Impact Assessment of TTIP for Belgium

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Interim Report – Economic Pillar

Ecorys Nederland BV
University of Bern, World Trade Institute
Cambridge Econometrics
IDEA Consult NV

Colophon

Sustainable Impact Assessment of TTIP for Belgium

Project leader:
Koen Berden, WTI (Bern)

Primary authors:
Koen Berden, WTI (Bern)
Joseph Francois, WTI (Bern) and CEPR (London)
Miriam Manchin, UCL (London)
Paul Wymenga, Ecorys Nederland BV (Rotterdam)
Hector Pollitt, Cambridge Econometrics (Cambridge)
Erik Merkus, Ecorys Nederland BV (Rotterdam)

Client:
FOD Economie

Date:
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Contact:
Ecorys & World Trade Institute
University of Bern
Hallerstrasse 6
3012 Bern, Switzerland

Phone: +41 (0)31 631 32 70
Email: inquire@wti.org

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Introduction

This is the interim report of the impact assessment of the Transatlantic Trade and Investment Partnership (TTIP) for Belgium. TTIP is the agreement that is currently being negotiated between the EU and US. In this report, we look at TTIP and its expected impact on the Belgian macro-economy as well as at sectoral level. We investigate the impact of TTIP for Belgian Small- and Medium sized Enterprises (SMEs), and look at value added effects. This study is also one of the first to model an EU-trade agreement with a Brexit scenario included (comparing the difference in effects when the UK is / is not a party to TTIP). The goals of this study are twofold. First to provide clear insights into the expected effects of TTIP for Belgium at federal and sub-federal level. Second, to make clear how TTIP works and how to best assess it: what are the elements that are being negotiated, how does regulatory cooperation work, and what is the best methodological approach to do these kinds of impact assessments.

Key Takeaway 1: Trade and investment in the 21st Century

TTIP takes place in the context of a rapidly changing world with respect to trade and investment. Trade and investment in the 21st Century are about trading parts and components: 80% of world trade is trade in intermediates and firms are (small) parts of global value chains (GVC). This is the consequence of ongoing specialization that leads to the fragmentation of production into narrower and narrower parts of the process. A Boeing 787 Dreamliner is only partially American. Tariffs are of diminishing importance (they have come down a lot) while regulatory differences become increasingly important, because GVC operate globally and in multiple regulatory regimes.

Key Takeaway 2: What is TTIP (not) about?

TTIP is in part a trade agreement and in part a regulatory cooperation framework. For tariff liberalization, TTIP is a classical trade agreement, with the negotiating goal of reducing between 97 and 100 percent of tariffs to zero to facilitate market access. Regulatory cooperation is about reducing (unnecessary) differences between regulatory systems (non-tariff measures – NTMs) that try to achieve the same or very similar goals (e.g. high consumer safety and social standards). When TTIP reduces NTMs, it therefore does not imply lowering of levels of protection, but reducing the differences between regulatory practices.

Key Takeaway 3: Sensitive product analysis for Belgium

There are several sensitive products in Belgian-US trade. On some the US levies a 350 percent tax, but also the EU has tariffs higher than 30 percent. These typically apply to cigarettes and alcohol, but also to fruit juices, footwear (with metal toes), textiles and clothing and dates. The export share of the 30 most sensitive Belgian export products to the US as a share of total exports is only 0.13 percent. The share of imports of the 30 most protected products into Belgium as a share of total imports is 0.06 percent. These are very small shares. However, there are some products that matter significantly for Belgian exports to the US with tariffs that matter also. For example, heterocyclic compounds with nitrogen hetero-atoms constitute an export value of € 612 mln in 2015 and still face a US tariff of 5.2 percent. TTIP's tariff impact will therefore have to be carefully monitored.

Key Takeaway 4: Important non-tariff measures between the EU and US
There are several NTMs (i.e. differences between regulatory systems) that affect EU-US trade and global value chains. We distinguish between cross-cutting NTMs (that apply across sectors) and sector-specific NTMs. Some of the most important and well known NTMs are – for example – the Buy American Act, US customs refusal of EU origin, the Fly American Act, FATCA, Grade A Dairy, REACH, the Jones Act, ban on hormone treated beef, Geographical Indications, and GMOs. The truth is, however, that regulatory cooperation is not about adjusting, or trading these NTMs, or trying to persuade the other party to abolish them. It is about looking for various layers deep within these regulatory giants, and working on technical aspects to get the systems closer and increase their quality (e.g. recognition of inspections or certifications, or synchronization of laboratory testing and inspections).

Key Takeaway 5: TTIP impact on Belgian GDP and National Income
TTIP is expected to benefit Belgian GDP and National Income considerably. As shown in the summary table below, GDP gains for Belgium range from 2.2 percent to 8.7 percent each year and National Income could go up between € 8 bn and € 31.2 bn each year. The main driver for these results is regulatory cooperation.

Variable	Belgium	EU-26	US	UK
GDP – Scenario B (% change)	2.2	0.5	0.3	-0.2
GDP – Scenario D (% change)	8.7	1.9	0.7	-0.4
National Income – Scenario B (€ bn)	8.1			
National Income – Scenario D (€ bn)	31.2			

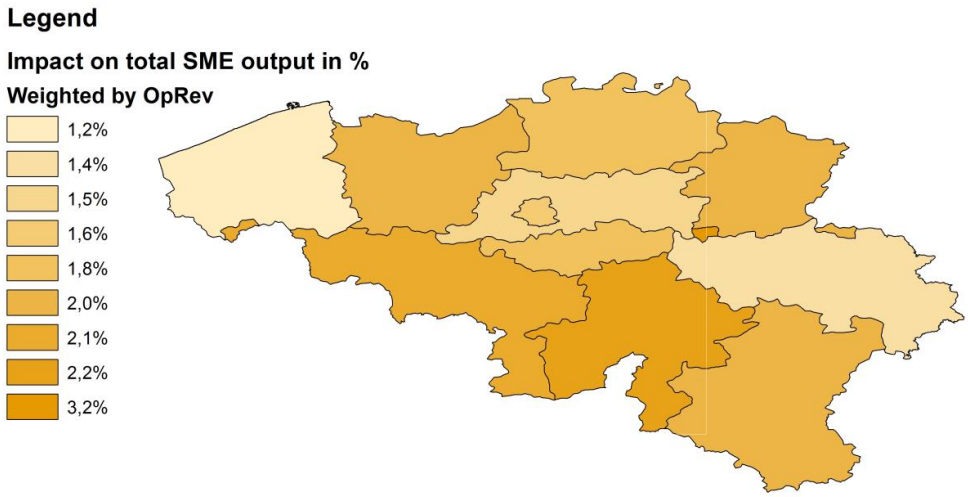
Key Takeaway 6: TTIP impact on Belgian trade flows and consumer prices
Belgian consumer prices are expected to rise marginally (by +0.2 to +0.3 percent). Despite the drop in consumer prices in manufacturing as a consequence of TTIP, overall price levels rise because the increased economic activity in manufacturing leads to higher demand for services that become more expensive. Exports go up by 4.8 and 16.5 percent in Scenarios B and D respectively. Imports go up by 3.1 and 10.7 percent respectively.

Key Takeaway 7: TTIP impact on Belgium at sectoral level
At sectoral level, it becomes clear that sectors are not affected the same way. TTIP will reduce prices (mostly import prices) and increase two-way market access, affecting competitiveness of different sectors. The Belgian sectors that are set to benefit most are chemicals, other services, petrochemicals, beverages and tobacco, construction, and trade. Sectors that are expected to decline because resources shift to the growing sectors are other machinery, other transport equipment and other manufactures. Trade patterns show a similar picture as output changes. The chemicals sector is the most important driver for the sectoral results.

Key Takeaway 8: TTIP impact for Belgian SMEs
First, we find that SME shares in operating revenues, sales and value added differ significantly per Belgian province and per sector. Second, we find that the number of SMEs differs hugely per sector (e.g. in business services Eurostat locates around 176.000 SMEs, while in petrochemicals that number is 8). The top-5 of SME-intensive sectors (business services, trade, construction, personal services, and communications) contain over 90 percent of all SMEs in Belgium. When we combine this information with the expected effects of TTIP at sectoral level in Belgium, we see how SMEs are affected at sector level and overall, and we can determine in which provinces in Belgium, the SME effects are largest (in terms of the number of SMEs

and in terms of their share of operating revenue in a sector). Figure 1 shows that especially the provinces of Namur, Hainaut, Luxembourg, Limburg and East-Flanders are expected to gain most, while SMEs in West-Flanders, Flemish-Brabant and Liege also gain, but relatively less.

Figure 1 Impact of TTIP on total SME output (by sectoral op-rev of SMEs, %)



Key Takeaway 9: TTIP and value added

Shares of sectors in terms of value added to GSP differ depending how they are measured. What this study shows is that services are vital for the manufacturing industry when their backward and forward linkages are measured. Chemicals and business services are the most important two sectors for Belgian value added both in terms of backward and forward linkages.

Key Takeaway 10: TTIP impact under a Brexit future

From our scenario analysis, we conclude that TTIP without the UK is better for the EU-26 (as EU-26 firms gain relative market share vis-à-vis UK firms in the US market as the UK is excluded from TTIP). For the UK the expected effects of TTIP as part of the EU (+0.5 percent) are much better than the expected effects in a Brexit scenario (-0.2 percent) – even if the UK stays 'as close as possible' to the EU as is assumed. For the US, Brexit has only a marginally negative effect (compared to the UK as an EU Member State) in terms of expected impact from TTIP.

Methodological Approach

We intentionally use a balanced and multi-pronged approach for this TTIP impact assessment for Belgium. First, because we need to select an approach (of different methods) that is suitable for an impact assessment of a trade agreement. Second, we need to carry out a sustainable impact assessment, not simply an economic one. Third, we need an approach that links up to empirical data and can be benchmarked on actual information that we have today, not just on forward-looking models. Fourth, we need to incorporate feedback and comments from civil society on the methodologies used in this and other impact assessment studies.

This why we do not only employ a bottom-up CGE model (as done in Ecorys, 2009; CEPR, 2013; CEPII, 2013; Bertelsmann, 2013; and WTI, 2016) but also other models. The CGE model remains indispensable (CEPS, 2014) because it allows us to look at the linkages between sectors, between countries and between markets (e.g. links between chemicals and downstream plastics industry; between a Brexit and the impact of TTIP on Belgium) and it allows us to model consumer impacts on demand for goods and services. Also, it is important we recognise the fact that in contrast to reducing tariffs, the removal of NTMs is not as straightforward. There are many different reasons and sources for NTMs. Some are unintentional barriers while others reflect deliberate public policy. As such, for many NTMs, removing them is not possible because, for example, they require constitutional changes, unrealistic legislative changes, or unrealistic technical changes. The models needs to allow us to choose a level of ambition, but also a range of NTMs that can simply not be touched. CEPS (2014) in its meta-study for the European Parliament is clear that the CGE model is best there is currently available to do this kind of impact assessment work. Because we do not want to rely on the CGE model only, we also run a scenario that is built on structural gravity estimation. That means that we base the TTIP scenario not on a bottom-up approach of the sum of tariffs, NTMs and services barriers, but on information we have on the depth of existing trade agreements: in other words existing factual data. From these two approaches – combined with the Brexit reality, we construct four scenarios:

- Scenario A: bottom-up CGE model with the UK as part of the EU (pre-Brexit situation);
- Scenario B: bottom-up CGE model with Brexit;
- Scenario C: structural gravity approach with the UK as part of the EU;
- Scenario D: structural gravity approach with Brexit.

In addition to the CGE model and structural gravity approach, we carry out an SME analysis where the expected impacts are combined with the Amadeus database to look at effects on SMEs (through direct and indirect impact channels) and how this influences the provinces where these SMEs are located. We also cover the (regulatory) barriers that SMEs mention as bottlenecks for them to trade and grow. There are several sensitive products in the TTIP negotiations. Via a detailed tariff-level analysis of export products traded most as well as an analysis of products where the highest tariff lines are still applied (e.g. 350 percent US tariff on tobacco; 32 percent EU tariff on grape must) we shed light on these sensitivities and show the potential impact. In order to assess in much more detail – and in a different way – social and ecological effects of TTIP for Belgium, we employ the E3MG model that links the economy to specially developed energy and environmental components – linked to each other (e.g. emissions and economy are linked through emissions policies; emissions in turn are linked to energy prices and energy use) and to technological developments. Finally, we supplement our quantitative analysis by detailed write-ups of what TTIP does and does not do and by conducting two qualitative case studies to delve deeper into issues that cannot be analysed in a quantitative sense (e.g. biodiversity or working conditions).

Ecorys, WTI, Cambridge Econometrics, IDEA Consult
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I. Introduction

EU-US cooperation in trade, investment and regulatory issues has already been ongoing for many decades. Discussions on tariff reductions in the context of consecutive GATT rounds and – after 1994 – the WTO have taken place (WTO, 2007; Mayer, 1981). Also, the EU and US have long cooperated to encourage and facilitate two-way investments as well as to set the rules for global investments (Markusen and Venables, 1998; Cooper, 2009). Especially in the age of globalisation, multinationals and international production fragmentation, investments have soared. By far the largest shares of origin and destination foreign direct investments (FDI) globally occur between the EU and US (Hamilton and Quinlan, 2016). Also – though some may still think so – the field of regulatory cooperation – that is receiving a lot of attention in TTIP – is not new. Already in 1990, the EU and US issued the Transatlantic Declaration. From these perspectives, the Transatlantic Trade and Investment Partnership (TTIP) can be seen as merely a continuation of these existing initiatives; a next step.

This study looks at the potential sustainable effects of TTIP – currently under negotiation – for the Belgian economy overall and at sub-federal level. In this introductory Chapter we first turn to the Request for Services and the background for it before looking in more detail at what 'trade and investment in the 21st century' mean and what TTIP is actually about.

A. Background of the Request for Services

In 2013, the negotiations between the EU and US for the Transatlantic Trade and Investment Partnership (TTIP) commenced. To date, fourteen negotiating rounds have taken place. They took place against the background of high levels of global uncertainty, a Eurozone debt crisis, a refugee crisis, political gridlock in the US and the Crimean crisis.

TTIP – by the size of the EU and US economies alone, is an agreement that encompasses around 40 percent of global GDP and the two economies with the largest consumer demands in the world. It also encompasses the largest bilateral investment relationship by far. TTIP is not only an agreement that by size of the two negotiating blocks is expected to have a global impact, it is also an agreement that is envisaged to be "deeper" than any other agreement previously negotiated, including the recently signed (but not yet ratified) TransPacific Partnership (TPP).

With the ongoing TTIP negotiations, and with TTIP being a potential global game-changer, the Belgian government has issued a Request for Services to look at the expected sustainable impact of TTIP for Belgium overall and at sub-federal level.[1] The goal is to look at the economic, social and ecological effects of TTIP for Belgium in particular. Important elements in this sustainable impact assessment are the focus on the effects for small- and medium sized enterprises (SMEs), the geographical spread of the expected effects, and the qualitative case studies.

This study comes at a timely moment, because though the TTIP negotiations are progressing steadily, resistance against TTIP is significant. The fears and worries on what TTIP is and what

[1] Bestek Nr. 2015/P11/E4/Impact analysis Trade Agreement – Overheidsopdracht van diensten. "Uitvoering van impact analyses van handelsovereenkomsten en methodologische ondersteuning". Open offerteaanvraag FOD Economie, K.M.O., Middenstand en Energie.

it could do warrant further research – focusing on separating the issues that matter from those that are simply untrue.

B. Content of the Request for Services

The Request for Services is clear in its scope and requests. As per the Request of Services, the following elements are being called for:

- Carry out an impact analysis of trade agreements – TTIP in this case – for Belgium on the basis of a scientifically recognized model, focusing on the removal of tariffs and non-tariff measures (NTMs), including convergence of regulatory differences;
- The study should be conducted in English, Dutch or French and contain a synthesis in French, Dutch and English;
- A critical review of the models currently used in impact analyses in order to ensure a high-quality and scientifically-based study, as well as ensuring that knowledge transfer to experts at the Belgian government is based on the highest academic standards;
- Create a capacity building programme to allow experts at the Belgian government to be able to interpret the Computable General Equilibrium (CGE) model in the Belgian context – for future practical insights;
- Carry out an analysis of expected effects of trade agreements – TTIP in this case – for Belgium in terms of economic, social and ecological effects;
- The economic pillar should include information on what sectors gains and what sectors lose from TTIP, what regions benefit and wat regions do not benefit from TTIP, what is the effect of TTIP on SMEs, and how are the following variables affected: bilateral import and export, terms of trade, output (production), GDP, national income and value added;
- The social pillar should include information on the impact on employment and working conditions, wages, and labour mobility;
- The ecological (environmental) pillar should focus on CO2 emissions, the effects on biodiversity, or quality of environmental standards and norms (e.g. water quality);
- Comparison of the abovementioned elements to overall EU effects;
- An overview of some of the tariff and non-tariff elements that – if removed – would lead to the largest potential economic gains.

For the purpose of this Interim Report, the Request for Services requires us to focus on the economic pillar of the study. In the next phase, the social and ecological pillars will be covered.

The Request for Services then specifies to deal with TTIP first and then – possibly – also to focus on other trade agreements and how they would affect Belgium.

The results are to be presented in a specific format, with high definition graphs and pictures, and accompanied by a synthesis in French, Dutch, and English.

C. Trade and investment in the 21st century: trade 2.0

Before turning to TTIP, it is important for the context of this study to explain how trade and investment work in today's international world. Due to several factors over the past decades, trade and investment have soared. Some studies focus on progress in the WTO or the rapid increase in (bilateral/regional) trade agreements (Dür et al., 2014; WTO, 2011) while others

put more emphasis on dropping transport costs (Hummels, 2008; Rodrigue, Comtois and Slack, 2013) or drops in communication costs and the rapid increase in global digital connectedness. Transport economists also argue that the concept of 'containerisation' is one of the most important drivers for increases in global transport flows (Bernhofen, El-Sahli and Kneller, 2016; Levinson, 2016).

Leaving the drivers aside, trade and investment in 2016 are different from trade in the 1970s, 1980s or even 1990s. Trade has moved from trade in (that is: exports and imports of) final products to trade in parts and components. Specialisation of production has passed the level of final products and now means specialization in sub-processes and sub-parts of production. For example, each part and component of a car – and there are thousands of them – is now produced according to what country/company delivers the highest value for money; i.e. has the highest comparative advantage. 'Value' is hereby measured more broadly today than ever before, including social, human rights, and environmental standards. This trend in ongoing specialization has led to global production fragmentation in the production processes of products and – as said – a shift from trade in final products to trade in parts and components. This trend has also led to the emergence of the global value chain. With only very few companies globally being the global value chain the vast majority of firms, larger and smaller, are part of a bigger chain that produces products and services globally. That implies that for this vast majority of firms, they face suppliers that supply manufacturing and/or service inputs for their production. What is then produced (again physical goods or services) is supplied further downstream the value chain. Hence, the economic outlook for a firm no longer depends only on consumer demand, but more and more relates to prices for inputs from higher ends of the value chain and demand for intermediate products down the value chain. This is particularly important for small- and medium sized enterprises (SMEs), who – as we will see in this study also – can not only benefit potentially from TTIP in a direct sense (i.e. more market access due to lower barriers and thus more sales) but increasingly also in an indirect sense (i.e. the SME still does not export, but demand for its products increases because the larger firms in the value chain that benefit more directly from TTIP have better outlooks due to lower costs and increased market access and hence demand for SME parts and components or services increases).

With the emergence of the global value chain, another 21st century issue has emerged as well: How to regulate the multinational enterprise (MNE)? If producing an electrical toothbrush involves dozens of countries who contribute to the final product by taking care of producing certain parts and components, design, marketing and/or final assembly, the MNE is faced with multiple regulatory regimes as each country where part of the value chain is located, has different rules and regulations. Apart from the fact that technical specifications for an electrical toothbrush in each of these countries must lead to a finally assembled, certified and well-functioning toothbrush that is safe, also different labour and environmental laws matter. Logically, with tariffs being relatively low (but not zero) differences in regulatory regimes – in the age of production fragmentation and global value chains – matter more and more in terms of producing goods and services.

Moreover, we see that in recent years, the borderline between manufacturing and services is increasingly blurring. Whereas in the past a clear distinction between physical goods produced by the manufacturing industry and intangible services could be made, that distinction is not so clear any more. Each manufacturing product – in a global value chain concept – contains a range of inputs. Some of these inputs are physical inputs (e.g. a raw material like steel), but

other inputs are services inputs (e.g. trade, distribution, financial or insurance services). If for each part and component physical and intangible inputs matter, the final product is a complex interwoven combination of manufacturing and services inputs. This is what Lucian et al. (2014) call Mode 5: services delivered into parts and component production of manufacturing industries.

Not only is a final product, the combination of a complex web of physical and intangible inputs from upstream manufacturing industries and supporting services sectors, trade investment and migration – for some three separate issues – can no longer be seen separately. Already a lot of research has been done on the degree of complementarity or substitution between trade and investment (Greenaway and Kneller, 2007; Skaksen and Sørensen, 2001) Indeed, deeper levels of specialization into parts and components lead to more trade following from investments in specialized production facilities around the globe to produce a single (or range of) final product(s). Trade (exports and imports) can also be the substitute for investments (or vice versa) because producing the same final product in two factories, each close to a large consumer market, is expected to reduce trade and transport flows. However, trade, investment and migration are also closely linked. If we think of parts and components or final product trade not as the trade in the actual products/services, but rather as trading the labour and capital embedded in those products/services, trade is actually about trading capital and labour (and land, and quality of infrastructure facilities, etc.). Thus, investing in a local factory to produce or trading final products is substituting for labour and capital mobility. However, in a global value chain, trade, investment, labour and capital mobility are all needed to make the value chain operate efficiently and globally. And if there are tariffs or if there are regulatory divergences that pose bottlenecks to the global value chain, investment and labour mobility are the other mechanisms the global value chain will use to continue to add value and remain efficient. Hence, policy makers should heed the message that in 21st century global value chains trade and investment bottlenecks, as well as regulatory divergences are automatically circumvented by capital and labour mobility (i.e. increased migration pressures). Vice versa, the lower the barriers to trade and investment and the lower regulatory divergences the lower the pressure for – for example – labour mobility to keep the value chain efficient.

D. What is TTIP (not) about?

While TTIP is almost always characterized as a free trade agreement (FTA), and indeed it has been framed that way by the EU and US from the start, this characterization is not entirely correct. In fact, calling TTIP a 'trade agreement only' could be confusing and also misleading when it comes to the elements the agreement is envisaged to contain.

Of course, TTIP, to a large extent, is exactly a trade agreement: with a focus on the reductions in remaining tariff levels that exist between the EU and US. TTIP is also, however, focusing on the 'deeper elements of trade and investment', like, for example, competition policy and intellectual property rights (IPR). The most innovative element is the one that is called 'regulatory cooperation' – stemming directly from the characteristics of what is 21st century trade in global value chains and trade in parts and components. These 'deeper elements', including regulatory cooperation, are often referred to as non-trade issues and – this is important to stress – are dealt with in an entirely different manner than the tariff negotiations.

Regarding tariff level reductions, negotiations are focused on a mix of offensive and defensive interests from both sides, aiming to – overall – make ambitious headway in removing the bulk of the remaining tariffs (e.g. EU defensive interests on some agricultural products; US defensive interests on some chemical products; EU offensive interests in dairy products). On average tariffs are already low – with a trade weighted average tariff of 2.2 percent for the US and a 3.3 percent average tariff for the EU. There are, however, products where peak tariffs are much higher. For example for cigarettes, tobacco, fruit juices, footwear (with metal toes), and dates. Also a tariff of 3.3 percent, if a product crosses the Atlantic Ocean five or six times (first as raw material input, then as semi-finished product, then as larger semi-finished product, then via a different country, etc.), effectively becomes something like a 10 percent tariff.[2] The way tariffs are typically reduced is by looking at the offensive and defensive interests and then identifying what can be done – "if you reduce your tariffs on product X, we will reduce ours for product Y".

This is totally different when it comes to the non-trade issues like competition policy, public procurement, IPR and regulatory cooperation. Framing TTIP as a free trade agreement does not help here because it makes people think non-trade issues are dealt with in the same way as tariffs in traditional trade agreements. The similarity between tariff reductions and reductions in non-tariff measures is that both aim to reduce obstacles to trade, in order to facilitate trade and investment and reduce disruptions to global value chains. The way these reductions are achieved, however, and what is meant with 'reduction' could hardly be more different.

First of all, when we talk about reducing tariffs, we mean that a tariff goes down from – for example – 10 percent to 5 percent, lowering the level of tariff protection. When we talk about reducing non-tariff measures (NTMs), we mean the reduction in the *differences* between regulatory systems (not a reduction in the level of protection). Regulations have been designed in countries to protect and uphold, for example levels of social, environmental and/or consumer protection – they serve a valid purpose in society, which comes first. They have not been set up from the perspective of facilitating (or protecting from) international trade but from a perspective of societal norms and values related to how a society wants to protect the environment, worker's rights or consumer health and safety. This can be done in many different ways. In almost every country there are institutions and governmental agencies that have been set-up with mandates to oversee and protect these different levels of protection. When – in TTIP as in other deeper FTAs – we then discuss 'reducing NTMs' this does *not* mean a reduction in the levels of protection down to a lowest common denominator (as would be the tariff equivalent and as many people falsely believe), but enhancing cooperation, joint research, focusing on best practices, looking if we can issue one certificate for two similar procedures, looking for whether we can synchronise testing procedures, and assessment of results, etc. In other words: regulatory cooperation aims to align regulations to reduce the differences – and hence the trade barriers – without lowering the levels of protection. In fact, regulatory cooperation increases the levels of protection and enhances product safety. Reducing levels of protection would violate the various mandates of government oversight bodies, committees and institutions and go against the way societies have chosen to set levels of protection in their respective jurisdictions.

[2] If the tariff for steel would be 3.3 percent the total tariff effect is not simply 6 (for number of times it crosses the Atlantic) x 3.3 percent = 19.8 percent. Because the value of the raw material declines as a share of the final product, also the weight of the steel tariff decreases as the product develops from the raw material (where steel inputs and thus tariffs had a maximum effect) to an intermediate product and finally a final product. The 3.3 percent tariff therefore diminishes over time as it crosses the Atlantic more times.

The second difference with tariff reductions lies in the way regulatory convergence is achieved. Regulatory convergence is not carried out by 'trading off' offensive and defensive interests as could be the case in tariff reductions (e.g. the US will drop the Jones Act in exchange for the EU accepting genetically modified organisms - GMOs). Regulatory convergence is achieved by looking at the differences in the regulatory systems – from legislative differences to technical differences. Then, taking on one issue at a time, the goals of the different regulations are identified, after which the discussion to reduce regulatory divergence focuses on how to bring the differences down – in light of the policy goal the regulation aims to satisfy, often sharing best practices and thus increasing the levels of protection while reducing the differences between the regulatory systems. This is a lengthy and complex process that involves many actors on both sides of the Atlantic. This process has been going on for already over 25 years and will continue for many years to come. Box I.1 shows the regulatory cooperation initiatives between the EU and US from 1990 to now – with TTIP being only the last effort in a long list of previous initiatives.

Box I.1 EU-US regulatory cooperation initiatives from 1990 – now

US and EU have pursued a variety of policy initiatives over the past decades which feature regulatory cooperation in the area of TBTs as a key element – TTIP is only its latest step:

- Transatlantic Declaration (1990)
- New Transatlantic Agenda (NTA) (1995)
- EU-US Joint Statement on Regulatory Cooperation (1997)
- Transatlantic Economic Partnership, and Action Plan (TEP) (1998)
  - EU-US MRA (1998)
  - EU-US Guidelines for Regulatory Cooperation and Transparency (2002); ECJ Judgement 2004
- EU-US Positive Economic Agenda (PEA) (2002)
- EU-US Economic Initiative; High Level Regulatory Cooperation Forum (2005)
- Framework for Enhancing Transatlantic Economic Integration, with the Transatlantic Economic Council (TEC) (2007)
- High Level Group for Jobs and Growth (HLG) (2011)
- TTIP (2013 -)

If gone about this way, regulatory cooperation leads to decreases in costs while upholding or even increasing the levels of protection. Neither party will agree to 'lowering standards' because the regulations have been enshrined in national and/or EU laws (in the case of TTIP). A violation of these laws would almost certainly imply the EU and US courts would strike down any agreement or element therein that would be in violation with these laws. The fact that regulatory cooperation would lead to lower costs, lower trade barriers, while upholding or increasing the levels of protection in societies is exactly what is so attractive in going down this road: it is a potential political, regulatory and economic win-win-win.

Let's be clear also, however, that there are many regulatory differences where reducing NTMs is not possible. As in the tariff-realm, in non-tariff measures there are differences that cannot be bridged, exactly because the different norms and values that have led to the creation of certain regulations differ fundamentally. If the norms and values differ, societies simply choose to do things in different ways; ways that may be un-reconcilable with each other. These differences will therefore simply remain, even after 100 more TTIP agreements. It is for this reason,

that in any reliable modelling exercise into the expected effects of TTIP (or any other agreement alike), reductions in NTMs can modelled as significant or modest, but have to pertain only to the 'actionable' share of NTMs. That means, modelers – if they want to mimic a potential TTIP outcome will have to exclude sensitive areas (e.g. the Jones Act), technical differences that cannot be changed (e.g. different voltage systems between the EU/US), or are politically or culturally simply not 'on the table' (e.g. genetically modified organisms or hormone treated beef). NTMs (i.e. differences between regulations) can thus never be reduced to zero. Regulatory divergence is to stay with us always. Given the value we place on democracy and the rule of law and the fact people in different countries have a democratic right to organise their societies in different ways, that is how governments, should act, trade barrier or not.

Finally, TTIP looks at rules and promoting the rules-based systems. Under rules, we group SMEs, the sustainable development and energy chapters, and raw materials. The EU and US hold shared beliefs on most of these issues – especially when compared to other economic juggernauts like China, Russia or Brazil. At this moment in time, so argue policy makers, the EU and US combined economic clout is sufficient to ensure that TTIP would enable them to be 'rule-makers' – as opposed to possible 'rule-taker' roles in a future where economic gravity shifts more and more to Asia. Hence for TTIP also a time-element plays a role.

II. TTIP: State of play of the negotiations

In this chapter we discuss the current state of play of the TTIP negotiations. We will provide a short overview of the progress made insofar we have a view on this, as well as some of the obstacles the negotiations face.

A. The negotiating process

In June 2013 the European Commission has received the mandate from the EU Member States for negotiating the TTIP agreement. The mandate contains guidelines for the negotiations and indicates what the European Commission can negotiate on, and what should not be up for negotiations. The negotiations officially started in July 2013. In short, the objective of the agreement is to increase trade and investment between the EU and the US which would result in increased (economic) growth and job opportunities. The aim is to achieve this by removing tariffs, reducing unnecessary and burdensome trade restrictions, and by stimulating more EU-US cooperation.

