however, matter for results nearly as much as the implicit macroeconomic structures: With models that feature full employment, trade liberalization tends to produce positive – though small – gains in GDP. None of the studies considers alternative modeling approaches that could provide a robustness check on these results and inform on key macroeconomic issues.

d. Bertelsmann/ifo study:

The Bertelsmann/ifo study takes a very different approach than all other studies. The model applied is not a CGE model of the GTAP/MIRAGE type, but rather is a gravity model augmented with a New Keynesian search unemployment labor market. Bertelsmann/ifo first estimates that a free trade agreement between EU and US would create roughly 80 % growth in bilateral trade. In the calibrated gravity-cum-unemployment model trade costs are then reduced so as to produce this trade creation effect. Despite the unusually large trade creation effect, the long run gains in GDP (1.35 %) from TTIP remain small. The expected gains in employment for TTIP countries which amount to 2.4 million jobs, of which roughly 1.3 million accrue to the EU, however are very large. In our view, the latter depend on the properties of the utilized labor market model, which assumes large employment gains in EU countries with pronounced labor market frictions and high unemployment rates. In addition, job reallocations within sectors due to trade liberalization have apparently not been accounted for. Thus, employment gains from TTIP do not seem plausible to us.

I. INTRODUCTION

The United States (US) and the European Union (EU) are negotiating a free trade agreement: the *Trans-Atlantic Trade and Investment Partnership* (TTIP). This report presents a critical assessment of four key studies on the projected economic benefits of such an accord: Ecorys (2009), CEPR (2013), CEPII (2013),¹ as well as Bertelsmann/ifo (2013).²

Trade flows between the EU and the US, which both account for almost half of world GDP, have a substantial influence on the world economy. Including trade within the EU, exports and imports of the potential TTIP member states represented more than 43 % of world trade in 2012 (World Bank data). The US is still EU's single most important trade partner, accounting for almost 20 % of extra-EU exports in goods and services and more than 15 % of imports in 2012, even though the bilateral EU-US trade as a share of world trade has lost some importance in recent year. Several studies say that TTIP would not only stop this trend but, more importantly, give a boost to global economic growth. Most prominently, the European Commission estimates the potential economic stimulus because of TTIP at €120 billion for the EU economy, €90 billion for the US economy and €100 billion for the rest of the world.³ But how are these benefits of TTIP derived?

One commonly applied method to calculate costs and benefits of trade liberalization is a *computable general equilibrium* (CGE) model. A CGE model falls within the general category of empirical economy-wide models. It is based on a Social Accounting Matrix (SAM), which depicts detailed data on relations of production and distribution between the main socio-economic agents in an economy. The model adds behavioral relationships to the accounting; econometric evidence is applied to calibrate relevant parameters. The complete model can then be used to calculate counterfactuals in response to assumed shocks and policies – for example, tariff removal.

In the case of trade between the US and EU, most tariffs are already very low. Removing remaining tariffs is expected to have very limited effects. Therefore the focus of negotiating and modeling efforts is on *non-tariff measures* (NTMs), or non-tariff barriers. These are procedures, laws and regulations other than tariffs or quotas that impede trade in goods and services between two countries. In order to apply NTMs to a CGE model, these barriers need to be estimated, including what share of them is practically removable (or *actionable*). A different (and much less common) method to calculate potential benefits is to *assume* that TTIP will create a certain increase in trade between the United States and European Union. A general equilibrium model of the world economy can then be used to calculate the necessary NTM removal to produce such gains.

Three of the four studies reviewed here follow the standard procedure. (Table 1 presents a quick overview.) These are Ecorys (2009), CEPR (2013) and CEPII (2013). All three build on the same set of NTM estimates provided in Ecorys (2009), feeding these into a CGE model. Ecorys and CEPR employ the same model, which is based on the popular GTAP model. The CEPII model, called MIRAGE, differs in the details, but rests on the same conceptual foundations. The fourth study, Bertelsmann/ifo (2013), i.e. financed by Bertelsmann Foundation and conducted by the ifo institute, estimates a *gravity trade* model, and employs a quite different simulation strategy. Thus, the procedures to estimate gains differ, but all four

¹ The CEPR (2013) report is listed in the references as Francois et.al. (2013), the CEPII (2013) policy brief as Fontagné/Gourdon/Jean (2013) and Ecorys (2009) as Berden et.al. (2009). Throughout the main text, we will refer to these simply as the *Ecorys*, *CEPR* and *CEPII* study, respectively.

² The Bertelsmann Foundation has published a study on TTIP with two parts. Our analysis is based in particular on part 1: macroeconomic effects. This report is listed in the references as Felbermayr/Heid/Lehwald (2013) and referred to as *Bertelsmann/ifo* throughout the main text.

³ See <http://ec.europa.eu/trade/policy/in-focus/ttip/about-ttip/> (last accessed 03/24/2014).

models have important similarities, which ensure that adjustments to liberalization work their way through the economy via price changes.

Specifically, a country's domestic prices decrease in response to the removal of its trade barriers. Falling prices reflect, on the one hand, increases in productive efficiency, as labor and capital are moved to economic activities where a country has a comparative advantage. On the other hand, they reflect decreases in mark-ups or rents, as firms with substantial market power face higher competitive pressures. Together, these changes imply higher production levels, higher incomes and higher real wages. The gains from trade are then, simply put, the result of the removal of distortions – may they be differing regulations or tariffs – combined with the assumption that labor and capital *can easily be moved between activities* – the full employment assumption. In other words, economic performance is determined from the supply side.

In this sense, the estimation and simulation procedures applied in all four studies build on the old idea that the market left to its own devices produces the best of all possible worlds. This report critically assesses the building blocks of that endeavor. In the next section, we begin with a detailed overview of the projected benefits of TTIP by the four most influential studies (Section II). This is followed by insights on potential macroeconomic adjustment costs and other issues that are generally neglected in these studies, in particular the social costs of regulatory change (Section III). Furthermore, a comparison of ex-ante assessments and ex-post experiences of NAFTA is provided, since the latter is often cited as a show-case example for successful trade liberalization (Section IV). Finally, the theoretical background and the technical specifications of the applied models are analyzed in detail (Section V). This is started with a discussion of the origins of these models in section V.a.. Section V.b. reviews the issue of trade costs in general and the estimation of NTMs in Ecorys (2009) specifically. Section V.c. discusses the two CGE models that were mostly used (GTAP, MIRAGE) and their closure and elasticities' assumptions. Section V.d. considers the different methodology underlying the Bertelsmann/ifo study, as it pertains to NTMs and calculated gains. Finally, Section V.e. provides a note on the estimations on the effects of income derived from foreign direct investment (FDI).

II. MAIN FINDINGS OF STUDIES ON TTIP

a. Overview of Results

The message is clear in the influential empirical studies on TTIP: all EU member states and the USA will benefit from TTIP. Consistently the studies by Ecorys, CEPR, CEPII and Bertelsmann/ifo that are reviewed in this report predict such a positive economic impact on real income and trade for both sides of the Atlantic.

Given the similar data base (GTAP 7 and 8) and the closely related methodological approaches, it is not surprising that Ecorys (2009), CEPR (2013) and CEPII (2013) report gains in real income and trade flows within a similar range for all participating countries. The variations in the quantified effects can be attributed to variations in the approach to calculate tariffs equivalents of NTMs and modifications of the CGE model, for instance, the inclusion of spill-over effects to the rest of the world in the CEPR model. In contrast, the Bertelsmann/ifo findings mark the most pronounced benefits also due to larger bilateral trade effects of TTIP, higher implied trade costs and the assumption that trade costs are resource consuming.⁴ Despite diverging assumptions and differences in the set-ups of the general equilibrium models, all analyzed reports follow the fundamental question: How does a reduction of trade costs between the EU and the US work through the two economies?

All studies simulate various scenarios by comparing policy changes to a baseline calibration. The forecast periods are set by researchers individually and typically a period of 10 years is assumed until the full effect of TTIP is reached. We consider the “limited scenario” in Ecorys (2009), the “ambitious experiment” in CEPR (2013) and the “reference scenario” in CEPII (2013) as major scenarios. In all of these scenarios, a cut in trade costs of roughly 25 % is assumed. In the Bertelsmann/ifo study, the “comprehensive liberalization scenario” is regarded as the most important simulation. This experiment is also comparable to the “NTB-scenario” in BMWT/ifo in which trade costs are also cut by 25 % (p92). The basic similarities allow for a comparison of the results with regard to changes in real GDP, trade flows and distribution among sectors in the two economic areas. In addition, the implications for real wage and employment can be summarized. Table 1 provides an overview with additional details on the assumptions and specifications and a summary of the main findings. A detailed description of the applied methodologies is provided in the sections V.b. to V.d. of this report.

⁴ The Bertelsmann/ifo report is based on a study performed by Felbermayr et.al. (2013), also referred to as *BMWt/ifo* in the main text, on behalf of the German Federal Ministry for Economic Affairs and Technology (BMWt). The comprehensive BMWt/ifo findings are only partially included in the Bertelsmann/ifo report. For a comparison of all studies, results of Chapter II and III of the BMWt/ifo study are partially used. We aggregate these results to a trade- and GDP-weighted EU-27 average, if possible. An illustration of the relationship between the BMWt/ifo and Bertelsmann/ifo is provided in the Annex, Figure 1-A.

Table 1: Overview on basic assumptions and findings

	Ecorys (2009)*	CEPII (2013)	CEPR (2013)	Bertelsmann/ifo (2013)
Basic Assumptions				
CGE	GTAP	MIRAGE	GTAP	Simulation of gravity model
Data	GTAP 7	GTAP	GTAP 8	not specified
Non-tariff measures (NTM)	Ecorys	CEPII & Ecorys	Ecorys	ifo
Forecast period	2008-2018	2015-2025	2017-2027	10-20 years
No. Of Scenarios	7	5	5	3
Tariffs reduction	100 % of goods 75 % of services	100 %	98 - 100 %	100 %
NTM reduction in reference scenario	25 %	25 %	25 %	Reduction corresponding to trade creation effect
Main Findings (different scenarios, percentage changes compared to baseline scenario within forecasting period)				
EU GDP	0.32 - 0.72	0.0 - 0.5	0.02 - 0.48	0.52 - 1.31 ⁺⁺
US GDP	0.13 - 0.28	0.0 - 0.5	0.01 - 0.39	0.35 - 4.82 ⁺⁺
EU bilateral exports	not specified	49.0 ⁺	0.69 - 28.0	5.7 - 68.8 ⁺⁺
EU total exports	0.91 - 2.07	7.6 ⁺	0.16 - 5.91 (extra-EU only)	not specified
EU real wages	0.34 - 0.78	N/A	0.29 - 0.51	not specified
Unemployment rate in EU-OECD countries (avge. %-points)	unchanged (assumption)	unchanged (assumption)	unchanged (assumption)	- 0.42 (deep liberalization)

Source: Ecorys (2009), CEPII (2013), CEPR (2013), Bertelsmann/ifo (2013)

* Findings for ambitious and limited scenarios only;

+ Reference scenario only

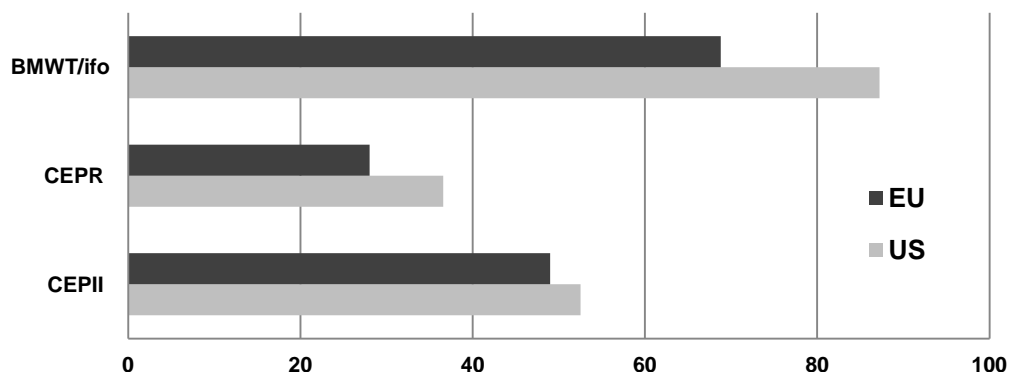
** Derived from BMWT/ifo (2013), aggregated to EU-27 level

b. Trade Flows

The most obvious impact of a TTIP is the change in the EU-US trade flows. Three out of four reports state these long run changes in bilateral exports explicitly. Consistently, the export creating effect for US exports to the EU is higher than vice versa. The largest effect in export changes for the US and the EU is reported by Bertelsmann/ifo (2013).⁵ These changes are not a result of a CGE model but the econometrically measured trade creation from observed free trade agreements. On average, bilateral exports between the US and all 27 EU members are assumed to increase by around 80 % (see section V.d. for more details). In the CEPR report, these trade creating effects are significantly smaller with an increase of bilateral US exports by 36.6 % and bilateral EU exports by 28.0 % (Figure 1).

⁵ The aggregated bilateral trade data for EU-27 and the US are derived from "NTB-Scenario" in BMWT/ifo, 2013, Chapter III, in order to allow for a rough estimation.

Figure 1: Estimated percentage change in bilateral exports

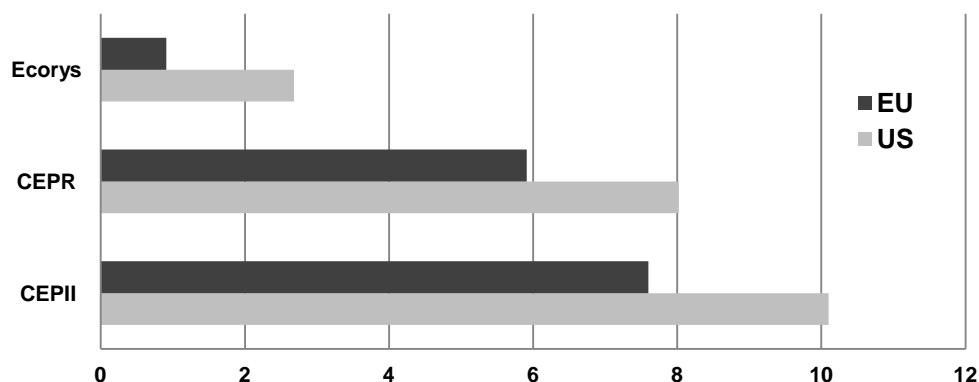


Source: Ecorys (2009), CEPR (2013), CEPII (2013), own calculation based on BMWT/ifo (2013)

Major scenarios, compared to baseline scenario

The impact of TTIP on *total exports* (excluding intra-EU trade) is very similar to the pattern in bilateral exports but significantly smaller. The highest reported changes are predicted by CEPII (2013) with a plus of more than 10 % in US exports and 7.6 % in EU exports. In the study by Ecorys (2009) the increases in total exports are 2.7 % for the US and only 0.9 % for the EU (Figure 2).

Figure 2: Estimates percentage change in total exports



Source: Ecorys (2009), CEPR (2013), CEPII (2013)

Major scenarios, compared to baseline scenario, excluding intra-EU trade

The overall positive impact of TTIP on total exports conceals large trade diversion effects. In particular, intra-EU trade is negatively affected as cheaper imports from the US and the rest of the world (ROW) can displace products and services that were exchanged within the EU before. CEPII (2013, p10) reports that the increase in EU exports would be limited to 2.3 % compared to the 7.6 % increase, when intra-EU exports are excluded, as depressed intra-EU trade weighs on the total export performance. Intra-EU trade diversion is also reported by CEPR. In the ambitious experiment, trade among EU member states is expected to decline by €72 billion (p55). However, higher exports to the US and the ROW (€187 billion and €33 billion) would still amount to an increase in exports from EU member states.

In the Bertelsmann/ifo report and other ifo publications⁶ the trade diversion effects of TTIP are highlighted, based on the pure gravity framework (BMWT/ifo 2013, chapter II). In a deep liberalization scenario, TTIP would even "...alter the trade diversion effects currently in force in the EU [that came about as a result of preferential treatment of intra-EU trade flows]" (Bertelsmann/ifo, p14) influencing trade flows of most EU member states negatively. Details on changes in trade flows among 25 major economies with regard to trade volume reveal that only total exports from the US (+13 %), Greece and from some non-EU countries among these countries would benefit from TTIP (BMWT/ifo 2013, p162, Table A.III.1; also partially presented in Bertelsmann/ifo section 4). In contrast, the intra-EU exports among the selected EU countries would fall by 25 to 41 % (see last column of Table 2). Applying these changes to actual 2007 trade data (UN comtrade and UN service trade) shows that intra-EU trade value would drop by more than US\$900 billion. In total, this would not only cause total export from EU countries to decline, but even force total trade volume among the selected 25 countries to fall by US\$380 billion. Overall, the negative trade diversion effects would considerably exceed trade creation effects of TTIP in such a scenario (Table 2).

Table 2: Possible trade diversion effects of TTIP

		Importers												Exports to 24 countries*	Intra EU exports
		AUT	BEL	GER	ESP	FRA	GBR	GRC	ITA	NLD	POL	SWE	USA		
Exporters	AUT		-21	-24	-29	-18	-37	-25	-24	-23	-21	-31	108	-13	-25
	BEL	-21		-26	-31	-21	-39	-27	-27	-26	-24	-33	100	-14	-27
	GER	-24	-26		-34	-23	-41	-30	-29	-28	-26	-35	94	-10	-29
	ESP	-29	-31	-34		-29	-45	-35	-34	-33	-31	-40	80	-24	-34
	FRA	-18	-21	-23	-29		-36	-25	-24	-23	-21	-31	108	-8	-26
	GBR	-37	-39	-41	-45	-36		-42	-41	-41	-39	-46	61	-10	-41
	GRC	-25	-27	-30	-35	-25	-42		-31	-30	-28	-36	90	2	-33
	ITA	-24	-27	-29	-34	-24	-41	-31		-29	-27	-36	92	-13	-30
	NLD	-23	-26	-28	-33	-23	-41	-30	-29		-26	-35	95	-17	-29
	POL	-21	-24	-26	-31	-21	-39	-28	-27	-26		-33	100	-20	-27
	SWE	-31	-33	-35	-40	-31	-46	-37	-36	-35	-33		75	-16	-37
	USA	108	100	94	80	108	61	90	92	94	100	75		13	Avg: -30

Source: calculations based on BMWT/ifo (2013, p165) and UN comtrade and UN service trade data (base year 2007)

* other counties include Argentina, Australia, Brazil, Canada, China, Indonesia, India, Japan, Mexico, Russia, South Korea, Switzerland and Turkey

In general, the authors of the BMWT/ifo emphasize that several studies typically found negative trade diversion effects for third countries due to bilateral trade agreements and mutual recognition agreements (Felbermayr/Larch 2013b, p8). In contrast, CEPR sees a positive impact of TTIP for all other regions in the world due to the inclusion of spillover effects in their model.⁷ This would cause exports to increase between 0.6 % and 2.3 %. Also CEPPII sees negative consequences for exports of selected ROW countries in their reference scenario, but a positive impact if spill-overs are included (Appendix p A.9, Table A.7). Thus, the assumptions of spill-over effects enable CEPR and CEPPII to avoid a conflict with the EU's commitment to Policy Coherence for Development. PCD stipulates that the EU's policies must not counteract the EU's development objectives and policies. Any negative effects from trade diversion as indicated in the data (from other trade agreements) and Bertelsmann/ifo

⁶ For instance, Felbermayr and Larch (2013b) in CESifo Forum 4/2013

⁷ It is assumed that trade costs for third countries exporting to the EU and the US decline by 20 % of the bilateral fall in EU-US trade costs and that trade costs for EU and US exports to third countries decline by 10 % of the bilateral trade cost reductions (CEPR 2013, pp28-29)

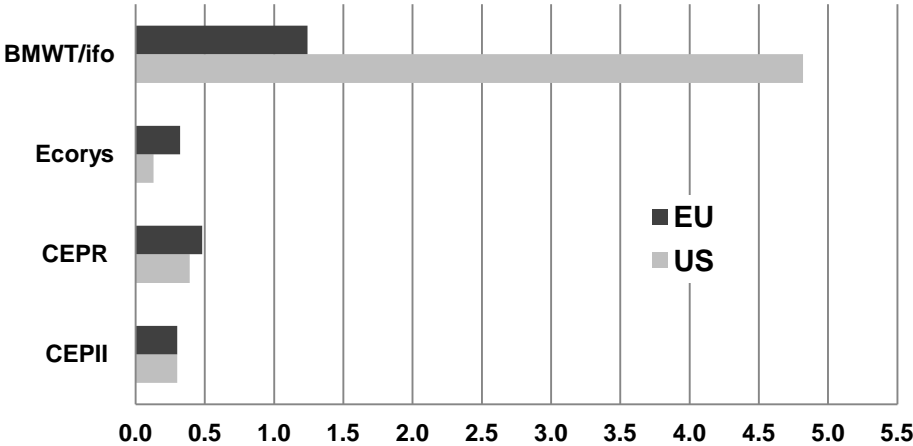
could thus undermine the EU commitment to eradicate poverty in developing countries⁸ (see also next section on GDP effects).

