
# Assessing the potential impact of an EU-India trade agreement

## Cost of Non-Europe Report

STUDY

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Author: Cecilia Navarra
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Economic cooperation and trade between the EU and India are central issues, since the two partners are major players in the international economic and political arena. This study presents the results of a quantitative simulation of a potential FTA between the EU and India in goods and services. Under the most relevant scenarios, gains from increased trade for both sides are between €8 billion and €8.5 billion (0.03 % increase with respect to the baseline for the EU and about 0.3 % for India). Furthermore, a qualitative analysis suggests that potential gains may appear from coordinated EU action in addressing possible side effects of changes in trade, distributive impacts and externalities (such as inequalities, labour market effects, poverty and development implications, and environmental issues). This indicates that the Cost of Non-Europe in this field may be larger.

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**AUTHOR**

Cecilia Navarra, European Added Value Unit, DG EPRS.

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This annexed analysis of the economic impact has been written by Federico Gallina of Université Libre de Bruxelles (ULB), Professor Mathieu Parenti of Université Libre de Bruxelles (ULB), and Professor Vincent Vicard of the Centre d'Études Prospectives et d'Informations Internationales (CEPII) at the request of the European Added Value Unit (EPRS).

To contact the authors, please email: eprs-europeanaddedvalue@europarl.europa.eu

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eprs@ep.europa.eu
http://www.eprs.ep.parl.union.eu (intranet)
http://www.europarl.europa.eu/thinktank (internet)
http://epthinktank.eu (blog)

# Executive summary

Economic cooperation and trade between the EU and India are central issues, as both are major players in the international economic and political arena and together encompass one fifth of the world's population. India is the ninth commercial partner for trade in goods for the EU (10th since Brexit). Both imports from and exports to India account for about 2 % of the respective totals for the EU. The EU is a more relevant partner for Indian trade: in terms of overall trade, the EU ranks first among India's partners, with a value of trade in goods that is about 13 % of the total value of trade (11.1 % after Brexit [1]).

Since 2004, the EU has had a strategic partnership with India; in 2007, negotiations were launched on a broad-based trade and investment agreement (BTIA). These negotiations reached a deadlock in 2013 around a number of unresolved issues and different perspectives. Still, cooperation between the two partners (including on the economic level) is ongoing. In this direction, at the end of 2018 the EU adopted a strategy on India, aimed at reinforcing the strategic partnership, with a focus on sustainable modernisation and on collaboration in a multilateral context. Beyond trade, it is widely recognised by analysts that there are still untapped benefits to be derived from the EU speaking 'with a single voice' in its relations with India.

The present study provides an estimation of the **potential effects of a free trade agreement (FTA)** that partly liberalises trade in goods and services between the EU and India; [2] effects are measured both for welfare and trade volumes. The model used belongs to the group of new quantitative trade models, where the demand for goods and services is defined by a 'structural gravity equation' that links trade flows to country-specific characteristics and to bilateral trade costs between countries.

Under the most relevant scenarios, gains from increased trade for the EU are **between €8 billion and €8.5 billion** (a roughly 0.03 % increase with respect to the baseline). A similar increase in absolute terms is to be expected on the Indian side, which represents a greater share of the initial welfare (about 0.3 %). These scenarios assume a heterogeneous decrease in bilateral import tariffs (tariffs in most sectors, but not all, decrease by 90 %). In both scenarios, a homogeneous and symmetric reduction of non-tariff measures (NTMs) by 3 % for both goods and services is assumed. Alternative scenarios provide lower figures when no decrease is assumed in NTMs, or when it is assumed that the effect of the FTA on trade will be the effect of the 'average FTA'. The scenario where it is assumed that an EU-India FTA may have the same trade effect as the one between the EU and South Korea (but where the decrease in tariff revenues is not taken into account) provides a higher figure (€11.6 billion gain for the EU, or 0.045 % – and €13.1 billion for India – or 0.43 %). The potential FTA is expected to increase trade between the EU-28 and India: in the most relevant scenarios, exports from the EU-28 to India increase by about 52-56 %, while imports from India increase between 33 % and 35 %. The model does not consider the possible changes in foreign direct investment (FDI) related to trade.

This estimation does not consider Brexit (which, according to other studies, is likely to reduce the gains on the Indian side, while heterogeneously affecting the EU-27, with gains from the FTA that are expected to be bigger for some countries and smaller for others with respect to the pre-Brexit simulation. Furthermore, this estimation does not consider the global downturn due to the coronavirus pandemic. Still, it provides indications on the direction of possible changes due to a potential FTA.

[1] https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_india_en.pdf#page=9

[2] Since negotiations have been in deadlock for several years now, this study cannot be considered an impact assessment of scenarios that are actually negotiated; it is rather a modelling exercise of a stylised agreement.

The study then addresses qualitatively some relevant policy elements that are not included in the model, but that may represent possible **side effects** of trade liberalisation, or **policy areas different from trade that would nevertheless be affected**.

First, the quantitative analysis leaves open the question of how gains from trade are distributed. Looking at the literature and the experience of India during previous waves of liberalisation, it appears that the effects of trade liberalisation on poverty and inequality are complex and that the outcome is not unambiguously pro-poor. These effects are indeed context-specific and may impact several dimensions of inequality (e.g. inequality between factors of production and the distribution of income between the labour and capital shares, across consumers via price effects, across wage and skill levels, and along the gender dimension). Relatedly, there may be 'adjustment costs' in the absence of policy intervention. The economic model used compares two 'equilibrium' situations – one without and one with the potential FTA – assuming that the shift from the first to the second is frictionless. In reality, frictions are likely to exist and can translate into employment displacement, with impacts that may be relevant at the local level (even when not necessarily big overall) and may produce territorial inequalities.

Trade shocks can also have effects on labour conditions, especially in the context of the fragilities of the Indian labour market, and the direction is difficult to predict. Similarly, environmental conditions may be affected and there is the risk of negative externalities. Taking into account these aspects is both an issue of policy coherence and of gains from reducing coordination externalities. Relatedly, human rights protection and democracy represent very relevant issues in the EU-India relationship.

All these aspects are areas where there is a potential added value for common and coordinated EU action. Therefore, a broader view on the Cost of Non Europe in trade relationships between the EU and India signals that this could be larger than the gains from trade liberalisation themselves, and includes the foregone gains from a common approach to international economic cooperation, including a common approach to addressing the side effects of trade liberalisation and of the distribution of the gains from trade, and an increased coordination on the provision of global public goods such as environmental and labour standards.

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# 1. Introduction

The notion 'Cost of Non-Europe' was introduced by Michel Albert and James Ball in a 1983 report commissioned by the European Parliament, and it was also the central element of a 1988 study on the Cost of Non-Europe in the single market, carried out for the European Commission by Italian economist Paolo Cecchini. This approach was revisited in a 2014 report on the same subject, and the 2016 Interinstitutional Agreement on Better Law-Making indicated that the 'cost of non-Europe' in the absence of action at EU level should be taken into account when setting the legislative agenda.

Cost of Non-Europe (CoNE) reports are designed to examine the possibilities for gains and/or the realisation of a 'public good' through common action at EU level in specific policy areas and sectors. They usually attempt to identify areas that are expected to benefit most from deeper EU integration, and for which the EU added value is potentially significant.

Given that international trade is an exclusive competence of the EU, the 'Cost of Non-Europe' takes a somehow different meaning, where the main point is not to compare outcomes under different integration scenarios, but rather to focus on the potential benefits (costs) of (not) having a common approach to international trade and a single voice in the international arena regarding trade and economic cooperation.

This common approach is shaped by the 2015 Trade for All strategy('Trade for All')[3] aimed at boosting growth and employment through trade to the benefit companies, consumers and workers, while being consistent with development- and broader foreign policies. This strategy reinforces the commitment to ensure the compatibility of trade with sustainable development and with the UN 2030 Agenda focused on achieving the sustainable development goals.

EU trade policy 'seeks to improve conditions for citizens, consumers, workers and the self-employed, small, medium and large enterprises, and the poorest in developing countries, and addresses the concerns of those who feel they are losing out from globalisation. While trade policy must deliver growth, jobs and innovation, it must also be consistent with the principles of the European model' (European Commission, 'Trade for All', p. 7). This policy develops in the framework of Article 3.5 of the Treaty on European Union,[4] which explicitly mentions the promotion of 'free and fair trade' as one of objectives of the European Union, together with the contribution to 'peace, security, the sustainable development of the Earth, solidarity and mutual respect among peoples ... eradication of poverty and the protection of human rights'.

