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Thinking ahead for Europe

The Impact of TTIP

The underlying economic model and comparisons

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Abstract

What are the economic and other impacts of the Transatlantic Trade and Investment Partnership? At the request of the European Parliament, CEPS has provided an appraisal of the TTIP Impact Assessment carried out by the European Commission, with special elaboration of the underlying economic model. The methodology applied by the Centre for Economic Policy Research (CEPR) for this economic modelling is analysed in depth, together with the assumptions used to make TTIP amenable to an economic appraisal. The research paper also compares the IA on TTIP with selected previous empirical economic assessments of EU trade agreements and with a set of alternative studies on TTIP itself. In reading our findings, two central caveats should be kept in mind that affect any analysis of the CGE model included in the European Commission's Impact Assessment. First, TTIP is a rather unusual bilateral trade agreement; and second, TTIP is so wide-ranging that an alternative approach, such as the so-called 'partial' (equilibrium) approach – already a second-best solution – would be totally inappropriate to the case under examination.

This paper is the first in a special series of CEPS reports on the Transatlantic Trade and Investment Partnership (TTIP). The study was commissioned by the Ex-Ante Impact Assessment Unit of the Directorate for Impact Assessment and European Added Value, within the Directorate General for Parliamentary Research Services (DG EPRS) of the General Secretariat of the European Parliament, at the request of the European Parliament's Committee on International Trade (INTA). The main conclusions were presented to the MEPs on 1 April 2014 in the INTA Committee. The study is also published at www.europarl.europa.eu/RegData/etudes/etudes/join/2014/528798/IPOL-JOIN_ET%282014%29528798_EN.pdf.

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List of Abbreviations

AGE	Applied General Equilibrium
CETA	Comprehensive Economic Trade Agreement (being negotiated between EU and Canada)
CGE	Computable General Equilibrium
EC	European Commission
EEA	European Economic Area
EU	European Union
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GTAP	Global Trade Analysis Project
IPR	Intellectual Property Rights
HLWG	High-Level Working Group on Jobs and Growth
IA	Impact Assessment
MEP	Member of the European Parliament
MFN	Most-Favoured Nation
NAFTA	North America Free Trade Agreement
NTB	Non-Tariff Barrier
NTM	Non-Tariff Measure
RoW	Rest of the World
SHEIC	Safety, Health, Environment, Investor and Consumer protection
SME	Small- and Medium-sized Enterprise
SPS	Sanitary and Phytosanitary Measures
TBT	Technical Barrier to Trade
TSIA	Trade Sustainability Impact Assessment
TTIP	Transatlantic Trade and Investment Partnership
US	United States
WTO	World Trade Organization

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Executive Summary

The empirical economic analysis underlying the European Commission's Impact Assessment (IA) of the Transatlantic Trade and Investment Partnership (TTIP) (European Commission, 2013) is particularly difficult because TTIP is an unusual bilateral trade agreement.[1] Apart from the sheer economic size of the two partners and their economic intercourse today, its nature is more like a wide-ranging regulatory agreement, with some elements of classical trade agreements as well. The regulatory core of TTIP makes it extremely difficult for economists to come to grips with the expected economic meaning of the outcome of the negotiations. NTBs (non-tariff barriers, in fact, mostly 'regulatory barriers') and regulatory heterogeneity between the US and the EU create 'trade costs' for market access, both ways, but it is exceedingly hard to assess authoritatively what the trade costs are and what their consequences might be, whether for goods or services. Both the nature of TTIP as foreseen, and the sheer economic size of actual transatlantic economic intercourse, are important reasons for decision-makers, if not the public at large, to want to understand more about the potential economic gains of these wide-ranging negotiations than just taking the core figures from the European Commission's IA. This agreement might be of strategic significance and the economic stimulus that it might bring to the signatories, and possibly to third countries, could be important.

This study, carried out by CEPS at the request of the European Parliament, analyses the appropriateness and validity of the methodology – in particular, the economic model – behind the European Commission's IA, by comparing its results, methodology, assumptions and findings with those of other recent IAs on EU trade and investment agreements. Indeed, simply using expected (EU and US) economic welfare gains or the simulated impact on flows of goods and services, without having any appreciation of the underlying methods (and their

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Although the subject matter concerns CGE modelling of the effects of TTIP effects on trade and GDP, every effort has been made to keep this report non-technical in the main text and, to some extent, also in the annexes.

[1] The IA under examination is meant to support the Commission's recommendation to the Council requesting a mandate to negotiate.

limits), and without having much of an idea of alternative ways of simulating TTIP's effects (and their results, if available), would seem to be too shallow a basis for sound debate.

The study is composed of four chapters. We begin by presenting in chapter 1 the Commission's IA and the methodology applied by the background study[2] carried out by the Centre for Economic Policy Research (CEPR, 2013a), followed by an analysis of the assumptions through which TTIP has been streamlined for purposes of economic analysis (chapter 2). In chapter 3, the study compares the IA of TTIP with selected previous empirical economic assessments of EU trade agreements. The few alternative studies on TTIP are compared in chapter 4. The conclusions that are then drawn on the basis of the analysis respond to the specific questions raised in the terms of reference for this study.

The Commission's IA and its methodology are generally coherent with the IA Guidelines,[3] even if IAs of draft mandates for EU trade negotiations are not fully comparable with regular IAs for legislative proposals.

The GTAP Computable General Equilibrium (CGE model), which was run to assess the potential impacts of the agreement, represents the 'state-of-the-art' in economics. The present authors are not aware of any better tool with which to estimate the long-term impacts of such a complicated trade agreement. This approach also has several advantages. First, CGE allows modelling the behaviour of different actors in several markets in the entire economy, including many sectors. Second, the GTAP-8 database (which has been used) provides a powerful and reliable set of data. This matters a lot because the data requirements for many countries (in this case, 40), many sectors (20), several types of markets and the baseline scenario are extremely demanding.

However, there is no such thing as a perfect economic model. Even this CGE approach has drawbacks, such as the (unrealistically) flexible labour market, the peculiarities of how investments are included, the lack of innovation and productivity-growth effects in enterprises of different sizes.

Environmental impacts have been adequately assessed, insofar as CO_2 emissions are concerned, but there are many environmental aspects other than climate that have not been included in the IA.

With respect to social impacts, the CEPR study simulates the effects of reallocating labour between sectors and wage changes for low- and high-skilled workers. Free trade agreements modelled by CGE normally do not deliver employment effects as they assume perfect equilibrium between supply and demand of labour in the long run. With production increases, however, more labour is demanded in a specific sector, which in turn leads to higher wages; if such wage increases were restrained (or fixed real wages were assumed), such incipient wage increases would appear as employment increases. Even though today's CGE models do not include effects on employment, one might interpret wage effects in this way, or one might study carefully the inter-sectoral reallocation of workers in the model. In the recent literature, the only possibility to model unemployment effects (in modern CGE models) would have been to incorporate a new theory of unemployment (also known as 'search unemployment') that allows the creation of new jobs or to hypothesise that changes in wages are very sensitive to change in labour demand.

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[2] "Reducing Transatlantic barriers to Trade and Investment – An Economic Assessment", Final Project report delivered in March 2013 under Implementing Framework Contract TRADE10/A2/A16 by CEPR consortium.

[3] SEC (2009) 92, Impact Assessment Guidelines.

The sample of sectors would seem to be reasonable, especially because the sectors where TTIP is expected to have major effects are included in the IA. It is true that GTAP-8 has more than 50 sectors, but the costs ('tariff equivalent') of US and EU NTBs are only known for a group of 20 aggregated sectors. In this exercise, the positive spill-overs of the TTIP 'regulatory part' to third countries has been brought into the model, albeit in a very simple way: a share (in percent) of the benefit of NTB removal would spill over to other trading partners. This spill-over share (one-fifth in the ambitious scenario) is arbitrarily postulated by CEPR. In the present report to the European Parliament, we have attempted to provide some economic underpinning of the likelihood of an incentive for spill-overs of TTIP. Although a limited exercise, it does show that spill-overs beyond the five closest economic neighbours of TTIP (Mexico, Canada, Norway, Switzerland and Turkey) are not likely without explicit incentives. So-called 'domino' effects to the largest trading countries in the world should not be taken for granted, unless plurilateral agreements are offered or bilateral agreements, e.g. Mutual Recognition Agreements, are simplified on the basis of TTIP results. For the purpose of spill-overs, the sample of countries (now 40) could have been larger, especially given the effects on developing countries that export the type of goods, subject to regulatory convergence, to TTIP partners.

More should be done here than we have been able to do, especially by bringing in a sectoral perspective and distinguishing different methods of regulatory convergence, e.g. harmonisation versus mutual recognition.

On policy options, a baseline scenario, drawn on the current state of EU-US trade and investment relations, is adequately analysed – more and refined analysis is of course possible but would not add much value for the purpose of using the CGE-GTAP model, as this model can only handle rather stylised approaches anyway (and no other model would be capable of yielding more in this respect).

The predominance of NTBs, reflecting regulatory barriers to economic intercourse across the Atlantic, is fully justified, as they reflect a core problem in TTIP. But it is also extremely difficult to address them properly in any economic model and very few examples exist where this has been attempted. The cost of regulatory barriers (that is, tariff equivalents of NTBs) is a major problem and the background study supporting the Commission's IA has done what is *safe*: relying on the elaborate and wide-ranging study of Ecorys (2009a), which is second-to-none (except for services). We discuss in some detail the technical procedure of estimating the trade costs of NTBs in TTIP, with some critical notes. The 'actionability' (that is, how much of the costs of such NTBs can be reduced in TTIP) of NTBs is essentially based on the insights of the many sectoral experts involved in the Ecorys study. In any event, a less ambitious scenario and a more ambitious one, as to actionability, have been used, and this is to be applauded.

As to the simulation of the 'real' world economy, we show that – when comparing different IAs of recent trade agreements – quite different growth paths have been used and this may hinder the comparability of results between them. Given the crisis, the assumed path in the TTIP IA seems not unreasonable. The options analysed appear sufficient to us, because further refinement in an analysis like this would not bring much added value for MEPs. It should be noted that the effects on cross-border investments are derived from a somewhat ad hoc analysis outside the CGE model.

The economic findings would seem plausible for TTIP signatories, although they are too conservative in services due to low costs of NTBs in services compared to another study by Fontagné et al. (2013).

Comparing results between different IAs should be handled with care. We have tried to compare the economic methodology applied in the background EU-US study with that used

to analyse two other free trade agreements, all based on quantifying NTBs. The three studies, namely EU-US, EU-Japan and EU-Canada, exhibit profound differences, both from a theoretical and methodological perspective. We conclude that the different CGE estimations present several divergences in the following areas: market structures (evenly), underlying data used for macroeconomic forecasts, theory and indicators of NTB costs and policy scenarios.

Such multiple divergences are bound to influence the final results of each study, i.e. specific gains (or losses) over time and sectorally as well as between countries. Therefore, arguing that one agreement would be more (or less) beneficial than another only on the basis of the CGE estimations discussed would not make much economic sense and may be misleading.

Our report also analyses the modelling, assumptions and findings of all recent studies that analyse the potential impacts of the EU-US free trade agreement. We have divided them into two groups: one includes two reports that employ methodologies and assumptions quite distinct from CEPR. The second group includes what we have called 'satellite studies' because they represent only different applications of the main CEPR report on which the Commission IA is based. CGE modelling is the preferred one by all of them.

While the second group uses the same methodology as applied by the Commission IA, the first group merits careful scrutiny.

Fontagné et al. (2013) show that TTIP is only of some economic importance if one moves beyond mere tariff removal to partial removal of NTBs, confirming the finding of the CEPR study. However, Fontagné et al. (2013) has approached the NTBs in services differently. For nine services sectors they calculated average protection (based on a sample of 65 countries) with a different technique. The upshot is that the costs of services NTBs turn out to be much higher than those of Ecorys (2009a) used by CEPR. Nevertheless, final findings on GDP effects do not vary greatly with the ones reported by the IA; indeed, the final GDP effect for both signatories is slightly more conservative (0.3% for both), probably due to the higher costs of post-TTIP NTBs computed.

The spill-over effects in Fontagné et al. (2013) are defined as a further reduction of 5% of trade restrictiveness of NTMs (non-tariff measures) for third countries as a result of the regulatory convergence process for the two signatories. As in the Commission IA, the percentage is based on a debate among expert groups.

The second study is the Bertelsmann/GED report on the effects of TTIP. It provides a different CGE approach based on a daring simulated scenario. The idea behind the simulation is that TTIP, if ambitious, might accomplish a level of market integration, including the reduction or removal of NTBs, similar to NAFTA or even the EU internal market. This assumption is clearly unrealistic and it drives the enormous country-specific effects (also in terms of negative and positive spill-overs) reported in the study. We show with a simple example why the results in the Bertelsmann study are not just an extreme outlier compared to the CEPR and other studies, but are impossible under any reasonable assumption. However, from a technical point of view, the Bertelsmann study has some merits, such as its far-reaching and wide sample of countries and the explicit treatment of unemployment.

Introduction

In 2006, the EU ended a seven-year moratorium on new bilateral or regional free trade area agreements, mainly in order to facilitate the multilateral trade negotiations in the Doha Round. Ever since, the EU has pursued an ambitious strategy of negotiating modern bilateral and regional free trade areas (FTAs) with strategic trading partners and others willing and able to conclude *deep and comprehensive* treaties. The agreements concluded so far are rather different

from FTAs of the past, at least if one solely pays attention to forms of market integration outside Europe.[4] Indeed, the recent agreement with South Korea is ambitious, deep and comprehensive. The intentions of the current EU-Japan negotiations and new FTAs with Singapore and Canada are probably no different.

However, despite this much-higher gear in FTA negotiations and the resulting intrusive FTA-*plus* regimes, the Transatlantic Trade and Investment Partnership (TTIP) negotiations, begun in 2013, are nevertheless in a class of their own. There are essentially two reasons: the nature of the agreed negotiation strategy of the partners and the sheer economic size of transatlantic economic intercourse. The nature of the negotiations is clear from the report of the scoping exercise by the United States-European Union High-Level Working Group on Jobs and Growth (US-EU HLWG) (2013) and confirmed, so far, by subsequent negotiations and stakeholder briefings. The nature and ambition are unique, due principally to three factors: i) the worldwide leadership of the two parties in both old and new methods of improving market access (including investment); ii) the prominence of their regulatory convergence, coherence and/or compatibility over a very wide range of markets and policy domains and iii) the explicit objective of devising or upgrading rules "addressing shared global trade challenges and opportunities" (US-EU HLWG, 2013).

The size of today's transatlantic economic intercourse is also in a class of its own, as it dwarfs any other bilateral or even regional relationship, both in terms of flows and stocks. This has an immediate consequence for the empirical economic analysis of TTIP: even (percentage-wise) small changes in the components of this economic interdependence will quickly add up to considerable effects in terms of euros or dollars.

The aim of this paper is to analyse the appropriateness and validity of the methodology behind the European Commission's Impact Assessment of TTIP,[5] also by comparing its result with alternative exercises. In this respect, we discuss the assumptions and findings by comparing, where possible, this IA with other recent IAs on EU trade and investment agreements in terms of methodologies and assumptions. Both the nature of the TTIP as foreseen and the sheer economic size of actual transatlantic economic intercourse are important reasons for the European Parliament and many other decision-makers, if not the public at large, to understand the potential economic gains of these wide-ranging negotiations in a way that goes far beyond just taking note of some core figures from the European Commission's Impact Assessment. The background study behind the Commission IA is CEPR (2013a), which relies on the pioneer study of Ecorys (2009) concerning the quantification of non-tariff measures between the EU and the US. Indeed, simply using expected (EU and US) economic welfare gains or the simulated impact on (say) the flows of goods and services, without having either any appreciation of the underlying methods (and their limits) or much of an idea of alternative ways of simulating TTIP effects (and their results, if available), would seem to offer a shallow basis for sound debate in the European Parliament.

TTIP is incredibly complex and wide-ranging, much more so than in economic studies of other (EU) trade policy initiatives; hence, in studying this initiative, there is no way to escape from fairly drastic assumptions in order to be able to generate meaningful empirical results. To put it differently, to link in a responsible fashion the negotiation mandate for TTIP with what economic modelling can and cannot do, requires the acceptance of state-of-the-art economic modelling today. If one declines to do this, the only other way would consist of vague

[4] In Europe, of course, the European Economic Area (EEA) is uniquely *deep* and *wide in scope* and the EU-Turkish customs union is fairly deep, especially in goods.

[5] European Commission (2013a).

qualitative economic inferences, without any rigour and without any way to scrutinise complex secondary and dynamic effects, and having no clue about economy-wide effects at all. That would fail to serve as the basis for a proper EU Impact Assessment. As the authors will emphasise throughout this report, it is important to fully recognise all kinds of criticisms one might make about economic modelling, but it is mistaken to read in such criticism any suggestion that intuitive insights allow greater appreciation of the TTIP as a whole. Quite the contrary!

The study is structured as follows: Chapter 1 focuses on the Commission's Impact Assessment and the methodology applied by the background study (CEPR, 2013a), by discussing the background study's merits and drawbacks for empirical simulation.

Chapter 2 will explain how TTIP can be stylised for economic purposes, particularly (but not only) in so-called 'CGE models' as used in the CEPR and other studies. In particular, we will assess the validity of the applied methodology and how they have affected the impacts both for signatories and third countries. Chapter 3 will compare the impact assessment of TTIP with selected previous empirical economic assessments of EU trade agreements. Chapter 4 will compare the methodology adopted for the Commission's impact assessment of TTIP with the few alternative studies available. Conclusions will be then drawn on the basis of the analysis.

1. What the EU-US impact assessment tells us and how

The aim of this chapter is two-fold: firstly, it will briefly assess whether the impact assessment (IA) on the EU-US TTIP negotiations (European Commission, 2013a) is consistent with the European Commission's Impact Assessment Guidelines (European Commission, 2009). Subsequently, we will zoom in on the methodology and results of the economic section of the IA based on the CEPR (2013a) report to the European Commission and published in March 2013. In particular, we want to explain whether the quantitative methodology used by the background study of the IA corresponds to the analytical needs of an ex-ante evaluation of such a trade agreement and whether alternative evaluation methods are possible.

It is recognised in the policy debate that the negotiations between the EU and the US for a comprehensive free trade area will be different from previous agreements. This is due to the economic size of the signatories and their economic intercourse (hence the possible impact on third countries) and to the nature of the negotiations dealing mainly with the removal of non-tariff barriers (NTBs).[6] Tariff levels are a lesser problem over the North Atlantic; there are higher tariffs on, e.g. processed agro-food products and motor vehicles, but overall the level of tariffs is low (and many product lines no longer have any tariffs).

1.1 The Commission's IA and the Guidelines: A general assessment

This section discusses the compliance of the European Commission's impact assessment of the proposed TTIP with the Commission's Impact Assessment Guidelines.[7] Before doing so, it is worth mentioning an important difference between this type of analysis and other impact assessments routinely performed by the various directorates general (DGs) of the European Commission, including DG Trade. The IA under examination is meant to support the Commission's recommendation to the Council requesting a mandate to negotiate. As is common practice since 1999, once the Commission receives the negotiating mandate, a second assessment procedure is launched, the "Trade Sustainability Impact Assessment" (TSIA).[8] As noted also in the Handbook for TSIA (European Commission, 2006:11), a key difference between these two assessments lies in the question either is meant to answer: whereas the IA performed before the negotiating mandate is granted explores *whether* action should be taken, the later TSIA looks at *how* action should be taken and what its consequences are. Moreover, the TSIA is undertaken during the negotiation process.[9]

TSIAs are regularly performed for all major trade negotiations by the EU for the last decade or so. Conversely, 'pre-negotiation IAs', such as the TTIP IA of 2013, are rare. Indeed, 11 years

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[6] As chapter 2 will deeply analyse, quantifying NTBs and regulatory divergences is anything but easy. Indeed, NTBs are not by definition merely a cost – because they tend to be the consequence of domestic measures that deal with market failures or (sometimes) redistributive motives, hence, can be regarded as desirable or even necessary for the better working of markets – but they may imply more difficult market access, that is, a cost for foreign affiliates and trading partners (CEPR, 2013a).

[7] European Commission (2009). These guidelines, issued in January 2009, were under revision at the time of writing. Revised IA guidelines are expected by the end of 2014.

[8] For further details on the methodology of TSIA, see the official Handbook (http://trade.ec.europa.eu/doclib/docs/2006/march/tradoc_127974.pdf).

[9] Another difference lies in the fact that the IA is undertaken by the Commission, although most of the evidence used in the assessment is often drawn from external studies; conversely, TSIAs are performed by external independent consultants and the Commission comments on their findings via the so-called "position-papers".

after the introduction of the Commission's IA system, only two examples of such IAs are available: for Japan (2012)[10] and the US (2013).[11] Yet pre-negotiation IAs seem to have become a more regular feature since 2012.

CEPS has developed a scorecard of over 200 items for assessing the extent to which the IAs produced by the European Commission comply with the requirements included in the official IA Guidelines. When applied to a large number of IAs (CEPS has scored over 600 Commission IAs), this system allows for a rather accurate comparison of how comprehensive an individual IA is and can locate its main weaknesses and strengths.[12] In this respect, the IA prepared for TTIP scores rather well in comparative terms, as it covers most of the items contained in the IA Guidelines. It also appears to be more comprehensive, in the variety of policy options considered, than the other available example of a pre-negotiation IA, for Japan. It should be noted, however, that when compared to traditional IAs, this type of assessment offers policy options that are much more limited in variety and essentially includes the 'no policy change option' as well as several variations (in depth and scope) of a possible trade agreement. There is little or no scope in such agreements for other approaches, such as self-regulation, the use of market-based mechanisms, etc., as foreseen by the IA Guidelines; hence, these alternative options would simply be ignored. Methodologically and in terms of the evidence base, the two pre-negotiation IAs are very similar and refer to the results of CGE modelling. This is in line with the IA Guidelines, which recommend using a specific model when it is deemed appropriate for a certain type of analysis.[13]

Rather than the question of compliance with the Impact Assessment Guidelines (particularly since the pre-negotiation IA is only a first analytical step that will be followed by the TSIA), what is perhaps more interesting is to examine the position of this IA in the general impact assessment process of the European Commission. Three points can be made in this respect:

- The first concerns the policy options under examination. As mentioned, these are not particularly varied. If it were not for the fact that they are meant to support a request for the mandate to negotiate, in a traditional IA they would be seen as the classical set of options that 'artificially' pre-empt other courses of action and 'justify' the preferred option. While such criticism is less appropriate in this particular case, the assumptions and the different combinations of the various scenarios leading to the proposed options may not be fully exploited for the purpose of exploring all possibilities. With respect to policy options retained for analysis, the TTIP IA scores better than the IA for Japan.
- Another important point is the link between the IA and the proposal. Contrary to most other IAs, the accompanying TTIP proposal (as with the China IA) was confidential at the time and not accessible. In other words, the 'natural' link between the evidence base

[10] A deep analysis on the economic modelling behind the EU-Japan IA is presented in chapter 3.

[11] Note that DG Trade performed a total of 10 IAs between 2003 and March 2014. Another example that can be of some relevance in the present discussion is the 2013 IA of the Recommendation for a Council Decision authorising the opening of negotiations on an investment agreement between the European Union and the People's Republic of China.