All analyzed studies report an increase of total imports to the US and the EU. The TTIP effect on imports as a percentage change is generally lower than the change in total exports. For instance, CEPR (2013) expects total US and EU imports to increase by 4.74 % and 5.11 %, respectively. On the other hand, calculations based on BMWT/ifo estimates (NTB-Scenario, p93) reveal that EU imports from ROW (excluding intra-EU trade) would decline by 4.0 % (or 53 billion USD; based on 2007 UN comtrade data). On the other hand, EU imports from the US would increase by 87.3 % (or 217 billion USD).

c. GDP and Household Income

The TTIP impact on economic income, measured in changes of real GDP, is limited compared to changes in trade. Although percentage changes of US total and bilateral trade flows are expected to exceed shifts in EU trade throughout all analyzed studies, only two studies forecast the same pattern for changes in GDP. Based on a higher value added composition of EU exports, CEPR (2013, p46) expects real GDP growth in the EU to exceed US GDP growth despite smaller EU trade effects. Overall, the impact of TTIP on real GDP, given the major scenarios is positive, ranging from 0.13 to 4.82 % for the US economy and from 0.32 to 1.31 % in the EU (see Figure 3). The oft-cited large real per capita income changes in the Bertelsmann/ifo study (US: 13.9 %, EU: 5.3 %) are based on the concept of equivalent variation and are not considered in this comparison of real GDP change (see Section V.d. for more details). Instead, the BMWT/ifo data on real GDP changes are reported here (see Figure 1-A for interconnection between BMWT/ifo und Bertelsmann/ifo).

Figure 3: Estimated percentage change in real GDP



Source: Ecorys(2009), CEPR (2013), CEPII (2013), own calculation based on BMWT/ifo (2013)
Major scenarios, compared to baseline scenario

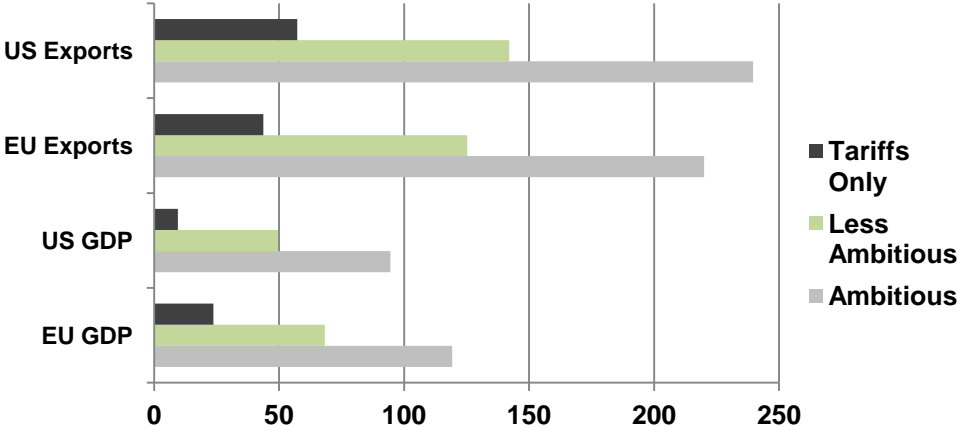
However, the interpretation of these results has to be handled with care as the estimates refer to a change relative to a baseline scenario at a specific point in time. In the case of CEPR, the simulation period is set between the years 2017 and 2027. The estimated increase of 0.48 % in EU GDP is therefore the value addition due to TTIP up to 2027 compared to a projected benchmark without TTIP.⁹ In other words, all studies estimate by

⁸ The EU commitment to contribute to the reduction and in the long term eradication of poverty is stated in Article 208 of the Lisbon Treaty, and reaffirmed in the European Consensus on Development.
⁹ Data from GTAP 8 (2007) projected to 2027 with IMF estimates

how much the level of GDP is elevated due to TTIP in the long-run. As this level effect continues to exist, once it is established, the studies speak of “percentage gain per year in 2018” (Ecorys 2009, p xiv), “annual long run increase in national income” (CEPII 2013, p10) or “disposable income gain [...] annually in the EU.” (CEPR 2013, p47)

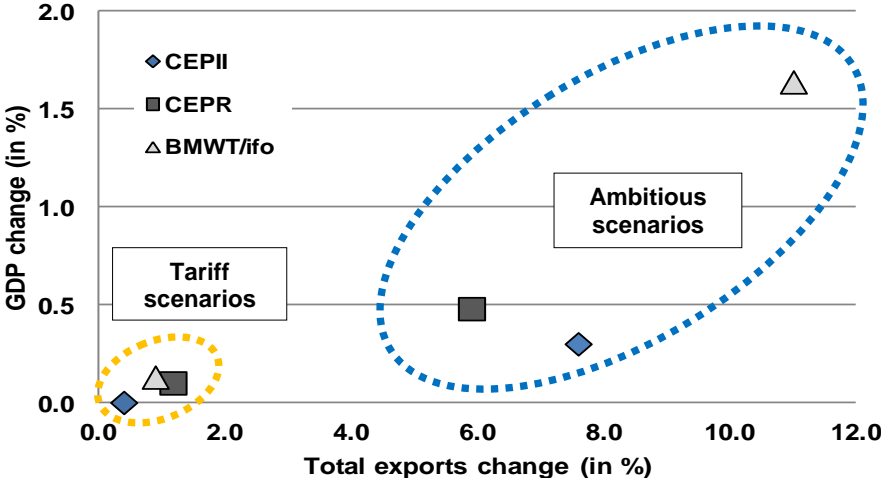
The magnitude of real GDP growth is highly dependent on scenario assumptions. Even in major experiments which assume a substantial cut in NTMs, the *relative* impact on GDP growth is limited, despite the prospect of value addition as high as €120 billion until 2027 (see Figure 4). An elimination of all tariffs without changes in NTMs (“Tariffs Only”) would hardly have an effect on export growth as well as GDP level change (Figures 4 and Figure 5). Contrary, the positive effect of almost €24 billion of EU value added until 2027 is also associated with foregone EU tariff revenue of more than €7.3 billion according to CEPR calculations (p54).

Figure 4: CEPR scenario results for Exports and GDP



Source: CEPR (2013)
 In billion €, Changes compared to baseline scenario

Figure 5: Comparison of total exports and GDP changes (in %)



Source: CEPR (2013), CEPII (2013), own calculation based on BMWT/ifo (2013)
 Changes compared to baseline scenario; BMWT/ifo results based on “NTB-Scenario” (p93 – trade weighted changes with 2007 comtrade data)

Despite the relatively small upside potential in GDP, the reports all make an effort to present the income gains in simplistic, if not misleading ways. For instance, Ecorys (2009, p xiv) states that elimination of all 'actionable' NTMs (around 50 % of NTMs) would be equivalent to an extra €12,300 (in 2008 prices) per EU household over a working lifetime (starting in 2018), without any details on this calculations. Also, CEPR (2013, pp47-48) calculates an annual income gain of up to €545 per EU household (family of 4), however, only after the full effect of TTIP is in action after 2027. Finally, BMWT/ifo (2013, p99) forecasts an average GDP per capita increase in Germany of €500 (2011 prices) in the long run. Taking into account the long transition period of 10 years or more, and the strong assumptions with regard to NTMs reductions, the absolute benefit per person from TTIP remains highly unrealistic. Besides, it conceals that very likely the distribution of gains amongst the population will be uneven.

Due to global trade diversion, the TTIP would also influence the GDP growth potential of all other countries around the globe. Scrutinizing the BMWT/ifo results (Chapter 2 and Table A.II.6, p159, 126 countries) on real GDP changes in a deep liberalization scenario underlines possible negative effects on non-TTIP economies due to trade diversion effects (Table 3).

Table 3: Real GDP Change by Income Groups (according to World Bank classification)

Income Groups (number of countries included by ifo)					
Low Income (18)	Lower Middle Income (25)	Upper Middle Income (36)	High Income: non-OECD (16)	High Income OECD (31)	TTIP Countries (28)
-1.40 %	-1.75 %	-1.90 %	-1.52 %	1.44 %	2.93 %

Source: own calculations based on BMWT/ifo 2013, Table A.II.6

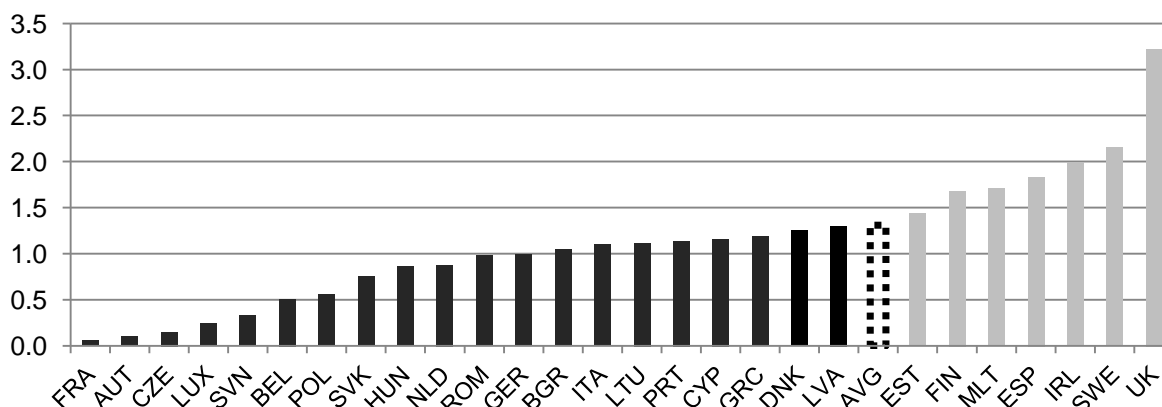
Weighted average by 2007 GDP data

While TTIP economies would see an increase in real GDP close to 3 %, most countries in the lower income group would suffer from TTIP in terms of output. In particular, economies with closer trade relationships to the US and Europe like Canada, Mexico, Norway and Russia might face declines in real GDP. Also low income countries would get hurt (-1.4 %) – a clear violation of EU's coherence principle. Moreover, Latin America (-2.8 %) and Sub-Saharan Africa (-2.1 %) would be among the main losers from TTIP according to the BMWT/ifo results. These unequal effects, however, are not seen as a problem by the authors of the Bertelsmann/ifo study. In their view, potential negative effects of TTIP would increase the willingness of third countries to adopt TTIP standards or to enter into bilateral and multilateral trade agreements in order to gain from free trade (p29).

In contrast, CEPR (2013) expects a positive impact for all regions worldwide as positive trade creation in third countries (spill-over effect) exceeds negative trade diversion. In total, this would amount to an addition of almost €100 billion or 0.14 % to world GDP compared to a 2027 baseline scenario. However, in a separate publication, the Bertelsmann and ifo authors stress that these results are based on specific assumptions contradicting the experience with trade diversion so far (Felbermayr/Larch 2013b, p12).

In addition, TTIP would lead to potential 'losers and winners' in different scenarios among the EU-27 countries. Although all EU countries would benefit from TTIP, changes in real GDP range from 0.06 % (France) to 3.22 % (UK) within the forecast period of up to 20 years in the BMWT/ifo experiment (Table A.II.6, pp159-161). The GDP-weighted average of 1.31 % (2007 GDP data, Eurostat) is mainly surpassed by UK, the Scandinavian countries as well as Spain and Ireland. Almost unchanged would be the GDP in France, but also Germany and Italy would see below-average growth rates in this scenario (Figure 6).

Figure 6: GDP changes in EU-27 countries



Source: BMWT/ifo 2013, Table A.II.6, pp159-161
 GDP-weighted average with 2007 Eurostat data

Despite a more positive value-added effect for Germany, CEPII also sees diverging GDP results within the EU. In particular, France, as well as the Southern and Eastern European countries would see relative weak effects compared to Germany, UK and the Northern European states (CEPII 2013, Appendix pp A.7-A.8). CEPII also mentions potential conflicts among EU players due this unequal distribution of potential economic benefits (p11). In sum, it would seem that as a tendency countries which already have competitive export sectors would benefit disproportionately from TTIP.

d. Sectoral Effects

The decomposition of aggregated macroeconomic estimates of trade and value added by sectors reveals one of the basic mechanisms how a free trade agreement could work through the economy. More competitive sectors in an economy will benefit from enhanced access to a combined market. Consequently, output and exports of a competitive sector will increase and the corresponding sector in the other economy will suffer as cheaper imports replace domestic production. However, the trade volume in most sectors should benefit from lower import prices and untapped trade potential in general.

A sectoral analysis was performed by Ecorys (2009) with details on potential NTM reductions and effects by sector. Three core messages are highlighted in the Ecorys (2009) report. Firstly, all sectors in the EU and the US (except for the US insurance sector) contribute positively to national income¹⁰ compared to the benchmark, even if output in several sectors declines. Secondly, total gains from an economy-wide alignment of NTMs (in all sectors) are four times larger than the sum of sector-specific gains from TTIP (NTM reduction in one sector while all other NTMs remain constant). In other words, the gains from TTIP shrink dramatically if an agreement does not include NTM reductions in a large number of sectors. This is also stressed by CEPR (2013, p63). And thirdly, even if output and employment in a sector might decline, the contribution to national income might still be positive. This indicates the importance of price effects for TTIP benefits.

These conclusions are also valid for the CEPR (2013) report as the methodology is very similar to the Ecorys (2009) study. As expected, the changes in sectoral output show the

¹⁰ National income includes price changes. Prices are expected to decrease due to lower trade costs and elimination of economic rents (Ecorys 2009, p xxii).

effects of increased bilateral competition within the sectors: competitive sectors in one economic area benefit from TTIP and increase trade as well as output, while the corresponding sectors in the country of the trading partner shrink (see Table 4). In motor vehicles, for instance, the EU could increase output by 1.54 % in the ambitious scenario of CEPR, while the motor vehicle output in the US would decline by 2.78 % (pp60-61). However, total and bilateral trade in this sector would still increase on both sides of the Atlantic with a plus of EU exports to the US of 87 % and US exports to Europe of 346 % (!). In general, the motor vehicles sector would generate around 43 % of total changes in extra-EU trade exports, as estimated by CEPR. Again, the total output change in the EU motor vehicle sector is quite small due to decreasing intra-EU trade and a strong increase of imports, mainly from the US.

A reverse case in output changes can be seen in the sectors “metals and metal products” and “other transport equipment” (aerospace) where the US output increases while EU output is expected to decline. Interestingly, electrical machinery which includes electronics and office information & communication is expected to decline in the EU and the US as spill-over effects would lift exports from ROW countries to TTIP countries (CEPR 2013, p63).

Table 4: Increasing and decreasing output by sectors and regions

EU sectors		US sectors	
+	-	+	-
Motor vehicles	Electrical machinery	Other machinery	Motor vehicles
Water transport	Metals and metal products	Other transport equipment	Electrical machinery
Insurance	Other transport equipment	Metals and metal products	Insurance

Source: CEPR (2013)

Ranked by percentage change

Overall, sectoral changes in output are mainly positive but small. Even the most pronounced positive change in output in one sector, the 1.54 % increase in EU motor vehicles, is almost negligible as the output of this sector accounted for 2.2 % of total EU-27 output in 2009 (Eurostat). However, aggregation on an EU-basis hides substantial differences in the sectoral structure between EU member states. Studies that were conducted to analyze single-country effects of TTIP, for instance on UK, Sweden, Netherlands and Austria¹¹ report diverse sectoral effects. For instance, Ecorys (2012) sees the output of motor vehicles in the Netherlands to decline by 2.9 %, while EU-26 output would go up by 1.2 %.

An indication for the diverse effects among EU members is given by CEP II (2013) as trade and GDP effects are reported for agriculture, industry and services in six EU regions/countries (detailed results in CEP II appendix). In terms of value addition, the EU industrial sector is expected to have the largest percentage increase of 0.6 %, pulled by Germany (0.9 %) and Northern Europe (0.8 %). In total, the CEP II sees GDP changes above average in Germany, the UK and Northern Europe (due to a strong industrial base in Germany and a large service sector in the other two regions). The other EU regions and countries (France, Eastern and Southern Europe) would hardly benefit from TTIP (GDP change of 0.2 % compared to baseline in 2025).

¹¹ See CEPR/BIS (2013), Kommerskollegium (2012), Plaisier et.al. (2012) and Francois and Pindyuk (2013).

These sectoral examples underline the large estimated bilateral trade effects of TTIP in contrast to the limited output effect. In other words, more goods are exchanged, but not produced.

e. Real Wages and Employment

Besides trade and value added, the change in real wages is reported in three studies. The wage effects are very similar to GDP changes and follow the same logic: cost saving due to lower input prices increases average productivity which then leads to a higher compensation for labor. CEPR and Ecorys differentiate between unskilled and skilled labor. For unskilled labor, the two studies expect real wages in the EU to increase between 0.36 % and 0.51 %. Wages for skilled employees would be lifted between 0.34 % and 0.50 % compared to the benchmark. However, both studies assume a fixed supply of labor in the long run meaning that unemployment is not affected by the agreement. Thus, only wages adjust to higher labor demand stemming from more competitive sectors of an economy in the long run.¹²

Sectoral reallocation of labor, as shown in CEPR (2013), therefore entails the shift of employment from less competitive (importing) sectors towards more competitive (exporting) sectors. In the sector “motor vehicles” in which CEPR sees the highest output change in the EU (see above), total employment is expected to increase by around 1.28 %. In contrast, the US motor vehicles sectors will lose around 2.76 % of its labor force as output is expected to decline.

The ifo model-based studies take another path with regard to labor markets (see for a detailed discussion of the method section V.d.). BMWT/ifo expects both, an increase in real wages and a positive employment effect for the EU and the US. In total, unemployment should decline by 193,000 people (124,000 in the EU and 69,000 in the US, NTB-Scenario, p100) in the TTIP member countries. These results represent a net gain and jobs are reallocated between and within sectors due to increased productivity. Interestingly, ROW countries would suffer by losing 165,000 jobs due to trade diversion effects.

In the Bertelsmann/ifo report the changes in employment are more pronounced with an employment effect in the US of more than one million new jobs due to TTIP in their deep liberalization scenario, and of 1.3 million for the EU. Also Germany would see 181,000 additional jobs created. This is almost seven times the reported effect of 25,000 new jobs in Germany in the “NTB-scenario” in BMWT/ifo (Chapter III, p100). For the US, the job creation effect would even be elevated by a factor of ten. While the BMWT/ifo model is based on the “new” new trade theory by Melitz (2003) to allow for job reallocation from less to more productive companies and includes search unemployment, the model applied in Bertelsmann/ifo is an extension of the gravity model with a search and matching framework, but apparently without heterogeneous firms (see Heid/Larch 2013). In addition, the BMWT/ifo model is calibrated for Germany, USA and three aggregated regions to model global effects of TTIP, based on 2007 data. The Bertelsmann/ifo report focuses on 28 OECD countries only, which enables the authors to include labor market data variables like wage replacement rates. Data used are from 2010, implying higher unemployment rates because of the global financial crisis. Based on their search and matching framework, it is shown that economies with higher market frictions (higher unemployment rate and/or higher unemployment benefits) experience larger unemployment effects. Thus, trade liberalization and the associated price reductions lead to a higher reduction in unemployment. In addition, the missing reallocation mechanism à la Melitz causes net employment effects in the Bertelsmann/ifo report to be elevated as job losses in less productive companies are not included (see also Stephan 2014). In our view, these two factors explain the difference in

¹² Under the assumption of flexible labor supply, wages would be fixed and employment would adjust (CEPR 2013, p71).

employment effects between the BMWT/ifo paper and the Bertelsmann/ifo report. In addition, it must be stressed that it is really unclear when these effects materialize, since they are derived from the long term adjustment process to a steady state. That could well take 20 years or more. Against this time frame, the reported large effects appear rather small on a per annum basis.

