GED Focus Paper

The Trans-Pacific Partnership Deal (TPP): What are the economic consequences for in- and outsiders?

GED
Global Economic Dynamics

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What are the economic consequences for in- and outsiders?

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1. Introduction

After more than five years of intensive negotiations, the US and eleven other Pacific Rim countries – Australia, Brunei, Chile, Canada, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam – concluded the Trans-Pacific Partnership (TPP) deal on 5 October in Atlanta establishing the world's largest free trade zone of 800 million people with a combined GDP of US $28 trillion (about 37% of world GDP measured in current US dollars). Apart from addressing traditional trade issues such as the abolition of duties and quotas, it is intended to break new ground on issues such as labor laws and technology.

US president Barack Obama welcomed the TPP stating that it will "eliminate more than 18,000 taxes that various countries put on US products." The deal "*reflects America's values and gives our workers the fair shot at success they deserve*" he argued, adding that the US should not "*let countries like China write the rules of the global economy*".

In a separate statement the US Trade Representative (USTR) Office underlined that the "*TPP brings higher standards to nearly 40 percent of the global economy*."

Japanese Prime Minister Shinzo Abe told reporters the deal was a "*major outcome not just for Japan but also for the future of the Asia-Pacific*".

Tim Groser, New Zealand's Trade Minister said the "*strategic*" implications of the deal for global trade were "*enormous*."

"*Today is a historic day. It is a great day for Canada. It is a great day for Canadians*", Canadian Prime Minister Stephen Harper said during a press conference announcing the deal. "*It is going to be the new gold standard for global trade agreements*", he added.

EU trade commissioner Malmström also welcomed the conclusion of TPP negotiations. At the same time, many observers fear that TPP will marginalize Europe in the race to shape global standards and rules.

Negotiations on a TPP- agreement started in 2010. They build on a predecessor agreement: the so called Trans-Pacific Strategic Partnership between Brunei, Chile, New Zealand and Singapore, which was signed in 2005, and entered into force in 2006. In 2008, the US joined the talks. As of 2014, twelve countries are part of the trade negotiations: Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States of America and Vietnam.

For the US, the TPP is an important part of a strategy reorientation towards East Asia, the so called pivot. The key areas of this regional strategy are: "strengthening bilateral security alliances; deepening our working relationships with emerging powers, including with China; engaging with regional multilateral institutions; expanding trade and investment; forging a broad-based military presence; and advancing democracy and human rights."[1] The Obama administration made TPP one of the top priorities in its trade agenda. Repeatedly, in his State of

[1] Richard Bush (2012), The Response of China's Neighbors to the U.S. "Pivot" to Asia, Brookings Institution Brief, http://www.brookings.edu/research/speeches/2012/01/31-us-pivot-bush

the Union speeches, the president referred to these talks. They are an important part of the US's pivot towards East Asia.

The deal has now to be signed formally by each country and ratified by the respective parliament. A "comprehensive" text of the agreement in principle has yet to be released, but cornerstones of the deal have become public. Ratification is by no means certain. Hilary Clinton, the likely presidential candidate of the Democratic Party in the US, has said about the deal "*As of today, I am not in favor of what I have learned about it*".[2] An interesting debate during the presidential campaign is sure to follow.

Yet, the question arises, whether the enthusiastic remarks with which heads of government celebrated the breakthrough are not entirely overblown. So, in this report we ask:

- What are the economic advantages of TPP to the insider countries? Who benefits most?
- How are outsiders, such as Europe or China, affected?
- What is the price that the TPP countries pay for keeping China out?

2. What the agreement is about

Goods

The TPP agreement abolishes tariffs in a wide array of products, relaxes quantitative restrictions, and establishes mechanisms to avoid unjustified sanitary and phytosanitary (SPS) measures as well as technical barriers to trade (TBT). These policy changes also affect the sensitive agricultural, food, and textile markets, but a number of compromises have been made.

Central areas of conflict have been sugar, milk quotas, rules of origin in the automotive industry, and bio-pharmaceuticals. New Zealand and Australia negotiated a better access to the US milk market, which is still strongly protected. In return, American dairy farmers asked for better access to the Canadian and Japanese milk markets, where tariff and non-tariff protection is very high. Details on the negotiated quota and tariff system are still not known, but all sides must have made compromises.

In the automotive industry, Canada and Mexico have strong incentives to demand very strict rules of origin, so that the use of car parts produced outside of the TPP zone must be small enough for the final car to enjoy tariff-free access. Japan has opposite incentives, because it sources a large share of car parts from non-TPP countries such as Thailand. Here, too, a bargain was struck, with details still pending.

Public procurement is a thorny issue in many countries, in particular in the US which has ruled out to drop policies such as Buy American requirements or measures that privilege small businesses in obtaining government contracts.

Services

In the area of services, TPP focuses on improving transparency and predictability of regulatory procedures with a special emphasis on financial services and telecommunications. Given very

[2] CNN, Oct 7, 2015. http://edition.cnn.com/2015/10/07/politics/hillary-clinton-opposes-tpp/index.html

different states of development of participating nations, and very different political orientations, market access improvements are however limited. Yet, the agreement is the first one to address digital trade and a friction free operation of the global internet. It includes provisions on protection of practices such as cloud computing and prevents national governments from requiring that TPP companies build data centers to store data as a condition for operating in a TPP market.

Intellectual property

The agreement includes several provisions that build on foundations established in the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights and other international intellectual property agreements, such as the World Intellectual Property Organization (WIPO) Copyright Treaty, the WIPO Performances and Phonograms Treaty, and the Patent Cooperation Treaty. The objective is to protect patents, trademarks, copyrights, and trade secrets, including safeguards against cyber theft of trade secrets. Controversially, the USA wanted to protect the inventors of bio-pharmaceuticals for 12 years after the end of patents by granting them the right not to share the data on their products. This implies that producers of generic pharmaceuticals cannot simply use the data of the original inventors when they seek market admission of their products, but have to provide own data and tests which results in higher costs. Australia, for example, grants "data exclusivity" rights for five years. The TPP compromise resulted in a common limit of 8 years.

Investment

The deal also includes the Investor State Dispute Settlement (ISDS) mechanism that will allow investors to bring TPP governments to arbitration. At the request of Australia, which has no ISDS mechanism with the US yet, the ISDS mechanism will not cover the tobacco industry.

Level playing field

Since TPP is an agreement that covers some of the richest and most advanced countries of the world (such as the US) but also some rather poor ones (such as Peru, Malaysia, or Vietnam), special attention was paid to the need of guaranteeing a level playing field for all market participants. For this reason, the deal sets up new workers' rights, including rules on child labor, forced labor and discrimination. It also includes rules on state-owned enterprises (SOEs), which still play a huge role in an officially communist country such as Vietnam. Since rules like these are missing in existing agreements that tie TPP members (such as the North American Free Trade Area, NAFTA), these existing pacts are updated by TPP.

Summarizing

From what is known to date, TPP is more of a standard trade agreement of the type that the US or the EU have signed in the last years (e.g., with South Korea) than of a new generation deal that cuts into new topics such as regulatory cooperation, the mutual recognition of standards, or the joint setting of standards. It does not go very far in services or government procurement, and important carve-outs in agriculture are very likely.

