
PART 1

- CHAPTER 1. ASSESSING THE POTENTIAL ECONOMIC IMPACT OF THE TTIP

Lars Nilsson & Nuno Sousa

- CHAPTER 2. THE TTIP AS THE ENGINE OF GROWTH: TRUTHS AND MYTHS

Álvaro Schweinfurth

- CHAPTER 3. THE TTIP OR EUROPE?

Ricard Bellera

CHAPTER 1. ASSESSING THE POTENTIAL ECONOMIC IMPACT OF THE TTIP

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Background to the TTIP

In 2007, the EU lifted its self-imposed moratorium on bilateral free trade agreements and launched so-called competitiveness-driven deep and comprehensive FTA negotiations with ASEAN countries (negotiations are concluded with Singapore), India (negotiations are ongoing) and Korea (FTA in force since 2011).

Following the analysis presented in the European Commission's communication "Global Europe – Competing in the world",¹ these partners were identified as priorities for bilateral agreements on the basis of criteria such as economic potential, trade barriers (tariffs and NTBs) against the EU's export interests and engagement in FTA negotiations with EU competitors. At the time, the US and Japan were not among the priority partners mainly due to concerns about the potential impact on the multilateral trading system.

However, by early 2013, as the EU's new approach to bilateral FTAs started to deliver (notably with the entry into force of the EU-Korea FTA), and with slim prospects for advancing in multilateral trade talks, the EU and Japan decided to engage in negotiations for an FTA after conducting a joint exercise to determine the scope and the level of ambition of a future agreement. In parallel, EU and US leaders directed the Transatlantic Economic Council to establish a High Level Working Group on Jobs and Growth (HLWGJG), led by the EU Trade Commissioner and the US Trade Representative. It was tasked with identifying policies and measures to increase EU-US trade and investment to mutually support beneficial job creation, economic growth and international competitiveness.

The HLWGJG presented its final report in early 2013, recommending a comprehensive trade agreement between the EU and the US addressing a broad range of bilateral trade and investment barriers, including those related to regulatory issues. The European Council president, Herman Van Rompuy, and US president, Barack Obama, endorsed the recommendation which subsequently led to the opening

1. COM (2006) 567 final.

of negotiations on the Transatlantic Trade and Investment Partnership (TTIP) in July 2013. Before the European Commission could obtain a negotiating mandate from the council for the TTIP negotiations, an Impact Assessment (IA)² had to be prepared analysing the potential economic, social and environmental impact of the policy initiative.³ The economic impact of the TTIP as presented in the commission's IA is based on work carried out for the commission by CEPR. The CEPR (2013) analysis was mainly grounded on a computable general equilibrium (CGE henceforth) model simulation following the standard methodological approach for *ex ante* analyses of trade agreements. But the lively policy debate prompted by the TTIP negotiations and the intense public scrutiny that the report has been subjected to has also fuelled a debate on how to go about measuring the impact of FTAs and the extent to which analyses like the one featured in CEPR (2013) (and other studies employing similar methodologies) capture the real world complexities that matter for understanding the impact of trade policy changes.

The rest of this paper is structured as follows: Section 2 reviews the so-called computable general equilibrium type of models that usually are employed to assess, *ex ante*, the impact of FTAs and lists some pros and cons of using them. Section 3 reviews the estimated impact of the TTIP as presented in CEPR (2013) in terms of main macroeconomic results and trade outcome. The last section concludes.

Overview of economic impact assessment of trade liberalisation

The basic motivation for opening up to trade is that it leads to increased specialisation and improved resource allocation, allowing firms to fully exploit economies of scale and to lower production costs. At the same time the increased presence of foreign competitors puts downward pressure on prices and offers greater product variety for consumers. In addition, over time, trade openness allows ideas and technologies to spread, spurring innovation and productivity growth. All these reinforcing channels amount to profound changes to how the economy works. However the many interlinkages at play make these effects difficult to quantify.