Overall, the three studies with estimations for changes in labor markets see a positive impact of TTIP, at least on real wages. Bertelsmann/ifo models labor markets explicitly and forecasts positive real wage as well as employment effects, a strong statement given that standard neoclassical labor market models assume lower wages in order to create employment. However, the adjustment process between and within the sectors is associated with short term unemployment. These negative effects are widely ignored or understated in the studies by stressing the long run effect. Therefore, we will illustrate possible short run disturbances and costs associated in particular with estimated labor market reallocations in the next section.

III. ADJUSTMENT COSTS AND REGULATORY CHANGE

a. Macroeconomic adjustments costs

Trade agreements entail many changes to the public sector, the private sector as well as households. These changes are both positive and negative, and the adaption to them confers benefits as well as costs upon society and particular social groups, respectively. Both benefits and costs may be of a transitory or more permanent nature. In the former case, these costs are usually labelled as adjustment costs. These transitory adjustment costs are to some extent recognized by conventional impact assessments, while it is generally assumed that trade agreements do not entail long term costs for society.

In the following, we intend to focus our attention on types of adjustment costs that were either underestimated by the four scrutinized TTIP studies, or were neglected outright. A class of adjustment costs refers to macroeconomic variables, which are crucial to economic policy in any advanced country. These are (i) the current account balance, (ii) the public budget balance, and (iii) the level of unemployment.

(i) The current account balance

Trade agreements by their very purpose lead to changes in trade as well as capital flows. If for instance, imports rise disproportionately vis-à-vis exports immediately after trade liberalization, a trade deficit might emerge. A large trade deficit might eventually require a devaluation of the national currency, with negative repercussions on the domestic price level or on local businesses with outstanding debts in foreign currency. Similarly, if a country receives substantial amounts of foreign direct investment after trade liberalization, a certain fraction of the profits of that FDI will be repatriated by the parent companies, thus creating a constant drain of resources in the current account. Countries that attract FDI by low tax rates are particularly prone to these kind of practices. Ireland is the classic case in point here.¹³ If not handled with care, further investment liberalization due to TTIP might aggravate such problems, particularly for smaller and less competitive EU countries, which receive large amounts of US FDI. If the trade agreement also includes portfolio investment in its definition of investment, as is the case with the more recent EU trade agreements (e.g. CETA), the structural vulnerability vis-à-vis short term and speculation-driven capital movements might become even more relevant. All of the four studies do explicitly deal with these issues. While we would consider it plausible to assume that liberalized trade flows under TTIP will not lead to a substantial change in the bilateral trade balance, which currently stands at an EU surplus of nearly €100 billion (2012, goods and services),¹⁴ the issue of capital movements has not been dealt with systematically in the TTIP studies (see section V.e. for a more detailed discussion). Given the experiences with the financial crisis since 2008, and the recurrent fluctuations of short term capital flows, as for instance recently into and out of emerging economies, it would seem to us that the effects of TTIP on the capital account merit considerably more attention.

¹³ While the trade surplus stood at €29.2 billion in 2009, Ireland had a current of account deficit of €4.9 billion, which was mainly caused by a large deficit in the net income from abroad, in the order of €28 billion. (see M. Burke "Who benefits from Ireland's (im)balance of payments?", <http://www.progressive-economy.ie/2010/08/who-benefits-from-irelands-imbalance-of.html> (last accessed 03/26/2014).

¹⁴ Data from European Commission/DG Trade website, <http://ec.europa.eu/trade/policy/countries-and-regions/countries/united-states/> (last accessed 03/26/2014).

(ii) The public budget balance

Public budgets are impacted by trade liberalization both on the income and expenditure side. We will here focus on the income side, and take up the expenditure side when discussing labour market adjustment costs in the next section.

A straightforward consequence of trade agreements is the reduction, if not elimination of tariffs. The latter, however, form part of public revenues. Thus, all other things equal, trade liberalisation will reduce public revenues and hence increase the government deficit. While tariffs still account for up to 40 % of public income in many LDCs, public revenue from tariffs in the EU and US is rather small. However, tariff revenues are an important income source for the EU budget. In 2012, roughly 12 % of the EU budget was financed via tariff revenues. In 2012, according to the European Commission (2013a, p55), tariffs levied on US imports amount to €2.6 billion, or 12 % of total EU tariff revenue. Depending on the simulation scenario, CEPR (2013, p54) reports reduced tariff income between €5.4 – €7.3 billion on a yearly basis by 2027, i.e. after the full implementation of TTIP. Thus, if we conservatively estimate the long-term or structural loss of tariff income to the EU to be in the range of €5 billion per year, of which 75 % (€3.75 billion) go into the EU budget as traditional own resources, that amounts to a permanent annual revenue loss of at least 2.7 % for the EU budget in its current magnitude. Though it is plausible that an increase of EU exports and thus output because of TTIP will also lead to an increase of GNI own resources for the EU budget, which will at least partially compensate for the lost tariff income, we would argue that in the short to medium term, a net loss to the EU budget will be likely. This owes to the fact that tariff revenue losses will happen immediately, while EU exports will only gradually increase over time. Thus, we would expect a need to adjust the EU financial framework over the short and medium term, after TTIP eventually enters into force. Though the European Commission in its impact assessment report does not expect any problem in compensating tariff losses by other funds (European Commission 2013a, p55), we would argue that although 2.5 % seem to be a manageable amount, in the prevailing austerity environment the political will of member states to give more money to the EU budget might be limited.

(iii) The level of unemployment

As shown before, the potential benefits from TTIP can only be generated by a sectoral reallocation of the production factors labor and capital. This long-term process necessarily involves job displacements in the short to medium run as sectors facing strong import-competition after liberalization have to reduce output and employment. It is widely recognized that adjustment costs are distributed unequally as certain individuals or groups, for instance older and less skilled workers in manufacturing bear a substantial burden of trade-related adjustments (OECD 2005). It is also likely that some output is foregone until all production factors will adjust to the new equilibrium which in consequence will lead to less employment, income and tax revenues for some period of time.

In general, trade related adjustment costs include private costs for labor such as unemployment, retraining costs or obsolescence of skills as well as adjustment costs for capital, for instance investments to become an exporter. In addition, increased spending for unemployment benefits, retraining and social security programs, as well as and lower tax revenues are likely to constrain the government budget (see also Laird/de Córdoba 2006, for more details). The inclusion of potential adjustment costs into an assessment of trade agreements is essential as it reveals possible winners and losers from trade liberalization beyond average welfare gains as well as the uneven distribution of possible benefits and costs within and between economies in a trade agreement.¹⁵ In addition, economic shocks

¹⁵ This would also have important implications on who should be part of FTA negotiations.

during the long term adjustment process (10-20 years) might increase the cost of adjustment and potentially reduce or eliminate gains from trade agreements.

In the analyzed studies on TTIP such negative effects on labor markets are understated with a commonly used argument: unemployment is a temporary phenomenon during an adjustment process that is overcompensated by higher income streams in the long run. The CEPR does not model long run unemployment at all in order to "... gather clearer insights on what would be the impact of the agreement on labor markets in the long-run" (European Commission 2013b, p15), meaning that the fixed labor supply will be fully employed after a transition period of 10 years. The BMWWT/ifo report suggests that all adjustment processes are completed within five to eight quarters (p14). BMWWT/ifo also refers to Trefler (2004) for the speed of adjustment. Trefler (2004), who analyzed adjustment processes in Canada after the free trade agreement (FTA) with the US in 1988, found evidence for likely aggregate welfare gains but reported substantial job losses associated with the FTA – 12 % for the import-competing industries and 5 % for manufacturing. And the author suggests, "... albeit not conclusively, that the transition costs were short run in the sense that within ten years the lost employment was made up for by employment gains in other parts of manufacturing" (p879). Evidence from changes in labor markets after NAFTA also raises questions whether trade-related negative impacts are only transitory or not (see section IV for more details).

In 2005, the OECD evaluated trade-adjustment costs in the labor market of its member states with interesting findings: Firstly, adjustment costs for trade-displaced workers are moderately higher than for other job losers due to slower re-employment (EU) and lower wages in new jobs (US). Secondly, displacements in EU manufacturing hits older, less skilled workers more likely, a characteristic which makes re-employment more difficult. However, differences to other displaced workers are limited. Finally, many displaced workers find a new job again in the same industry, but with slightly lower wages. Workers that switch industries even faced substantially lower earnings, in particular in the US. Also Francois et.al. (2011) refer to this study and emphasize that labor bears the bulk of adjustment costs and that "...trade reform can add significantly to job displacement if undertaken when the job market is already under stress, such as situations of economic recession or major structural change" (p224).

Regarding potential adjustment costs under TTIP, only rough estimations and suggestions based on CEPR (2013) and Bertelsmann/ifo (2013) findings on employment effects are possible. As fixed labor supply is assumed, CEPR reports only net reallocations among sectors in the EU and US. A displacement index shows how many workers have to move across sectors in order to regain balanced job markets. In the case of less skilled workers in the EU only less than 7 workers per 1,000 have to switch to another sector, in the US it is less than 5 workers out of 1,000. This is no surprise, given the limited changes in output and the different relevance of goods in EU-US trade and labor markets. In 2012, trade in goods amounted to 75 % of total EU trade volume but less than 30 % of the workforce was employed in the related sectors (Eurostat). Still, when putting the displacement number into perspective, within the EU between 0.43 and 1.1 million workers would be affected by such a transition. Although CGE models foresee an improvement for people due to a switch from low to more productive sectors with higher wages, the empirical evidence shows that a switch to another industry typically includes a loss in income (OECD 2005). CEPR also argues that a displacement index around 0.6 % is relatively small compared to normal labor turnover in the EU of more than 3.7 % since the crisis in 2008 (p78). However, the displacement index does not capture all relevant changes in labor markets "...as displacement across firms is widely ignored in this literature [on adjustment costs in CGE models]" (Francois et.al. 2011, p226).

CEPR publishes only sectoral net employment changes which are the outcome of larger gross job flows within a sector. Given heterogeneity of firms, reallocation of jobs mainly happens within sectors (OECD 2005, p36). This is also true for less competitive sectors that loose in terms of average productivity, output and real wages. Taking into account the high risk of long-term unemployment faced by older and less skilled workers in manufacturing once displaced (OECD 2005), and the reality of increasing long-term unemployment in OECD countries, a substantial part of the displaced workforce might be worse off with TTIP, even if average real wages as a whole are expected to increase. Furthermore, the assumption of no long-term unemployment in the case of the EU also implies sufficient labor mobility across EU member states. Given the diverging wage levels within the EU, labor movements from higher to lower wage countries are however most unlikely (see also EuroMemo Group 2014).

The Bertelsmann/ifo and the related BMWT/ifo studies try to overcome some of the conceptual limits of the other CGE models by modeling labor markets explicitly. The authors include search unemployment and heterogeneity of firms. Thus, productivity gains are translated into aggregate employment *and* wage effects (flexible labor supply). In addition, gross job flows are shown, at least for Germany (BMWT/ifo, p103). The employment effect in the BMWT/ifo study is relatively small with a decline in the unemployment rate of around 0.05 % in the EU and the US given the preferred NTB-Scenario, also due to rigid labor market institutions (p105).¹⁶ In absolute terms, the net increase in employment, and therefore the decline in unemployment, amounts to 124,000 new jobs of which 25,000 would be in Germany. In more detail, this would result from a loss of more than 22,000 jobs in Germany but the loss would be overcompensated by more than 47,000 new jobs due to TTIP (p103). BMWT/ifo sees job displacements mainly in small, labor intensive companies while new jobs occur in mid-size companies that become new exporters.¹⁷ Therefore, 90 % of total job creation should emerge in companies which are becoming new exporters.

Overall, it has to be stated that none of the studies provides an exact estimation of possible adjustment costs in labor markets. However, such an assessment would be crucial. A simple hint towards positive long-term effects understates the need for policy measures to mitigate the risk of welfare and employment losses for specific groups and individuals. In particular, the distressed situation in several European labor markets increases the need for the assessment of potential adjustment costs of TTIP even more.

(iv) Potential macroeconomic adjustment costs – a rough calculation

After discussing the different types of macroeconomic adjustment costs, that are relevant for the TTIP negotiations, we would like to illustrate the likely magnitude of these costs by offering a rough calculation. The calculation includes loss of public revenue and the costs of unemployment. It is our objective (i) to provide a conservative estimate and (ii) to provide a plausible number that indicates the order of magnitude we will likely have to tackle with. The loss of public tariff revenue is estimated on the basis of the reported number on tariff income from US imports in 2012 (European Commission 2013a), representing the lower bound, and the estimated tariff income loss in 2027 from the most ambitious liberalization scenario of the CEPR study, thereby assuming that over a 10 year period annual losses would reach the upper bound of €5.4 billion in 2027. Unemployment numbers were also taken from labour displacement estimates of the CEPR study, and assumed to be in the range of 430,000 – 1,100,000. Compared to the reported US job losses due to NAFTA (see section IV), we consider these numbers to be plausible. However, given the difficult labour market situation

¹⁶ Real wage effects, +1.63 % in the EU and +2.15 % in the US, are more relevant than changes in employment (BMWT/ifo 2013, p100).

¹⁷ BMWT/ifo is even more precise: new jobs will only be created in companies with 50-250 employees which were responsible for only 8 % of total employment in 2007.

in many EU member states and the evidence from the empirical literature (see discussion above), we assume that 10 % of the displaced persons will not find another (full-time) employment and will thus become long-term unemployed. We assume that the average length of their unemployment is five years during the ten year implementation period of TTIP. In accordance with most national unemployment benefit schemes, we further assume that during the first year workers will receive a higher net replacement rate (66 %) than for the following four years (41 %). For annual wages and replacement rates we use averages derived from OECD statistics. In contrast, we assume that 90 % of displaced workers will become re-employed after six months on average, without a loss compared to their pre-TTIP income level – again we are on the optimistic side. We also consider the foregone public income from taxes and social contributions from unemployment. Even if during the transition period, new jobs will be created in the sectors driven by additional exports, we would argue that much of that represents a net loss to the public budget, since exports will react more slowly than imports to TTIP implementation, so that in the best of cases net employment will only be at a higher level after the ten year implementation period. Upon that basis, we calculate a lower and an upper bound of cumulative adjustment costs of TTIP during the ten year implementation period. Our lower bound is €33 billion, our upper bound €60 billion. On an annual basis that would amount to €3 billion to €6 billion. Of these between €0.5 – €1.4 billion will come from unemployment benefits, and €0.4 – €1 billion from foregone income from taxes and social contributions.

Table 5: Macroeconomic adjustment costs – a rough calculation (in €, 2012 prices)

	Lower Bound (p.a.)	Lower Bound (cumulative, 10 year period)	Upper Bound (p.a.)	Upper Bound (cumulative, 10 year period)
1. Loss of Public Revenue				
Annual Loss of Tariff Revenues of 2.6 bn	2,600,000,000	26,000,000,000		
Annual Loss of Tariff Revenues of (€2.6+€5.4)*0.5			4,000,000,000	40,000,000,000
Adjustment Margin for Phase-Out Periods, and Carve-Outs for sensitive products (10%)	260,000,000	2,600,000,000	400,000,000	4,000,000,000
Sub-Total	2,340,000,000	23,400,000,000	3,600,000,000	36,000,000,000
2. Costs of Unemployment				
<i>a. Unemployment Benefits</i>				
43,000 long-term unemployed post-TTIP (Year 1)	681,120,000	681,120,000		
110,000 long-term unemployed post-TTIP (Year 1)			1,742,400,000	1,742,400,000
43,000 long-term unemployed post-TTIP (Year 2 - 5)	423,120,000	1,692,480,000		
110,000 long-term unemployed post-TTIP (Year 2 - 5)			1,082,400,000	4,329,600,000
387,000 short term unemployed post TTIP (6 months)		3,065,040,000		
990,000 short term unemployed post TTIP (6 months)				7,840,800,000
Sub-Total		5,438,640,000		13,912,800,000
<i>b. Foregone Public Income from Taxes and Social Contributions</i>				
43,000 long-term unemployed post-TTIP (Years 1 - 5)		2,039,705,000		
111,000 long-term unemployed post-TTIP (Years 1 - 5)				5,217,850,000
387,000 short-term unemployed post TTIP (6 months)		1,835,734,500		
990,000 short-term unemployed post TTIP (6 months)				4,696,065,000
Sub-Total		3,875,439,500		9,913,915,000
Cumulative Adjustment Costs - TOTAL		32,714,079,500		59,826,715,000

Sources: OECD Employment Statistics, Benefits and wages statistics, www.oecd.org/els/benefitsandwagesstatistics.htm (03/27/2014); Eurostat Labour Market Statistics, CEPR (2013), European Commission (2013a)

Assumptions: Average duration of long-term unemployment during TTIP implementation phase: 5 years; Average duration of short-term unemployment during TTIP implementation phase: 0.5 years; Number of displaced persons post-TTIP: 430,000 (lower bound) – 1,100,000 (upper bound), of which 90 % short-term and 10 % long-term unemployment

Notes: EU-27 average annual net income (3 family types, 100 % AW, 2012): €24,000; EU Net Replacement Rate (60 month unemployment, simple average of 4 family types and two earning levels (67 %, 100 % average wage)): 41 %; EU Net Replacement Rate (initial unemployment phase, simple average of 6 family types and three earning levels (67 %, 100 %, 150 % average wage)): 66 %; Implicit tax rate on labour (EU 27 2011): 35.80%; EU-14 average gross annual income (2011): €26,500;

If we compare these numbers to the maximum annual budget of the European Globalisation Adjustment Fund and the European Social Fund – €150 million and €10 billion respectively, it should be expected that TTIP will be a substantial additional burden on the budget of these

facilities. Given the historically high levels of unemployment in many EU member states, many-fold needs to fund employment policies do already exist and will have to compete for funds with TTIP adjustment policies. An increase of financial resources for these funds should thus be seriously considered by EU policy-makers.

b. The social costs of regulatory change

A type of adjustment costs conveniently ignored, but particularly relevant in the case of TTIP, refers to the regulatory change resulting from the agreement. This type of cost appears in various forms. Firstly, harmonization of NTMs, e.g. technical standards, will imply both a short-term adjustment cost for public institutions and for firms required to align their administrative procedures, production processes and products to the new standards. Secondly, mutual recognition of regulations and standards between trading partners will increase information costs for consumers, since the latter will be confronted with a more complex and potentially less transparent multiplicity of permissible standards, e.g. on goods and services. Thirdly, the elimination of NTMs will result in a potential welfare loss to society, in so far as this elimination threatens public policy goals (e.g. consumer safety, public health, environmental safety), which are not taken care of by some other measure or policy. Though subject to considerable insecurity, these types of adjustment costs might be substantial, and require careful case-by-case analysis. As we will see in the following, although the social costs of regulatory change are of particular relevance for the analysis of TTIP because of its emphasis of regulation issues, they have not been dealt with properly by the four scrutinized TTIP studies.

As already mentioned, around 80 % of the estimated economic benefits of TTIP stems from the dismantling of NTMs or their alignment. In their assessment of NTMs, two out of the four scrutinized TTIP studies draw on the work of Ecorys (2009). The other two study, CEP II and Bertelsmann/ifo employ a somewhat different methodology,¹⁸ but essentially share the same underlying philosophy with regard to NTM reduction. NTMs are basically understood as “all non-price and non-quantity restrictions on trade [...]. This includes border measures (customs procedures, etc.) as well as behind-the-border measures flowing from domestic laws, regulations and practices...” (Ecorys 2009, p xiii). The study focuses on both elimination of NTMs and of regulatory divergence, i.e. the existence of different regulations with the same purpose, e.g. technical standards for turn signals in the EU and US. The latter should be aligned, e.g. by negotiating a common new standard. These NTMs are understood to hinder the deep economic integration of the EU and US economies. Thus, their elimination or alignment to some common standard becomes desirable, as this would facilitate further economic integration. Ecorys then purports to estimate the quantitative significance of these NTMs by way of an elaborated procedure. Most importantly, in a survey companies and experts were asked to assess the level of restrictiveness of NTMs in bilateral trade.¹⁹ Upon that basis indexes were constructed which were then used to estimate the impact of NTMs on trade and investment flows, or in other words, to calculate trade cost equivalents of existing NTMs. In a further step, again with the help of experts, levels of actionability were established, i.e. assessments with regard to “the degree, to which an NTM or regulatory divergence can potentially be reduced...” (Ecorys 2013, p15). Actionability levels were determined to range from 35 to 70 %, with the average for the EU at 48 % and 50 % for the US. In a last step, these actionability levels were taken as inputs for the CGE scenario estimations in the three studies by Ecorys (2009), CEPR (2013) and CEP II (2013). In the

¹⁸ See Fontagné/Gourdon/Jean (2013) and Fontagné/Guillin/Mitaritonna (2011) for details. The Bertelsmann/ifo methodology is discussed in section V.d.