What this means for our simulations

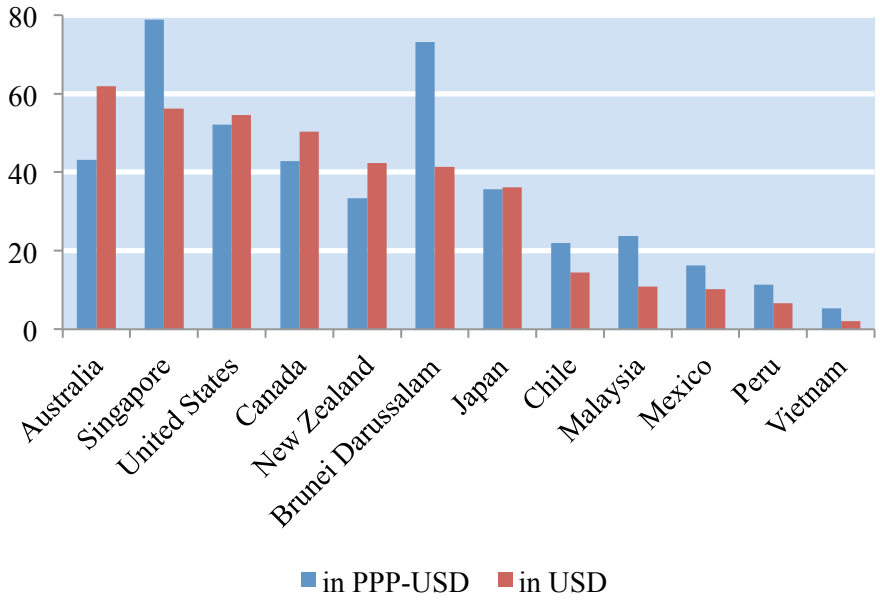
TPP is an ambitious agreement, in that it brings together some of the richest and most developed countries of the world with rather poor ones, one of which still has a communist regime (Vi-

etnam has a single party system and has a per capita GDP that is just one tenth of the US level, measured in purchasing power parities). This wide geographical and developmental reach does limit its depth. In the simulations below, we assume that the TPP agreement eliminates all tariffs between the parties (even if we know that some tariffs may remain for certain products). And we assume that the agreement reduces non-tariff barriers by as much as medium-depth agreements that already exist do. We describe the methodology in more detail below.

3. Some Facts about the TTP partners

The following illustration illustrates key facts on the TPP region. The agreement would cover roughly 40% of world GDP, 10% of world population and 20% of world trade. However, the degree of heterogeneity is huge. Figure 1 shows that, in 2014, the GDP per capita in current USD is more than 60,000 USD in Australia while it is just about 2,000 USD in Vietnam. In purchasing power parities (PPP), discrepancies look similarly large.[3] Peru, Mexico, Malaysia and Chile are substantially richer than Vietnam, but the per capita income of the richest of these, Chile, still is just one quarter of the Australian level.

Figure 1 GDP per capita in the 12 TPP partner countries, 2014, in thousands



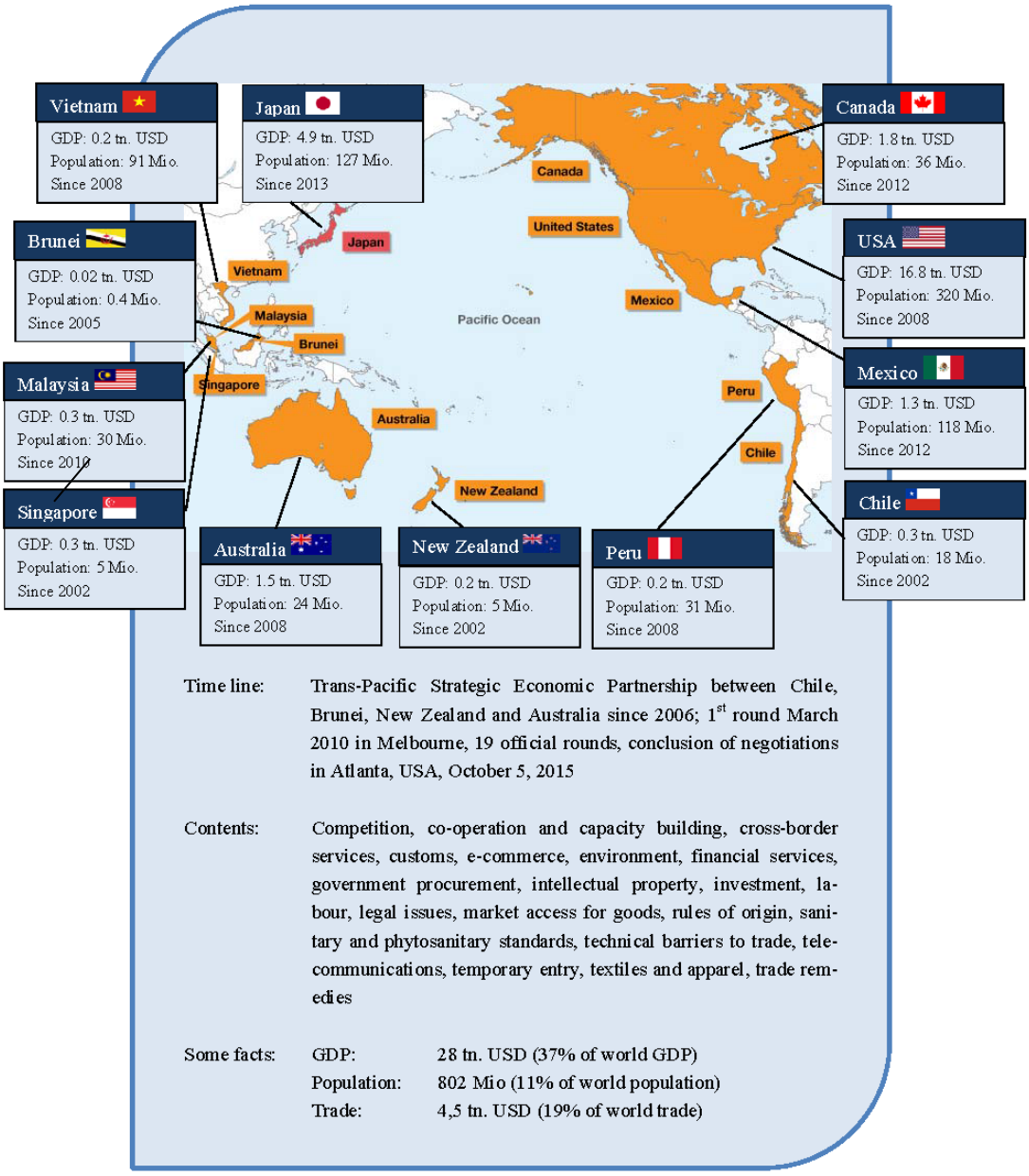
Source: World Development Indicators. New Zealand: data refers to 2013. Authors' illustration.

Figure 3 reveals another two dimensions of heterogeneity. First, the TPP agreement is very strongly dominated by the economic clout of the USA. The figure ranks TPP member states according to falling GDP, measured in current US dollars. The solid red line in the illustration shows the cumulated share of countries in total TPP GDP. The US accounts for almost 62% of the TPP's economic power, together with the other rich OECD countries Japan, Canada and

[3] In the current context, income per person should be measured in the currency which is used for international transactions.

Australia, the share rises to about 90%. Together, Vietnam and Brunei add less than 1 percent to total TPP GDP.