Most studies have relied on CGE models to assess *ex ante* the general economic impact of trade liberalisation. They are thus used to reply to the question "What would happen if..." by simulating the price, income and substitution effects associated with trade policy changes and comparing them against predictions about what would happen without such policy changes in place.

Features of CGE models

The longstanding principle of CGE models is (usually) the creation of a simulated version of the global economy to form the background against which policy changes are imposed and evaluated. However, over the past decades(s) they have undergone important changes to keep up with the economic theory on which they are grounded.

2. COM (2013) 136 final.
3. One should note that several analyses are made by the European Commission during the lifetime of an FTA. During the negotiations stage a Sustainability Impact Assessment is carried out in order to complement the IA with additional sectoral and qualitative analyses and stakeholder consultations. Once the negotiations are concluded and before signature, an economic assessment of the negotiated outcome is made. The main difference compared to previous economic analysis is that at this point in time the text of the agreement is available and the exact nature of tariff and non-tariff barrier liberalisation is known. Finally, after the agreement has been in place for a sufficient period of time an *ex post* analysis of its impact is also carried out.

Today, the more advanced CGE models used for trade policy analysis incorporate imperfect competition and product differentiation by variety and by quality. At the same time, the workhorse database – the Global Trade Policy Analysis Project Database – has seen its country coverage increase significantly,⁴ and now includes data for a whole range of variables that are relevant for the analysis of the wider effects of trade policy changes (e.g. CO₂ emissions and so-called satellite data – foreign affiliate sales, Foreign Direct Investment (FDI), migration flows, etc.).

The main advantage of CGE models is that they quantify the effects of trade policy taking into account the main links between the domestic and international production of goods and services and the consumption and investment decisions of firms (across sectors) as well as of consumers and the government (in all countries). The models also account for the fact that different sectors compete for capital, labour and land.

This allows for an assessment of all the direct and indirect effects of changes to trade policy. As an example, let us assume that policymakers decide to raise import barriers on steel to relieve the competition pressure on the domestic industry. A CGE model would show how detrimental protecting this one sector from competition would be to downstream industries that use steel as inputs (due to higher steel prices). Furthermore, the inter-linkages in the CGE model would also pick up the impact on upstream industries, since the steel producers and downstream industries would make less use of business services like logistics. CGE models are therefore important for evaluating the economy-wide effects of specific policy decisions.

However, this advantage of the CGE methodology comes at a cost, notably the high level of aggregation required to be able to use comparable and consistent data across countries to run these models. The standard CGE models do not normally feature more than 57 sectors (if it is based on GTAP data). This contrasts with the fact that trade liberalisation takes place at tariff line level, which in the EU is normally at 8-digit level.⁵ If products at this fine level of aggregation are considered sensitive, the assessment of trade policy changes would have to rely on complementary analyses based on other methodologies. These would notably involve the use of partial equilibrium models that can handle specific impacts at detailed product level. However, the linkages across and between sectors and countries would go unaccounted for.

Criticisms of the approach

CGE models have been criticised for simplifying reality and for omitting important issues. For example, when trade costs are reduced, the mechanics of the model ensure that the output of the more competitive sectors of an economy is expected to increase (relative to the baseline) while the opposite holds true for the less competitive sectors.⁶ For this to happen labour has to move from contracting to expanding sectors, where wages increase.⁷ This process is assumed to be relatively friction free. This assumption may be appropriate within sectors but it is less so between sectors. Moreover, the fiscal implica-

4. The latest version of the GTAP database (GTAP 9) covers 140 regions, whereas GTAP 5 from 2011 covered 66 regions.
5. The Harmonised System (HS) comprises about 5000 products at 6-digit level. In the EU, the Combined Nomenclature contains two subheadings of the HS and thus breaks it down to 8-digit level.
6. The baseline refers to the state of affairs that would apply to the world economy should the simulated trade liberalisation scenario never occur.
7. Due to labour market specificities in each country and across sectors within countries, such as varying reservation wages (for which data generally is missing), labour supply is usually not modelled.

tions that this adjustment entails in the presence of labour market frictions (retraining, temporary wage replacement payments, etc.) are not accounted for in the macroeconomic welfare analysis.