¹⁹ We should note that it remains unclear to us, how the survey manages to extract answers from respondents on regulatory divergence given the questions it asked. In our judgement, the latter only allows to establish overall restrictiveness levels (see Question A12a in Box 3.1., (Ecorys 2013, p10)).

optimistic scenarios, a reduction of actionable NTMs of 50 % and 25 % (e.g. by CEPR) were typically assumed (see section V.b. for details).

Though we have a number of reservations with regard to the details of the methodology (see section V.b. for a discussion), our concern here relates to the methodological approach in more general terms. First and foremost, the Ecorys study implicitly assumes that a substantial dismantling and alignment of NTMs between the EU and the US is possible without a change to the regulatory quality, i.e. the ability of a certain regulation or standard to safeguard a defined public policy goal. Only upon that basis, Ecorys is able to restrict itself to estimating the savings to companies because of NTM removal, while completely neglecting the social costs concomitant with that removal. Consequently, it arrives at in general small, but positive economic gains.

Overall, we think that using such an approach is not warranted, given that the Ecorys study derives very high gains from regulatory alignment in exactly those sectors – e.g. chemicals, cosmetics and pharmaceuticals, or food and beverages –, where substantial and partly incommensurable differences in regulatory approaches and standards between the EU and US exist. Any dismantling must have an effect on regulatory standards and thus infer a cost upon that society, which ends up with a lowered standard. In general, it must be recognized that a change in a standard will always alter the distribution of costs and benefits between social actors, e.g. between firms and consumers. Alternatively, also firms might be unevenly affected by regulatory change, the latter might e.g. favour big companies, while inferring an additional burden on small companies.

Undoubtedly, NTM dismantling will make sense in some cases, e.g. because the dismantled regulation has proven ineffective in serving a particular public policy goal, or continues to exist for purely historical reasons (e.g. differing track gauges between national railway systems). This may be true in individual cases, but must not be assumed as a general rule. Typically, regulations serve a public policy goal. If that regulation is changed – either dismantled or aligned to some other standard, its effectiveness in serving the public policy goal will eventually be affected. This might infer a social benefit, if the new standard is higher than the old one, or a social loss, if the new standard is lower than the old one or has been eliminated without substitution. The latter case is obviously the focus of the Ecorys study. Though without doubt difficult, the study does not make any effort to quantify social losses, but exclusively looks at the benefits of NTM reductions to companies and the economy. Social losses might come in the form of temporary adjustment costs, e.g. for harmonising and implementing legislation, or be of a long-term nature to society, e.g. if standards for poisonous chemicals were relaxed and resulted in higher public health costs because of a higher incidence of allergies amongst the population. This non-consideration of social costs is especially problematic, since the study estimates the trade cost reductions of TTIP to be particularly high in sensitive sectors such as chemicals, pharmaceuticals and cosmetics, food and beverages, or automobiles (see Ecorys 2009, Table 4.2, p23). Thus, in order to arrive at its optimistic welfare estimations, strong reductions/alignments of NTMs in precisely those sectors are necessary, where the safeguarding of public policy goals is perhaps most crucial. For instance, above average actionability levels were chosen for the sectors chemicals, cosmetics, food & beverages (see Ecorys 2009, Table 3.3, p16).

Not surprisingly, the overall welfare effect, which is computed by the CGE simulations, is very sensitive to the assumed actionability level. The higher actionability of NTMs, the higher the welfare gains. Actionability is defined as “the degree to which an NTM or regulatory divergence can potentially be reduced (through various methods) by 2018, *given that the political will exists to address the divergence identified*” (Ecorys 2009, p15, *emphasis added*). Actionability thus depends on political will, which however is assumed as given. This definition is highly problematic, since the political process is effectively assumed away, and

substituted for by an ad-hoc assessment of a sample of mostly business-related experts, which we would suspect exhibit a certain tendency to overestimate actionability. Thus, the determination of actionability levels is basically a more or less sophisticated guess of a group of persons with vested interests, and is not grounded on any kind of robust methodology.

This bias in the selection of respondents is clearly visible in the study. The study has primarily asked firms (5,500 in business survey) and business associations in the EU with regard to the restrictiveness of US regulations and vice versa. One should however suppose that firms and business associations have a tendency to overestimate the cost of complying with foreign standards, since they want to lower the cost of doing business abroad, and thus have a vested interest. In order to counter-balance this and increase the robustness of results, at the very least, one should have also asked US firms on their assessment of the cost of complying with US regulations, and EU firms on EU regulations. In addition, one might have asked experts with diverse professional backgrounds, e.g. people representing labor interests, consumers, human rights groups etc. for their assessment.

In terms of the robustness of its results, the study states that it has cross-checked its restrictiveness estimates with other existing measures, in particular the OECD FDI restrictiveness index (Ecorys 2009, p16). However, cross-checking the Ecorys NTM indexes with the OECD FDI restrictiveness index amounts to comparing apples with peaches. The latter focuses on four specific types of discriminatory measures: equity restrictions, screening and approval requirements, restrictions on foreign key personnel, and other operational restrictions – such as limits on purchase of land or on repatriation of profits and capital (Kalinova/Palerm/Thomsen 2010). Though there may be partial overlaps, the two indices essentially refer to different types of measures: while the Ecorys NTM indexes refer mostly to behind the border measures, which typically are not discriminatory, the FDI restrictiveness index refers primarily to specific types of discriminatory measures. In sum, it is questionable, whether the FDI restrictiveness index is a suitable vehicle for a robustness check of Ecorys' NTM indexes.

Also, the magnitude of income effects from NTM reductions in the Ecorys study is inflated by a factor of four for the EU and three for the US, by assuming that NTMs will not be aligned sector by sector, but economy-wide, i.e. reductions of NTMs in all sectors of the EU and US economies will occur simultaneously (Ecorys 2009, p27). This multiplication is justified on the grounds of sector inter-linkages, i.e. cost savings from NTM alignments, which are passed on to other sectors and thus reduce input costs and prices of end products. Similarly, the simultaneous reduction of NTMs across all sectors has a strong effect on output and exports, and investment in the affected sectors is expected to increase. We do not dispute that sector-linkages have a role to play. If, however, one makes the more realistic assumption that as a result of the TTIP negotiations NTM reductions/alignments will occur only in a subset of sectors – i.e. in some sectors, while not in others, because of e.g. national security or consumer protection reasons – the effects on income, output and exports will shrink substantially, as mentioned in section II.d.

c. Other neglected issues

One of the most controversially debated features of TTIP is investor-to-state-dispute settlement (ISDS). While a comprehensive discussion of ISDS is beyond the scope of this study, it should be evident that ISDS, if included in the final TTIP agreement, would eventually lead to litigation cases, which could entail compensation claims against the EU. This indeed seems to be quite likely, given the exceptionally high level of FDI between the EU and the US. The bilateral FDI stock stood at €2,400 billion in 2011 (European Commission 2013a, p9), annual FDI inflows from the US to the EU amounted to roughly €80 billion in the same year.

As a matter of fact, a strong increase in ISDS litigation has been observed. Indeed, ISDS has experienced a boom during the last two decades. According to UNCTAD, in 2012 alone 58 new cases were initiated, bringing the total number of known cases (concluded, pending or discontinued) to 514 by the end of 2012 (UNCTAD 2013, p110). 23 % or 123 of these were filed by US investors, with EU investors from the Netherland (50 cases), the UK (30) and Germany (27) following (Bizzarri 2013, p25). In some instances, countries have faced claims going into billions of Euro, with the highest award of US\$1.77 billion issued against Ecuador in 2012 (UNCTAD 2013, p111). According to UNCTAD, host countries – both developed and developing – have experienced that ISDS claims can be used by foreign investors in unanticipated ways. A number of recent cases have challenged measures adopted to act in the public interest, and policymakers in some countries have found that international investment agreements can unduly constrain their domestic regulatory prerogatives.²⁰

Given both the high amount of bilateral investment between the US and the EU and the proactive attitude of US and EU investors in using ISDS so far, it seems safe to assume that investors will use ISDS as an opportunity to discipline governments on both sides of the Atlantic. Thus, in case of successful litigation against the EU, compensation payments will have to be made. While it is of course not possible to provide an estimate on the timing and magnitude of such payments, from the experience so far, it should be clear that they can be substantial, and would present an additional burden on public budgets. A further and potentially even more important consequence of an ISDS mechanism in TTIP could come in the form of a threat effect to governments. ISDS gives investors an additional and powerful legal remedy, thus improving their bargaining positions vis-à-vis governments on issues of regulation. That might lead governments either to abstain from enacting public regulation outright for fear of being challenged before an international investment arbitration panel. Or alternatively, it might induce governments to accept forms of regulation, which privilege investor interests over the interests of the general public. The latter would of course imply a welfare loss for society.

By way of summarizing, we would posit that the four scrutinized studies have largely neglected a careful analysis of adjustment costs and the social costs of regulatory change. While to some extent this can be explained by the biases of applied theoretical framework, it must be stressed that in particular adjustment costs relating to the EU budget and labour market policies (retraining, unemployment benefits) will be substantial, and need to be dealt with at the political level. The social costs of regulatory change are by their very nature difficult, if not impossible to quantify. Nevertheless, they can be very large and thus require careful analysis, in particular in those areas where they relate to public security & health as well as environmental safety. It should also be stressed that a methodological approach for such an impact analysis is needed, that is characterized by inter-disciplinarity and the participation of all affected stakeholders. Last but not least, an investor-to-state dispute settlement mechanism, if included in TTIP, could lead to compensation payments by governments and have a disciplining effect on future regulation in the public interest.

²⁰ See UNCTAD website, [http://unctad.org/en/pages/DIAE/International%20Investment%20Agreements%20\(IIA\)/Research-and-Policy-Analysis.aspx](http://unctad.org/en/pages/DIAE/International%20Investment%20Agreements%20(IIA)/Research-and-Policy-Analysis.aspx) (last accessed 03/30/2014).

IV. LESSONS FROM OTHER TRADE LIBERALIZATION VENTURES – THE EXAMPLE OF NAFTA

Much of the discussion about TTIP focused on the possible effects on welfare and employment. Supporters of TTIP typically dismiss opposing arguments by highlighting that trade liberalization promotes the general welfare of society. This is frequently supported by commissioned research. Within the EU, the European Commission, in particular DG Trade, regularly uses commissioned studies demonstrating the positive effects of trade liberalization in order to support its proposals to initiate new negotiations on Free Trade Agreements. With regard to TTIP, for instance, Trade Commissioner Karel de Gucht frequently refers to the CEPR study and its alluring promise of an increase of €545 in the annual disposable income per household in the EU. This strategy is not new and has been applied in many similar instances in the past. Before the North American Free Trade Agreement (NAFTA) came into force 20 years ago in 1994, a campaign with a wide array of promises was launched under the headline of the promotion of growth and the creation of new jobs. President Bill Clinton argued on the basis of an optimistic interpretation of studies conducted by Hufbauer and Schott (1992, 1993), that NAFTA would result in boosting employment in the US by creating a net gain of 200,000 jobs within two years (Hufbauer/Schott 2005, p8).

Even though estimation techniques may have evolved to a more sophisticated level, the basic principle of simulating an uncertain future on the basis of questionable assumptions has endured. In this section, we will use the show-case example of NAFTA in order to argue that ex-ante projections of the impact of NAFTA had a tendency to overestimate welfare, wage and employment effects. Furthermore, nearly all ex-ante studies completely ignored that workers had to pay the vast bulk of adjustment costs. With respect to the current debate on TTIP, it is evident that ex-ante projections again play a crucial role in justifying trade liberalization and thus should be treated with the appropriate skepticism. Scrutinizing the scientific debate on NAFTA should thus serve as a cautionary tale for the on-going TTIP discussion.

The objective of this section is to examine the accurateness of ex-ante studies that presented projections on the economic impact of NAFTA. It is *not* the primary task to examine the methodology of the studies. Instead we try to draw a picture of possible differences between ex-ante projections and ex-post evaluations on the impact of NAFTA. The literature on the effects of NAFTA is extensive, thus we cannot claim completeness. Our analysis will nonetheless capture the general tendencies that emerged from some of the most widely cited studies.

Whereas forecasting methods rely mainly on CGE models, various approaches have been used to assess the actual impact of NAFTA. Most ex-post studies apply qualitative and quantitative research, as well as econometric analysis. The major limitation of ex-ante projections is their basis: shaky assumptions, in particular with regard to the results of the negotiations. On the other hand, ex-post evaluations suffer foremost from the very difficult task of distinguishing between what happened *since* NAFTA and what happened *because of* NAFTA.²¹ The quality of results varies widely, since not all studies pay the attention necessary to these issues. For this reason, all presented results should be interpreted with caution. Another important matter is the difference between the scenarios as defined for the purpose of CGE modeling and the actually concluded trade agreement. Regarding tariffs, ex-

²¹ The effect of NAFTA on trade is highly disputed. For example, Pacheco-López and Thirlwall (2004) believe that NAFTA had no significant effects on trade whatsoever. Other studies concerned with this subject are for example Agama/McDaniel (2002), Naanwaab/Yeboah (2012), Gould (1998), Colyer (2001), Okun et. al. (2003) and Krueger (2000). The evaluation of this issue is beyond the scope of this study, but it should be kept in mind that all discussed ex-ante and ex-post estimates reported by us do imply an effect of NAFTA on trade flows.

ante simulations generally modeled the abolishment of all tariffs. These scenarios are roughly in line with NAFTA regulations, despite a few minor exceptions. Even though NAFTA was not fully implemented until 2008, most provisions were already put into effect around the millennium.²² Ex-ante simulations commonly also included NTMs²³ and foreign direct investment (FDI)²⁴. Because NAFTA did include a wide array of directives regarding the reductions of NTMs, CGE simulations accounting for the impact of NTMs should be included in our survey. Furthermore, NAFTA also covered the interests of foreign investors by applying national treatment, and by introducing investor to state dispute settlement (NAFTA 1992; Hufbauer/Schott 1993, 2005). Since the Canadian-US Free Trade Agreement (CUFTA) was already in place and Mexico had implemented comprehensive trade liberalization measures in the 1980s, Pacheco-López and Thirlwall (2004) believe the major effect of NAFTA to be on FDI.²⁵ For this reason we also need to include ex-ante FDI scenarios in our comparison.

Ex-ante projections of real GDP, real wages and employment

In this section we will try to assess the overall tendencies of ex-ante projections for NAFTA. A summary on the basis of 11 studies and 22 different experiments is presented in Table 6 and Figure 7. Further information on the cited studies is presented in Table 7. All results are based at least on tariff elimination. In addition, some studies include NTM reductions and a few FDI flows. Taking into account the actual importance of NTMs and FDI in the NAFTA agreement, some of the defined ex-ante scenarios do not seem to capture the full scope of NAFTA and therefore should present relatively conservative estimations, while more comprehensive scenarios should represent the concluded agreement in a more adequate manner.

Ex-ante projections of real GDP and national income were relatively homogeneous. For the US, NAFTA was expected to have only a small positive impact. Most predictions range between 0.1 % and 0.3 % real GDP growth as a result of NAFTA (Table 7). For Mexico, the expectations were more optimistic. Including NTMs in the scenarios, most studies projected real GDP growth well above 2 %. The consideration of FDI raised impact projections for NAFTA even further. To illustrate, Brown, Deardorff and Stern (1992) calculated a GDP gain of 5 % and Hinojosa-Ojeda and Robinson (1991) an increase of 6.4 % when including tariffs, NTBs and FDI in their experiments. Data for NAFTA projections on Canada is less extensive and varies widely. For example, Brown, Deardorff and Stern (1992) expected 0.7 %, Cox and Harris (1992) 1.49 % and Roland-Holst, Reinert and Shiells (1994) between 0.4 % and 10.6 % GDP/welfare growth as a result of NAFTA. Overall, we find a median of 0.14 % GDP growth for the US, 2.27 % for Mexico and 1.1 % for Canada (Figure 7).²⁶

The effects of NAFTA on real wages were expected to be positive for all three countries. The smallest impact was calculated for the US, generally projecting no more than 0.2 % of real wage growth. For Mexico, the estimated wage gains were enormous – also depending

²² Most tariff reductions were realized in 1994. The remaining tariffs were to be gradually phased out within 5, 10 and 15 years (NAFTA 1992, Ch. 3, Annex 302.2). Several acceleration exercises speeded up the process (SICE 2014).

²³ The scenarios for NTMs vary widely. While some results are based on sectoral or partial NTM reductions, others are the outcome of the abolishment of all NTMs (Brown/Deardorff/Stern 1992; Francois/Shiells 1992). Regarding import quotas, NAFTA comes relatively close to the more optimistic scenarios (Hufbauer/Schott 1993, 2005; NAFTA 1992).

²⁴ Scenarios including FDI concentrate on the impact on Mexico. FDI are linked to an increase in capital stock and thus to an increase in output. In our study survey, increases of up to 10 % in Mexico's capital stock due to FDI were assumed (not necessarily coming from the NAFTA area). While there is little doubt that NAFTA boosted FDI dramatically (Cuevas/Messmacher/Werner 2005; Pacheco-López/Thirlwall 2004; Waldkirch 2003), the assumed positive effects remain questionable (see next chapter).

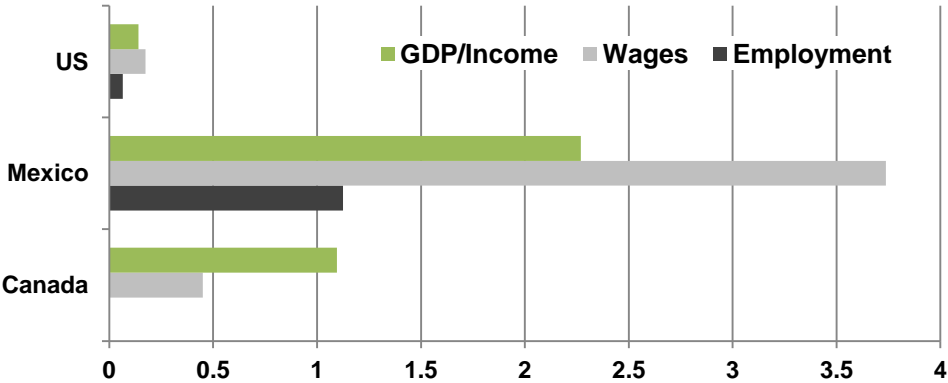
²⁵ Cuevas, Messmacher and Werner (2005) estimate, that NAFTA increased FDI inflows to Mexico by 60 %. Waldkirch (2003) gets similar results.

²⁶ By analyzing results of studies surveyed by the US International Trade Commission, Baldwin and Venables (1995) present a median of 0.16 % GDP growth for the US, 2.5 % for Mexico and 3.26 % for Canada.

mainly on the inclusion of FDI in the CGE experiments. Whereas calculations without increasing FDI inflows as a result of NAFTA projected an impact of below 1 %, FDI would boost expectations for real wage growth in Mexico on the order of 6 – 9 % (Table 7). The most optimistic projection was given by Sobarzo (1991), presenting an impact of 16.2 % by holding employment fixed. For Canada, the limited literature shows relatively small gains of 0.4 – 0.5 % in the case of Brown, Deardorff and Stern (1992) and relatively large gains of 1.3 % in the case of Cox and Harris (1992).

Even though expected employment gains were used as the major sales argument in the US, ex-ante projections did not necessarily support this on a broad basis. The often cited free-trade advocates Hufbauer and Schott (1992, 1993) calculated a net gain of 130,000 to 170,000 jobs due to NAFTA, to materialize within a few years. DRI/McGraw-Hill (1992) expected an *annual* growth of 160,000 to 221,000 jobs in the US (1993-2000). Roland-Holst, Reinert and Shiells (1994) projected an increase between 0.08 % and 2.47 % in employment – depending on the set of assumptions (Table 7). Nonetheless, most studies did not expect a meaningful impact on the US labor market (O’Leary/Eberts/Pittelko 2012). For Mexico, expectations were however high. Most notably, the studies of KPMG Marwick (1991), Sobarzo (1991) and Roland-Holst, Reinert and Shiells (1994) calculated employment gains between 2.4 % and 6.6 %. In our literature review, only Roland-Holst, Reinert and Shiells (1994) presented employment projections for Canada, ranging between 0.61 % and 11.02 %.