Figure 2 Trans-Pacific Partnership (TPP)

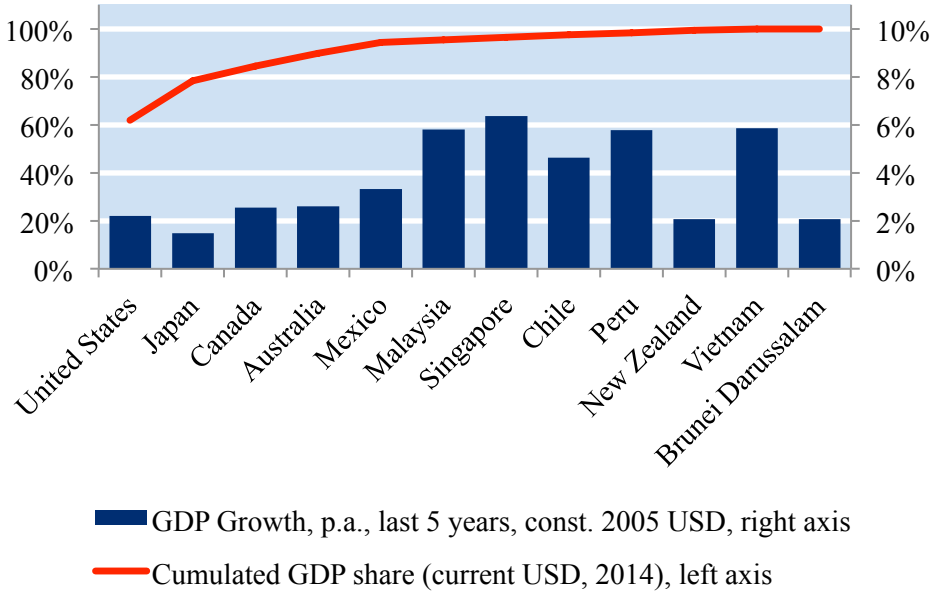


Source: ifo Institute. Data from World Development Indicators.

In terms of recent growth rates (of GDP in constant 2005 US dollars), it is however the countries with smaller GDPs that have tended to grow faster (with the exception of ultra-rich Brunei and New Zealand). The TPP region as a whole featured an average growth rate of real per capita income of more than 4% over the last ten years, according to World Bank data. The TPP countries form a dynamic region, and the region's rising level of income makes it an increasingly

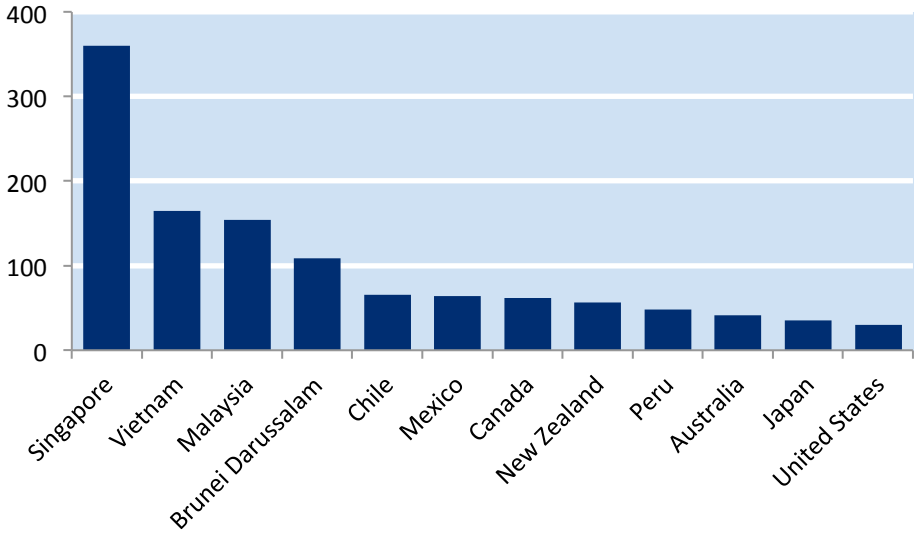
attractive market for companies from the US and Europe. Looking into the future, this is why the agreement makes sense to the USA and why it may pose threats to Europe.

Figure 3 Shares in total GDP of TPP group and average GDP growth over last 5 years, %



Source: World Development Indicators, Author's illustration.

Figure 4 Total trade (exports plus imports, goods and services) over GDP in the TPP countries, %



Source: World Development Indicators, own illustration. Data refer to the year of 2013. Author's illustration.

Finally, Figure 4 shows that the TPP members differ dramatically with respect to their degree of openness as measured by total trade (goods plus services) as a fraction of GDP. Singapore is the

world's most open economy: exports plus imports amount to almost 360% of GDP. In the US, in contrast, this share is merely 30%.

This heterogeneity explains the difficulties in finding common ground and also explains the fact that the agreement has a strong focus on development related aspects such as labor and environmental issues.

4. Including China: The Free Trade Area of the Asia-Pacific

Other countries, which are currently left out of the TPP agreement, have signaled their interest in joining the agreement. These countries are Colombia, Philippines, Thailand, Indonesia, Taiwan, and South Korea.

China is not yet in this group. However, it has advocated another big trade policy initiative in Asia at the APEC (Asia-Pacific Economic Cooperation) summit in Beijing in November 2014, which brings the TPP countries, and other Pacific Rim countries including China together into a Free Trade Area of the Asia-Pacific (FTAAP). APEC leaders agreed to launch "a collective strategic study" on the FTAAP and instruct officials to undertake the study, consult stakeholders and report the result by the end of 2016. However, the idea for a free trade area spanning the Pacific has been around for almost 50 years.

Although originally proposed by the US, the push for a Free Trade Area of the Asia-Pacific has not been welcome by the US which appears to have resisted conducting a full feasibility study. The US seems to not want FTAAP negotiations to start before TPP is completed. TPP would give the US more pre-eminence in the Asia-Pacific region than an FTAAP that also includes China and Russia would.

An FTAAP agreement would be even bigger than TPP. It would cover 21 countries, including two of the world's three largest economies, and many other fast growing countries. In total, it would account for 2.7 bn. consumers, 40% of the world's population. It would cover 56% of world GDP, i.e., 43 trillion USD. In terms of economic size, the agreement would be truly gigantic, letting the TTIP agreement that the EU is negotiating with the US look like a minor undertaking.

For the time being, it is unclear how comprehensive and deep an FTAAP could be. This would depend on the precise mix of countries that engage in negotiations. It is hard to imagine trade talks between the US and Russia, both being APEC members. Also negotiations between China and the US would imply a full turn-around of the containment strategy that the US has practiced towards China in the last decade. Petri et al. (2014) have described FTAAP as an intermediate agreement, less ambitious than TPP but more so than the Regional Comprehensive Economic Partnership (RCEP) agreement that China is pursuing with ASEAN countries (many of which are either in TPP or in the list of interested countries) and other major trade partners such as India.

In any case, the Chinese initiative, and its endorsement at the APEC summit shows that regional economic integration in South and East Asia is likely to progress in the future in one or the other

way. TPP, RCEP, and FTAAP take different forms and have different levels of ambition for the included countries. Yet, they will all affect Germany, Europe, and other countries left out. Their size will make them potentially relevant for the entire world trade order.

Below, we not only look at the effects TPP could have on countries around the world, but also study the FTAAP agreement. This will show how costly it is to exclude China and which additional advantages a larger regional agreement would possibly deliver.