Another criticism often made of CGE models concerns how much the macroeconomic impact of trade policy changes depend on the size of the so-called elasticities (or in other words the extent to which demand and supply react to price changes). Higher elasticities lead to stronger substitution effects between imports and domestic products and to enhanced welfare gains. The elasticities for modelling trade liberalisation are estimated using robust econometric methodologies at product and sector level to reflect the level at which cuts in trade barriers actually take place. However, more work is needed to update these estimates, not least in light of all the new products that are put on the market every year.

Much of the criticism of CGE models implies that they may be exaggerating the welfare gains from trade liberalisation, but some arguments have been put forward suggesting that these may in fact be underestimated. Two arguments along this line carry particular importance. First, the CGE models that are used in trade liberalisation simulations do not account for increased productivity effects associated with greater incentives to innovate from enhanced competitive pressure. Second, the impact of the liberalisation of foreign investment (increasingly an important component of modern trade agreements) is unaccounted for in most models. This is an important drawback, as FDI is a significant part of modern economic integration and the presence of foreign capital is proven to be, in itself, a catalyst for knowledge and technology advancements in recipient countries, which eventually leads to productivity gains.

While many of these criticisms are valid and deserve further reflection, the few alternatives to CGE models that have been proposed have not yet proven to be sufficiently reliable for *ex ante* analyses of economy-wide effects of trade policy changes.⁸

8. One alternative to CGE-based analyses of the economic impact of trade agreements that is gaining some traction in policy circles is the use of simulations based on structurally (econometrically) estimated general equilibrium models. Arguably a main advantage of this methodology is that the key modelling parameters (used for the counterfactual analysis) are all consistently estimated (and not merely calibrated as in the traditional CGE models) using structural relationships as implied by the underlying theoretical model.
9. The discussion of the societal value of any particular measure that may be regarded as an NTB is outside the scope of this discussion, which is focused on how economic tools can be used to assess the impact of trade agreements. Clearly, a full assessment of the role of NTBs in trade policy must be done in light of the broader context that frames the existence of particular measures.

Incidence of NTBs and extent to which trade liberalisation can reduce these

As important as discussions on the merits of modelling tools may be, one must remember that the output of any model will never be of higher quality than the data put into it. When it comes to trade policy analysis, the data on NTBs are particularly worth mentioning. The trade costs imposed by NTBs are an increasingly important question to address from a policy standpoint. As tariffs have come down worldwide NTBs are fast becoming the main friction to trade. However, quantifying the trade cost they impose (ideally in *ad-valorem* equivalents) continues to be a challenge for analysts due to their nature.

For example, if there is a restriction on imports of eggs in the form of additional sanitary controls, how much, in percentage terms, does it add to the price of the foreign good?⁹ In services, the trade costs imposed by legislation in place are even harder to quantify, as the

restriction could, for instance, be a cap on the number of foreign engineers allowed to deliver a service. These restrictions may be particularly difficult to analyse, but the trade costs they carry are tangible and can easily spill into goods trade (e.g. if foreign engineering services are needed to install imported technically-advanced goods such as solar panels or wind turbines).

Research in this field has managed to advance by adopting different techniques (notably through surveys, econometrics, and/or expert opinions) to estimate the associated trade costs. The simulations of the impact of the TTIP that can be found in the CEPR (2013) report rely on data on the trade costs of the NTBs that affect the bilateral EU-US trade flows as published in Ecorys (2009). The quantification of these costs was based on a direct quantity-based approach that involved applying a questionnaire (on the basis of an inventory of measures), from which an index of trade restrictiveness was constructed. This reflected exporting firms' perceived difficulties in terms of market access.¹⁰

An additional problem for *ex ante* analyses of FTAs is determining how much the negotiated outcome will actually reduce NTBs. Again this is particularly difficult to establish for services where it is common that trade partners agree to bind current levels of restrictions, i.e. the potential for increasing applied restrictions is eliminated. While this reduction in business uncertainty is valuable, after entry into force of the agreement operators still face the same barriers as before. How should the removal of this uncertainty be quantified in terms of reduced trade costs for this particular type of services trade?