[12] As discussed in the literature (see, e.g. Fritsch et al., 2013; Dunlop et al., 2012), the scorecard approach has limitations, for instance, it shows whether a certain item is analysed in an IA but cannot draw specific conclusions on the quality of the analysis. This limitation is less relevant when applied to a very large number of IAs (as the purpose is to show trends); for individual cases, the scorecard analysis can be complemented with a more focused approach, e.g. case study, as is done in other parts of this study.

[13] See Annex to the IA Guidelines (European Commission, 2009, p. 68).

provided by the IA and the proposal is broken. This in a way raises the question of the IA's utility beyond the closed-circle of individuals with access to the draft mandate. On the other hand, given the limited number of IAs carried out before the negotiating mandate is granted (compared to the overall number of TSIAs), the TTIP IA can serve as an additional tool for accountability and, more important, sets in motion another mechanism, as explained below.

- Indeed, by being undertaken as a support for the Council Recommendation, this IA is subsumed under the general IA process and undergoes the scrutiny of the Impact Assessment Board (IAB).[14] The IAB uses the IA Guidelines as a reference and does not seem to treat this specific IA any differently than it would an assessment accompanying a traditional proposal.[15] And indeed in its opinion,[16] the IAB levelled some rather demanding criticism at the IA, requiring a strengthening of the problem definition, better integration of stakeholder consultation results, a clarification of the assumptions behind the policy options[17] and, more importantly for the purpose of this research paper for the European Parliament, that the quantitative analysis provided by the CGE be further complemented by other quantitative and in-depth qualitative assessments of impacts. The resubmitted version does indeed pay more attention to those aspects and these additional efforts might be further pursued with the TSIA.

1.2 The applied CGE modelling in the EU-US trade and investment relations

The economic impacts of the expected TTIP that the Commission refers to are based on a background study by CEPR (2013a) carried out before the start of the actual negotiations. In order to rigorously assess the applied methodology, we have to briefly describe how it is technically possible to measure the impact of a free trade agreement and how this methodology has been applied in this specific case.

1.2.1 CGE modelling in general?[18]

Computable General Equilibrium (CGE)[19] models are quantitative methods to describe the interactions among several markets and the impacts that an economic shock (such as a free

[14] The Impact Assessment Board is a central quality control that works under the authority of the Commission President. It examines and provides feedback on the Commission Impact Assessments, being independent from the policy-making departments.

[15] This is in line with the findings of Alemanno & Meuwese (2013) as regards the IAs undertaken for some delegated and implementing acts. The authors noted that while IAs for these acts are becoming more widespread, there is no official rule in place to establish whether undertaking an IA is appropriate or not, but when this happens the IAB always uses the same checklist to evaluate the IA. This appears to be the case also for pre-negotiation IAs.

[16] European Commission (2013b, p. 154).

[17] Note that negative comments on the assumptions and the problem definition were also found in the IAB opinions on the IAs for Japan and for China.

[18] A large part of this sub-section is based on Lejour et al. (2006).

[19] CGE or AGE modelling has been, since the late 1980s, the standard workhorse for analysing free trade agreements. The most prominent examples are Harris (1984) and Cox and Harris (1985) and Brown and Stern (1989). These models received much attention in modelling the effects of the North American Free Trade Agreement (NAFTA) a few years later. Then, Hertel (1997) and his colleagues started to develop a common database of CGE analysis in the 1990s. The latest version has 2007 as the base year and

trade agreement) could have on economic variables such as GDP and trade flows as well as inter-sectoral adjustment for workers and capital.

In these models, prices of goods and factor inputs are flexible, such that demand and supply equalise at an equilibrium price.[20] In the long run, this implies that all markets that have interacted with each other reach equilibrium.

CGE models thus reflect the behaviour of consumers and firms. Consumers demand the different consumption goods and services, and provide labour and capital to the firms. The consumption bundle of the different goods and services is determined so that it brings maximum utility to the consumer, given his budget constraint. It is normally assumed that the supply of labour is known. Because consumers save part of their income, they are able to supply capital to the firms in return for income. Consumers supply labour and firms demand it. Two types of labour are distinguished: high-skilled and low-skilled. It is assumed that labour markets are in equilibrium at the national level, i.e. no unemployment would remain, supply is equal to demand of labour, and that the prices of both types of labour (the wage rates) are flexible. For each labour type, supply and demand will become equal to the equilibrium wage. Normally unemployment is not modelled or projected exogenously.[21] High-skilled and low-skilled labour supply is also fixed, so consumers cannot decide to invest in education in order to reach a higher-skill type.

Consumers supply the capital that firms demand. In some CGE models the capital markets are national. Supply has to meet demand within a country. Other CGE models, such as the GTAP model (as used by CEPR, 2013a) assume (rudimentary) international linkages between the capital markets. Then, the equality of global demand and supply determines the price of capital. Thus, if capital is abundant in one country (and hence relatively inexpensive), it is invested in another country in which capital is scarce (and relatively expensive).

International markets for goods and services are linked with each other as well. The demand for a good is not only expressed in the home market, but also in foreign markets.

CGE models assume that in each region a different variety of a good or service is being produced and that, in principle, consumers demand all varieties. The demand for each one of the varieties depends on its relative price, the substitution possibilities between the varieties, transportation costs, trade barriers and preferences. If the price of a particular variety goes up,

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distinguishes about 130 regions and countries in the world and 57 economic sectors. Together with an easy-to-use static CGE model and many short courses, CGE modelling became more and more popular not only in academia but also in policy circles.

[20] The flexibility assures the following mechanism: assume that consumers' preferences shift in favour of a particular good and that final demand for that good increases. Then, the price of the good will increase and profit-maximising firms will want to produce more and will demand more inputs, such as intermediary goods, capital and labour. As a result, prices in other markets, such as capital and labour, may increase because of the increase in demand of the final good. These sectoral linkages transmit the price increase of the final good to other markets. The price increases in other markets also have consequences for other sectors. Input prices increase depending on the production process or the proportion of inputs and will have effects on prices of other final goods. These are the secondary effects of the shift in preferences. The changes in demand and supply of final and intermediate goods, labour and capital go on until a new equilibrium is reached. This new equilibrium is the situation in which the prices balance demand and supply in all markets.

[21] In economics, a variable is exogenous to a model if it is not determined by other parameters and variables in the model, but is set externally and any changes to it come from external forces.

demand will decrease in favour of other varieties. Total demand for each variety thus depends on the demand in the home and foreign markets.

There are CGE models that explicitly include the government in the model; others add government expenditures to (private) consumption. In all cases the behaviour of government is hardly modelled. CGE models include the government budget, such that the collected taxes on imports, on consumption and sometimes on production are equal to (export) subsidies and government consumption. All tax and tariff rates are assumed to be exogenous (given).

1.2.2 The CGE modelling for the TTIP IA: The CEPR study

The analysis of CEPR (2013a) relies on a multi-region and multi-sector type of GTAP model (the newest version 8), and on its huge database, including information on 'bilateral trade' and on the social accounting matrices (SAMs).[22] The underlying theoretical model comprises world trade, production and consumption (through a representative modelling of a household) allowing for economies of scale and imperfect competition in a static perspective.[23] Since the results hinge on long-run estimations,[24] it is appropriate to take investment effects into account. However, the macro and sectoral effects of removing or reducing barriers to foreign direct investment (FDI) are separately analysed by CEPR (2013a), outside the CGE context. The modellers have also included the effect of tariff reductions, removal of export taxes, subsidy reduction and other international trade costs, all regulatory divergences between two trading partners.

Data are included for 20 sectors[25] across 11 regions[26] in the world economy. Data have been taken exclusively from the enormous GTAP database, which represents a comprehensive and reliable source collected worldwide to ensure a solid representation of trade flows across sectors and countries and over time.

To analyse the effect of the TTIP agreement on the economic variables of the two signatories (and also on those of third countries), the different scenarios are characterised by the partial or total removal of: current tariffs (even if the average tariff rates are bilaterally low compared to non-tariff measures, they nevertheless show a certain degree of heterogeneity across sectors

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[22] Following the UNEP (2005) definition, a social accounting matrix "is a presentation of a country's national accounts in a matrix that elaborates the linkages between a supply and use table and sector accounts. An SAM measures distributional impacts using policy simulations with complete specification of the economy. Prices are fixed and exogenous. The model normally contains entries for productive activities, commodities, factors, institutions, the capital account and the 'rest of the world'."

[23] The assumption of imperfect competition is considered quite realistic: it implies firm level competition and a variety of goods supplied according to the characteristics of 'monopolistic competition'. It also allows us to analyse the effects of intermediate linkages between sectors as well as the modelling of changes in capital stocks due to investment effects. For a discussion of the general extensions of the CGE modelling, refer to Annex II.

[24] For an overview of the results of the CEPR study, refer to Annex I.

[25] Sectors included in the analysis are Agricultural, Forestry and Fisheries, Other Primary Sectors, Processed Foods, Chemicals, Electrical Machinery, Motor Vehicles, Other Transport Equipment, other Machinery, Metals and metal products, Wood and paper products, Other manufactures, Water transport, Air transport, Finance, Insurance, Business Services, Communications, Construction, Personal Services and Other Services.

[26] European Union, United States, Other OECD-High Income, East Europe, Mediterranean, China, India, ASEAN, MERCOSUR, Low Income, Rest of the World.

and some sectors are still affected by a relatively high level of tariffs such as motor vehicles) and non-tariff barriers (NTBs) in goods and services.

The definition of the policy scenarios is extremely sensitive to the degree of actionability of the non-tariff barriers. With this term, CEPR means the extent (expressed in a percentage share) to which the identified costs of a NTB or regulatory divergence can potentially be reduced (through various methods) by 2018, assuming a TTIP agreement that will address these barriers. According to the background study of Ecorys (2009a), commissioned by the European Commission at the time, approximately 50% of costs due to NTBs are actually removable; put differently, only half of the existing barriers or regulatory divergences are considered 'actionable'. Both this judgment, arising from a large panel of sectoral experts, and the estimated costs of NTBs (a difficult exercise, see further) are of course critical for the final results about impacts.

Two policy options are considered, further subdivided into sub-scenarios according to the actual implementation of tariffs and NTBs removal.

The first option is split into three limited scenarios, analysed as three 'stand-alone' possibilities (*only tariff liberalisation, only service liberalisation* and *only public procurement liberalisation).*[27]

The second option is split into two versions of what would be expected from a Comprehensive Trade Partnership:

- A *less ambitious scenario* including the simultaneous negotiations of the three chapters included in the limited agreement (98% of tariffs eliminated, 10% of services and goods NTBs eliminated, 25% of public procurements NTBs eliminated); or
- An *ambitious* scenario removing all the actionable NTBs costs (so the 50% previously mentioned) as follows: 100% of tariffs eliminated, 25% of NTBs on services and goods eliminated and 50% of procurement NTBs eliminated.

In the three versions of option 1, gains in terms of GDP and millions of euro are very small and no positive spill-overs for third countries are expected (for services, it all depends on non-discrimination, but this is not discussed in the CEPR study). However, the negotiating effort would nevertheless be appreciable. Changes in bilateral trade in goods are found to be larger under the tariff cut compared to services or public procurement. Although the overall effects are not impressive, this result shows that TTIP trade flows are more sensitive to tariff cuts than to (here, limited) service liberalisation. The two policy options included in the comprehensive trade partnership (as also outlined by other studies on an EU-US trade agreement) show higher outcomes for both the EU and the US that can vary according to the degree of actionability of non-tariff removal. All the findings, both in the limited and in the comprehensive scenarios, incorporate (for the first time, in such a quantitative exercise) the effects due to the (partial) removal of non-tariff measures in public procurement.

The purpose of the economic modelling of the policy options is to provide proxies of both overall quantitative impacts as well as of effects in the specific sectors affected, according to the different scenarios. In this respect, CGE modelling presents potential outcomes: what the economies would look like once the foreign trade agreements would come into force. However, the applied methodology can never pretend to be exhaustive as the econometric approach is by definition limited by fairly restrictive assumptions, with quite some distance from 'reality'. At the same time, one has to realise the enormous complexity and very large

[27] This is considered a feasible but limited outcome. Indeed, the low outcomes for both signatories do not seem to justify the effort of the negotiations.

number of calculations, combining the respective barriers to trade in some 40 countries with goods, services and labour markets, 20 sectors and a 10-year period for the simulations.

To assess the methodology applied to the prospective TTIP, it is useful to shed light on two specific steps of the econometric exercise. The first one considers the validity of the assumptions imposed by the authors in order to obtain robust results that are not too far removed from what can be realistically achieved (as analysed in chapter 2). It is useful to bear in mind that modelling assumptions in this exercise, as in all econometric estimations, largely drive the final outcomes of the model. The second step is to discuss the structure of the model and the validity of the additional calculations introduced to improve the results (mostly, spill-over effects and, separately, impacts on FDI).

The CGE modelling also allows for sustainability impacts such as effects on labour market, CO_2 emissions and use of natural resources.

With respect to labour effects, it is worth noting that standard CGE models do not estimate changes in employment/unemployment. This follows directly from the fact that such models are governed by equilibrium conditions (in other words, supply equals demand of labour at some set of wages for skilled and low-skilled workers). Therefore, the model may show the reallocation of labour between sectors after TTIP has come into force, but it does not tell us anything about unemployment or indeed extra jobs. It does describe the wage changes for low- and high-skilled labour, in interaction with inter-sectoral movements of labour; together these ensure that there will be no unemployment (supply equal to demand). Other approaches to evaluate employment effects will be examined later, but such approaches have not been employed in the CEPR report.[28]

The last addition provided by the CEPR exercise is the evaluation of the removal of restrictions on Foreign Direct Investments (FDI) and in particular for EU affiliates in the US that might be affected, and vice versa. The assessment is separated from CGE estimates and this different methodology does not allow for a comparison between trade and investment NTBs. As in the previous exercise, the Ecorys study reports a survey on bilateral degrees of (restricted) market access. While data on NTBs come from Ecorys**,** investments are based on Foreign Affiliate Trade Statistics (FATS) that more precisely capture the economic activities of foreign branches and affiliates.[29]

1.2.3 How robust is the CGE modelling in the TTIP IA?

Whether or not CGE models are the best for estimating the impact of comprehensive FTAs like TTIP can only be judged properly if one first recognises that all quantitative models have their limitations. First, models are by definition a simplified and stylised way of understanding the economy. The more complex, comprehensive and deep trade agreements are, the harder it will

[28] Results on labour effects, CO_2 emissions and use of natural resources are reported in Annex I.

[29] To capture the role of foreign-controlled affiliates under Mode 3 of GATS (providing a service by establishing a commercial presence), the authors opted to use Foreign Affiliates Statistics (once Foreign Affiliates of Trade in Service – or FATS). FDI in services, however, keeps its relevance in analysing trade in services under the form of investment, notwithstanding their broader coverage. FATSs indeed consist of variables (sales/turnover, employment, added value, number of enterprises) referred to in the overall operations between the direct investors and the foreign affiliates. They are defined at firm-level and subsequently grouped by country and sectors (Manual on Statistics of International Trade in Services, 2010, compiled by the Statistics Division of the Department of Economic and Social Affairs, United Nations).

be to include all aspects in any economic model. Deep free trade agreements include goods trade, services trade, direct investment, trade facilitation, procurement issues and intellectual property rights. Although these issues are the most important ones, this list is not complete. Economic models do not include all these issues. Second, modern trade agreements include many issues that are hard to quantify. This is not only the case for the policy instrument (TTIP), but also for the underlying economic mechanism and the policy impact. These limitations imply that we have to judge the impact assessment and corresponding CGE analysis of TTIP not with the yardstick of an ideal model (as there is no such thing) and ideal and abundant data (as this is never the case), but with the yardstick of the state-of-the-art practice of economists using empirical models applied to FTAs.

The great strength of CGE modelling is that one can encompass the whole economy, with many markets, relying on sound microeconomic analysis in a general equilibrium context.[30] It is therefore possible to derive the welfare effects of trade policy proposals and to link their effects to specific economic sectors and countries. Another advantage is the relatively clear mechanisms and working of the models, although the later expansions in more complex models have complicated the analysis. Often, the way in which regions are aggregated can hamper a clear understanding of the policy effects.

CGE models have their disadvantages too (Ackerman, 2005). The assumed flexible prices (especially wages) create a very flexible economy, which implies full employment; dismissed workers will be quickly absorbed by other sectors. Even though alternative modelling options for the labour market have recently been developed, these are not often applied.[31] Moreover, capital can also be reallocated very quickly to other sectors, while some capital is often fixed or sector-specific in actual practice. The nature of the models is static. It is hard to model the expansion of capital through investment and productivity improvements, let alone innovation. First of all, research and development is either rudimentarily or not at all modelled, and the productivity effects of trade liberalisation are also not included in the models. On both issues there have been some serious modelling efforts, but these are still not adopted in the core of CGE analyses. The empirical underpinning of the new mechanisms in particular is considered problematic.

1.2.4 The role of employment and public procurement in the CGE modelling

The basic structure of CGE models consists of markets with perfect competition and flexible prices. Introducing imperfect competition, as CEPR (2013a) has done, has now become more routine. Because the labour supply is fixed by region and not mobile between regions, employment is always equal to labour supply. Trade liberalisation scenarios do not deliver employment effects in these models. Quite often, however, production increases and more labour is demanded. As a result, wages increase. This is the typical labour market effect. Sometimes reports using CGE models deliver labour market effects by translating the wage increase in the model into employment increases. These are off-model exercises that make sense if wages are more or less rigid (as is often the case in Europe) and unemployment is substantial. Although CGE models are often criticised for their modelling of the labour market, the simulations are nevertheless informative about job changes between sectors. Due to trade

[30] Partial equilibrium models cannot but ignore important feedbacks on the rest of the economy, that is, they lose out on important welfare effects, which remain 'invisible', as it were. In CEPR (2013a), this is exemplified by a comparison of an addition of separate sectoral effects and the overall economic effect, incorporating all the interactions between sectors, markets, etc. The overall effect is much larger than the addition of the separate effects.

[31] See in chapter 4, for instance, how the labour market has been treated in the Bertelsmann study.

liberalisation some sectors gain and others lose and these effects are reflected in job gains or losses in these sectors. In the models such labour reallocations occur very smoothly, but in reality they are likely to result in temporary unemployment. The amount of labour reallocation in the model is normally expected to be much larger than temporary unemployment that might be induced, because a considerable part of the mobile labour force will voluntarily look for other jobs and often find them (as we know from job changes on a monthly basis) and another part will have few problems as their work is not sector-specific and may be in demand at the going wage. The genuine problems are to be expected for fairly low-skilled workers with sector-specific knowledge who either have to move to other regions in a country or between (EU) countries or have to accept lower wages as their 'sector bonus' will evaporate.

In principle, CGE models could be extended with wage-bargaining models and search and friction models to improve the modelling of the labour market.[32] By incorporating these extensions, the model allows for unemployment. Moreover, labour supply could also become a variable instead of a given, by deriving a relationship between supply and the wage. Although various efforts have been made by incorporating these extensions in CGE models, there are still no standard tools that can be employed in multi-country CGE modelling. One of the econometric problems is estimating the behavioural equations in particular for developing countries.

Deep free trade agreements also contain some provisions on the opening up of public procurement for foreign firms.[33] Generally, CGE models neither model public procurement nor include public procurement scenarios as a part of the trade liberalisation. The CEPR study seems to be the exception, although the details of modelling the opening up of public procurement are not well explained. In principle, it seems possible to model public procurement. The underlying GTAP data contain a government sector. This sector can be interpreted narrowly, including, for example, only public administration, education, health and defence, or more broadly by including recreation, culture and sports and the utility sectors. It is not clear which interpretation has been chosen in the CEPR study. The problem, however, is that the possible discrimination towards foreign sales is difficult to quantify. But an NTB approach as in other sectors could be chosen. This is also done in the report; a lower NTB is associated with opening up public procurement. Because the effect of lower NTBs in services and goods is already modelled in the broader trade liberalisation scenario, the public procurement liberalisation is thus already included in the effects (as part of the lower NTBs in services). Therefore, although the results are separately shown, they cannot be added to the totals. The present authors are not aware of any successful attempt of modelling the opening of public procurement for foreign firms in CGE models.

1.2.5 Are there any alternatives to CGE modelling?

The most prominent alternative for CGE analysis is gravity analysis. This is mainly an econometric application that tries to explain bilateral trade between two countries.[34] This is

[32] See also the overview on labour markets in CGE modelling of Boeters & Savard (2013).

[33] Public purchases are large markets: according to the OECD, on average 12% of GDP in OECD countries. The OECD and Vogel (2009) conclude that costs savings in public procurement and transparency can increase economic growth. Trionfetti (2000) finds that import shares in public procurement are substantially lower than in private procurement, suggesting a significant 'home bias' for public procurement. Modern FTAs try to correct for this home bias, but the quantitative impact of these measures is hardly known.

[34] It originates from Tinbergen (1962), among others.

often at the level of aggregated goods trade, although recent papers also discuss aggregated services trade. Apart from GDP of both countries and the distance, researchers include many potential trade barriers in these models and test their relevance for trade. By applying the policy analysis on the estimated models, the trade effects of FTAs are simulated and sometimes followed by GDP effects based on the relationship between trade and GDP. Although the gravity equation has a firm theoretical background,[35] this methodology does not include interactions between sectors and markets, hence no general equilibrium, thereby missing out on significant welfare effects. Although gravity equations can be estimated at the level of economic sectors, most studies estimate the models for aggregate goods trade flows. Trade in services is usually ignored.

For goods trade, the gravity model has been thoroughly tested empirically. The explanatory power of the model is large compared to many other econometric models, but there is always the question of whether the model includes all the relevant variables. The part of trade that is not explained is often associated with trade barriers. If the model misses important explanatory variables, the impact of those variables is erroneously associated with (higher) non-tariff barriers. Non-tariff barriers are often sector-specific and higher in services due to regulation, which is ignored in this macro approach.

As a second step, the trade effects of trade liberalisation are translated into welfare or income effects. The effects of liberalisation in gravity models are much larger than those in CGE models, because the estimated link between economic openness and GDP incorporates implicitly all dynamic linkages, related productivity improvements and knowledge spill-overs.[36]

Nowadays many papers also use gravity equations for explaining bilateral FDI (flows or stocks). Although the explanatory power of gravity equations is somewhat smaller for FDI than for trade, this econometric model performs well. GDP in the home and host country and distance are the main explanatory variables. This application is often derived from the trade literature but also from theoretical frameworks describing the determinants of FDI.

Alternative modelling options have their weaknesses too. The econometric methods used for gravity equations and for growth-openness equations seem to be very attractive. At least these estimates include all dynamic effects of productivity improvements and knowledge diffusion. However, the link between trade policy proposals and economic openness is much weaker than in CGE models. Moreover, these models do not include services trade (at least not in the first stage). Although these models do very well in illustrating the long-term effect of openness on GDP, it is much harder to analyse concrete policy proposals, if only because they rarely have a sectoral specification, and if so, only in a very aggregate way. In fact, gravity models are best for obtaining an overall 'ballpark' figure (say, GDP and overall trade flows) for major changes in trade, not for details. Another disadvantage is that these models do not have general equilibrium spill-overs towards the capital market, for example.

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[35] Anderson & van Wincoop (2003).

[36] Recently, Arkolakis et al. (2012) use another approach that is expanded by Felbermayr et al. (2013). Using a very simple model, which requires only information on import shares and the substitution elasticity between different varieties of a good, they estimate the welfare gains of trade. These gains are modest, but in their conclusions Arkolakis et al. (2012) state that many dynamic mechanisms are missing in their model. The model expansion of Felbermayr et al. (2013) enlarges the welfare gains of trade liberalisation significantly.