5. Modelling the effects of trade agreements

To simulate the effects of a trade agreement such as TPP or FTAAP, one needs a model of the world economy that accounts for countries' different levels of development, for their different geographical locations, the particular structure of their cultural, linguistic and political bilateral ties. A model that is able to do this is the one developed by Caliendo and Parro (2015). Aichele et al. (2014) have added non-tariff barriers and services sectors to this model, and have prepared it for the ex-ante analysis of trade agreements.[4]

The key idea is to provide a mathematical framework that is able to replicate the structure of world trade, of sectoral value added, and of aggregate incomes at the country-level as it is observed in the status quo data. This is no easy task, because the world consists of roughly 170 independent nations, and so there are 170 times 169 possible trade links (28,730) in each of the 30 sectors of economic activity we model.

The status quo situation takes account of the structure of trade barriers as they exist in the data: tariffs, and the sum of all other barriers that hinder the flow of goods and services across international borders. Some of these barriers are given by nature, such as geographical distance, or have been formed by thousands of years of history, such as language ties. Others can be changed by trade agreements. These non-tariff barriers are hard to quantify empirically. The nice feature of the employed model is that the level of these barriers need not be known; it is enough to know the expected change of these barriers due to the proposed agreement.

To define an appropriate scenario, one could simply assume changes in these barriers. This is not what we do in this paper. Rather, we assume that the proposed agreements, both TPP and FTAAP will be as successful in reducing non-tariff barriers between member states as other, comparable agreements. We use data from Dür et al. (2014), who have classified the hundreds of existing trade agreements with respect to their depth. In our setup, the studied trade agreements are more than just about tariffs, but they fall short from the most ambitious agreements that reach deep into non-tariff barriers, such as NAFTA or the EU.

The simulations we report below answer the following question: what if, in the world as we observe it today, there were a trade agreement between the TPP countries that is as comprehensive and as deep as other medium-depth agreements that already exist?

[4] For more detail than what we can reasonably cover here, we refer the reader to the mentioned papers; the Appendix also discusses some important aspects.

The simulations return a wealth of data on things such as changes in the sectoral trade structure, the sectoral value added, total income, prices and price indices of all countries. In this brief report, we limit ourselves to describing the effects on real per capita incomes. Trade, of course, is not an objective per se; whether an agreement is successful or not is measured by its effect on average incomes.[5]

Changes in per capita incomes derive from two sources: changes in income, expressed in international currency, and changes in the aggregate price index (i.e., the cost of purchasing a representative basket of goods). Due to the agreement, incomes may increase as lower trade costs allow countries to specialize more strongly on the sectors in which they enjoy a comparative advantage, or because they allow concentrating production of specific goods at fewer places, therefore enabling economies of scale. Incomes may fall, however, because tariffs on imported goods no longer reach the public coffers. The price level may fall because lower trade costs imply that foreign goods are delivered more cheaply to domestic consumers, and because specialization or economies of scale lower production costs of foreign and domestic producers.

In most of the following tables, we use a multi-industry model that replicates the pattern of specialization of about 130 countries (and some aggregate regions that collect many small countries for which data coverage is insufficient) in about 30 sectors. A key assumption in this exercise is that the technological structure of comparative advantage does not change due to TPP. This may be correct in the medium run, but in the very long run, systemically relevant trade agreements may affect sectoral productivity levels and, thus, the technological structure of comparative advantage. We turn to results provided by Felbermayr et al. (2015) to address this issue.

Regional trade agreements do not cover all countries of the world. Because they reduce trade costs between insiders, but not between insiders and outsiders to the agreements, they reduce the competitiveness of outsiders relative to insiders. This is why these agreements are also called ‘preferential’: they extend preferences to certain countries but withhold them from others. This leads to trade creation between insiders, and to trade diversion between in- and outsiders to the extent that they produce similar goods. However, because a successful agreement raises incomes in the insider countries, and this income is spent on goods from all over the world, outsiders can benefit as well. This income (or scale) effect is magnified, if outsider countries are strongly tied into value added chains of insiders: then, higher production triggers higher demand for raw materials, or components. If these income effects are strong enough compared to the diversion effects, then outsiders can actually benefit from a preferential trade agreement.

The reported numbers are to be understood as the long-run effects that materialize over time and are, as evidence suggests, (almost) fully available after 10 years. Since income is a flow variable, an increase by x % means that incomes are permanently higher by this percentage amount for the entire history after the agreement is in full swing, holding all other determinants of per capita incomes constant.

[5] The model, like many others, is silent on distributional consequences within countries. This is a shortcoming. Note, however, that trade may affect the structure of gross incomes. What matters, however, for individual incomes are net incomes which are shaped by the tax-and-transfer system.

6. The effects of Pacific agreements for members

In Table 1 we report the effects that the TPP and the FTAAP agreements would have on current real per capita incomes. Looking first at the TPP deal, it is clear that merely eliminating tariffs would not affect per capita incomes much. The reason is that tariffs are already low between the OECD countries, and between TPP members that already have trade agreements with each other (as, e.g., the US has with Chile or Peru). Only Vietnam and New Zealand benefit in a measurable way from a tariffs-only TPP. In the case of New Zealand this is because of the fact that the country has no bilateral trade agreements in place with large TPP members such as Japan, the US or Canada.

Table 1 Effects of TPP and FTAAP on real per capita income in insider countries, %

	Membership		Real income change (in %)			
			TPP		FTAAP	
	TPP	FTAAP	tariffs	comprehensive	tariffs	comprehensive
Australia	yes	yes	0.06	4.52	0.73	7.04
Canada	yes	yes	0.01	2.08	0.07	3.43
Chile	yes	yes	0.04	0.13	0.19	0.58
China	no	yes	-0.04	-0.08	0.95	5.89
Hong Kong	no	yes	0.00	-0.06	0.39	4.45
Indonesia	no	yes	0.00	0.02	0.95	3.20
Japan	yes	yes	0.08	2.17	0.46	3.82
South Korea	no	yes	-0.02	-0.07	0.77	4.33
Mexico	yes	yes	-0.03	-0.08	-0.01	0.59
Malaysia	yes	yes	-0.09	3.11	1.86	7.62
New Zealand	yes	yes	0.33	6.33	0.95	9.05
Peru	yes	yes	-0.01	2.40	0.02	3.55
Philippines	no	yes	-0.03	0.05	0.18	2.87
Russian Federation	no	yes	0.00	0.08	0.29	6.14
Singapore	yes	yes	0.01	0.86	0.82	3.31
Thailand	no	yes	-0.09	-0.12	1.61	5.93
Taiwan	no	yes	-0.05	-0.07	1.94	10.77
United States of America	yes	yes	0.02	1.95	0.10	2.79
Vietnam	yes	yes	0.70	5.38	0.40	8.18

Source: Authors' calculations. No data for Brunei and Papua New Guinea.

Looking at the comprehensive scenario, which also addresses non-tariff barriers, it becomes apparent that TPP can unlock rather sizeable gains amongst members. Again, for the same reasons than those explained above, New Zealand turns out to be the biggest winner, with long-term benefits as large as 6%. Poor countries, such as Vietnam, also have a lot to gain from better market access to large and mature economies such as the US or Japan. The latter benefit, too, but at a smaller rate of about 2%. The country with the smallest gains is Singapore. Not surprisingly: this is one of the most open economies of the world, it is already extremely specialized, and its overall openness cannot go up by as much as is possible elsewhere. Interestingly, Mexico, a TPP partner, could actually lose from the agreement. The reason is preference erosion: this

country, a NAFTA member, runs almost 80% of its export business with the US. If other countries, in particular Japan enjoy better access to the US markets in crucial industries such as automotive, this could crowd out Mexican producers and hurt the Mexican economy. However, the simulated loss is small (-0.08%).