Figure 7: Results of ex-ante simulations for NAFTA



Sources: Francois/Shiells 1992: Table 2a, 2b, 2c; Brown/Deardorff/Stern 1992: Table 1, 2; CBO 1992
 Median change in %; Own calculations based on 11 studies and 22 different experiments. Not sufficient data for Canadian employment available. Data on real GDP/income reflects GDP except for two experiments.

Table 6: Simulation results of most cited ex-ante studies

	United States	Mexico	Canada
Real GDP	0.0 to 2.07	-0.35 to 11.39	0.12 to 10.57
Real wages	-0.7 to 0.95*	0.4* to 16.2	0.04 to 1.3**
Employment	-0.3 to 2.47	-0.1 to 6.6	0.61 to 11.02

Source: extended table of Brookhart et. al. 1993: Table 2-1; see also Francois/Shiells 1992: Table 2a, 2b, 2c and Brown/Deardorff/Stern 1992: Table 1, 2. For more specific information about most of the here considered studies see Table 7.
 In %; Summary based on 11 studies and 22 different experiments. *unweighted average of four different job classifications, **comparison base is the impact of the Canadian-US Free Trade Agreement.

Ex-post evaluations on real GDP, real wages and employment

The impact of NAFTA on real GDP and welfare as evaluated by ex-post studies seems to be significantly lower than expected by ex-ante projections, even though the literature is not extensive. Caliendo and Parro (2014) estimated an impact on welfare between 1993 and 2005 due to NAFTA tariff reductions to 0.08 % for the US, 1.31 % for Mexico and -0.06 % for Canada. This is by far the most optimistic estimate and is already well below most ex-ante expectations. A study conducted by the Congressional Budget Office (2003) estimates the annual impact of NAFTA on US-GDP to be between 0.001 – 0.005 % in 1994 and between 0.006 – 0.042 % in 2001. Similarly, the US International Trade Commission (Okun et. al. 2003, p332) finds the effect of NAFTA on US-welfare to be negligible. A World Bank study (Lederman/Maloney/Serven 2003) quantifies the increase of Mexican GDP per capita as a result of NAFTA to be at 4 – 5 % until 2002. Weisbrot, Rosnick and Baker (2004) show that the data used in the World Bank model is biased. By using the same model as the World Bank study with reasonable data, they find that NAFTA actually slowed the growth rate for Mexico. Along the same lines, Romalis (2007) discovers no effect of NAFTA on US and Canadian GDP, but a decrease of 0.3 % in Mexican GDP.

After NAFTA came into effect, real wages in member countries were either stagnating, or – as in the case of Mexico due to the peso-crisis – decreasing (Polaski 2006). While this development occurred *since* NAFTA, it cannot be attributed *to* NAFTA. Caliendo and Parro (2014) believe the impact of NAFTA tariff reductions on real wages between 1993 and 2005 to be positive for the US (0.11 %), Mexico (1.72 %) and Canada (0.32 %). Again, this study is relatively optimistic. Polaski (2006) attributes the decoupling of productivity growth from wages in the US and Mexico to the decreasing bargaining power of labor unions as a result of FTAs. A study on plant-closing threats in connection with NAFTA conducted by Bronfenbrenner (2000) supports this idea. McLaren and Hakobyan (2010) show that wage growth for workers in US-industries affected by NAFTA was substantially lower. Waldkirch (2008) believes that increased FDI inflows as a result of NAFTA raised productivity in Mexico, but FDI's “[...] *effect on average compensation per worker is negative or zero at best*” (p3). Hanson (2003) finds that NAFTA contributed to rising income inequality in Mexico, with an unknown effect on the general wage level. Wage growth for high skilled workers and workers in the north with exposure to foreign markets and FDI turned out to be significantly higher than for unskilled workers and workers in the south. Generally, the link between increasing income inequality and NAFTA seems to be widely accepted (Abbott 2004, p12ff.). As a conclusion, most ex-post evaluations do not find a noteworthy positive effect of NAFTA on real wages – quite to the opposite. The few studies that do find a positive impact still cannot fulfill the big promises announced by ex-ante assessments (Figure 7).

Because the political discussion prior to the implementation of NAFTA focused especially on employment, the discussion on the actual impact of NAFTA has been heated. Nonetheless, the broad consensus is that expectations were not confirmed. Even the free-trade advocates Hufbauer and Schott, who's results were widely referred to before 1994, seem to have lost faith, stating that “[...] *NAFTA is no more than a blip on US employment picture*” (Hufbauer/Schott 2007, p85). Furthermore, the general discussion shifted from ex-ante projections trying to assess the job gains induced by NAFTA, to ex-post evaluations focusing on the question of net losses. Scott (2011) believes that 682,900 jobs in the US were displaced between 1994 and 2010 as a result of the NAFTA related trade deficit with Mexico. In his simple calculation, 791,900 jobs were created by US exports to Mexico and 1,474,800 jobs were lost due to US imports from Mexico. Kletzer (2002) estimates that the US lost 1,238,593 jobs due to NAFTA related imports, accounting for 24-27 % of manufacturing job losses and 10.7 % of total job losses between 1993 and 1999. Hinojosa-Ojeda et. al. (2000) concludes that 94,000 jobs in the US were “*put at risk*” every year due to NAFTA-related

imports (Data: 1990-1997). A highly recognized estimate for US job losses is presented by the Trade Adjustment Assistance (TAA), an institution implemented to absorb negative effects of free-trade related job displacement. Data from the NAFTA-TAA suggests that a minimum of 845,000 US workers were displaced due to increased imports from Canada and Mexico since 1994 (Public Citizen 2014). For Mexico, one would expect more positive estimates due to the longer lasting trade surplus with the US, but this is not the case. Polaski (2006) finds that NAFTA has only produced a disappointingly small net gain in jobs: *“Data limitations preclude an exact tally, but it is clear that jobs created in export manufacturing have barely kept pace with jobs lost in agriculture due to imports”* (p1). Polaski believes that increasing productivity is a major job killer in Mexico (p1ff.). Salas (2006) concludes that approximately one-sixth of the Mexican population with jobs in the agricultural sector got displaced since the beginning of the 1990s – in part as a result of NAFTA. The biggest loss occurred in the corn production sector, accounting for 1,013,000 displaced jobs. Salas (2006, p49) also notes that FDI inflows into Mexico have grown significantly since NAFTA, but that these were mostly used to purchase existing assets and thus did not affect the real economy as much as was hoped.²⁷ This is particularly interesting since the highly optimistic ex-ante projections for Mexico were mainly an outcome of FDI flows.

In sum, our review of the available literature suggests that a significant gap exists between ex-ante projections and ex-post evaluations with regard to NAFTA’s effects on GDP, wages and employment. Most ex-ante models had a tendency to overestimate the benefits and underestimate the costs of free-trade. Even though estimation techniques may have evolved to a more sophisticated level during the last two decades, the basic impact assessment methodology for trade liberalization has remained largely unchanged. Policy makers should thus treat the results of ex-ante projections on TTIP with the appropriate skepticism.

²⁷ Nonetheless, Waldkirch (2008) finds a connection between non-maquiladora FDI and productivity increases in Mexico.

Table 7: Summary of most cited ex-ante CGE studies on NAFTA

Summary of most cited ex-ante CGE studies											
Author, Year	Methodology	Experiment	Key Findings								
			Real GDP / Real Income			Wages			Employment		
			US	MEX	CAN	US	MEX	CAN	US	MEX	CAN
Brown, Deardorff and Stern, 1992	IRS, Static, IC	2	0.1	1.6	0.7	0.2	0.7	0.4	-	-	-
	IRS, Static, IC	3	0.3	5	0.7	0.2	9.3	0.5	-	-	-
KPMG Peat Marwick, 1991	CRS, Static, PC	2	0.02	0.3	-	0.02	-	-	-	0.9	-
	CRS, Static, PC	3	0.04	4.6	-	0.03	-	-	-	6.6	-
Hinojosa-Ojeda and Robinson, 1991	CRS, Static, PC	2	0	0.3	-	0.175*	0.4*	-	-	-	-
	CRS, Static, PC	3	0.1	6.4	-	0.175*	8.65*	-	-	-	-
	CRS, Static, PC	4	0.1	6.8	-	0.95*	6.55*	-	-	-	-
Roland-Holst, Reinert and Shiells, 1994	CRS, Static, PC	1	0.06	0.13	0.38	-	-	-	0.08	0.33	0.61
	CRS, Static, PC	2	1.34	2.27	7.22	-	-	-	1.88	1.49	8.96
	IRS, Static, IC	2a	1.3	2.57	5.82	-	-	-	1.79	1.73	7.29
	IRS, Static, IC	2b	2.07	3.38	10.57	-	-	-	2.47	2.4	11.02
Cox and Harris, 1992	IRS, Static, IC	1c	-	-	1.49**	-	-	1.3**	-	-	-
Sobarzo, 1991	IRS, Static, IC	1d	-	1.7	-	-	-	-	-	5.1	-
	IRS, Static, IC	1e	-	1.9	-	-	-	-	-	5.8	-
	IRS, Static, IC	1f	-	8	-	-	16.2	-	-	-	-
McCleery, 1992	CRS, Dynamic, PC	2	0.22	0.01	-	-	-	-	-	-	-
	CRS, Dynamic, PC	3	0.32	3.09	-	-	-	-	-	-	-
	CRS, Dynamic, PC	3g	0.51	11.39	-	-	-	-	-	-	-
Young and Romero, 1992	CRS, Dynamic, PC	1h	-	2.6	-	-	-	-	-	-	-
	CRS, Dynamic, PC	1i	-	8.1	-	-	-	-	-	-	-

Sources: Original studies; CBO 1992; Francois/Shiells 1992: Table 2a, 2b, 2c; Brown/Deardorff/Stern 1992: Table 1

(1) = Tariff abolishment, (2) = 1 + NTM reductions, (3) = 2 + and FDI/capital flows, (4) = 3 + labor migration; (a) = Cournot competition, (b) = Contestable markets, (c) = comparison base is the impact of CUFTA, (d) = fixed wage, capital stock and trade balance, (e) = fixed wage, capital stock and exchange rate, (f) = fixed employment and exchange rate, international mobile capital, (g) = endogenous productivity, (h) = fixed interest rates at 10 % in Mexico, (i) = interest rates fall to 7,5 % in Mexico; CRS = Constant return to scales, IRS = Increasing return to scales, IC = Imperfect competition, PC = Perfect competition; *unweighted average of four different job classifications. See Francois/Shiells (1992) for a more detailed discussion of the models.

V. TECHNICAL CRITIQUE OF TTIP IMPACT ASSESSMENT STUDIES

a. Origins and development

One can think of the origins of the various models along two different lines. One retraces the academic discourse from Ricardo's comparative advantage to today's theoretical trade models. The other – necessarily intertwined – strand retraces the development of the applied trade policy models that are put forth in debates such as this one regarding TTIP.

Let us briefly consider theoretical developments first. Ricardo's (1817) theory of comparative advantage states that countries can mutually gain from trade by specializing in the production of the goods at which they are relatively proficient. Gains materialize even if one country is less efficient in the production of any of the goods than all other countries. In all countries, average productivity rises with specialization in the *relatively* more productive sectors. Hence, the gains from trade arise from technological differences – from differences in labor productivity. The Heckscher-Ohlin trade model introduces capital as a second factor. The gains from trade are then driven by factor endowments: the relatively capital abundant country exports capital intensive goods, and imports labor-intensive goods. Still, differences in factor endowments determine patterns of comparative advantage, which drive changes in productivity and, consequently, *prices*. With this crucial extension, the theory of comparative advantage predicts trade between developed and developing economies, as the former are relatively capital abundant, the latter relatively capital scarce. These trades are “machines for t-shirts,” meaning inter-industry trade. While trade does occur along these lines, the vast majority of trade occurs between relatively capital abundant countries, trading “cars for cars,”²⁸ meaning intra-industry trade.

The introduction of imperfect competition, scale economies and “love for variety” addressed this puzzle. Firms in an industry with imperfect competition have market power and can charge prices in excess of marginal costs, thus extracting economic profits. Average costs of these firms are falling, which implies that efficiency increases with output. Crucially, a firm's output is a *differentiated product*, so that it is, however marginally, different from a competitor's product – think of a Samsung versus Sony flat screen TV. The last piece of the puzzle is that consumers' value variety: the more such products to choose from, the higher is the consumer's “utility.”²⁹ Now suppose a firm gains access to a new market, and demand for its product increases. Costs, and, in consequence, prices decrease – again driving the gains from trade.

The market structure underlying this model is monopolistic competition. The assumption of monopolistic competition is convenient because it means that firms behave as if they had a monopoly, while their products, though differentiated, are (imperfect) substitutes. This precludes strategic interaction, but maintains pricing power, falling average costs, and explains intra-industry trade. Adam Smith was an early proponent of this type of trade. The modern reformulation is commonly attributed to Krugman and Helpman.³⁰

More recent developments focus on firm heterogeneity. Important stylized facts in this context are that (1) firm populations in an industry have substantially differing productivity levels, and (2) that only the most productive firms in an industry export. In fact, the vast majority of international trade is conducted by a tiny minority of firms. Here, gains from trade liberalization reduce cost barriers for the firms “near the exporting threshold,” which then see

²⁸ Any standard textbook provides further background. See, for example, Feenstra (2004, p1-63).

²⁹ These are *Dixit-Stiglitz preferences*, following Dixit and Stiglitz (1977).

³⁰ See Krugman (1979, 1980) as well as Helpman/Krugman (1985).

average costs falling, productivity rising, and prices falling. As low productivity firms exit the industry, average productivity rises – and prices fall, driving the gains from trade.³¹

These theoretical models are *general equilibrium models*. In their various guises, they assume that agents are able to calculate and obtain their optimal economic allocations: firms maximize profits subject to costs and market structure, and households maximize utility subject to their budget (and time) constraint. The resulting equilibrium *maximizes welfare*, in the sense that nobody (or no group) could be made better off without making somebody else (or some other group) worse off. Two issues are relevant here.

First, the theory of general equilibrium has been in shambles for a while. One important issue relates to the so-called *Sonnenschein-Mantel-Debreu* (SMD) result. The SMD result is that individual rationality and “normal” preferences – such that demand decreases when the price increases – do not imply such a demand function in the aggregate. In consequence, there can be multiple equilibria, and they might not be stable. Further, a key assumption of general equilibrium theory is that all economic transactions are undertaken *at equilibrium prices*. If trades are made out of equilibrium, endowments change, which in turn change the not-quite-so-general equilibrium. These and other criticisms are raised within the bounds of the methodology of general equilibrium theory. One can, of course, go beyond that and consider the validity of assumptions. Among these, individual rationality is seen as a most unrealistic starting point. Despite all of these known problems associated with questionable assumptions and dead-end theorizing, standard trade models continue to build their analyses on the fairy tale of the welfare theorems.³²

Second, when we proceed to an *applied CGE model* we inevitably move from the realm of pure microeconomic theory to a world where macroeconomic constraints matter. General equilibrium *theory* rests on a purely theoretical, idealized construct of individuals exchanging endowments. Theoreticians such as Arrow and Hahn therefore recognize that general equilibrium carries no meaning for real world analysis, but only provides a vision for what *the world would need to be like for the welfare theorems to matter*. In sharp contrast, applied CGE models describe firms and households and governments and consumption and investment – and, therefore, describe a *macroeconomy*. Invariably, the proponents of these models want to highlight and hold on to microeconomic theoretical foundations, rather than discuss the implicit macroeconomic narratives.³³

It should further be noted that early versions of these policy models were decidedly not general equilibrium models. In this sense, the label *computable general equilibrium* model is a misnomer. Equilibria described by these models are general only in the sense that they satisfy all the accounting constraints of a macroeconomy, but are not general in the sense that they describe an optimal welfare allocation among microeconomic agents. For reviews of these and related issues, see Robinson (2003), Mitra-Kahn (2008) and Taylor (2011).

³¹ See Melitz (2003) as well as Bernard et.al. (2003) for important theoretical contributions. Bernard et.al. (2007) provides a survey. The BWMT/ifo study includes firm heterogeneity; and is discussed in more detail in Section V.d.

³² For a review of these and related themes, one might consult a standard microeconomic textbook, such as Mas-Colell/Whinston/Green (1995). Kirman (1992), Ackerman (2002) and Syll (2014) present critical discussions. Foley (2010) considers out-of-equilibrium trading, and consequences for the welfare theorems, in detail. A classic reference is Kaldor (1972).

³³ For example, in a review of the model in CEPR (2013), it is argued that “[t]he CGE model used by CEPR is state-of-the-art. It needs to make assumptions about the economy in order to work but these are *as reasonable as possible to make it as close to the real world as possible*. For instance, it is able to account for the effects of economies of scale, different skill-levels of employees, imperfect competition between companies and many other features of the real world economy.” (European Commission 2013b, p3-4, our emphasis) Note that all these ‘reasonable’ assumptions refer to *microeconomics*; no macroeconomic assumptions – full employment, balanced budget, etc. – are discussed.

b. The Quantification of Non-tariff measures

Non-tariff measures (NTMs) are, as the name implies, impediments to trade *other than tariffs*. NTMs are one crucial – since potentially *actionable* – component of overall *trade costs*. NTMs can be regulations, laws, procedures, or safety standards – in short, any domestic policy measures that do affect trade flows.³⁴ Here we briefly introduce some of the key issues. In the following sections, we discuss trade costs more generally, as well as how the studies by Ecorys and Bertelsmann/ifo have addressed these issues.

To get started, note that the key idea behind NTM removal – as is the case with tariff removal – is to increase economic efficiency. Very often, macroeconomic processes and constraints complicate that simple sounding task. We will discuss NTMs, the models, and the reports through that lens, which means in turn that we will not focus on potential but fundamentally unknown costs to removal of NTMs. Specifically, consider genetically modified GMO foodstuffs. The US position is that current science suggests GMO food is safe. The European position is that precaution should be applied; and GMO food should not generally be approved. If there turn out to be downsides that ‘current science’ does not foresee, and costs arise, these would have to be added to the arguments against TTIP. None of the studies ventures into such terrain, and neither will we.

That said, how do NTMs differ from tariffs as they relate to the vaunted economic efficiency? Removal of NTMs is quite a different animal than tariff removal. Tariffs are a revenue generating policy instrument that affects firm costs. Historically, and still in some developing countries, tariffs are *the* prime source of revenue generation. Other than that, the purpose of tariffs is to provide a degree of protection to domestic firms. Removal changes costs, prices, government revenue and trade flows, and increases competition for domestic firms.³⁵

NTMs, on the other hand, do not usually generate revenue, and their purpose is not necessarily to insulate domestic firms from competition, though that is certainly possible. For firms, NTMs can be cost increasing, or rent producing. NTMs produce rents if they restrict market access for foreign firms. These do insulate the domestic firm from competition, and enable it to charge higher prices. NTMs that increase costs are rather “like a tariff” for the foreign firm.

Let us consider examples to highlight these issues. One market access restricting NTM could be a quota for imports of genetically modified soy. (Here we go again.) Another market access restricting NTM would be a ban on genetically modified soy imports. A cost increasing NTM would be differing requirements for documentation of origin of genetically modified soy products. The quota and the ban produce rents, but presumably only the quota’s purpose is to limit competition. Documentation requirements increase costs “like a tariff,” and thus reduce competition.³⁶ Rather unlike a tariff, documentation requirements or a ban might be driven by cultural differences and difficult to overcome.³⁷

³⁴ Ecorys and Bertelsmann/ifo use slightly different definitions of NTMs. Ecorys considers NTMs as those policy measures affecting trade other than tariffs and quotas, while ifo lumps quotas into NTMs. ifo does as well label regulations affecting trade as “trade policy” (Bertelsmann/ifo 2013, p7). The ‘gravity literature’ usually considers as well inferred barriers associated with language, culture, and currency, among others, as NTMs. In this introduction, we focus on a broad conceptualization to motivate later, more detailed, discussions.

³⁵ Removal of policy measures is specifically relevant when they alter government revenues. These imply macroeconomic fiscal effects. As will be seen later, these need to be “assumed away” to maintain supply side determination of output.

³⁶ The respective reports discuss these matters in a similar manner, albeit without reference to food: CEPR (2013, Box 1, p16), Bertelsmann/ifo (2013, p6/7), Ecorys (2009, p xviii), and CEPII (2013, Box, p8).

³⁷ It should be noted that within the perverse logic of a general equilibrium model, the “cultural barriers” meant here could be overcome through compensation, or, more aptly maybe, bribes to the unwilling populations. One might ask them, “what’s it worth to you?” and then arrange the relevant transfers. This is obviously quite different than the potential though unknowable future costs of experimentation with the world’s gene pool discussed previously.