The EU recognises that multilateralism is the key aspect of a trade policy that reflects these values: 'The multilateral system must remain the cornerstone of EU trade policy' (European Commission, 'Trade for All', p. 27). The EU also supports the World Trade Organization (WTO) as the pre-eminent forum for trade negotiations and as the context in which entities can 'seek to place the development of rules to govern global trade' (p. 29). In the meantime, the EU pursues a bilateral and regional agreement agenda that aims to support rather than obstruct the return of the WTO to the centre of global trade negotiations. The EU is indeed active in the negotiation of bilateral trade agreements. These can take the form of customs unions, agreements to remove or reduce customs tariffs in bilateral trade (association agreements, stabilisation agreements, deep and comprehensive free trade agreements and economic partnership agreements), or partnership and cooperation agreements that provide a framework for economic cooperation without addressing tariff reductions.

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[3] Trade for All, European Commission, 2015.

[4] Article 3.5 of the Treaty on European Union.

This study focuses on free trade agreements (FTAs, belonging to the second of the abovementioned categories). Among the EU's most recent FTAs that have entered into force are the ones with Japan and Singapore.[5] FTAs are very articulated agreements aimed at reducing bilateral tariffs and harmonising rules. Contemporary FTAs go far beyond traditional trade restrictions at the border, encompassing policy areas that have important implications beyond trade (and that need to be assessed not only from a trade angle, according to Rodrik, 2018). The European Parliament (EP) has historically requested to have greater say in these processes. Accordingly, the Treaty of Lisbon gave it greater formal powers as regards the EU common commercial policy (CCP). The EP gained the right to consent to international agreements, the right to be informed about ongoing trade negotiations, and co-legislative powers on matters of autonomous trade policy.[6]

This study focuses on the effect of a potential FTA between the EU and India. The EU and India are major global players, multicultural entities, both with a multilevel system of governance enshrining values of freedom, equality, tolerance and the rule of law in the respective funding treaties and Constitution (D'Ambrogio 2019a[7]). Both the EU and India have a common interest in multilateralism (Lannoo and Benaglia, 2019[8]).

After a first chapter that introduces the Indian economy in brief and provides more detail on the EU-India economic relationships, this study analyses the possible effects of a potential FTA in goods and services. It presents a modelling exercise that estimates the potential effects under different scenarios on trade volumes and on the two partners' welfare. The last chapter discusses some possible elements and side effects that are not present in the model, but that may have policy relevance.

The quantitative estimates based on the abovementioned model have been carried out by external researchers, and their paper, featuring the full details of the estimation, constitutes the Appendix to this document.

As will be explained in greater detail further down, negotiations for an FTA between the EU and India started in 2007, but are deadlocked since 2013. It is unclear whether they may resume. Therefore, this study cannot be considered an impact assessment of scenarios that are actually negotiated; it is rather a modelling exercise of a stylised agreement.

It has to be borne in mind that this paper focuses on trade in goods and services, but that – for the sake of tractability – it does not include foreign direct investment (FDI) in the picture.

Finally, the quantitative analysis was carried out before the United Kingdom left the EU, therefore the results include the UK (EU-28). This issue will be briefly discussed when presenting other studies; however, it was not possible to properly take it into account when making the estimations. Moreover, this study was carried out before the coronavirus pandemic and could not take it into account.

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5 https://ec.europa.eu/trade/policy/countries-and-regions/negotiations-and-agreements/

6 Parliamentary scrutiny of trade policies across the western world, Policy Department for External Relations, European Parliament, 2019.

7 E. D'Ambrogio, India: taking stock of Modi's five years, briefing, EPRS, European Parliament, 2019.

8 K. Lannoo and S. Benaglia, Could the EU and India jointly shape the world?, briefing, CEPS, 2019.

# 2. EU-India context

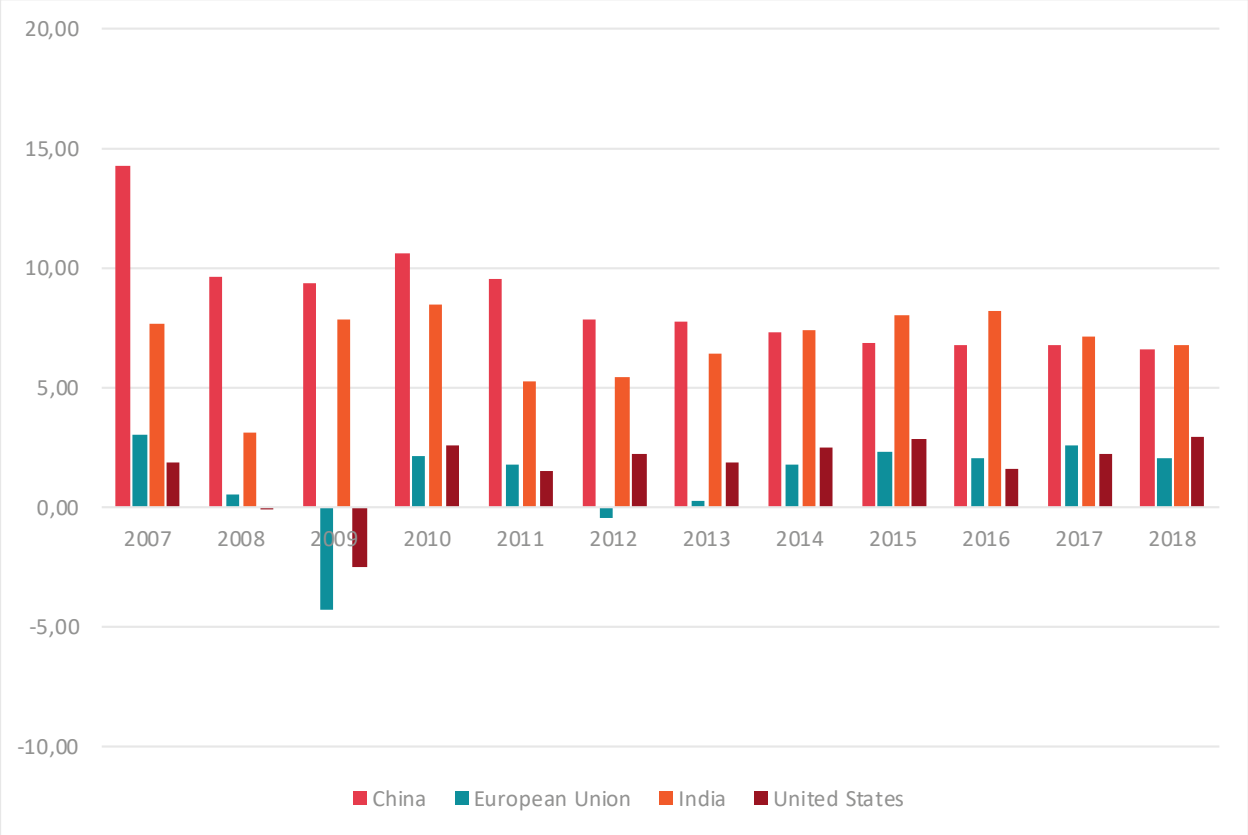
## 2.1. A brief introduction to India's economy and trade policy

In recent years, India has witnessed significant growth rates, overtaking China as the world's fastest growing major economy (Figure 1).

It has to be noted that the official GDP figures have been highly debated[9]; furthermore, other indicators in recent years have pointed to a less optimistic picture.[10] More recently, the pace of GDP growth has decelerated and at the end of 2019 both international financial institutions and the Reserve Bank of India revised their forecasts downwards.[11] According to the Central Statistics Office, already before the coronavirus pandemic the 2019-2020 growth rate was about 5 %.[12]

The reason underlying India's economic growth in the past decades is a debated issue. Some scholars attribute it to the liberalisation reforms (including in the area of external trade) of the 1990s (Ahluwalia, 2002), while other scholars trace it back to the 1980s (Rodrik and Subramanian, 2005).

Figure 1 – Annual growth rates of major economies




Source: author's elaboration based on World Bank data.[13]

[9] A recent study suggests that growth rates between 2011 and 2016 may have been overstated by 2.5 percentage points (Subramanian, 2019).