Looking at countries in the Pacific region that are excluded by TPP, one observes some slight losses for China (-0.08%) or Thailand (-0.12%). These countries are hurt by trade diversion, but the damage is limited due to increased demand for their products as TPP countries grow richer and produce and consume more. Other outsiders, such as Indonesia, actually gain, if only slightly, as the demand effect outweighs trade diversion.

Turning to the FTAAP scenario, which is defined in the same way as TPP with the difference that it covers additional countries, we may state that all countries (except Mexico) would gain from the elimination of tariffs. Countries with sizeable tariff protection, such as Taiwan or Thailand could gain handsomely. Other countries benefit substantially more than under the TPP scenario; again, the reason is that tariff barriers amongst the additional FTAAP members are still high. Looking at the comprehensive scenario, FTAAP benefits everyone in the group, including Mexico. Countries with strong trade ties but no existing free trade agreement with China benefit most. Compared to TPP, the USA has only modest advantages from FTAAP. While better access to the Chinese market is a big prize, the USA is not particularly competitive in China and faces the risk of losing market shares in other countries, such as Japan, which would, through FTAAP, attract more competitors from China. In a sense, the costs of containing China do not turn out to be very large for the US. Maybe this is the reason why the US focused on TPP rather than on FTAAP.

7. The effects on world regions

Next, we turn to other world regions. Table 2 reports aggregate (i.e., population weighted) gains from TPP and FTAAP in major economies or world regions. For non-TPP or non-FTAAP countries, the key question is whether the damaging trade diversion effects are offset by positive demand effects. This is an empirical question that the simulation exercise can answer.

The table documents that the average world citizen benefits from both TPP and FTAAP, but the gains obtained by insiders are many times bigger than those for outsiders. The only big economic entity to lose from TPP is China. However, the damage is very limited and statistically indistinguishable from zero. The same is true for the EU27, which also remains largely unscathed. Growth in the TPP region triggered by TPP boosts demand for European products and this keeps the negative trade diversion effects at bay. Maybe this is the reason why EU trade commissioner Malmström welcomed the political breakthrough of October 5th.

FTAAP would be much more beneficial globally than TPP as it would leave world GDP almost 4% higher. This is due to its larger economic size: Adding China and ASEAN countries (including regional heavy-weights such as Indonesia) does make a very significant difference. China and the ASEAN countries would register benefits of 6% and 5%, respectively, if they gained improved access to the US, Japanese and Canadian markets (amongst others). It also turns out

that resource rich countries, from which China sources, would benefit massively. This is true for the South African Customs Union (SACU), oil producing countries, or Sub-Sahara Africa.

In other words, FTAAP is much better for the world as a whole than TPP, while the advantage to the USA is only minor.

Table 2 Real Income Effects of Pacific Mega Regionals on World Regions

	TPP	FTAAP
Alianza del Pacifico	0.14	1.15
ASEAN	0.87	4.70
Australia & New Zealand	4.77	7.32
Canada	2.08	3.43
Central Asia	0.06	7.75
China	-0.08	5.80
East Asia	1.74	3.92
EFTA	0.03	3.00
EU27	0.02	2.90
Eurasian Customs Union	0.07	5.84
Latin America & Caribbean	0.16	5.06
MENA	0.08	6.35
MERCOSUR	0.00	2.64
Oceania	0.25	9.36
Oil exporters	0.38	11.75
Rest of Europe	0.10	3.12
SACU	0.08	7.48
South Asia	0.04	3.54
Sub-Saharan Africa	0.07	8.27
Turkey	0.04	2.41
USA	1.95	2.79
World	0.84	3.67

Source: Authors' calculation.

8. Zooming in on Europe

Table 3 sheds a closer look on the effects of Pacific trade agreements on Europe and Germany. Overall, the TPP agreement has no measurable effect on Europe. Apparently, trade diversion and income effects neatly cancel each other out. Behind the averages, some countries are affected more than others. Malta, for example, a major global supplier of shipping services, could benefit from TPP by 0.3%. The same is true for Greece, albeit at a lower rate. Germany, on the other hand, is likely to lose slightly (-0.04%), the same is true for countries with similar comparative advantage or with strong production ties to Germany (Austria, Czech Republic, Netherlands, Slovak Republic). The effects are, however, statistically indistinguishable from zero.

In contrast, the larger FTAAP agreement would have larger effects on European countries. If it were limited to tariffs, Germany would lose 0.23%, but the very substantial income effects triggered by an agreement that does address non-tariff barriers generates much more positive effects. Europe, in spite of being an outsider, would gain 3%; this is more than the gains that the US, an insider, can expect. The reason is that Europe benefits much more than the US from an increase in global demand since it is more open. That it overtakes the US is, however, a surprise. The gains are supported by strong benefits in the UK, but also in France, Germany, or Spain.

These results show very strongly how strong global trade links can multilateralize the gains from trade arising from systemically relevant regional deals. As China grows richer from FTAAP, its trade partners benefit, too. An old truism is confirmed again: Growth in one region in the world need not be harmful to other regions if it is due to productivity improvements.

Table 3 Real Income Effects of Pacific Mega Regionals in Europe (%)

	TPP		FTAAP	
	Comprehensive	Tariff only	Comprehensive	Tariff only
European Union	*0.02*	*0.00*	*2.90*	*-0.08*
Austria	-0.03	0.00	2.36	-0.11
Belgium	0.11	0.00	5.24	-0.18
Bulgaria	0.11	0.01	4.61	0.06
Cyprus	0.18	0.01	6.44	0.23
Czech Republic	-0.05	-0.01	1.47	-0.26
Germany	-0.04	0.00	2.48	-0.20
Denmark	0.04	0.00	3.09	-0.03
Spain	0.06	0.00	2.62	0.02
Estonia	0.12	0.01	5.51	0.11
Finland	0.03	0.00	3.79	-0.17
France	0.04	0.00	2.60	-0.04
United Kingdom	0.06	0.00	3.57	0.01
Greece	0.13	0.01	4.64	0.13
Hungary	0.00	0.00	2.42	-0.27
Ireland	0.03	-0.02	5.84	-0.42
Italy	0.02	-0.01	2.18	-0.08
Lithuania	0.19	0.01	7.93	0.18
Luxembourg	0.14	0.00	6.25	0.02
Latvia	0.16	0.01	5.78	0.32
Malta	0.30	0.00	31.46	0.16
Netherlands	-0.02	-0.01	1.70	-0.18
Poland	0.06	0.00	3.16	-0.02
Portugal	0.08	0.00	3.17	0.08
Romania	0.08	0.01	3.01	0.12
Slovakia	-0.02	0.00	2.73	-0.24
Slovenia	0.07	0.00	3.70	-0.02
Sweden	-0.03	0.00	2.60	-0.11

Source: Authors' calculation.

9. Flexible comparative advantage

The results discussed so far come from microeconomic simulation results that take sectoral detail into account and also account for global value chains. In order to address third country effects, such a perspective is preferable to a macroeconomic view, which does not distinguish between different industries and, thus, may overstate trade diversion effects. However, the macro perspective implicitly assumes that the comparative advantages of countries are malleable in the long-run. In other words, with technology transferable internationally, the only driver of cross-country differences in GDP per capita is the endowment with human capital. In other words, even if countries specialize on certain industries in the baseline equilibrium, the long-run pattern can change. So, specialization patterns do not provide much of a defence against trade diversion effects. With TPP, Asian countries will move into producing products that have traditionally been produced in Europe. Also, as they move into new industries, any income expansion in the TPP or RCEP regions will lead to smaller demand effects of Europe as a larger share of the new demand will be satisfied by local producers.