Potential economic impact of the TTIP

EU and US trade barriers

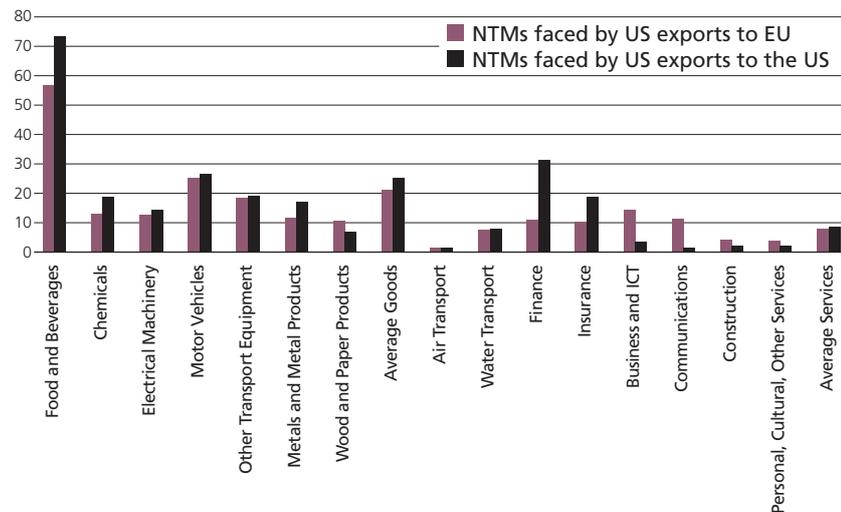
The economic impact of trade liberalisation between the EU and the US hinges on several things, notably the relative importance of various sectors in terms of GDP and trade flows and the extent to which the two markets are linked by global value chains and international production. The average tariff levels in the EU and US are broadly similar and relatively low, although in agricultural products the EU average level of tariff protection (about 13%) is significantly higher than the US average (just below 5%). In manufacturing there is one sector in which EU tariffs are generally higher than those in the US— passenger cars, where the tariffs imposed by the EU (10%) are four times higher than the US tariff (2.5%). But on the other hand, contrary to the EU, most trade-restrictive US tariff peaks are found in the manufacturing sector (e.g. textiles, clothing, footwear, ceramics, glass and leather products).¹¹

The overall low level of tariffs in EU-US trade has shifted the focus to the role of NTBs. Figure 1 shows that EU and US bilateral NTBs are fairly high, reaching some 60%-70% in the food and beverages sector and some 25% in motor vehicles. EU exports of financial services to the US are also estimated to face high barriers.

10. These scores were employed as a proxy for the NTM indicator in a gravity equation. On that basis an *ad valorem* tariff equivalent per sector was obtained.

11. A tariff peak is usually defined as a tariff of 15% or higher.

Figure 1. Estimated levels of EU and US NTBs, by broad economic sector (%)



Fuente: Ecorys (2009).

Simulation of the impact

The CEPR (2013) study simulates various potential negotiation outcomes. Below, we report on what is labelled a comprehensive agreement with an “ambitious” outcome which fully eliminates tariffs and reduces NTBs by 25%.¹² It is further assumed that NTBs linked to procurement are reduced by 50%. Moreover, the impact of partial alignment with global rules and recognition of respective partners’ standards is also taken into account. For this it is assumed that reducing regulatory barriers bilaterally might improve access for third countries through what the report calls “direct spillovers”. In addition, if third countries adopt/converge with EU-US standards, this will lead to lower costs in trade between them and to better access for the EU and US to these markets. This is called “indirect spillover”.¹³ Hence, the rest of the world may actually gain from EU-US regional integration efforts.