These issues matter greatly in the estimation of potential benefits from NTM removal – since, in the first place, *the higher the estimated NTM to be removed, the higher the potential benefits*. Moreover, the larger the “removable” (or *actionable*, in Ecorys’s terminology) share of the estimated NTM, the higher the potential benefits. Removable here means that one considers a (market access restricting or cost increasing) NTM to be potentially lowered or eliminated. In the above example, Europeans might not be willing to accept genetically modified soy imports, and instead prefer to pay slightly higher prices than otherwise for genetically unmodified soy.

It matters further whether barriers are cost or rent producing. Cost increasing NTMs represent a “welfare loss,” in general equilibrium parlance, since the equilibrium without the distortion would be more efficient, or “pareto superior,” to the equilibrium with the distortion. Rent producing NTMs, in contrast, lead to redistribution from consumers to producers, since the latter’s market power would be higher than without the distortion. All of this will be important further below when we discuss scenario design and simulations. Next, we discuss the estimation of *trade costs* in general.

Trade costs

What are trade costs? Anderson and van Wincoop (AVW) (2003, 2004) present estimation of trade costs and a detailed survey. Both Ecorys and Bertelsmann/ifo refer to these two papers as principal sources.³⁸ That warrants a closer look. First, consider the following definition:

“Trade costs, broadly defined, include all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself: transportation costs (both freight costs and time costs), policy barriers (tariffs and nontariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail).” AVW (2004, p691)

This definition highlights the inherent problem in estimating trade costs: many components of these costs are unobservable. Even if they are in principle observable, data availability is spotty. In AVW’s (2004, p693) words, “[t]he grossly incomplete and inaccurate information on policy barriers available to researchers is a scandal and a puzzle.”

Regarding NTMs, a further difficulty arises: Where data is available, it concerns their *incidence* rather than their *restrictiveness*. In other words, and following “Jon Haveman’s extensive work,” (AVW 2004, p696), available data on NTMs provides sectoral coverage ratios by country. This work classifies NTMs narrowly defined as “basically price and quantity control measures and quality control measures, while broad coverage is the narrow classification plus threat measures related to antidumping.” (AVW 2004, p699) Table 8 shows this narrow and broad measure for the US and EU, which puts the broad trade weighted coverage ratio at about 38 % of products for the US and 10 % of products for the EU. The large discrepancy between narrow and broad measures for both US and EU suggests that threat measures loom particularly large. Sectoral data reported in Table 4 of AVW (2004) further indicates that agriculture, food products, textiles & apparel and wood & wood products feature the highest coverage ratios.

³⁸ Bertelsmann/ifo (2013, p8) notes that “[a] detailed representation of the empirical model would overwhelm this study. Instead let us simply mention here that econometric estimation of the gravitation equation has made great progress in recent years, including the ground-breaking work of Anderson and van Wincoop (2003, 2004)” – which is all there is in terms of documentation of estimation procedures. James Anderson – one of the two authors of the Anderson and van Wincoop papers – served as an academic advisor to Ecorys. Annex III, which details estimation methodology applied there, follows these papers closely, and presents a discussion that focuses on NTMs (Annex III, Section III.2.6, p208-210). Henceforth, we will refer to these two papers as AVW (2003, 2004).

Table 8: NTM coverage ratio

NTM	Narrow Ratio	Trade weighted	Broad Ratio	Trade weighted
EU	0.8	4.1	9.5	10.6
US	1.5	5.5	27.2	38.9

Source: Adapted from AVW (2004, p699, Table 3). We reproduce here the caption from AVW.

Notes: The data are from UNCTAD's TRAINS database (Haveman repackaging). The "narrow" category includes, quantity, price, quality and advance payment NTBs, but does not include threat measures such as antidumping investigations and duties. The "broad" category includes quantity, price, quality, advance payment and threat measures. The ratios are calculated based on six-digit HS categories.

What is the *tariff equivalent* of these measures? In other words, how much do these measures *restrict* trade? This question has been addressed in a variety of ways in "gravity equation" frameworks. The intuition of gravity trade models is straightforward, and borrows from physics: the closer two bodies are to each other, and the larger they are, the stronger is their gravitational pull towards each other. Gravity trade theory suggests that economies will trade more with each other if they are larger and closer. Size is measured by income, and the income elasticity is usually assumed to be one: 1 % growth in GDP leads to 1 % growth in imports. The closeness of economies is measured by their geographical distance. A variety of other variables are then employed to make this "closeness" more precise. Examples include a shared language, shared colonial history, and other socio-political factors, as well as whether they share a land border and the like.

The remaining key variable then is a product's *price*. Thus, controlling for economic size and a host of measures of "closeness," demand for a product depends on its relative price. This price variable contains a distribution factor: the same product will cost p in Austria, but pt in Texas. These distribution costs are labeled iceberg trade costs. The analogy is that floating the block of ice from Austria to Texas will lead to proportional melting; to deliver the whole product, Austria must send off a value of pt . Now, here lies the crux of the matter. Iceberg costs can be thought of as an index of all relevant trade costs, such as transportation costs *as well as costs driven by non-tariff measures*.

AVW (2003, p174) complain that "[t]he empirical literature [on gravity trade models] pays no more than lip service to theoretical justification." They derive a gravity equation from a theoretical general equilibrium model, which produces a standard gravity equation plus a term describing *multilateral resistance*. Thus, standard gravity presumes that a country pair's trade depends on their closeness, whereas augmented gravity presumes that a country pair's trade depends on their closeness *relative to all other countries, including itself*. As summarized in Bertelsmann/ifo (2013, p8), "[t]hey show that the trade costs within other pairs are important for making an accurate estimate of trade costs within a country pair. For example, how much geographical distance restrains trade between two countries also depends on the average distance of these two countries from their other trading partners." In AVW's (2004, p708) words, "[t]he main insight from the theory is that bilateral trade depends on the *relative* trade barriers."

So far, so theoretical, so good. In practice, unobservable trade costs must be proxied by observables: for the delivered price pt , a trade cost function must explain t . If z is a vector of observables – such as geographic distance, language, currency, NTMs, etc. – with m elements, the tax equivalent of trade barriers due to variable z_m can be approximated as $\lambda_m(z_m - 1)/(1 - \sigma)$, see AVW (2004, p713). Here, λ_m is the estimated coefficient and σ the

elasticity of substitution. On this elasticity of substitution, the literature leads AVW (2004, p713) “to conclude that σ is likely to be in the range of five to ten.”³⁹

AVW present an overview of various routes to estimate the elasticity of substitution. One way – followed by Ecorys – is to interpret the tariff coefficient in the trade cost function as the elasticity of substitution. In this context, it is important to emphasize that the resulting estimate of the tariff equivalent of trade costs is quite sensitive to the estimate of the elasticity of substitution. Table 9 reports such sensitivity for elasticities ranging from 5 to 10. Simple averaging suggests, roughly, that a 1 % increase in the assumed elasticity of substitution implies a 1.2 % decrease in the tariff equivalent of trade costs.

Table 9: Tariff equivalents of trade costs, and their sensitivity to the assumed elasticity of substitution

	$\sigma = 5$	$\sigma = 8$	$\sigma = 10$
Head and Ries (2001)	97	47	35
AVW (2003)	91	46	35
Eaton and Kortum (2002)	123-174	58-78	43-57

Source: Adapted from AVW (2004, p717, Table 7). All three studies employ a gravity equation that includes multilateral resistance à la AVW. Head and Ries is based on disaggregated data; the other two on aggregated data. The sensitivity calculations have been made by AVW based on estimates reported in the respective papers.

Hence, the lower the assumed elasticity, the higher are the implied and potentially actionable trade barriers, and the higher are the potential gains from trade. This negative effect from high elasticities of substitution on gains from trade liberalization stands in contrast to a positive effect: the higher the trade (price) elasticities, the more strongly does demand react to changes in international prices following liberalization, and the more do countries benefit. Before we get into discussion of these matters, however, let us consider – finally – a decomposition of trade barriers:

“Direct evidence on border costs shows that tariff barriers are now low in most countries, on average (trade-weighted or arithmetic) less than 5 percent for rich countries [...]. Our overall representative estimate of policy barriers for industrialized countries (including nontariff barriers) is about 8 percent. Inferred border costs appear on average to dwarf the effect of tariff and nontariff policy barriers. An extremely rough breakdown of the 44-percent [estimate of border-related trade costs] is as follows: an 8-percent policy barrier, a 7-percent language barrier, a 14-percent currency barrier (from the use of different currencies), a 6-percent information cost barrier, and a 3-percent security barrier for rich countries.” AVW (2004, p693)

In other words, following AVW (and Haveman), and roughly speaking, NTMs add about 3 - 4 % to the price of a traded good or service between two industrialized countries. These 3 % correspond to about 7 % of total trade costs. Most crucially, nontariff policy barriers as identified in the authoritative paper all four here reviewed studies build on *are so small that significant gains from trade cannot be expected to materialize from their removal*. In the next section, we consider how Ecorys addressed this issue.

³⁹ It should be noted here that functional forms assumed play a significant role for the evaluation of elasticities. For example, in AVW (2003, 2004) – meaning the gravity estimations – as well as GTAP à la Francois – meaning the CGE model in Ecorys (2009) and CEPR (2013) – demand is *homothetic*. Homothetic preferences imply that expenditures shares are independent of income. Since demand patterns undergo structural changes as income rises, this is a problematic assumption. MIRAGE, in contrast, assumes that below a “first-tier Cobb-Douglas function, the preferences across sectors are represented by a LES-CES (Linear Expenditure System – Constant Elasticity of Substitution) function. Without excessive complexity, this allows to account for the evolution of the demand structure of each region as its income level changes. With this kind of utility function, the elasticity of substitution is constant only across the sectoral consumptions over and above a minimum level.” (Decreux/Valin 2007, p9)

À la Ecorys

The Ecorys study makes two contributions: It provides estimates of actionable non-tariff measures (NTMs), and applies these to a CGE model to calculate potential benefits from TTIP to EU-US trade. The NTM estimates figure in three of the four studies reviewed here, so that we discuss the methodology in some detail. Let us begin with the definition of NTMs put forth by Ecorys:⁴⁰

“Non-Tariff Measures are defined as ‘all non-price and non-quantity restrictions on trade in goods, services and investment, at federal and state level. This includes border measures (customs procedures, etc.) as well as behind-the-border measures flowing from domestic laws, regulations and practices’ (Study Terms of Reference of the Study, p7). In other words, non-tariff measures and regulatory divergence are restrictions to trade in goods, services and investment at the federal or (member) state level.” Ecorys (2009, p xiii)⁴¹

Thus, Ecorys’s definition of NTMs is quite different than the standard approaches discussed in AVW (2004). Quotas – usually a non tariff trade policy measure – are excluded, while domestic regulations and laws are included. As will be seen, Ecorys’s estimates of NTMs across sectors are substantially larger than the ranges suggested in AVW – a result that appears to be driven by the different definition applied. Implicitly, this suggests that the gains from trade calculated based on Ecorys estimates squarely rest on *regulatory and legal convergence*, rather than border measures.

Indeed, it can be difficult to compare these various definitions of NTMs. In Anderson and van Wincoop (2004, p699), an NTM is “basically price and quantity control measures and quality control measures [...] plus threat measures related to antidumping.” In Ecorys (2009), NTMs include as well “behind-the-border measures flowing from domestic laws, regulations and practices.” Surveyed firms might perceive this to be essentially *anything*. Figure 1 of Bertelsmann/ifo (2013, p7) illustrates the problem: NTMs related to *trade policy* are probably very small, NTMs related to “other policies” appear ill-defined.

Let us consider the methodology in more detail. Chapter 3 of the main report concerns the methodology applied (Ecorys 2009, p9-19). Crucially, Ecorys combined literature reviews, econometric analysis, business surveys, interviews with sector experts, and consulted existing indices on restrictions and regulations. The sectoral averages across results from these different methodologies is then interpreted as the relevant index of NTMs. Figure 3.1 in chapter 3 (p9) illustrates the procedure.⁴² The business surveys and interviews are detailed in Annexes. The “actionability” of NTMs is assessed there, and we will revisit the question of actionability when we discuss scenario design.

According to Ecorys (2013, Annex VI, p250), the survey results “show us the *perception* of firms on both sides of the Atlantic as well as from third countries regarding the overall levels of restrictiveness (we recall Question 12a of the survey) in terms of NTMs and regulatory

⁴⁰ The Ecorys report is – due to its length – split in multiple documents. All can be accessed here: <http://ntm.ecorys.com/>. The various files are listed at “Downloads.” (last accessed 02/04/2014.) Page references to Ecorys (2009) concerns the “Final Report.” Page references to Annexes refer to “Final Report Annexes.” The background paper “Non-tariff barrier study methodology” is contained in Annex III, and is referred to in there.

⁴¹ Ecorys suggests here that NTMs exclude quantity restrictions, which presumably refers to quotas. There appears to be a contradiction with CEPR (2013, Box 1, p16), where explanation of Ecorys’s NTM methodology includes the following statement: “[t]raditional NTBs, like import quotas, are an example where NTBs [restrict] market access.” This is noteworthy since at least one author (J. Francois) worked on both studies. While it is not clear where the confusion lies, quotas probably do not play a large role in US-EU trade.

⁴² Note that Figure 3.1 presents NTMs as a percentage of trade costs. (If these are representative for estimation results, Ecorys’s NTMs might be up to three times larger than those suggested by AVW.) In contrast, as will be discussed further below, Annex III outlines how NTM estimates are translated into a “tariff-equivalent” cost. In the CGE model, reduction of these tariff equivalent costs represents the liberalization policy.

divergence of systems that they feel they face.”⁴³ The emphasis is theirs – the business survey appears to have been designed to take firms’ pulse on how difficult they feel it is to export (or invest) in a foreign country. Question 12a:

“Question A12a. Consider exporting to the US (EU), keeping in mind your domestic market. If 0 represents a completely ‘free trade’ environment, and 100 represents an entirely closed market due to NTMs, what value between 0 – 100 would you use to describe the overall level of restrictiveness of the US (EU) market to your export product (service) in this sector?” Ecorys (2009, p10)

Thus, firms answers to this question produce an index, which then feeds into the econometrics. That is interesting, but it seems as well *very different* than measuring NTMs as they are traditionally – by Anderson and van Wincoop or Havemann – conceived of. Specifically, it is unclear whether respondents had a somewhat uniform or “correct” understanding of what question 12a meant by NTMs. It did certainly not mean language or cultural or currency barriers. That respondent’s answers imply much higher NTMs than traditional observation of actual border measures in place – see the following paragraphs – suggests that firms might possibly have misunderstood the question. Alternatively, one might surmise that Ecorys’s design of the survey is questionable.

That said, let us now take a look at what the index leads to in Ecorys’s gravity estimation. Annex III, titled “Detailed methodology,” explicates the econometric techniques used. As mentioned above, the econometric methodology directly builds on AVW (2003, 2004). Annex III details the derivation of the tariff equivalent, taking NAFTA and EU internal trade into account. Based on that, Table 4.2 (Ecorys 2013, p23) reports the trade costs for US exports to the EU and EU exports to the US attributable to NTMs. Table III.1 in Annex III.3 CGE Tables, page 214, lists the same and includes as well the “estimated price elasticities,” which are derived from the tariff coefficient. The second and third column show, respectively, the calculated tariff equivalent of NTMs for exports from and to the US, which is based on the elasticity of substitution and the NTM indexes derived from business surveys (etc). The last row – not in the original – shows a simple average across the column, as we do not have sectoral weights of this disaggregation. These averages for both exports from and to the US round to seventeen, which is *a multiple of the three percent discussed in AVW (2004)*.

In summary, while Ecorys (2009) builds on state-of-the-art methodology regarding the estimation of the gravity framework, the NTM variable that enters the regression appears to differ significantly from the “standard” NTM measure. Considerable effort has gone into the business survey to construct these new measures of restrictiveness. Nevertheless, it is difficult to ascertain that Ecorys’s conceptualization does not introduce an upward bias: the higher the estimated NTMs, the higher the potential benefits from its reduction. As will be seen, Ecorys considers roughly 50 % of NTMs “actionable,” and feeds this policy change into a CGE model. Below, we dissect the CGE.

⁴³ The “Summary of the Business Survey Results” on <http://ntm.ecorys.com/> is unavailable for download (2/20/14). In response to email requests, Dr. Koen Berden from Ecorys confirmed that *only question 12a* was used in the NTM indexes applied in the regressions.

c. Two CGE models, a common heritage: GTAP and MIRAGE

In this section we discuss the two computable general equilibrium (CGE) models used for simulations. As mentioned in the introduction, Ecorys (2009) and CEPR (2013) use the same model, which is based on GTAP. Joseph Francois, an expert on neoclassical CGE models and a key figure in the GTAP research community, is the main author for both reports as far as the CGE models are concerned. The second model, applied by CEPR (2013) as well as BMWV/ifo (2013, chapter IV), is called MIRAGE.

MIRAGE is in principle quite similar to GTAP, but differs in some details. The key common features are nested production and demand structures, with some differences in the specification of imperfect competition and the product varieties available. These differences are, overall, quite marginal. As has been documented elsewhere, what really matters for the results a model produces are its *closures*. Essentially, the macroeconomic accounting restrictions that must be imposed on any economy-wide model leave few degrees of freedom available for additional ‘behavioral’ assumptions. Making these assumptions determines which variables are exogenous, which endogenous, and how these are determined – thus, how the model is “closed.”

These closures, in turn, are informed by the analyst’s view of the world. Put differently, the closures represent what the analyst considers to be *defensible and reasonable assumptions*. To try an analogy: while speed, comfort, and gas efficiency of different cars varies widely, you will ultimately end up where you decided to drive to independently of the car you took. In that sense and for the purposes of this review we will focus on closures. Further below, we consider elasticities and scenarios.

Closures

Let us begin with GTAP à la Joseph Francois. This is the model used in Ecorys (2009) and CEPR (2013). Ecorys (2009) provides technical detail only on the general equilibrium model that underlies the gravity estimation; this was discussed in a previous section.⁴⁴ For details on closures, we therefore rely on CEPR (2013), Annex 2, and selected background papers. Key among these are Francois, McDonald and Nordstrom (1996) and Francois, van Meijl and van Tongeren (2005).⁴⁵ Both offer relevant insights, and we will let the latter get us started:

“The theoretical backbone of the model is the standard textbook Helpman-Krugman model that combines elements of the ‘new’ trade theory that emphasizes increasing returns and imperfect competition with elements of the ‘old’ trade theory that stresses factor endowment and technology differences. [...] In all regions there is a single representative, composite household in each region, with expenditures allocated over personal consumption and savings (future consumption) and over government expenditures. The composite household owns endowments of the factors of production and receives income by selling them to firms. It also receives income from tariff revenue

⁴⁴ Ecorys (2009) suggests in Annex III.2, p203, that “[t]hese estimated partial effects can then be employed in various computable general equilibrium (CGE) economic models to determine the overall gross domestic product (GDP) and economic welfare effects of the elimination of Transatlantic (EU-US) nontariff barriers. CGE models allow for feedback effects on this flow of other variables and behavior in the two countries and the rest-of-the-world (ROW) to generate a ‘general equilibrium’ impact.” Ecorys (2009) offers no further documentation of the model used. Joseph Francois has confirmed in email communications that Ecorys (2009) and CEPR (2013) employ the same model. CEPR (2013) includes a technical Annex 2. Further, Joseph Francois maintains a website that catalogs model versions, see <http://www.i4ide.org/people/~francois/Models/index.htm>. He has helped us through the maze on several occasions.

⁴⁵ A wealth of material on the core of the GTAP model is available on <https://www.gtap.agecon.purdue.edu/>. Francois, Manchin and Martin (2013) is particularly relevant for the imperfect competition market structure, which is not our key concern.

and rents accruing from import/export quota licences (when applicable). Part of the income is distributed as subsidy payments to some sectors, primarily in agriculture. [...]

And further:

“On the production side, in all sectors, firms employ domestic production factors (capital, labour and land) and intermediate inputs from domestic and foreign sources to produce outputs in the most cost-efficient way that technology allows. Perfect competition is assumed in the agricultural sectors [... and in ...] these sectors, products from different regions are assumed to be imperfect substitutes in accordance with the so-called ‘Armington’ assumption. [...] Prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium. This means that we solve for equilibriums in which all markets clear. [...] We model manufacturing and services as involving imperfect competition. The approach followed involves monopolistic competition, [... which ...] involves scale economies that are internal to each firm, depending on its own production level.” Francois et.al. (2005, p362-364)

This is a succinct summary of – most – of the relevant issues; we will have to turn our attention to international linkages in a moment. For now, though, consider the statement that *prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium*. If all markets clear through price adjustments, there is no space for quantities to play a role. Sure enough, firm production levels change, and demands for final and intermediate products change, and so on – but aggregate demand does not factor into the macroeconomic process of equating incomes and expenditures. In other words, the goods market closures rests on price flexibility. And, as there are no quantity adjustments in the goods market, there are as well no quantity adjustments in the labor market: prices on factors adjust until their markets clear. In other words, these models assume that real wages fall until anybody who wants to have a job.