Table 4 Effects of TPP with flexible comparative advantage, selected countries, % of real per capita income

	%		%
Austria	-0.15	United States*	2.14
Belgium	-0.11	New Zealand*	12.66
Bulgaria	-0.22	Japan*	8.20
Croatia	-0.22	Singapore*	4.04
Cyprus	-0.25	Vietnam*	3.75
Czech Republic	-0.17	Australia*	2.37
Denmark	-0.19	Peru*	0.89
Estonia	-0.25	Canada*	0.27
Finland	-0.28	Bangladesh	-0.13
France	-0.18	Egypt, Arab Rep.	-0.20
Germany	-0.19	India	-0.24
Greece	-0.24	Turkey	-0.24
Hungary	-0.20	Kenya	-0.26
Ireland	-0.24	Cameroon	-0.28
Italy	-0.21	Cote d'Ivoire	-0.39
Latvia	-0.24	Korea, Rep.	-0.39
Lithuania	-0.23	Argentina	-0.41
Luxembourg	-0.13	Cambodia	-0.46
Malta	-0.26	Colombia	-0.51
Netherlands	-0.15	Brazil	-0.52
Poland	-0.20	Morocco	-0.52
Portugal	-0.26	South Africa	-0.52
Romania	-0.20	Russian Federation	-0.64
Slovak Republic	-0.19	Senegal	-0.70
Slovenia	-0.17	China	-0.86
Spain	-0.28	Chile*	-1.00
Sweden	-0.25	Mexico*	-1.13
United Kingdom	-0.27	Indonesia	-1.28

Source: Authors' calculations based on Felbermayr et al., 2015. * indicates TPP member states. No data for Brunei and Malaysia.

Table 4 shows the simulated changes in real per capita income from the macro study of Felbermayr et al. (2015). The gains predicted for most TPP members are larger than in the micro study presented in the previous chapters. But the sorting of the countries is roughly similar, with New Zealand benefitting the most, and Mexico and Chile the least. Again, Mexico, a TPP partner, could actually lose from the agreement, as could Chile. The reason is preference erosion, in particular with the US.

In Felbermayr et al. (2015), all welfare changes for European countries due to turn out negative. The size of the effects is not very large, though. Countries with strong ties to the US lose strongly from TPP. Moreover, smaller economies tend to lose more than larger ones (Finland, Baltic countries). Countries that are very open with respect to the entire world lose less (Austria, Belgium, and Netherlands).

The macro results describe a worst-case scenario for Europe, because they show larger diversion and smaller income effects than models which take the currently observed patterns of comparative advantage as fixed. While these patterns are probably much less fungible than the macro studies implicitly assume, the results still are illustrative: they are a strong warning against taking the global shifts due to large regional trade policy initiatives not serious enough.

10. Sectoral effects in Europe and Germany

Next, we turn to sectoral effects and focus on Europe and Germany. This shows where vulnerabilities and opportunities may lie.

Table 5 ranks the sectors in Europe according to their relative importance in the world. For example, about 51% of world value added in the business services industry is generated in Europe. The Pacific agreements would slightly reduce this share, but only, if they involve reductions in non-tariff barriers. The metals and the leather industries, where the EU has large shares of global value added, could see sizeable reductions in their relative global weight if FTAAP is realized but not with TPP.

The same holds true for the automotive industry, albeit at a much larger scale. This sector is the only one which faces a sizeable threat from TPP. However, this threat is dwarfed by what FTAAP could bring. The simulations suggest that Europe's share in global value added, today around 37%, could fall by almost 18 percentage points to 19%. This would be a dramatic evolution that is mostly driven by a strong integration of the Asian production network (into non-TPP member countries such as China, Thailand, or Indonesia) and a resulting massive improvement in relative competitiveness of car producers based in Japan, South Korea and China in world markets, including Europe. Interestingly, this effect does not hinge on whether the US is part of FTAAP or not. It is really about a stronger integration of business processes in Asia. Note that Table 5 shows effects of value added generated in Europe by firms that may be headquartered around the world; it does not account for value added generated by European firms in foreign countries, e.g., in Asia.

Table 5 The EU's Importance in Global Sectoral Value Added with TPP and FTAAP

		Change in world value added share (%points)			
		TPP		FTAAP	
	Initial share in world value added (%)	Comprehensive	Tariffs only	Comprehensive	Tariffs only
Business services nec	51.08	-0.17	-0.02	-0.88	-0.28
Metal products	42.42	0.08	-0.03	-2.05	-0.64
Leather	41.25	-0.02	-0.10	-3.14	-3.60
Paper	37.79	-0.12	-0.02	-1.58	-0.39
Machinery nec	37.30	0.16	-0.02	0.71	-0.68
Motor vehicles	36.56	-1.48	-0.06	-17.98	-0.85
Food, processed	36.33	-0.15	-0.02	-1.37	-0.76
Chemicals	35.03	0.04	-0.04	1.27	-0.88
Construction	33.75	-0.10	0.00	-0.97	-0.25
Manufactures nec	33.60	-0.09	-0.02	-0.47	-0.35
Mineral products	32.95	-0.07	-0.01	-0.49	-0.49
Recreational services	32.61	-0.11	0.00	-0.83	-0.22
Textiles	32.04	-0.01	-0.07	-2.24	-2.48
Communication	31.41	-0.09	0.00	-0.50	-0.16
Air transport	31.06	-0.28	0.01	-1.04	0.41
Other services	29.84	-0.15	-0.01	-1.06	-0.29
Transport nec	29.48	-0.16	-0.01	-1.03	-0.15
Electricity	28.93	-0.14	-0.02	-1.00	-0.34
Wood	27.58	-0.06	-0.02	-3.58	-0.26
Electronics	24.39	-0.07	-0.02	0.32	-0.25
Ferrous metals	23.48	-0.37	-0.14	-1.07	-0.56
Metals nec	21.24	-0.35	-0.03	-5.89	-0.27
Insurance	20.87	-0.06	0.00	-0.04	-0.01
Water	20.73	-0.11	-0.02	-0.85	-0.24
Financial services nec	20.42	-0.04	0.00	-0.26	-0.09
Trade	18.89	-0.09	-0.01	-0.71	-0.17
Agriculture & Food	17.52	-0.09	-0.04	-2.05	-0.43
Water transport	15.11	0.08	0.00	-0.51	0.16
Gas	13.54	-0.02	0.00	0.11	0.07
Dwellings	11.62	-0.10	0.00	-0.65	-0.18
Mining	5.74	0.02	0.01	1.22	0.05
Total	29.74	-0.14	-0.01	-1.16	-0.35

Source: Authors' calculation.

Other sectors in which Europe looks vulnerable in the FTAAP scenario are textiles, wood, metals, but also the agri-food sector. These vulnerabilities have various reasons and affect different EU member states differently. For example, stronger competitive pressure for European producers in the agri-food area would be mostly driven by the US, while the other mentioned sectors

are threatened by higher competition from China. Within Europe, it is mostly the Southern and Eastern European countries that would be affected. This becomes apparent when looking at Table 6, which provides results for Germany.

For Germany, the Pacific agreements bring opportunities for the machinery sector, as higher growth in the Pacific regions increases demand for German investment goods. However, they threaten the motor vehicles sector for reasons explained above.