The results are compared to a baseline scenario which represents what the economy would look like in the absence of the TTIP. The comparison is made in 2027 when the agreement is assumed to be fully implemented and the necessary adjustments among and within sectors are assumed to have taken place.¹⁴ The scenario simulated is summarised in Table 1.

- 12. NTBs often come in the form of domestic rules and regulations which may impact on trade. Regulations serving a legitimate purpose neither can nor should be removed. But when the objective on both sides of the Atlantic is the same (e.g. safe cars), negotiators will aim for acceptance of each other’s procedures to reach that objective. Such recognition has the potential to lower trade costs significantly.
- 13. Spillovers are modelled conservatively. Direct spillovers are modelled at 10%-20% of direct NTB reductions. Indirect spillovers are modelled as half of the direct spillover reductions.
- 14. The projection of the data to 2027 is based on the latest forecasts by the IMF, the World Bank and others in terms of economic and population growth, etc.

Table 1. Summary of reported scenario simulation

Policy change	Ambitious scenario
Tariffs	100% reduction
NTBs (goods and services)	25% reduction
Procurement NTBs	50% reduction
Spillovers	20% (direct), 10% (indirect)

Source: CEPR (2013).

The CGE model employed in the simulations is described in detail in the CEPR (2013) report. It is based on the widely-used GTAP model (Hertel et al., 1997), with added features such as firm level competition and supply of varieties of goods and services to both final consumers and downstream firms under monopolistic competition. The simulations were run using a conservative approach regarding the choice of labour market closure assuming that the economy has a fixed supply of labour in the long run. Alternative labour market closures entail huge data requirements to accurately capture the realities of national labour markets (including wage dynamics, domestic labour regulations, demographic changes, occupational and qualifications requirements, labour mobility, etc.), which are complex to model. Such information is often not available and up-to-date, including projections on comparable cross-country bases for a global model.

Results in terms of GDP, trade, output and jobs

The results show that in 2027 the TTIP could increase EU and US GDP by about 0.5% and 0.4%, respectively, relative to a situation without the TTIP in place (see Table 2). This is not a one-off gain. The increase in GDP will gradually build up and increase every year until reaching the levels mentioned above in 2027. After that this economic gain, which reflects the ability of the economy to produce more with its available resources, will continue. The reduction of NTBs is the main driver behind this gain, accounting for as much as 80% of the total expected effects by 2027.

The GDP gains are intrinsically linked to greater trade activity following the liberalisation. The CEPR (2013) simulation suggests that EU exports to the US would increase by 28%, while US exports to the EU would go up by close to 37%. EU and US exports to the rest of the world would also increase by 0.9% and 2.7%, respectively.¹⁵ EU and US imports from the third countries would at the same time increase by 1.5% and 0.3%, reflecting how part of the cost savings achieved by the reduction of NTBs will not be restricted to EU-US bilateral trade flows (spillover effects), but due to increased economic activity (higher GDP).

	Total A=sum(B:F)	Tariffs (B)	NTBs goods (C)	NTBs services (D)	Direct spillovers (E)	Indirect spillovers (F)	Procurem. (G)
European Union	0.48	0.11	0.26	0.03	0.07	0.02	0.05
Bilateral exports to US	28.0	7.7	21.0	1.4	-1.7	-0.3	2.1
United States	0.39	0.04	0.23	0.06	0.06	0.00	0.03
Bilateral exports to EU	36.6	15.3	19.9	1.4	-0.1	0.0	1.6
Other	0.14	-0.01	-0.04	-0.01	0.05	0.15	0.00
OECD, high income	0.19	-0.03	-0.06	0.00	0.07	0.20	0.00
Low inc. countries	0.20	-0.02	0.01	0.00	0.00	0.21	0.01

Source: CEPR (2013)

The results reported in Table 3 show that sector output changes in the EU in general are small. Production in the primary sectors is almost unaffected, while there is a small increase across all services sectors. In manufacturing there is also a small increase in output with some excep-

¹⁵ The latter two figures are derived from CEPR (2013), Table 19 and Table 20.

tions. The most notable exception is in electrical machinery, where output is expected to decline by 7.3%, but from a low baseline share in value added. The reductions of NTBs in goods and in services are important drivers of changes at sector level. For example, for motor vehicles, tariff reductions alone are detrimental to the EU motor vehicle sector with falling output levels. In contrast, with NTB reductions the sector expands.