The EU negotiation team consists of experts from the different Directorates General within the European Commission and is led by Mr. Ignacio Garcia Bercero. During the negotiations the European Commission has to regularly inform both the European Parliament and the European Council about the negotiation rounds and the progress made. The European Parliament and the European Council do not take part in the negotiations; only in the final stage they are involved. Once the negotiations are finished and the EU and the US have reached a final agreement, the European Parliament and European Council have to approve or reject the agreement.

As of January 2014 the European Commission had established an Advisory Group, consisting of sixteen experts from key stakeholders to the TTIP process: consumers, business, health, environment, labour law, etc.[3] The Advisory Group does not take part in the negotiations but advises the negotiation team on the above mentioned topics and on the negotiation documents.

At the moment of writing this report, the TTIP negotiations and how far they have been progressing, have met with fresh criticism from some of the larger EU Member States as both Mr. Gabriel (Germany) and Mr. Fekl (French Secretary of State for Foreign Trade) have expressed reservations regarding the progress and substance of the negotiations and suggested talks should be suspended.[4] [5] Also it has appeared that the US and Italians are contemplating the idea of a 'TTIP Light' to be concluded by the end of 2016 – with the US suggesting some landing zones for parts of TTIP that have progressed quite a bit. This has divided the EU Member States – some of who are sympathetic to the 'TTIP Light' idea (e.g. Italy) while others are clearly against this idea and want to continue to pursue a TTIP that is deep and comprehensive (e.g. The Netherlands). These voices together with the notice of the upcoming elections in America, France and Germany make it seem hard for the negotiations to be concluded this year.

3 http://trade.ec.europa.eu/doclib/press/index.cfm?id=1019
4 http://www.euractiv.com/section/trade-society/news/germany-says-ttip-dead-in-the-water/
5 http://www.euractiv.com/section/trade-society/news/paris-to-demand-an-end-to-opaque-ttip-negotiations/

What is important to keep in mind with negotiations on trade and non-trade issues, especially as complex as the TTIP ones, is that there is no deal until there is a deal. That means: many issues – though discussed – are not concluded or sealed unless as a package deal. What is also important to keep in mind is that evidence from other negotiations that have been cut into more parts, with easier elements pinned down in a 'first phase' and harder and more toxic issues left for a 'second phase', have often resulted in only the 'first phase' being concluded (e.g. the Open Skies agreement).

B. The four pillars

The agreement consists of 24 chapters covering different sectoral topics as well as horizontal ones, like public procurement, investment, SMEs and sustainable development. The chapters can be divided into four pillars.[6]

Market access
The first pillar concerns improved access to the US (EU) market for EU (US) firms. Within this pillar the EU and the US discuss the removal of tariffs, the approach to rules of origin, opening up of service markets, investment liberalisation, and the public procurement market.

Regulatory cooperation
The pillar on regulatory cooperation, that is expected to bring the largest benefits in terms of GDP, trade and employment, is about looking at differences in standards and regulations between the EU and the US. The aim is to reduce these differences where standards and regulations are compatible, without lowering the high levels of protection of the EU and US on consumer, health, social, and environmental protection. In addition to a reduction in these actual Non-Tariff Measures (NTMs), TTIP also aims to avoid future differences in standards and regulations, by means of cooperation and exchanges of information at early stages. This pillar concerns both overall and sector specific levels of regulatory cooperation.

Rules
Within the rules pillar more general and global issues are addressed. The issues discussed concern amongst others sustainable development, SMEs, energy and raw materials, investment, intellectual property rights and geographical indicators.

Institutional
The last and fourth pillar has only been introduced recently and concerns institutional provisions. The establishment of different committees, fora and working groups are outlined here. The main objective of these committees and groups is to supervise and facilitate the implementation of the TTIP agreement once the agreement is concluded.[7]

C. Position papers and textual proposals

Following a lot of critique from civil society with regards to transparency and available information about the agreement and the negotiations, the European Commission has launched a

6 http://trade.ec.europa.eu/doclib/press/index.cfm?id=1230#regulatory-cooperation
7 DG TRADE – EU proposal for institutional, general and final provisions

transparency initiative. As part of this transparency initiative the European Commission has published many factsheets, position papers and technical proposals for the different chapters on the website of DG Trade.[8] The position papers present the aims of the EU with regards to a certain chapter and the textual proposals are the documents that are tabled during the negotiations and discussed with the US. After discussion and review, the EU and US textual proposals will finally be consolidated into one. With regards to 18 specific sections the EU and the US are currently working on a consolidated file.

In addition to these documents the European Commission provides also updates about the negotiations in the form of summary reports of each negotiation round and summary reports of the meetings with the Advisory Group. Moreover the European Commission organises regularly civil society meetings where updates are provided and where NGOs and other stakeholders can present ideas, viewpoints and feedback to the negotiators. Finally – as already mentioned – the European Commission regularly updates the European Council and European Parliament (INTA committee) as well as EU Member States. This makes the TTIP negotiations the most transparent trade negotiations ever conducted by the EU and arguably in trade history.

D. The negotiation rounds

Up to date fourteen negotiation rounds have been held, alternately in Brussels or in the US. Generally speaking all chapters are discussed during each negotiation round, although the exact focus can differ per round. Exceptions are financial services, investor protection and institutional provisions, which have not been discussed for some time.

The last round was held from 11-15 July 2016 in Brussels. During this round both sides have exchanged many more proposals. With regard to market access, the EU has exchanged offers twice on both tariffs and services. Overall, opportunities lie in the areas of SMEs, State-Owned Enterprises (SOEs), environment, regulatory cooperation, customs facilitation and tariff reductions.

Discussions and progress on some important issues have, however, not progressed as much as the EU or US would like. These issues are notably public procurement, the Jones Act, Geographic Indications, and Food Safety Concerns (GMOs, chlorine washing, growth promotors), as these are clearly sensitive. Concerning regulatory cooperation, almost all textual proposals for different chapters are now on the table.[9] There was also a first exchange of views on the recent EU proposal for institutional frameworks. Regarding the third pillar, the EU and the US made progress on the consolidation of their proposals on intellectual property rights, and have had detailed discussions on the trade and sustainable development chapter.[10] The next negotiation round is expected to take place in autumn 2016.

E. Civil society

[8] http://trade.ec.europa.eu/doclib/press/index.cfm?id=1230#regulatory-cooperation
[9] DG TRADE – Statement on the 14th negotiation round
[10] DG TRADE – Public report of the 14th TTIP negotiation round

The TTIP negotiations are clearly also a new milestone in the role that civil society plays in trade negotiations and discussions on regulatory cooperation. Both the size of the agreement and the availability of information have contributed to this very active role. The majority of civil society voices are critical and opposed to TTIP. Despite the reassurance and explanations of the European Commission, civil society fears (amongst others) that the TTIP agreement will lower the high standards in the EU regarding consumer, health, social and environmental protection, that the EU will introduce lower quality products from the US and that from among all stakeholders large businesses will be the (only) ones benefiting from the agreement. That is why studies like this one are vital in finding out which are justified concerns and which worries are unfounded. In many EU Member States, civil society organisations have organised protests or actions against TTIP, and some regions or local governments have declared themselves "TTIP free" (which is a factual impossibility given how economies are internationally, nationally, regionally and locally interlinked). In Belgium, some local officials have called for a "no TTIP zone", e.g. St. Gilles, Watermaal-Bosvoorde, and Borgerhout.[11] It is vital that policy makers in EU Member States as well as the European Commission negotiators listen carefully to these concerns and address them.

Civil society is also very critical about the information and details publicly available with respect to the agreement. They feel they are left in the dark and the trade agreement is negotiated in secret, leading to a final text they can only take in total or reject. Upon looking deeper into this, we have witnessed a process where the TTIP negotiations started off in a more secretive manner (as had been customary up to that point), but gradually have become more transparent – initially on a more ad hoc basis and currently on a structural basis – at least on the EU side. With transparency, however, another new challenge has emerged: with hundreds and hundreds of pages of legal texts (e.g. EU position papers or textual proposals) that are difficult to read for non-experts (or interested citizens without a legal background). Availability of the documents, hence, does not imply full transparency as texts are not fully or only to a very limited extent understood. Moreover civil society has the feeling that business and business associations are involved more and exert more influence on the negotiating process, whereas civil society is not. This feeling is, for example, fuelled by statistics about the number of meetings the European Commission has with key stakeholders – 92% of which are with the private sector. These statistics, however, are clearly misleading for a number of reasons and thus need to be read with caution. First all private companies are viewed as businesses, including – for example – Ecorys when it meets with the European Commission on the Trade Impact Assessment work, and including various private think tanks who do research into TTIP topics. When it comes to business associations and NGOs, it is also clear that NGOs cover a much wider range of issues (and thus many more TTIP chapters), while business associations often only represent very narrow sub-sub-sectors (and thus only a small part – if any – of an individual sector chapter in TTIP).

Another large point of critique concerns investment protection within TTIP. During and before the public consultation on the Investor to State Dispute Settlement (ISDS) mechanism as included in TTIP, civil society has raised some of the following concerns[12]:

- There is a lack of understanding why such a system is needed when both the EU and the US have a well-functioning legal system in place.

[11] https://euobserver.com/beyond-brussels/129510; http://www.flanderstoday.eu/politics/11-19-brussels-communes-against-ttip-trade-pact; http://www.dewereldmorgen.be/artikel/2015/06/22/borgerhout-verzet-zich-tegen-vrijhandelsverdrag

[12] http://trade.ec.europa.eu/doclib/docs/2015/january/tradoc_153044.pdf

- They fear that the risk of being sued (for large amounts of money) could result in a 'regulatory chill' effect and affect the right of governments to regulate.
- There are doubts about the independence of the arbitrators, who could arbitrate in one case and act as lawyers in the next.
- They feel that there is a lack of transparency and potential for unfairness. E.g. only foreign investors are entitled to make use of the mechanism whereas national investors, social, consumers, human rights or environmental organisations are not.
- They also feel that the mechanism would be mainly accessible to large firms and would be too complex and costly for SMEs to make use of it.

Based on the critics received by civil society but also on the inputs received from the different EU governments, the European Commission has proposed an Investor Court System (ICS) which would replace the ISDS mechanism in TTIP.[13] With the following new features in the ICS proposal the EU hopes to address these critics:[14] [15]

- Instead of arbiters the investment tribunal would comprise 15 judges, for each hearing three 3 judges would be selected arbitrarily.[16]
- An appeal tribunal would be established.
- The system would be more transparent as documents will be posted online and hearings would open to the public.
- The ICS would be more easily accessible for SMEs, with the possibility of a cap on the procedural costs they would have to cover in case of a lost hearing.
- Also the government's right to regulate is safeguarded explicitly in the proposal.
- A significant change compared to the old system is that investors can now only claim a compensation for the investment that was lost, and no longer have the right to also claim a compensation for the loss of potential future profits.

All in all, civil society is very wary of TTIP and a continued dialogue, with practical examples, is more vital than ever to explain what TTIP is and is not about.

13 http://trade.ec.europa.eu/doclib/docs/2015/november/tradoc_153955.pdf
14 http://trade.ec.europa.eu/doclib/docs/2015/january/tradoc_153018.pdf
15 http://trade.ec.europa.eu/doclib/docs/2015/november/tradoc_153955.pdf
16 Five judges will come from EU Member States, five from the US and five from third countries.

III. Methodological comparison and our Approach

A. Comparison of methods for trade impact assessments

Over the past years, many different studies have been published trying to analyse the impact of the potential TTIP agreement. The studies range from assessing the overall impact at EU level to assessing the impacts for a certain sector, a certain country or a specific social indicator.

Below, we will discuss some of the largest and most cited TTIP impact assessment studies (in chronological order): Ecorys (2009), CEPR (2013), CEPII (2013), Felbermayr et al. (2013), Bertelsmann (2013), Capaldo (2014), Felbermayr et al. (2015), Egger et al. (2015), WTI (2016), and Ecorys (2016). In addition, two meta-studies have been carried out: CEPS (2014) and Bekkers and Rojas Romagosa (2016) that analyse these studies (and others).

Using CEPS (2014) and Bekkers and Rojas Romagosa (2016), we will compare these main studies based on several criteria:

- The purpose of the impact assessment;
- The assumptions made (main focus);
- The methodology used (main focus);
- The data sources used;
- Possibility of comparing the results.

By far the most important assessment criteria to determine the usefulness of the different models to analyse TTIP are the assumptions made – linked to the methodology used. From our analysis in this section, it becomes clear that there are approaches that are suitable to look at the question of impact of TTIP, and there are methods that less or even totally unsuitable.

1. Purpose of the impact assessment

Although all studies of course try to assess the potential impact of TTIP, they do differ in the exact research question, i.e. short term vs. long term impact, macro vs. micro impact, etc. The aim of the Ecorys (2009), CEPR (2013) and Egger et al. (2015) studies was to assess the impact of TTIP on the EU and the US, both at macro level and at sector level. The Ecorys (2016) study, also aims to analyse the impacts of TTIP on the EU and the US, both at macro level and at sector level, but include also the macro impacts on the EU Member States. In addition the WTI (2016) study provides EU Member State sectoral details. The Bertelsmann (2013) study has disaggregated effects of TTIP per US State. The CEPII (2013) study aims to analyse the EU/US impacts at macro level, but only looks at an aggregated sector level.[17] The aim of the Capaldo (2014) and Felbermayr et al. (2013) studies has been to analyse the impact at the macro-economic level for the US and for some EU countries, but not for the EU as a whole. Except for the Ecorys (2009) that also looks at short-run effects, all studies have assessed the long run impacts.

Models are simplifications of the real world by definition and are used to better understand certain developments, or impacts from a shock. Since assumptions are made, in order to simplify real world issues, a perfect model does not exist. Nevertheless, some models can be better than others. This not only depends on the quality of the models and data, but also on the appropriateness of the model for the specific analysis at hand.

[17] Agriculture, industry and services.

2. Assumptions made

Before modelling the potential impacts of TTIP, several assumptions have been made in the different studies. We will discuss the assumptions made regarding the scenarios, the fixed labour supply and labour mobility, but also how trade costs have been measured and treated.

Scenario definitions

Ecorys (2009) applies two scenarios: an ambitious and a more modest one – and for each of these looks at the short-run and long-run impacts (modelled through the degree of capital mobility – which is assumed fixed in the short-run and flexible in the long-run. Ecorys (2009), however, only looks at NTM alignment, not at tariff reductions (and hence does not model the total TTIP effects as TTIP has developed in the years after this study was released). The limited scenario assumes a reduction of 25 percent of all NTMs, the ambitious scenario assumes a reduction of 50 percent of all NTMs. CEPR (2013) is based on this approach as well: working with less and more ambitious scenarios – but in total half as ambitious as the Ecorys (2009) study. The less ambitious scenario assumes a tariff reduction of 98 percent, a reduction of 10 percent on goods and services NTMs, and a reduction of 25 percent on procurement NTMs. The ambitious scenario assumes a reduction of 100, 25 and 50 percent for the three indicators respectively. A new element in the CEPR (2013) study is the concept of 'spill-overs' – both direct and indirect ones. This leads to an impact on results for the following reason: TTIP is not expected to only have an EU-US discriminatory impact, but also a potentially positive third-country effect. If a third country adheres to both the US regulatory system and the EU regulatory system, when TTIP increases alignment between these two systems, also costs for the third country go down. This is a direct spill-over. Indirect spill-overs occur between third countries among each other when each of them benefits independently from each other of EU-US alignment. The degree of spill-overs is thus an estimation of the potential global impact of TTIP. Capaldo (2014) makes use of the TTIP CEPR (2013) scenario where they assume that the volume of trade among TTIP countries will expand with the same level as in CEPR (2013). CEPII (2013) assumes a complete removal of tariffs and a 25 percent cut in the trade restrictiveness of NTMs. This is equally ambitious as the CEPR (2013) study in terms of reductions in NTMs, but the initial level of NTMs is assumed to be much higher. Also CEPII (2013) assumes a much higher level of NTM alignment in agriculture (processed foods) than CEPR (2013). Bertelsmann (2013) is using the CEPR (2013) scenarios, with a disaggregation for US States. WTI (2016) is also based on the CEPR (2013) scenarios for disaggregation for EU Member States. The Ecorys (2016) study uses a similar but not identical scenario as in CEPR (2013). Notably, in the Ecorys (2016) study, no reductions in NTMs in the processed food sector are modelled – because of technical reasons, not because of a change in negotiating ambitions. Finally, Felbermayr et al. (2013) and Egger et al. (2015) use a different approach: they assume the removal of all tariffs and a more ambitious alignment of NTMs (based on benchmarking evidence from existing trade agreements).

Fixed labour supply

This assumption relates to how the labour market closure is specified. One can either assume a fixed labour supply, where wages will adjust when labour demand changes, or fix wages, where labour supply will adjust when labour demand changes. It is not possible to fix both wages and labour supply or allow free adjustment for both wages and labour supply. Labour and wage theory assumes that – slower than prices for goods – labour markets clear towards a long-run equilibrium. In case of large shocks (e.g. the Great Depression in the 1930s or Global Financial Crisis of 2008) these adjustments make take a considerable amount of time,

but when shocks are smaller, adjustments are faster. So if one wants to model the long-run effect of TTIP, labour markets have the time to clear – and process the 'TTIP impact shock' – implying that employment / unemployment has not changed before and after the TTIP shock – as it remains at the long-run trend of full employment (e.g. around 5.5 percent unemployment for the US based on the long-run trend). Moreover, in the long-run wages can and do adjust. Hence if one wants to model the long-run effect of TTIP one should fix the labour supply and let wages adjust. If one wants to model the short-run effects, however, it is much better to fix wages (as wages are not flexible in the short-run) and allow the labour supply to adjust (allowing for decreases or increases in unemployment) – which is realistic when assessed against empirical evidence.

All models claim to look at the long-run effects of TTIP. If that is the policy question, they should all use the fixed labour supply assumption, while letting wages adjust (Ecorys; 2009; CEPR, 2013; CEPII, 2013; Felbermayr, 2013; Bertelsmann, 2013; Felbermayr, 2015; Egger et al., 2015; WTI, 2016; Ecorys, 2016). Rising wages at the macro-level in this approach signify increases in employment in the long run (without the models being directly able to show 'numbers of jobs' because the effect becomes visible through wages). Indeed, all models use the fixed labour supply assumption, except for Capaldo (2014). He claims to use a long-run model, but he uses the fixed wage assumption – the short-run simulation. This means he is inconsistent between the long-run effects he predicts with the UN GPM and the underlying labour supply assumption. The Ecorys (2009) study also looks at short-run sub-scenarios and does so by fixing capital mobility.

Labour mobility

Another assumption that matters for the impact analyses for TTIP is how labour mobility is treated. The question is whether or not workers can move between sectors. Labour market evidence shows that, generally speaking, labour is not mobile in the short-run but much more mobile in the long-run. As with the previous assumption, the question is not which assumption is better, but which assumption matches with the time-horizon the study claims to analyse. The Ecorys (2009), CEPR (2013), CEPII (2013), Felbermayr et al. (2013), Egger et al. (2015), WTI (2016), and Ecorys (2016) studies assume 'labour mobility' which is consistent with their long-run approach. Bertelsmann (2013) also has a long-run perspective, but for the purpose of policy-making, the wage effects have been translated into numbers of jobs in the long-run scenario. Capaldo (2014) is the only study assuming no labour mobility, hence – again – making it a short-run model that cannot predict long-run employment effects of TTIP.

Other assumptions

Capaldo (2014) stands out in the above list of studies on impact of TTIP because in this approach it is also assumed that the labour share in production decreases over time (exogenously) and that we will witness increased lending by the financial sector (also exogenously). These two assumptions are important drivers for the final results of the Capaldo analysis. However, using these assumptions is flawed. It may absolutely be true that we witness empirically in the world in which we live that the share of labour in production has been decreasing over time, and also that we witness increase lending by the financial sector. However, putting these assumptions into the model to analyse TTIP implies that the cause for these two trends is TTIP. This is simply not true. Hence the results in Capaldo (2014) are in part driven by factors that one cannot hold TTIP responsible for – no matter whether we witness them in the real world; i.e. they should not be part of the TTIP impact assessment, but part of a global trend analysis instead.

3. Methodology used

In this section, we distinguish between the specific model used to estimate the TTIP impacts, and the methodology used to do this. This mainly implies: how does each model assess the impact of tariff reductions and trade costs related to NTMs. In the studies analysed, three different methodological approaches have been used: the computable general equilibrium (CGE) model, the structural gravity model and the UN Global Policy Model (GPM).

The Ecorys (2009), CEPR (2013), CEPII (2013), Bertelsmann (2013), WTI (2016) and Ecorys (2016) studies have all made use of Computable General Equilibrium (CGE) models, in order to estimate the TTIP impacts. Felbermayr et al. (2013) and Felbermayr et al. (2015) use a structural gravity approach, while Egger et al. (2015) have made use of a hybrid between the CGE model and a structural gravity model. The Capaldo (2014) study has employed the United Nations Global Policy Model (GPM). The CGE and structural gravity models are designed to look at effects of trade and investment policies. The UN GPM is used to assess the impact of changes in national income policies, fiscal policies or industrial policies, but not for trade policies.

In order to look at the appropriateness of the models used, we need to assert whether they look exactly at the aspects TTIP is going to change – i.e. endogenously look at what TTIP elements are being negotiated: tariff lines, services barriers and regulatory cooperation.

Tariff elimination and trade cost reductions from NTMs

The CGE model endogenously treats the impact of tariff reductions in TTIP. Hence all studies, using the CGE model are equipped to model tariff eliminations negotiated in TTIP (Ecorys, 2009; CEPR, 2013; CEPII, 2013; Bertelsmann, 2013; WTI, 2016; Ecorys, 2016). The Capaldo (2014) study's UN GPM has not estimated tariff reductions since the GPM does not include data on tariffs. Instead, the study imports the modelling outputs of other studies as input for its own modelling. But this means that the UN GPM does not model the dynamics of what tariff reductions imply; i.e. reducing the changes in comparative advantage, effects on competitiveness of sectors (with winners and losers), and gains from specialisation, are not modelled.

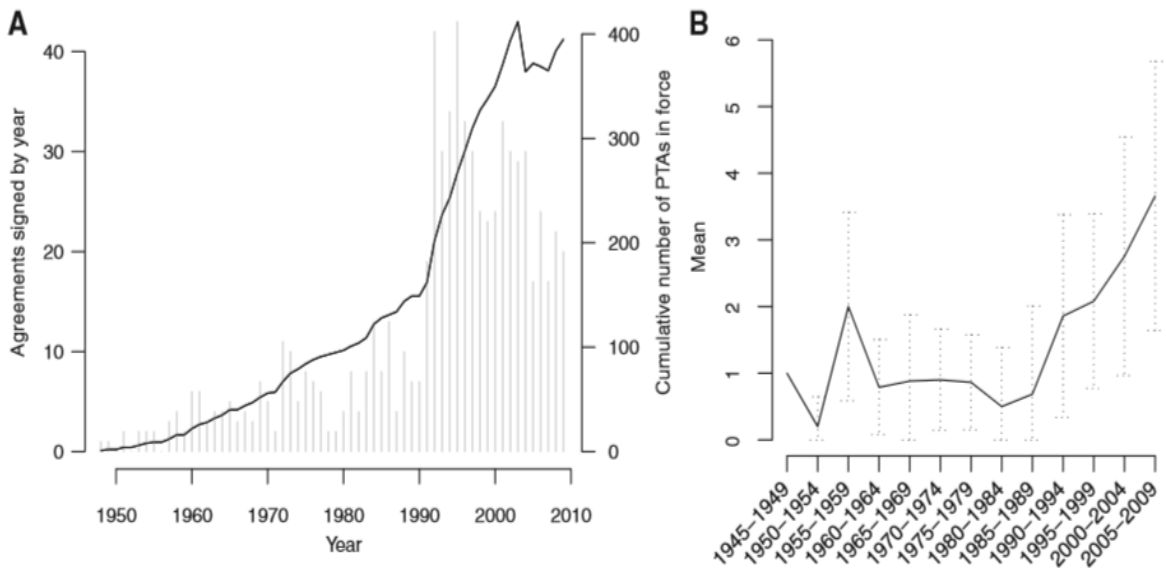
Ecorys (2009), CEPR (2013), CEPII (2013), Felbermayr et al. (2013), Bertelsmann (2013), Felbermayr et al. (2015), Egger et al. (2015), WTI (2016) and Ecorys (2016) have all estimated a trade cost equivalents (TCEs) of NTMs. A trade cost equivalent is the expression of differences in regulatory systems in a tariff-like number (a tariff equivalent or trade cost equivalent). They can be estimated via a quantity-based or a price-based approach (Ferrantino, 2006; Berden and Francois, 2015; Cadot, Asprilla, Gourdon, Knebel, and Peters, 2015). Reducing regulatory differences between the EU and US systems would thus imply a reduction in NTMs and a reduction in the trade cost equivalent of these NTMs. This is how these studies incorporate NTM alignment at sectoral and horizontal levels into the model approach. The data used for these estimations are not the same, however, as we show in the next section. There are two further advantages of this modelling approach. The first advantage is that a choice can be made between cost-increasing and rent-creating NTMs. Or – when NTMs are reduced: reductions in costs and reductions in market power of firms (and thus rent-creation). The second advantage is that a share of non-actionable NTMs can be defined to make the scenarios more realistic and in line with what can realistically be achieved in TTIP. The Capaldo (2014) study has not estimated any trade costs since this is not a feature of the UN GPM. Hence Capaldo (2014) cannot calculate the tariff equivalent of a reduction in trade costs. This means that the

study does not model any trade costs nor trade cost reductions (neither tariff nor non-tariff-based), which is exactly what TTIP is about.

Benchmarking existing trade agreements

The second approach, the structural gravity approach, takes a different road to estimating the potential gains from TTIP. The Felbermayr et al. (2013) approach states that they *"first econometrically measure the trade effects of existing Preferential Trade Agreements and then apply the results to the transatlantic agreement with the help of a model simulation. This has the advantage that in addition to tariffs, NTBs are automatically taken into account as well."*[18] In Felbermayr et al. (2015), NTMs are modelled off a dummy variable. We are not sure this captures the full complexity of the NTMs. The Felbermayr et al. (2013) approach – preceding the Felbermayr et al. (2015) study – separates the labour market model from the main model that determines the welfare effects. This may not be the optimal approach. The structural gravity approach comes from the literature that provides the micro-foundations for the gravity equation (Anderson and van Wincoop, 2003; Eaton and Kortum, 2002). Also these approaches can be used to look at welfare and GDP effects, like CGE models do, as well as looking at trade flows. According to Bekkers and Rojas Romagosa: "Their appeal is that these smaller models are more parsimonious and allow the structural estimation of their main parameters" (Bekkers and Rojas Romagosa (2016), pp. 1-2). This is a great characteristic. The positive also leads to a potential drawback, however: "To keep these models parsimonious they are often single sector and omit many institutional details present in CGE models" (Bekkers and Rojas Romagosa (2016), pp. 1-2).

Figure III.1 DESTA: the number (A) and depth (B) of trade agreements



Source: Dür et al. (2014)

A hybrid approach

Egger et al. (2015) have carefully studies both the CGE and structural gravity approaches and use a hybrid approach that combines both. Tariffs and NTM alignment are all modelled based on the empirical information of the depth of existing trade agreements, not on a forward-looking approach with structural parameters of the economy as the CGE model does. Services barriers are approached using the Jafari and Tarr (2015) approach. This hybrid approach is important,

[18] Felbermayr et al. (2013). Dimensions and effects of a transatlantic free trade agreement between the EU and the US.

because the fact that this approach is based on estimations that come from known, existing information about what we know of trade agreements already means this approach is grounded in existing evidence, not on predictions only. This approach uses the Design of Trade Agreements (DESTA) that contains information on the number and depth of trade agreements (Dür et al., 2014). Figure III.1 illustrates this.

4. Data sources

The various studies use different data sources for their impact assessments. Apart from the model assumptions and methodological approach used, this is a third factor that could explain differences in results. The Capaldo (2014) study does not use trade data, tariff data or tariff equivalent data, but available data within the GPM for its baseline analyses and then uses the outcomes of other impact assessments as exogenous input for the TTIP modelling scenario. The Ecorys (2009) study uses the GTAP database of harmonised international trade and production data, but also the outcomes of a large business survey and OECD data to determine NTMs in goods and services. CEPII (2013) makes use of the GTAP database for synchronised macro-economic data and – in addition – MacMaps, UNCTAD TRAINS, and WTO notifications for information on trade cost data. CEPR (2013) makes also use of the GTAP 9 database, but relies on Ecorys (2009) and OECD data for the TCE of NTMs. Ecorys (2016) uses the same inputs as CEPR (2013) for its analysis but the GTAP database is updated to 2014. Egger et al. (2015) uses the DESTA database of existing trade agreements to benchmark the level of TTIP ambition against.

5. Synthesis of model comparison

In line with the conclusions of CEPS (2014) and Bekkers and Rojas Romagosa (2016) – the two meta-studies, we conclude that the CGE model is one of the best ways to look at the impact of TTIP. In addition, Bekkers and Rojas Romagosa (2016) also recommend that structural gravity approach elements, more recently developed, are also used because this approach is grounded in empirical facts regarding the depth of already existing trade agreements in line with Dür et al. (2014).

Regarding the scenarios, CEPR (2013) and CEPII (2013) have the more modest TTIP scenarios, even in the ambitious versions of these studies. The Egger et al. (2015) and Felbermayr et al. (2013) studies have much more ambitious scenarios – grounded in empirical evidence of depths of existing trade agreements. The other works are in between. Capaldo (2014) does not have a TTIP scenario at all as it is assumed exogenously from CEPR (2013).

Regarding the labour supply and wage flexibility assumption, all models are consistent with the long-run impact of TTIP they analyse, except for the Capaldo (2014) model. This model claims to look at long-run impacts while using short-run labour supply assumptions – that is methodologically inconsistent. Labour mobility can be assumed fixed or not. All models assume labour is mobile, except for the Capaldo (2014) model. This makes the model – again – inconsistent with the long-run impacts for TTIP it claims to predict.

The majority of the studies discussed make use of a CGE model. According to CEPS (2014) a great strength of the CGE modelling is that it can encompass the whole economy with many different actors and markets, with a reliable micro-economic analysis in a general equilibrium

context.[19] The CGE models make use of the GTAP database, which is the most comprehensive global dataset available. However, the assumption made about fixed labour supply could result in an underestimation of the results. The structural gravity approach, using empirical benchmarking data of already existing free trade agreements, as used in Felbermayr et al. (2013) and (2015) are examples of this approach. These two studies, however, face challenges because of their binary treatment of NTMs and how Felbermayr et al. (2013) treat and model the labour market. Egger et al. (2015) use a hybrid approach combining the CGE and structural gravity benefits. This approach has the great benefit of being grounded in empirics of depth of trade agreements that have already showed their effect. Bekkers and Rojas Romagosa (2016) discuss the different aspects of both CGE and structural gravity models and find both suitable for analysis of trade agreements, like TTIP.