2. Stylising TTIP for the IA: Assumptions and simplifications?

This chapter discusses how the different parts of a trade agreement are analysed in the economic analysis. We explain, in particular for TTIP, how the main assumptions have been modelled and how they influence the impact assessments. After a general introduction, the section mainly focuses on quantification of NTBs and spill-over effects.

2.1 Stylising the TTIP negotiations for economic analysis

Modern bilateral or regional trade agreements, let alone comprehensive economic partnerships (also including investment and a host of other domains), are so encompassing and comprise so many policy issues that it is not possible to obtain an overall economic overview for MEPs and others by attempting to scrutinise each and every detail. In any event, at the outset not all such details are known in the first place. The purpose of early economic assessments, prior to negotiations and/or, in any case, prior to agreeing substantive results, is to acquire an overall perspective on the aggregate economic effects as well as a credible but merely approximate notion of sectoral and specific horizontal economic effects. It should be realised that such empirical economic analysis is already a tall order and a rather demanding exercise. Because of this broad, almost panoramic perspective, partial equilibrium approaches – with which all economists are familiar – would never do. The choice is between variations of CGE models, macroeconometric models, gravity-based approaches and highly stylised/simplified, aggregate trade models with basic simulation. However, the more demanding the assignment, e.g. in sectoral details, whilst also retaining the overall economic impact based on ally interactions between markets, the less likely it is that the latter simplified approaches would be able to deliver.

A prerequisite for such early overall economic assessment is a stylised presentation of the expected agreement. In Table 1, the negotiation structure of TTIP as agreed in February 2013 by the HLWG provides a good first lead of what is likely to be the substance of the eventual agreement, hence, what would have to be assessed in terms of expected economic effects.

In trying to appreciate any quantitative economic assessment of TTIP, the first caveat is found already here, before any technical details have been discussed yet. Table 1 immediately makes clear that not all domains specified by the HLWG are susceptible to (quantitative) economic analysis. Thus, in the second column on regulatory issues, neither the "cross-cutting disciplines on regulatory coherence and transparency" nor the "framework on future cooperation" can be quantified ex-ante, and possibly not even ex post without heroic assumptions. However, this does not mean that achievements in these domains are not important economically. It is always an option to insert an arbitrary degree of lowering market access costs due to accomplishments in such areas, but this would be purely speculative, most of all on the future framework. In the third column, the problems for the economic analyst are even greater. In a few cases, e.g. customs and facilitation, a 'guesstimate' of the bilateral potential of cost reduction might be made with the help of experts – and this has become a significant question for customs facilitation due to the expensive 100% container scanning regulation that the US plans to introduce in 2014. But for the most part, it is out of the question that one can quantify the impact of transatlantic rule-making for the rest of the world economy, which depends in any event on the willingness of others to follow suit.

Table 1. Negotiation structure of TTIP

Market access	Regulatory issues, NTBs	Rules, globally relevant
Tariffs	SPS-plus	IPRs
Services	TBT-plus	Environment and labour
Investment	(Cross-cutting disciplines on) regulatory coherence and transparency	'Other globally relevant challenges and opportunities', strengthen rules-based multilateralism
Public procurement	Sectoral commitments	Rules, principles or modes of cooperation in: • customs & facilitation • competition policy; state-owned • enterprises • local barriers to trade • raw materials & energy • SMEs • transparency
	Framework for future cooperation	

Source: US-EU HLWG (2013).

Of course, one might argue – as CEPR (2013a) briefly refers to and which we shall inspect in greater detail in section 2.III – that the huge weight of EU-US economic intercourse creates a strong incentive for third countries to align rule-making and/or standards, given that they have to comply in exchanges with the EU and the US anyway. Moreover, some important neighbouring economies (Canada, Mexico, Turkey, Norway and Switzerland, for example) have a much greater incentive to follow, which, in turn, strengthens the incentives of others to join in too. But in the final analysis, these incentives and their 'effects' (so-called 'positive spill-overs' of TTIP to third countries) are not measurable beforehand and one can, at best, make only an intelligent 'guess' once one understands better the determinants of the follow-up decisions in third countries. In Table 1, column 3, it is equally challenging to analyse, quantitatively and beforehand, impacts on SMEs and transparency, for example.

However, even in the first column of the table one finds problematic areas for economic research. Opening up of public procurement is notoriously difficult to tackle with empirical economic analysis and in particular in CGE models, as employed by CEPR (2013a) and others (see also chapter 4). To a lesser degree, this is true for (direct) investment.

2.2 How non-tariffs measures (NTMs) have been quantified

The Ecorys (2009a) study, on which CEPR (2013a) is partially based, is a follow-up of the 2007 EU-US agreement on a Transatlantic Economic Council and a new Transatlantic Economic Framework. Table 2 presents, in summary terms, how the Ecorys and CEPR reports have stylised the eventual EU-US agreement.

Even casual observation shows that these two studies, although technically and in terms of inputs are closely related, do not fully overlap in terms of substance of (better) market access, and both also differ from Table 1 At the same time, the economic impact of an eventual TTIP agreement will overwhelmingly be based on the areas that have been covered. Readers thus have to study carefully *what exactly* has been assessed in empirical economic analysis and what has not.

Table 2. Stylised TTIP-like expected agreements studied by CEPR and Ecorys

CEPR (2013a)	**Ecorys (2009)**
Tariffs	No tariffs: focus is on NTMs in trade and investment
NTBs reduction on goods and services: since this is done with sectoral tariff equivalents, it amounts to covering TBT-plus in TTIP, SPS-plus and sectoral commitments in TTIP, all assumed to benefit from average reductions (of 10%, 25%, etc.)	NTMs reduction with different degrees dependent on actionability. The NTMs identified and assessed in detail for 12 goods and services sectors, and with less detail in 10 more sectors, plus cross-cutting NTMs; besides, 100% container scanning (US) is assessed separately
Investment; however, note that the analysis is not merely about barrier removal (called NTBs, too) but also about the impact on investment (and FDI income) from NTB removal in goods and services	Investment NTMs are included in the sectoral analyses (except one)
Public procurement	Public procurement, impact macro as well as for 20 sectors
Regulatory spill-overs to third countries (both direct and indirect); one can interpret that as reflecting (in **Error! Reference source not found.** on TTIP) most of the third column as well as regulatory coherence (second column), plus the *free* benefits of third countries, i.e. better or less costly market access to the EU-US markets due to (non-discriminatory) lower restrictiveness; however, the authors simply assume an arbitrary *degree* of spill-over	IPRs, macro effects as well as for 20 sectors

Note: NTMs are all non-price and non-quantity-based restrictions of trade in goods and services and of investment. The practical difference with NTBs is minor, once quotas and price controls (a rarity in EU-US trade relations) are ignored.

For a long time, NTBs or NTMs were ignored in trade analysis.[37] After 1970, they began to attract the attention of economists – in describing and classifying them for purposes of negotiation and understanding of policies – but it has only been in the last six or seven years that empirical measurements of NTMs were undertaken on a regular scale. Therefore, it is good to appreciate that Ecorys (2009a) was faced with a novel area of empirical economic research with formidable problems to overcome. Moreover, the ambition of the exercise – obtaining reasonably credible estimates of NTMs between the US and the EU over a wide spectrum of goods and services – was again unique at that point in time.

For practical purposes, NTMs between the US and the EU are 'regulatory barriers' of one kind or another. In other words, when considering exporting, firm X need not only take into account i) transport, insurance and freight (if goods), ii) customs procedures (if goods), iii) tariffs (if

[37] According to the UNCTAD definition, non-tariff measures (NTMs) are policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both (UNCTAD/DITC/TAB/2009/3). Non-tariff barriers (NTBs) refer to restrictions that result from prohibitions, conditions or specific market requirements that make importation or exportation of products difficult and/or costly. NTBs also include unjustified and/or improper application of NTMs, such as sanitary and phytosanitary (SPS) measures and other technical barriers to trade (TBT).

goods) and iv) inland distribution costs, but also the costs of NTMs. Such NTM costs tend to have a discouraging effect on trade, as they are bound to raise the price when reaching the final consumer or the industrial user in the value chain. (By the way, how much the price is raised – by the full amount of the costs of the NTM or less – is yet another complication that we shall ignore, to keep matters simple.)

Before going into how one may arrive at a proxy for the costs of NTMs over the North Atlantic, it is useful to examine the nature of NTMs. Regulatory barriers find their roots in domestic regulation, which we typically denote as 'SHEIC regulation': regulation (and all that it takes to ensure that companies conform to it) to reduce or minimise the risks with respect to Safety, Health, Environment, Investors (and savers), and Consumer protection. These five areas are those of the classic 'market failures' that can justify domestic regulation. The normal routine should be – and often is, although not always – that an independent, scientific assessment determines the risk(s) of a good or service in terms of one or more of the objectives under SHEIC. Both the EU and the US have a system to assess whether and to what extent such risks have to be contained, reduced or minimised via policies. Although sometimes targeted taxes or subsidies are used for purposes of overcoming such market failures, in the overwhelming majority of instances, it is domestic regulation that is employed to reduce risks to levels that society (ultimately, the legislator) accepts as tolerable. Zero risk is almost never possible; even if it were in some cases, the (marginal) costs would probably make it unaffordable or indeed absurdly costly. Such SHEIC regulation inevitably has a cost domestically, and 'good regulation' should ensure that regulation is designed in such a way as to have the benefits to society (reducing risk to a tolerable level) outweigh the cost by a considerable margin. This should be done on the basis of a sound and rigorous regulatory impact assessment. Once one exports to that country, obviously one has to comply with that regulation, just like domestic producers or suppliers do.

Let us simplify and assume that a US regulation (aimed at health and safety) for good X adds 25% of extra costs to the price of that good. An EU exporter should be expected to pay those extra costs as well. One might be led to believe that the EU exporter faces a US NTM of 25%. This may or may not be correct. It would be correct only if i) the US imposes regulatory requirements that are not imposed at all in the EU (but this is rare, although not entirely impossible) or ii) the EU and the US both have a regulation for good X but what is required for the EU domestically is of no relevance for compliance in the US. (This is rare in such an extreme formulation, but less rare for parts of the requirements, which may differ to some degree). This shows immediately that, in the large majority of cases, NTMs cannot be read from the domestic costs of regulation. However, even the domestic costs of regulation are not all that easy to determine, as they are available neither in statistics nor in a regulator inventory.

Most of the time, the EU is likely to have somewhat similar SHEIC objectives, i.e. risk reduction to tolerable levels, to those of the US and hence companies producing good X have normally incurred costs in order to design and produce a compliant product. In this routine case, NTMs may take two forms. One is that the US authorities apply fairly similar rules based on similar objectives but still subject good X to conformity assessment, without taking the prior EU conformity into account. The NTM would then be equal to those extra costs. And TTIP could negotiate that the EU and the US would explicitly take into account what the other's conformity assessment has done before (and make rules to ensure that these assessments are comparable). If the rules on both sides are seen as 'equivalent' (for the purpose of similar SHEIC objectives), the NTM can fall to near zero due to recognition. The other NTM form consists of somewhat different rules (or, at times, even a distinct logic or system) even though the objectives are similar, and then compliance adjustments will have to be made in production prior to conformity assessment. In some cases, this is easy, and in other cases, this can be

expensive. The NTM would then be the extra compliance costs of adjustment (or the unit costs of having a separate line of production especially for compliant exports to the US), plus the conformity assessment in the US. It goes without saying that the latter type of NTMs might be expected to be rather high.

All this shows that even a simple exposition of NTMs can quickly become complicated and finding out the proper (costs of) NTMs is far from easy. Moreover, we have ignored other costs such as getting-to-know rules, procedures and agencies 'on the other side' (think of SMEs trying out their first exports), waiting time (so-called 'time-to-market') due to certification or testing, which is highly sensitive in fast-moving markets, and other aspects leading to additional costs of getting the good or service to the (US or EU) market (including liability insurance premiums, which tend to be much higher in the US than in the EU). On the other hand, transatlantic trade (to some extent, in services, too) is often part and parcel of wider value-chains, and this might actually reduce transaction costs due to technical specifications (and access to testing, etc.) 'on the other side'. Moreover, some one-third of transatlantic goods trade is thought to be intra-firm trade where such NTMs might be lower in actual practice, for the same reasons, only *a fortiori*, e.g. think of components made in the EU according to US specifications already agreed by authorities.

After all these (simplified) preliminaries, it is possible to try to understand and assess how Ecorys has estimated NTMs in EU-US trade in goods and services. In order to render their exercise intelligible to laymen, we refer to a flowchart (see Figure 1) of all the steps Ecorys has gone through (see below). Irrespective of our critical remarks and the weaknesses observed, it is a major effort with several sources and that will be difficult to repeat without another large and expensive transatlantic research project. However, some weaknesses are built into the entire approach and they need to be highlighted first.

First, one gross simplification is that the method will yield only one single NTM per sector for 20 goods and services sectors. However, the 20 sectors range in size from large to very large. In other words, NTMs are averaged for the entire sector, even though there may well be many different goods or services, not to speak of differentiated goods and services (somewhat similar goods but to a degree substitutable depending, e.g. on quality and relative prices). Thus 'the' chemical sector and 'the' car sector have one single NTM. In actual practice, NTMs will differ and this might matter for export patterns. Also, the subsequent price responses may therefore differ in the market of destination. The principal reason for opting for a single NTM per sector is that the CGE–GTAP model, in which the NTMs are simulated to be reduced due to TTIP, only allow for aggregated sectors with a single price. This is understandable given the many sectors (here 20), and the many countries and regions explicitly included in the model.[38]

Secondly, another fundamental difficulty is in services. Between the US and the EU, services exchange is likely to be concentrated in mode 3, given the distance, and for 'well-tradable services' (only a few sectors) in mode 1. This creates an extra difficulty of mixing two very different NTMs, one for services trade and one for services supplied locally 'on the other side' via subsidiaries. In some cases, there might even be a substitution between these two modes.

Third, Ecorys bundles two barriers into one: NTMs in a narrow sense (as explained above) and what is called 'regulatory heterogeneity' ('regulatory divergence' in Ecorys). The latter overlaps with the idea of NTMs, but it is very hard to say exactly how much. The distinction has immediate implications for how the NTMs are modelled in terms of costs. Thus, if

[38] Thus, on p. 200 of Annex III of the Ecorys study (www.ntb.ecorys.com), the authors note that, with 40 countries' pairs of bilateral trade flows with 14 sectoral NTMs over a 10-year period during which the adjustment to a TTIP agreement takes place in the economy, one obtains 224,000 observations!

objectives are 'equivalent', mere heterogeneity (thereby no NTM barrier as such, only different rules) would express the *fixed costs* – to be incurred only once – of getting into the (US or EU) market with (say) a product derived from chemicals. On the other hand, NTMs would suggest the addition of a cost every time one exports (a *mark-up over marginal* costs). Ecorys does not discuss this economic distinction at all. This implies that regulatory heterogeneity is modelled by (extra) marginal costs and is therefore not distinct from NTMs. Clearly, even when initial entry costs created by regulatory heterogeneity are high, once turnover in the export market grows, the initial entry costs are seen as fixed costs once-and-for-all and written off, and variable costs will not be affected. NTMs, on the other hand, would always add to export costs. Therefore, if the US or the EU would not impose continuous and repetitive tests (hence the extra marginal costs, which would remain roughly constant over time) but only one-time 'entry costs', it is critical to identify the remaining NTMs. If the remaining NTMs are repeated mark-ups over marginal costs, continuous inspection/approval costs, or extra costs for a different design for each product exported to the US, the Ecorys study has the appropriate method for NTM identification. If, however, the adjustment to NTMs of the US concerns a separate production line, scale economies must matter and average NTM costs will decline over exported output. In such cases, the estimated NTMs would be much too high.

Ecorys makes a point of not employing an empirical technique whereby NTMs are only explained by a residual after controlling for other determinants of trade.[39] There is indeed a risk that the residual might comprise other aspects not explicitly incorporated. Using a stepwise procedure in order to insert NTMs directly may be better methodologically; it is nevertheless a complicated procedure with a large scope for mistakes or misinterpretations.

Figure 1 describes the seven steps of the Ecorys method to identify NTMs. *Step 1* and *step 2* are of course very big hurdles: one needs sectoral expertise for both the EU and the US in many sectors and one requires many respondents (the researchers obtained 5,500 answers) to a very broad business survey in order to answer the question in *step 3*. Without these elaborate first two steps, no direct estimates of NTMs can be generated. What Ecorys acquired are 'perceived NTMs' in the form of a subjective restrictiveness indicator (from 0-100, in *step 4*). However, such restrictiveness indicators, from the perspective of business, are very different from the well-known PMRs of the OECD or, for that matter, the OECD's FDI restrictiveness indicator. In the text of the Ecorys study, there are repeated references to the use of OECD indicators (for services, even a combination of their own NTM indices with OECD indices, see *step 5*), but this is puzzling. After all, the PMRs are not about SHEIC objectives but about other (so-called 'economic') regulation such as entry restrictions (say, in retail) and conduct rules, price restrictions, monopolies, tariffs (not NTMs), etc. Moreover, the revised PMRs since 2007 are mainly focused on network industries, which is hardly the relevant sector group for TTIP. *Step 6* is inevitably technical: the NTM indices are multiplied bu the dummy variables[40] for NAFTA, the EEA and TTIP; the resulting variable is inserted in the gravity equations for regression; the coefficients before these variables give the effect of NTMs on trade (and FDI where relevant). These coefficients can then be turned into the tariff equivalents (equal to percentage costs over the price) of NTMs, after first aggregating the three-bloc coefficients into a single NTM one (*step 7*).

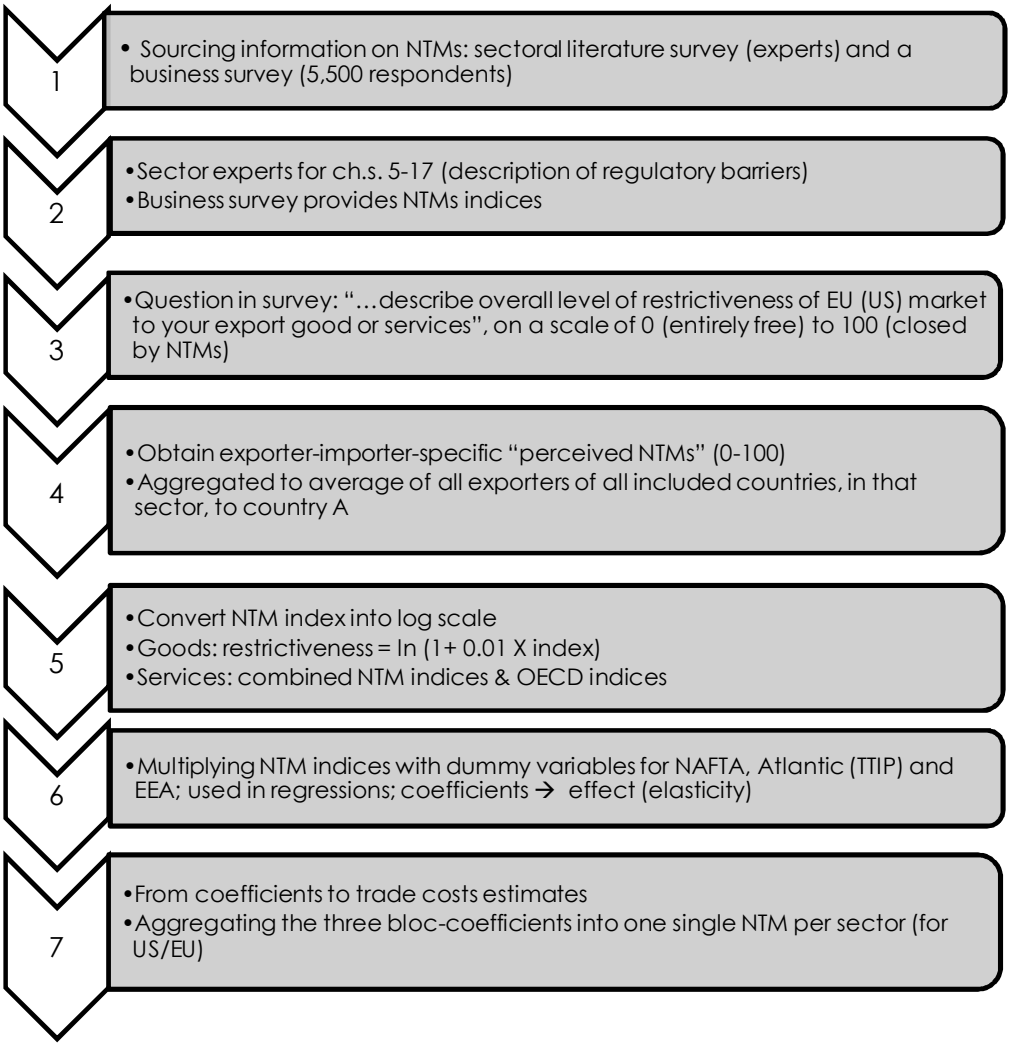
[39] This means that NTMs are not observable but derived indirectly.

[40] Dummies are binary variables used to approximate the influence of explanatory variables impossible to quantify.

Subsequently, no less than seven scenarios are suggested, but only the first two are actually introduced in the CGE model. These scenarios depend on the actionability of NTMs (as explained in the section "

What the EU-US impact assessment tells us and how"). The idea is that NTMs are a consequence of SHEIC regulation, therefore, it is not to be expected that such regulation is totally unjustified. Hence, it might be reformed but it will not disappear. It follows that NTMs cannot be compared with tariffs, which can be eliminated; NTMs cannot be removed except under full harmonisation together with full recognition, but they can be reduced.

Figure 1. How Ecorys (2009) has quantified NTMs in 7 steps



2.3 Spill-over effects

A very interesting extension in the CEPR study on the TIPP is the spill-over effect to third countries, following the lowering of regulatory barriers between the US and the EU. These spill-over effects would not emerge if two small countries form an FTA, but this is different once the two largest economies in the world cooperate on regulatory issues. Direct and indirect spill-over effects are positive for third countries and can be modelled. Direct spill-overs improve the trade possibilities of third countries with the EU and US without any further action on the part of third countries – they are automatic. If the EU and the US streamline their regulatory procedures, this is subject to most-favoured-nation treatment (MFN) under the WTO and it also becomes easier for firms from other countries to export to the US or the EU.

It seems very reasonable that this effect exists in FTAs with large countries, but the authors are not aware of any attempt to estimate this effect.[41] The 20% spill-over, conjectured in the study, is a kind of middle ground between irrelevance (0%) and incredibly large (50%). Indirect spill-overs could be present as well, when third countries purposefully adopt the regulatory standards of the EU and US. It makes sense that firms in other countries adopt the regulatory standards of large countries, when the former are closely linked to the EU, the US or both. This would also improve market opportunities for American and European firms in these third countries. In CEPR, these indirect spillovers are half as many as direct spillovers , thus 10% of the original decrease in NTBs, but empirical material on indirect spill-overs is missing – it is a mere conjecture – thus one better be prudent in order not to overestimate the effect. In practice, the size of the spill-overs is probably sector specific, but data needed to estimate these effects are missing.

Of course, the greater the spill-overs to third countries, the more TTIP outcomes begin to look like multilateral or plurilateral – rather than bilateral – results benefiting all. This important significance is further enhanced by the consequence that TTIP itself would also see its gains increase due to such spill-overs.