For the US, the changes in sector-specific output are also found to be small, with all services sectors changing less than 1% (not displayed). Finance and insurance sectors will contract, but by less than 0.5%. In manufacturing, processed foods, electrical machinery and motor vehicles are expected to contract, while in the other sectors output will marginally expand or remain by and large unaffected.

Table 3. Changes in EU output by sector (%)

	A+B+C+D+E+F	B	C	D	E	F	G	H
	Baseline shares in value added	total	tariffs	total NTMs goods	total NTMs services	direct spill-overs	indirect spill-overs	procurement
Agr forestry fisheries	0.040	0.06	0.03	-0.03	0.00	0.06	0.01	0.00
Other primary sectors	0.019	0.02	0.00	-0.03	0.00	0.05	0.00	0.00
Processed foods	0.030	0.57	0.08	0.56	0.01	-0.20	0.13	0.07
Chemicals	0.028	0.37	-0.07	1.08	-0.04	-0.77	0.17	0.24
Electrical machinery	0.004	-7.28	-0.13	-1.25	0.02	-5.74	-0.16	0.11
Motor vehicles	0.015	1.54	-0.93	4.04	-0.02	-1.81	0.26	0.61
Other transport equipment	0.007	-0.08	-0.23	0.10	-0.03	0.04	0.02	0.18
Other machinery	0.037	0.37	0.40	-1.03	-0.07	1.46	-0.39	0.05
Metal and metal products	0.021	-150	0.05	-0.55	0.05	-0.78	-0.18	-0.79
Wood and paper products	0.023	0.08	0.08	-0.06	0.00	-0.11	0.16	-0.02
Other manufactures	0.029	0.79	0.63	-0.11	-0.01	0.48	-0.19	0.02
Water transport	0.003	0.99	0.16	0.15	-0.01	0.27	0.41	0.05
Air transport	0.003	0.44	0.18	-0.05	0.03	0.17	0.11	0.02
Finance	0.032	0.42	0.07	0.10	0.25	-0.04	0.03	-0.05
Insurance	0.010	0.83	0.07	0.05	0.61	0.06	0.05	0.02
Business services	0.222	0.25	0.06	0.14	0.02	0.01	0.03	0.03
Communications	0.023	0.17	0.06	0.11	-0.05	0.00	0.04	0.02
Construction	0.083	0.53	0.14	0.30	0.03	0.01	0.04	0.05
Personal services	0.035	0.26	0.05	-0.03	-0.01	0.14	0.11	0.01
Other services	0.338	0.28	0.05	0.15	0.01	0.05	0.03	0.03

Source: CEPR (2013)

The report examines how the labour market could be affected (despite holding labour supply fixed) by analysing: (i) changes in the wages that employees are paid and (ii) the reallocation of jobs across the economy in response to the potential restructuring triggered by the agreement. It finds that the TTIP would have a positive impact both on more skilled and less skilled labour wages, with each increasing by close to 0.5% with a slightly higher impact in the EU.

The agreement is expected to generate a reallocation of jobs across different sectors of the economy, with expanding sectors pulling labour

from contracting sectors by offering them higher wages. However, the simulations suggest that these movements will be relatively limited. Less than 0.7% of those working in the EU are expected to move between sectors as a result of the agreement.

Complementary analyses for additional insights

Despite being the best tool for *ex ante* trade policy analysis, CGE models have inherent shortcomings, as discussed above. For this reason, one may also want to explore other types of analyses for complementary insights on the potential economic impact of the TTIP.