[10] E. D'Ambrogio, India's economy – Figures and perceptions, at a glance, EPRS, European Parliament, 2016

[11] https://theconversation.com/indias-economy-how-the-worlds-fastest-growing-nation-went-off-the-rails-129714

[12] E. D'Ambrogio, Challenges facing India's Democracy and Economy, briefing, EPRS, European Parliament, 2020.

[13] https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2018&locations=IN-EU-CN-US&start=1980&view=chart

Substantial poverty reduction has taken place. The most recent expenditure data has indicated that in 2011 the headcount poverty ratio (the share of the population living below the US$ 1.90/day poverty line) was 21.1 %. An imputation exercise done by the World Bank estimates that it declined to 14.6 % in 2015 (Newhouse and Vyas, 2019). The Data Lab, incorporating some announced methodological changes in the forthcoming expenditure survey, forecasts that today the share of the Indian population living below this threshold could be 3 %. If it was indeed correct, it would still mean that 47 million people are in severe poverty,[14] but would represent an important achievement in a decade. As will be discussed further in Chapter 4, the picture gets more complex when using a higher poverty line (US$3.10/day): in this case there has not been an equivalent decrease. This is partly related to persisting high unemployment (D'Ambrogio, 2019,[15] ILO 2018[16]). The National Sample Survey Office's (NSSO) periodic labour force survey found that the unemployment rate stood at 6.1 % in the 2017-2018 period, while it was 2.2 % in the 2011-2012 period, and the problem is particularly acute among young people.[17] While economic growth in the past decades has been fuelled by the growth in internal demand and consumption realised between 2004 and 2012 (Felbermayr et al., 2017b), some observers attribute the slowdown since 2016 to a decline in demand because of low wages and increasing inequality.[18] Indeed, major protests occurred in January 2020, raising the issue of unemployment and the country's slowing economic performance.[19] Just before the beginning of the slowdown, the Indian economist and Nobel prize-winner, Amartya Sen, warned against the lack of major policies in the education and health sectors and highlighted the fact that this would undermine economic growth.[20]

As many other countries across the world, India is experiencing an increase in inequality. According to Piketty and Chancel (2017), in a study that combined different data sources, the share of national income accruing to the top 1 % income earners is now at its highest level since the introduction of the Indian income tax in 1922. While in the first 30 years of independence, the incomes of the bottom 50 % group grew faster than the average and the top 0.1 % decreased, over the 1980-2014 period the top 0.1 % of earners captured a higher share of total growth than the bottom 50 % (12 % vs. 11 %). According to Eberhardt and Kumar (2010), an important concentration of fortunes started in the 1990s, when the reforms under the Structural adjustment programme occurred. Dang and Lajouw (2018) argue that income mobility has been rising, but the large number of people who have gone out of poverty in recent decades remain vulnerable. The authors argue that 'further poverty reduction will become increasingly difficult to achieve through growth alone if India fails to address the structural factors that prevent the chronically poor from escaping poverty.' (p. 2)

[14] https://worldpoverty.io/map and https://www.brookings.edu/blog/future-development/2018/12/13/rethinking-global-poverty-reduction-in-2019/

[15] E. D'Ambrogio, India: taking stock of Modi's five years, briefing, EPRS, European Parliament, 2019.

[16] India Wage Report. Wage policies for decent work and inclusive growth, ILO, 2018.

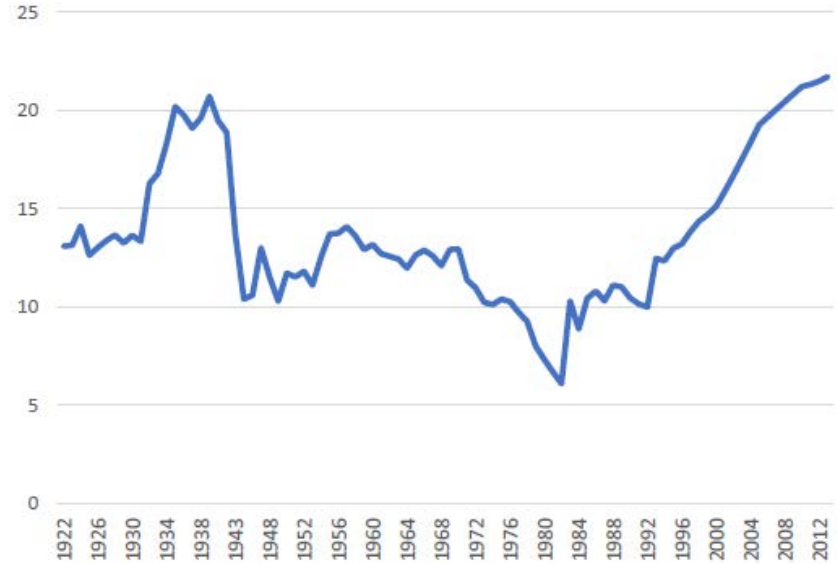
[17] E. D'Ambrogio, India: taking stock of Modi's five years, briefing, EPRS, European Parliament, 2019.

[18] https://www.thehindubusinessline.com/opinion/underlying-causes-of-the-economic-slowdown/article30299555.ece#

[19] https://www.theguardian.com/world/2020/jan/08/india-towns-and-cities-grind-to-halt-as-workers-stage-24-hour-strike

[20] A. Sen, 'India is the only country trying to become a global economic power with an uneducated and unhealthy labour force', LSE Blog, 2015.

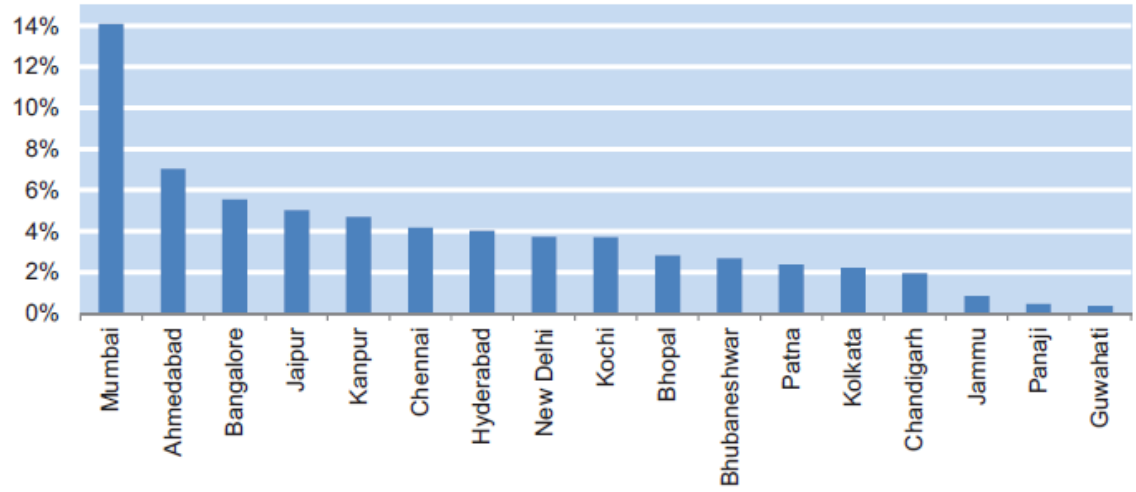
Figure 2 – Income share of the top 1 % income earners




Source: Dang and Lajouw (2018), based on Chancel and Piketty (2017).