Concluding the comparison of studies is clear on the preferred methodology with regard to TTIP impact assessments. The best approach does not so much lie in the scenario definition (though this matters for the results) – as the scenarios can be defined and openly discussed. The deciding factors for the better approach to an impact assessment of TTIP relate to the assumptions made and methodological approach chosen. The UN GPM used by Capaldo (2014) is not a model used for trade policy analysis and neither is it equipped for it. Since the model does not include tariff data and cannot quantify trade costs, the model cannot estimate the impact of a trade agreement. Although the study indicates to assess the impact of TTIP in the long run, the model assumptions made are making it a short run approach. The impact assessments using either the CGE model (Ecorys, 2009; CEPR, 2013; CEPII, 2013; Bertelsmann, 2013; WTI, 2016; Ecorys; 2016) or the structural gravity approach (Felbermayr et al., 2013; Felbermayr et al., 2015), are found to be adequate in analysing TTIP. Through either of the two approaches, the elements of TTIP – tariff, services barriers and NTMs – can be addressed. Egger et al. (2015) present a hybrid approach that combines strong elements of both methodological families. This approach allows for the linkages between sectors, countries and markets – while being funded in micro-economic theory (the strength of the CGE model) with the structural estimation of main parameters (the appeal of the smaller structural gravity models). The data sources used in both the CGE and structural gravity approaches, among others, contain the most elaborate global data of comparable trade and production data, as well as detailed tariff and NTM information and detailed information about the depth of existing trade agreements.

B. Comparison of trade impact assessment results

Bekkers and Rojas Romagosa (2016) compare the results of the various studies, not including Capaldo (2014) because they do not consider the model credible for assessing the impact of TTIP. CEPS (2014) also carries out a comparison. The below Table III.1 summarises the findings of the meta-studies of CEPS (2014) and Bekkers and Rojas Romagosa (2016) supplemented by the Capaldo (2014) and Ecorys (2016) results.

Table III.1 Expected welfare effects of different TTIP impact assessments

Study	Main outcome	EU effect (% change)	US effect (% change)
Ecorys (2009)	GDP	+0.7	+0.3

[19] CEPS, 2014. EU-US Transatlantic Trade and Investment Partnership – Detailed appraisal of the European Commission's impact assessment.

Study	Main outcome	EU effect (% change)	US effect (% change)
CEPR (2013)	GDP	+0.5	+0.4
CEPII (2013)	GDP	+0.3	+0.3
Felbermayr et al. (2013	Real income	+8.0	+13.4
Bertelsmann (2013)	-	-	-
Capaldo (2014)	GDP	-0.5	-0.5
Felbermayr et al. (2015)	Real income	+3.9	+4.9
Egger et al. (2015)	Real income	+1.0	+2.3
WTI (2016)	-	-	-
Ecorys (2016)	GDP	+0.5	+0.4

Source: Own compilation based – in part – on Bekkers and Rojas Romagosa (2016)

Looking at the above overview on GDP/real income, we see that Capaldo (2014) and Felbermayr et al. (2013) and (2015) are three outliers. Bekkers and Rojas Romagosa (2016) argue that the other studies show a credible range of real income gains between +0.2 and +2.0 percent of GDP. The large losses predicted by Capaldo (2014) are not seen as credible because the model is driven by factors that do not relate to TTIP, trade costs are assumed not to exist, and it is a short-run model, not designed for a long-run TTIP assessment. On the other hand, "Larger gains predicted by some studies are also considered unlikely, either because they are either based on unreliable NTM reductions of 30 percent and more, or because they are based on a simulation model displaying methodological problems" (Bekkers and Rojas Romagosa (2016, pp. 41).

C. Our methodological Approach

1. A multi-pronged approach

We have taken great care to ensure a balanced and multi-pronged approach forms the basis and fundament of this study. Our methodological approach is driven by the following considerations:

- We needed to select a method – or combination of methods – that is suitable for an impact assessment of a trade agreement including tariff reductions, reductions in services barriers and regulatory cooperation elements;
- We needed to select a method – or combination of methods – that is suitable for a *sustainable* impact assessment – i.e. that can cover not only economic, but also social and ecological assessments in a quantitative sense;
- We needed to select an approach that is a balance of the latest methodological insights, a combination of methods (so as not to depend only on one method), and that reaches out to empirical (i.e. existing) data for cross-checking and benchmarking;
- We needed to ensure engagement with and input from key stakeholders, including civil society, on the approach, as well as the concerns and worries that exist.

The result is a multi-pronged approach consisting of several different methods and approaches that takes into account our analysis of the previous section that looks as follows:

- We employ not only a bottom-up CGE modelling approach (tariffs, NTMs, services barriers) as done in – for example – CEPR (2013), CEPII (2013), and Ecorys (2016), but also the hybrid model developed by Egger et al. (2015) that combines the general equilibrium modeling with the structural gravity approach (allowing an analysis benchmarked on empirical

observations of already existing trade agreements). These are the best two methodological approaches to date to analyse a trade agreement like TTIP;

- We base our SME analysis for Belgium on micro-data on Belgian SMEs that we obtain from the AMADEUS dataset;
- We look at regulatory barriers by surveying the different surveys that have been conducted that contain extensive responses from SMEs about barriers to trade between the EU and US;
- We employ the E3MG model (by Cambridge Econometrics) that looks in particular at the linkages between the economy and the environment and energy. The latter two modules are carefully built into the E3MG model and allows us to look in much more detail at some social and quite a few ecological variables;
- We carry out an empirically based sensitive product analysis at detailed product levels, using existing and current tariff lines that help us to pinpoint where some sensitivities lie (offensive and defensive) for the EU, US and Belgium;
- We carry out two qualitative case studies for the social and ecological pillars based on inputs received from Civil Society.

This approach, based on three different models (CGE, structural gravity, E3MG) and over eight different data sources (GTAP data, WITS tariff data, Ecorys NTM survey data, Jafari and Tarr (2015) services barrier data, AMADEUS SME data, energy and ecological data for E3MG, UN Comtrade trade pattern data, and qualitative data analysis).

2. CGE and structural gravity

Non-technical model description

The study employs both a CGE model and a structural gravity approach (in the form of a hybrid approach) to assess quantitatively the likely impact of the proposed TTIP agreement for Belgium, the UK, the rest of the EU (EU-26), the US and several other countries and country groupings. This approach requires modelling of tariffs, barriers to services trade and NTMs. We organise data in order to run the CGE and structural gravity models with the latest data available. We use detailed tariff lines from WITS and UN COMTRADE, OECD data and data from Jafari and Tarr (2015) for barriers to services trade.

The European Commission's project led by Ecorys (2009) on NTMs has quantified regulatory divergence and NTMs between the EU and US at sector level. That study uses an extensive business survey incorporating firms originating in the EU, US and other countries and then uses a set of econometric models to estimate levels of NTMs affecting EU-US trade (Ecorys, 2009). Based on Anderson, Berden, Bergstrand, Egger and Francois (2008) calculation of ad valorem equivalents (AVEs) of NTMs has been possible using two gravity model specifications (one for goods sectors, one for services sectors). These TCEs (trade cost equivalents) are then inserted into the CGE model - combined with two scenario definitions – to look at potential economic impacts of a potential trade deal between the EU and US.

For the structural gravity approach in a hybrid combination with the CGE model, we use Egger et al. (2015). The welfare effects are calculated using a general equilibrium setting, combined with structural estimations of the trade elasticities and trade cost reductions. In the first step – of the two – a gravity model is used to generate estimates of reductions in trade costs that are then used in a CGE setting to look at economy-wide effects. The NTMs are calculated in a different way, however, than in the Ecorys (2009) and CEPR (2013) approaches. Egger et al.

(2015) use the approach first developed in Egger and Larch (2011). They estimate a gravity equation with the traditional gravity variables and with dummies for different levels of depth of FTAs (using the DESTA database from Dür et al. (2014)). Based on the estimated tariff elasticities and depth of FTAs (ranking from 1 – 7 in DESTA with 1 being a shallow FTA and 7 a very deep one) Egger et al. (2015) then calculate the tariff equivalent of moving from no FTA to a deep FTA. How "deep" essentially stands for the scenario that is being used. Because TTIP is envisaged to be a deep FTA, the maximum value of 7 is chosen. For services trade and NTMs in services, Egger et al. (2015) use the estimates from Jafari and Tarr (2015) that are – in turn – based on the World Bank's STRI database (Borchert et al., 2014). Cost-increasing and rent-generating shares are determined at sector level as well as the share of actionable NTMs that can be reduced.

We use the GTAP database, version 9, which is benchmarked to 2011, projected forward to 2014. The model itself is based on Francois, van Meijl and van Tongeren (2005) and Dee et al. (2011). It includes extensions to cover NTMs, and distinguishes between 'cost generating' NTMs and 'rent generating' NTMs. It also includes short- and long-run closure options as developed by Francois et al (1996). The sector and regional aggregation for the model are made in line with the CEPR (2013) study to allow for comparability of results.

The key features of the model can be summarized as follows:

- It is a general equilibrium model based on the latest GTAP database (that is the latest internationally comparable trade and production database);
- It allows for different types of competition and scale effects per sector;
- It allows for interactions both within each economy as well as between economies;
- It includes scope for analysis of tariffs barriers and NTMs. NTMs in turn can be studied as a mix of rent- and cost-generating NTMs;
- Depending on the closure condition, it can focus on wages or employment effects;
- It includes dynamic linkages between investment and the installed capital stock;
- It can be used to study NTM liberalization spillovers (where some bilaterally negotiated NTM reductions also spill over to third countries);
- It can look at effects on disposable income (wages and prices) and thus the social effect on poverty;
- It can be based on structural gravity estimates of NTMs to allow for the inclusion of actual data on the depth of existing trade agreements.

Four future TTIP scenarios

We then compare the economic outcomes of the 'baseline' scenario with four alternative scenarios – two of which are based on the CEPR (2013) approach explained above – the CGE model approach – and two of which are based on the Egger et al. (2015) approach from the Economic Policy journal – the hybrid approach making use of structural gravity. The baseline for the model is the equilibrium before the policy change projected forward without any FTA. The four 'scenarios' are the equilibria after the policy change *with* four different potential FTAs. The effect of the policy changes are then quantified as the differences between the baseline and each of the four scenarios. Within each of the two different methodological approaches, we model a Brexit and non-Brexit scenario to reflect also the post 23.6.2016 realities facing the EU, UK and TTIP. In Table III.2, the scenarios are presented.

Table III.2 Modelling scenarios for this study

Scenario name (1)	Methodological approach (2)	Brexit reality (3)	Scenario description (4)
Scenario A	CGE approach (CEPR, 2013)	No Brexit	In line with the CEPR (2013) approach, we assume a 100% cut in tariffs. We also assume that regulatory divergences in goods and services are reduced by 25% and that public procurement barriers are cut by 50% (we present the public procurement results but do not count them into the total effects we report). Underlying assumptions are that: 1. Only 50% of all NTMs are actionable (i.e. can be addressed); 2. We assume that 60% are cost-related NTMs and 40% rent-related. We assume that the UK is still part of the EU (to yield results matching the pre-June 2016 situation).
Scenario B	CGE approach (CEPR, 2013)	Brexit	In line with the CEPR (2013) approach, we assume a 100% cut in tariffs. We also assume that regulatory divergences in goods and services are reduced by 25% and that public procurement barriers are cut by 50% (we present the public procurement results but do not count them into the total effects we report). Underlying assumptions are that: 1. Only 50% of all NTMs are actionable (i.e. can be addressed); 2. We assume that 60% are cost-related NTMs and 40% rent-related. We assume that the UK is no longer part of the EU because of the Brexit vote (to simulate results matching the post-June 2016 situation). The UK is assumed to end up very close to the EU in a sort of Norway-model, but not as part of TTIP.
Scenario C	Hybrid approach (Egger et al., 2015)	No Brexit	We model the degree of liberalization based on the depth of existing FTAs, so based on empirical evidence of what trade agreements have shown so far. The depth of FTAs in the DESTA database is ranked from 1 to 7, with 7 being the deepest FTA. We model TTIP as a deep trade and investment agreement, i.e. a level 7 FTA. We assume that the UK is still part of the EU (to yield results matching the pre-June 2016 situation).
Scenario D	Hybrid approach (Egger et al., 2015)	Brexit	We model the degree of liberalization based on the depth of existing FTAs, so based on empirical evidence of what trade agreements have shown so far. The depth of FTAs in the DESTA database is ranked from 1 to 7, with 7 being the deepest FTA. We assume that the UK is no longer part of the EU because of the Brexit vote (to simulate results matching the post-June 2016 situation). The UK is assumed to end up very close to the EU in a sort of Norway-model, but not as part of TTIP.

Source: own calculations

The differences between the two methodological approaches (column 2) have been explained in detail in the previous section. We also include in our scenarios (column 3) the different effects, depending on a Brexit or not. Scenarios A and C reflect the situation before 23.6.2016 when the British people voted for Brexit; i.e. for Britain to leave the European Union. Scenarios B and D are a simulation of the Brexit situation. We are not – at present – clear on how the future relationship between the EU and UK will look like. Hence, this scenario simply assumes that the UK stays as integrated with the EU as it is now (i.e. sort of a Norway-type relationship

with the EU), except for the fact that – with the UK no longer being an EU Member State – the UK is not part of TTIP anymore. Instead TTIP is signed between the US and the EU27.[20]

CGE and structural gravity model outputs

The variable outputs of the CGE and structural gravity approaches are as presented in Table III.3. They contain macro-economic variables, sector-specific variables and variables related to the social and ecological pillars.

Table III.3 Variable generated by the CGE and structural gravity models

Theme	Indicator	Measurement
1. Macro-economic results	National income GDP Wages (skilled and unskilled) Total exports Total imports Terms of trade	Billions of dollars; Percentage change; Percentage change; Percentage change; Percentage change; Percentage change.
2.Sector results	Bilateral exports Output Value added Employment (skilled and un-skilled)	Percentage change; Percentage change; Percentage change; Percentage change.
3. Social variables	Unskilled wage changes Labour displacement Measure of inequality	Percentage change in household in-come; Percentage of workers required to move jobs; Change in relative share of unskilled workers in total income.
4. Ecological variables	Emissions Agricultural Fisheries	Percentage change in CO2 emis-sions; Percentage change in output; Changes in land use; Percentage change in fish catch (pro-duction).

Source: Francois, Van Meijl and Van Tongeren (2005)[21]

3. The E3MG model

Non-technical model description

The E3MG model is a model that links up the world's economic and energy systems to the environment. For the global edition, Cambridge Econometrics is able to cover 53 global regions as well as 33 European countries. The starting point of the E3MG model is comparable to the CGE model: linking it to the system of national accounts with – then – links to energy and

[20] Clearly this is the closest modelling scenario for the UK to TTIP as possible. If the UK decides for other options to define its relationship with the EU (e.g. a Swiss model or the WTO model) the effects are going to work out differently. As said, for the moment, we do not know enough about the future UK-EU relationship to speculate on this.

[21] Francois. J.F., H. van Meijl and F. van Tongeren (2005), "Trade Liberalization in the Doha Development Round," Economic Policy April: 349-391.

environmental modules. The labour market is also included, allowing for voluntary and involuntary unemployment and unemployment effects for different parts of the population. The E3MG model takes the labour and employment effects a step further than CGE models can. The variables modelled are GDP and its components (consumption, investment, government expenditures and international trade) as well as prices, energy demand and raw materials demand. Especially the latter two elements move the E3MG model beyond standard CGE models.

E3MG's historical database covers the period 1970-2012 and the model projects forward annually to 2050. The main data sources for European countries are Eurostat and the IEA, supplemented by the OECD's STAN database and other sources where appropriate. For regions outside Europe, additional sources for data include the UN, OECD, World Bank, IMF, ILO and national statistics. Gaps in the data are estimated using customised software algorithms. As a general model of the economy, based on the full structure of the national accounts, E3MG is capable of producing a broad range of economic indicators. In addition there is range of energy and environment indicators. The list of indicators generated by the E3MG model is presented below in Table III.4.

Table III.4 Variable generated by the CGE and structural gravity models

Theme	Indicator	Measurement
1. Macro-economic results	GDP (including household expenditure, investment, government expenditure, international trade)	Percentage change;
	Consumer prices and expenditure	Percentage change;
	Trade	Percentage change;
	Energy prices	Percentage change.
2.Sector results	Output	Percentage change;
	Global Value Chains	
	Trade	Percentage change;
	Competitiveness effects	
	Employment/unemployment	Percentage change;
	Wages and labour supply	Percentage change;
	CO2 emissions	Percentage change;
	Energy demand	Percentage change.
3. Social variables	Unskilled wage changes	Percentage change in household income;
	Labour displacement	Percentage of workers required to move jobs;
	Measure of inequality	Change in relative share of unskilled workers in total income.
4. Ecological variables	CO2 emissions by fuel	Percentage change;
	Energy demand by fuel	Percentage change;
	Other airborne emissions	Percentage change;
	Material demands (Europe)	Percentage change.

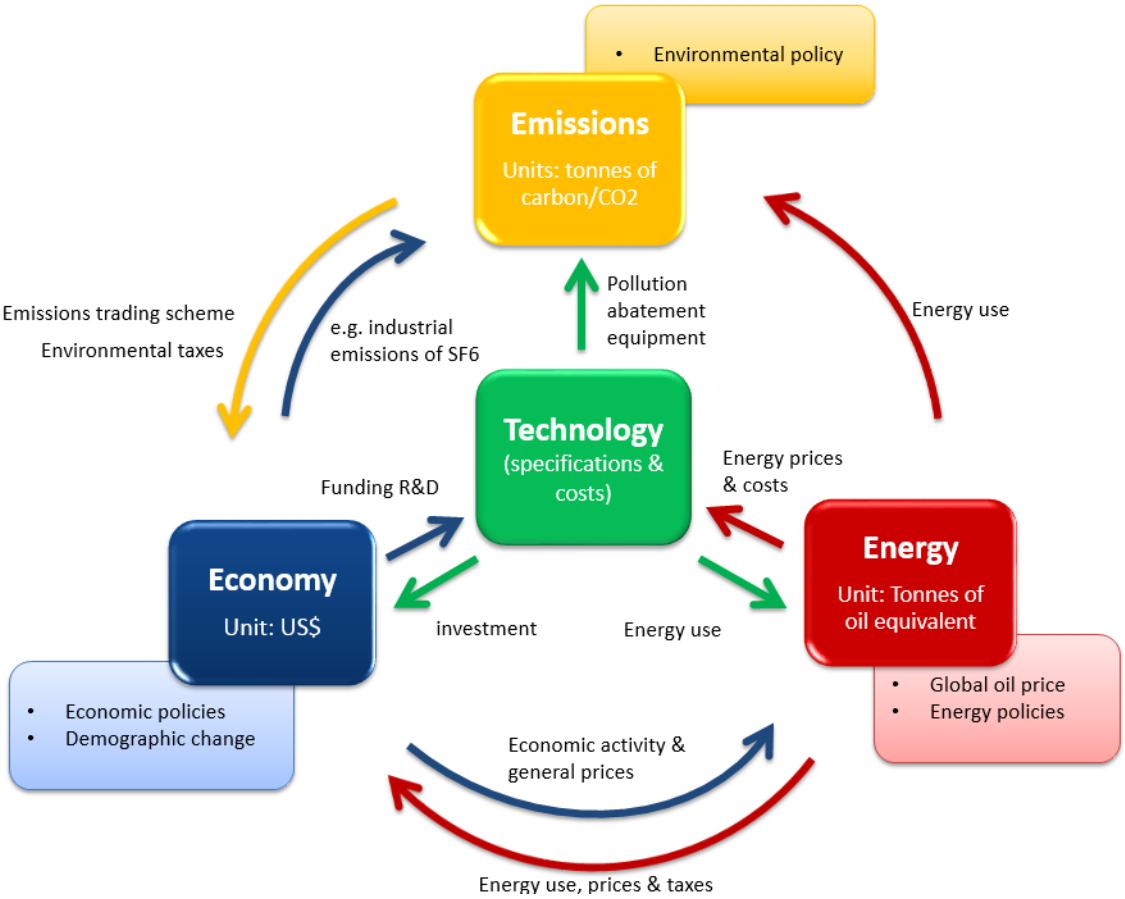
Source: Cambridge Econometrics

In addition to the sectoral dimension mentioned in the list above, these indicators are produced at the national and regional levels and annually over the period up to 2050.

The three components of the E3MG model (economy, energy, environmental) link up together as presented in Figure III.2. Each component is presented separately but with the mechanisms linking them up to the other components. Exogenous factors (i.e. those factors coming from outside the model) are shown on the edges of the Figure. For the economic component exogenous factors are economic policies (e.g. taxes, growth in government expenditures, interest rates and exchange rates). For the energy component the exogenous factors are world oil prices and energy policies (e.g. regulation of energy industries). The environmental component is affected from the outside by – for example – reduction in SO2 emissions by various technical solutions.

The economic component provides measures of economic activity and general price levels for the energy component; the energy component – in turn – provides measures of emissions of the main air pollutants to the environmental component, which in turn can give measures of damage to health and buildings. The energy component provides detailed price levels for energy carriers distinguished in the economic component as well as the overall price of energy and energy use in the economy.

Figure III.2 Economic, energy and environmental linkages in the E3MG model



In contrast to the CGE model, technological progress plays an important role in the E3MG model, affecting all three Es: economy, energy and environment. The model's endogenous

technical progress indicators (TPIs – from the centre component of the model depicted in Figure III.2), a function of R&D and gross investment, appear in nine of E3MG's econometric equation sets including trade, the labour market and prices. Investment and R&D in new technologies also appears in the E3ME's energy and material demand equations to capture energy/resource savings technologies as well as pollution abatement equipment. In addition, E3MG also captures low carbon technologies in the power sector through the FTT power sector model.[22]

Treatment of the labour market is an area that distinguishes E3MG from other macroeconomic models. E3MG includes econometric equation sets for employment, average working hours, wage rates and participation rates. The first three of these are disaggregated by economic sector while participation rates are disaggregated by gender and five-year age bands. The labour force is determined by multiplying labour market participation rates by population. Unemployment (including both voluntary and involuntary unemployment) is determined by taking the difference between the labour force and employment. This is typically a key variable of interest for policy makers that CGE covers less elaborately (see discussion on labour market closing condition in the previous section).

The E3MG model and CGE framework are similar in various ways, but different in a very important element also. In a typical CGE framework, optimal behaviour is assumed, output is determined by supply-side constraints and prices adjust fully so that all the available capacity is used (for the long-run model specifications). In E3MG the determination of output comes from a post-Keynesian framework and it is possible to have spare capacity. The model is more demand-driven and it is not assumed that prices always adjust to market clearing levels. The differences have important practical implications, as they mean that in E3MG regulation and other policy may lead to increases in output if they are able to draw upon spare economic capacity.

A great advantage of the E3MG model is that the econometric specification gives the model a strong empirical grounding. E3MG uses a system of error correction, allowing short-term dynamic (or transition) outcomes, moving towards a long-term trend. The dynamic specification is important when considering short and medium-term analysis (e.g. up to 2020) and rebound effects, which are included as standard in the model's results.

4. In-depth tariff analysis of sensitive products

In addition to the three quantitative modeling approaches, we also base ourselves on empirical analysis of existing tariff lines and trade patterns.

We know that the average tariff on the US side is 2.2 percent and on the EU side 3.3 percent. However, behind this average, a significant variation hides between many products with no tariff protection at all and some products with still high levels of tariff protection. The impact for the Belgian economy would be significant if a product that matters for Belgian exports or imports is still protected by a high tariff that is significantly reduced in TTIP.

In such situation, the impact would be significant because prices would be affected significantly. In case of imports, the Belgian (sub)sectors competing with these imports would be negatively affected while the prices for Belgian consumers (in case of final products) and prices

[22] See Mercure (2012).

for intermediate inputs for other companies (in case of intermediate products) would drop significantly. In case tariff reductions apply to the export sector (i.e. occur on the other side of the Atlantic) market access is enhanced, which could benefit the Belgian export sectors significantly.

Finally, it is important to stress that the sectoral and competitiveness impacts for the EU do not necessarily have to be the same for Belgium. The chemical sector in the EU is set to gain from TTIP, but in Belgium that effect is expected to be relatively larger – i.e. Belgium benefits more relatively than the EU from this sectoral effect.

For the purpose of this analysis, we base ourselves on detailed product level information on trade and tariff lines from UN Comtrade and WITS. This is: we base ourselves on data from the past that is available and latest known tariff lines.

5. SME analysis: AMADEUS and survey results

A further element in our multi-pronged approach is the SME analysis. SMEs are the backbone of any economy – especially in terms of employment. TTIP proponents claim that SMEs will benefit from TTIP, while opponents argue that the benefits of TTIP will accrue mostly to large corporations. It is important to realise that SMEs are affected in both a direct and an indirect way. The direct way – often mentioned – is that TTIP would stimulate Belgian SMEs that currently do not export to the US to start doing so because market access increases (due to reductions in tariffs and reductions in red tape and other regulatory differences). The indirect way, however, is that TTIP would help larger firms that already export to increase exports and production (or that TTIP would reduce input prices for these companies leading to higher margins), positively affecting their businesses. These effects then trickle down (or up) the value chain to SMEs that do not start to export, but witness an increased demand (locally or regionally) for their products and/or services.

This is why it is important that we look at how SMEs are affected – not only based on the model results, but based on a range of sources. So, apart from the model outcomes, we use the AMADEUS database to show the location as well as relative importance – as well as actual number – of SMEs at sectoral level. The combination of this information shows how SMEs and regions are affected. We also carry out a concise literature review of surveys conducted among SMEs to get a good idea of the barriers they experience – to see if TTIP is indeed set to address these (or not). In Belgium, the SME discussion is an important one because of the diverging opinions of SMEs across the country pertaining to the benefits and risks for SMEs stemming from TTIP.

IV. Tariff and Non-Tariff Measure Inventory

A. Analysis of detailed EU-US tariff lines

Tariffs are 2.2 percent on average for the US and 3.3 percent for the EU. This hides the variation behind this average; i.e. the fact that for most products the tariff lines are actually zero percent, while for some products tariffs are much higher than the average. This matters because the variation implies that tariff reductions will not be felt as a 2.2 percent average in the US or a 3.3 percent average in the EU. Some sectors will be impacted a lot, while others will be hardly affected. (Note that even with zero tariffs, sectors may be affected by TTIP: through value chain effects up- or downstream, or through consumption effects and through prices. As a result, a sector without any tariffs can still be impacted.)

In this section, we look at four tables with information. First we look at the most important Belgian export products to the US and Belgian imports from the US at HS8 level. Though TTIP is an agreement between the EU and US, we look at the impact for Belgium. So even though the tariffs are set at the EU level, the trade patterns are Belgium-specific. For example, a tariff of 5.2 percent on the import of heterocyclic compounds with nitrogen hetero-atoms matters highly for Belgium as it is an important import for Belgium from the US. This is not an important import product for Lithuania. So if the tariff on this product is lowered – or even entirely removed – as part of TTIP, in Belgium the effect will be significant and direct, while for Lithuania only indirect effects would occur (through interlinkages between sectors and economies).

1. Most important Belgian-US traded products

Table IV.1 shows Belgian imports from the US for the top-15 products at HS8 level of detail (highly disaggregated product level). Table IV.2 shows Belgian exports to the US for the top-15 products. Column (1) in the two Tables is the HS category. Column (2) provides the name of the product (or product group). Column (3) shows the Eurostat (2015) values (in €) for Belgian imports from the US (Table IV.1) and Belgian exports to the US (Table IV.2). Colum (4) presents the import/export shares of that product as share of total imports/exports, while Column (5) shows the cumulative shares. In Column (6) we present the average MFN tariff at HS6 level to depict the actual levels of tariff protection between Belgium and the US for the top-trade products. Column (7) shows the bound tariffs between Belgium and the US for the top-15 products. This column is not decisive for the actual levels of tariff protection, but it shows the potential maximum tariffs that could possibly be levied (i.e. the maximum bound rates Belgium and the US have agreed to in the WTO context.

When comparing both Tables, we see that the majority of imports and exports is intra-industry trade (i.e. trade of products in the same sectors), especially trading medicine and vaccines, artificial joints, vehicles, diamonds, and fuels. This is an indication that Belgium is heavily integrated in global value chains for these products. Belgium's top 5 imported manufacturing goods categories are medicaments, vaccines, nitrogen, blood, and gas oils. Belgium's top 5 exported manufacturing goods categories are medicaments, vaccines, organic chemicals, blood, and cars. As becomes apparent from the Tables (both columns (5)), the total share of Belgian imports from the US for the top-15 most important products is 44.15 percent. The share of Belgian exports to the US for the top-15 most important products is 26.03 percent. So none of the imports, nor exports, make up for a large majority of exports or imports. The Belgian-US

trade shows a diversified structure of imports and exports (where exports are even more diversified than imports). Trade should therefore be versatile and not severely affected by shocks in one particular sector.

From Table IV.1 it becomes clear that the top-15 products constitute over 44 percent of Belgian imports from the US. The most important import product (an import value of € 612 mln in 2015) with a significant tariff (5.2 percent) is 'heterocyclic compounds with nitrogen hetero-atoms'. Also for 'motor cars and other vehicles for transport of persons', with a Belgian import value of € 521 mln in 2015, US exporters face a 10 percent tariff. From this Table our main conclusion is that most important imported manufacturing goods are by far not the most protected ones, with the exception of three products that are sectors are in the top-15 of most important Belgian imports from the US with still significant tariff levels (over 5 percent).