Table 6 Germany's Importance in Global Sectoral Value Added with TPP and FTAAP

	Initial share in world value added (%)	Change in world value added share (%points) TPP		FTAAP	
		Comprehensive	Tariff only	Comprehensive	Tariff only
Machinery nec	12.40	0.09	-0.01	0.45	-0.20
Motor vehicles	10.80	-0.56	-0.02	-5.23	-0.24
Business services nec	10.39	-0.04	0.00	-0.25	-0.06
Metal products	10.28	0.01	-0.01	-0.47	-0.13
Chemicals	7.70	0.07	-0.01	0.68	-0.19
Recreational services	7.10	-0.03	0.00	-0.27	-0.06
Paper	6.95	-0.02	0.00	-0.28	-0.08
Manufactures nec	6.49	-0.01	0.00	-0.12	-0.07
Air transport	6.28	-0.04	0.00	-0.30	0.08
Electronics	6.17	0.01	0.00	0.26	-0.04
Food, processed	5.85	-0.02	0.00	-0.25	-0.14
Electricity	5.61	-0.03	0.00	-0.21	-0.07
Wood	5.34	0.00	0.00	-0.63	-0.05
Mineral products	5.34	0.00	0.00	-0.02	-0.09
Other services	5.17	-0.03	0.00	-0.22	-0.06
Trade	4.86	-0.03	0.00	-0.23	-0.05
Communication	4.80	-0.02	0.00	-0.13	-0.03
Metals nec	4.78	-0.08	-0.01	-1.32	-0.04
Transport nec	4.77	-0.04	0.00	-0.32	-0.03
Leather	4.68	0.01	-0.01	-0.44	-0.54
Textiles	4.53	0.01	-0.01	-0.35	-0.43
Ferrous metals	4.35	-0.06	-0.02	-0.17	-0.10
Water	4.24	-0.03	0.00	-0.23	-0.05
Construction	4.16	-0.01	0.00	-0.13	-0.03
Financial services nec	3.91	-0.01	0.00	-0.09	-0.02
Insurance	3.46	-0.01	0.00	-0.06	-0.01
Dwellings	2.76	-0.03	0.00	-0.18	-0.05
Agriculture & Food	1.99	-0.01	0.00	-0.28	-0.05
Water transport	1.58	0.01	0.00	-0.14	0.01
Gas	1.45	0.00	0.00	0.11	0.03
Mining	0.43	0.01	0.00	0.18	0.02
Total	5.86	-0.03	0.00	-0.26	-0.07

Source: Authors' calculation.

11. Conclusions

1. Negotiations on The Trans-Pacific Partnership (TPP) agreement are concluded. Now, the text has to move to the 12 participating countries' parliaments for ratification. In the US, TPP faces strong opposition, particularly in the Democratic Party.
2. A defining feature of the agreement is the strong asymmetry amongst its members: The US accounts for more than 60% of GDP in the group of TPP member states; yet it relies far less on international trade in goods and services than its partners. The richest TPP country (Australia) has a GDP per capita (in current US dollars) that is more than 30 times as large as that of the poorest member (Vietnam).
3. While no final text on TPP is available yet, negotiators had to strike a number of difficult compromises. While ambitious in many respects, the deal does not totally eliminate all barriers in the agri-food sector, it does not go far in services liberalization, and it does very little to open public procurement.
4. While a tariffs-only TPP would not be worth much, a medium-depth agreement (reducing tariffs, addressing non-tariff barriers such as in comparable other existing agreements), TPP can raise incomes in the member states and in the world.
5. TPP raises real world income by about 1%. However, insiders to the deal (such as Australia, Vietnam or the USA) reap the benefits (5%, 5%, and 2%, respectively), while outsiders either benefit or lose marginally. China loses from TPP, as it suffers more from trade diversion than other countries. Losses are, however, only minor.
6. The FTAAP agreement, which in contrast to TPP includes China, would be much better for the world as TPP, as it could lift world income by almost 4%. All world regions would benefit; insiders more than outsiders, but many poor, resource rich economies (such as in Sub-Sahara Africa), with close ties to China, would benefit handsomely.
7. For the US, FTAAP is only marginally better than TPP. This is because both agreements do not cut very deeply in areas where the US is competitive in China (such as services), but increased competition from China in TPP markets puts additional pressure on US firms.
8. For Europe, an outsider to both TPP and FTAAP, the latter is much more beneficial than the former. FTAAP could unlock very substantial gains in China which spill over to Europe through the strong production networks that have emerged between these regions over the last two decades. While TPP leaves Europe essentially unaffected, FTAAP could lead to additional income of 3%, almost as much as the US, an insider to FTAAP, could expect.
9. The optimistic outlook for Europe, however, depends on a given technological structure of comparative advantage. If the latter changes as a consequence of TPP, more sizeable losses could materialize. The same is true for China, which would lose much more (-0.9%) than the EU (-0.2%), while effects on TPP insiders remain qualitatively similar to the case of fixed comparative advantage.
10. Across all sectors, both TPP and FTAAP imply market share losses for EU and German industries. This does not mean that most industries shrink due to the trade pacts, but it does reflect an important shift in the competitiveness of the old continent.
11. On the sectoral level, TPP turns out to be a particular threat to the European and the German automotive industries. This is even more pronounced in the case of FTAAP,

where Germany's share in global value added could fall by almost 50%. This massive effect is explained by the fact that the Pacific agreements are expected to strongly reduce barriers in this industry so that trade diversion effects could be sizeable. Note, however, that the numbers report value added in Germany, not value added generated by German firms outside Germany.

12. The machinery and chemicals industries in Germany could benefit from both TPP and FTAAP. The reason is that the former benefits strongly from higher growth abroad (due to increased investment demand), while the latter is sheltered as non-tariff barriers in this area are not assumed to change much between TPP and FTAAP partners.

Appendix

Model structure

We use the model developed and described in a technical paper (Aichele et al., 2014). This is the Ricardian multi-sector trade model of Caliendo and Parro (2015) with input-output linkages, extended by the authors to capture services trade and non-tariff measures. The model enables us to calculate the long-run effects of changes in tariffs and in non-tariff barriers. Because research shows that the long-run effect of trade opening on structural unemployment (i.e., the component not driven by business cycles) is broadly zero, the model takes aggregate employment as given.[6] Moreover, the model assumes perfect competition. This is an often criticized assumption; but recent research shows that more realistic (and complicated) modeling of economic structures does not lead to different aggregate predictions; see Arkolakis et al. (2012) or Felbermayr et al. (2015). Following Dekle et al. (2008) we allow for multilateral trade imbalances, but assume them to be fixed to the status quo. The TPP or FTAAP will, therefore, not change the aggregate balances, but their composition.

In the specific model employed in our work, gains from trade are driven by two general mechanisms: First, if trade costs fall (tariffs and non-tariff barriers), countries can better exploit their comparative advantages; this leads to stronger specialization. In the aggregate, this effect manifests itself as a productivity gain: with the same resources (mostly: labor), a higher output can be achieved. Second, lower trade costs reduce prices of consumption goods and services for consumers and of raw materials or intermediaries for producers. In the aggregate, this contributes towards a lower price index which benefits both consumers and producers. Due to perfect competition, productivity gains and lower prices are fully passed over to workers, owners of assets (physical and natural capital), and the government (through taxes). Amongst other things, this implies that trade liberalization typically leads to higher real wages (i.e., one hour of work gives the worker a higher purchasing power).[7]

Data and parameter estimation

The model is brought to the data provided by the Global Trade Analysis Project (GTAP), baseline 2007. It covers 17 merchandise industries, and 15 services industries (one of which, "dwellings", is non-traded) as well as 134 countries and regions.[8] The GTAP data provides the input-output tables for each country or region, which indicate how much any industry (domestic or foreign) supplies inputs to the production of other industries (domestic or foreign) and how

[6] More precisely, the literature actually finds that trade liberalization on average leads to small employment gains. See Felbermayr et al. (2011) for empirical evidence and Felbermayr et al. (2013) for simulation results related to the TTIP. Thus, assuming constant employment is a conservative approach.