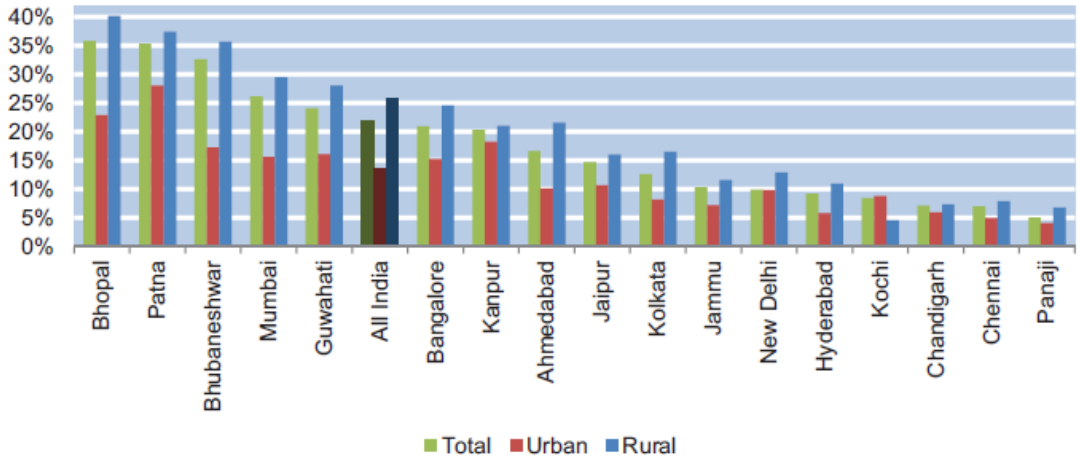
On the one hand, India is an extremely heterogeneous country in terms of its federal structure, multiculturalism, religious and linguistic diversity, and on the other hand, in terms of its economic and social indicators, as can be seen in Figure 3 and Figure 4. The comparison between the two figures indicates that there is no necessary and unequivocal overlapping between regions with high economic performance and regions with low poverty incidence.

Figure 3 – Contribution to the Indian GDP by state (selected), 2013-2014




Source: Felbermayr et al. (2017b), based on data published by the Directorates of Economics and Statistics of the respective state governments, and on data for all India: Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India.

Figure 4 – Share of the population living below the poverty line, 2011-2012




Source: Felbermayr et al. 2017b, based on data from the Planning Commission, Government of India.

The informal sector is very relevant in the Indian economy and, as is underlined by Harriss-White and Sinha (2007), it has not declined in parallel with economic growth. The shadow economy – estimated at 20-25 % of GDP (D'Ambrogio, 2019) – was the target at the end of 2016 of an overnight demonetisation implemented by the Indian government. The 500 and 1000 rupee banknotes were suddenly declared invalid and had to be exchanged for new ones. This operation led to increased tax revenues, but was widely criticised because while it did not succeed in reducing the size of the informal sector much, it had a negative impact on the economy and employment and increased the distrust of the poorest in the banking system. Somehow paradoxically, informal networks were necessary for poor people to overcome the shock.[21] Some scholars argue that this case illustrates the downsides of making the poor bankable before they have the necessary social protection system in place.[22]

In recent years, farmers' protests alongside demonstrations focused on employment issues have channelled social discontent. In November 2018 tens of thousands of rural workers marched on the parliament in Delhi, protesting against increasing operating costs and dipping produce prices.[23] A 2017 report underlined the condition of distress faced by farmers.[24]

Moreover, recent demonstrations were organised by the Indian civil society in relation to the ongoing reform of the citizenship law, the Citizenship (Amendment) Act.[25] This reform[26] is aimed at allowing a fast-track process for acquiring Indian citizenship through naturalisation (by reducing the minimum residency requirements) for members of six religious minority communities – Hindu, Sikh, Buddhist, Jain, Parsi and Christian – coming from Pakistan, Afghanistan or Bangladesh. It is heavily

21 https://theconversation.com/the-shock-of-indian-demonetisation-a-failed-attempt-to-formalise-the-economy-93328

22 *ibid* and https://www.thehindu.com/opinion/interview/'Serious-job-losses-are-taking-place'/article17046208.ece

23 E. D'Ambrogio, India: taking stock of Modi's five years, briefing, EPRS, European Parliament, 2019.

24 Performance audit Union Government Agriculture Crop Insurance Schemes Reports of Agriculture and Farmers Welfare, General Report No 7, Comptroller and Auditor General of India, 2017.

25 https://www.theguardian.com/world/2020/jan/07/india-campus-attack-police-fail-to-make-arrests-but-charge-injured-student

26 https://www.bbc.com/news/world-asia-india-50670393

criticised for being discriminatory against Muslims,[27] and in contrast with the Indian Constitution, which prohibits religious discrimination.

As analysts argue,[28] this has to be seen in the light of the fact that the current Indian government draws a large part of its support from among Hindu nationalists, and that Hindu nationalism is increasing its influence on society and politics.[29] Indeed, although the country remains a robust multicultural democracy, both the Indian civil society and the international community have drawn attention to a heightened risk of human rights violations and the adoption of discriminatory laws and practices in India.

Together with the Citizenship (Amendment) Act, another issue relevant to the protection of human rights is the situation in India-administered Kashmir (Jammu and Kashmir). In 2018, the Office of the UN High Commissioner for Human Rights published its first-ever report on the human rights situation in the region – criticising arbitrary arrests, excessive use of force, restrictions on the right to freedom of expression, and violence.[30] In August 2019, the Indian Parliament approved the withdrawal of Article 370 of the Constitution, which had guaranteed Jammu and Kashmir (which is India's only Muslim-majority state) a high degree of autonomy.[31] The Jammu and Kashmir Reorganisation Act split the state into two territories, demoting them to entities run directly from Delhi through a governor. Furthermore, political leaders and activists were arrested, and communications and schools suspended. This situation raised concern among the international community. The then High Representative of the EU for Foreign Affairs and Security Policy, Federica Mogherini, met in Brussels with India's Foreign Minister, Subrahmanyam Jaishankar, where she reaffirmed the EU's support for a peaceful solution to the crisis and stressed the importance of steps to restore the rights and freedoms of the population in Kashmir.[32]

Relations between the current Indian government and India's historically antagonistic neighbour, Pakistan, have not improved. In the meantime, India has increased its diplomatic presence in the Asian geopolitical arena, and especially in the Association of Southeast Asian Nations (ASEAN). While worried about China's expanding influence, India has developed a closer relationship with the US and Japan (and Russia, especially as a provider of security hardware). India's current stance in the global arena is usually considered non-isolationist; an example is that after the US withdrew from the Paris Agreement, India reaffirmed its own commitment to the agreement (D'Ambrogio, 2019).

Regarding trade, in a historical perspective, India had followed a protectionist policy for some decades before embarking on a decisive course of liberalisation in the 1990s. At the same time, India had been member of the GATT since 1948, and then transitioned to the WTO in 1995. According to a study done for the European Parliament in 2015 (Sachdeva, 2015), in the years 2000s and 2010s, India launched negotiations for agreements with several countries. According to the WTO repository,[33] India has signed seven FTAs that are currently into force, out of which five[34] cover both

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27 The European Parliament was expected to vote a resolution on the issue; the vote, initially scheduled for March 2020, has been postponed.

28 https://foreignpolicy.com/2019/12/11/secularism-is-dying-in-india/ or https://thediplomat.com/2019/12/the-citizenship-amendment-bill-and-the-theocratization-of-india/

29 D'Ambrogio, Challenges facing India's Democracy and Economy, briefing, EPRS, European Parliament, 2020. On Hindu nationalism, see *inter alia* Hansen (1999) and, for analysis on its role around the 2014 election, see e.g. Bobbio, 2013, Palshikar, 2016.

30 2019 update of the report on Situation of Human Rights in Indian-Administered Kashmir and Pakistan-Administered Kashmir, Office of the United Nations High Commissioner for Human Rights, 2018.