Similar structures are suggested in CEPII (2013). The authors argue that CGE models are the best tools to analyze trade agreements because

“[t]heir reliance on sound microeconomic modeling of agents’ behavior makes it possible to analyze, in a consistent way, how they might react to the new environment following a policy shock, given their respective objectives and constraints. Meanwhile, the general equilibrium framework ensures that the analysis takes due account of the feedbacks from income effects and labor or capital markets, and the interdependencies across economies.” CEPII (2013, p8)

The representative agent takes her income as given, observes prices, and maximizes utility – the paradigm of price flexibility rules. The relevant background papers are Bchir et.al. (2002) and Decreux and Valin (2007). The latter updates the former, so that the content of the two papers often overlaps. However, Bchir et.al. (2002) does not discuss the labor market. Decreux and Valin (2007, p16) feature a section on the labor market that focuses on an add-on for developing economies, but offers no general discussion of closures. The appendix, however, states the equations for “full use of factor endowments,” (Decreux/Valin 2007, p34), thus confirming that despite possible add-ons full employment emerges.

This turns out to be a strong assumption. To illustrate, let us consider the EU und US. Currently, a lot of involuntary unemployment exists in both these large economies, as they seek recovery from the Great Recession. However, over the course of a half century or so, and abstracting from demographic changes (due to aging, for example), the ratio of employment to population is roughly constant. In other words, in the very long run it seems that the unemployment rate is roughly constant. Does that justify the assumption that real wages adjust *within a year* to generate full employment? Absolutely not: it is both empirically

false and distracts from the relevant issues. First, the labor market theory underlying these CGE models presumes that where necessary *real wages will fall to produce full employment*. In the real world, however, nominal wages are downwardly rigid. And, as Keynes (1936) forcefully argued, even if nominal wages were to decline, prices would follow, holding the real wage roughly constant. Second, trade (and technological change) can have substantial impact on labor demand patterns. The existence of poor, immobile, unemployed working class households in former industrial centers attests to the difficulties to move across sectors. For this reason, real world trade policy includes public expenditure to ease transition. In other words, a credible model should focus on where transition problems might arise, rather than assume them away. But in the models under discussion unemployment simply does not exist.

Similarly, the government does not (quite) exist. The government is subsumed into the representative household. Government revenues from policy – taxes, tariffs, etc. – accrue as income to the household, who distributes part of it to certain sectors as subsidies. Further, the household buys government services from herself, so to speak. What does that imply for the budget deficit? In Annex 2 of CEPR (2013, p108), it is argued that “[w]here we assume fixed expenditure shares, then [sic] we also have a fixed savings rate. [...] We maintain a fixed-share allocation between public and private consumption.” Put differently, the *budget deficit is assumed to be constant*. If revenues change, government expenditures must adjust endogenously to satisfy the fixed budget deficit. To be sure, tariff revenue looms large neither in the US nor in the EU. However, casual observation of the real world makes it entirely obvious that even if the government would want to, say, reduce spending on education to balance its books after a change in tariff policy, it tends to not be able to. In the real world, government budget deficits are the norm, can be large, and are not usually reduced by expenditure reductions. Instead, deficits tend to be reduced by growth-driven increases in revenues. Clearly, the causal structure assumed is highly questionable. In essence, it serves the purpose of assuming the government as a macroeconomic entity away.

MIRAGE basically mirrors these assumptions. Decreux and Valin (2007, p9), first, nod to GTAP: “[T]he nineties witnessed the increasing spreading [sic] of the GTAP database (Global Trade Analysis Project, Purdue University), that marked the sharing of the heavy data work required for this kind of models [sic], making their access far easier. The MIRAGE model builds on this literature [...]” Further, the government is assumed to balance its books, but does so not through expenditure adjustment but a non-distortionary replacement tax. Decreux and Valin (2007, p10) state that

“[t]otal demand is made up of final consumption, intermediate consumption and capital goods. Sectoral demand of these three compounds follows the same pattern as final consumption. The regional representative agent includes the government. He therefore both pays and earns taxes, and no public budget constraint has to be taken into account explicitly: this constraint is implicit to meeting the representative agent’s budget constraint. Unless otherwise indicated (modelling a distorting replacement tax does not raise any technical problem), this implicitly assumes that any decrease in tax revenues (for example as a consequence of a trade liberalisation) is compensated by a non-distorting replacement tax.”

It is not further clarified what this tax is or whom it affects; it might be a lump-sum tax. While a “representative household” might consider, for example, a uniform sales tax non-distortionary, real world households would think it regressive; thus, worthy of further discussion. But be that as it may, the key is that budget deficits are constant, because the government reduces expenditures or raises other revenues.

Next, let us think through issues related to investment. Here, the two models differ as well only in detail. First, investment and savings are specifically addressed in Francois et.al. (1996). The authors suggest there that one might assume a constant savings rate of the representative household. Given income (from full employment output with the available technology), this implies aggregate savings available for investment. That corresponds to the workhorse neoclassical Solow growth model. In a multi-sector model, such *savings-driven* aggregate investment would be distributed across sectors; most commonly with fixed sectoral shares. Alternatively, one might assume that the savings rate adjusts to its rate of return: the representative household saves more if the real rate of return on the real asset financed with the savings increases. Given income (from full employment output with the available technology), this again implies aggregate savings available for investment. This setup corresponds to the Ramsey growth model. CEPR (2013, p109) assumes such “a basic Ramsey structure with constant relative risk aversion (CRRA) preferences.” That implies that aggregate investment adjusts endogenously to the optimal aggregate level of savings.

MIRAGE, in contrast, assumes that cross-border investment matters especially:

“This is why an original modelling of FDI is used here, aiming at combining empirical realism and theoretical consistency. The latter objective requires, in particular, that domestic investment’s setting be consistent with FDI’s one, and that savings allocation behaviour be rational. In this context, the rate of return to capital is a natural determinant of investment sharing across sectors and countries. [...] Practically, a single generic formalisation is used for setting both domestic and foreign investment. It stems from allocating savings across sectors and regions, as a function of the initial savings pattern, of the present capital stock and of the sectoral rate of return to capital” Decreux and Valin (2007, p15)

Thus, the flow of savings allocated to a region and there channeled into real investment rises with a higher rate of return to that asset. The specific functional form differs, and the motivation differs. Crucially, there is no reference to Ramsey-style intertemporal utility maximization. But the end result is that available savings drive aggregate investment, which is of course a restatement of Say’s Law as well as the fundamental rule of price flexibility to bring about macroeconomic balance.

Does not the international link present a crucial difference? It does not seem so. Macroeconomic balance, whether with full employment and reference to a microeconomic general equilibrium or not, implies that aggregate injections equal aggregate leakages. In other words, the accounting system underlying macro or CGE or any model implies that investment less private savings plus government expenditures less revenues plus exports less imports are identically equal zero.

The above discussion suggests that both GTAP à la Francois and MIRAGE let (1) external accounts adjust to changing relative prices (and the international investment position), force (2) the government to keep its deficit constant, and make (3) the savings rate an increasing function of returns to capital. Then, to satisfy the macroeconomic balance equation, (4) aggregate investment adjusts. All that is rounded off with the full employment assumption to create a Panglossian view of whatever trade negotiators might come up with.

Scenarios and elasticities

How does the causal structure of the models described above then produce the headlines and talking points that a comprehensive free trade agreement can produce such-and-such gains in GDP? Essentially, the further inputs needed are scenarios and elasticities.

Scenario refers to the policy change applied to the baseline calibration. The baseline in turn is the model run repeatedly over ten or fifteen “years,” so as to, presumably, get at the long run changes. This baseline is based on GDP projections that are exogenous to the model.⁴⁶ In other words, based on forecasts of GDP growth rates of the relevant countries and regions over the next fifteen or so years, the model produces GDP levels for, say, the year 2027. The model is then solved again – year by year – with the gradually implemented policy change. The final year’s GDP levels can be compared to baseline GDP levels – the difference is attributed to the policy change, which here essentially means removal of NTM.⁴⁷

The key scenarios employed in Ecorys (2009) and CEPR (2013) are the *ambitious* ones, and concern the *long run*. Since the overall effects of liberalization are quite small, it seems reasonable to focus here on the biggest possible gains. Ecorys’s (2009, p xvii) ambitious long run scenario assumes that “by 2018 around 50 % of all NTMs and regulatory divergence are addressed.” It should be highlighted that these 50 % present an average across sectors. Tremendous effort has gone into a sector-by-sector assessment of the relevant issues. Annex IX presents a long list of regulatory divergences by sector, with sources varying from sector experts to the survey to literature reviews. Further, an additional “Annex III: Stylized overview literature review” presents a sector-by-sector assessment of whether these barriers are *actionable*.⁴⁸ It says there, for example (p468) that “US exporters of agricultural biotechnology products have been affected by a de facto EU moratorium on approving new products,” which implies a “very high” NTM, and that “[a]ction could be expected following the WTO ruling.”

It is not clear from this statement whether the ambitious scenario implies that EU citizens are assumed to accept, post-TTIP, genetically modified agricultural products. But, Ecorys presumably used all of this information to produce Table 3.3 in the main report (Ecorys 2009 p16), which details “actionability levels per sector.” As it turns out, potential NTM reduction averages at 50 % and 48 % for EU-US and US-EU exports, respectively, with a standard deviation of only about eight across the two columns. Thus, about half of the tariff equivalent (reproduced by sectors in our Table 10) is reduced.

The ambitious scenario in CEPR (2013) is titled “comprehensive ambitious scenario,” see Table 4, CEPR (2013, p28). It is based on Ecorys’s data, but assumes that only 25 % of NTMs are eliminated – meaning only half of all actionable NTMs. The report states (p28) that “[t]he scenarios reported here are therefore far less ambitious than under the original Ecorys study, where full elimination of actionable NTBs was assumed.” CEPR (2013) offers four scenarios, the first assuming tariff removal only. The three others assume varying degrees of NTM removal, including one build on Ecorys’s scenario and another including “harmonization spillovers,” which refers to the possibility that some other countries will want to adopt TTIP standards. CEPR (2013, p8) explicates:

⁴⁶ For example, Table A3 on page 111 of CEPR (2013) lists such baseline projections for GDP growth rates. CEPR (2013, p7) explains this procedure as follows: “Before considering counterfactual scenarios, we simulate a business-as-usual growth path for the world economy up to 2025, referred to as the ‘baseline’ simulation.”

⁴⁷ The particular implementation of NTM removal is discussed in a bit more detail in CEPR (2013, Annex 2, p111): “We distinguish between cost and rent generation under NTBs on the basis of Ecorys (2009), assuming 2/3 of rents accrue to importer interests, and 1/3 to exporter interests. Rents are modelled, in effect, like export and import taxes. For cost-raising barriers, we follow the now standard approach to modelling iceberg or dead-weight trade costs in the GTAP framework, [which was as well applied in] the 2009 Ecorys study on EU-US non-tariff barriers. In formal terms, changes in the value of this technical coefficient capture the impact of non-tariff measures on the price of imports from a particular exporter due to destination-specific reduced costs for production and delivery. This has been further modified to split NTB wedges into those linked to costs and those that generate from rents.” CEPR (2013, p7), in contrast, assumes that NTMs do not generate rents – or, in other words, that they are all cost-increasing.

⁴⁸ This “Annex III: Stylised overview literature review” is available in pdf on <http://ntm.ecorys.com/> under the heading “Summary of the lists of sector level NTBs.” It should be emphasized that there exists, as previously discussed, a different Annex III on “Detailed methodology,” which is available under the heading “Final Report Annexes.” While one can only commend the efforts spent, the overall presentation of the various reports and documents does not ease a reviewer’s task.

“For NTMs, a complete phasing out would be neither desirable nor realistic. As mentioned above and stated repeatedly by European leaders, the objective of an agreement would be not to lower the level of regulations but to make regulations as compatible as possible across the Atlantic to reduce unnecessary additional costs for exporters. Achievement of this objective is not easy in practice, but cross-sector differences are difficult to gauge.”

In a footnote to this paragraph, it is stated that “Ecorys (2009) [...] attempt [at measuring actionability at 50 %] is essentially an ad hoc evaluation.” In the following paragraph, CEPII proceeds to state that their simulations rest on the ad hoc evaluation that 25 % of NTMs are actionable.⁴⁹ Neither CEPR nor CEPII provides any rationale for the reduction of actionability.

Be that as it may, we can conclude that all three CGE applications – GTAP à la Francois in Ecorys (2009) and CEPR (2013) and MIRAGE in CEPII – use Ecorys’s estimates of NTMs, though they do assume different degrees of actionability. Even the reduced degrees of actionability imply that the trade cost tariff equivalent of NTMs is on average about twice as large as the one inferred through observation of actual policy barriers.

Now, on to the *elasticities*. The elasticities are so important in this endeavor because they determine how strongly the model will react to the policy change. (Since the ‘result’ of the baseline calibration is set from projections external to the model, the elasticities do not impact these GDP levels.) An elasticity describes the percentage change in a variable in response to a percentage change of another variable. Crucial for trade analysis is the question by how many percent exports of a product increase if its price relative to a relevant index decreases by 1 %. This is the price elasticity of trade, or *the elasticity of substitution*.

We can link the elasticity issue back to our earlier discussion of the various sources of the gains from trade. Fundamentally, the gains from trade materialize through price decreases. As trade costs are reduced – and specialization takes place, and scale economies matter, etc. – prices are reduced. The assumption of full employment in turn ties down aggregate income. Falling prices with constant or rising incomes leads to ‘welfare gains.’ Under conditions of monopolistic competition, every firm in every country produces its own, unique variety of a product. *It follows that the higher that price elasticity, the stronger does demand in one country react to a lower price of the unique variety from the other country, and vice versa.*

How high are the elasticities used? The discussion of elasticities in Anderson and van Wincoop (2003) suggests, as mentioned before, that the elasticity might fall in a range of five to ten. The elasticities used in Ecorys (2009) are reproduced in our Table 10, with an (unweighted) average of six. A similar set of elasticities is reported in Table A1 of Francois et.al. (2005, p384) which rounds as well to an unweighted average of six. CEPR (2013) reports elasticities in Table 5, which round to an unweighted average of six. CEPII (2013) does not report elasticity values, but it seems safe to assume that the values applied average around at least five. These ranges of estimates of elasticities are based on disaggregated data, often at the product level. It should be noted that estimates of elasticities at the macroeconomic level usually fall in a range of one half to two – maybe three, but not five or ten. (For recent discussions, see Kwack et.al. (2007) as well as Bahmani-Oskooee and Kara (2005). Table III, p174, in the latter, for example, presents a simple average of trade price elasticities across twenty eight countries of 1.3.). Standard CGE models have been criticized repeatedly for the use of high average elasticity values; for examples and further references, see Taylor and von Arnim (2006).

⁴⁹ CEPII does as well build on a different set of NTM estimates, referring to Kee et.al. (2009) and Fontagne et.al. (2011). These do not differ substantially in terms of magnitude from Ecorys (2009) – meaning in turn that they *do differ substantially* in magnitude from the stricter definition of NTMs in Anderson and van Wincoop (2003).

Table 10: Price elasticities and tariff equivalents of NTMs

	Price elasticity	US exports to EU	EU exports to US
Services (excluding travel & transport)	-2.0	13.0	7.6
Travel			
Transport			
Financial services	-2.0	11.3	31.7
ICT services	-3.2	14.9	3.9
Insurance	-3.2	10.8	19.1
Communications	-3.2	11.7	1.7
Construction	-4.2	4.6	2.5
Other business services	-3.2	14.9	3.9
Personal, cultural & recreation services	-8.7	4.4	2.5
Chemicals	-5.1	23.9	21.0
Pharmaceuticals	-9.6	15.3	9.5
Cosmetics	-4.8	34.6	32.4
Machinery	-9.7		
Electronics	-12.2	6.5	6.5
Office & communication equipment	-7.1	19.1	22.9
Medical, measuring & testing appliances	-7.0		
Automotive	-7.1	25.5	26.8
Aerospace	-7.1	18.8	19.1
Food & beverages	-2.5	56.8	73.3
Metals	-13.0	11.9	17.0
Textiles & clothing	-7.2	19.2	16.7
Wood & paper products	-8.0	11.3	7.7
Average	-6.2	17.3	17.1

Source: Adapted from Ecorys (2013, Table III.1 in Annex III.3, p214). Essentially the same table reappears in CEPR (2013, p20).

The first column shows the estimated sectoral bilateral (EU-US) price elasticities (or elasticities of substitution). These are based on the coefficient of the tariff factor in the trade cost function (Ecorys 2013, Annex III, p208-210). The second and third column show, respectively, the calculated tariff equivalent of NTMs, which is based on the elasticity of substitution and the NTM indexes derived from business surveys (etc.). The last row – not in the original – shows simple average across the column, as we do not have sectoral weights of this disaggregation.

The various reports using CGE models do not provide sensitivity analysis. This is particularly important in light of the fact that the elasticities *matter twice*. First, a high elasticity value reduces the implied NTM, which reduces the potential reduction of barriers and hence reduces the potential gains from trade. Second, though, and as discussed here, a high elasticity value increases the gains from trade to the amplification of demand responses. Without sensitivity analysis of the relevant models, it is hard to tell which effect will dominate. It is clear, though, that (1) *the elasticity value applied far exceed reasonable macroeconomic trade price elasticities*, and that (2) *once the NTM index has been calculated, a higher elasticity value leads to higher gains from trade*.

That is not the case, however, in the studies conducted by ifo. Here, a higher elasticity leads to *lower* GDP gains. The elasticity underlying macroeconomic simulations in Bertelsmann/ifo (2013) is eight. This is discussed in more detail in BMWT/ifo (2013, p75), albeit in German.

Sensitivity analysis presented therein (Table A.II.6, p159) suggests that the elasticity and GDP gains are indeed negatively related. A quick calculation indicates that the model produces for a one percentage point increase in the elasticity of substitution a *reduction* in (unweighted) average GDP gains of about two thirds of one percentage point.⁵⁰ Why? The reason lies in the different simulation method – discussed in more detail in the following section. In short, ifo first estimates the trade creation effect of a free trade agreement across existing agreements, then estimates a gravity model, and uses that model to calculate NTM reduction necessary to produce the previously estimated trade creation. Now recall that the elasticity matters twice – first in the calculation of the implied NTM, and second in the calculation of the trade response. We have to assume that ifo’s work emphasizes the former rather than the latter – and therefore shows a negative link between elasticity values and GDP gains.

In summary, the scenarios that are fed into the CGE models all rest on Ecorys’s estimates of NTMs. These reflect *subjective statements from firms on their perception of NTMs*, rather than policy measures actually in place. We recognize the difficulty in measuring the specific restrictiveness of existing regulation, customs procedures, etc. We must note, however, that the indices constructed exceed the estimates from an authoritative study (Anderson/van Wincoop 2004) on NTM trade costs *other than language, currency, culture, etc.* by a multiple. Even after making assumptions about actionability (from 25-50 %), the reduction in NTMs still seems high on average. Further, the elasticities that are fed into the CGE models are much higher than reasonable macroeconomic elasticities. Since the reduction in NTMs and model closures in combination with elasticities drive all gains, the calculated gains in Ecorys (2009), CEPR (2013) and CEPII (2013) from TTIP seem very optimistic on average.

d. Bertelsmann/ifo: A different approach

The methodologies applied by ifo in the work on TTIP differ substantially from the other studies. Where the other studies ask what effect a reduction in trade cost has on trade flows, IFO asks what reduction in trade costs produces a previously estimated level of trade flows. This is quite ingenious and novel, but therefore as well difficult to put in context, and, basically, somewhat “untested.” In this section, we provide a brief review of the methodology. We begin, though, with a brief explanation of the various reports that document IFO’s work.