Therefore, it is desirable to acquire some understanding of the determinants of TTIP spill-overs to third countries. Institutionally, TTIP spill-overs can be acquired via three mechanisms. First and easiest, positive spill-overs can be 'direct'. This would happen merely due to MFN obligations in the WTO. Due to MFN, third countries can sometimes be 'free riders'. This would be so if TTIP would incorporate MFN-based forms of 'harmonisation' or straight regulatory market access liberalisation, e.g. by dropping certain requirements. These cases are likely to be rare but not at all impossible. Second, indirect spill-overs or, to make it more clear, 'policy-induced spill-overs' occur when agreed harmonisation or mutual recognition in TTIP (perhaps with a minimum of regulation, say, of objectives only) would also be adopted by third countries. This (domestic) act of re-regulation by third countries will of course have to be incentivised, otherwise, it will not, or in any case will not easily, happen. One can stretch this to standards, be they common US-EU standards, or, more likely, world standards, or declarations of some legal validity that (these) US and EU standards (though somewhat different) are 'equivalent', or, in the case of compatibility or interoperability standards, that they need to be identical. This second mechanism may not require any explicit act between the TTIP partners and a third country, or presumably no more than an informal agreement.

The third mechanism consists of an explicit attempt by TTIP partners (via a call on others to join such attempts) or by third countries to negotiate the equivalence of rules based on TTIP results. Given the complexity of some regulatory regimes, this would not be surprising. However, the outcome of such efforts is presumably less certain; once agreed, the spill-overs are similar in nature.

The second mechanism would only be set into motion once there are sufficient incentives; activating the third mechanism would require even greater incentives. The most obvious and most important incentive is found in mutual trade relations. The EU and US are still quite

[41] While spill-over effects are foreseen to be positive for mature or emerging economies that orbit around the two signatories, there is an increasing concern that the possibility of setting a regional regulatory framework involving, for instance, common standards or a harmonisation process could increase intra-regional exchange of goods and services by excluding developing economies that are not able to comply with the agreed level (Mattoo, 2013). It is worth noticing, however, that before knowing what the negotiating chapters will be, evaluating spill-over effects on different sets of countries is a rather speculative exercise. This is probably why it is not very clear how the estimated spill-over effects have been calculated in CEPR (2013a).

important in world trade, though much less than a few decades ago. The following simple exercise shows that spill-overs – quite apart from their specific regulatory substance – are incentivised far more in NAFTA and in Europe with the EU's closest economic neighbours (Switzerland, Norway and Turkey) than in a second group of the seven largest traders in the world (not counting TTIP and ignoring Russia, as it does not export manufactured goods in large volumes). Precisely with Turkey, Switzerland and Norway the EU already has credible channels for regulatory convergence and a lot of harmonisation and standardisation has already taken place in the past. In NAFTA regulatory convergence used to be no more than marginal but both Mexico and Canada now have Regulatory Councils with the US.

Table 3 below shows that 'the Five' leading exporters (Canada, Mexico, Turkey, Switzerland, Norway) have export shares for TTIP (in their world exports) ranging from 43% to 86%, whereas 'the Seven' top exporters ('the Five' plus Brazil and China) merely score TTIP shares of between 17% and 34%. One may wonder whether these lower shares would give enough incentive to initiate a process of domestic re-regulation.

One might, however, consider the possibility of 'domino effects'. Thus, once 'the Five' would have adopted TTIP rules, third countries might reconsider if they have a much higher export share to TTIP plus 'the Five'. Table 3 shows, however, that such domino effects are at best very weak – the exports of 'the Seven' to TTIP plus 'the Five' are hardly larger.

There may well be other reasons to align with TTIP norms and rules. However, insofar as this simple exercise would reflect a proxy for incentives to engineer (indirect) spill-overs, one is led to conclude that i) 'the Five' trading partners, already very important to the EU, resp. the US, and locked into rather 'deep' agreements, are the countries for which one would expect spill-overs to be interesting, ii) this is far less the case for the seven largest trading countries (of industrial goods) outside TTIP and iii) it is unlikely that a domino effect will emerge, at least on this basis.

Table 3. Exports of total products ($ billions), 2012

	To	US	EU27	World	(EU+US) /World (%)
Exports from					
Nafta	Canada	337.83	38.50	453.38	83%
	Mexico	288.15	22.13	370.83	84%
EEA + Custom Union	Turkey	5.61	60.24	152.54	43%
	Switzerland	25.12	125.93	225.95	67%
	Norway	8.09	130.74	161.00	86%
Rest of the World	Brazil	26.85	48.89	242.58	31%
	China	352.44	334.27	2,048.78	34%
	India	37.17	48.53	289.56	30%
	Indonesia	14.91	18.05	190.03	17%
	Japan	142.04	81.47	798.57	28%
	Korea, Rep	58.81	49.63	547.85	20%
	South Africa	6.51	17.41	86.71	28%

Source: UNCTAD (2013).

Table 4. Exports of total products ($ billions), 2012

	NAFTA		EEA+ CU			World	NAFTA /World (%)	EEA+CU /World (%)
	Canada	Mexico	Norway	Switzerland	Turkey			
Exports to								
Brazil	3.08	4.00	0.87	1.71	1.21	242.58	3%	2%
China	28.13	27.52	3.02	3.51	15.59	2,048.78	3%	1%
India	2.01	1.60	0.24	1.17	3.67	289.56	1%	2%
Indonesia	0.79	0.65	0.09	0.06	1.37	190.03	1%	1%
Japan	10.26	10.48	1.23	4.38	2.41	798.57	3%	1%
Korea, Rep	4.83	9.04	1.06	0.41	4.55	547.85	3%	1%
S. Africa	0.45	0.37	0.29	1.11	0.74	86.71	1%	2%

Source: UNCTAD (2013).

3. Comparison with other free trade agreements and their underlying modelling[42]

The purpose of the present chapter is to compare the CEPR (2013a) approach to an EU-US trade agreement (here, TTIP) with other recent studies on 'deep' bilateral trade agreements. Chapter 1 has already pointed out that the Commission's IA on EU-US trade relations can only be compared to the EU-Japan IA. This is indeed the second time (excluding the investment agreement with China) that the Commission has proposed an IA to request the mandate to start the negotiations (differently from TSIAs, which are usually performed *during* the negotiations). As already mentioned, the two IAs (EU-US and EU-Japan) follow similar structures and are coherent with the IA Guidelines.

Besides that, other free trade agreements comparable to TTIP (especially CETA) have been assessed through economic modelling to evaluate the possibility of starting the negotiations. In this respect, this chapter will compare the economic modelling behind other FTAs by focusing on four elements: methodologies, data sets, how studies deal with NTMs (NTBs) and the respective stylised scenarios. The comparison should help readers to appreciate a range of factors and/or assumptions that might cause methodology behind IAs of trade agreements to differ. We compare the TTIP study with recent economic studies, similarly based on the quantification of NTBs that supported the start of EU-Japan and CETA negotiations. Due to its importance,[43] we also include a box on the EU-South Korea Agreement.

[42] It is worth emphasising that the aim of this chapter is to compare the economic methodology behind the background studies that preceded the start of the negotiations of comparable free trade agreements. Some of them, however, like CETA, have not been subject to a Commission IA. We thought it was meaningful to compare them anyway given the similarities on the trade pattern and potential spill-over effects that could take place.

[43] We refer to the EU-Korea FTA because it is the first agreement reached after the Lisbon Treaty and one of the first templates of a new generation of deep and comprehensive FTAs.

3.1 EU-US vs. comparable agreements: Is the economic modelling consistent?

FTAs' analyses comparable to those on TTIP such as EU-Japan and EU-Canada differ in market structure.[44] Analysing further where the differences in market structure occur,[45] one observes that the EU-US and the Japan IAs have quite a similar approach, differing only in the "automotive" (or "motor vehicles") sector. Nevertheless, the subset of transport equipment defined as "automotive products" (Standard International Trade Classification [STIC] product grouping) is far from being a negligible one. In 2012, it represented 13.7% of EU exports to Japan (equal to €7.6 bn) and 15.3% of EU imports from Japan (€9.74 bn); 11.3% of EU exports to US (€33.15 bn) and 3.5% of EU imports from US (€7.14 bn); 12.3% of EU exports to Canada (€3.84 bn) and 1.1% of EU imports from Canada (€342 mn).[46] Such differences in modelling assumption could eventually lead to discrepancies in final estimations, i.e. having possible repercussions on trade (import-export) impact, welfare, wages and output (composition and change) evaluation.

The EU-Korea Free Trade Agreement

Two studies – both commissioned by the European Commission (DG Trade) – produced an assessment regarding the economic impact(s) of an EU-Korea FTA. Copenhagen Economics (CE) published its final report in August 2006, whereas four years later, in May 2010, the CEPII/ATLASS report was made available to the general public. Both reports made use of the CGE modelling techniques in order to provide estimations for benefits and costs of this specific trade policy. Nevertheless, similarities (almost) end there. To avoid confusion, the reports will be analysed separately, i.e. first the CE report, second the CEPII/ATLAS, and a final comparison of results will be provided below.

The 2006 CE report uses the GTAP database, in its 6.2 version (2001 data). It acknowledges the very active FTA policy conducted by Korea, and therefore takes into account the other seven 'Korea-centred' FTAs, i.e. US, Canada, China, India, Japan, ASEAN, and EFTA, assuming Korea to enter these FTAs simultaneously, with the following features: a limited liberalisation in agriculture, an intermediate one in services (-25% of barriers to trade services), and a full liberalisation in manufacturing.

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[44] The GTAP community acknowledges the importance market structure (*inter alia*, monopoly, duopoly, oligopoly, perfect competition) has for theoretical models, their consequent computations, and their final estimations (Konan & Van Assche, 2004).

[45] Two major modelling options are available at the time of writing this report (indeed, it is possible to assume the structure of the sector to be 'Armingtonian' or subject to 'monopolistic competition', for further explanation about the meanings, see Annex II). As there is not a unique rule defining which of the two approaches is the best for each sector, conceptualisation of market structures among different IAs may vary, depending on the underlying assumptions researchers decide to make. A summary for market structures used in the EU-US, EU-Japan and EU-Canada IAs is provided in Annex II.

[46] EU-US: DG Trade statistics on EU-US trade (http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113465.pdf).

EU-Japan: DG Trade statistics on EU-Japan trade (http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113403.pdf).

EU-Canada: DG Trade statistics on EU-Canada trade (http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113363.pdf).

CE designed three scenarios to be implemented through CGE modelling: two 'partial' agreements, both including 40% tariff reductions in food and full bilateral tariff reductions in non-food, but differing in barriers to service trade, with the first foreseeing a reduction of 25%, the second of 50%; and one 'full' FTA, where food, non-food and services are fully liberalised.

CE calculated the costs of NTMs using industry-specific gravity equations, and took services as a single sector. CE found a real income increase of up to 2.4% for South Korea and barely beyond zero (but positive) for the EU.

The 2010 CEPII/ATLASS report uses MIRAGE to elaborate the calculations of CGE modelling. It elaborated two baselines: the first foresees no Doha agreement, includes only those FTAs already in force and assumes a possible *increase* (equal to 50%) in Korean protection in the services sector. The second includes an agreement in Doha (concerning services and trade facilitation) and FTAs under negotiation, i.e. Korea-USA, Korea-Canada, EU-India, EU-Singapore, and EU-Canada. In addition, it considers a possible *increase* (equal to 25%) in Korean protection in the services sector. CEPII/ATLASS elaborated one scenario only, on the basis of the official contents of the agreement, both for tariffs and NTBs.[47]

CEPII/ATLASS utilised a mixed methodology for NTBs calculations, similar to the one of the CE report, which gave relatively high results, later scaled down in order to be adapted to reality.

The table below shows a summary of the estimations provided by the two studies. Looking at the differences (sometimes not trivial, changing from a negative to a positive effect, or the opposite, e.g. EU chemicals, metals or consumer electronics, in the final effects between the CE and the CEPII/ATLASS report, it seems that assumptions, methodology to calculate the NTBs and/or the scenarios modelled play a crucial role in determining the final results.

[47] Note on the Table 5: Korea-US: Tariff: 95% of liberalisation in three years and the rest in 10 years. Around 2% is excluded (agriculture); services: binding of actual openness (similar to EU but without additional liberalisation in three sectors); Korea with Canada: 95% cut for goods. Other FTAs with the EU: same bilateral tariff cuts as for the EU-Korea agreement. The scenario comprehends tariffs cuts "as scheduled" and the following NTBs cuts: 60% cut at t=0 (Korea, out of which 10% at MFN basis); another 20% cut at t=5 (Korea) in the automotive sector; 80% cut over five years (Korea) in the consumer electronics sector; 50% cut at t=0 (Korea, MFN basis) in pharmaceuticals; and a 20% cut (EU and Korea) for all other industries. In addition, it includes 10% cuts in services NTBs at t=2 (Korea) for the telecom and financial sectors; 10% cut at t=10 (Korea) for business services; whereas all other services sectors are left unchanged.

Table 5. EU-South Korea FTA: Main findings

	EU				KOREA			
	CEPII/ATLASS		Copenhag.		CEPII/ATLASS		Copenhag.	
	min	max	min	max	min	max	min	max
GDP	0.07	0.08	0.1	0.3	0.46	0.84	0.6	1.6
Overall exports (%)	0.96	1.40	0.3	0.9	4.01	5.50	6.4	20.8
Bilateral Exports (billion euros)	33.0	41.1	19.1	30.8	23.0	34.41	16.4	n.a.
Production:								
Cars	-1.38	-0.40	-1.74	-0.9	8.08	19.34	16.35	28.80
Textile	-2.22	-2.06	-0.61	-0.27	24.33	34.25	0.93	1.45
Leather-Clothing	-0.14	-0.04	-0.25	0.06	8.77	9.48	0.55	2.87
chemicals	0.09	0.17	-0.48	-0.03	-1.01	0.88	-0.78	2.73
metals	0.02	0.08	-0.96	-0.06	-1.98	-1.70	-0.27	-18.12
machinery	0.19	0.27	-1.68	0.06	-2.94	-1.96	6.26	27.06
consumer electronics	0.04	0.05	-1.68	-0.41	-1.56	0.77	0.22	27.07
transport services	-0.05	0.28	0.10	0.15	-1,48	-0.05	-0.03	4.07
communication	-0.01	0.00	0.07	0.33	-0.08	-0.03	-6.65	-1.64
financial	-0.01	-0.01	0.02	0.18	-0.07	-0.06	-2.17	-0.23
insurance	0.00	0.02	-0.21	-0.05	-0.82	-0.53	-0.28	-0.19
business	0.01	0.01	0.13	0.66	-0.96	-0.59	-23.08	-4.88

Note: See Footnote 48.

Source: CEPII/ATLASS (2010).

3.2 Dataset and economic results

CGE models are based on a complex and comprehensive database, which is periodically revised and updated. Thus, different versions might contain different data (in cases of identification and correction of inconsistencies this might be true even for the same value), or simply could refer to different years, used as a baseline in the model. In fact, these databases are 'pictures' of the economy in different periods of time. As an example, the last version of GTAP – known as GTAP 8 – includes for the first time a 'dual reference' to 2004 and 2007, whereas its previous version (GTAP 7) portrays the global economy in 2004 only (GTAP, 2014).

In order to estimate future gains and losses through the use of a CGE model, economists have to build a 'baseline scenario', which – as in every EU impact assessment – should depict "how the current situation would evolve without additional public intervention" (EC, Guidelines IA 2009, p. 24). The CGE framework describes this 'baseline scenario' at some point in future, in order to be able to include all the effects of the specific trade deal.[48] Thus, as it is a 'future'

[48] Using these data as a fundamental reference, the modellers create a "baseline scenario" at some point in future, reasonably far enough in time to be able to capture all static and dynamic effects (Copenhagen Economics, 2009). Static (or short-run) effects correspond to the "immediate" impacts of trade liberalisation, i.e. consequences in the year of reference, e.g. 2025, when the agreement is "fully introduced and implemented". Dynamic (or medium-long-run) effects provide an estimation of the impacts in the year of reference, e.g. 2025, of the agreement as if it would have been already applied for a substantial amount of time, e.g. 2018, in order to fully assess investment effects. In other words, static effects correspond to the gains linked to a more efficient allocation of productive factors, i.e. labour and capital, due to the economic agreement. Dynamic effects also take into account that trade and investment liberalisation affects the returns to productive factors, i.e. labour, meaning wages, and capital). These variations are very likely to affect the supply of these productive factors, and consequently the overall productive capacity of the economy under analysis.

scenario, the baseline (and consequently all the other scenarios that are calculated as the difference with the baseline) is not built on ex post data collection but on forecasts. These (macro) economic projections are assembled on the basis of past datasets, e.g. in the case of GTAP 8 the dataset contains information on 2004 and 2007, and some assumptions, *inter alia*, the economic growth rate.

As a consequence, changing assumptions on (for example) growth rates might influence the 'baseline scenario', change which, in turn, might affect the other scenarios and therefore the final estimates.

Again, the research team decided to gather information on macroeconomic projections used to benchmark models to their 'baseline year', regarding the three agreements concerned above (EU-US, EU-Japan and EU-Canada). Details on differences are available in Annex II.**Error! Reference source not found.**

Unfortunately, the comparative exercise runs into limitations, mainly due to different projection periods and limited availability of data in the case of the EU-Japan study. Nevertheless, it is possible to focus on the EU, the only geographical area that remains coherent across the three documents. In fact, annualised GDP growth for the EU assumed in the EU-Canada agreement (+2.55%, 2007-2014) turns out to be more than three times higher than the more conservative one reported in the EU-US agreement (+0.70%, 2007-2016).[49]

3.3 NTMs: Theory and indicators construction

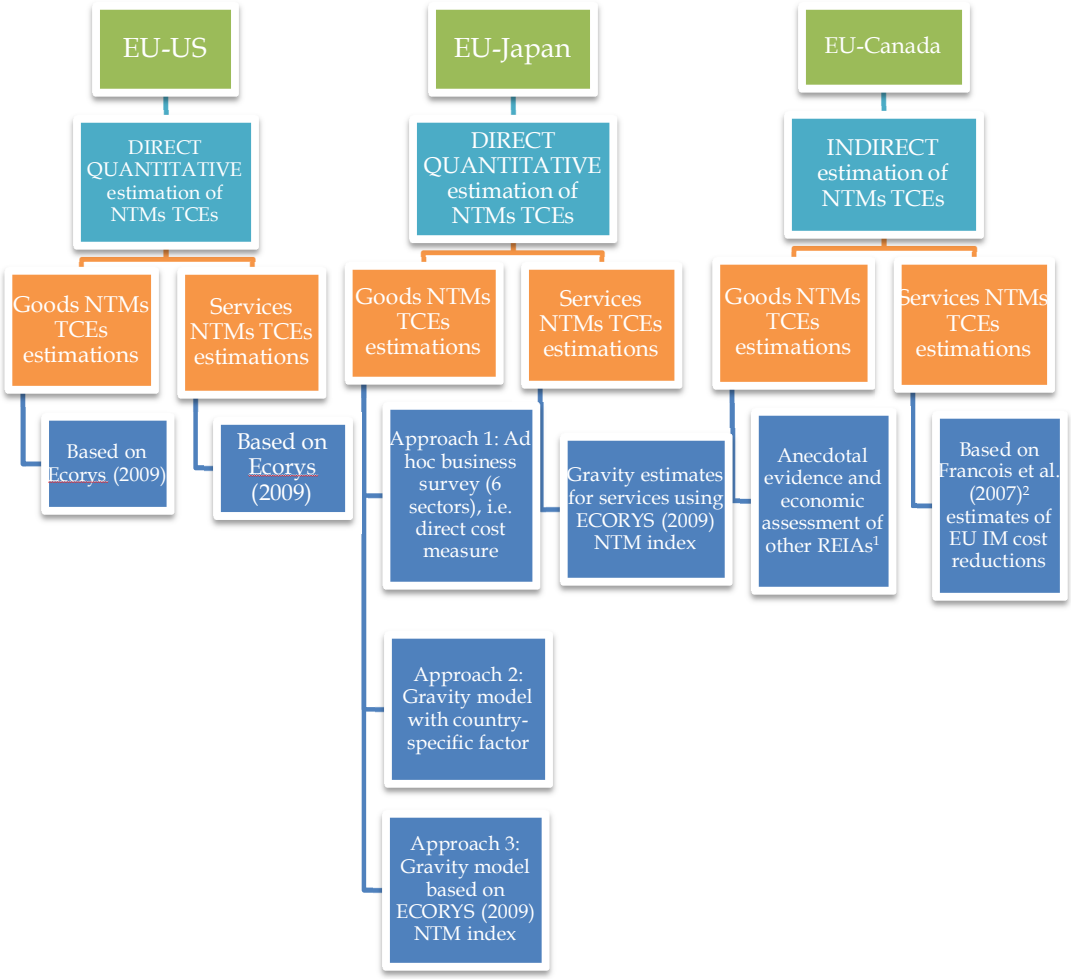
NTMs[50] are all but negligible in international trade, especially when referring to trade among developed countries. Thus any assessment related to the hypothetical effects of a trade agreement between the EU-US, EU-Japan or EU-Canada should incorporate them in its analysis, and in fact they do. Nevertheless, CGE modelling offers alternative approaches to include NTMs, and the three studies address the question of calculating tariff equivalents (or ad valorem equivalent) using different techniques.

Figure 2 provides a schematic appraisal of the alternative methods used in assessing the cost impact of NTMs.

[49] Even if the time span is not perfectly comparable the two periods are similar (2007-2014 and 2007-2016), and it is difficult to hypothesise that huge differences could come from the period 2014-2016. The opposite being true, economic modelling – *ceteris paribus* – hardly foresees huge variations during future periods.

[50] In this section NTMs and NTBs will be used as synonyms (even if some discrepancies emerged in the literature), maintaining a neutral approach and leaving aside implied judgments on their legitimacy. See chapter 2.

Figure 2. Trade cost reduction estimations: Differences in approaches



Note: TCEs = Tariff cost equivalent, referred as 'NTMs tariff equivalent' elsewhere.

[1] Regional Economic Integration Agreements.

[2] Francois et al. (2007), "Does Gravity Apply to Non-Tangibles: Gravity Estimates of Trade and FDI Openness in Services", Plenary Paper, European Trade Study Group Meeting.

Sources: Authors' elaboration on CEPR (2013a), Copenhagen Economics (2009), European Commission and Government of Canada (2008).

The EU-US goods and services NTMs tariff equivalents estimations rely largely on the 2009 Ecorys study, as explained more extensively in the earlier section entitled "**Error! Reference source not found.**".

On the same issue, the EU-Japan report makes explicit reference to the 2009 Ecorys study, too, but it forms part of a broader analytical framework. Goods and services NTMs estimations rely on separate methodologies.

Goods NTMs have been determined by three different methods:

- Direct cost measures through a Copenhagen Economics questionnaire[51] aimed at providing a business self-assessment, i.e. direct estimates, of the NTMs EU exporters face when trading with Japan. The survey covered six goods sectors in Japan, of which five are reported and largely described in the report, namely: "pharmaceuticals", "medical devices", "processed food", "motor vehicles", and "transport equipment".
- A standard econometric method for quantifying NTMs in the manufacturing sectors.[52] Even though the researchers account for some other factors that typically are described as influencing trade, e.g. GDP, distance, language, tariffs, etc., using this technique implies a considerable risk of overestimating higher NTMs values.[53]
- The third method is similar to the previous one, only differing by the use of a directly quantified NTMs index. The notion of a NTMs index is based on the 2009 Ecorys survey, and complemented by new data obtained by Copenhagen Economics directly.[54]

Table 6 reports a comparison of NTMs tariff equivalents estimates obtained using the three methods explained above.