31 E. D'Ambrogio, India-administered Kashmir: current situation, briefing, EPRS, European Parliament, 2019.

32 E. D'Ambrogio, India-administered Kashmir: current situation.

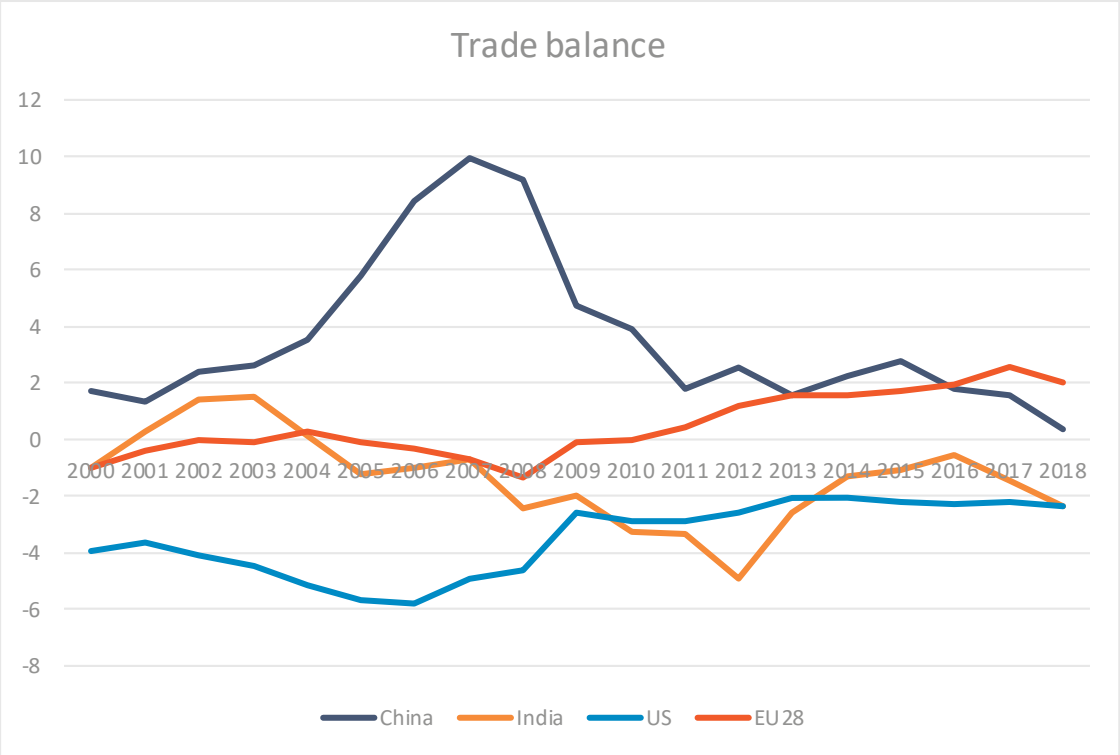
33 http://rtais.wto.org/UI/PublicAllRTAList.aspx

34 Japan, Malaysia, ASEAN, South Korea and Singapore.

goods and services and two[35] only goods; five partial scope agreements (PSAs, covering a limited amount of goods) are in force.[36] Still, trade defence measures are used to a relatively large extent (Khorana and Garcia, 2013).

During the same years, the trade deficit first decreased and then increased, as shown in Figure 5. The trade deficit in India is due to trade in goods, while trade in services shows a small surplus.

Figure 5 – Trade balance of selected economies, 2000-2018




Data source: author's elaboration on Unctad data,[37]

The current government is usually considered as having taken a protectionist stance. It recently pulled out of the negotiations for a Regional Comprehensive Economic Partnership (RCEP), which would have involved 16 countries,[38] including ASEAN and several Asia-Pacific countries, and initiated a review of existing FTAs to assess their overall impact on the Indian economy.[39] At the same time, some analysts argue that, while the discourse and the policy have taken a clear nationalistic, pro-business and mercantilist turn, India's negotiating position has not changed substantially under Modi (Gupta, 2019).

At the multilateral level, an important differentiating factor of India's role has been the fact that it is the one major economy that has opted out of the WTO e-commerce talks.[40] Despite its growing tech

35 Bhutan and Sri Lanka.

36 Nepal, MERCOSUR, Chile, Thailand and Afghanistan.

37 http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx

38 https://foreignpolicy.com/2019/11/19/modi-pull-out-rcep-india-manufacturers-compete-china/ , https://dailybrief.oxan.com/Analysis/GA247871

39 https://dailybrief.oxan.com/Analysis/DB249440/India-and-EU-will-deepen-strategic-partnership. Moreover, in 2016 Delhi announced the termination of 58 bilateral investment treaties and proposed to renegotiate a new form of such agreements https://hsfnotes.com/arbitration/2017/03/16/mixed-messages-to-investors-as-india-quietly-terminates-bilateral-investment-treaties-with-58-countries/.

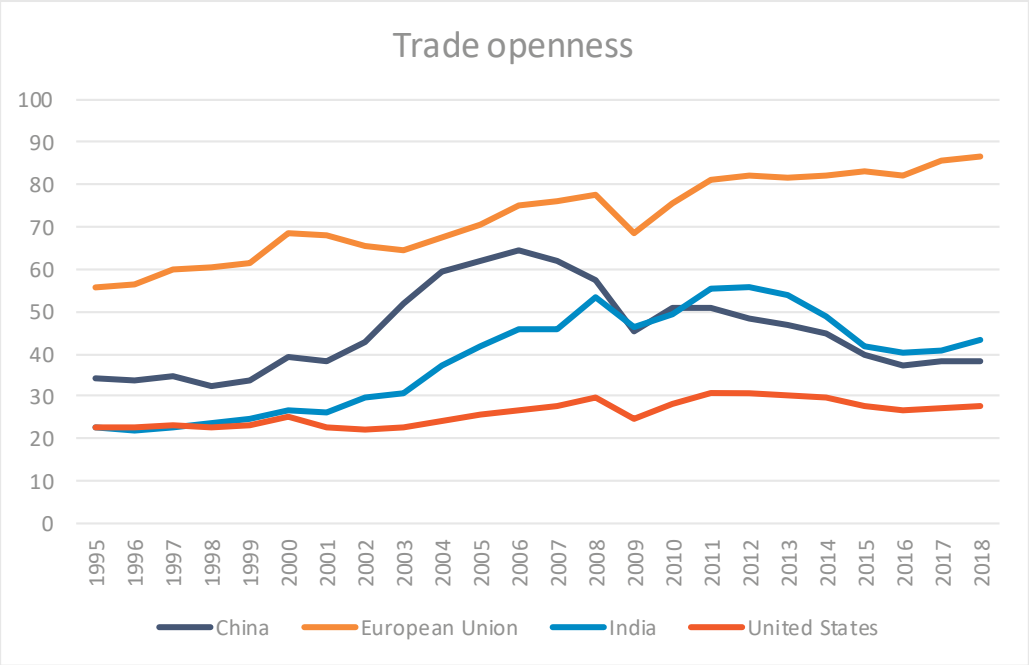
40 https://trade.ec.europa.eu/doclib/docs/2019/january/tradoc_157643.pdf

sector, India is sceptical about the plurilateral digital trade negotiations in the WTO, which started in 2019.

At the same time, the debate in India seems to recognise the increasing importance of global value chains (GVCs) in the Indian production system, as shown by the discussion around the 'Make in India' initiative aimed at growing the country's manufacturing sector.[41] Indeed, India's participation in GVC has increased, as indicated by Veeramani and Dhir (2017): the ratio of domestic value added to gross exports declined between 1990-2000 and 2012-2013 from 0.86 to 0.65. At the same time, because of the scale effect of increased participation of local production in international value chains, the overall domestic value added content in exports has increased from US$46 billion to US$295 billion, supporting a relevant share of Indian employment generation in the first decade of the 2000s. Since 2013, the ratio of domestic value added to gross exports has displayed a change in trend and has been increasing again, possibly indicating a shift towards local suppliers, especially in the growing information and communications sector.[42]

It has to be noted that, if trade openness is measured as the sum of exports and imports of goods and services measured as a share of GDP, India's situation is similar to China's, or even a slightly more pronounced. Until 2009, China's openness to trade had been much greater than India's, but since then the situation has reversed (Figure 6). A more detailed discussion on Indian trade barriers will be made in Section 2.2.1 below.

Figure 6 – Trade openness of China, the EU, India and the US (export and import as a share of GDP)




Source: author's elaboration based on World Bank data.[43]

[41] E. D'Ambrogio, 'Make in India' for more 'made in India', at a glance, EPRS, European Parliament, 2015, and https://www.brookings.edu/opinions/for-modis-india-a-new-trade-policy-2/.