[7] The model is more complicated than what this rough description suggests; see Aichele et al. (2014). In particular, it accounts for the fact that lower tariffs reduce government revenues, and that lower trade costs have complicated effects on global sourcing patterns (i.e., on the global production chains).

[8] Table A1 in the Appendix to Aichele et al. (2014) provides details.

much primary factors of production (i.e., labor) is used. The database also contains consistent output data and trade flow information on the bilateral industry level.

The main advantage of the modern quantitative trade models introduced in Costinot and Rodríguez-Clare (2015) is their parsimony. They can be parameterized based on simple econometric equations that emerge as equilibrium relationships from the model itself. And the parameter estimations can be conducted on exactly the same data that describes the baseline scenario in the analysis.[9]

In the present model, two types of industry-level parameters matter most: the elasticity at which tariff changes affect trade flows (denoted in Table 7 by $-1/\theta$) and the effect of preferential trade agreements (PTAs) on those same flows ($-\delta/\theta$). In the latter, we distinguish between shallow and deep agreements, borrowing a detailed classification from Dür et al. (2014). In the text, we define as a comprehensive agreement a trade deal that eliminates tariffs but that is shallow in terms of non-tariff barriers.

Table 7 Estimated trade policy effects, goods trade

	(1)	(2)	(3)	(4)	(5)	(6)
	Ln tariff		Shallow PTA		Deep PTA	
	$-1/\theta$	s.e.	$-\delta/\theta$	s.e.	$-\delta/\theta$	s.e.
Agri-Food	-2.861***	(0.636)	1.442***	(0.458)	0.689	(0.630)
Mining	-20.066***	(2.791)	-0.975	(0.793)	4.292***	(1.087)
Food, processed	-3.140***	(0.605)	-0.118	(0.532)	1.564**	(0.712)
Textiles	-4.342***	(0.860)	-0.321	(0.533)	2.357***	(0.700)
Leather	-5.046***	(0.920)	-0.204	(0.650)	2.049**	(0.831)
Wood	-5.684***	(0.806)	1.137**	(0.536)	0.473	(0.707)
Paper	-4.848***	(1.012)	0.826	(0.571)	0.021	(0.762)
Petroleum	-9.538***	(3.335)	-1.702	(1.116)	3.527**	(1.432)
Chemicals	-11.210***	(1.097)	0.194	(0.448)	1.055*	(0.622)
Mineral products	-8.872***	(0.890)	0.430	(0.533)	0.287	(0.692)
Ferrous metals	-10.456***	(1.355)	-0.137	(0.636)	2.245***	(0.845)
Metals nec	-10.756***	(1.901)	1.706***	(0.643)	-0.831	(0.818)
Metal products	-5.725***	(1.170)	0.059	(0.559)	0.859	(0.754)
Motor vehicles	-1.484*	(0.796)	2.210***	(0.608)	-1.175	(0.768)
Electronics	-4.321***	(1.498)	-0.921	(0.617)	2.032**	(0.829)
Machinery nec	-7.186***	(1.022)	0.328	(0.483)	0.550	(0.658)
Manufactures nec	-3.867***	(0.747)	0.526	(0.571)	-0.069	(0.757)

Source: Aichele et al. (2014), Table 1. Standard errors in parentheses. ***,**,* denote statistical significance at the 1, 5, 10% level, respectively.

[9] Consistent estimation raises a number of difficult questions which Aichele et al. (2014) discuss in detail. In particular, since PTAs do not occur randomly, one needs to employ so called instrumental variable estimation.

Table 7 reports estimation results that are described in much more detail in the technical companion paper (Aichele et al., 2014). Column (1) describes how, sector by sector, a one percent increase in an ad valorem tariff reduces bilateral trade. For example, a one percent increase in the tariff lowers exports by about 1.5% in the automotive sector but by about 11.2% in the chemicals industry. The estimated pattern is as expected: the less differentiated the products of an industry, and the more homogenous the production conditions across countries are, the stronger does a tariff invite consumers and businesses to divert their sourcing behavior. All estimates come with very small standard errors. Columns (3) and (5) report the effects of existing shallow and deep PTAs on trade flows. The model structure allows using the estimates from (1) to back out the trade cost effects of those estimates. Broadly in line with expectations, shallow agreements have trade cost reducing effects only in some industries (agri-food, metals, wood, motor vehicles) while deep agreements prove to be effective in a larger host of industries. Together, in 12 out of 17 manufacturing industries, PTAs affect trade costs beyond tariffs (i.e., through their effect on non-tariff barriers). Note that we will set estimated PTA parameters to zero unless the t-statistic of positive coefficients exceeds unity.[10]

Table 8 Estimated trade policy effects, services

	(1)	(2)	(3)	(4)
	Shallow PTA		Deep PTA	
	$-\delta/\theta$	s.e.	$-\delta/\theta$	s.e.
Electricity	0.137***	(0.048)	0.192**	(0.082)
Gas	0.025	(0.056)	0.354***	(0.092)
Water	0.086***	(0.030)	0.250***	(0.055)
Construction	0.024	(0.061)	0.304***	(0.092)
Trade services	0.036	(0.038)	0.452***	(0.061)
Transport nec	0.060*	(0.031)	0.267***	(0.054)
Water transport	-0.028	(0.056)	0.479***	(0.087)
Air transport	0.064	(0.039)	-0.025	(0.059)
Communication	0.032	(0.027)	0.076	(0.046)
Financial services nec	0.048	(0.039)	0.303***	(0.064)
Insurance	0.038	(0.031)	0.136***	(0.052)
Business services nec	0.066*	(0.036)	0.322***	(0.056)
Recreational services	0.030	(0.033)	0.192***	(0.054)
Other services	0.086**	(0.035)	0.268***	(0.059)

Source: Aichele et al. (2014), Table 1. Standard errors in parentheses. ***,**,* denote statistical significance at the 1, 5, 10% level, respectively. No trade in sector « Dwellings ». θ is assumed to be equal to 6; see Egger et al. (2012).

Interestingly, the evidence suggests that non-tariff barriers will go down significantly in the automotive sector, but not so in machinery (where the t-statistic is close to but below one). In

[10] The t-statistic is computed by dividing the coefficient by its standard error.

the chemicals or the electronics industries, only deep integration lowers trade costs in a measurable way, while the paper industry benefits from shallow integration but receives no additional boost from a deep agreement.

Table 8 reports estimation results for services industries. In this area, there are no tariffs. Shallow PTAs do not reduce non-tariff barriers in most sectors, the estimated effect is not statistically different from zero in 10 out of the 15 service industries. Given that shallow PTAs often do not cover services sectors, this result is not very surprising. Only deep PTAs have proven to reduce trade costs in a statistically significant manner in all but two sectors. Note that comparing results between Table 7 and Table 8, one sees that non-tariff barriers fall by much more in the manufacturing area than in services. For example, the results for processed food suggest that a deep PTA reduces trade costs by about 39%.[11] In contrast, in the area of business services, the cost saving effect is only about 6%.[12]

[11] 1-exp(-1.564/3.140)*100%.

[12] 1-exp(-(0.066+0.322)/6)*100%.

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