Table IV.1 Belgian imports from the US for 15 top sectors (€)

HS	HS number (1)	Product (group) name (2)	Import value Belgium from US (€) (3)	Share of total imports from the US (%) (4)	Cumulative share of total imports from the US (%) (5)	Average EU import tariff at HS6 level (%) (6)	Maximum bound tariff at HS6 level (%) (7)
HS	30049000	Medicaments for therapeutic of prophylactic purposes	6.020.666.366	20,77	20,77	0,00	0,00
HS	30022000	Vaccines for human medicine	1.234.338.807	4,26	25,03	0,00	0,00
HS	29333999	Heterocyclic compound with nitrogen hetero-atoms	612.056.159	2,11	27,14	5,20	6,50
HS	30021091	Haemoglobin, blood and serum globulins	603.399.301	2,08	29,22	0,00	0,00
HS	27101943	Gas oils of petroleum or bituminous minerals	556.942.450	1,92	31,14	0,69	4,70
HS	90189084	Instruments and appliances: medical, surgical, veterinary	539.134.384	1,86	33,00	0,00	0,00
HS	87033319	Motor cars and other vehicles for transport of persons	520.529.584	1,80	34,80	10,00	10,00
HS	90183900	Medical, surgical, dental, veterinary needles catheters	504.803.148	1,74	36,54	0,00	0,00
HS	87115000	Motorcycles, incl. Mopeds cylinder > 800 CMÂ³	378.626.553	1,31	37,84	2,68	6,00
HS	90213990	Artificial parts of body, excl. dental fittings, artificial joints	334.819.280	1,16	39,00	0,00	0,00
HS	30021098	Blood fractions and immunological products	323.420.368	1,12	40,12	0,00	6,50
HS	29372900	Steroidal hormones and their derivatives	309.943.519	1,07	41,18	0,00	6,50
HS	71023900	Diamonds, worked but not mounted, not industrial	301.035.725	1,04	42,22	0,00	0,00
HS	39019090	Polymers of ethylene, in primary forms	284.326.259	0,98	43,20	5,85	6,50
HS	84119100	Parts of turbojets or turbo-propellers	273.853.043	0,94	44,15	0,90	2,70

Source: Eurostat (2015)

These products are the following:

- Heterocyclic compounds with nitrogen hetero-atoms (5.2 percent import tariff; HS29333999);
- Motor cars and other vehicles for transport of persons (10 percent import tariff; HS87033319);
- Polymers of ethylene, in primary forms (5.85 percent import tariff; HS39019090).

For the above products, the TTIP impact needs to be monitored closely from a Belgian perspective.

From Table IV.2 we conclude again that the products most exported from Belgium to the US are not facing the highest US import tariffs. However, the following sectors face US import tariffs higher than 4 percent:

- Organic chemicals of heterocyclic compounds (4.12 percent US import tariff; HS 29339980);
- Fuel oils from bituminous materials, sulphur > 0.1% (6.40 percent US import tariff, HS 27101964);
- Motor spirit, with lead content 0,013 G/L (7.00 percent US import tariff, HS27101241);
- Fuel oils obtained from bituminous material > 1% by weight (6.40 percent US import tariff, HS27101968);
- Heterocyclic compounds with nitrogen hetero-atoms (5.2 percent import tariff; HS29335995).

If we add up the total current export value (in €) for these five products (product groups), the US import tariffs apply to a total value of € 2.88 billion. That is a significant share of Belgian exports that faces above-average US import tariffs. TTIP could therefore lead to a significant opening of the US market for important Belgian export products.

Table IV.2 Belgian exports to the US for 15 top sectors (€)

HS	HS number (1)	Product (group) name (2)	Export value Belgium to US (€) (3)	Share of total exports to the US (%) (4)	Cumulative share of total exports to the US (%) (5)	Average US import tariff rate at HS6 level (%) (6)	Maximum bound tariff at HS6 level (%) (7)
HS	30049000	Medicaments for therapeutic of prophylactic purposes	3.918.840.725	7,81	7,81	0,00	0,00
HS	30022000	Vaccines for human medicine	1.967.623.160	3,92	11,73	0,00	0,00
HS	29339980	Organic chemicals of heterocyclic compounds	1.394.283.570	2,78	14,51	4,12	6,50
HS	30021091	Haemoglobin, blood and serum globulins	880.488.442	1,75	16,27	0,00	0,00
HS	87032319	Motor cars and other motor vehicles for 1 to 9 persons	823.629.757	1,64	17,91	2,50	2,50
HS	71023900	Diamonds, worked but not mounted, not industrial	774.913.454	1,54	19,45	0,00	0,00
HS	27101964	Fuel oils from bituminous materials, sulphur > 0,1%	566.943.625	1,13	20,58	6,40	7,00
HS	29389090	Glycosides, natural or reproduced by synthesis	510.588.124	1,02	21,60	3,70	3,70
HS	90213100	Artificial joints for orthopaedic purposes	480.807.062	0,96	22,56	0,00	0,00
HS	27101241	Motor spirit, with lead content 0,013 G/L	395.807.440	0,79	23,35	7,00	7,00
HS	27101968	Fuel oils obtained from bituminous material > 1% by weight	341.308.232	0,68	24,03	6,40	7,00
HS	84119100	Parts of turbojets or turbo-propellers	314.943.913	0,63	24,65	0,00	0,00
HS	30043900	Medicaments used as hormones not antibiotics	292.590.296	0,58	25,24	0,00	0,00
HS	87021011	Motor vehicles for the transport of 10 or more people	214.113.056	0,43	25,66	2,00	2,00

HS	HS number (1)	Product (group) name (2)	Export value Belgium to US (€) (3)	Share of total exports to the US (%) (4)	Cumulative share of total exports to the US (%) (5)	Average US import tariff rate at HS6 level (%) (6)	Maximum bound tariff at HS6 level (%) (7)
HS	29335995	Heterocyclic compound with nitrogen hetero-atoms	181.847.378	0,36	26,03	5,78	6,50

Source: Eurostat (2015)

2. Most tariff-protected products in Belgian-US trade

Tables IV.3 and IV.4 shows the most protected Belgian imports from the US and exports to the US for the top-30 most protected products. We see that the top tariff rates for Belgian imports from the US (i.e. the EU import tariff rates) exceed 70 percent. They apply to tobacco and tobacco products. But also grape must (32 percent), other grape juice not fortified with vitamins or minerals (29.44 percent), orange (22.90 percent) and grapefruit juice (22.80 percent), as well as cherries (20.93 percent) pineapples (20.91 percent), cranberries (20.64 percent), and strawberries (20.51 percent) imports from the US face a higher than 20 percent EU import tariff.

When we look at the import values as a share of total imports, we conclude that thought these tariffs are large, they relate to products that are only traded to a marginal extent. The total share of the top-30 most protected products amounts to 0.06 percent of total Belgian imports.[23]

Table IV.3 Top-30 Belgian imports from US facing the highest EU import tariffs

HS	HS number (1)	Product (group) name (2)	Import value Belgium from US in thousands (€) (3)	Share of total imports from the US (%) (4)	Average EU import tariff rate at HS6 (%) (5)	Maximum bound tariff at HS6 level (%) (6)
HS	240311	Water pipe tobacco	108	0,00005	74,90	74,90
HS	240319	Tobacco Other	114	0,00005	74,90	74,90
HS	240290	Other Cigars, Cheroots, Cigarillos, Cigarettes	5	0,00000	57,60	57,60
HS	240220	Cigarettes containing Tobacco	143	0,00006	33,80	57,60
HS	220430	Other grape must	28	0,00001	32,00	32,00
HS	200969	Other grape juice not fortified with vitamins or minerals	1169	0,00051	29,44	40,00
HS	240399	Other Manufactured Tobacco, Tobacco Substitutes, Tobacco Extracts	5875	0,00258	29,10	41,60
HS	160569	Other aquatic invertebrates, nesi, prepared	2	0,00000	26,00	26,00
HS	240210	Cigars, cheroots and cigarillos, containing toba	1300	0,00057	26,00	26,00
HS	200919	Other orange juice not fortified with vitamins or minerals	10999	0,00483	22,90	33,60
HS	200929	Other grapefruit juice not fortified with vitamins or minerals	8984	0,00394	22,80	33,60

[23] We do note here that there is a challenge in the form of an endogeneity problem. We find low import values for these highly protected products. The fact we find low import values implies the sectors are not so important. However, the fact we find low import values could exactly be the consequence of the high import tariffs on the EU side. Lowering these import tariffs could significantly increase import values (and volumes) also.

HS	HS number (1)	Product (group) name (2)	Import value Belgium from US in thousands (€) (3)	Share of total imports from the US (%) (4)	Average EU import tariff rate at HS6 (%) (5)	Maximum bound tariff at HS6 level (%) (6)
HS	200979	Other apple juice not fortified with vitamins or minerals	107	0,00005	21,00	30,00
HS	200860	Cherries	4142	0,00182	20,93	25,60
HS	200820	Pineapples	43	0,00002	20,91	25,60
HS	200893	Cranberries	72101	0,03165	20,64	25,60
HS	200880	Strawberries	81	0,00004	20,51	25,60
HS	200911	Orange juice, frozen, sweetened or not sweetened	3244	0,00142	19,80	33,60
HS	200949	Pineapple juice not fortified with vitamins or minerals	73	0,00003	19,47	33,60
HS	200840	Pears	0	0,00000	19,29	25,60
HS	200870	Peaches, including nectarines	273	0,00012	19,17	25,60
HS	200990	Mixtures of juices	3130	0,00137	18,94	33,60
HS	200850	Apricots	66	0,00003	18,87	25,60
HS	200830	Citrus fruit	1976	0,00087	18,82	25,60
HS	200989	Juice Of Any Single Vegetable, Other Than Cranberry Juice Or Other Fruit Juice	8643	0,00379	18,71	33,60
HS	200981	Cranberry Juice, Concentrated Or Not Concentrated	17485	0,00768	18,22	33,60
HS	200939	Citrus Juice Of Any Single Citrus Fruit (Other Than Orange Or Grapefruit)	203	0,00009	16,89	33,60
HS	030819	Other sea cucumbers, frozen, dried, salted or smoked, or in brine	0	0,00000	16,00	26,00
HS	030829	Other sea urchins, frozen, dried, salted or smoked, or in brine	72	0,00003	16,00	26,00
HS	200897	Other mixtures of fruit or edible parts of plants, in airtight containers	1160	0,00051	15,92	25,60

Source: WITS (2014)

The most restricted manufacturing sectors for Belgium's exports to the US are also tobacco, footwear and apparel (textiles & clothing). The US imposes its highest tariffs on tobacco to the value of 350 percent. Also groundnuts (79.08 percent), footwear incorporating a metal toe (37.50 percent), dates (29.80 percent) and babies' garments of synthetic fibres (27.64 percent) face high US import tariffs. Various garments, part of textiles & clothing, are also hit by significant tariffs.

As with the import sectors, these export sectors – though facing very high US import tariffs – constitute only 0.13 percent of Belgian exports to the US.

Table IV.4 Top-30 Belgian exports to the US facing the highest US import tariffs

HS	HS Number (1)	Product (group) name (2)	Export value Belgium to US in thousands (€) (3)	Share of Total exports from the US (%) (4)	Average US import tariff rate at HS6 (%) (5)	Maximum bound tariff at HS6 level (%) (6)
HS	240319	Tobacco Other	10064	0,00278	350,00	350,00
HS	240399	Other Manufactured Tobacco, Tobacco Substitutes, Tobacco Extracts	5347	0,00147	350,00	350,00
HS	240391	"Homogenised" or "reconstituted" tobacco	1839	0,00051	350,00	350,00
HS	200811	ground-nuts	66	0,00002	79,08	131,80
HS	240120	Tobacco, partly or wholly stemmed/stripped	26384	0,00728	77,78	350,00
HS	240110	Tobacco, not stemmed/stripped	42799	0,01180	58,33	350,00
HS	240130	Tobacco refuse	764	0,00021	38,89	350,00
HS	640110	Footwear incorporating a protective metal toe-ca	307	0,00008	37,50	37,50
HS	080410	Dates	46	0,00001	29,80	29,80
HS	611130	Babies' garments of synthetic fibers, knitted or crocheted	314	0,00009	27,64	32,00
HS	640199	Other waterproof footwear with bonded or cemented outer soles	1878	0,00052	27,50	37,50
HS	071220	Onions	612	0,00017	25,55	29,80
HS	611430	Garments of manmade fibers, knitted or crocheted	8535	0,00235	25,03	32,00
HS	640291	Footwear Covering the ankle	10003	0,00276	24,88	48,00
HS	610620	Womens' or girls' blouses and shirts of manmade fibers, knitted or crocheted	5671	0,00156	23,45	32,00
HS	610520	Mens' or boys' shirts of manmade fibers, knitted or crocheted	1469	0,00041	22,80	32,00
HS	640420	Footwear with outer soles of leather or composite	78512	0,02165	20,83	37,50
HS	200850	Apricots prepared or preserved	282	0,00008	19,90	29,80
HS	640299	Other footwear not covering the ankle	57871	0,01596	19,83	48,00
HS	640411	Sports footwear; tennis shoes, basketball shoes	4791	0,00132	18,00	48,00
HS	640419	Other footwear, with outer soles of rubber and uppers of textile	54109	0,01492	17,50	48,00
HS	611030	Sweaters, pullovers, sweatshirts, vests of manmade fibres	54008	0,01489	15,32	32,00
HS	701399	Other glassware incl. toilet, office, indoor decoration or similar purposes	38504	0,01062	15,18	38,00
HS	960310	Brooms and brushes, consisting of twigs or other	121	0,00003	14,40	32,00
HS	610990	T-shirts, singlets, tank tops of textile materials	19738	0,00544	14,05	32,00
HS	640192	Covering the ankle but not Covering the knee	3362	0,00093	14,03	37,50
HS	080719	Other melons (except watermelons) and papayas	85	0,00002	13,98	29,80
HS	160414	Tunas, skipjack and bonito (sarda spp.)	6140	0,00169	11,73	35,00
HS	640610	Footwear uppers and parts thereof, other than stiffeners	1518	0,00042	9,55	33,60

HS	HS Number (1)	Product (group) name (2)	Export value Belgium to US in thousands (€) (3)	Share of Total exports from the US (%) (4)	Average US import tariff rate at HS6 (%) (5)	Maximum bound tariff at HS6 level (%) (6)
HS	071290	Other vegetables; mixtures of vegetables	31110	0,00858	7,81	29,80

Source: WITS (2014)

B. Analysis of main Non-Tariff Measures

In this section we will present and discuss some of the most important EU-US NTMs. We will cover both horizontal NTMs, applicable to all sectors, and sector specific NTMs. Table IV.5 provides an overview of the main horizontal NTMs. On both sides of the Atlantic, firms are faced with regulations that differ between (Member) States, as for some issues there is not a single EU or US federal regulation. An example NTM that forms a hindrance on both sides of the Atlantic is the difference in patent legislation. The US applies the principle of "first to invent" while Europe (and the rest of the world) apply the principle of "first to file". The other barriers in the table are mainly, but not only, applied by the US. The Buy American and Small Business Acts are related to procurement and contracting of third parties. The Buy American Act covers restrictions to government funded purchases with respect to non-domestic end products, while the Small Business Act requires agencies to "set aside" a certain amount of purchases for small businesses. Also burdensome for EU firms is the fact that US customs does not recognise the EU as a country of origin and consequently does also not accept EU certificates of origin. In addition to these more specific cross-cutting measures and restrictions, there are also more general barriers to EU-US trade faced by almost all sectors that lead to delays and additional costs. These barriers concern (sometimes slight) differences in product labelling, testing procedures, or certification, foreign ownership restrictions, limits on nationality of employees, or regulations that are not in line with the international ones.

Given the increased focus on (consumer) safety and the environment during the past years, it is likely that the number of SPS and TBT measures will increase. Whether these additional measures will also result in transatlantic trade barriers is unclear. This could be the case when the EU and the US apply different regulations or measures to try to achieve (almost) the same outcomes (as that is exactly what NTMs are). However, if the EU and the US would apply the same regulations or measures (or recognise each other's systems), this would most likely only lead to additional domestic regulations and costs but not to additional trade costs.

Table IV.5 Main cross-cutting EU–US NTMs and market access restrictions

	Title	Applied by
1	Buy American Act	US
2	Container security initiative (CSI)	US
3	Small Business Act (SBA)	US
4	State-level regulations that differ across states	US
5	US customs refusal of EU origin	US
6	US dual use export control	US
7	Differences in patent legislation	EU/US
8	Double certification need caused by the EU Authorized Economic program and the US customs.	EU/US
9	Foreign ownership restrictions	EU/US

	Title	Applied by
10	Different Member State regulations	EU
11	Different Member State investment regimes	EU

Sources: EU Market Access Database, Ecorys (2009), Ecorys (2016), WTO I-TIP

The main sector specific NTMs are presented in Table IV.6 below. Some important and burdensome sector specific NTMs and market access restrictions applied by the US are the Fly American Act, Grade A Dairy, the Corporate Average Fuel Economy Payment (CAFE), and The Jones Act. The Fly American Act is an NTM in the air transport sector, which requires that all federal government funded flights are provided by US flagged air carriers. Although it is a horizontal issue, the foreign ownership restrictions are quite severe for this sector. The Jones Act can be found in another transport sector, maritime transport services. According to The Jones Act only vessels that are owned, built, documented, and crewed by the US are allowed to ship/(un)load goods between US state harbours. Slightly related is the CAFE payment in the automotive sector. The measure is related to the environment and concerns a tax when fuel efficiency is lower than 27.5 miles per gallon. Grade A Diary regulations concern the agriculture sector and are applied to milk products. The US Food and Drug Administration (FDA) has set rules and inspection requirements for firms that want to trade these milk products. According to the EU Market Access Database, only two EU firms have been able to meet all provisions and finance the inspections conducted by US state officials.

American firms often complain about the EU agriculture (safety) measures that constitute NTMs. The EU does not allow any beef on the market that is treated with hormones or pork that is treated with ractopamine. Moreover, the EU protection of geographical indicators is seen by the US as unnecessary and protectionism. Another measure that has often been discussed is the EU Registration, Evaluation, Authorisation and Restriction (REACH) of Chemicals and its differences with the US Toxic Substances Control Act (TSCA).

Table IV.6 Main Sector EU - US NTMs and market access restrictions

	Title	Sector	Applied by
1	Discrimination with regards to wet leasing	Air transport	US
2	Fly American Act	Air transport	US
3	Farm bill (US farm subsidies)	Agriculture/process foods	US
4	Grade A Dairy	Agriculture/process foods	US
5	Strict and time consuming approval procedures for plants, fruits and vegetables	Agriculture/process foods	US
6	Corporate Average Fuel Economy payment (CAFE)	Automotives	US
7	Differences in safety testing (producer vs. testing agency)	Automotives	US/EU
8	Gas Guzzler tax	Automotives	US
9	Application of different versions of the National Electrical Code (NEC) by local authorities in tendering	Electronics and electrical equipment	US/EU
10	100% collateral requirement on reinsurance business and discriminatory tax treatment	Financial services	US
11	Foreign Account Tax Compliance Act (FATCA)	Financial services	
12	Local content requirements	Iron, steel and non-ferrous metals	US

	Title	Sector	Applied by
13	Differences in standards and technical specifications used in tenders	Machinery	US
14	Third party testing for machinery with a high risk potential	Machinery	US
15	US Non Road Mobile Machinery (NRMM) Global Technical Regulation	Machinery	US
16	The Jones Act	Maritime transport	US
17	US flagged vessel regulation	Maritime transport	US
18	Classification of over the counter drugs (OTC)	Pharmaceuticals	US
19	FDA new drug approval processes	Pharmaceuticals	US
20	Lacey Act – import declaration requirements	Wood, pulp and paper	US
21	Operating restrictions at airports	Air transport	EU
22	Ban on hormone treated beef	Agriculture/process foods	EU
23	Prohibition of ractopamine in pork production	Agriculture/process foods	EU
24	Protection of Geographical Indicators (GI)	Agriculture/process foods	EU
25	EU/international standards differ from US standards	Automotives	EU/US
26	REACH	Chemicals	EU
27	Restriction on the use of dangerous substances	Chemicals	EU
28	Restriction on the use of Hazardous Substances (RoHS)	Electronics and electrical equipment	EU
29	Waste Electrical and Electronic Equipment (WEEE) Directive	Electronics and electrical equipment	EU
30	Different Member State regulation regarding off road machinery	Machinery	EU
31	Third party testing for machinery with a high risk potential	Machinery	EU
32	Limitations on cabotage	Maritime transport	EU
33	Differences in Good Manufacturing Practices (GMP)	Pharmaceuticals	EU

Sources: EU Market Access Database, Ecorys (2009), Ecorys (2016), WTO I-TIP database

V. The Economic Impact of TTIP for Belgium

In this Chapter, we focus on the expected economic impact of TTIP for the Belgian economy as a whole. In particular, we will look at the following economic variables in more detail:

- The effect of TTIP on Belgian macro-economic variables (national income, GDP, total exports and imports, bilateral Belgian-US exports and imports, consumer prices, producer prices and terms of trade;
- The effect of TTIP on the Belgian economy at sector level – looking at 20 sectors (the same ones as in CEPR (2013) for comparative reasons – to compare the results to those used by the DG Trade negotiators;
- The effect of TTIP on SMEs in Belgium;
- The effect of TTIP on value added in the Belgian economy.

To this purpose, we have defined four different scenarios as explained in the previous Chapter, and as presented in Table III.2.

For the purpose of this study, we will mainly focus on comparing Scenarios B and D – the two Brexit-inclusive scenarios through two different modelling approaches (because the focus is on the potential impact of TTIP on Belgium, not on Brexit). However, because Brexit is the reality of the day, the final section of this Chapter will compare GDP and trade flows for all four scenarios – to highlight also the Brexit impact for Belgium, the UK, the EU-26, the US and other countries and country groupings.

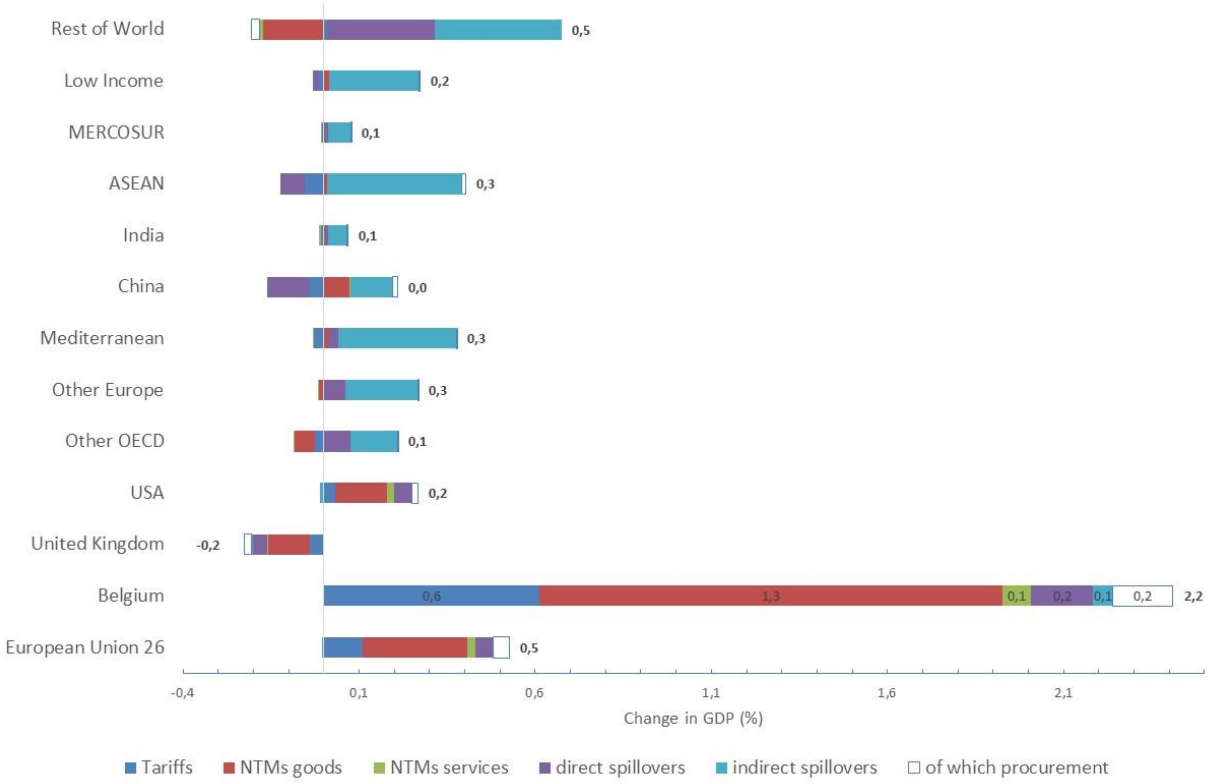
A. TTIP-effects on the Belgian macro-economy

In this section we discuss the estimated impact on Belgian macro-economic variables while also presenting the predicted GDP for other regions. As said above, we will focus on two scenarios in detail, both assuming that the UK is excluded from the agreement (all other scenario results assuming that the UK remains in the TTIP agreement can be found in part in Section V.E of this Chapter.

We start by looking at the impact of the agreement on all regions in terms of GDP changes. Figure V.1 depicts the estimated changes in GDP, showing also how each component contributes to the total impact for Scenario B (CEPR + Brexit). Among all regions, Belgium is estimated to be the biggest beneficiary of the agreement. The Belgian GDP is estimated to increase by 2.2 percent (excluding public procurement that would add another 0.2 percentage point). The most important part contributing to this positive impact, similarly for the other signatories of the agreement, pertains to reductions in NTMs in goods. Reducing regulatory divergences for goods alone, when trading with the US is estimated to result in a 1.3 percent GDP increase for Belgium.

The total impact for the rest of the EU is estimated to be 0.47 percent and for the USA 0.24 percent (excluding public procurement). For most countries/regions which are not signatories to the agreement, reductions in NTMs would result in minor negative impact on their levels of GDP (except for China), due to trade diversion effects. On the other hand, indirect spillover effects for all other regions are estimated to have a positive impact, contributing to a small increase in their level of GDP in total. The UK is expected to lose 0.2 percent of GDP by not being in TTIP.

Figure V.1 Estimated GDP changes (PPP, 2014 baseline, Scenario B)



In Figure V.2, we present the estimated GDP changes for all regions under Scenario D (Egger et al. (2015) + Brexit). The main difference here is that for Scenario D we used the methodology of Egger et al. (2015) (instead of CEPR 2013), whereby we estimate NTMs directly and assume liberalization in NTMs based on evidence from existing trade agreements. It turns out that using this methodology, estimated effects are significantly larger. This is interesting because it is this approach that is grounded in empirics of existing FTAs and what we measure in reality.

We estimate an 8.7 percent increase in Belgium's GDP of which 1.4 percent is due to liberalization in procurement. The reason for the difference is due to NTMs, with the increase in GDP coming from tariff liberalization is about the same as under Scenario B. On the other hand, while under Scenario D we estimate a 5.4 percent increase in Belgian GDP resulting from NTM alignment, this was only estimated to be 1.3 percent under Scenario B. Given the greater positive impact from NTM alignment under Scenario D, both direct and indirect spillover effects are also larger. Consequently, also third regions which are not part of the agreement, are estimated to gain more. Most importantly, this applies to the ASEAN region, which is estimated to have a 2.4 percent total increase in its GDP, mostly due to indirect spillovers, because of TTIP.

Figure V.2 Estimated GDP changes (PPP, 2014 baseline, Scenario D)

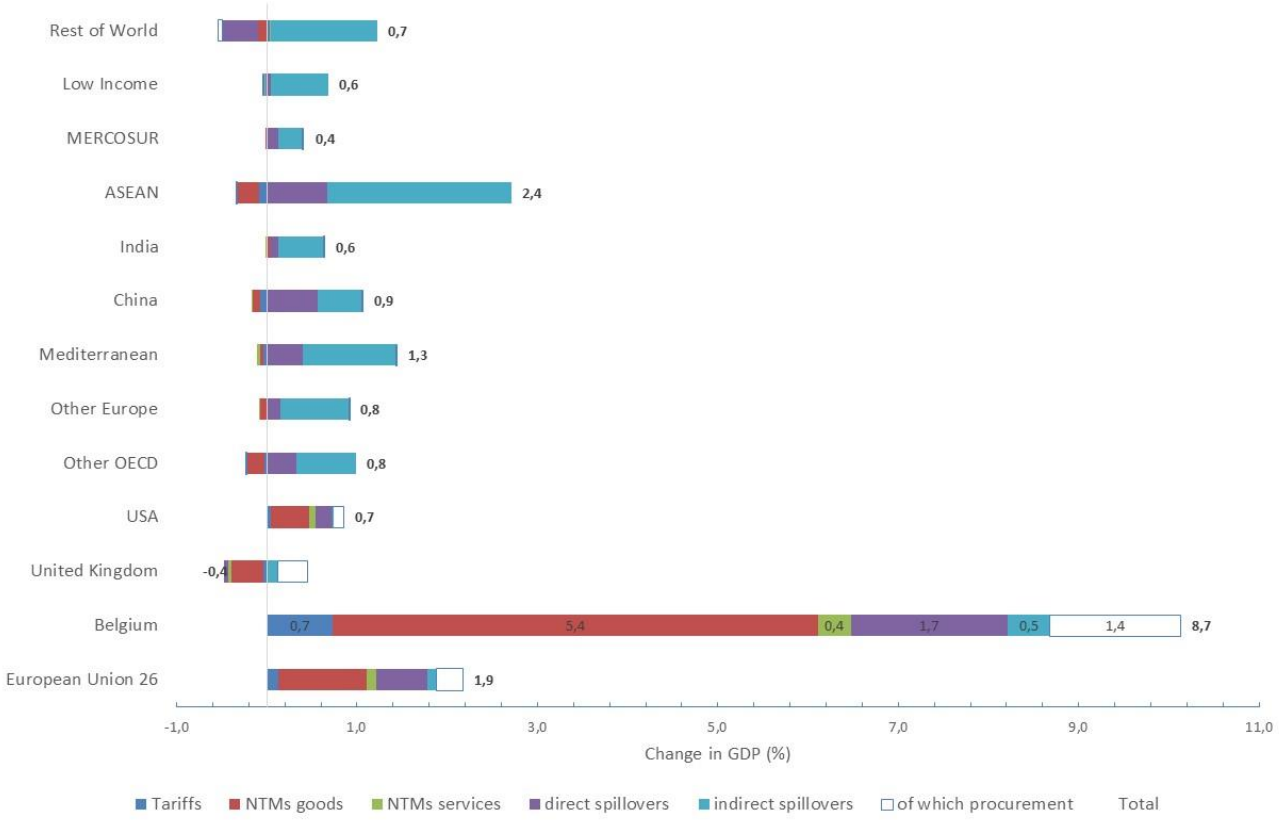
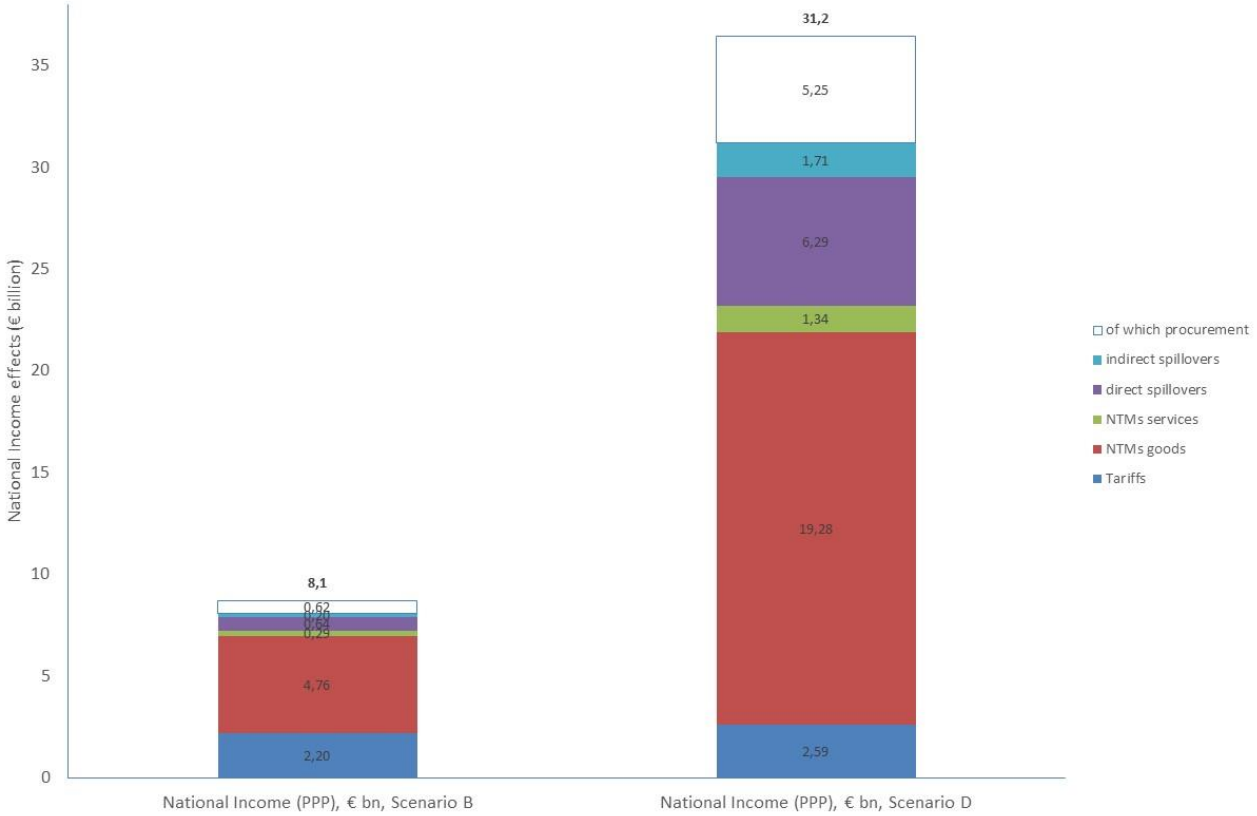


Figure V.3 Estimated impact of TTIP on Belgian National Income (Scenarios B and D)



The corresponding estimated change in Belgian national income is estimated to be an increase by about € 8.1 bn under Scenario B, and an increase of about € 31.2 bn under Scenario D (excluding public procurement effects) as presented in Figure V.3. Similar to the decompositions discussed above, the main contributor to the national income gains is the reduction in NTMs for goods. Gains from tariffs, given the similarity in modeling assumptions, are similar under the two scenarios, and amount to around € 2.2 bn to € 2.6 bn in terms of national income increase. Because public procurement is under discussion at the moment and the level of ambition in TTIP in doubt, we have not included the effects in the totals – but do present the potential graphically. Under Scenario D, assuming more ambitious alignment of NTMs in line with evidence from existing deeper FTAs, the gains become considerably more important, with the Belgian national income estimated to increase by almost € 20 bn due to NTM alignment in goods under Scenario D. We have split out the potential gains from public procurement but not added it to the national income effects. In case there is an agreement on public procurement (even if only at federal level with the US), this element can be added to the potential positive national income effects.