Table 6. NTMs costs (tariff equivalents) for goods, comparison by method

	Japan barriers against EU			EU barriers against Japan	
Sector	Method 1	Method 2	Method 3	Method 2	Method 3
Food and beverages	**25**	59	25	43	-
Pharmaceuticals/chemicals	**22**	32*	30	32*	**18**
Electrical machinery	-	39	**12**	16	**4**
Motor vehicles	**10**	-	-	-	**16**
Other transport equipment	**45**	-	25	-	**19**
Metals and metal products	-	30	**21**	18	**6**
Wood and paper products	-	31	**15**	22	**11**
Other machinery (medical)	**30**	-	-	-	-

Note: The table shows the percentage of NTMs tariff equivalents in goods. The estimates shown in bold are those Copenhagen Economics used in its CGHE model. "Method 1" refers to "direct cost measures"; "Method 2" refers to gravity model with "time invariant exporter dummy" estimations; and "Method 3" refers to gravity model with "NTMs index" estimations.

Source: Copenhagen Economics (2009).

[51] Copenhagen Economics Questionnaire to managers of European firms that export to Japan, cited in Copenhagen Economics (2009).

[52] A gravity model, which does not contain NTMs measures or indexes, but simply "time invariant importer dummy", i.e. a variable that aims to capture the "importer" specific effect.

[53] Incurring in higher NTM calculations (so-called 'overestimation') is due to the specific technique, which assigns to the 'importer effect' all sorts of other immeasurable (and non-removable in nature, at least through trade policy tools) factors, *inter alia*, a country's culture, institutions, consumer preferences (CE, 2009). For more information on this econometric technique, refer to, *inter alia*, J.M. Wooldridge (2012), *Introductory Econometrics: A Modern Approach*, S.W. Cengage Learning.

[54] As the 2009 Ecorys survey observations related to EU exporters in Japan were not numerous, Copenhagen Economics decided to ask the same question during their survey (therefore, only in the five sectors: pharmaceuticals, medical devices, motor vehicles, processed food and other manufacturing). It is worthwhile noting that NTM indices reported some discrepancies with Ecorys data, particularly in medical devices and processed food. In the other sectors Ecorys NTM results were confirmed (Copenhagen Economics, 2009).

Table 6 exhibits the great variability of NTMs values, depending on the calculation method used. In sectors where comparison is possible, variation in estimation results among different methods appears to be considerable (from zero variation, i.e. estimates are equal, to more than 100%, i.e. one estimate is more than the double of the other).

In order to estimate NTMs in services[55] CE combined theoretical and empirical work.[56] The econometric method used for services is similar to "Method 2" used for estimating NTMs tariff equivalents in goods. Then, the 2009 Ecorys study serves as reference for determining the extent to which calculated barriers to trade are 'abatable' (similar to 'actionable' in CEPR, 2013a). Table 7 recapitulates these calculations.

Table 7. NTMs tariff equivalents for services in EU-Japan relations

Service Sector	Barriers to EU exports to Japan[1]	'Abatable' barriers (EU to Japan)[2]	Barriers to Japan exports to EU[1]	'Abatable' barriers (Japan to EU)[2]
Finance	15.8	8.7	11.3	7.0
Insurance	6.5	1.2	10.8	5.6
Business and ICT	2.5	2.5	14.9	4.3
Communications	24.7	19.2	11.7	8.2
Construction	2.5	1.9	4.6	2.6
Personal, cultural and other services	6.5	3.7	4.4	2.5

[1] The column shows percentage of NTMs tariff equivalents in services.

[2] The column shows the maximum amount of percentage points each NTMs tariff equivalents in services can be reduced.

Note: 'Abatable' is the same as 'actionable' in CEPR (2013a).

Sources: Authors' elaboration on Francois gravity estimates cited in Copenhagen Economics (2009), including Ecorys (2009).

Concerning the EU-Canada study, no gravity model is created for the purpose. Two different techniques are adopted, one for goods and one for services. For the former set, NTMs tariff equivalents which are 'actionable' are assumed to be equal to 2% of trade costs, on the basis of "anecdotal evidence of a sample of regulations identified as having trade-inhibiting effects" and of "economic assessments of the trade-deepening effect of regional economic integration agreements". For the latter set, it is taken as a reference to what has been achieved by EU MS, in terms of services liberalisation, and considered as a scenario that might be feasible in the context of CETA. Following this assumption, three studies from Francois et al.[57] are taken as references.

[55] Due to "severe data limitations", Copenhagen Economics used cross-border trade data.

[56] The theoretical work of Fillat Castejon, Francois and Woerz (2008) has been combined with the OECD FDI regulatory restrictiveness index (2007) and the 2009 Ecorys NTM index. In fact, the theoretical work above cited is necessary to build the model. It argues that, in the long run, complementarity exists between FDI restrictions and trade restrictions. This is crucial to overcome data limitations that otherwise would impede a "formal scenario-modelling".

[57] Francois, Hoekman and Woerz (2007); Francois, Pindyuk and Woerz (2008); and Francois and Wignarajan (2008).

They estimate that trade in services inside the EU internal market is 35% higher than what would be expected without intra-EU liberalisation. This quantification has been used to assess the amount of NTMs tariff equivalents reduction, i.e. cost savings, which would be needed for creating such an increase. It is found to be in the range from 2% to 10%, depending of the service sector. Data was not available for all sectors. Therefore, the aggregate services trade NTMs tariff equivalents reduction (equal to 6.27%) has been used where necessary, i.e. trade, other finance, insurance and consumer services. The total amount of NTMs tariff equivalents, both for EU exports to Canada and for Canada exports to EU, have been estimated by Francois et al.[58]

3.4 What stylised scenarios for the CGE models?

Stylised scenarios, or 'policy options', are hypothetical and (ideally) mutually exclusive situations obtained by different defined uses of diverse trade policy instruments. Corresponding CGE outputs rely on the set of assumptions made when designing alternatives.

Estimated gains or losses – in GDP, welfare, trade volumes, etc. – indicate the difference between the so-called 'baseline' (the hypothetical future scenario without any policy modification) and the generated scenario (which may vary if more than one option has been foreseen).

Consequently, due to the "differential nature" of the results mentioned above, the following comparison among the different assessments will also devote attention to the baseline features.

The TTIP study (CEPR, 2013) assumes the completion of the agreement in 2017, and its full implementation ten years later in 2027. It also excludes a possible conclusion of the Doha round, as the slow negotiation process decreases the likelihood of this happening. In addition, the baseline scenario takes into account "all FTAs currently in place", and it also includes the EU-Singapore and EU-Canada agreements (European Commission, 2013). No explicit information is available about how these two agreements have been arranged in the CGE model. The study foresees five alternative scenarios or 'policy options', already described in chapter 1.2.2.

The EU-Japan study hypothesises the full implementation of the agreement happening in 2018; therefore, it projects the underlying economic situation to that year. It does not incorporate the Doha round or any other FTA, e.g. EU-Korea. The report delineates two scenarios. Both of them envisage complete tariff elimination (100%), whereas NTMs in manufacturing and services are dealt with in two scenarios. The minimum reduction scenario considers a trade cost reduction ranging from 0.8% (insurance) to 33.8% (transport equipment) for EU exports to Japan, and varying between 0.4% (air transport) and 7.3% (chemicals) for Japanese export to the EU. The maximum reduction scenario instead calculates a trade cost reduction of between 1.2% (insurance) and 41.0% (transport equipment) for EU exports to Japan, and between 1.1% (air transport) and 12.1% (chemicals) for Japanese exports to the EU. Tables 8 and 9 provide a more detailed appraisal of trade cost reductions hypotheses according to the two scenarios.

[58] Document cited in European Commission and Government of Canada (2008), p. 44. No other detail of the document is provided.

Table 8. NTMs affecting EU exports to Japan and relative cost reductions

	Trade costs for Exports to Japan		
	Baseline	**Lower Bound**	**Upper Bound**
	Trade costs Estimate (%TCE)	Min. Reduction scenario (% point change)	Max. Reduction scenario (% point change)
Food and beverages	25.0	-6.0	-9.0
Chamicals (incl. pharma)	22.0	-15.0	-20.0
Electrical Machinery	11.6	-2.6	-3.9
Motor vehicles	10.0	-1.2	-3.8
Trasport Equipment (incl. aircraft and rail)	45.0	-33.8	-41.0
Metals and metal products	21.3	-4.3	-6.5
Wood and paper products	15.4	-7.1	-10.6
Other machinery (incl. medical devices)	30.0	-2.9	-3.9
Air Trasport	2.0	-0.9	-1.3
Water transport	8.0	-3.5	-5.2
Finance	15.8	-5.8	-8.7
Insurance	6.5	-0.8	-1.2
Business and ICT	2.5	-2.5	-3.7
Communications	24.7	-12.8	-19.2
Constructions	2.5	-1.2	-1.9
Personal, Cultural and other services	6.5	-2.5	-3.7

Source: Copenhagen Economics (2009).

Table 9. NTMs affecting EU exports to Japan and relative cost reductions

	Trade costs for Exports to Eu		
	Baseline	**Lower Bound**	**Upper Bound**
	Trade costs Estimate (%TCE)	Min. Reduction scenario (% point change)	Max. Reduction scenario (% point change)
Food and beverages	na	-	-
Chamicals (incl. pharma)	18.0	-7.3	-12.1
Electrical Machinery	4.5	-1.7	-2.8
Motor vehicles	16.3	-3.5	-5.3
Trasport Equipment (incl. aircraft and rail)	18.8	-3.1	-5.6
Metals and metal products	6.0	-1.9	-5.2
Other machinery (incl. medical devices)	na	-	-
Air Trasport	2.0	-0.4	-1.1
Water transport	8.0	-1.4	-4.5
Finance	11.3	-2.9	-7.0
Insurance	10.8	-2.8	-5.6
Business and ICT	14.9	-2.5	-4.3
Communications	11.7	-4.3	-8.2
Constructions	4.6	-1.9	-2.6
Personal, Cultural and other services	4.4	-1.0	-2.5

Source: Ecorys (2009) cited in Copenhagen Economics (2009).

The EU-Canada study assumes 2014 as the reference year, encompassing the successful implementation of the Doha round (which, of course, never happened). The report focused on one policy option only. The scenario portrays the elimination of all tariffs (and tariff-rate quotas) in agricultural and industrial sectors, the "reduction of trade costs generated by non-tariff measures by an amount equivalent to 2% of the value of trade in non-commodity goods sectors", and a reduction of NTMs tariff equivalents for services between 2% (other business services) and 10% (construction services). As in the EU-Japan report, NTMs are not symmetrically equal, i.e. NTMs that EU exports face in one sector are different from NTMs Canadian exports face in the same sector. Differently from EU-Japan, however, the EU-Canada report assumes symmetric cost reductions, for trade both ways, e.g. if trade costs savings in sector X are equal to, say, 5%, this is assumed to be valid both for EU exports to Canada and for Canadian exports to EU. Table 10 illustrates NTMs and sectoral cost reductions as inserted in the CGE model.

Table 10. NTMs affecting EU-Canada trade and relative cost reductions

Services Sector	Trade Cost Savings (%)	Total Trade Cost Estimates	
		EU Exports to Canada (%)	Canadian Exports to the EU (%)
Utilities	5.82	52.4	37.0
Construction services	10.21	47.0	19.0
Trade	6.27	52.4	37.0
Transportation	9.09	48.6	28.1
Communication and information services	4.21	40.4	18.4
Other finance	6.27	29.4	42.3
Insurance	6.27	27.3	35.8
Other business services	2.08	50.3	34.9
Consumer services	6.27	24.3	27.6
Public services	3.81	33.8	18.3

Source: European Commission and Government of Canada (2008).

A comprehensive juxtaposition of the 'policy options' as outlined in the three documents (CEPR, 2013; Copenhagen Economics, 2009; European Commission and Government of Canada, 2008) is provided in Annex II. It compares – when possible – scenarios' premises and relative changes in GDP.

Interestingly, Ecorys (2009b) also performed an assessment on an EU-Japan FTA, maintaining the same hypotheses (and definitions not in line with the literature) shown in Chapter 1.2.4. Instead, procedures for NTMs identification differ between the two studies.

Arguably, results displayed in Table 11 show the CGE sensitivity to methodological choices, e.g. how to calculate NTMs, and to how hypothetical policy options are represented. Indeed, in the CE report (2009) estimated changes in GDP (from the baseline) range from +0.1% to +0.14% for the EU and from +0.2% to +0.31% for Japan. The Ecorys report (2009b) treated the Netherlands separately, estimating additional benefit ranging from +0.1% to +0.2%. Effects on the EU-26 are negative, and equal to -0.1%. Finally, the report foresees additional growth for Japan ranging from +2.4% to 3.2% (depending on the scenario considered).

Table 11. Scenarios and changes in GDP baseline (%): EU-Japan

Scenario					
Description		Tariffs reduction	NTBs reduction (in "goods" or "manufacturing")	NTBs reduction (in services)	**RES.**
EU-Japan (CE, 2009)	"Lower bound scenario"	- 100%	- "minimum reduction scenario"	- "minimum reduction scenario"	**EU: +0.10 Japan: +0.20 (long run effects)**
	"Upper bound scenario"	- 100%	- "maximum reduction scenario"	- "maximum reduction scenario"	**EU: +0.14 Japan: +0.31 (long run effects)**
EU-Japan (Ecorys, 2009b)	"short-run effects"	- 100%	See Table 13		**NL: +0.1 EU-26: - 0.1 Japan: +2.4**
	"long-run effects"	- 100%			**NL: +0.2 EU: - 0.1 Japan: +3.2**

Source: Authors' elaboration on Copenhagen Economics (2009) and Ecorys (2009b).

4. Comparison with other EU-US studies

The Impact Assessment of the European Commission is not the only quantitative analysis of TTIP. While the CEPR (2013a) represents undoubtedly the main reference, there are a few other quantitative exercises that, by modifying the background assumptions, have obtained different impacts on sectors and expected trade flows. Indeed, we will show that, while it is difficult to adopt other models than the CGE, different assumptions mainly on the quantification of non-tariff measures and data can affect the final results in interesting ways.

The aim of this chapter is to provide an overview of the recent literature assessing the impacts of TTIP. We discuss two main streams of contributions:

- The first ('satellite studies') works with the quantifications of NTMs tariff equivalents taken from Ecorys (2009) (Kommerskollegium, 2013; Ecorys, 2012; Francois and Pindyuk, 2013). In this first group, estimation techniques and data do not vary significantly but the focus is on the effects for specific EU countries and American states;
- A second ('alternative studies') includes two studies (Fontagné et al., 2013, and Felbermayr et al., 2013[59]) that introduce either new NTMs quantitative estimations in a CGE model or employ another model (not CGE) as well as other assumptions that of course lead to distinct results.

[59] Fontagne et al. (2013) will be treated as a synonym of CEPII (2013), and Felbermayr et al. will be treated as a synonym of Bertelsmann/GED (2013).

4.1 Satellite studies

The Ecorys survey acted as a building block not only for the CEPR study (2013) – which constitutes the groundwork for the Commission IA – but also for a group of satellite studies. These four studies analysed the prospective TTIP, with only marginal differences in the methodology, e.g. in a few background hypotheses or in the represented scenarios. Each focussed on one EU member state, namely Austria (FIW, 2013), Sweden (Kommerskollegium, 2013), the Netherlands (Ecorys, 2012) and the United Kingdom (CEPR, 2013b).

Reported differences are attributable to four aspects:

- the consideration of the EU level, i.e. whether the report includes and reports explicitly the effects on the EU (or EU minus the member state concerned);
- use of NTBs estimations done by Ecorys (2009a);
- calculations of static and dynamic effects, namely whether the model focuses only on reallocation of resources between sectors, efficiency gains due to cost reduction, i.e. increase in productivity due to a more competitive environment, and terms of trade, i.e. ratio of export over import prices, change; or whether the model also accounts for dynamic effects;[60] and
- the number of scenarios described in the report.

Table 12 compares those options with respect to these four differences.

Table 12. Relevant hypothesis and scenarios: Satellite studies comparison

Relevant issue / Report	EU-level considered	EU-US NTBs	Static or dynamic effects	Scenarios (number, excluding baseline)
FIW (2013)	NO	Based on Ecorys (2009a) and Dee et al. (2011)[1]	Both	1
Kommerskollegium (2013)	YES	Based on Ecorys (2009a)[2]	Static (No representation of FDI)	3
Ecorys (2012)	YES	Based on Ecorys (2009a, 2009b)[2]	Both	2
CEPR (2013b)	YES	Based on Ecorys (2009a)[3]	Both	4

[1] Austrian NTBs are assumed to be equal to EU NTBs.

[2] Sweden NTBs are assumed to be equal to EU NTBs (reported explicitly).

[3] UK NTBs are assumed to be equal to EU NTBs.

Sources: Authors' elaboration on FIW (2013), Kommerskollegium (2013), Ecorys (2012) and CEPR (2013b).

[60] Meaning it calculates capital accumulation, changes in factor returns (of labour and capital) and convergence to a so-called 'steady state' (a term in economic growth theory expressing that, after a number of years, all effects generating such dynamics have worked out and no further changes in growth take place).

One peculiarity deserves attention. The Ecorys report on the Netherlands (Ecorys, 2012) does not make any original computation for assessing the benefits of an eventual EU-US trade agreement, apart from deriving the Netherlands benefits from the EU agreements.

The results shown are based on two earlier Ecorys reports (2009a, 2009b). One of them (2009b) distinguished the concept of 'barriers in services trade' from the larger category of 'non-tariff barriers', whereas the other (Ecorys 2009a) does not use this 'separate accounting'. Even though one might suspect that one of these two (possibly the first) should be linked to the concept of 'regulatory heterogeneity', the report does not clarify the point, as it does not include any meaningful explanation (Ecorys, 2009b). Thus it is impossible to discern the precise effects of the assumptions made in this specific scenario. For the sake of completeness, Table 13 reports the scenario hypothesised by Ecorys (2009b).

Table 13. Ecorys 'separate accounting'

Hypothesis	Reduction
Tariffs for trade in goods (except some sensitivities in agricultural products)	**- 100%**
Barriers to services (average)	**- 75%**
Non-tariff Barriers (NTBs)	**- 2.5%**

Source: Ecorys (2009b).

A comprehensive juxtaposition of the 'policy options' as outlined in the various 'satellite studies' is provided in the Annex (Table AIII. 4). It compares – where possible – scenarios' premises and relative changes in GDP.

In **Error! Reference source not found.**, we juxtapose the relevant aspects presented in both Ecorys reports. Constraints on available data limit the comparability for real income effects, expressed in absolute terms, i.e. millions of euro, and to the terms of trade, in relative terms, i.e. in percent.

Table 14. Ecorys exercises on an EU-US agreement: Results

	Real income change (€ millions)			Terms of trade (% change)		
	EU-26	**US**	**NL**	**EU-26**	**US**	**NL**
Short-run						
Ecorys (2009a) – Limited	18,738	7,817	610	0.05	-0.06	0.05
Ecorys (2009a) – Ambitious	44,437	18,992	1,411	0.11	-0.15	0.12
Ecorys (2009b)	15,261	17,959	246	0.0	0.1	-0.2
Long-run						
	EU-26	**US**	**NL**	**EU-26**	**US**	**NL**
Ecorys (2009a) – Limited	51,744	18,343	1,811	0.03	-0.10	0.03
Ecorys (2009a) – Ambitious	117,413	40,781	4,076	0.07	-0.23	0.07
Ecorys (2009b)	34,927	24,062	1,375	0.0	0.1	-0.2

Sources: Ecorys (2009a) and Ecorys (2009b).

Real income estimations fluctuate greatly between the two studies. In the short run, EU-26 (excluding the Netherlands) benefits vary from €15 billion to almost three times that sum, €44 billion. Comparing the corresponding values for the US shows no relevant difference (Table

14). In the long run EU26 benefits range from €35 to €117 billion, whereas US benefits vary from €18 to €41 billion. Concerning the terms of trade, changes also include the reversion of its direction. Depending on the study and on the scenario, EU-26 terms of trade can be positive (+0.11% in the short term; +0.07% in the long term) or neutral (equal to zero both in the short and long terms). Even sharper is the difference for the US, for which the terms of trade can be either positive (+0.1% both in the short term and long terms) or negative (-0.15% in the short term; -0.23% in the long term).

"The TTIP and the 50 States"[61] is another study based on CEPR (2013a), developed by the Bertlesmann Foundation. It provides an estimation of the economic impact – in terms of exports and employment – at state level in the US, in the case of an 'ambitious agreement' as defined by CEPR.[62] Nevertheless, it does not assume full employment (as CEPR does) at the moment of full implementation of TTIP, i.e. 2027. This has been made possible by assuming increased labour demand and wages.

The study estimated the impacts by industry at the national level first, distributing them at the state level on the basis of projections. One of the keys for 'creating' positive effects is companies and consumers having access to cheaper goods and services, which liberates (additional) resources to be spent. This (additional) spending is in itself job-creating.

4.2 Alternative studies

In the second group of contributions we refer to two studies that are more comparable to the CEPR report.

In Fontagne et al. (2013),[63] the MIRAGE[64] model has been estimated by partially relying on the GTAP database (for Social Accounting Matrices[65]) but otherwise on MAcMap-HS6 (CEPII-ITC)[66] for ad valorem equivalent (AVE) tariff protection.

Compared to the CEPR analysis, in Fontagne et al. (2013) the measurement of average protection (AVE) in cross-border trade in services is computed through a quantitative-based methodology for nine service sectors in 65 countries. This is a different approach than that of Ecorys, 2009, whose estimates result from a large business survey conducted in 23 sectors between the EU and the US.[67] The two approaches lead to different levels of tariff equivalents as shown in**Error! Reference source not found.** As in Ecorys (2009), NTMs in goods and

[61] Atlantic Council, Bertlesmann Foundation and the British Embassy in Washington, 2013, "TTIP and the Fifty States: Jobs and Growth from Coast to Coast", September.

[62] Ecorys (2009a) is used to provide NTM estimations. The Trade Partnership's CDxports database is used as underlying dataset.

[63] Fontagne, L., J. Gourdon and S. Jean (2013), "Transatlantic Trade: Whiter Partnership, Which Economic Consequences?", CEPII Policy Brief No. 12, September.

[64] MIRAGE is a multi-sector, multi-country CGE model developed by a consortium led by CEPII in 2001. Being a general equilibrium model, MIRAGE represents world trade in a context of general equilibrium where production and consumption of different countries interact among themselves through different behavioural assumptions.

[65] Social Accounting Matrices are matrices that represent national flows on economic transactions among all the economic agents (firm, household, government, rest of economy and net investment).

[66] Market Access Map is a database providing a measurement of applied tariff duties. The database is constructed in a way that is useful to quantify ad valorem equivalent (in percentage) of applied protection for exporter, importer and product (http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=12).

[67] For a more profound comparison between the approaches, see chapter 2.

agricultural products are higher than in services, while US services look more protected than goods compared to Ecorys where the opposite is found. However, the estimations of AVE in services provided by CEPII are much higher than the ones used in Ecorys.