[42] https://www.oecd.org/industry/ind/TIVA-2018-India.pdf

[43] https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS?locations=IN-CN-EU-US

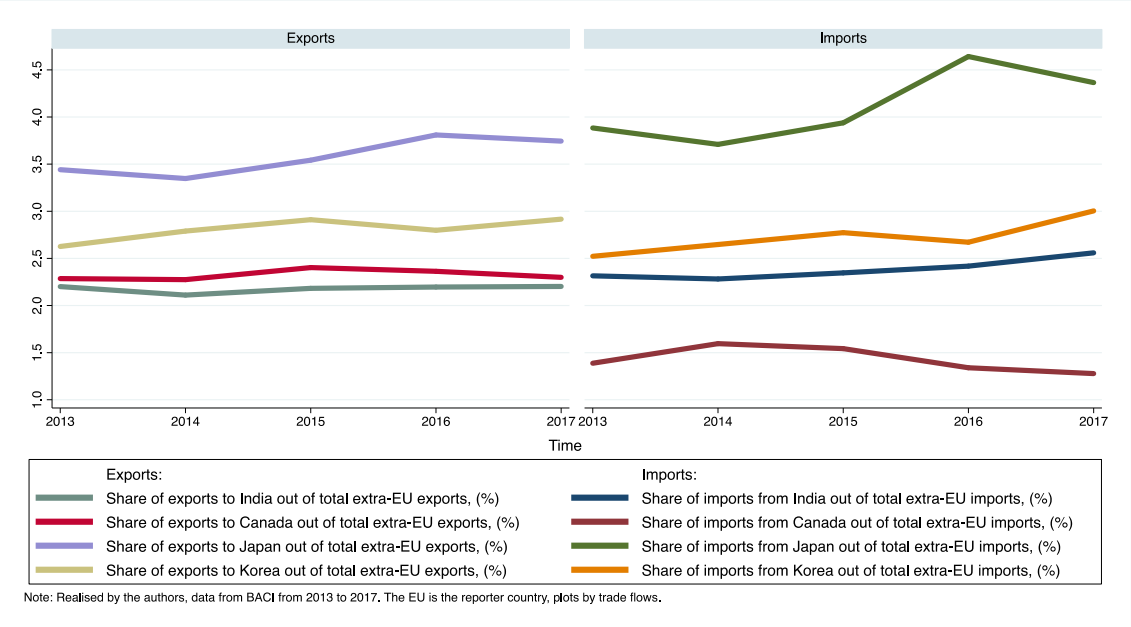
# 2.2. History and state of play of EU-India trade relations

## 2.2.1. Figures on bilateral trade and trade barriers between the EU and India

### Trade flows

India was the 9th commercial partner for trade in goods to the EU-28, both as concerns exports and imports, following the US, China, Switzerland, Russia, Turkey, Japan, Norway and South Korea.[44] Since Brexit, India has been the EU's 10th partner EU for trade in goods. Both imports from and exports to India account for about 2 % of the respective totals for the EU. The EU is a more relevant partner with regard to Indian trade: the EU-28 (including the UK) was the first destination of Indian exports (15.77 % of the total)[45] and the second origin of Indian imports (10.28 %) after China;[46] in terms of overall trade, the EU ranks first among India's partners with a value of trade in goods that is 13.19 % of the total[47] (11.1 % if we consider the latest data on the EU-27[48]). Figure 7 illustrates the relative importance of India as a trade partner to the EU together with other comparable partners (before Brexit).

Figure 7 – Share of trade flows for extra-EU trade in goods, 2013-2017




Source: Gallina et al., 2020 (in the Appendix).

Figure 8, albeit using a different dataset, shows the important increase of EU-India trade volumes over a longer period of time: since the beginning of the 2000s. This increase in trade is consistent with the findings of Gaurav and Mathur (2016); the two authors ascribe this increase in trade to an important decline in trade costs due especially to the wave of trade liberalisation in India. Still, according to Sachdeva (2015), despite India-EU trade having increased in recent decades, it has decreased in relative terms (relative to trade flows with other countries), for both India and the EU.

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44 Eurostat, India-EU – international trade in goods statistics, countries listed in order of importance as recipient of EU-28 exports. India became the 10th trading partner to the EU-27 after the UK's withdrawal from the EU.

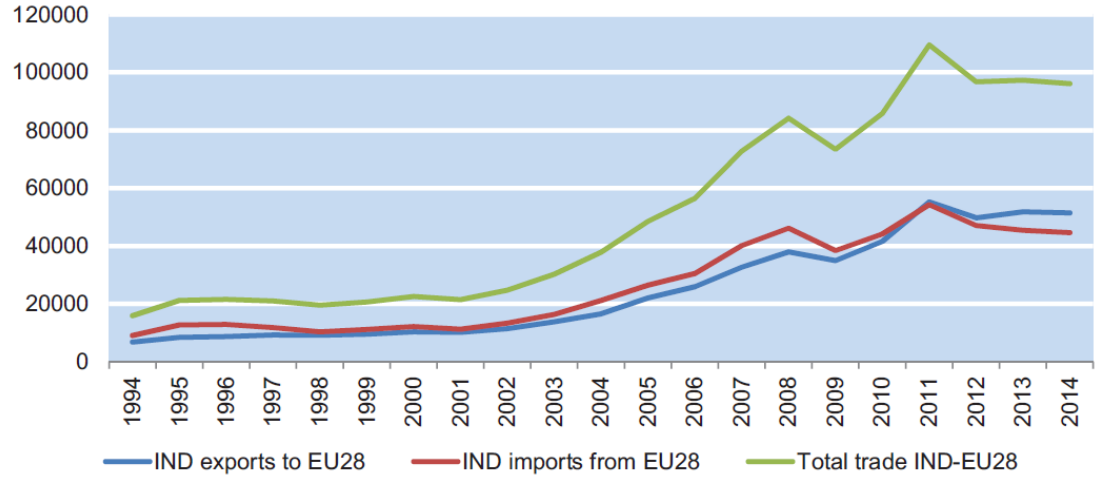
45 It assumes second position after the US, since the UK left the EU. Source: European Commission's DG TRADE statistics.

46 EU-India Trade and Investment, Delegation of the EU to India and Bhutan, EEAS, 2019.

47 ibid., EEAS.

48 DG TRADE statistics.

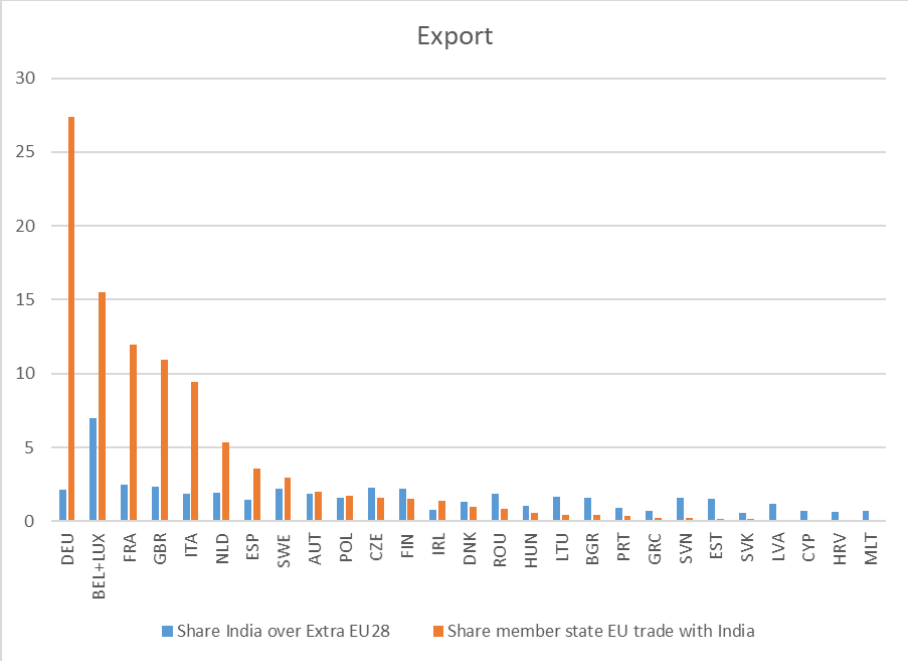
Figure 8 – Trade volumes between the EU-28 and India, 1994-2014 (in US$ million)




Source: Felbermayr et al. (2017b) using the FMI DoTS database.

When disaggregating by EU Member State,[49] it becomes apparent that in 2017 Germany was India's main EU trade partner for both export and import of goods. Its exports to India were 27 % of total EU exports and its imports were 18 % of total imports. India was an important importer for Belgium (especially for the mining and quarrying sector).