Figure V.4 (Scenario B) and Figure V.5 (Scenario D) present estimated changes in consumer prices along with estimated GDP changes for Belgium (GDP changes are the same as those presented in Figure V.1 and V.2, presented here for comparison reasons). Consumer prices are estimated to increase marginally, by 0.2 percent and 0.3 percent. This may seem counter-intuitive when TTIP aims to reduce regulatory differences lowering costs for firms. Under both methodologies, NTM alignment on goods contributes most to this small positive increase in consumer prices (recall that NTM alignment was also the most important driver behind the increase in Belgian GDP). Underling these changes is a reduction in most goods prices for consumers, most importantly of chemicals (by 1.8 percent under Scenario B), which is accompanied by an increase in services prices because services are in higher demand with manufacturing industries growing. Because services are relatively more important for consumer prices, this leads to an overall increase in consumer prices. While the import prices of most goods and services fall, the domestic prices of goods and services increase with the exception of chemicals, which falls by 6.1 percent. Given the higher share of domestic services for consumers, this leads to a small overall price increase. These are mainly driven by an expansion of the Belgian economy driven by the chemicals sector, generating increased demand and small price increases.

Changes in aggregate exports, imports and terms of trade under Scenario B are presented in Figure V.6 and under Scenario D in Figure V.7. Aggregate exports under both methodologies are estimated to increase more than imports, the estimated growth in exports being 4.8 percent under Scenario B and 16.5 percent under Scenario D, while imports are expected to rise by 3.1 percent and 10.7 percent respectively. This gap is mainly due to increasing exports to other regions than the US, while imports from other regions, most importantly from other EU regions is estimated to increase only to a smaller extent. We discuss this in more detail next, by looking at the estimated changes in *bilateral* exports and imports.

Figure V.4 Estimated change in Belgian consumer prices and GDP (%, Scenario B)

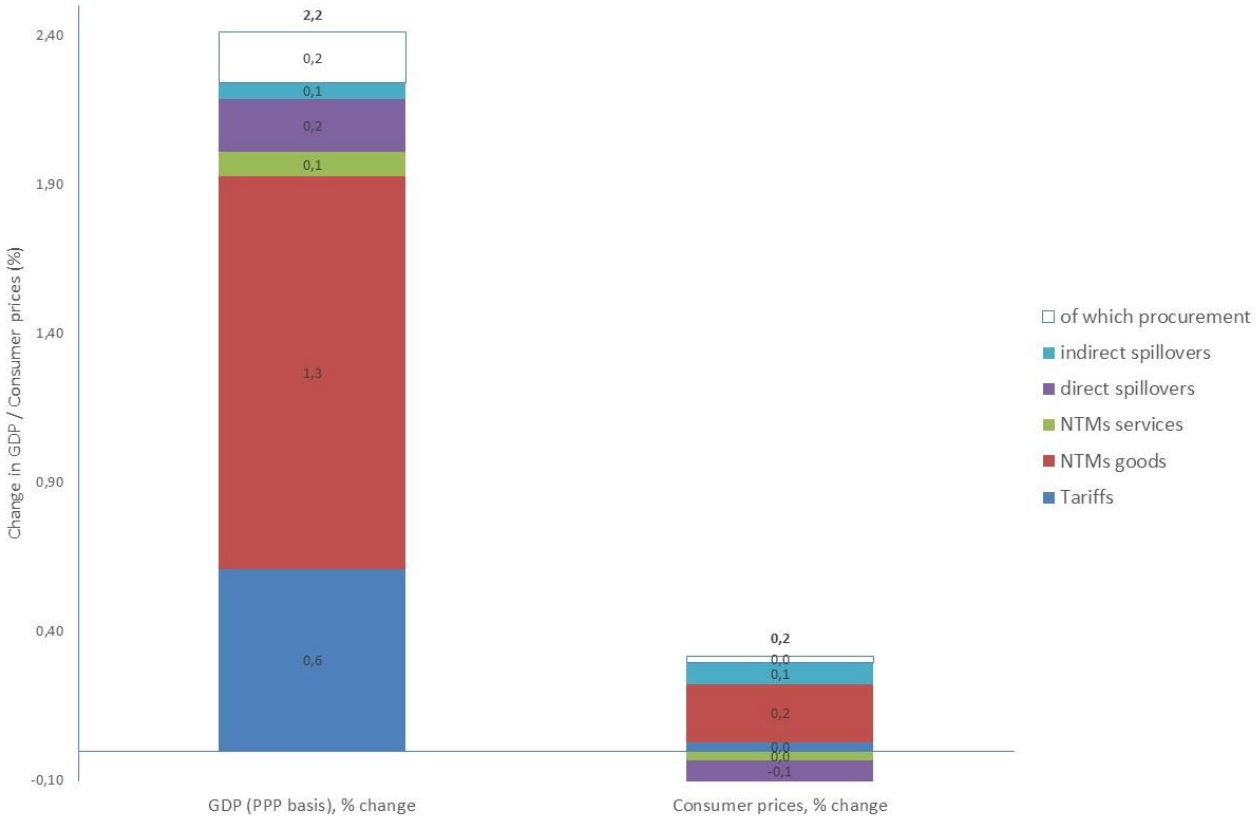


Figure V.5 Estimated change in Belgian consumer prices and GDP (%, Scenario D)

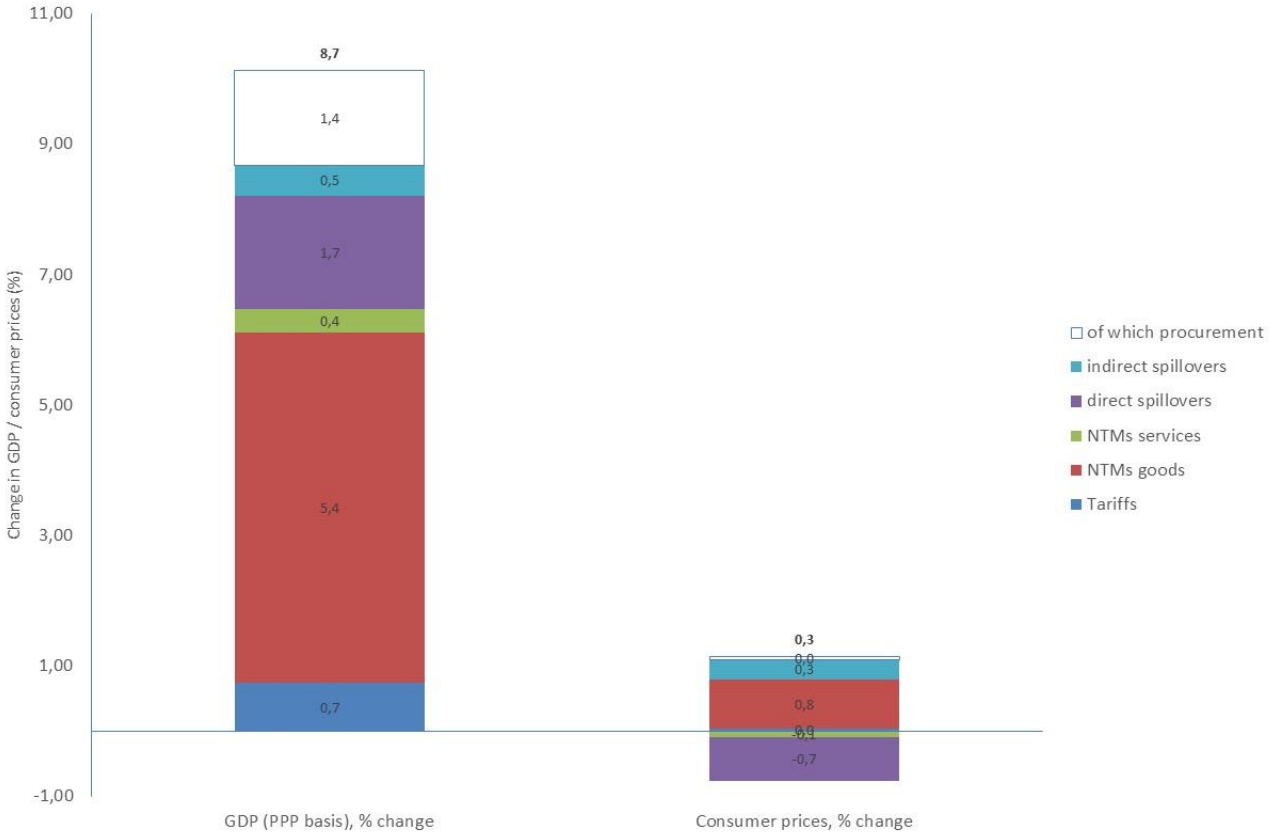


Figure V.6 Estimated changes in exports, imports, and terms of trade (Scenario B)

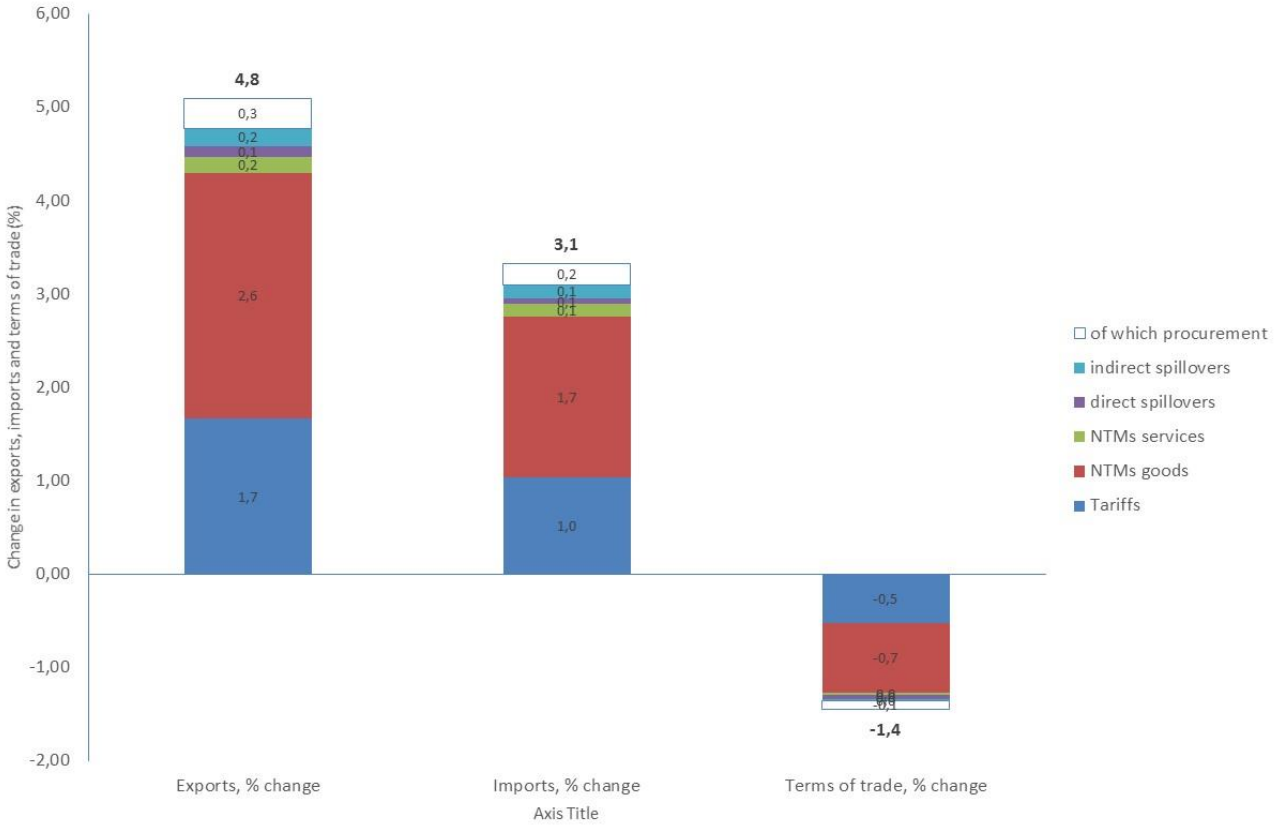
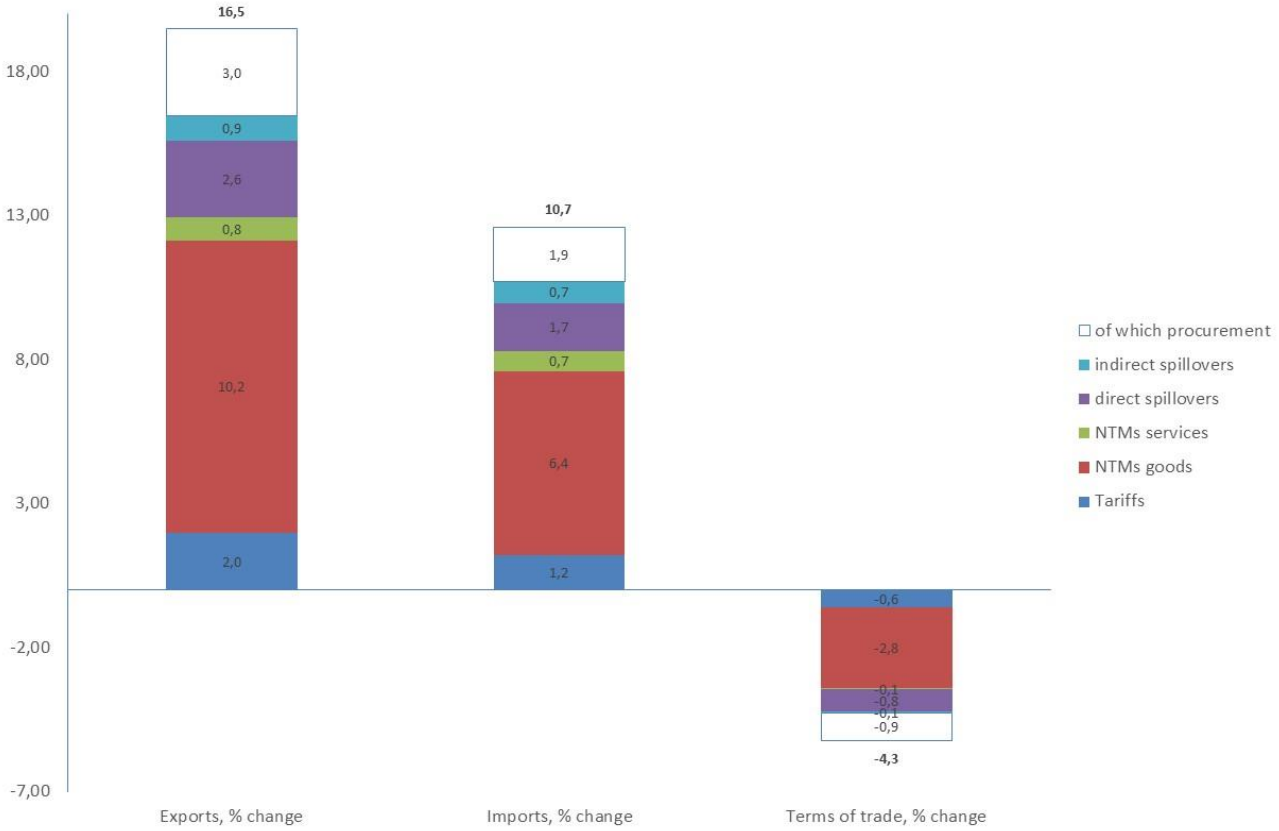


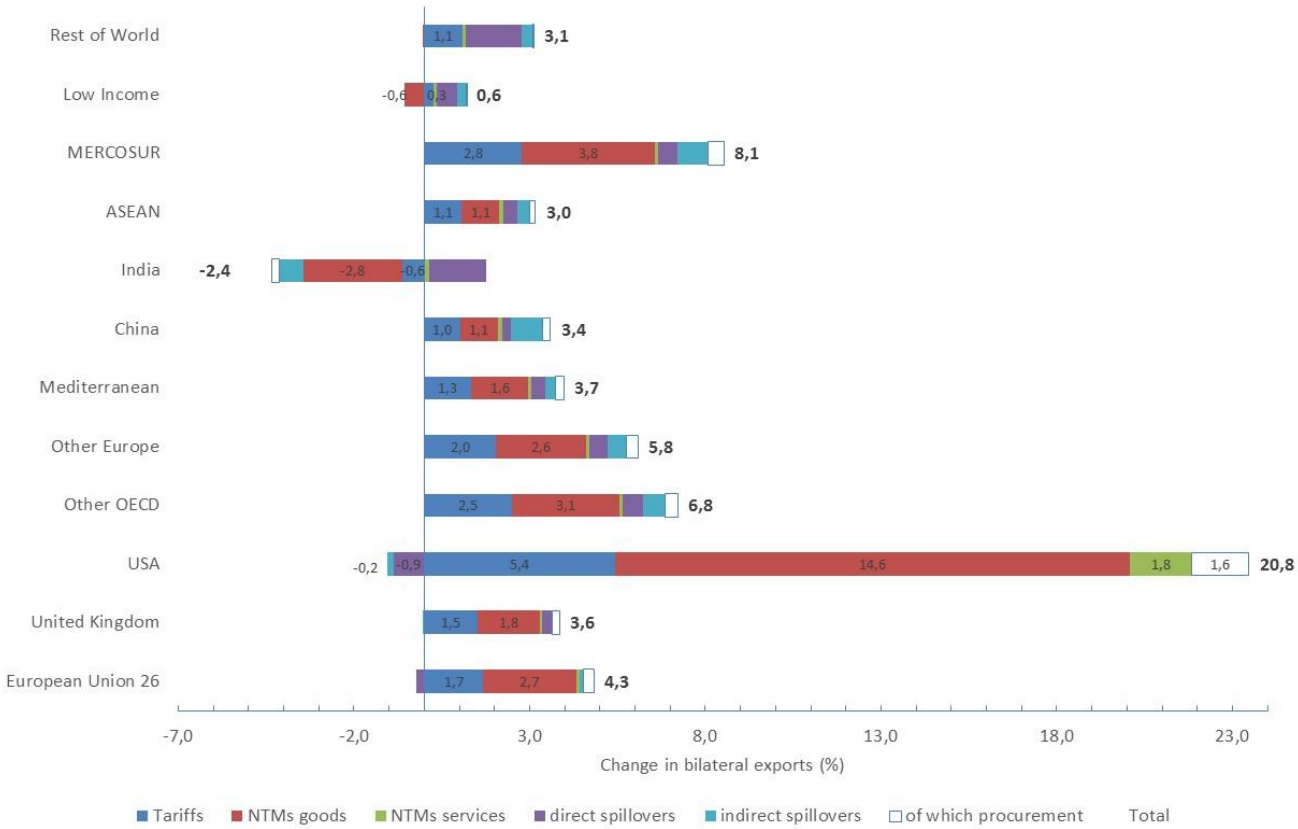
Figure V.7 Estimated changes in exports, imports, and terms of trade (Scenario D)



Estimated changes in how Belgium's bilateral exports towards different regions are presented in Figure V.8 and Figure V.9. While Figure V.8 shows results under Scenario B, Figure V.9 presents results under Scenario D. As before, given the more ambitious evidence-based TTIP under Scenario D, the impact is estimated to be considerably greater. Based on Figure V.8, Belgium's exports would increase by about 21 percent vis-à-vis the US, most of this, again, driven by NTM reductions on goods (amounting to 14.6 percent), while only about 5.4 percent of the increase is driven by tariff reductions. Belgium's exports would increase towards most all other destinations as well.

The magnitude of the impact of the agreement under Scenario D is estimated to be much more pronounced as can be seen in Figure V.9. Belgium's exports to the US would increase by 68 percent. As before, most of the difference between the impact under the two scenarios is coming from NTMs. Under Scenario D, exports to the US are expected to increase by 52 percent due to reductions in NTMs in goods, and 10 percent due to alignment of NTMs in services.

Figure V.8 Belgium's bilateral exports changes (Scenario B)

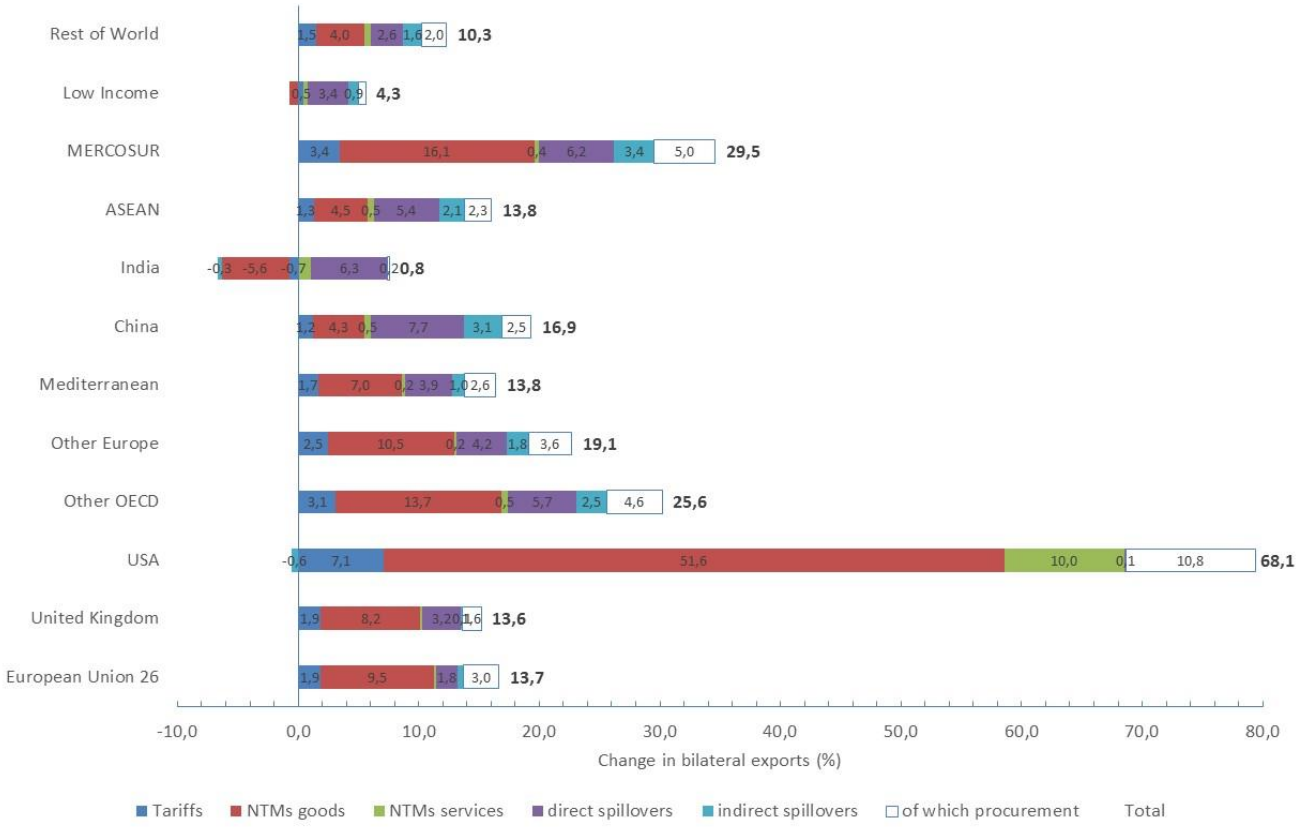


The two other regions towards which Belgium's export is estimated to increase the most are Mercosur and "other OECD" countries. This is driven by the chemical sector, since exports in the chemical sector increase the most and not only towards the US, as Belgium is an important producer and exporter of chemical products. Chemical exports to Mercosur and other OECD countries prior to the agreement are relatively more important than towards other regions.[24] As the chemical sector expands and the sector is becoming more competitive because of lower costs and lower import prices, exports of this sector increase even further, with destinations

[24] About 40 percent of Belgian exports to Mercosur consisted of chemical exports in the base year. For 'other OECD' countries this share was 35 percent.

towards which chemical exports are relatively more important experiencing higher degrees of increases (i.e. Mercosur and other OECD countries).

Figure V.9 Belgium's bilateral export changes (Scenario D)



Next we present the estimated changes in bilateral imports, again presenting both results under Scenarios B and D in Figure V.10 and Figure V.11. There is a slightly higher increase in imports from the US than exports to the US under both estimates, with imports estimated to increase by 24 percent under Scenario B and by 79 percent under Scenario D. Imports from other regions on the other hand are estimated to increase less than Belgian exports to these regions, most increasing by about 9 to 12 percent. Imports from other EU countries are estimated to increase only by about 2 percent while imports from the UK are expected to decrease by 1.5 percent because under these scenarios, there is no further liberalization between Belgium and other EU countries. In addition, the UK here is assumed not to participate in the agreement (i.e. Brexit).