Table 15. Estimated costs of NTMs for transatlantic trade (%)

	CEPII		Ecorys	
	EU	US	EU	US
Agriculture	48.2	51.3	56.8	73.3
Manufacturing	42.8	32.3	19.3	23.4
Services	32.0	47.3	8.5	8.9

Note: Estimates from CEPII refer to the 'Reference' scenario. In order to compare the two sets of figures, estimates both from CEPII and Ecorys refer to unweighted averages across the model sectors for NTM AVE protection.

Source: CEPII (2013).

As in other exercises, the authors define a 'baseline' scenario, i.e. characterised by a growth path that we would observe without any TTIP agreement. Once the outcome of possible agreements is calculated, the difference provides an estimate of the economic impacts. All the scenarios defined, other than the baseline one, include the gradual removal of all tariffs according to the timetable agreed in CETA.

NTBs, in general, can be removed only partially, hence assumptions on the degree of removal ('actionability') are required. Five scenarios are described as follows:

- 'Reference' scenario: a 25% cut in the level of trade restrictiveness: as outlined by the authors, a further harmonisation process in services *inside* the EU would be helpful to reinforce the impact of this scenario.
- 'Tariffs only': characterised by tariff liberalisation only.
- 'Targeted NTM Cuts': AVE protection in agriculture, industry and services due to NTMs cut by 30% for the upper half of sectors initially more protected and by 15% for the lower half.
- 'Harmonisation Spill-overs': reduction of 5% of trade restrictiveness of NTMs for third countries as a result of the harmonisation process for the two signatories.
- 'Ecorys NTMs': the 'reference' scenario with the assessment of Ecorys. This works as a robustness check.

Among these scenarios, the 'reference scenario' replicates the degree of ambition of the free trade agreement that is likely to be discussed during the TTIP negotiations.

Table 16 compares the percentage changes of exports and expected GDP in the long run compared to the baseline expected path (using 2025 as a reference year) for the EU and the US according to the different scenarios.

We immediately notice that there is a huge difference between the expected increase in exports for the US (10.1%) and the EU[68] (only 2.3%). US exports increase mainly in agricultural and services; for the EU mainly in services and industry. At the same time, imports are expected to increase by 7.5% in the US and 2.2% in the EU. Fontagne et al. (2013) also expects EU exports

[68] Figures on EU trade flows included intra-EU trade.

to be partly reoriented outside the EU in all three sectors, although the possibility of this happening in services is strongly influenced by the completion of the single market.

Long-term impacts on total GDP in the 'reference scenario' will be modest for both economies (0.3%), with uneven effects on the different sectors. Indeed, while agriculture in the US is expected to grow by 1.9%, in EU-27 the same sector will experience a modest contraction (0.8%). Results are slightly more conservative with respect to the Commission exercise in the most ambitious scenario (0.5% and 0.4%). Compared to the 'reference scenario', very small gains are estimated for a 'tariffs only' scenario, confirming that a large percentage of the expected growth is due to NTM cuts. However, the computational method of NTMs matters, as shown by the 'alternative NTM' scenario, which applies the methodology suggested by Ecorys and the IA. As noticed by the authors, higher tariffs equivalents' removal (in other words, higher 'actionability') generates higher impacts on trade flows and GDP.

Progressive removal of NTMs as suggested by 'targeted NTM cuts' and third countries spill-overs (harmonisation spill-overs) affect positively exports and GDP by adding a few basis points to the negotiations outcome.

Table 16. Long-term impact on EU and US exports and real income (%)

	Reference		**Tariffs Only**		**Targeted NTMs cut**		**Harmonization Spillovers**		**Alternative NTM**	
	Exports	Total GDP	Exports	Total GDP	Exports	Total GDP	Exports	Total GDP	Exports	Total GDP
USA	10.1	0.3	2.1	0	10.4	0.3	14.5	0.5	5.4	0.2
EU	2.3	0.3	0.4	0	1.9	0.2	3.4	0.5	1.3	0.1

Note: EU exports also include intra-EU trade; trade is in volume; percentage deviation from the baseline in 2025.

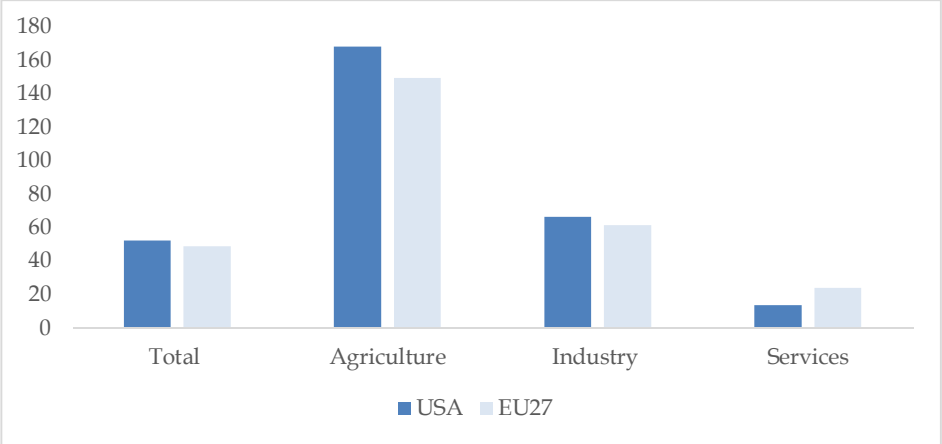
Source: CEPII (2013).

One objective of the trade agreement is to boost bilateral trade. In this respect, Figure 3 shows that US exports to the EU and EU exports to the US are expected to increase by 52.5% and 49%, respectively. The sector benefitting the most from bilateral trade liberalisation is agriculture (mainly dairy products, meats and fibre crops) for both signatories: it will more than double.

In services, the increase is very small, yet larger for the EU (24%, compared to 14% in the US): this is explained by the initial level of liberalisation in both economies, where, especially, in the EU, intra-EU regulatory divergences in services play an important role. This finding reveals that insurance, finance and business services will be the sectors most affected by the agreement.

Finally, in industries where regulatory heterogeneity might be smaller, gains are equal for both economies and mostly concentrated in machinery, chemicals, transport equipment and electronics.

Figure 3. Long-term impact on bilateral exports in the 'reference scenario' (in %)



Source: CEPII (2013).

The previous section has shown how the assumptions can influence the findings in trade agreements assessments. The study proposed by Bertelsmann/GED on the impacts of Transatlantic Trade and Investment Partnership can explain even more starkly why this is true. Note that the study is *not* directly linked to the current content of negotiations and makes quite different assumptions compared to the approach followed by the Commission through the CEPR study.

Before going into methodology, it ought to be noted that the findings of the Bertelsmann study are radically different from other studies. In other words, it is an outlier. Whilst other studies do not obtain overall GDP effects beyond 1%, and in CEPR (2013) and Fontagne et al. (2013) only half of that, Bertelsmann (2013) obtains a GDP increment of – incredibly – 13% for the US and 5% for the EU. For the US, this finding is approximately 25 times the result in CEPR (2013a) and this raises suspicions about its plausibility. A simple back-of-the-envelope calculation shows how implausible this result is, even when ignoring the CEPR study. US exports to the EU amount to some 3.5% of US GDP and a good deal of these exports are already free of barriers or face low barriers. Thus only part of the existing trade would be positively affected by TTIP, no matter how ambitious. Generating eventually no less than 13% extra US GDP from the sectors that are hindered today by NTMs (and sometimes tariffs) – whilst other (sub)sectors might be affected hardly or not at all – is most implausible, if not impossible. The case of the EU is less extreme but still pretty radical, with ten times the effect found in CEPR when the scenario is ambitious. Whereas CGE-GTAP models probably underestimate GDP effects due to the absence of dynamic effects, we are not aware of scholars arguing that this shortcoming would make a difference of this magnitude or even anywhere near it. Another example about the implausibility is given when looking at Canada, with a decrease in its GDP of some 9%. This must imply a gigantic trade diversion away from Canada-US trade due to TTIP. The Bertelsmann study does not incorporate spill-overs to third countries such as Canada, but that might lead to modest disadvantages for Canada, but not such enormous GDP shocks. The economic crisis, for example, affected Canada much less. But NAFTA, the regulatory and (profound) technical standards cooperation with the US and CETA all seem to be ignored as well. We shall proceed, below, with an explanation of the study, but it is (very) unlikely (to put it mildly) that this work can serve as a guide for MEPs or EU policy-makers at large.

The underlying model is, as in the other studies, a computable general equilibrium with one main difference: in this specific case, the authors combine a typical econometric exercise with a simulated scenario as if NAFTA or EU integration was achievable over the Atlantic. What

this implies is very simple: the Commission IA assessment has tried to quantify trade costs – tariffs and (mainly) non-tariff barriers (see Ecorys, 2009) – in order to estimate future trade flows that could potentially derive from the (partial) removal of them. Their removal is clearly linked to the degree of 'actionability' that, as discussed previously, is exclusively obtained from experts' opinions.

In this analysis instead, the authors derive trade costs by observing (overall) trade flows and how they increased in previous agreements, notably (intra) EU and (intra) NAFTA. Thus they assume that the EU-US agreement, when it will enter into force, would reproduce very long-run trade creation effects of existing trade agreements such as the EU or NAFTA. The trade pattern created by those agreements (a trade flow increase of 80%) helps to estimate a trade costs matrix on the basis of a gravity equation.

There is no doubt that this quite extreme assumption drives the entire structure of findings of this study. Analytically, it is most convenient, as it allows avoiding the (difficult and) elaborate exercise of how to quantify non-tariff measures and how 'actionable' they are. However, it is hard not to infer that it looks quite unrealistic. Findings on GDP are extremely wide-ranging and far too dependent on a trade openness effect, which is derived from 'deep' integration between contiguous economies in North America and in Europe. This seems most unlikely ever to be reproduced over the North Atlantic.

This brings us to the second characteristic of the study, namely the definition of the policy scenarios. Compared to CEPR and CEPII, we have only two possibilities. The first is limited to (almost) total removal of tariffs by reducing the trade costs matrix[69] to the extent to which tariffs can no longer affect trade patterns between the EU and the US. The second includes a liberalised scenario that, unlike the possibilities studied in the IA, is independent from any degree of actionability of non-tariff measures. Indeed, their matrix of trading costs is solely derived from the simulation of observed trade flows of existing, deep trade agreements.

Policy scenarios, described in this way, are simply too different from each other. They do not even allow for intermediate possibilities that are more likely to take place. The great discrepancy can also be noticed from the huge gap between their findings in the limited and fully liberalised scenario.

Another difference worth mentioning is the use of country data. Contrary to the IA, economic variables are not aggregated by region but considered one by one for a total of 126 countries. This allows specifying trade diversion effects within each region, where some member states could get more benefits than others. In the EU, for instance, member states such as Germany and the UK will benefit more in the liberalised scenario, by replacing other member states with the US as trade partner (to some extent). Besides calculating country specific expected gains for the EU and the US, the exercise is also extended to third countries by reproducing the expected trade flows that took place in already existing agreements. This way of modelling the third countries effects avoids the discussion on spill-over effects seen in the IA. However, negative – indeed, often very negative – outcomes in both scenarios (with the same gaps observed for the signatories) for almost all third countries seem unrealistic, even to the authors themselves.[70] As extensively explained in chapter 2, spill-over effects are difficult to predict without knowing the incentives that third countries have to join the regulatory frameworks

[69] As we will explain below, the matrix here helps to estimate bilateral costs (tariffs and non-tariffs) between every pair of countries.

[70] "Under certain circumstances, it is even realistic for countries that already have free-trade agreements with the EU or USA to indirectly participate in negotiations…so their concerns are taken into account…This does not show up in the calculation, so the negative welfare effects may be exaggerated".

that could be envisaged by the negotiations. Geographic proximity, existing trade agreements with one or the other signatory, could impact third countries in different ways. Moreover, the actual way through which non-tariff barriers will be removed (either by harmonising the regulatory framework in specific domains or by mutually recognising or adopting international standards) could influence the incentives and thus the costs to adapt the system of a third country to the one adopted by the EU and the US. In this respect, the econometric estimates do not provide – in this case as in others – a clear picture of how the system of incentives for third countries will actually work.

The final important point to address in the Bertelsmann/GED report is the role of labour markets. Different from previous studies that assume in the long run that supply and demand of labour are equal, thereby neglecting the existence of involuntary employment, in this study the labour market is included according to a theory of unemployment that allows the existence of frictional unemployment also in boom periods. Its presence is due to the fact that frictions and labour institutions can affect the unemployment rates regardless of the economic cycle.

However, data for this kind of approach are limited to 28 OECD countries, omitting the market structure of entire regions such as South America and parts of Asia and Africa. In general – and this is a positive aspect – the introduction of search employment theory allows for the creation of new jobs following a certain policy shock, such as TTIP.

Conclusions

The empirical economic analysis underlying the European Commission's Impact Assessment of TTIP is particularly difficult because of two principal reasons. First, TTIP is a most unusual bilateral trade agreement. Apart from the sheer economic size of the two partners and their economic intercourse today, its nature is more like a wide-ranging regulatory compact, with some elements of classical trade agreements as well. The regulatory core of TTIP makes it extremely difficult for economists to come to grips with the expected economic meaning of the negotiation outcomes. NTBs and mere regulatory heterogeneity create 'trade costs' for market access both ways, but it is exceedingly hard to assess authoritatively what the trade costs are and what consequences they have, whether for goods or services. Yet without good proxies of those costs and the scope for their reduction, an empirical economic analysis with proper modelling is either impossible or mere sophisticated guesswork. Second, TTIP is so wide-ranging that a so-called partial (equilibrium) approach – already second-best at any rate – would be totally inappropriate. Therefore, this type of economic analysis is made with the help of modern CGE models. Such highly complicated and demanding empirical general equilibrium models are capable of addressing most interactions between horizontal and sectoral negotiated aspects of TTIP, presenting sectoral effects (after incorporating such interactions), extending the immediate effects in the specific goods and services markets to their impact in labour markets, and arriving at changes of trade flows as well as overall increments to GDP. Each one of these two reasons is already a tall order; together they amount to an enormous challenge.

Against this background, the aim of this paper was to analyse the appropriateness and validity of the economic modelling behind the Commission's IA in assessing the potential impacts of such a potential trade and investment agreement.

In this research paper we have addressed the following questions:[71]

[71] The conclusions are structured according to the questions raised by the Terms of Reference for this assignment.

1) ***Does the CGE model used by the Commission correspond to the analytical needs of the ex ante impact assessment of such potential trade and investment agreement?***

The broad answer is: yes. There are indeed no better alternatives to assess the impacts of trade agreements than CGE modelling. Indeed, as amply shown, it allows modelling the behaviour of actors in the entire economy, including many sectors. Then, the GTAP database provides a strong and continuously updated source of reliable data. The methodology, however, also presents some drawbacks, such as the peculiarities through which the labour market and investments are included, the lack of innovation effects, and results on productivity-growth of the different size of enterprises. Having said that, and besides pure methodological issues, CGE modelling does not perform at its best when assessing deep trade agreements such as the one between the EU and the US, which is mainly based on (partial) removal of non-tariff measures. We have seen how assumptions on their quantification, together with other variables that are difficult to estimate, can influence the final findings considerably. However, we have also to admit that there are no better alternative tools to estimate long-term impacts of such a complicated trade agreement.

2) ***Has the Commission adequately assessed the environmental and social impacts and, in particular, is there a standard model available that could have been used to quantify the number of jobs potentially created by the agreement?***

Environmental impacts have been adequately assessed, insofar as CO_2 emissions are concerned, but there are many environmental aspects other than climate, and they are not included – they probably depend critically on the exact terms of some sectoral issues. Due to the sectoral aggregation imposed by the quantification of NTBs (from Ecorys, 2009a) and scant knowledge, at that time, of the content of the negotiations, it was indeed difficult to cover other aspects.

Concerning social impacts, exclusively represented by impacts on the labour market, we have thoroughly explained that free trade agreements modelled by CGE do not deliver employment effects, as they assume perfect equilibrium between supply and demand of labour in the long run. Production increase, however, demands more labour in a specific sector having a raising effect on wages that can be interpreted as employment increases. This can be said especially if wages do not immediately react to policy shocks (such as a free trade agreement).

In the recent literature, the only possibility to model unemployment effects (in modern CGE models) was to incorporate a new theory of unemployment (also known as 'search unemployment') that allows the creation of new jobs or to hypothesise that changes in wages are very sensitive to change in labour demand.

3) ***Are the samples used (including samples of sectors, spill-over effects and the representativeness of the household) appropriate?***

First, **the sample of sectors** is surely acceptable, given that the sample incorporates all the sectors where NTBs are known to be a serious hindrance for trade and investment. It would seem that adding more sectors or disaggregating sectors (which also adds to complexity and requires many more observations and data) would not add much value, at the stage prior to even deciding the negotiating mandate.

Second, the **spill-over effects** are also largely influenced by the sample of countries and how those have been aggregated. In this respect, the sample of countries (now 40) could have been larger. Again, this is a burden on the calculations (assuming that data are adequate); yet if timing allows, especially adding a larger group of developing countries might have been interesting. However, it would also depend on how the relationships in global value chains

between suppliers from developing and TTIP countries would be approached and (in CGE models or even macroeconometric models, already less suitable for trade purposes) this is next to impossible without 'heroic' assumptions, possibly derived from recent empirical OECD work on global value chains. Still, the question merely links the sample of countries issue to the spill-over issue – this is too restrictive, because one ideally would want to know the effects on many developing countries as well when spill-overs would be zero. The spill-over issue in CEPR (2013a) is treated (read: postulated) in an arbitrary way, but, admittedly, it is not easy to do any better. We have inserted an initial analytical basis for providing an underpinning of assumed spill-over rates. More should be done here, especially by bringing in a sectoral perspective and distinguishing different methods of regulatory convergence, e.g. harmonisation versus mutual recognition.

Third, **the representativeness of households** refers to a modelling technique in CGE models of employing a 'single' household (or, in other words, millions of perfectly identical households, taken together). This 'household' acts according to standard microeconomic principles, which indeed are stylised. Altering this fundamental building block in CGE models is likely to be very difficult, if not impossible, certainly when such a change in the underlying model would have to be used in a short-term contract. It would probably require testing the model with respect to different variations of the 'household' and obtain robust relationships first, before applying it empirically. Also, the data would have to support working with distinct types of 'households' for many countries.

4) Has the Commission adequately made reasonable assumptions about the content of the potential TTIP agreement and analysed in sufficient detail the options and the potential impacts?

Our report supports the following short answers only based on analytical issues.

For the purpose of defining **a baseline scenario**, the current state of EU-US trade and investment relations is adequately analysed – more and refined analysis is of course possible but would not add value for the purpose of using the CGE-GTAP model, as this model can only handle rather stylised approaches (and no other model would be capable of yielding more, in this respect). Are the assumptions about a prospective TTIP agreement 'reasonable'? The answer is yes, taking into account what can and cannot be done, e.g. public procurement is already difficult to model and issues such as IPRs or broader aspects of regulatory cooperation are simply beyond the current capabilities.

The predominance of **NTBs**, reflecting regulatory barriers for economic intercourse across the Atlantic, is fully justified. This is the core problem in TTIP. But it is also extremely difficult to address properly in any economic model and very few examples exist where this has been attempted. The cost of regulatory barriers (that is, tariff equivalents of NTMs) is a major problem, no doubt, and the background study supporting the Commission's IA has done what is *safe*: relying on the elaborate and wide-ranging study of Ecorys (2009a), which is second to none (except for services).

The **actionability of NTBs** is essentially based on the insights of many sectoral experts that Ecorys involved in the study. Given the scope of this paper, it is impossible to 'know better' objectively. In any case, less and more ambitious scenarios as to actionability have been used and this is to be applauded. The direct and indirect spill-overs are arbitrary, as noted, and more should be done on this. Further work might build upon the relatively simple exercise we have offered in chapter 2.

Going by this exercise (which is too limited, admittedly), the probability of large **spill-overs** is far from obvious, except for five countries already having privileged trade and investment

relations with TTIP countries, i.e. Turkey, Switzerland, Norway, Mexico and Canada. So-called '**domino effects**' in the world economy might well have to be incentivised explicitly via bilateral or plurilateral offers, e.g. in MRAs, or in negotiations. As to the development of the 'real' world economy, we show that – when comparing IAs of recent trade agreements – quite different growth paths have been used and this may hinder the comparability of results between them. Given the crisis, the assumed path in the TTIP IA seems not unreasonable. The options analysed appear sufficient to us, because further refinement in an analysis like this would not bring much value-added for the MEPs. On the many impacts referred to, the effects on cross-border investments have remained outside the CGE model.

The rather general notion of **'the' competitiveness** of European business is not analytically useful in an approach like this – it critically depends on sectoral NTBs and their removal. Some sectors in the EU are less competitive and others more competitive vis-à-vis the US – the model is useful in the sense that it clearly shows that *other* sectors' gains may actually help the relatively weaker sectors to do 'less bad'. The impact on SMEs cannot be modelled in CGE models. It would probably require partial approaches, with (what in economics are called) 'heterogeneous firms', whether in size or performance. Such refinements are a natural complement to this CGE-based analysis.

Finally, the impact on **WTO partners**, in particular on developing countries, has been discussed above. In a model like this, it all depends on the spill-overs. It is possible to do much more work on this issue, also distinguishing distinct methods of regulatory convergence, as noted, but one should not be under the illusion that this will be easy in general – case studies might well be suitable, with the concomitant risk that only 'special cases' would get attention.

5) Do you consider the Commission's findings based on these presumptions and assumptions to be reasonable?

Yes, they are reasonable for the TTIP signatories, although maybe too conservative due to the low level of NTBs, especially in services. The findings on impacts on third countries could suffer from a non-specific methodology on quantification of spill-over effects (also, Bertelsmann does not offer a valid alternative). Here more research is needed. Although there are serious shortcomings, a better methodology is not available.

6) In terms of the methodologies and economic modelling, assumptions and qualitative and quantitative analysis, how does the IA on the potential TTIP agreement compare to the Commission's other recent impact assessments on the EU's trade and investment agreements (notably the one with Japan)?

Comparing results between different IAs should be handled with care. We have tried to compare the economic methodology applied to the EU-US case with the analyses performed for two other free trade agreements, all of them based on the crucial assumption of quantifying NTBs. The three studies, i.e. EU-US, EU-Japan and EU-Canada, exhibit profound differences, particularly as regards analysed market structures, underlying data used for macroeconomic forecast, assessment of NTBs and policy scenarios.

Such multiple divergences are bound to influence the final results of each assessment, particularly the specific gains (or losses) over time, sectorally and between countries. Therefore, arguing solely on the basis of the CGE estimations that one agreement would be more (or less) beneficial than another would not make much economic sense, and could be seriously misleading.

If the recent trend of performing, in addition to the TSIA, an IA in compliance with the Commission IA Guidelines (as is the case for EU-US and EU-Japan) would become standard

policy, greater comparability could be achieved and also cover impacts that are currently not subsumed in the CGE modelling by separate exercises.

7) In terms of modelling, assumptions, and findings on impact, how does the IA compare to other recent studies on the potential TTIP agreement?

We have analysed the **modelling**, **assumptions** and **findings** of all the most recent studies that analyse the potential impacts of the EU-US free trade agreement. We have divided the two groups of studies: one includes two reports that make different assumptions and arrive at different findings. A second group is comprised of what we have called 'satellite studies' because they represent different applications of the CEPR report on which the Commission IA is based. The CGE modelling is applied by all of them.

While the second group cannot be in disagreement with the methodology applied by the Commission IA, the first group has been carefully analysed.