First, ifo published BMWT/ifo (2013), which was commissioned by the German government (and is available only in German) to assess the effect of a free trade agreement – then still called TAFTA – with the US. In this report, ifo presents in chapter II econometric work on the determinants of a free trade agreement as well as gravity estimations of world trade, including, of course, EU and US trade. The relevant background paper is Egger et.al. (2011). In chapter III BMWT/ifo extends this framework to include a New Keynesian labor market, which enables analysis of the *structural dimensions* of TTIP effects on the labor market. Relevant background is presented in Felbermayr et.al. (2011) as well as Felbermayr et.al. (2012). These two chapters form the basis of the macroeconomic part of the Bertelsmann/ifo study, which is listed in our references as Felbermayr/Heid/Lehwald (2013).⁵¹ As previously mentioned, Bertelsmann/ifo (2013) is *very short* on any details regarding methodology. We therefore rely here largely on the government study; unless otherwise noted all page numbers refer to BMWT/ifo (2013).

⁵⁰ We calculate the average percentage change of GDP gains across countries based on the two different elasticities – see Table A.II.6, p159 – which turns out to be -0.37, and divide the percentage change in the elasticity (0.6) by that to get -0.62.

⁵¹ Chapter IV of BMWT/ifo (2013) presents furthermore sectoral results based on an application of the MIRAGE model. Since ifo’s contribution to the debate is its novel simulation strategy, and ifo’s emphasis in the reports lies on these, we will here refrain from further discussion of MIRAGE.

Now let us try to provide an intuitive explanation of the research strategy. First, BMWT/ifo asserts that free trade agreements are not random. In other words, countries that negotiate a free trade agreement very often are relatively close to each other, have deep historical and political ties, and share other relevant characteristics. Instrumental variable regressions are put forth to provide evidence. See, specifically, Table II.2 p65. These results directly draw on Egger et.al. (2011). The instruments are COLONY, which indicates whether one country once has been the other country's colony, as well as COMCOLONY, which indicates whether the two countries once had the same colonial master, and SMCTRY, which indicates whether the two countries once have, in fact, formed one country. These variables are "only relevant for the decision regarding formation of a free trade agreement, but not for the determination of trade flows" (p66, own translation).

Second, BMWT/ifo estimates a gravity framework by accounting for free trade agreements as *endogenous*, through use of the previously established instruments. See, specifically, Table A.II.1 and Table A.II.2. on p148-149. Now, crucially, assuming the formation of TAFTA/TTIP in this gravity framework leads to large trade creation effects – which grow substantially if the potential free trade agreement between the US and EU is considered endogenous. Table II.4, p71, reports results from different regression models, with trade creation effects varying between roughly 60 % and 160 % – meaning, trade flows on average are estimated to double.⁵² These are, as the study notes (p69, own translation), large:

"The reported effects are to be understood as broad long run effects. They are broad, because they consider all trade creation effects [...]. That means, as has been emphasized, that the estimation implies removal of tariffs as well as non-tariff barriers. Additionally, effects are created through processes triggered by the free trade agreement. These include investments in bilateral infrastructure, gaining of knowledge and competence regarding the partner, growth of informal networks, etc. [...] These reported effects are long run effects, which reach their full impact only after 10-20 years."

ifo's implicit definition of "removable trade barriers" is even much broader than Ecorys's. In the estimation strategy, the observed trade creation effects of past agreements rest on common infrastructure investments, informal networks, and so on. Therefore, the estimated trade creation effect of an EU-US agreement must be interpreted in that light. This does raise the question whether one can extrapolate from past agreements – such as the EU, or NAFTA – to today's situation between the US and EU. Especially EU integration in the post-WWII decades must loom large in the data, and it is not immediately clear whether European trade growth in the Sixties is a good guide on what to expect from TTIP.

Nevertheless, building on these trade creation estimates, BMWT/ifo calculates "welfare effects." These are here measured as 'equivalent variation', which report the change in real income that allows consumers to obtain the same utility level after a change in prices, due to trade liberalization, for example, as before, but at the original relative prices. Equivalent variation is not a meaningful measure: it is quite void of empirical substance, since prices, after liberalization, really do change. "Welfare" itself is, as discussed above, a theoretically problematic concept, as the presumed social optimality of such a general equilibrium cannot be affirmed – recall problems of existence as well as stability of general equilibria after the Sonnenschein-Mantel-Debreu results, and the vacuousness of the welfare theorems if trades at out-of-equilibrium prices occur. For all these reasons, changes in real GDP are the relevant measure to work with. That the welfare changes reported by BMWT/ifo are grossly inflated relative to real GDP changes only adds to this assessment. For the US, welfare

⁵² These are 'general equilibrium' effects, which include trade diversion. If trade diversion is not considered, the trade effects swell to about 215 percent.

changes are 13 %, whereas real GDP growth is 5 %. On average, reported welfare changes are ten times higher than GDP changes (Table A.II, p159-161).

Key model results, however, are reported in chapter III. This chapter takes the gravity framework with endogenous formation of free trade agreements as well as firm heterogeneity and augments it with a New Keynesian labor market à la Pissarides (2000). This labor market model is often labeled *search unemployment*, as it explicitly models a firm's search costs as well as a 'matching function' to describe the negotiation between potential employer and employee. The model allows for *involuntary unemployment*, and thus presents an important improvement relative to the competitive, clearing labor market in GTAP and MIRAGE. However, unemployment is *structural* – it is equilibrium unemployment, and in this sense not fundamentally different from other New Keynesian NAIRUs. (Even supposing that such a steady state exists, convergence to it might be very slow.) Unemployment here exists because labor markets are imperfect: It costs firms money to find the right employee.

The causal mechanism for gains from trade – and employment effects from trade – is as follows. First, firm heterogeneity finds its expression in different productivity levels. Only the most productive firms are exporters. Following a reduction of trade costs due to, say, implementation of TTIP, firms that were just on the cusp can become exporters. As prices fall due to the reduction in trade costs, and as competition increases, the least productive firms exit the market. A key source for the gains from trade is this *reallocation effect* from low to high productivity firms. The former shrink, the latter grow, and as they do, they hire:

"It follows that the average firm faces lower search costs, and at the same time faces higher revenue from expanding employment. It therefore strengthens incentives to offer jobs. To put it still differently: The average firm [...] is after liberalization more productive, more profitable; and has lower search costs. Demand for labor rises. A part of these gains goes to employees, whose real wages are rising." (p86, own translation)

However, as we have discussed before, reallocation takes time:

"The above described mechanism concerns effects in the long run. Short run effects are not considered. [...] It is important to note that there can be negative effects in the short run: Reallocation of employees from shrinking to growing firms can, especially with non-linear adjustment costs, lead to an asymmetry: Exit occurs very fast, whereas expansion of employment opportunities in export-oriented firms occurs only slowly." (p86, own translation)

How big are these long run effects? Let us here consider the NTM scenario, which is BMWT/ifo's preferred one. For this scenario, it is assumed that TTIP creates on average as much trade as the previously discussed estimations suggested a free trade agreement between the US and EU would – namely roughly 76 %. The imputed trade costs in the baseline calibration are then reduced until that trade creation effect is matched. (Table 11 provides an overview.) The resulting change in GDP per capita comes to about 2 %. Since this is a long run effect, the estimated *annual* contribution of TTIP to GDP growth in the US and EU is negligibly small. This remains the case despite the bells and whistles introduced throughout, especially the large trade creation effect.

Table 11: Selected parameters and results from BMWT/ifo simulations

	1	2	3	4	5
US	2	105	-25	86	2.15
EU	1.3	64	-25	73	1.67
Source	III.2	III.3	III.7	III.8	III.12

Source: Adapted from BMWT/ifo (2013, chapter III).

Column 1 reports the “matching efficiency” of the respective labor markets. The higher US value presumably reflects its smoothly functioning labor market. Column 2 reports “imputed bilateral ad valorem trade costs” in percentage points. Column 3 is the percentage reduction in these trade costs in BMWT/ifo’s preferred NTM scenario, column 4 the corresponding growth of exports to the other region. Column 5, lastly, reports the growth rate of GDP per capita in the NTM scenario in response to TTIP reforms, which has to be interpreted as a fifteen year effect.

e. A note on foreign direct investment

Capital flows between countries can play an important role in the determination of a country’s output and employment. Especially *foreign direct investment* (FDI) can have positive effects. (Financial flows can be volatile and unpredictable even in developed countries, as the European debt crisis has shown.) For that reason, the agreement under negotiation between the US and EU is labeled as an “investment partnership.” Similarly, the public debate on TTIP often emphasizes economic effects related to investment.

There are, broadly, two concerns: (1) NTMs that serve as an impediment to cross-border investment, which one might conceive of in principle quite similar to NTMs that hinder trade flows; and (2) investor-state arbitration relations, which concern competition and regulation more generally. To illustrate, consider Google: If EU authorities tell Google that it cannot, due to privacy concerns, offer “street view” services, Google’s costs of operating in Europe would increase, since it might have to program or advertise its maps differently. This is a cost-increasing FDI NTM. If, on the other hand, the EU tells Google that it must unbundle its services – that its virtual search monopoly must be broken up, essentially – Google’s business model in Europe would have to change, fundamentally.⁵³ Such an issue would have to be addressed through investor-state arbitration mechanisms.

Free “trade” agreements increasingly do so. Usually the intention is to protect assets as well as the resulting income flows from host country government interference. Assets are physical assets – buildings, machines and computers – as well as “blueprints” or patents, which means that intellectual property right protections often feature prominently in such provisions. The key concern for our purposes is, first and foremost, to note that *the costs and benefits of investor-state arbitration mechanisms are exceedingly difficult to estimate* and remain quite fundamentally outside the scope of the reports and, more generally, modelling frameworks applied therein. To recognize this, however, is important, since it seems possible that the effects of a “deep” treatment of investment arbitration in TTIP would quantitatively outweigh the effects of NTM removal on FDI related costs.

Nevertheless, let us look at what the four studies reviewed here do say about investment. As will be seen, it turns out to not be much. First, the *GE models reviewed here do not speak to the issue of foreign direct investment*. To be perfectly clear: two of the four reports – Ecorys (2009) and CEPR (2013) – do in fact discuss FDI, but they do not within the theoretical and empirical framework of the simulation model applied. In sharp contrast, they present separate regression estimates of the effects of NTM removal on FDI activity indicators. Let us consider related concerns in turn.

⁵³ Similarly, the largest European banks operating in the US are under Dodd/Frank subject to Federal Reserve supervision. For relevant discussions see Schott and Cimino (2013) as well as Johnson and Schott (2013).

First, the results from CEPII's MIRAGE model *might be* decomposable into domestic and foreign investment flows. This is suggested in the relevant background paper (see our Section V), where the macroeconomic closure specifically refers to international investment. However, in the studies where MIRAGE has been applied (chapter IV of BMWT/ifo 2013, and of course in CEPII 2013), no reference to these investment effects is made: tables showing simulation results as well as discussion and conclusion do not mention numerical FDI or investment effects. Similarly, the GTAP model à la Francois applied in Ecorys and CEPR features an endogenous trade balance. Such trade flows must be financed – there must be a transfer in the current account, or compensating capital flows. Clearly, these issues are not considered in detail. While aggregate investment in one region or country adjusts to satisfy the macroeconomic balance, this investment is not explicitly modeled as FDI.

In sharp contrast, CEPII offers an “ad hoc” evaluation *against significant investment provisions*. It is worth quoting at length:

“With €1,200 bn invested by each country into its partner’s economy in 2010 (Eurostat), investment is potentially an important part of the agreement. [...] This willingness is consistent with the US emphasis on the inclusion of ambitious investment chapters in their preferential agreements, and with European countries’ numerous bilateral investment treaties (BITs). Nonetheless, the transatlantic partnership is particular in this respect, because the need for an agreement designed to grant investors “fair and equitable treatment” as it is usually described, is not obvious. The quality and impartiality of judicial systems on both sides leaves open whether an investor-state arbitration procedure is necessary to protect investors against discriminatory measures or uncompensated expropriations of property. Such a procedure might even be a source of concern, since it would prioritize an ad hoc system of arbitration with minimal institutional underpinnings and questionable legitimacy over national judicial systems. Paradoxically, such an arbitration system might even promote discrimination if it were to provide to foreign investors rights which domestic investors are denied. All this call [sic] for great caution in the wording of the provisions that might be included in the agreement, and great attention to avoiding overly restrictive provisions that would limit the capacity of government to implement independent policy in the areas of environment and energy in particular. In addition, while some existing rules are clearly protectionist – such as the impossibility for a foreign investor to own more than 25 % of a US airline company, or the existence of a golden share in the British military aerospace industry – current regulations do not seem to be stifling investment unduly judging by the size of existing bilateral cross-investment stocks.” CEPII (2013, p6-7)

Thus, neither of the two CGE models used in three studies (Ecorys, CEPR, CEPII) is applied to analyze investment related questions. But, Fontagne et.al. (2013) do suggest in the CEPII study to better stay away from far reaching FDI regulations that reach across borders.

How about the regressions? Ecorys (2009) and CEPR (2013) provide FDI analysis as an add-on to the central (trade) gravity estimation and CGE simulations.⁵⁴ As mentioned, this means that they essentially run regressions to estimate the effects of NTMs on FDI activity indicators. Bergstrand and Egger (2007) is suggested as theoretical foundation. Curiously, that framework treats FDI as trade is treated in a standard gravity framework, which means that FDI activity indicators are regressed on incomes as well as relevant measures of “distance” or “FDI costs.” One might then calculate a *partial effect of NTM removal on such an index of FDI activity*.

Partial is the key word here. All four studies emphasize that their main arguments on the gains from TTIP rest on *general equilibrium* analysis, be that a traditional CGE or a new

⁵⁴ Recall that these two studies feature Francois as one of the main authors.

trade-cum-New Keynesian labor market model. We do not argue that partial analysis has no merits, or that the use of different models for different purposes is somehow questionable. In contrast, we recognize the difficulty of comprehensively describing FDI in a CGE (or GE) macroeconomic model. However, the investment results by Ecorys and CEPR should be read with a grain of salt in light of the partial equilibrium nature.

In Ecorys, the discussion of investment related results is limited. Ecorys covers the methodology for FDI gravity regressions in some detail.⁵⁵ Chapter 4 on “Quantifying NTMs and regulatory divergence” first suggests that “[w]ith respect to investments and FDI, sector-specific regressions in the goods sector could not be run due to a severe lack of data,” (Ecorys 2013, p22), and proceeds to state the main results on “pooled regression results for FDI”:

“Gravity model estimations of bilateral foreign direct investment (FDI) flows between the EU and US have also been run with data stemming from Eurostat and the business survey NTM indexes, as well as additional data on tariffs and traditional gravity variables (distance, language and border). Gravity estimations are carried out at an aggregate level where all sectors are pooled, and on a disaggregate level where sectors are grouped into technology, durable goods and nondurable goods. There is not enough FDI data to carry out estimations on a sector level. Of the three gravity variables, only language turns out to have a significant impact on FDI. The positive tariff sign found, suggests FDI is driven by a tariff-jumping motive, i.e., foreign firms tend to invest in countries with high tariffs rather than serving the market through trade.” Ecorys (2013, p23)

Annex IV.3, p232, shows a table with regression results to complement this paragraph.

CEPR, in contrast, offers a full chapter (CEPR 2013, Chapter 6, p85-93). In this chapter, the emphasis lies on a discussion of FDI restrictiveness indexes as they can be constructed from various surveys, including Ecorys’s data. Towards the end, regressions are suggested, of the relevant FDI NTM index on measures of FDI activity – namely FDI income, number of (foreign owned) enterprises and number of employees (in foreign owned enterprises). The results suggest that, roughly, a 1 % decrease in the NTM index would lead to a 0.5 % increase in income generated in foreign owned enterprises. Using the estimated elasticities, CEPR calculates back-of-the-envelope effects of a 25 % reduction of NTMs on the order of more than 10 % increase of income generated by foreign owned enterprise, as well as about 10 % employment increases. Needless to say, these seem large relative to the otherwise estimated impacts of TTIP.

Thus, in summary, the analysis of investment in the reviewed reports is mostly cursorily, if it exists. Arguments made are based on partial analysis and simple regressions rather than the general equilibrium simulation models applied. Overall, considerably less effort has gone into discussion and documentation of FDI analysis than that of trade.

In this sense, it might be most important to note that the FDI discussions, where available, do not consider the underlying *macroeconomic* theory seriously. For example, the macroeconomic accounting implies that whatever effects TTIP has on FDI flows must be reflected in either capital or current account, and has effects on the macroeconomic balance therein. Similarly, valuation effects both through asset prices as well as exchange rates can matter greatly. None of the studies so much as touches upon these issues.

⁵⁵ The methodology is laid out in the main report in chapter 3 (Ecorys 2013, p11-13) and in Annex III with reference to Bergstrand and Egger (Annex III.2.7, p211).

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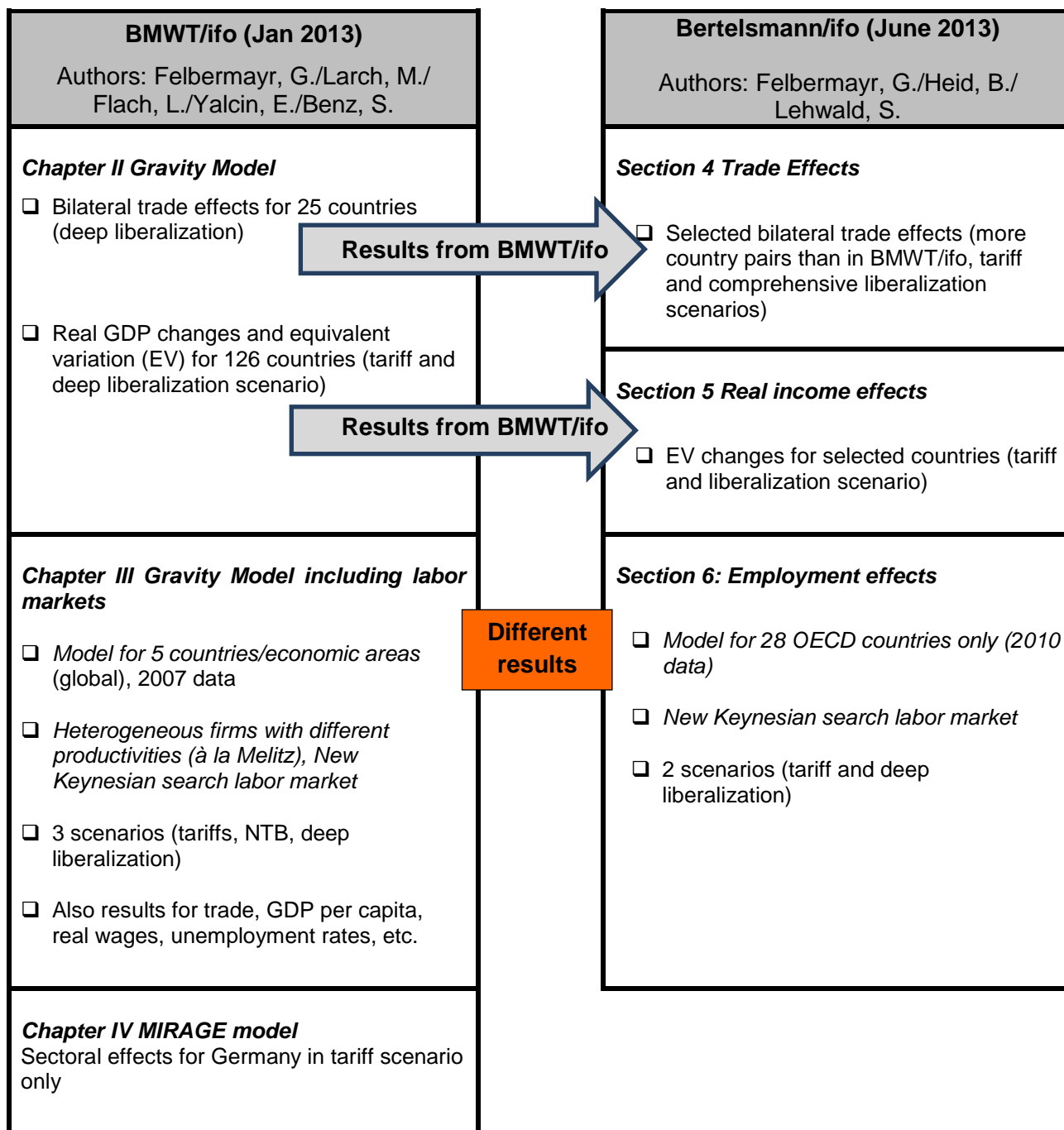
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ANNEX

Figure 1-A: Comparing BMWT/ifo and Bertelsmann/ifo



Source: BMWT/ifo (2013) and Bertelsmann/ifo (2013)

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