Figure V.10 Belgium's bilateral import changes (Scenario B)

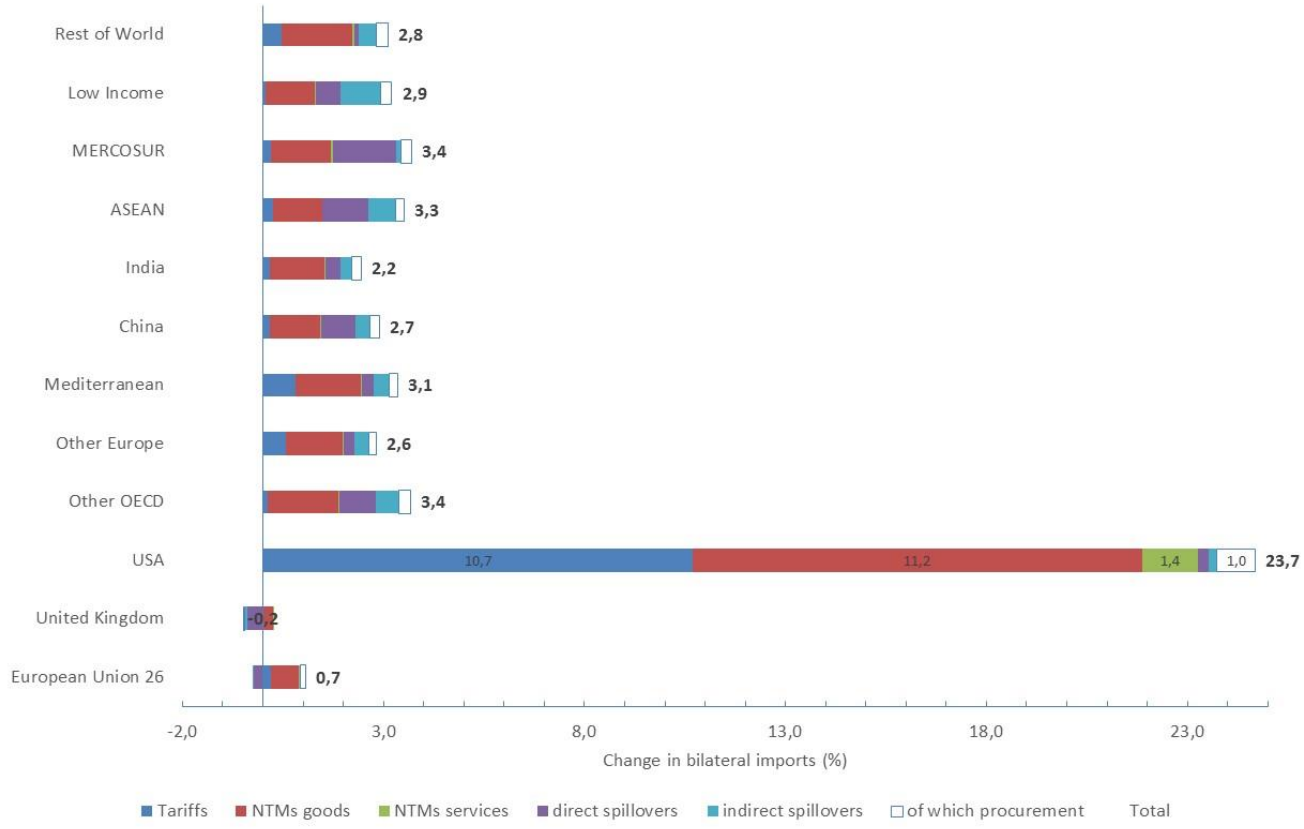
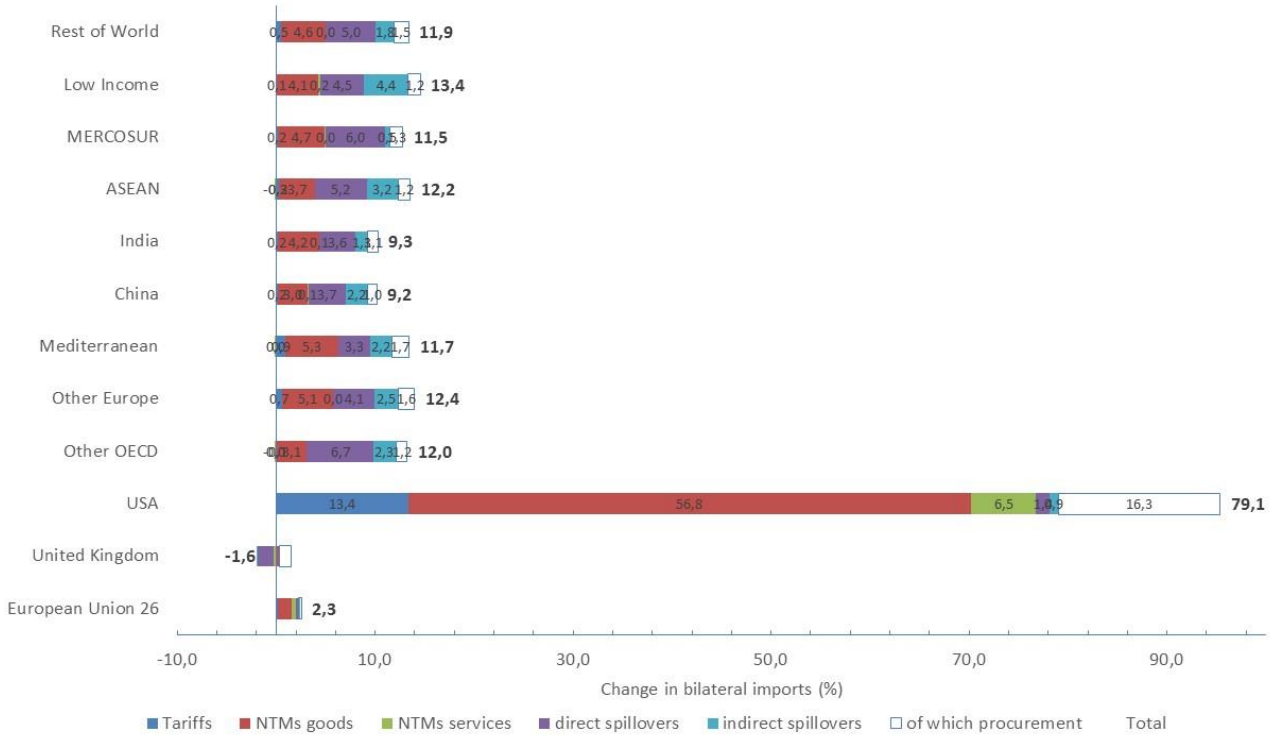


Figure V.11 Belgium's bilateral import changes (Scenario D)



In order to provide a better understanding about what drives these aggregate results, in the following section we discuss the potential impact of the TTIP agreement at sectoral level.

B. Sectoral TTIP-effects for the Belgian economy

We see in Table V.1 and Table V.2, that under both Scenarios, the most pronounced increase in output is estimated to take place in chemicals, which is a relatively important sector amounting to about 6 percent of total value added in the Belgian economy. Under Scenario B, the estimated output change in this sector would be 17 percent, while under Scenario D, given the more ambitious NTM alignment based on evidence of existing trade agreements, the increase is estimated to be quite substantial, amounting to about 55 percent. The expansion in this sector is for the lion's share driven by increases in exports (about 88 percent of the output increase in this sector is due to increased demand for Belgian exports in the sector under Scenario D). Domestic firms also increase their demand for domestic output in the sector, mostly as intermediate inputs for further processing. While exports to the US increase in some sectors even more than that of chemicals, the increase of Belgium's exports to other countries mostly increases with a focus on the chemical sector. This is due to substitution effects. This also helps drive the output increase in the sector.

The Belgian chemicals sector is the sector among all Belgian sectors (in our sectoral aggregation) which imports the biggest proportion of inputs for further processing (15 percent of total inputs). Imported inputs are also quite vital in the sector production, since about half of all inputs going into the sector are imported. Hence as tariff liberalization combined with regulatory cooperation in the chemical sector are assumed to be relatively substantial, the impact on the sector is substantial as well. Additionally, Belgium is an exporter of chemicals, having already established a comparative advantage in the sector. About 30 percent of Belgium's total exports towards the EU and the US are in chemical products (27 percent in all exports), indicating that Belgium has a comparative advantage in this sector. As the assumed tariff liberalization and regulatory alignment in TTIP is estimated to take place, Belgium is able to expand even further its exports in this sector.

Other sectors which are estimated to expand by more than 2 percent under Scenario B are beverages and tobacco, petrochemicals, construction, and other services. For sectors where NTM alignment is relatively more important (directly or indirectly), the estimates under Scenario D lead to considerably larger effects. The other services sector for example, which is a quite important sector in the Belgian economy, accounting for almost 10 percent of total value added, is estimated to expand by 10 percent under Scenario D. The expansion in the other services sector is entirely driven by increased domestic demand, mostly by increased private demand as private income increases, and also due to increased demand by firms for these services, although to a lesser extent.

On the other hand, the sector with the most pronounced contraction is the 'other machinery' sector, which is estimated to contract by 9 percent under Scenario B, and by 27 percent under Scenario D. This is a sector slightly less importance, contributing 3 percent to Belgian value added. Other sectors which are also estimated to contract by more than 1 percent under Scenario B are agriculture, forestry and fisheries, electrical machinery, other transport equipment, and other manufactures. The reductions in output in these sectors are mostly driven by general equilibrium effects. More specifically, as Belgium expands it chemical sector quite significantly,

which is the sector where the country has had an important comparative advantage to start with, given the limited availability of resources in the economy, resources from other sectors are pulled in to enable the increase of chemical outputs. This implies that these same resources must be (simultaneously) pulled out from other sectors, resulting in a drop in these sectors' output. This is what we call the 'pull-effect'. A sector declines not because of lack of competitiveness but because of other sectors drawing away capital and labour resources.

Table V.1 Belgian Output changes (2014 baseline, % change, Scenario B)

Sectors	Tariffs	NTMs goods	NTMs services	direct spillovers	indirect spillovers	of which procure-ment	Total
Agr forestry fisheries	-0,6	-0,7	0,0	0,0	0,0	-0,1	-1,3
Other primary sectors	0,0	-0,1	0,0	0,1	0,0	0,0	0,0
Processed foods	-0,1	0,4	0,0	-0,6	0,3	0,1	0,1
Beverages and tobacco	0,3	2,4	0,1	-0,1	0,3	0,2	3,0
Chemicals	6,2	10,4	0,1	-0,4	0,8	1,1	17,1
Metals and metal products	-0,3	-0,6	0,0	0,0	-0,1	-0,1	-0,9
Electrical machinery	-0,4	-0,6	0,3	-0,2	-1,0	-0,5	-2,0
Motor vehicles	-0,2	2,2	0,0	-0,4	0,3	0,3	1,9
Other transport equipment	-2,1	-1,3	0,0	-0,5	-0,1	0,1	-4,0
Other machinery	-2,7	-6,6	0,1	1,1	-1,0	-0,4	-9,0
Wood and paper products	0,1	-0,2	0,0	-0,5	0,1	0,0	-0,5
Petrochemicals	0,9	1,5	0,0	-0,1	0,2	0,2	2,6
Other manufactures	-1,0	-2,9	0,2	1,3	-0,6	-0,2	-3,1
Construction	1,0	1,7	0,1	0,2	0,1	0,2	3,1
Air transport	0,3	0,2	0,1	0,2	0,1	0,0	0,8
Water transport	0,0	0,1	0,0	0,2	0,4	0,0	0,7
Other transport	0,2	0,2	0,0	0,2	0,1	0,0	0,7
Trade	0,5	1,1	0,1	0,2	0,1	0,2	2,0
Communications	0,0	-0,2	-0,2	0,0	0,0	0,0	-0,4
Finance	-0,1	-0,3	0,1	0,0	0,0	-0,3	-0,3
Insurance	0,1	0,3	0,5	0,1	0,1	0,1	1,1
Business services	0,3	0,4	0,0	0,1	0,0	0,1	0,8
Personal services	0,1	0,4	0,0	0,1	0,0	0,1	0,6
Public services	0,1	0,5	0,0	0,1	0,0	0,1	0,8
Other services	0,7	1,5	0,1	0,2	0,1	0,2	2,6

Source: own calculations

Table V.2 Belgian Output changes (2014 baseline, % change, Scenario D)

Sectors	Tariffs	NTMs goods	NTMs services	direct spillovers	indirect spillovers	of which procure ment	Total
Agr forestry fisheries	-0,7	-3,7	-0,1	-1,7	0,4	-1,1	-5,8
Other primary sectors	0,0	-0,5	0,0	-1,0	-0,2	-0,2	-1,6
Processed foods	-0,1	0,0	0,2	-0,1	0,5	0,0	0,5

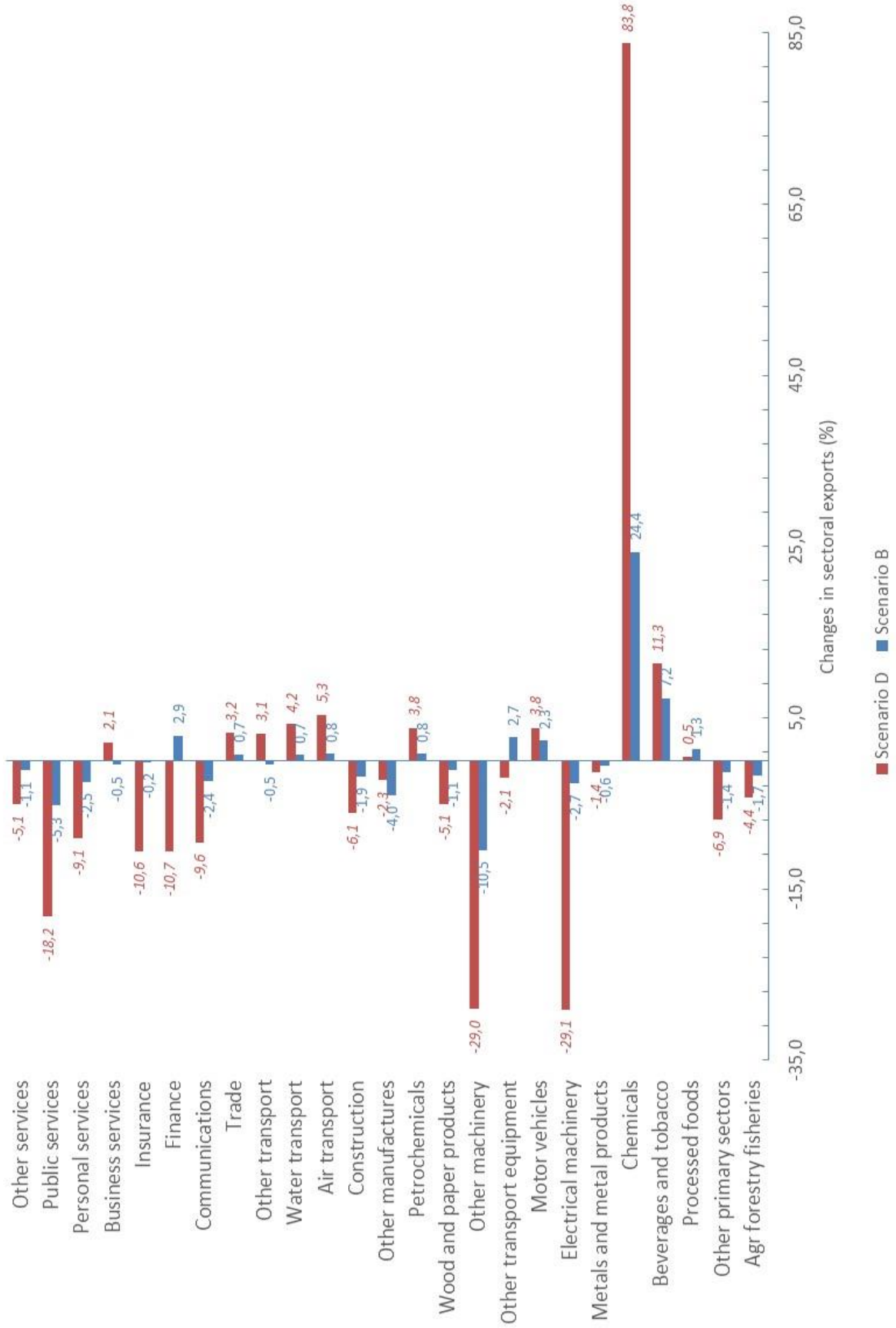
Sectors	Tariffs	NTMs goods	NTMs services	direct spillovers	indirect spillovers	of which procure ment	Total
Beverages and tobacco	0,4	4,9	0,4	1,1	0,8	1,0	7,5
Chemicals	7,2	38,9	0,0	6,3	2,7	10,8	55,2
Metals and metal products	-0,3	-2,0	0,2	-0,3	-0,2	-0,9	-2,5
Electrical machinery	-0,5	-15,5	1,6	-2,9	-3,7	-2,2	-21,0
Motor vehicles	-0,4	3,1	0,1	-0,3	0,5	-0,1	3,1
Other transport equipment	-2,2	-8,0	0,2	-1,2	-0,6	-2,9	-11,8
Other machinery	-2,7	-20,8	0,6	-1,6	-2,4	-5,0	-26,9
Wood and paper products	0,0	-0,7	0,3	0,4	-0,1	0,3	0,0
Petrochemicals	1,1	5,4	0,2	2,1	0,8	1,7	9,6
Other manufactures	-1,3	-4,3	1,3	3,6	-1,2	-0,3	-1,9
Construction	1,2	6,9	0,5	2,5	0,7	2,1	11,9
Air transport	0,3	1,0	0,4	1,2	0,6	0,7	3,5
Water transport	0,0	-0,2	0,6	2,3	1,8	0,3	4,5
Other transport	0,2	0,8	-0,1	1,0	0,8	0,5	2,7
Trade	0,6	4,3	0,6	2,0	0,5	1,4	8,0
Communications	0,0	-0,8	0,3	0,5	0,1	0,0	0,0
Finance	-0,1	-1,1	0,2	0,2	0,0	-0,1	-0,7
Insurance	0,2	1,3	0,3	0,9	0,2	0,4	2,8
Business services	0,4	1,3	0,2	0,6	0,4	0,7	2,8
Personal services	0,1	1,4	0,1	0,7	0,2	0,4	2,6
Public services	0,2	1,9	0,2	0,7	0,2	0,5	3,1
Other services	0,9	6,1	0,4	2,1	0,5	1,7	10,0

Source: own calculations

Changes in exports by manufacturing sectors for goods roughly follow trends in output. This is not the case for many of the services sectors, as the expansion in those sectors are mainly driven by increased domestic demand instead of the increased export demand like for manufacturing goods. Exports in percentage terms of chemicals is estimated to rise somewhat more than its output, with the main driver for the expansion of this sector's output being an increase in exports. Exports in this sector are predicted to increase by 24 percent under Scenario B and 84 percent under Scenario D.

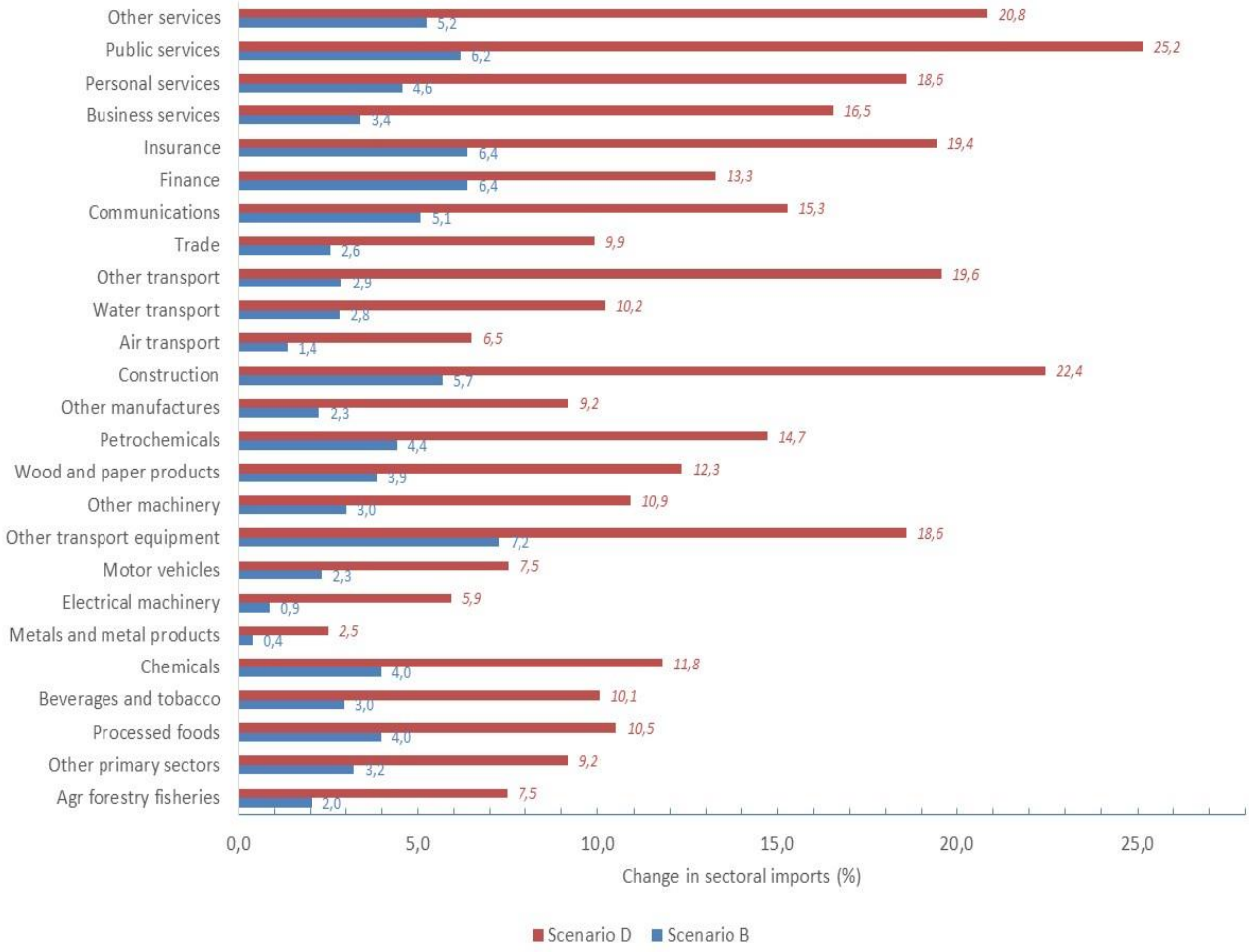
On the other hand, the sectors which are expected to experience the most important reduction in exports are other machinery and electrical machinery, which is again in line with changes in output. As output drops in these sectors due to general equilibrium effects, as we saw above, exports in these sectors also drop. Exports of other machinery and electrical machinery are estimated to contract by 11 percent and 3 percent respectively under Scenario B and by 29 percent each under Scenario D.

Figure V.12 Changes in sectoral exports (% change, Scenarios B and D combined)



The estimated changes in sectoral imports show less variance between sectors, with no estimated decrease in imports in any sector (see Figure V.13). Imports in all sectors are estimated to increase, with imports estimated to grow more on average in services sectors under both Scenarios B and D. The highest rise in import is expected to happen in public services and construction among the services sectors, and in other transport equipment among the goods sectors, as demand in Belgium for these sectors grows as domestic resources are shifted more towards the chemical sector. The difference in the magnitude of the impact between the two Scenarios is greater for services than for goods, as what drives the dissimilarities are the differences between assumptions about NTM alignment, while tariff liberalization assumptions are quite similar.

Figure V.13 Changes in sectoral imports (% change, Scenarios B and D combined)



While the sector in which exports increase the most is the chemicals sector, it can be seen from the Figure that imports also increase in this sector, although to a smaller extent. The reason for the increase in imports of this sector is that as the chemical sector expands significantly in Belgium, there is an increased demand for inputs, which are also coming from the chemicals sector. Hence most of the increased import in the sector is destined to be used for further processing by Belgium's own chemical sector.

Changes in consumer prices by sector are presented in Figure V.14. The most pronounced reduction is estimated to take place in prices of chemical products under both Scenarios. This

is in line with the developments described above, with the chemical sector expanding the most in the economy. For most sectors the decline in consumer prices come from lower import prices as barriers to imports are reduced. The sectors where reductions in domestic prices further contribute to the reduction in prices are the chemicals, petrochemicals, water transport and air transport sectors. In the case of services sectors, for most sectors consumer prices increase. This is driven by the increase in domestic prices, as services become more expensive in the domestic economy.

Figure V.14 Changes in consumer prices (% change, Scenarios B and D combined)

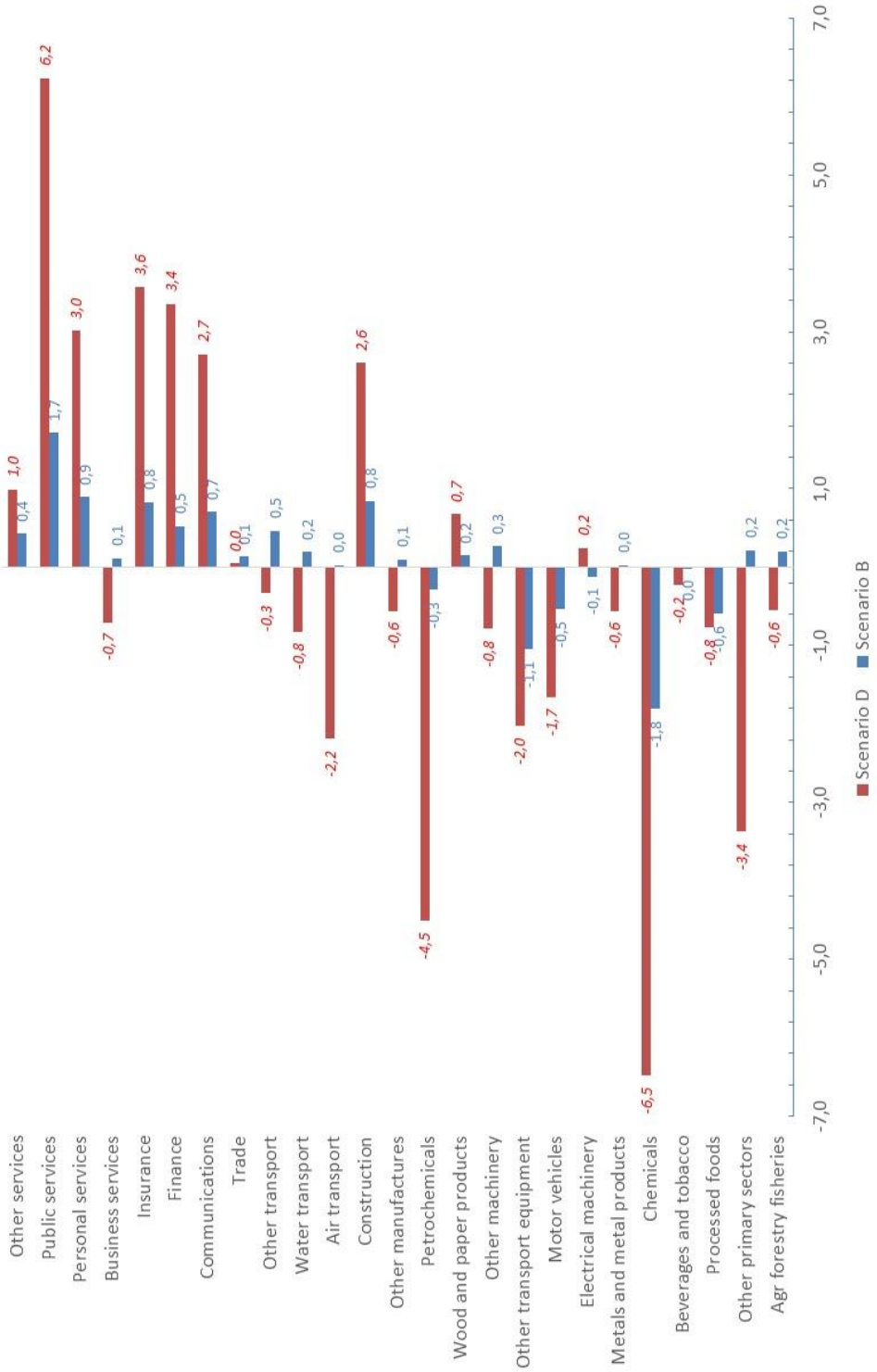
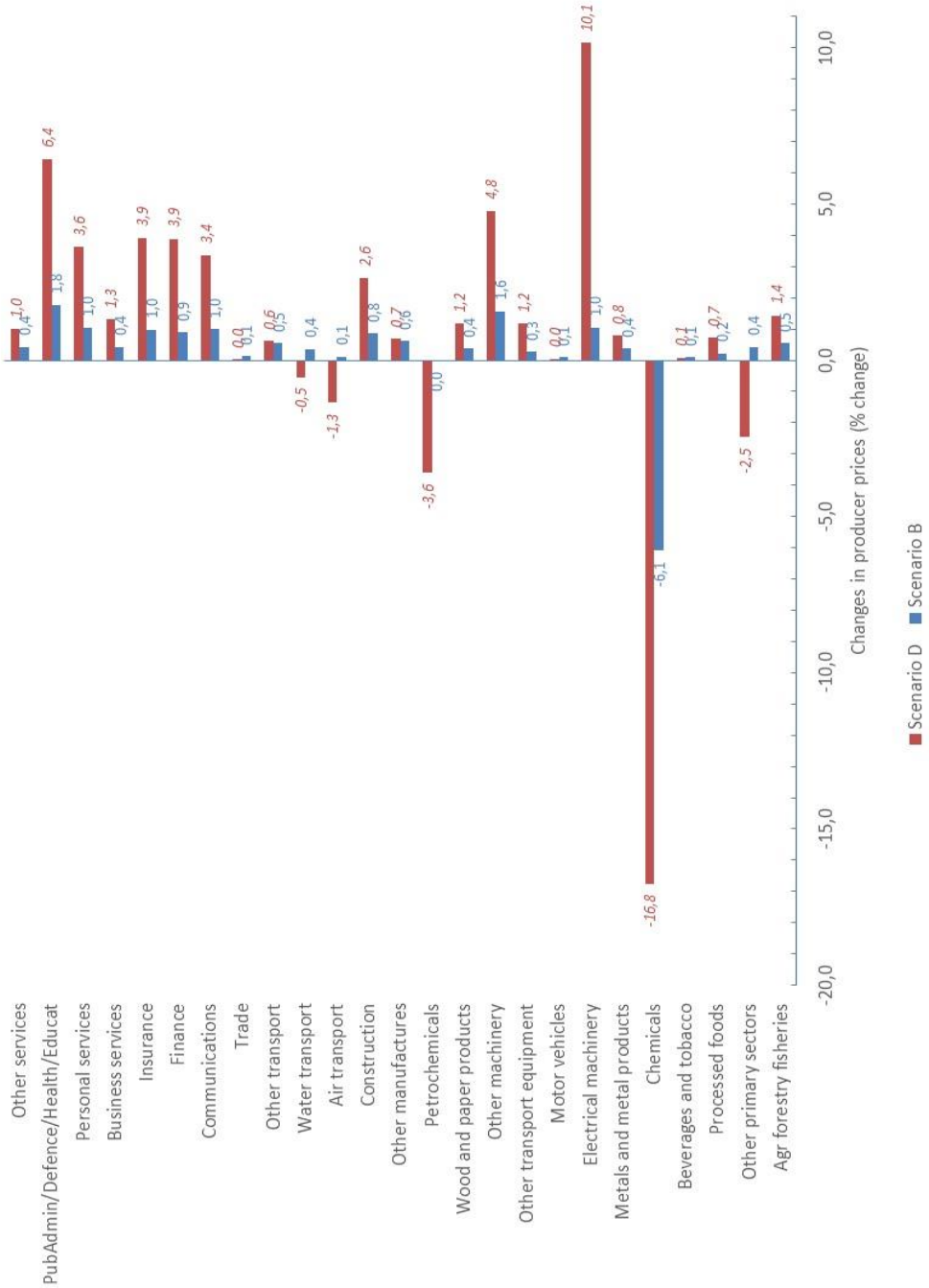


Figure V.15 shows that producer prices in the chemical sector drop even more than consumer prices in the sector. Producer prices in the sector decrease by about 6 percent under Scenario B, and by about 17 percent under Scenario D. This is partly driven by the reduction in prices of intermediate inputs of chemical products (most of which goes into the chemical sector for further processing) but also because of lower costs of production in the chemical sector itself due to regulatory alignment. With reductions in regulatory differences that constitute trade barriers and the expansion of the chemical sector, producer prices drop. In addition, as production resources are moved to the chemicals sector from other sectors, the producer prices in many of those sectors increase.

Figure V.15 Changes in sectoral producer prices (% change, Scenarios B and D)



C. TTIP-effects on Belgian Small- and Medium Sized Enterprises

SMEs are often referred to as the backbone of the European economy. They are typically responsible for the employment of a significant part of the labour force, and generate large contributions to the economy. According to OECD figures, there were some 560 000 SMEs in Belgium, 95 percent of which employ less than 10 workers (OECD, 2016). SMEs are responsible for the employment of around 1.6 million Belgian workers according to the SBS Statistics from Eurostat. The impact of trade agreements in general, and TTIP in particular, on Small and Medium-sized Enterprises (SMEs)[25] can be viewed through two distinct channels. The first channel covers SMEs that export directly to the US, on which TTIP will have a direct impact. The second channel is more indirect, where TTIP facilitates larger (Belgian) firms to which SMEs provide intermediate inputs to export to the US. The total impact on SMEs is therefore the sum of direct and indirect effects. The model employed in this report combines both channels. The first sub-section of this SME analysis looks at the literature and what surveys have found with regard to SMEs and the identified barriers. The second sub-section introduces some baseline statistics from the AMADEUS database. The third sub-section focuses on the impact channels for SMEs – through the lens of Belgian SME data. Finally, we combine the AMADEUS SME database with the sectoral effects the quantitative models predict in order to see what the effects for SMEs are – in particular while keeping in mind their geographical locations.