In Fontagne et al. (2013) the importance of the EU-US negotiations is confirmed, only if it reaches a partial removal of NTBs, confirming the finding of the EU-US IA. Conversely, the measurement of average protection (AVE) in cross-border trade in services is computed through a quantitative-based methodology on nine service sectors in 65 countries. This implies different results of tariff equivalents (much higher in cross-border services, for instance). However, final findings on GDP effects do not vary dramatically compared to those of the IA; indeed, the final outcome (GDP) for both signatories is slightly more conservative (0.3% for both), probably due to the higher level of NTBs computed. The spill-over effects are defined here as a further reduction of 5% of trade restrictiveness of NTMs for third countries as a result of the harmonisation process for the two signatories. As in the Commission IA, the percentage is based on the debate among expert groups and, so far, represents the only possible way.

The second study is the Bertelsmann/GED report on the effects of TTIP. It provides a different CGE approach, based on a simulated scenario, computed on the basis of existing agreements, e.g. the EU, NAFTA. Comparing TTIP potential with that of the EU (or NAFTA) is clearly unrealistic and, as in previous studies, it drives the enormous country-specific effects (also in terms of spill-overs) reported in the study.

Besides this, we have also noticed interesting characteristics such as the disaggregation of country data and the treatment of the job market.

8) Is the given quantitative and qualitative information/analysis)?

For the reasons set out below, we can only give a general reply to this question. The PMR indicators are not identical to market access barriers. Moreover, these indicators are often designed for specific sectors, such as network and services sectors, and not for manufacturing and agriculture (sectors covered by TTIP). The scope of PMR is thus much broader. A second conclusion is that the mapping between the sectors of the TTIP study and of the sectors in the OECD PMR study is very inadequate. Therefore, it is very hard to compare these indicators. NTB indicators derived from gravity analysis are often biased, because they are not directly observable.

9) Does the IA assess correctly the effects of a possible reduction of the duplication of work on both sides of the Atlantic on the number and quality of jobs, in particular with regard to low-skilled labour and SMEs, as well as the number of jobs in regulatory institutions? If not, what would be the likely effects?

The reduction of the duplication due to mutual recognition of testing and certifications or inspection expresses itself in a welfare gain, but of course it reduces the demand for testing

activities or inspections. Inevitably, this might lead to some reduction in the number of jobs in testing and certification, but the model is not refined enough to calculate this. For the question of SMEs and jobs in regulatory institutions, as noted, the model does not give any answer because firms are not distinguished as to firm size and the low-skilled jobs are only included for the 20 sectors, not for regulatory institutions.

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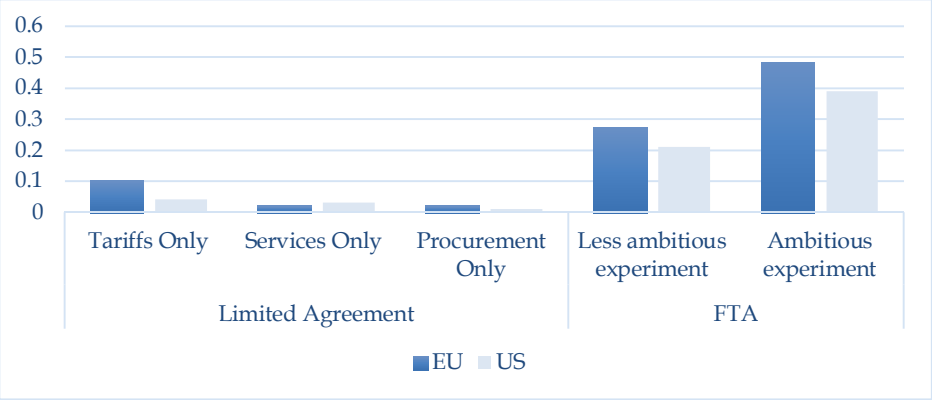
Annex I. Main findings of the CEPR report

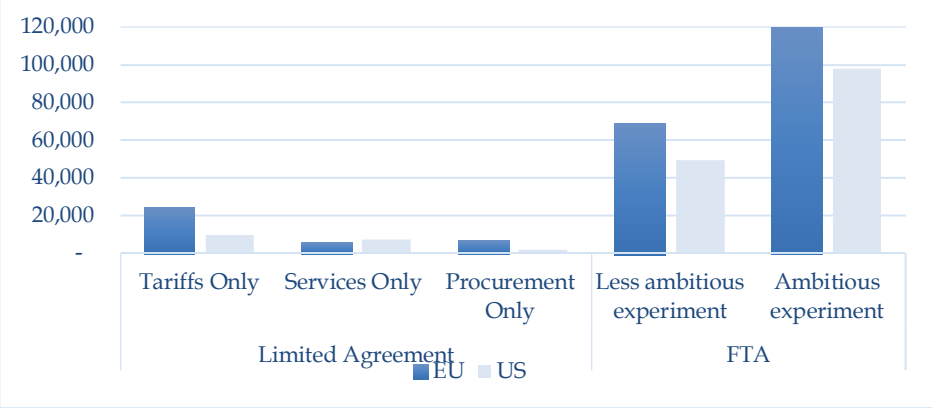
Figures AI.1 and AI.2below show the main results of the CGE modelling (changes in GDP both in percentage and in millions of euros) by comparing all the policy options previously mentioned. One notices immediately that the greatest benefits come from a comprehensive agreement that also aims at (partially) removing non-tariff measures on goods, services and procurement. In particular, the ambitious experiment, by removing at least 50% of the actionable NTBs, could in the long run generate a gain of up to €120 billion for the EU (see Figure AI.2), equal to a change in GDP of almost 0.5%.

Figure AI.1. Change in GDP (%), 2027 benchmark, 20% direct spill-overs



Source: CEPR (2013a).

Figure AI.2. Change in GDP (€ million), 2027 benchmark, 20% direct spill-overs.



Source: CEPR (2013a).

If results on economic welfare have shown the final potential impacts of more or less deepened EU-US economic relations, a trade agreement is of course negotiated primarily to boost trade and investment flows between the two economies. In this respect, Table AI.1 provides a general overview of the percentage changes of extra-EU total exports, imports and terms of trade according to different scenarios.

As also noticed for output changes (Figure AI.1), the limited agreement would bring modest gains (all less than 1%) in particular with the liberalisation of services and procurement only. Also changes in terms of trade for both signatories can be considered almost non-existent. Only tariff removal could yield changes larger than 1%, in particular for US exports.

Impacts change significantly under the hypothesis of a comprehensive free trade agreement, where the changes in value of trade flows and terms of trade stem from the liberalisation of tariffs, NTBs in goods and services, and direct and indirect spill-overs. Surprisingly, impacts on public procurement liberalisation have not been considered for the total figure although they would seem as important as the direct and indirect spill-overs. According to the CGE estimates, the ambitious scenario should augment extra-EU exports by €219.27 billion (while for the US the impact is slightly greater).

Table AI.1. Changes (%) of extra-EU exports, imports and terms of trade

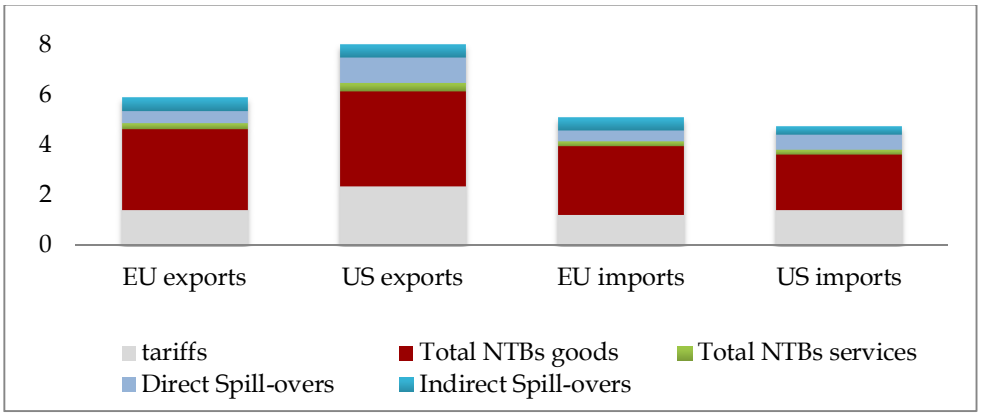
		Limited Agreement			Comprehensive FTA	
		Tariffs Only	Services Only	Procurement Only	Less Ambitious	Ambitious
Exports	EU	1.18	0.16	0.19	3.37	5.91
	US	1.91	0.19	0.23	4.75	8.02
Imports	EU	1.00	0.13	0.18	2.91	5.11
	US	1.13	0.57	0.14	2.81	4.74
Terms of Trade	EU	-0.01	0.00	0.00	0.00	0.01
	US	0.04	-0.01	-0.02	-0.08	-0.19

Source: CEPR (2013a).

Figure AI.3 shows the main drivers of the changes reported in the previous table for an ambitious scenario. Non-tariff measures in goods play the biggest role for both EU and US exports and imports, immediately followed by total tariff removal stimulating US exports by almost 2%. The role of NTBs in services is negligible and smaller than direct and indirect spill-overs.

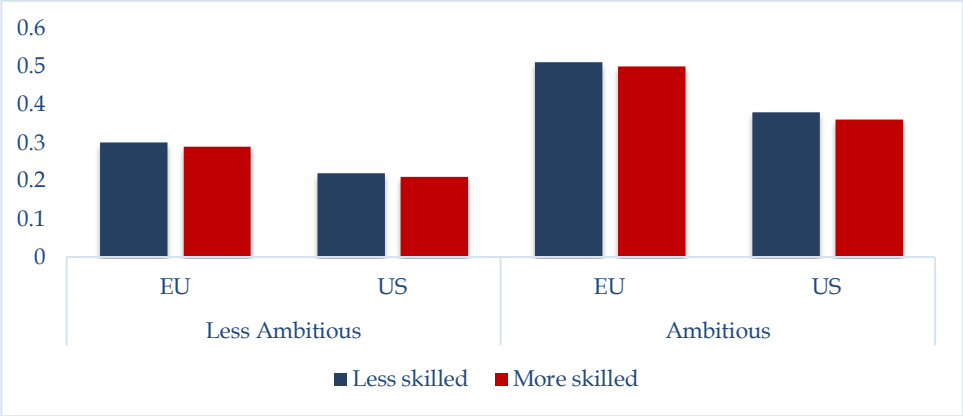
On sustainability impacts, we see in Figure AI.4 that wages are expected to rise by up to 0.5%, with even higher rises for the EU (slightly lower for skilled jobs) in the ambitious scenario. Reallocation effects across sectors also show an increase in employment – which does *not* mean new jobs; rather, it refers to workers changing sectors – in motor vehicles with a strong contraction (7%) in electrical machinery and metals (1.61%). For the US, expansions are expected in other machinery (1.49%) and transport equipment (0.72%) while contractions would take place mainly in electrical machinery (2.07%) and motor vehicles (2.77%).

Figure AI.3. Drivers of changes in exports and imports (in %), 2027 benchmark, ambitious agreement



Source: CEPR (2013a).

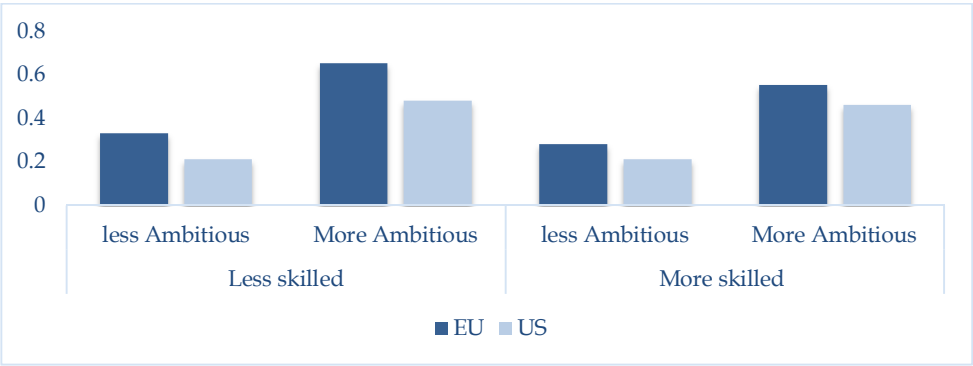
Figure AI.4. Changes in wages for less and more skilled labour, total effects (%), 2027 benchmark, 20% direct spill-overs)



Source: CEPR (2013a).

The displacement effect[72] that derives from labour reallocation is showed in Figure AI.5. The picture shows how less and more of the skilled labour work force will be displaced following the trade liberalisation in order to keep the market in equilibrium. In fact, as CGE models do not allow for unemployment, the only possible result is workers' displacement from sector A to sector B, possibly at an adjusted wage rate. Effects again are greater for a more ambitious scenario and slightly more so for the EU.

Figure AI.5. Displacement Index of less and more skilled labour in the EU and US



Source: CEPR (2013a).

Other impacts to be taken into account are changes in CO_2 emissions and use of natural resources. While the second impact is expected to be negligible, almost close to zero in all scenarios, changes in CO_2 emission are expected to be positive and up to (in total) 4 and 11.3 thousand metric tonnes, in the less and more ambitious scenario respectively. Estimates for the EU are smaller (2.7 and 3.6) and can be potentially lowered depending on the future in the emissions trading schemes.

- **Sectoral Effects**

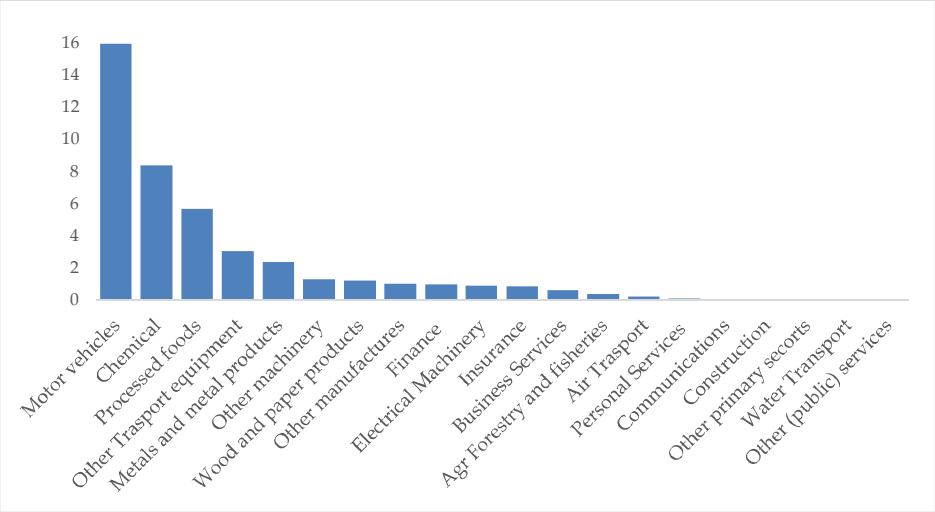
The CEPR study (2013a) might possibly be more directly useful for TTIP negotiators when it comes to the analysis of sectoral effects. This does not necessarily mean that the ongoing

[72] The labour displacement index comes from Francois (2004) and Francois, Jensen and Peters (2012) and summarises labour reallocation across the sectors.

negotiations will be driven by the policy suggestions put forward by the authors. However, due to the structure and assumptions of this exercise, the study suggests the sectors that could be most affected by the (partial) removal of tariffs and non-tariff barriers.

In Figure AI.6, Francois et al. (2013) provide an indicator[73] reflecting the interaction of the actionability of NTBs and tariffs, the value-added share of exports and the price elasticity of demand. The impact ranking shows that the manufacturing sector is the most affected given the highest valued-added in exports to the US, in particular in motor vehicles, chemicals and processed foods. The next step is to test the solidity of this ranking.[74]

Figure AI.6. Impact ranking index



Note: The index is calculated according to the following method: Actionable NTBs + tariffs x Export Value Added Share x price elasticities x .01.

Source: CEPR (2013a).

Table AI.2 reports the changes in EU output foreseen by 2027 in the different sectors: by comparing the policy options with respect to the baseline scenario, we see that in the hypothesis of a limited agreement all the EU sectors are either almost not affected or affected to a very limited extent. All the changes in EU output by 2027 are expected to be inferior to 1%, with relatively larger gains under the possibility of tariff removal only. Among them, manufacturing is relatively more affected (motor vehicles, transport equipment and electrical machinery). Changes in US output (not reported here) are not dramatically different, except a negative impact of 1.4% for electrical machinery. In a comprehensive free trade agreement, impacts are larger but in absolute terms relatively small. The only outlier is electronic machinery, expected to decrease by 3.74% in the less ambitious scenario and 7.3% in the ambitious one.

Another interesting result is the one zooming in on the main drivers of the sectoral impacts listed in Table AI.2.

In this regard, Figure AI.7 considers the sectors most affected under the scenario of an ambitious agreement and their drivers.

[73] Based on a partial equilibrium exercise.

[74] Procedure based on a general equilibrium context, thus considering the interaction among the different sectors.

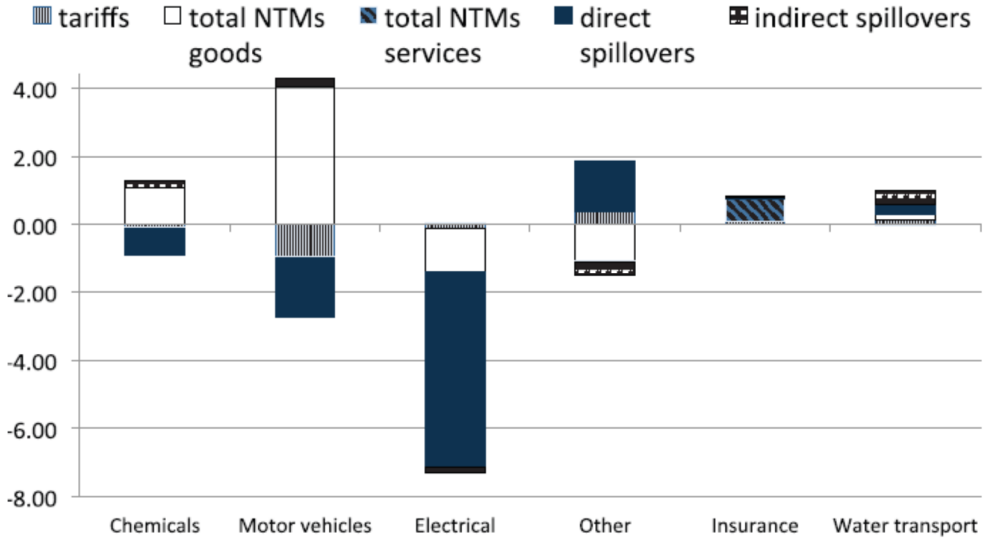
The decompositions of motor vehicles and electrical equipment are revealing since they are characterised by two opposite effects. Indeed, if the (positive) change of EU output in the motor vehicles sector is almost totally due to removal of NTBs in manufacturing, it is the direct spill-overs that negatively affect electrical machinery. As also stressed by the authors, the removal of NTBs in this picture presents different results compared to what was expected by partial equilibrium results. In this regard, modelling characteristics must be taken into account: in a context of general equilibrium, sectors interact, so what can be intepreted as a driver in a partial equilibrium exercise does not necessarily dominate in a CGE exercise.

Table AI.2. Changes in EU output by sector (%), 2027 benchmark, 20% of direct spill-overs

	Baseline shares in value added	Tariffs Only	Services Only	Procurement Only	Less Ambitious	Ambitious
Agr Forestry and fisheries	0.04	0.03	0	0	0.05	0.06
Other primary sectors	0.019	0	0	0	0.01	0.02
Processed foods	0.03	0.06	0.01	0.04	0.3	0.57
Chemicals	0.028	-0.11	-0.01	0.12	0.09	0.37
Electrical Machinery	0.004	-0.31	0.02	0.06	-3.74	-7.28
Motor vehicles	0.015	-0.65	-0.01	0.3	0.24	1.54
Other Trasport equipment	0.007	-0.26	-0.02	0.09	-0.17	-0.08
Other machinery	0.037	0.35	-0.04	0.03	0.4	0.37
Metals and metal products	0.021	0.03	-0.03	-0.39	-0.71	-1.5
Wood and paper products	0.023	0.06	0	-0.01	0.08	0.08
Other manufactures	0.029	0.6	-0.01	0.01	0.69	0.79
Water Transport	0.003	0.14	-0.04	0.03	0.55	0.99
Air Trasport	0.003	0.15	-0.01	0.01	0.3	0.44
Finance	0.032	0.06	0.11	-0.02	0.23	0.42
Insurance	0.01	0.06	0.32	0.01	0.44	0.83
Business Services	0.222	0.05	0.01	0.02	0.15	0.25
Communications	0.023	0.05	-0.03	0.01	0.1	0.17
Construction	0.083	0.12	0.03	0.02	0.31	0.53
Personal Services	0.035	0.04	0.02	0	0.15	0.26
Other (public) services	0.338	0.05	0.01	0.01	0.16	0.28

Source: CEPR (2013a).

Figure AI.7. Decomposition of EU output changes under the ambitious scenario



Source: CEPR (2013a).

On the trade side, EU imports and exports are expected to increase in all sectors (with the exception of electrical machinery), in particular, motor vehicles, chemicals and metals. In motor vehicles, EU exports to the US will increase with 71% and 148% in the less and more ambitious scenarios, respectively. Imports from the US to the EU in the same sector will rise even higher (207% and 346% in the less and more ambitious scenarios, respectively).

- **Impact of Investment NTBs**

A gravity equation is applied to estimate the impacts of NTB removal on EU and US affiliates' activities in the two regions. A gravity model works with pairwise observations and is not a general equilibrium model: for this reason, its results cannot be compared to CGE results listed previously (see chapter 3). This implies that bilateral foreign affiliates' activities are explained by a group of pairwise control variables. Among them, we want to isolate the coefficients (read in terms of elasticities) of NTBs and their impact on three specific dependent variables:

i. level of FDI income,
ii. number of affiliates from the EU to US and vice versa and
iii. number of employees in every affiliate.

Table AI.3 reports the main results. In particular we have to focus our attention on the second row showing coefficients for the effects of changes in the level of non-tariff measures on three variables. As we can see from the row in bold, a reduction of 10% of the NTBs index (implying in practice a convergence or mutual recognition between the two regulatory schemes that allow firms to be established on the other side of the ocean) could bring a 5.057% increase in FDI income.

Table AI.3. Summary of regression estimates for NTBs and FDI

	FDI INCOME	NUMBER OF ENTERPISES	NUMBER OF EMPLOYEES
LOG DISTANCE	-0.5381***	-0.9525***	-0.9773***
LOG NTB**S** INDEX FOR FDI	**-0.5057*** **	**-0.3463*** **	**-0.3136*** **
LOG NETWORK INDEX	0.2188***	1.1177***	0.6728***

Notes: Observations are (respectively) 11,140; 8,304; 7,253. Standard errors are not reported;
*** denotes significant at 1% level.

Unlike in the CGE modelling, results of the gravity equations on FDI do not change in different policy options. Indeed, not being an equilibrium model, there is no need to replicate an exogenous shock (as it has been done previously) and see how this affects the economic variables. However, this does not imply that the degree of ambition in the negotiation is a negligible variable. Indeed, the greater the level of ambition in reducing the NTBs index the larger the impact will be on FDI income between the two economies.