On the employment side, while robust CGE-based methodologies for a more sophisticated analysis of labour markets impacts are not yet available, it is possible to rely on the recent developments of inter-country input-output data for interesting insights and detailed quantification of the employment footprint of external trade. The European Commission's Joint Research Centre (DG JRC) and DG TRADE have recently published a comprehensive set of indicators that does just that.¹⁶ They show that between 1995 and 2011 the number of jobs in the EU supported by exports to the rest of the world increased by 67% to reach 31.1 million. Moreover, data show that 15% of these jobs (around 4.7 million jobs) depend on the sales of goods and services to the US market. These results underscore the possibilities offered by the ongoing TTIP negotiations to effectively contribute to creating employment opportunities in the EU.

Another limitation of CGE analyses is that they are ill-suited to accounting for the heterogeneity of the business sector and in particular the specificities of SMEs, which account for 28% of the EU's direct exports to the US. However, a recent survey has allowed for a thorough identification of a number of difficulties that EU SMEs face when trying to export to the US market.¹⁷ A number of cross-cutting issues came to light, such as the challenge of complying with technical rules and regulations and being legally excluded from many public procurement markets.

Other issues raised included problems in accessing the relevant information about the regulations that apply to their products. Manufacturing SMEs raised sector-specific rules such as in the case of food, beverages and agricultural products, pharmaceuticals, textiles, machinery and electrical equipment. In the services area, restrictions on the movement of people were the most highlighted issue. Such direct and structured exchanges with stakeholders (SMEs in this case) provide a wealth of valuable information to indicate areas which would be important for the perception of an ambitious, balanced and comprehensive TTIP agreement.

Conclusion

Assessing the impact of trade agreements is complex. Many of the traded goods are produced using domestic and/or imported intermediates, including services, which is something that has to be taken into account. CGE models try to take all these intricacies into consideration. However,

16. Arto et al., (2015).

17. See the report "Small and Medium Sized Enterprises and the Transatlantic Trade and Investment Partnership" available at: http://trade.ec.europa.eu/doclib/docs/2015/april/tradoc_153348.pdf.

the estimated impact is often provided at fairly aggregate level and may need to be complemented by additional analyses, though several issues are still difficult to quantify, such as the impact on the labour market and the productivity effects of trade liberalisation.

Despite having drawbacks, most trade economists would agree that CGE techniques are the best methodologies presently available to evaluate the impact of future FTAs. This is also the approach adopted in the CEPR (2013) study which was briefly summarised above. The report attempts to address the core issues in the TTIP negotiations, including tariff and NTB reductions and a moderate degree of regulatory harmonisation.

The results signal that the agreement could raise EU and US GDP by about 0.5% and 0.4%, respectively, once fully implemented, and increase bilateral exports by some 30%-35%. It is important to note that the modelling results should be interpreted with care and caution and should preferably be seen as providing an orientation on the magnitude and direction of the effects compared to a situation of no agreement.

References

Arto I., J.M. Rueda-Cantuche, A. F. Amores, E. Dietzenbacher, N. Sousa, L. Montinari and A. Markandya. *EU Exports to the World: Effects on Employment and Income*. Luxembourg, Publications Office of the European Union, 2015.

CEPR. *Reducing Transatlantic Barriers to Trade and Investment: An Economic Assessment*, Report prepared for the European Commission, J. Francois, M. Manchin, H. Norberg, O. Pindyuk and P. Tomberger, 2013. (online) http://trade.ec.europa.eu/doclib/docs/2013/march/tradoc_150737.pdf.

Ecorys. *Non-Tariff Measures in EU-U.S. Trade and Investment – An Economic Analysis*, Report prepared by K. Berden, J.F. Francois, S. Tamminen, M. Thelle, and P. Wymenga for the European Commission, 2009. (online) http://trade.ec.europa.eu/doclib/docs/2009/december/tradoc_145613.pdf.

Hertel, T.W., E. Ianchovichina, and B.J. McDonald. "Multi-Region General Equilibrium Modeling". In: J.F. Francois and K.A. Reinert (eds.) *Applied Methods for Trade Policy Analysis: a Handbook*. Cambridge University Press: Cambridge, ch.9, 1997.