SMEs and their barriers to trade

The Belgian Ministry of Economic Affairs has recently conducted and published a study that looked at the untapped export potential of Belgian SMEs (PwC, 2016). SMEs active in the sectors identified in this study could find TTIP especially interesting, as TTIP aims to facilitate improved market access to one of the largest economies in the world, the US economy. It appears from the study that, in relative terms, the wholesale sector is most active in cross border trade, with some 40 percent of the Belgian export market in or related to that sector. Small firms with less than 10 employees are still successful in this sector, as they make up 10 percent of the total wholesale export value. This timely study finds that especially firms with less than 50 employees are underperforming on the international market compared to large firms. In order to live up to this potential, the study therefore recommends that investment in export capacities should be supported through economic cooperation mechanisms, better information provision on financing instruments and reimbursable advances for costs associated with exports (PwC, 2016).

In a survey conducted among 1900 SMEs from a number of countries[26], exporting SMEs indicated to expect to benefit from TTIP most. Indeed, these SMEs have already invested in the necessary resources and infrastructure to sell their goods or services across borders, such that lower trade costs will create realistic opportunities on the other side of the Atlantic. However, these SMEs mentioned that access to credit and skilled labour are still important framework conditions that need to fall into place before the benefits from TTIP can be really be reaped (KwF Research, 2016).

[25] The European definition of "SME' will be applied throughout this section. See http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm.

[26] Spain, Great Britain, Germany, France, Italy, USA, Brazil, Japan, Russia, and China.

In another survey among 800 German SMEs, only 18 percent of SMEs (exporting and non-exporting) believed that trade agreements actually make it easier for SMEs to directly access new markets. 15 percent of the SMEs see the benefit of trade agreements as a tool to source their inputs in a more cost-effective way. In this survey, too, exporting SMEs are most optimistic about TTIP, but a vast majority of non-exporting SMEs is sceptical about the impact of TTIP on the economy and their positions therein (Prognos AG, 2016). Most fear that they will have to face stronger competition from the US, where predominantly the increased presence of large firms may harm their local niche markets (Euractiv, 2015).

The effects of TTIP for SMEs are also debated heavily on other grounds. One member of Belgian civil society fears that increased competition from the US will be largely unfair, as American firms are said to face different costs of production, due to lower salaries, lower energy costs and a weak US dollar (UCM, 2015). It turns out, however, that one cannot simply say that salary costs in the US are lower as this is the case for some firms in some sectors, but not for other firms in other sectors. Also insurance costs for US firms are more expensive than for Belgian firms. At present, the US indeed has lower energy costs than the EU (and Belgium) because of fracking and the shale gas revolution in the US. At the moment, however, energy prices are generally low. What happens when oil and gas prices will start to rise remains to be seen, but it is actually TTIP that in the fragmented international gas market could prove to facilitate gas exports from the US to Europe, balancing Europe's energy dependence interests. Finally, the weak US dollar has strengthened significantly in 2016 compared to the situation in 2015 – after the quantitative easing policy of the European Central Bank started last year. Some fear that cheaper inputs from the US could lead to trade-diversion within the EU, where intra-EU trade is replaced by cheaper US imports (Veblen Institute for Economic Reforms, 2015). One can also think of cheaper inputs helping downstream sectors in Belgium to get more competitive, grow, export more and create jobs directly and indirectly through demanding more intermediate goods and products from other (more local) firms. In fact, Prof. Patrick Messerlin has been quite clear that a TTIP agreement can only erode intra-EU (i.e. Internal Market) preferences if they exist. He notes that in the areas where TTIP aims to make headway, like regulatory cooperation, services, public procurement and IPR, the EU Internal Market is particularly weak (WTI, 2016).

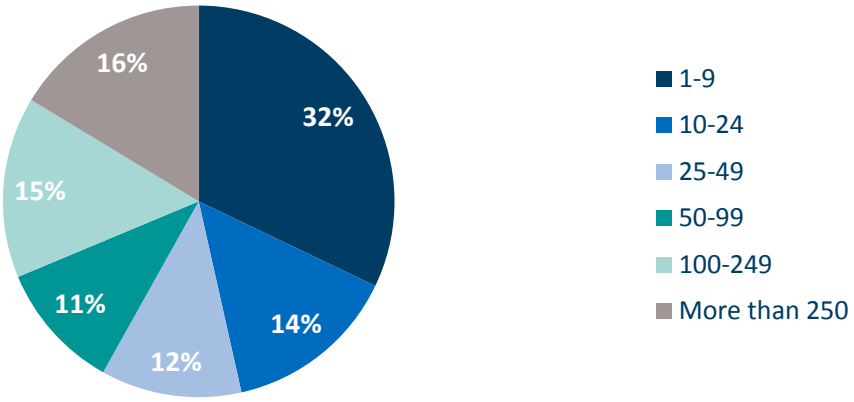
The European Commission, together with Ecorys, launched an SME survey in 2014 to collect information on barriers that European SMEs face when doing business in the US.27 The survey was completed by 869 respondents, of which 84 percent classified as SME according to the EU definition. This is illustrated in Figure V.16.

Three-quarters of all respondents declared that they were (at the time) exporting to the US, or any other extra-EU destination. That share was slightly higher for the larger firms in the dataset, of which 92 percent exported to extra-EU markets. Amongst SMEs, 57 percent of micro firms exported, 77 percent of small firms, and 90 percent of medium sized firms.[28] From all Belgium respondents, 91 percent indicated that they were exporting outside the EU. Of those exporting to extra-EU markets (all respondents); a quarter claimed that the US was their priority market.

[27] http://trade.ec.europa.eu/doclib/docs/2015/april/tradoc_153348.pdf

[28] Micro firms are indicated as firms with 1-9 employees, small firms as firms with 10-50 employees, and medium firms as firms with 51-250 firms.

Figure V.16 Number of respondents per size class (2014)



Source: Ecorys / European Commission Survey (2014)

The survey also contained a section on perceived barriers when exporting to the US market. About 20 types of barriers were presented, and respondents had to indicate whether they faced this type of barrier or not. According to the survey, the most frequently identified types of barriers with respect to goods trade were Sanitary and Phyto-Sanitary (SPS) measures, Technical Barriers to Trade (TBT), and border procedures. The first group often took the form of differences in food quality and safety regulations. A large number of SMEs also indicated labelling, licensing and certification, measures on competition, finance measures, and price control measures as barriers for EU-US trade. Only few SMEs mentioned anti-dumping or investment-related measures as barriers to trade.

Regarding the different sectors, the majority of measures were reported in the agri-food, chemicals-rubbers and plastic-pharmaceutical, machinery and equipment, and electric equipment and electronic products sectors. Whereas the agri-food sector is mainly hampered by SPS measures, the other sectors are mainly affected by TBTs. These barriers relate to minimum standard and quality requirements, registration, testing, labelling, certifications of conformity and inspections. Although it was not presented as one of the barrier types in the survey, many respondents indicated the difference in regulations across the US states as burdensome. According to the survey, respondents were often also not aware who applied the barrier (e.g. federal vs. state level regulation). This makes it harder for SMEs to keep an overview of existing regulations, to obtain the relevant information and to comply with these regulations.

In trade in services, discriminatory measures and standards, and restrictions on the movement of people were particularly indicated as barriers by SMEs. The latter barrier often translates into a fixed number of worker permits available with a maximum duration. Although the measures related to goods and services trade are faced by both large firms and SMEs, they are more detrimental to SMEs. Compared to large firms, they often lack the expertise and resources to deal with these barriers or to have employees present locally. Economically, it is clear that mobility of people, trade and investment are completely linked to each other.

There are several more studies that have analysed the trade barriers faced by EU SMEs.[29] These studies all agree that SMEs are affected disproportionally more than large firms by barriers, because they often lack the resources and time to deal with them. This – in turn – implies

[29] Atlantic Council, 2014. The transatlantic trade and investment partnership – Big opportunities for small busi-

that SMEs are expected to gain also proportionally more from the TTIP agreement than large firms. According to the study of Business Europe and the European Commission, SMEs can greatly benefit from e.g. improved market access and legal certainty in services trade, improved protection of intellectual property rights, and a reduction in regulatory differences across the Atlantic. The study published by Belgian Ministry of Economic Affairs on the untapped export potential of Belgian SMEs has also indicated several barriers that Belgian SMEs face when exporting. These include amongst others customs procedures, conformity assessments, currency risks, and costs related to the development of export activities. Although not all of these barriers can be dealt with in TTIP (e.g. currency risk), there are many barriers – affecting SMEs more than larger firms – that can.

Basic statistics

This section aims to characterise the size, importance and distribution of Belgian SMEs, as well as a number of other indicators. Stylized facts about SMEs often claim that they make up the lion's share of the total number of firms, but that their share in other indicators tends to be much smaller. On the basis of firm level data in the Amadeus database, SMEs indeed make up 99 percent of the number of firms in Belgium. However, expressed in the following three economic indicators, SMEs are responsible for a smaller share in the total. For instance, in Belgium as a whole, SMEs are responsible for approximately 40-45% of total operating revenue, sales and value added. In Brussels, these shares are slightly lower, as large multinationals are more likely to establish themselves in the capital region. In Flanders and Wallonia, half of the operating revenue and sales come from SMEs.

Table V.3 Share of Belgian SMEs in four indicators (2014)

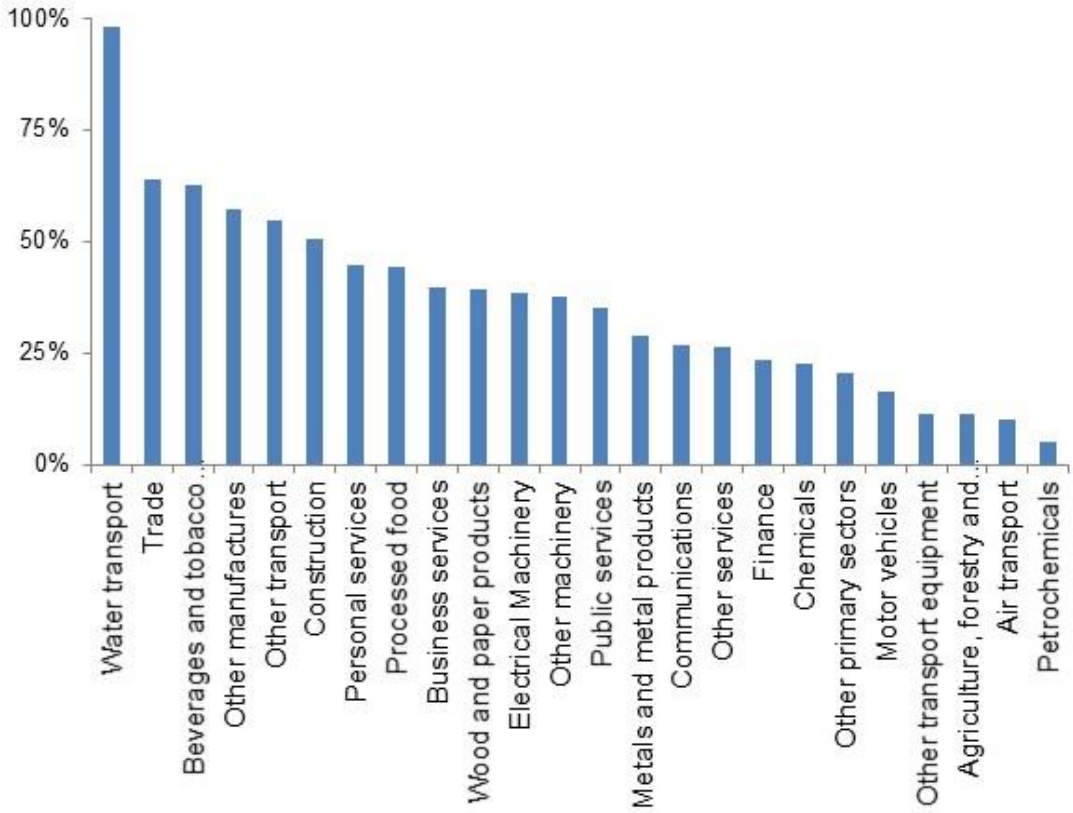
Region	NUTS	Number of firms	Operating Revenue	Sales	Value Added
Belgium (overall)	BE	99%	43%	44%	41%
Brussels	BE1	98%	30%	26%	37%
Flanders	BE2	99%	50%	51%	43%
Walloon	BE3	99%	46%	50%	43%
Brussels Capital Region	BE10	98%	30%	26%	37%
Prov. Antwerp	BE21	99%	47%	50%	35%
Prov. Limburg	BE22	99%	63%	63%	50%
Prov. East Flanders	BE23	99%	46%	47%	50%
Prov. Flemish Brabant	BE24	99%	52%	52%	53%
Prov. West Flanders	BE25	99%	53%	54%	42%
Prov. Walloon Brabant	BE31	99%	46%	50%	34%
Prov. Hainaut	BE32	99%	38%	41%	49%
Prov. Liège	BE33	99%	52%	57%	45%
Prov. Luxembourg	BE34	99%	56%	57%	46%
Prov. Namur	BE35	99%	57%	65%	46%

Source: Amadeus database, Ecorys calculations

ness; British American Business, 2014. How a EU-US trade and investment agreement can help business people and their companies in the UK; Business Europe, 2015. TTIP – What's in for small and medium sized enterprises; European Commission. Transatlantic Trade and Investment Partnership – The opportunities for small and medium-size enterprises

The importance of SMEs does not only vary per region, but also per sector. Figure V.17 displays the share of SMEs in total sectoral operating revenue. In water transport, the share of SMEs is almost 100 percent. In trade, and beverages and tobacco products, SMEs make up almost two-third of the market. This stands in stark contrast with petrochemicals and air transport, in which SMEs are largely irrelevant. The low share of SMEs in agricultural operating revenue is remarkable, and can potentially be explained by the lack of SME data for this sector in the Amadeus dataset.

Figure V.17 Share of SMEs in total operating revenue per sector



Source: Amadeus database, Ecorys calculations

As introduced shortly at the start of this Section, there are two main channels through which trade agreements can influence SMEs; a direct channel and an indirect one. The existing literature predominantly focuses on the former channel, which is directly linked to exporting SMEs, or SMEs that intend to expand their markets in the future. For them, the reduction of tariffs and other barriers such as mutual recognition of standards and testing procedures would reduce the costs related to trade.[30]

Simply reducing trade barriers, however, is not necessarily sufficient for SMEs to benefit from a trade agreement like TTIP. More so than large firms, SMEs face other, natural barriers that are only indirectly related to tariffs and NTMs. For instance, language barriers and currency risks, as well as incomplete information about the tastes and preferences of US customers constitute barriers for Belgian SMEs that are not easily addressed and overcome. By their very nature, SMEs are more likely to lack the resources, both managerial and financial, to be able

[30] See the Factsheet on Small and Medium-sized Enterprises on the DG Trade website: http://trade.ec.europa.eu/doclib/press/index.cfm?id=1230

to deal with such barriers (Salfi, 2015). In order to overcome these hurdles, the EU has proposed a number of mechanisms that should facilitate transatlantic trade for SMEs, though – so far – this remains limited to the creation of a platform to exchange good regulatory practices and linking business opportunities between innovative clusters.[31]

Direct channel

SMEs are an important part of the Belgian economy. According to Eurostat Comext/ TEC data, almost 78.000 Belgian firms engaged in cross-border trade in 2013. Unfortunately, some 40 percent of the firms did not report their size in terms of employees, so that the following analysis focuses on the 60 percent that did.[32] Of these 45.000 exporting firms, a little over 44.000 had less than 250 employees, thus classifying as an SME. Almost 95 percent of these firms served other EU Member States in 2013. Roughly a quarter of the Belgian SMEs were (also) active on the international, extra-EU market. More specifically related to TTIP, the data shows that to date 3.300 Belgian SMEs are currently exporting to the US market.

The data in Table V.4 allow for a rough estimation in the number of people employed by exporting SMEs. If, for each size category the lowest value is considered, at least 275.000 people are employed in the SME export sector. Similarly, for those SMEs that export to the US, this figure is at least 53.000. In reality, this figure is likely to be much higher, as a large number of firms does not report number of employees, and using the lowest value of each size category leads to a severe underestimation.[33] The WTI (2016) study, using value added and employment statistics, estimates that in 2013 162.000 jobs were created in Belgium by US controlled firms (any size firms).

Table V.4 Distribution of exporting firms in Belgium by number of employees (2013)

	1 – 9	10 - 49	50 - 249	Subtotal SME	250 or more	Unknown	Total
Intra-EU	29 051	10 375	2 496	41 922	634	30 445	73 001
Extra-EU	6 447	4 061	1 679	12 187	578	5 343	18 108
USA	1 308	1 201	791	3 300	353	1 153	4 806
World	30 526	10 941	2 738	44 205	739	32 620	77 564

Source: Eurostat Comext/TEC database. SMEs are defined as firms with less than 250 employees as per EC guideline.

Figure V.18 shows that the export value of Belgian SMEs is more than € 100 bn in 2013. It is likely that this figure is (much) higher, as some 42 percent of the Belgian firms does not report the number of employees in the Eurostat TEC database and are thus not classified as (exporting) SMEs. Other EU Member States are the most important export destinations for Belgian SMEs, but all Belgian SMEs combined did produce exports in goods and services worth over € 3.2 bn for the US market in 2013. Belgian SMEs are responsible for 18 percent of total Belgian exports to the US. This share is well below the EU average of 28 percent (European Commission, 2015). The *'larger'* SMEs in Belgium are competitive globally, in relative terms, even more so than large firms.

31 Textual proposal on Small and medium-sized enterprises (SMEs) by DG Trade. http://trade.ec.europa.eu/doclib/docs/2015/january/tradoc_153028.pdf

32 It is likely that a significant share of those firms marked 'unknown' are SMEs as well, due to their less strict reporting requirements.
Analysis of the Belgian Central Bank show that around 1.5 million workers are directly or indirectly linked to the export sector, both for SMEs and larger firms. See Duprez, C. *Waardecreatie bij de uitvoer; Een diagnose van België.* Economisch Tijdschrift of the NBB, September 2014 (In Dutch).

Figure V.18 Export value of Belgian firms by number of employees (in € bn, 2013)

Source: Eurostat Comext/TEC database. SMEs are defined as firms with less than 250 employees.

Indirect channel

In order to investigate the complete effect of TTIP (or any other trade agreement) on the performance of Belgian SMEs, it is important to look at the role of these firms in global, national, or regional value chains. The findings of the previous section indicate that Belgian SMEs are directly responsible for a significant part of total employment and turnover in the export-oriented segment of the economy.

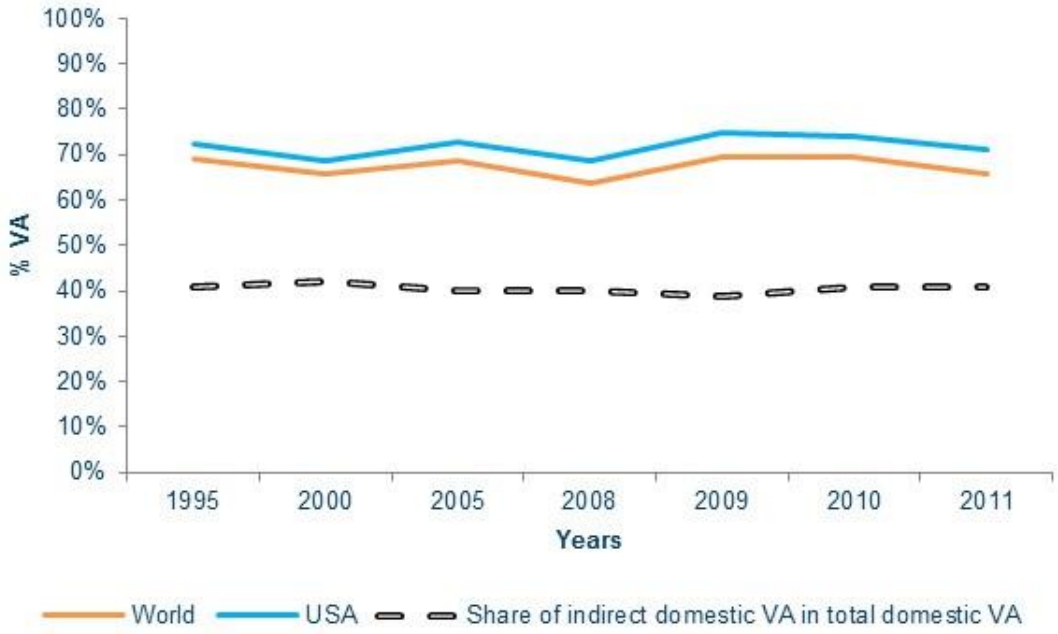
One should note two large trends that characterise a modern trading economy. On the one hand, manufacturing has decreased in relative importance in both employment and GDP terms. On the other hand, many service sectors and services jobs are related to the manufacturing base – through value chains. Also, trade in goods remains the most important aspect of cross-border activities of countries. The Belgian manufacturing sector declined by 16 percentage points in GDP and over 20 percentage points in total employment between 1970 and 2012. Over the same period, traded volumes have increased fivefold, whereas GDP "only" grew by 250%, with the bulk of trade still coming from the manufacturing sector (Duprez and Dresse, 2013).

The analysis above, with its focus on gross export value, only covers part of the story in today's economy. While in the past, economic activity that crossed borders consisted mostly of domestic inputs, in the last three decades there has been a shift towards the use of intermediate imports. It is therefore more worthwhile to look at value added rather than gross export values. In the case of Belgium, with its extensive infrastructure network, a significant part of the total exports consists of re-exports, with little value added by Belgian firms. In 2010, about 30% of the value of Belgian exports can be attributed to re-exports (Duprez, 2014).

This finding is in line with data from the OECD Trade in Value Added (TiVA) database.

Figure V.19 shows that the share of domestic value added content in Belgian gross exports is around 70%. Exports to the US contain slightly more Belgian value added than do the average Belgian export flows to the rest of the world. Moreover, the TiVA database also provides data on the share of indirect domestic value in gross export flows in total domestic value added. Over time, some 40% of the domestic value added is of indirect nature, where Belgian firms supply other Belgian firms, which then export the final product to other markets. Therefore, the indirect channel plays a significant role in the analysis of the impact of TTIP on Belgian SMEs.

Figure V.19 Share of Belgian VA in gross exports; share of indirect VA in domestic VA



Source: OECD TiVA database

Impact of TTIP

In this section, we present the sectoral and regional impact of TTIP on Belgian SMEs for various sectors of the economy. Table V.5 shows the sectors covered with the quantitative models, ranked from large to small numbers of SMEs (Column 2). Expected impact of TTIP for each of these sectors (Scenario B) is reported in Column (3). In Column (4) the share of SMEs in the sector's operating revenue is presented. The five largest sectors (business services until communications) contain 91 percent of SMEs registered in AMADEUS. Of the five largest sectors, only 'communications' is expected to see a decline in output as a result of TTIP. In this sector, however, SMEs are only responsible for a small part of the operating revenue.

We will now highlight the impact of TTIP on SMEs in total (i.e. combining expected gains and losses at sector level with the numbers of SMEs for each of these sectors and the shares these SMEs have in a sector's operating revenues). We also look at five of the above sectors because of either the high number of SMEs impacted (e.g. business services, trade, construction) or because the relative change in output is relatively large (e.g. chemicals and other machinery).

Table V.5 Impact of TTIP on Belgian SMEs (sectors ranked by # of SMEs, 2014)

Sector (1)	Number of SMEs (2)	Output change, in % - Scenario B (3)	Share SMEs in the sector's operating revenue (4)
Business Services	176.546	0.75	40
Trade	138.529	1.84	64
Construction	130.860	2.84	51
Personal services	51.154	0.58	45
Communications	24.360	-0.34	27
Other transport	15.563	0.68	55
Other manufactures	8.069	-2.90	57
Metal and metal products	7.161	-0.81	29
Processed food	6.912	0.06	44
Wood and paper products	4.473	-0.45	39
Other machinery	3.899	-8.63	38
Other services	3.059	2.40	27
Chemicals	1.413	15.98	23
Public services	920	0.69	35
Electrical machinery	442	-1.49	38
Water transport	411	0.67	98
Motor vehicles	404	1.66	16
Beverages and tobacco products	351	2.72	62
Air Transport	208	0.75	10
Other primary sector	172	0.02	21
Other transport equipment	26	-4.11	11
Petrochemicals	8	2.41	5
Agriculture, forestry and fisheries	n.a.	-1.17	11
Finance	n.a.	0.00	24
Insurance	n.a.	0.95	n.a.

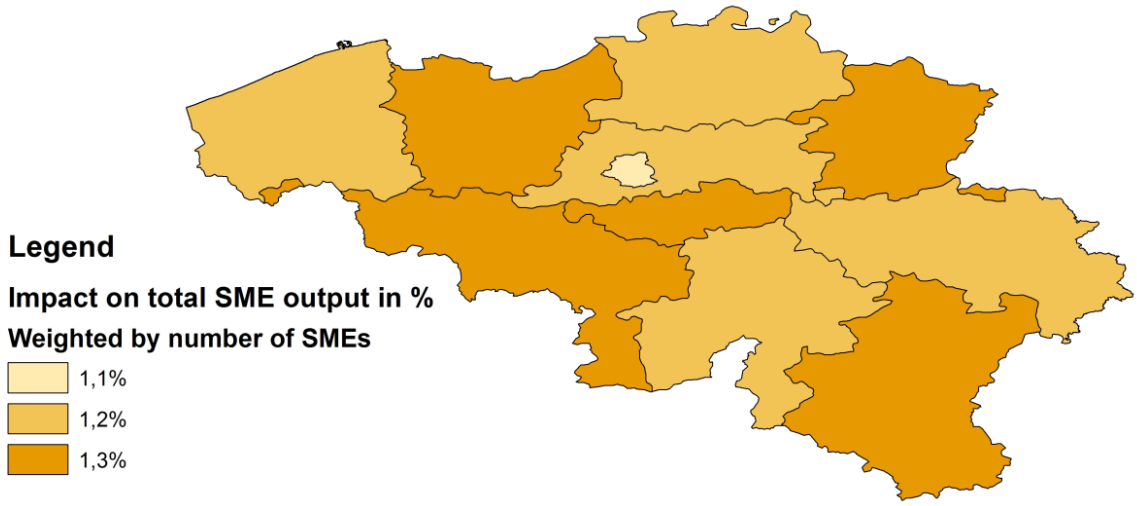
Sources: Number of SMEs is Eurostat SBS data, output changes come from the quantitative model, and share of SMEs in operating revenue comes from the AMADEUS dataset.

Overall impact of TTIP on SMEs per province

The impact of TTIP on SMEs at the provincial level is relatively difficult to measure. An indication can be given by looking at the output change of each sector, and then multiplying that figure by the relative share of each sector (in terms of the number of SMEs) for each province.

The result of this analysis is presented in Figure V.20. We find small variations between provinces when using the *'number of SME'* criterion. We see that for the total number of SMEs output increases in each province. The relative gain is smallest in Brussels and largest in East-Flanders, Limburg, Walloon-Brabant, Hainaut and Luxembourg. So how does this work? We look at all SMEs in – let's say the province of Limburg. We see how the number of SMEs in business services in Limburg is affected because we know the effect of TTIP on the sector (from the model) and we know (from AMADEUS) the number of SMEs in Limburg. We also do this for trade, for construction, for personal services, etc. all the way down the sectors ranked by number of SMEs to insurance. The total effect is then an SME weighted average of all the expected (positive and negative) effects per sector.

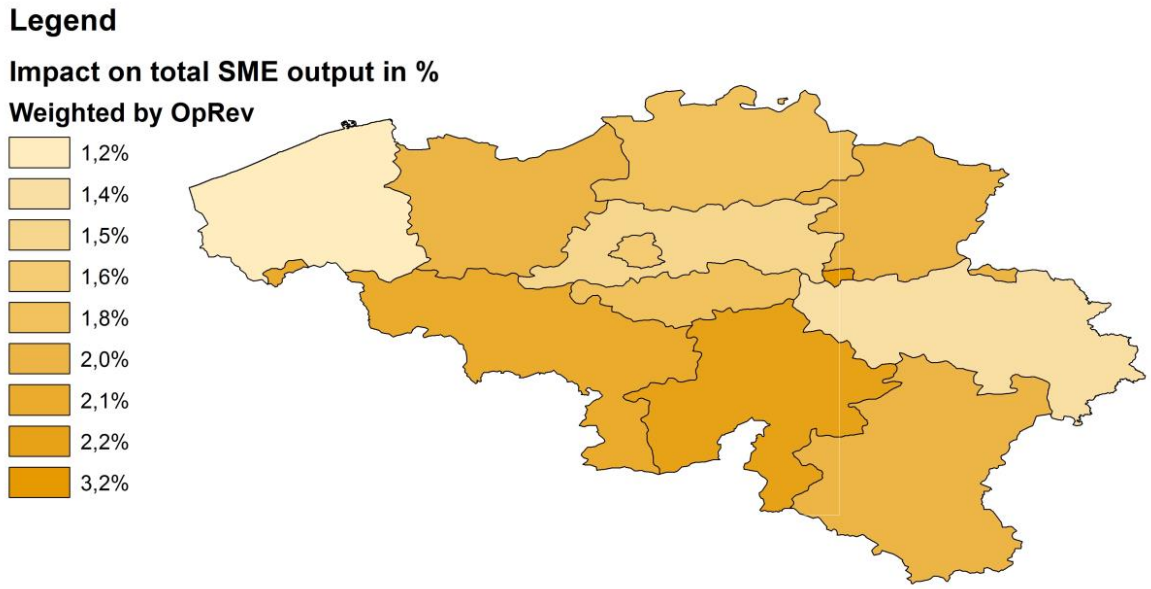
Figure V.20 Impact of TTIP on total SME output (by sectoral # SMEs, %)



If the impact on SME output is calculated in a slightly different way than by the number of SMEs, differences in the results become more pronounced. This is shown in Figure V.21. Based on the total operating revenue of SMEs in each province (which we can calculate from the information in AMADEUS: the total revenues per sector and the share of SMEs in that total revenue), the sectoral impact results from TTIP are weighted for each province.

Based on this approach, the SMEs in the provinces of Namur, Hainaut, Luxembourg, Limburg and East-Flanders are expected to gain most, while SMEs in West-Flanders, Flemish-Brabant, and Liege gain as well, but relatively less.