Annex II. Possible extensions of CGE modelling

NTBs

Another important mechanism is the inclusion of non-tariff barriers (NTBs). Older bilateral and multilateral free trade agreements focused mainly on a reduction of import tariffs in manufacturing, but the lower these import barriers became, the more the focus was redirected towards NTBs, quite often with the successful EU internal market in mind. These NTBs raise production costs, just as import tariffs do, but it is less clear which agents benefit from these barriers. Of course, local producers benefit because of less foreign competition, but it is less clear whether NTBs generate income in the same way import tariffs create revenues for the government. The CGE analysis on the TIPP by CEPR includes an informative box on cost-creating and rent-extracting (with income) NTBs. It is hard to find empirical evidence on the size of the NTBs for each relevant country and economic sector, and to distinguish between cost-creating and rent-extracting NTBs.

The NTBs are often modelled like import tariffs, as a mark-up on the production costs. A lower NTB has two main effects.[75] First, changes in relative prices imply that countries can better exploit their comparative advantages. This causes trade creation, increases production efficiency and raises welfare. At the same, however, there can be trade diversion. Rising imports by FTA partners come at the expense of imports from other countries. With the lower NTBs, these countries receive less preferential treatment. Although often mentioned in the theoretical literature, these diversion effects are small in most CGE analyses. The second effect is a terms-of-trade effect.[76] This is different for import tariffs where globally terms-of-trade effects cancel out: some counties experience positive terms-of-trade effects and other countries negative effects. With NTBs the terms-of-trade gains can be positive for every country. The reason is that the reduction of NTBs entails a reduction in real trade costs if they are cost-creating. This is also an important driver for the trade and welfare effects of CGE models. However, if the NTBs are rent-extracting, this is different. In this case, the reduction of NTBs also implies income and welfare losses for the beneficiaries of the rents. The outcomes of the models are thus sensitive for the distinction between cost-creating and rent extracting-barriers.

Imperfect competition

One of the first extensions was the modelling of imperfection competition and economies of scale. The traditional CGE models were based on perfect competition in all markets. This implied that firms did not make any profits in the end: marginal costs were equal to the average costs and the price. As a consequence, economies of scale could not be modelled, implying that the doubling of production also implied a doubling of the production costs. In many manufacturing sectors and also in services, however, economies of scale are important. Researchers have built this mechanism into most models, such as the GTAP model. They model a production function with fixed costs for production and constant marginal costs. When setting the price, firms put a mark-up on the marginal production costs. As production increases, average costs decline due to the mitigating effect of the fixed costs in total production costs. In equilibrium firm profits are zero: the mark-up times the sales volume equals the fixed costs of production. This condition determines the number of firms in a

[75] See among others Lejour and de Mooij (2005) for an extensive discussion of these effects.

[76] Notice that this effect is not a traditional terms-of-trade effect, but the result of a change in transaction costs, modelled by a change in the 'Samuelsonian iceberg' costs. When assumed to be of 'Samuelsonian iceberg' form, transportation costs are modelled as if a part of the good transported would melt while being carried from the place of departure A to the point of arrival B.

market. The main problem with this mechanism is to fix empirically the ratio between fixed and marginal costs. Although much research has estimated production functions, the size of this sector specific ratio is subject to a great deal of uncertainty. However, the quantitative estimates of these ratios and thereby the degree of scale economics have a large impact on the outcome of FTA analyses in CGE models. Nowadays this mechanism is often used for FTA analysis, and also for most bilateral agreements negotiated by the EU.

Services and trade facilitation

Another extension is trade in services. In the 1990s free trade negotiations focused on the elimination of import tariffs, mainly in manufacturing and later also in agriculture. Services and services data were neglected. The latter were also hardly available. Only in the beginning of the 2000s developed countries started to report bilateral services trade on a large scale. Until then bilateral services trade data were mainly approximated from total services exports and imports by country and the relative importance of bilateral goods trade. Starting from the database for 2004, GTAP also includes the bilateral services trade data from statistical offices, which improves the credibility of services trade liberalisation proposals. Moreover, researchers also start to estimate NTBs in a similar way as was done for the NTBs in goods trade with the same weaknesses.

A few years later, the topic of trade facilitation appeared at the negotiation tables. Import tariffs and other non-tariff barriers are one thing, but time-consuming and cost-raising customs procedures or shipments at airports and harbours add significantly to total transport time and costs. The indicators of World Banks Doing Business reports illustrated great differences between custom procedures in various countries. The GTAP consortium has data on international transport and these costs are also modelled as mark-up on the export price. This mark-up is often called the 'transport margin' and is empirically determined based on international transport data. The transport sector delivers these services. By lowering the mark-up or increasing productivity in the transport sector, international transport becomes cheaper, which exerts downward pressure on import prices and export products become more competitive in foreign markets. As a consequence, firms can better specialise and exploit their economies of scale. Input factors are reallocated towards more productive sectors, creating extra production, consumption and welfare.

Dynamic effects and productivity improvements

Most CGE models are static in the sense that the accumulation of capital over time, productivity improvements and economic growth are ignored. The welfare gains in these models are mainly due to the reallocation of production factors such that comparative advantages can be better exploited. Besides, terms-of-trade effects can have a positive or negative effect on welfare. We know from empirical work on trade openness and economic growth that it can take decades before the full gains of free trade are realised. Extra trade increases competition, which stimulates productivity, because the least efficient firms will cease to exist and the more efficient ones expand production.[77] Moreover, extra foreign competition also stimulates exchange of ideas and inventions and can induce firms to increase R&D efforts in order to escape fierce competition. Some CGE models are dynamic in the sense that investments in year *t* increase the capital stock in *t+1* and so on until equilibrium is

[77] There have been some efforts to link multi-sector and multi-regional CGE models with models that can handle efficiency gains from trade liberalisation, but these have not become popular (Del Gatto et al., 2006).

reached. Examples are the Linkage model of the World Bank, the World Scan model of CPB and G-cube model of McKibbin and Wilcoxen.[78] Also the GTAP model has a dynamic version. These models are more complicated and not so easy to use as static models. The former are often used for scenario analysis with a long time dimension and have to be 'fuelled' by assumptions on population and labour growth, productive improvements and so on. For trade analyses these models have never become very popular, or at least not compared to the static GTAP model. One solution for simulating the capital accumulation effects is to increase the total amount of capital in the model based on a fixed rule such as a constant capital GDP ratio. This increases the outcomes of trade liberalisation simulations, but other dynamic effects such as productivity improvements are not modelled.

The gains of trade do not only consist of terms-of-trade effects, reallocation effects and productivity improvements due to increased efficiency. Feenstra (2003) argues that firms also benefit from intermediate inputs, because they increase the variety of these inputs and embody knowledge. Trade increases knowledge spill-overs, which could have positive effects on productivity. There are some large-scale econometric models, such as the Quest model and Nemesis, which include R&D and knowledge spill-overs, but in multi-sector and multi-country CGE modelling R&D is absent.[79] The lack of dynamic mechanisms between trade and productivity in the CGE models explains the modest effects from FTAs and the discrepancy with the ex post outcomes.

Computer General Equilibrium modelling of foreign direct investment

There are large-scale computational general equilibrium (CGE) models for analysing trade policies,[80] but the general equilibrium effects of FDI flows are not widely examined in applied models.[81] Petri (1997) and Markusen (2002) conducted research on the microeconomic underpinnings of FDI and incorporated their ideas in general equilibrium models. The FTAP (Hanslow et al., 2000) model, which is an extension of the GTAP model (Hertel, 1997), incorporates most of the insights of Petri (1997) on modelling FDI in a CGE framework.[82] The main insight is the distinction between domestic and foreign ownership of firms in the model. Consumers first decide on the location where the variety is produced, then on the region of ownership of the firm. Their treatment assumes that from a Korean perspective, for example, a US multinational located in Korea is a closer substitute for a Korean-owned firm than it is for a US firm located in the United States. FTAP models barriers to establishment and to ongoing operations of foreign subsidiaries. The former are modelled as taxes on the movement of capital, the latter as taxes on output of the firms. These barriers are based on extensive

[78] See Van de Mensbrugghe (2001), McKibbin and Wilcoxen (1999), Lejour et al. (2006), for example.

[79] An exception is the WorldScan model. Lejour and Nahuis (2005) estimate sectoral and international spill-over effects, which are incorporated in the model, and Gelauff and Lejour (2006) model an R&D sector in WorldScan for analysing the 2010 Lisbon goals. Moreover, there are many dynamic CGE models of one country and one sector with endogenous R&D.

[80] Examples of these so-called global CGE models are the GTAP model (Hertel, 1997), the Linkage model (Van der Mensbrugghe, 2001), the Mirage model (Bchir et al., 2002), Michigan model (Brown and Stern, 2001), G-Cubed model (McKibbin and Wilcoxen, 1999), WorldScan model (Lejour et al., 2006), and the model of Rutherford (1999).

[81] Recently, many empirical papers have been published on FDI flows and the productivity of FDI. See Blonigen (2005) for a review of the empirical literature on the determinants of FDI, and Rojas-Romagosa (2006) on the productivity effects and the references included there.

[82] Petri's framework was later incorporated in other CGE models: the Michigan model (Brown and Stern, 2001), the model of Lee and Van der Mensbrugghe (2001), and the MIRAGE model (Bchir et al., 2002). However, most of these models apply some minor changes to the original framework of Petri.

empirical estimations by sector. Both taxes discriminate by ownership, which could imply an unfavourable treatment for foreign-owned firms. The barriers create rents and FTAP assumes that these rents accrue to the owners of the firms. They receive abnormal high returns because they were lucky to surpass the barriers while other potential entrants were not. Dee and Hanslow (2000) present the FTAP model results for global post-Uruguay round services trade liberalisation. The purpose of this paper was to assess the relative importance of services trade liberalisation compared to the liberalisation of agriculture and manufacturing.

The seminal work on modelling FDI decisions is from Markusen (2002). Markusen models trade and investment decisions of multinationals in a general equilibrium framework. The basic idea is that multinationals decide to serve the foreign market by exporting goods or services or by establishing a foreign daughter company. This decision depends on the size of the market, the distance, transportation costs and barriers to foreign direct investment. The multinational also has the option to outsource a part of the production based on cost advantages. A firm establishing an affiliate abroad also transfers firm-specific knowledge to that affiliate. This assumption implies that capital is more substitutable between countries within a specific sector than between sectors within a country. Markusen works out his ideas in two-country models. In spite of all his simplifying assumptions the models are complicated and cannot be solved analytically. He often uses simulations to assess the importance of the characteristics for the foreign investment decisions. This complexity is probably one of the main reasons why his ideas have not been frequently incorporated in large-scale CGE models. A second reason is a lack of data on bilateral FDI flows and stocks by sector, and on the transfers of specific knowledge and capital between the headquarters and the daughter companies of the multinational.

Annex III. Main findings from previous FTA assessments

'Armingtonian' sector market structure: It implies inter-sector perfect competition. Differentiation of products is conceived as horizontal and national. Thus products, e.g. goods or services, traded are differentiated by geographical origin, i.e. region or country, and their – imperfect – substitutability with 'local' products is assessed by the so-called 'Armington parameter' or elasticity of substitution. The higher the elasticity, the greater will be the substitutability of products (Armington, 1969). Following the assumptions in the Armington model, the number of commodities, i.e. products, is modelled as unvarying in number (product differentiation is therefore exogenous) (Lloyd and Zhang, 2006).

'Monopolistic competition' sector market structure: Firms are in direct competition amongst each other through the channel of firm-driven product differentiation (here treated as endogenous). This option reflects the 'new trade theory' approach and accounts for an increased product variety, which will benefit both intermediate and final consumers through productivity enhancement and – potentially – a greater real purchasing power (Krugman 1979, 1980; Ethier, 1982; Helpman and Krugman, 1985).

A summary for market structures used in the EU-US, EU-Japan and EU-Canada IAs is provided in Table AIII.1

Table AIII.1. Modelled sectors and market structure in different IAs

Sectors			EU-US	EU-Japan	EU-Canada
EU-US (20 sectors)[1]	EU-Japan (20 sectors)[1]	EU-Canada (31 sectors)[1]	Market structure		
Agriculture, forestry and fisheries	Agriculture, forestry and fisheries	Agriculture	A[2]	A	A
		Fishing			A
Other primary sectors	Other primary sectors	Coal	A	A	A
		Oil			A
		Gas			A
		Minerals nec[4]			A
Processed foods	Food & beverages	Processed foods	MoCp[3]	MoCp	MoCp
		Beverages & tobacco products			MoCp
Wood and paper products	Wood and paper products	Wood products	A	A	MoCp
		Paper products, publishing			
Chemicals	Chemicals and related products	Chemical, rubber, plastic products	MoCp	MoCp	MoCp
Metals and metal products	Metals and metal products	Mineral products nec	A	A	MoCp
		Ferrous metals			MoCp
		Metals nec			MoCp
		Metal products			MoCp
Motor vehicles	Automotive	Motor vehicles & parts	A	MoCp	MoCp
Other transport equipment	Transport equipment	Transport equipment nec	A	A	MoCp

Electrical machinery/ Other machinery[5]	Electrical machinery/ Machinery[5]	Machinery & equipment nec/ Electronic equipment[5]	MoCp	MoCp	MoCp
Other manufactures	Other manufactures	Petroleum, coal products	MoCp	MoCp	MoCp
		Textiles			MoCp
		Wearing apparel			MoCp
		Leather products			MoCp
		Manufactures nec			MoCp
Construction	Construction	Construction	A	A	MoCp
Water transport	Water transport	Transportation	A	A	A
Air transport	Air transport		A	A	
Communications	Communications	Communication	A	A	MoCp
Business services	Business and ICT services	Business services	A	A	MoCp
Finance	Finance	Other services[6]	A	A	A
Insurance	Insurance		A	A	
Personal services	Personal services		A	A	
Other services	Other services	Utilities	A	A	A
		Trade			MoCp
		Other services[6]			A

[1] Number of sectors according to market structure definition in the IAs.

[2] A= Armington.

[3] MoCp= Monopolistic competition.

[4] Not elsewhere classified.

[5] Two separate sectors in the paper, but for the purpose of coherence among sectors and among papers they are grouped in the same cell. Both markets are treated as MoCp.

[6] Repeated for the purpose of coherence. Blue or green fill = correspondent market structure(s) are coherently defined among all the IAs (respectively, Armington or Monopolistic Competition). Red fill = Discrepancies among the correspondent market structures.

Sources: Authors' elaboration on European Commission (2013), Copenhagen Economics (2009), European Commission and Government of Canada (2008).

Table AIII.2. Macroeconomic projections: A comparative assessment

Macroeconomic indicator	*Impact assessment*	Country				
		EU	US	Canada	Japan	Others
GDP (annualised growth, in %)	EU-US agreement	2.28 (2001-2007) 0.70 (2007-2016) 1.17 (2007-27)	3.30 (2001-2007) 1.74 (2007-2016) 1.90 (2007-27)	Included in "Other OECD"	Included in "Other OECD"	Different projections[1] for "Other OECD" (2.54; 1.84; 2.02); "Eastern Europe" (6.55; 2.03; 3.20), "Mediterranean" (4.98; 3.55; 3.93), China (11.21; 9.06; 8.24), India (7.91; 7.53; 6.19), ASEAN (5.70; 5.01; 5.19), MERCOSUR (4.28; 3.86; 3.97), "Low Income" (5.94; 5.43; 5.56), and "Rest of the World" (6.12; 3.81; 4.41)
	EU-Japan agreement	"The model is projected to 2018 using IMF growth projections of the world economy"				
	EU-Canada agreement[2]	2.55 (2007-14)	Included in "Rest of the World"	2.68 (2007-14)	Included in "Rest of the World"	"Rest of the World" 4.45 (2007-14)

[1] Projections inside each set of parentheses report values for, respectively, 2001-2007; 2007-2016; 2007-2027.

[2] In the report are also explicitly noted the following assumptions: real oil prices +82% and real grain prices +68% during the period 2004-2014.

Sources: Authors' elaboration on European Commission (2013), Copenhagen Economics (2009) and European Commission and Government of Canada (2008).

Table AIII.3. Scenarios and changes in GDP baseline (%): A comparative look

Scenario	**Baseline**			**Tariffs only**		**Services only**			**Procurement only**		
Description	**Year**	**Doha**	**FTAs**	**Tariffs reduction**	**RES.**	**NTBs reduction (services only)**	**Spill-overs**	**RES.**	**NTBs reduction (procur. only)**	**Spill-overs**	**RES.**
EU-US	2027	No[1]	Yes[1 2]	- 98%	**EU:+0.10 US:+0.04**	- 10%	Yes (20%)[5]	**EU:+0.02 US:+0.03**	- 25%	Yes (20%)[5]	**EU:+0.02 US:+0.01**
EU-Japan	2018	No[3]	No[3]	n.a.[4]	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
EU-Canada	2014	Yes	Not spec.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
Scenario	**Comprehensive, Less ambitious**										
Description	**Tariffs reduction**		**NTBs reduction (in 'goods' or 'manufacturing')**		**NTBs reduction (in services)**		**NTBs reduction (in procurement)**		**Spill-overs**		**RES.**
EU-US	- 98%		- 10% (20% of actionable NTBs)		- 10% (20% of actionable NTBs)		- 25%		Yes (20%)[5]		**EU:+0.27[7] US:+0.22[7]**
EU-Japan[6]	- 100%		- 'minimum reduction scenario'		- 'minimum reduction scenario'		No		No		**EU:+0.10[8] Japan:+0.20[8]**
EU-Canada	n.a.		n.a.		n.a.		n.a.		n.a.		**n.a.**
Scenario	**Comprehensive, More ambitious**										
Description	Tariffs reduction		NTBs reduction (in 'goods' or 'manufacturing')		NTBs reduction (in services)		NTBs reduction (in procurement)		Spill-overs		**RES.**
EU-US	- 100%		- 25% (50% of actionable NTBs)		- 25% (50% of actionable NTBs)		- 50%		Yes (20%)[5]		**EU:+0.48[7] US:+0.39[7]**
EU-Japan[9]	- 100%		- 'maximum reduction scenario'		- 'maximum reduction scenario'		No		No		**EU:+0.14[8] Japan:+0.31[8]**
EU-Canada	- 100%		- 2% of the 'value of trade in non-commodity goods sector'		- Equivalent to what achieved among EU MS		No		No		**EU:+0.08 Canada:+0.77**

Note: [1] No information on the baseline scenario provided in CEPR (2013a); details have been obtained consulting European Commission (2013). [2] All FTAs currently in place + EU-Singapore and EU-Canada as if concluded. Information available on the hypothesis regarding EU-Singapore and EU-Canada agreements, i.e. how they have been modelled in the CGE framework. [3] Robustness of the baseline scenario has been tested on hypothetical welfare effects in case of Korea and/or Doha round agreement. The inclusion of these two variables has little effects on estimations. [4] n.a.= Not applicable. [5] Robustness of spill-over effects has been tested using a 10% spill-over alternative scenario. Even if cited (p. 33) results are not included in the report. [6] This policy option is called 'Lower bound scenario'. [7] Effect of procurement not included in the total, as calculated in the CEPR report (p. 46). [8] 'Long-run effects', i.e. taking into account also changes in returns to labour and capital (thus including underlying 'short-run effects'). Precise short-run effects estimates are not available, but their qualitative description reports: 'short-run effects imply no measurable change in GDP from a full agreement for either the EU or Japan', Copenhagen Economics (2009), p. 82. [9] This policy option is called 'Upper bound scenario'.

Sources: Authors' elaboration on CEPR (2013a), Copenhagen Economics (2009), European Commission and Government of Canada (2008), European Commission (2013).

Table AIII.4. Satellite studies: Scenarios and changes in GDP baseline (%)

Scenario	**Baseline**			**Tariffs only**		**Basic modest**			**Modified modest**		
Description	Year	Doha	FTAs	Tariffs reduction	**RES.**	Tariffs reduction	NTBs reduction	**RES.**	Tariffs reduction	NTBs reduction	**RES.**
FIW (2013)	No relevant data on EU and US: FTAs (between EU and other economies, such as Canada, US, and Moldova/Georgia/Armenia) effects calculated on the Austrian economy only										
Kommerskollegium (2013)	2017	Not spec.	Not spec.	-100%	**Sweden: +0.01 EU-26:+0.02 US:+0.02**	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
Ecorys (2012)	2020	No	Not spec.	n.a.	n.a.	n.a.	n.a.	**n.a.**	n.a.	n.a.	**n.a.**
CEPR (2013b)	2027	Not spec.	Not spec.	n.a.	n.a.	-100% except limited reductions for processed food	-25% of 'actionable' NTBs (i.e. approx. 12.5%NTBs)	**UK:+0.14 EU-26:+0.37 US:+0.16**	-100% except limited reductions for processed food	-25% of 'actionable' NTBs (i.e. -12.5%NTBs) except 50% NTBs in chemicals, motor vehicles	**UK:+0.17 EU-26:+0.45 US:+0.20**

Scenario	**Comprehensive, Less ambitious**						
Description	Tariffs reduction	NTBs reduction (in 'goods' or 'manufacturing')	NTBs reduction (in services)	NTBs reduction (in procurement)	Spill-overs	**RES.**	
FIW (2013)	No relevant data on EU and US: FTAs (between EU and other economies, such as Canada, US, and Moldova/Georgia/Armenia) effects calculated on the Austrian economy only						
Kommerskollegium (2013)[1]	-100%	-25% of NTBs	-25% of NTBs	No	No	**Sweden:+0.09 EU-26:+0.12 US:+0.24**	
Ecorys (2012)[1]	No	-50% of actionable NTBs (25% of NTBs)	-50% of actionable NTBs (25% of NTBs)	No	No	**Short-run (real income change): NL:+0.11 EU-26:+0.16 US:+0.05**	**Long-run (real income change): NL:+0.32 EU-26:+0.32 US:+0.13**

CEPR (2013b)[2]	-100%	-50% of actionable NTBs (25% of NTBs)	-50% of actionable NTBs (25% of NTBs)	No	No	**UK:+0.27 EU-26:+0.61 US:+0.31**	
Scenario	**Comprehensive, More ambitious**						
Description	Tariffs reduction	NTBs reduction (in 'goods' or 'manufacturing')	NTBs reduction (in services)	NTBs reduction (in procurement)	Spill-overs	**RES.**	
FIW (2013)	No relevant data on EU and US: FTAs (between EU and other economies, such as Canada, US, and Moldova/Georgia/Armenia) effects calculated on the Austrian economy only.						
Kommerskollegium (2013)[3]	-100%	-50% of NTBs	-50% of NTBs	No	No	**Sweden:+0.18 EU-26:+0.22 US:+0.51**	
Ecorys (2012)[4]	No	-100% of actionable NTBs (50% of NTBs)	-100% of actionable NTBs (50% of NTBs)	No	No	**Short-run (real income change): NL:+0.25; EU-26:+0.25 US:+0.13**	**Long-run (real income change): NL:+0.72 EU-26:+0.73 US:+0.28**
CEPR (2013b)[5]	-100%	-50% of actionable NTBs	-50% of actionable NTBs (25% of NTBs) except 75% NTBs in chemicals, motor vehicles	No	No	**UK:+0.35 EU-26:+0.82 US:+0.39**	

Notes: [1] This policy option is called 'Limited scenario'. [2] This policy option is called 'Basic ambitious scenario'. [3] This policy option is called 'Comprehensive scenario'. [4] This policy option is called 'Ambitious scenario'. [5] This policy option is called 'Modified ambitious scenario'.

Source: Authors' elaboration on FIW (2013), Kommerskollegium (2013), Ecorys (2012) and CEPR (2013b).

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