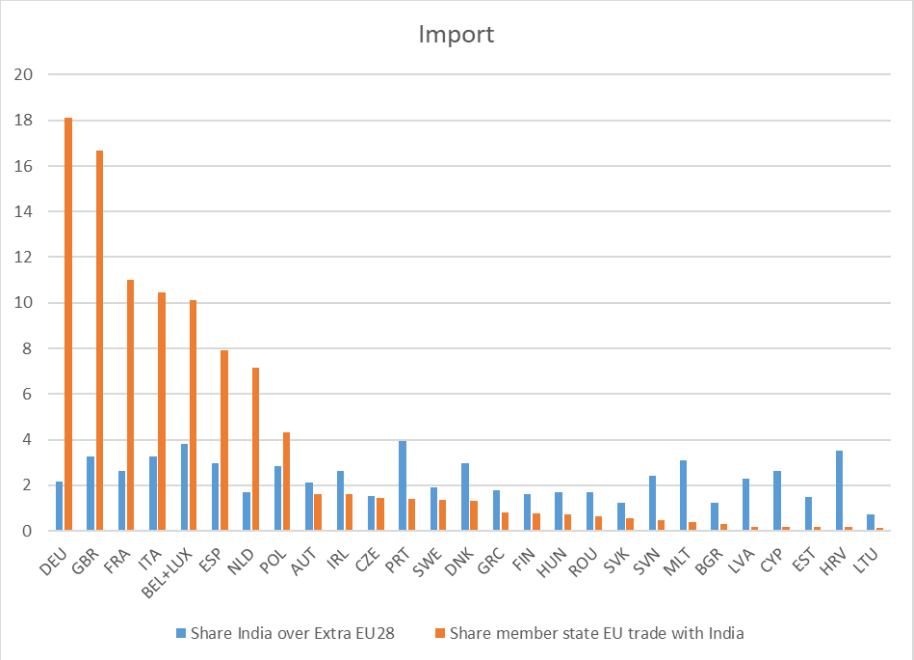
Figure 9 –Share of each Member State in total trade in goods with India (exports)




Source: author's elaboration from Gallina et al. (2020) in the Appendix. Data for 2017 from BACI.

[49] The blue bars indicate the relative importance of India in the total extra-EU trade of each Member State; the orange bars indicate the relative importance of each Member State in the total EU trade with India.

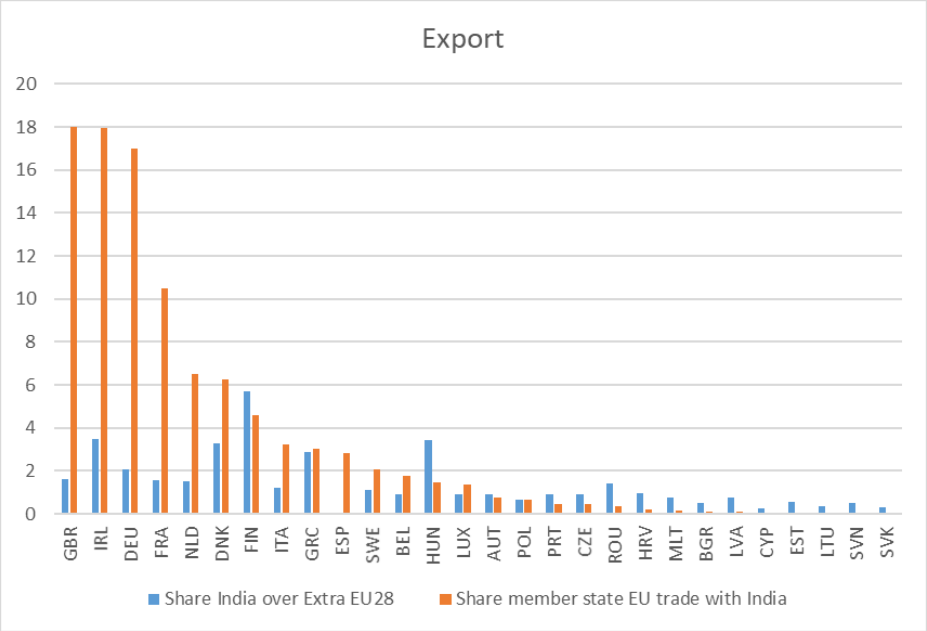
Figure 10 – Share of each Member State in total trade in goods with India (imports)




Source: author's elaboration from Gallina et al. (2020) in the Appendix. Data for 2017 from BACI.

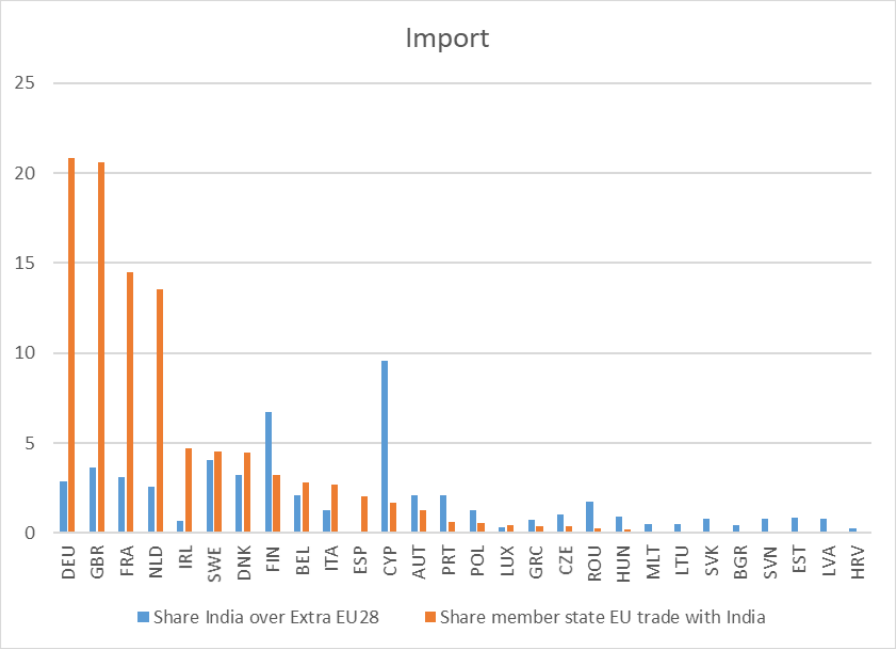
Looking at trade in services in Figures 11 and 12, the role of the UK (and hence the impact of its withdrawal from the EU, which is not accounted for in the present study) appears more significant. Indeed, for the export of services, the two most significant shares are 18.01 % and 17.93 %, of the UK and Ireland, respectively. Together, they account for 36 % of the total export of services to India from the EU. It is worth noting India's importance with regard to trade in services to Finland and the high importance of Cyprus as a services importer.

Figure 11 –Share of each Member State in total trade in services with India (exports)




Source: author's elaboration from Gallina et al. (2020) in the Appendix. Data for 2017 from Eurostat.

Figure 12 –Share of each Member State in total trade in services with India (imports)

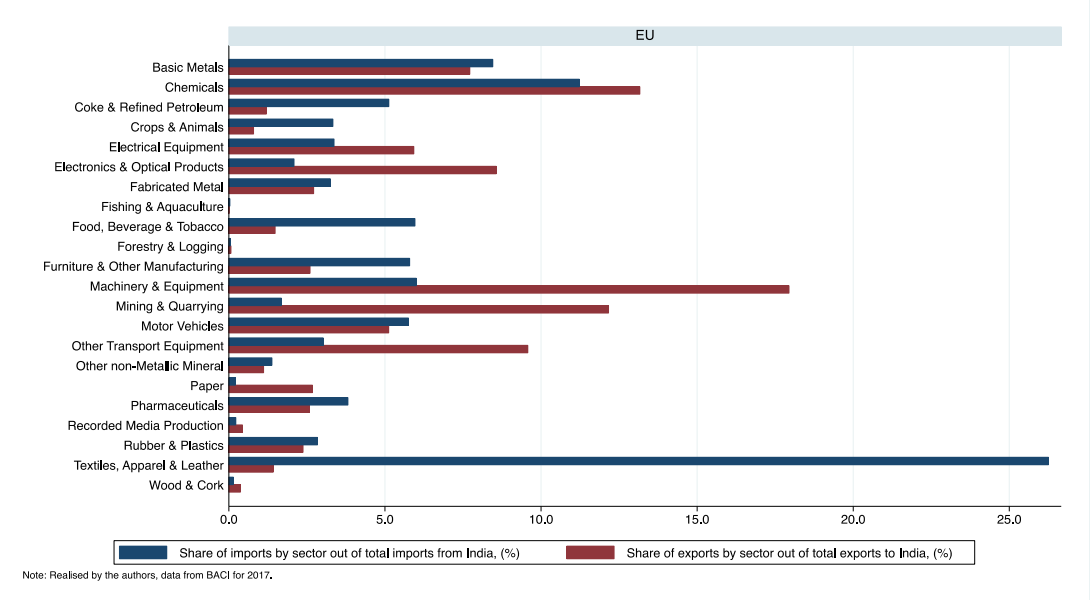



Source: author's elaboration from Gallina et al. (2020) in the Appendix. Data for 2017 from Eurostat.