Figure V.21 Impact of TTIP on total SME output (by sectoral op-rev of SMEs, %)



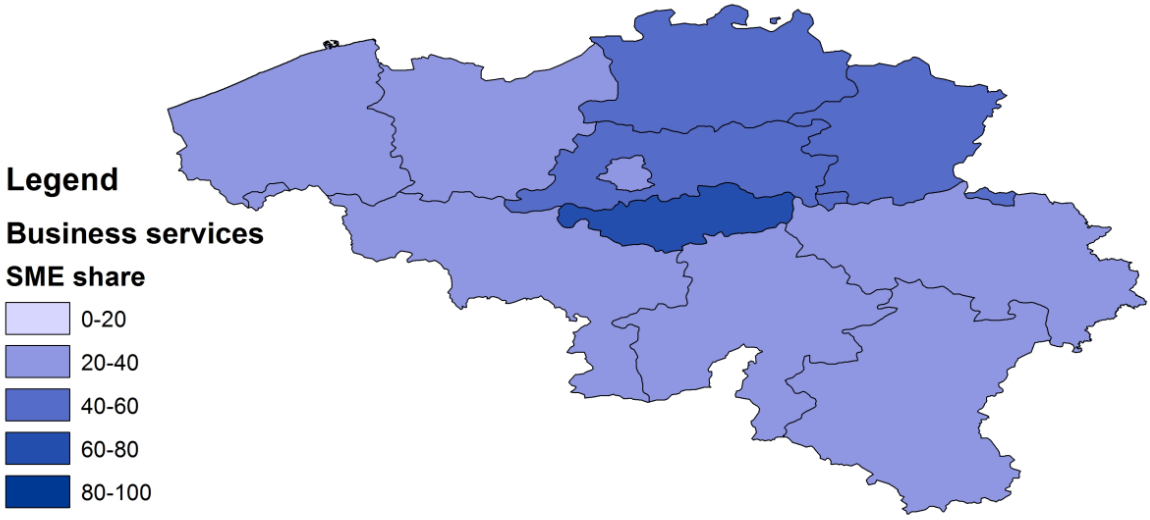
Sectoral impact of TTIP on SMEs per province

The above total analysis of the impact of TTIP on SMEs at the provincial level can also be split out into sector-specific analyses that allow us to look at how SMEs in specific sectors are impacted. As explained above, we will focus on: business services, trade, construction, chemicals and other machinery.

Business services

The business services sector covers the largest absolute number of SMEs in Belgium. A little more than 175.000 SMEs are active in this sector according to the Eurostat. SMEs are relatively more important in the provincial operating revenue within the business services sector in Flanders than they are in Walloon (see Table V.3). The 0.75 percent increase in business services (that includes interlinkages between sectors and economies) as a result of TTIP will lead to increased output of SMEs in all provinces – but more in some than in others (depending on the number of business service sector SMEs spread over the Belgian provinces and their shares in total sector revenues). Figure V.22 shows the provinces that are set to benefit relatively most (provinces of Walloon-Brabant, Antwerp, Flemish-Brabant, and Limburg) and the others that are expected to gain relatively less.

Figure V.22 Share of SMEs in 'business services' operating revenue (2014)

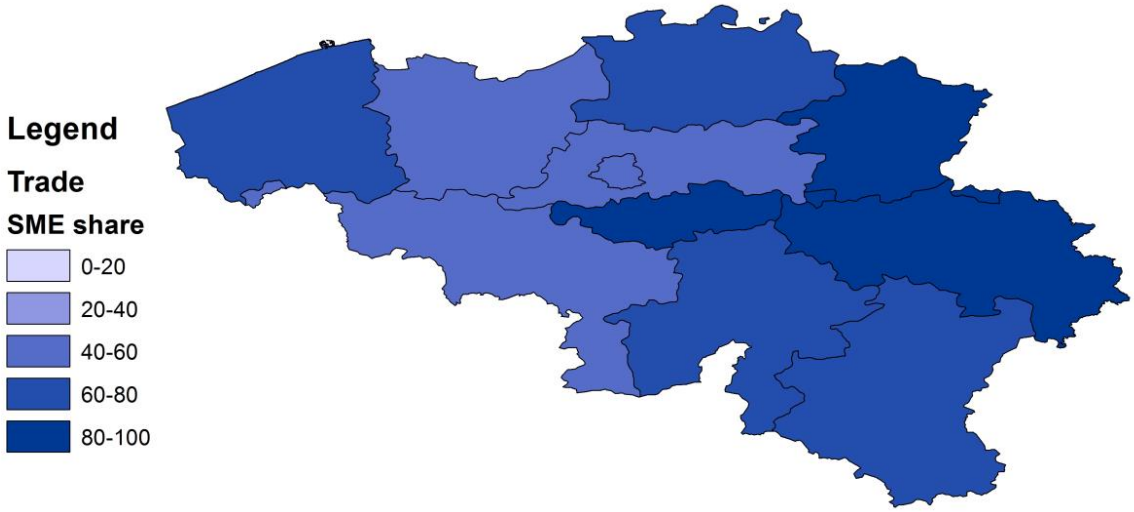


Source: Amadeus, Ecorys calculations.

Trade

In terms of absolute number of SMEs, Trade is the second most important sector. Expressed in operating revenues, in all provinces SMEs have share in total operating revenue of more than 50%. As Figure V.23 shows, SMEs are particularly important in the operating revenue of Trade businesses in the provinces of Liège, Limburg and Walloon-Brabant. As the sector as a whole is expected to gain from TTIP (+1.8 percent), it is likely that SMEs in this sector stand to gain from TTIP – as there is an increased demand for their services.

Figure V.23 Share of SMEs in 'trade' operating revenue (2014)

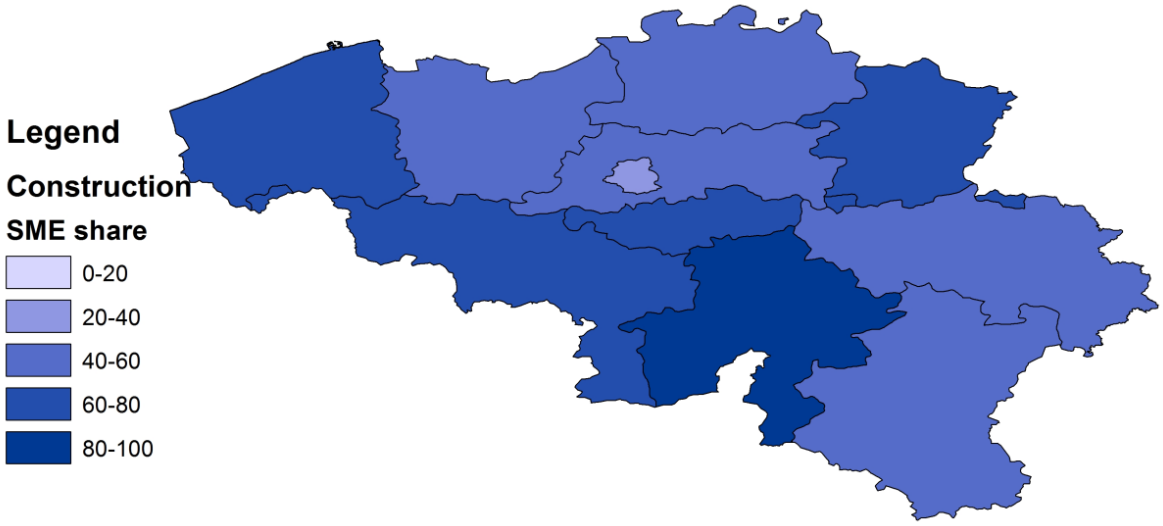


Source: Amadeus, Ecorys calculations.

Construction

Construction is another sector in which the absolute number of SMEs is relatively high, with an estimated number of around 130.000. The sector is expected to grow by 2.8 percent as a result of TTIP, in which case the SMEs in that sector are expected to share in the gains. More economic activity is beneficial not only for larger firms, but also for the smaller SMEs who deliver goods and services to the larger construction companies (e.g. electricians, carpenters, real estate agents, transport companies). SMEs in construction are, in relative terms, especially important in Namur, Walloon Brabant and West Flanders.

Figure V.24 Share of SMEs in 'construction' operating revenue (2014)



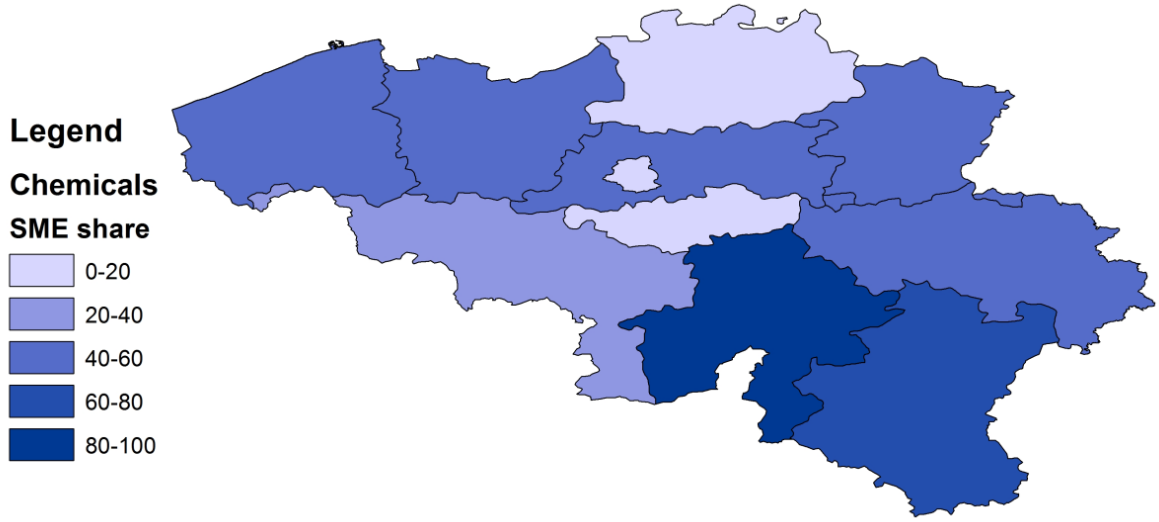
Source: Amadeus, Ecorys calculations.

Chemicals

As discussed in the previous section, TTIP will bring the largest gains to the Belgian chemicals sector (+16.0 percent in Scenario B). SMEs in chemicals are relatively more important in the operating revenue of the Walloon provinces, but the sectoral operating revenue there is smaller

in absolute terms. The opposite holds in Flanders and Brussels. As most of the chemical production is located around Antwerp and Brussels, and there are only 1.400 SMEs in the entire sector, SMEs are unlikely to benefit from this expansion through the direct channel.

Figure V.25 Share of SMEs in 'chemicals' operating revenue (2014)

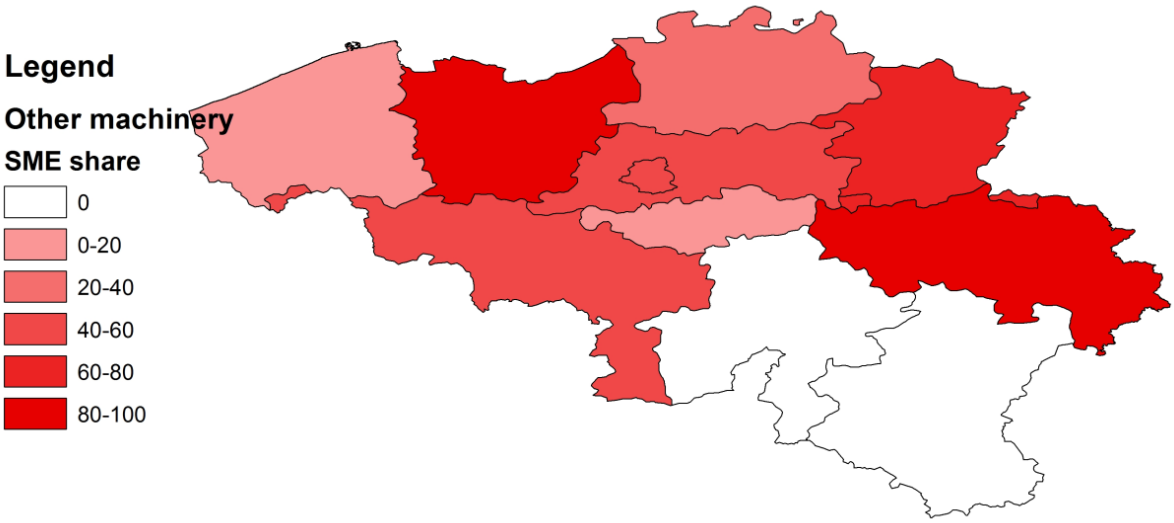


Source: Amadeus, Ecorys calculations.

Other machinery

The sector that is expected to contract the most as a result of TTIP is 'Other machinery'. There are some 3.900 SMEs active in this sector, according to Eurostat. In relative terms, SMEs make up a large part of the sectoral operating revenue in Walloon (e.g. province of Liège), but in absolute terms the production base of the 'other machinery' sector is Flanders (East-Flanders, Limburg), where SMEs will feel most of the contraction.

Figure V.26 Share of SMEs in 'other machinery' operating revenue (2014)



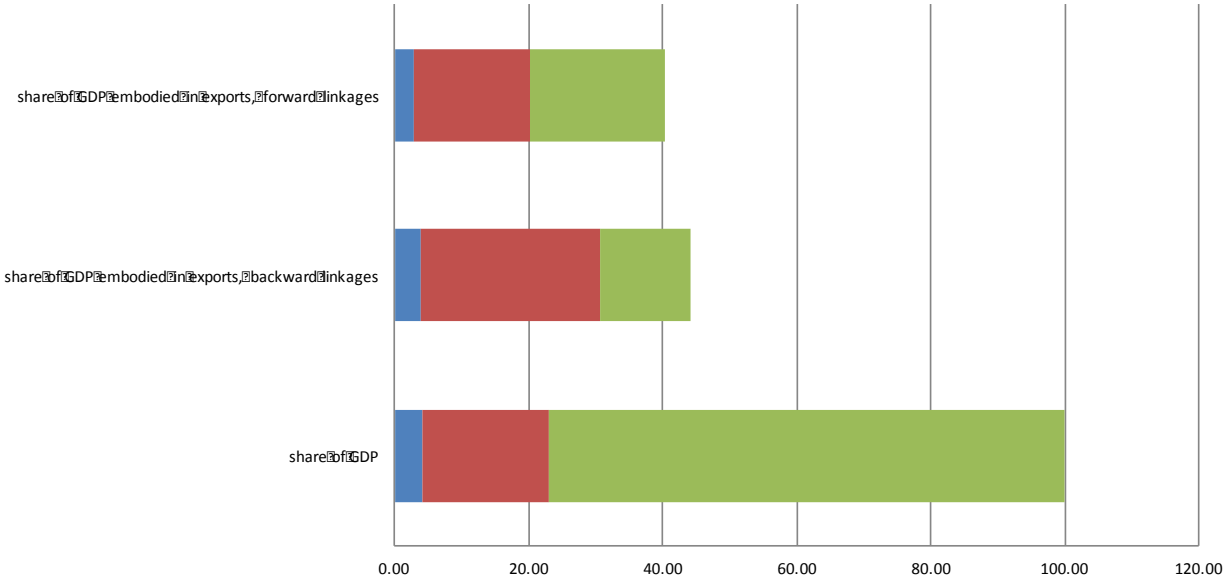
Source: Amadeus, Ecorys calculations. White-shaded provinces means too little data available.

D. Effect of TTIP on Belgian value added

Like other high-income countries, Belgium is services-intensive in terms of value added (meaning employment and capital) but goods-intensive in terms of trade. Figure V.27 provides a summary for 2011. The Figure provides three measures of the contribution of sectors to trade and GDP. The first is simply the share of value added (the basis for the value of national income) across primary production and food, manufacturing, and services. On this basis, services contributed 77.1 percent to the Belgian GDP in 2011, while manufacturing contributed 18.7 percent and primary production and food 4.2 percent.

In addition to GDP, allocations across sectors, which we will also refer to as economic *linkages*, matter. What we mean is the extent to which output from one sector feeds into another sector. This flow of output of goods and services is the basis for the concept of "value chains" linking the activities (value added) in sectors at various stages of processing, leading ultimately to the final output of goods and services. When one focuses on the downstream flow of output to final output – for example steel sold to motor vehicles production and to construction – it is referred to as *forward linkages*. When we instead examine the original sectors providing value added to final output in a given sector – for example steel, electricity, engineering services, and machinery all feed into motor vehicle production – it is referred to instead as *backward linkages*. Backward linkages help to identify the importance of workers and production in upstream firms contributing to final output.[34] Linkages are an important feature in the model of production and trade – the CGE model – used in this report.

Figure V.27 Value added structure of the Belgian economy (2011)



	share of GDP	share of GDP embodied in exports, backward linkages	share of GDP embodied in exports, forward linkages
Primary Production, foods	4.20	3.86	2.94
Manufacturing	18.72	26.82	17.15
Services	77.08	13.52	20.22

34 For a technical discussion on the definition of these concepts and their calculation from national input-output data, see Francois, Manchin, and Tomberger (2013) and Christen et al (2013). Here, in this section we work with the GTAP9 database, which is benchmarked to the global economy in 2011.

In terms of Figure V.27, we provide the contribution of exports to GDP based both on forward linkages and on backward linkages. Starting with backward linkages, 26.8 percent of Belgian GDP (jobs and capital services) was exported through goods. Services exports accounted for another 13.5 percent. In the case of manufacturing, these figures include not only value added within manufacturing, but also value added from services that feed into manufacturing output. In total, 44.2 percent of Belgian value added is exported. Most of this is exported through the manufacturing sector.

While manufacturing accounts for most of Belgian value added contained in exports, much of this actually comes through inputs from the service sector to manufacturing production. This is clear when we look at the last set of data in Figure V.27 on forward linkages. Here, we see that 20.2 percent of Belgian GDP, located in the service sector, is embodied in exports of goods and services. This figure points to the important role the service sector plays in Belgium as an intermediate input to goods production. Given the nature of the Belgian economy, manufacturing is itself very service intensive. Roughly half of the value added contained in Belgian goods exports actually comes from service activities.

We provide a further breakdown on the relative importance of services to Belgian exports in Figure V.28 and Figure V.29. Figure V.28 is based on backward linkages. The chemical sector stands out as particularly important. The chemical sector's exports account for almost 9 percent of GDP. Among the services sector, the most important in terms of backward linkages is business services, accounting for about 4 percent of GDP. Most of these exports are destined for the EU.

Figure V.28 Export shares of GDP, as embodied in final exports (backward linkages)

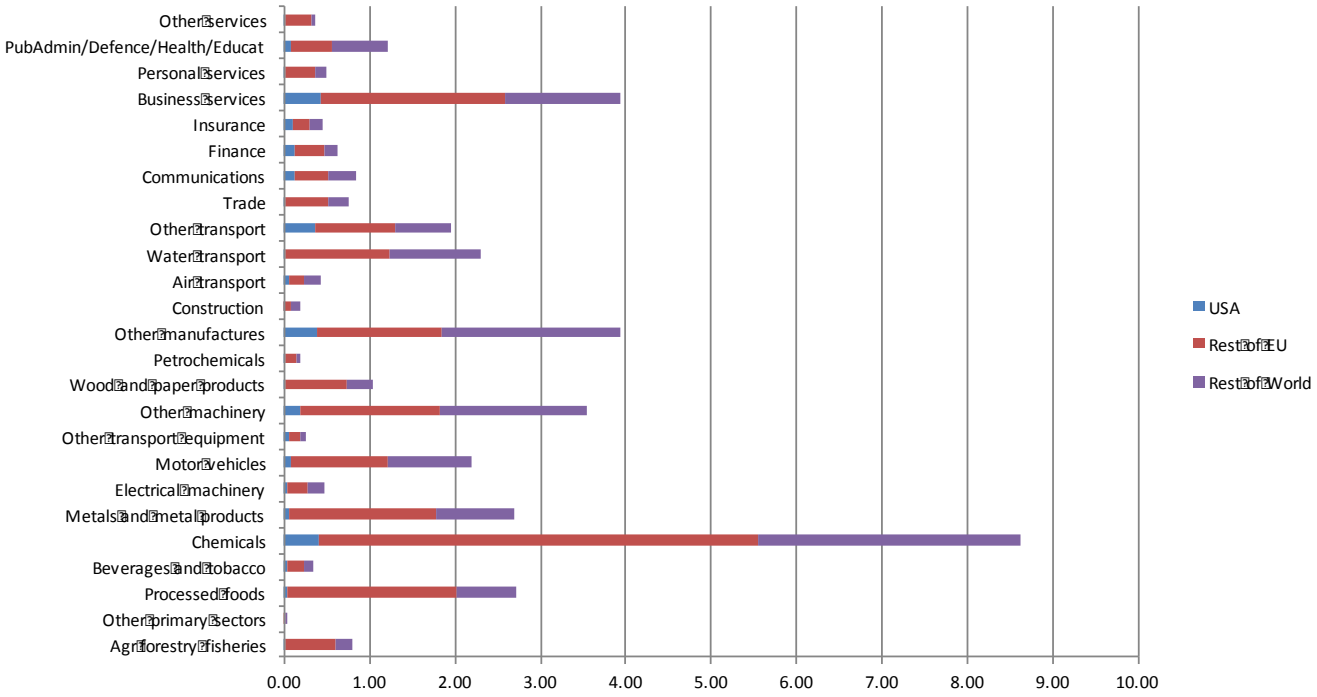


Figure V.29 Export shares of GDP, contained in final exports (forward linkages)

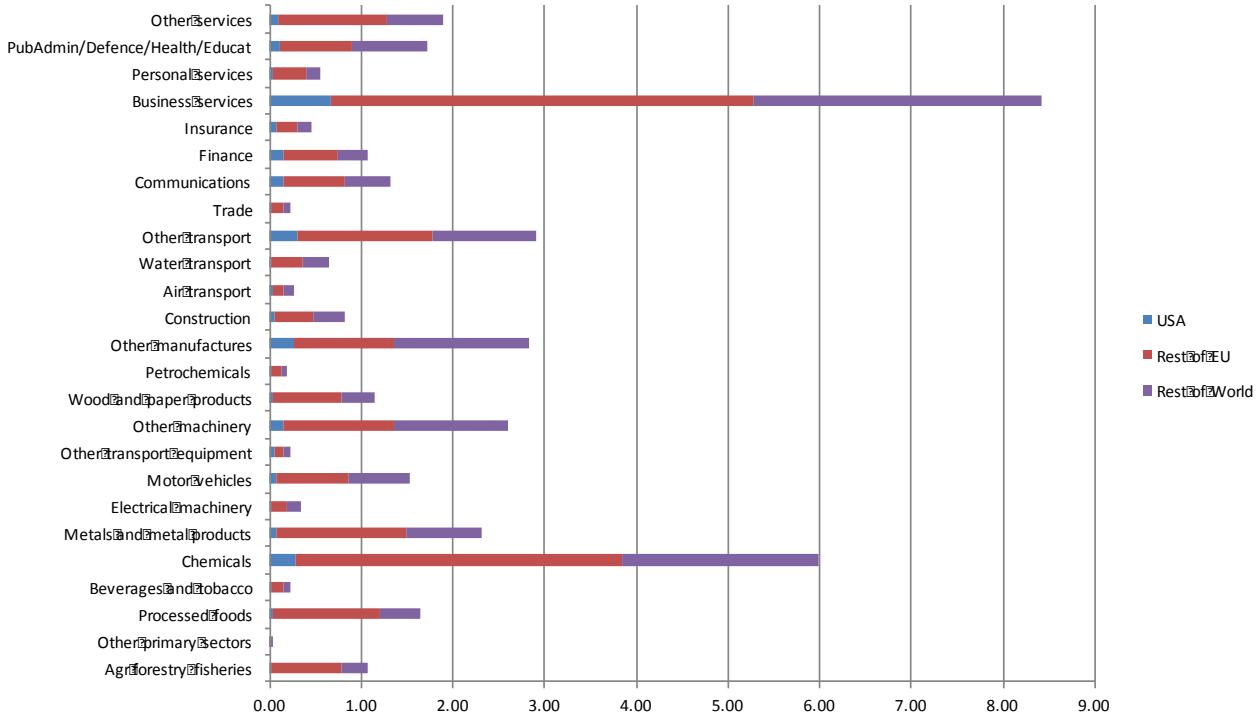


Figure V.29 is based on forward linkages. This is informative because it sheds light on the service intensity of Belgian exports, in terms of activities that serve as inputs to those goods and services that are actually exported. Like Figure V.28, we again see chemicals and business services as stand out sectors. In contrast, however, to Figure V.28, the business service sector is significantly more important in Figure V.29 with more than 8 percent of contribution to GDP.

E. The effect of Brexit – comparing TTIP scenarios

Though not the focus of this report, Brexit provides an important context to this impact assessment. The UK is an important trading partner for the US – as well as for the EU. If the UK leaves the EU and thus is not part of the EU28 anymore negotiating and potentially signing TTIP, this reality must be analysed. That is why in this study, we have focused on Scenarios B and D – both assuming the UK will leave the EU and not be a party to TTIP anymore. In this section, we compare the situations without Brexit (i.e. the pre 23rd of June 2016 situation) with the Brexit scenario (i.e. the post 23rd of June 2016 scenario).

Table V.6 compares estimated changes in GDP under all the four scenarios (see Table III.2). The numbers indicate that both the rest of the EU countries and Belgium are estimated to gain a bit more under the scenarios where the UK is excluded from the agreement. Belgium's GDP is expected to be about 10-20% higher without the UK being part of the agreement. The UK on the other hand is estimated to experience a negative effect if the agreement would take place between the rest of the EU and the US only. The estimated reduction in the UK's GDP is expected to be between 0.2 and 0.4 percent. This is driven by improved market access being gained by other EU countries with the UK loosing market access compared to EU exporters or service providers. For the US the effect of the UK not being part of TTIP is marginally negative.

Comparing Scenarios A and B, the expected impact of TTIP does not change. While comparing Scenarios C and D, the effect of TTIP without the UK is marginally less positive for the US.

Table V.6 GDP changes (PPP basis, 2014 baseline, % change)

	Scenario A UK part of EU	Scenario B Brexit	Scenario C UK part of EU	Scenario D Brexit
European Union 26	0.4	0.5	1.7	1.9
Belgium	2.0	2.2	7.8	8.7
United Kingdom	0.5	-0.2	1.8	-0.4
USA	0.3	0.3	0.8	0.7
Other OECD	0.1	0.1	0.8	0.8
Other Europe	0.3	0.3	0.8	0.8
Mediterranean	0.3	0.4	1.3	1.3
China	0.0	0.0	0.9	0.9
India	0.1	0.1	0.6	0.6
ASEAN	0.3	0.3	2.3	2.4
MERCOSUR	0.1	0.1	0.4	0.4
Low Income	0.3	0.2	0.7	0.7
Rest of World	0.5	0.5	0.8	0.7

Belgium's bilateral exports are expected to increase to all countries except for India. They would increase significantly to the UK and other EU Member States, while to a lesser degree to other countries. Exports to India are replaced by exports to other countries. There is no evidence of trade diversion away from the Belgian-UK trade relationship when looking at exports.

Table V.7 Belgian bilateral export changes (2014 baseline, % change)

	Scenario A UK part of EU	Scenario B Brexit	Scenario C UK part of EU	Scenario D Brexit
European Union 26	3,5	4,3	11,2	13,7
United Kingdom	1,8	3,6	5,2	13,6
USA	20,1	20,8	65,8	68,1
Other OECD	5,8	6,8	22,1	25,6
Other Europe	5,0	5,8	16,4	19,1
Mediterranean	3,3	3,7	12,1	13,8
China	3,2	3,4	16,0	16,9
India	-1,2	-2,4	5,3	0,8
ASEAN	2,7	3,0	13,0	13,8
MERCOSUR	6,8	8,1	25,1	29,5
Low Income	0,9	0,6	4,6	4,3
Rest of World	2,9	3,1	10,2	10,3

Belgium's bilateral imports would increase more from other EU countries, and also slightly more from the US if the UK would not take part in the TTIP agreement (see Table V.7). Under

the scenarios without UK, Belgium's imports from other EU countries would increase by about 4-6 times more than under scenarios with the UK, although this increase would still be rather small. On the other hand, imports from the UK would go down under both scenarios B and D, as some imports from the UK would be replaced by imports from other EU countries, and other import partners. This trade diversion would be reversed however, if similarly to other EU countries the UK would also be part of the agreement, and the estimated increase in imports from the UK would be significantly higher than from other EU countries.

Table V.8 Belgian bilateral import changes (2014 baseline, % change)

	Scenario A UK part of EU	Scenario B Brexit	Scenario C UK part of EU	Scenario D Brexit
European Union 26	0.1	0.7	0.5	2.3
United Kingdom	1.0	-0.2	3.6	-1.6
USA	23.0	23.7	75.3	79.1
Other OECD	2.9	3.4	10.3	12.0
Other Europe	2.2	2.6	10.9	12.4
Mediterranean	2.7	3.1	9.8	11.7
China	2.3	2.7	8.0	9.2
India	1.9	2.2	7.8	9.3
ASEAN	2.8	3.3	10.4	12.2
MERCOSUR	3.0	3.4	10.0	11.5
Low Income	2.7	2.9	12.4	13.4
Rest of World	2.4	2.8	10.1	11.9

Based on these results, we conclude that Brexit will increase the positive effects of TTIP (in terms of GDP and trade) for Belgium and the other EU Member States (as their relative access to the US compared to 'competitor' the UK improves), that it will have negative effects for the UK (from an expected +0.5 percent of GDP as part of the EU to a –0.2 percent post-Brexit), and that the effects for the US will be negligible to marginally negative in terms of the level of positive impact. Some third countries (e.g. other OECD) gain marginally, while others are not affected.

VI. Annex A: References

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VII. Annex B: GTAP conversion table

GTAP	NACE code
Agriculture, forestry and fisheries	01, 02, 03
Air transport	51
Beverages and tobacco products	11, 12
Business services	68, 69, 70, 73, 74, 75, 77, 78, 81, 82
Chemicals	20, 21, 22
Communications	61, 62, 63
Construction	41, 42, 43, 71
Electrical Machinery	27
Finance	64, 66
Insurance	65
Metals and metal products	24, 25
Motor vehicles	29
Other machinery	26, 28, 33
Other manufactures	13, 14, 15, 23, 31, 32
Other primary sectors	05, 06, 07, 08, 09
Other services	40, 53, 72,80
Other transport	49, 52, 79
Other transport equipment	30
Personal services	55, 56, 58, 59, 60, 90, 91, 92, 93, 96, 97, 98
Petrochemicals	19
Processed food	10
Public services	35, 36, 37, 38, 39, 84, 85, 86, 87, 88, 94, 99
Trade	45, 46, 47, 95
Water transport	50
Wood and paper products	16, 17, 18