The main sectors among exported goods (Figure 13) from the EU to India[50] are machinery and equipment, mining and quarrying, chemicals, electronics and optical products, and other transport equipment.

Chemicals are also one of the most strongly represented sectors in EU goods imports from India, but textiles, leather and apparel is by far the most dominant sector in this regard. This represents more than 7 % of the total EU-28 imports from extra-EU countries in this sector.

Figure 13 – Share of trade flows for the EU in total trade with India, trade in goods



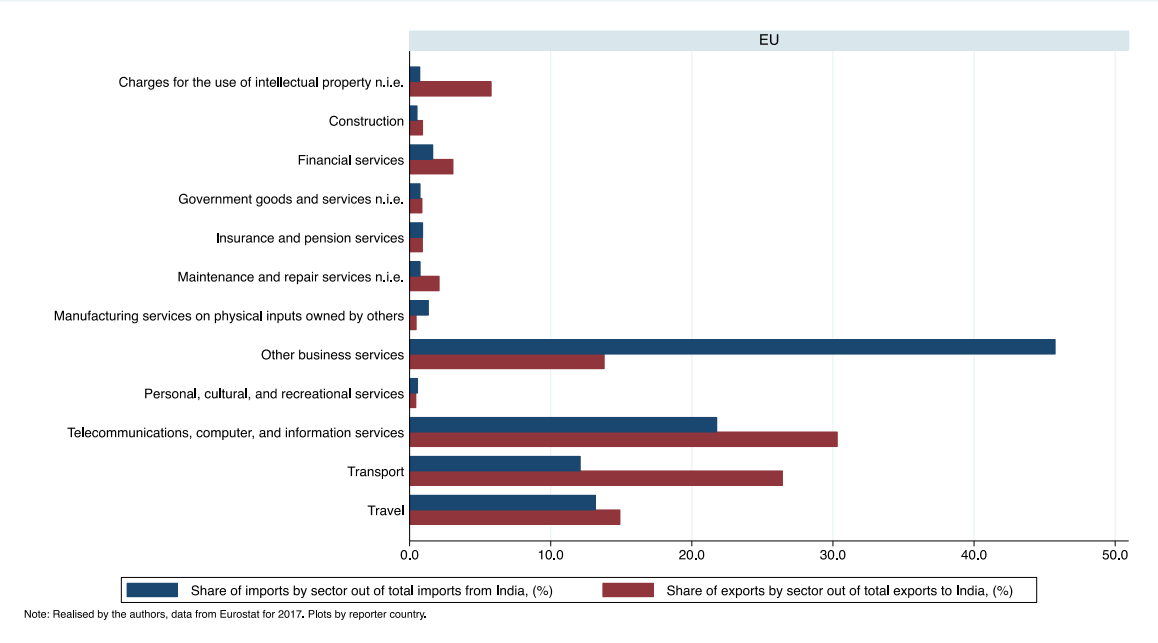

Source: Gallina et al. (2020) in the Appendix.

[50] To see a disaggregation across sectors and Member States, see the Annex.

Figure 7 in the Appendix illustrates the different weights that the two partners have for each other. In 12 sectors, the EU represents more than 20 % of the total Indian exports, and in the case of textiles this share is more than 30 % (this means that India exports to the EU more than 30 % of its total export of textiles, apparel and leather). On the other hand, more than 30 % of Indian imports in other transport equipment, machine & equipment, pharmaceuticals and motor vehicles come from the EU.

Turning to services (Figure 14), the EU imports €3.7 billion in services for the telecommunications sector from India. This amount is around 7.45 % of total EU imports from extra-EU countries in this sector. At the same time, for this sector, almost 4 % of EU exports to extra-EU countries are directed to the Indian market. Another relevant sector is the 'other business' services,[51] for which imports from India account for 3.6 % of the total extra-EU imports and almost half of the EU's services imports from India. Overall, in 2017, the EU services imports and exports from and to India were worth about €17 billion and €16 billion (roughly 2.37 % and 1.79 % of the total imports and exports in services for the EU), respectively. As regards exports from the EU to India, the two main sectors are telecommunications and transport services, which combined account for almost 57 % of the total exports to India.

Figure 14 – Share of trade flows between the EU and India, trade in services




Source: Gallina et al. (2020) in the Appendix.

## Trade barriers

India currently benefits from preferential tariffs for its exports of goods under the EU's generalised system of preferences (GSP).[52] Standard GSP[53] reduces EU import duties for about 66 % of product tariff lines. Its aim is to support developing countries in developing their industries in certain sectors that need to be sustained to compete on international markets. When a given country, as is the case with India, exports highly competitive products, the GSP is withdrawn from these products through a graduation mechanism. The EU reviews the list of graduated products every three years. Regarding

[51] Under the sixth edition of the balance of payments classification, this sector includes: 'research and development services'; 'professional and management consulting services'; 'technical, trade-related, and other business services'.

[52] EU-India Trade and Investment, Delegation of the EU to India and Bhutan, EEAS, 2019.

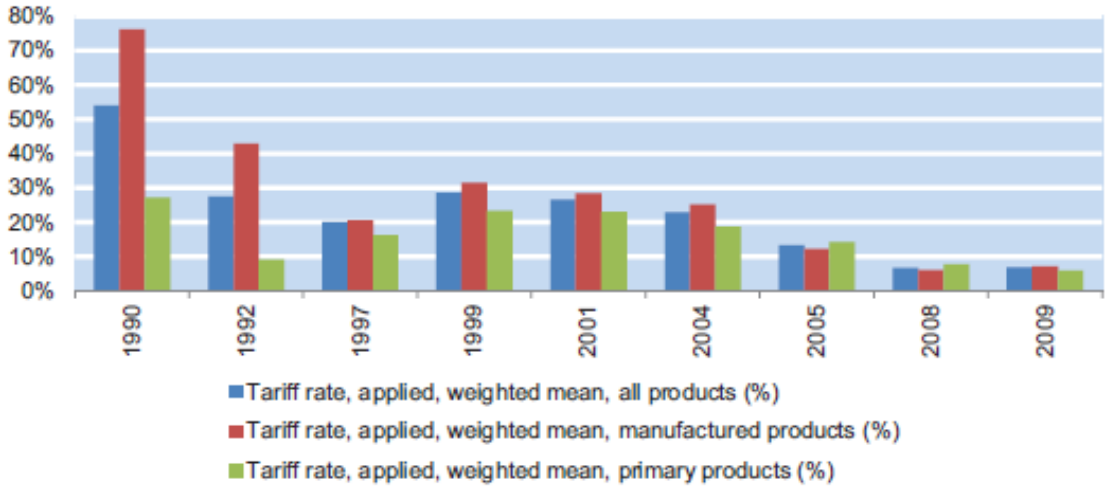
[53] https://ec.europa.eu/trade/policy/countries-and-regions/development/generalised-scheme-of-preferences/

India, the current list of graduated products includes some mineral products, chemicals, textiles, base metals, and motor vehicles.[54]

There is evidence of an important decline in trade costs between the EU and India in recent decades: as Gaurav and Mathur (2016) underline, a significant trade liberalisation occurred in India between 1995 and 2010 that led to a decline in tariff equivalents, as a measure of trade costs, by about 20 percentage points. This occurred especially following the trade liberalisation policies adopted by the Indian governments since the 1990s, even if trade flows started increasing in the 2000s. As discussed in the previous Section, this indeed led to a major increase in trade in goods between the EU and India in the most recent decades.

This decline in Indian import tariffs can be seen in Figure 15. Within a 20-year timeframe, India reduced its mean applied tariff by about 47 percentage points, both in the context of the Uruguay round and as unilateral liberalisation (Felbermayr, 2017b)

Figure 15 – Indian applied tariffs, 1990-2009

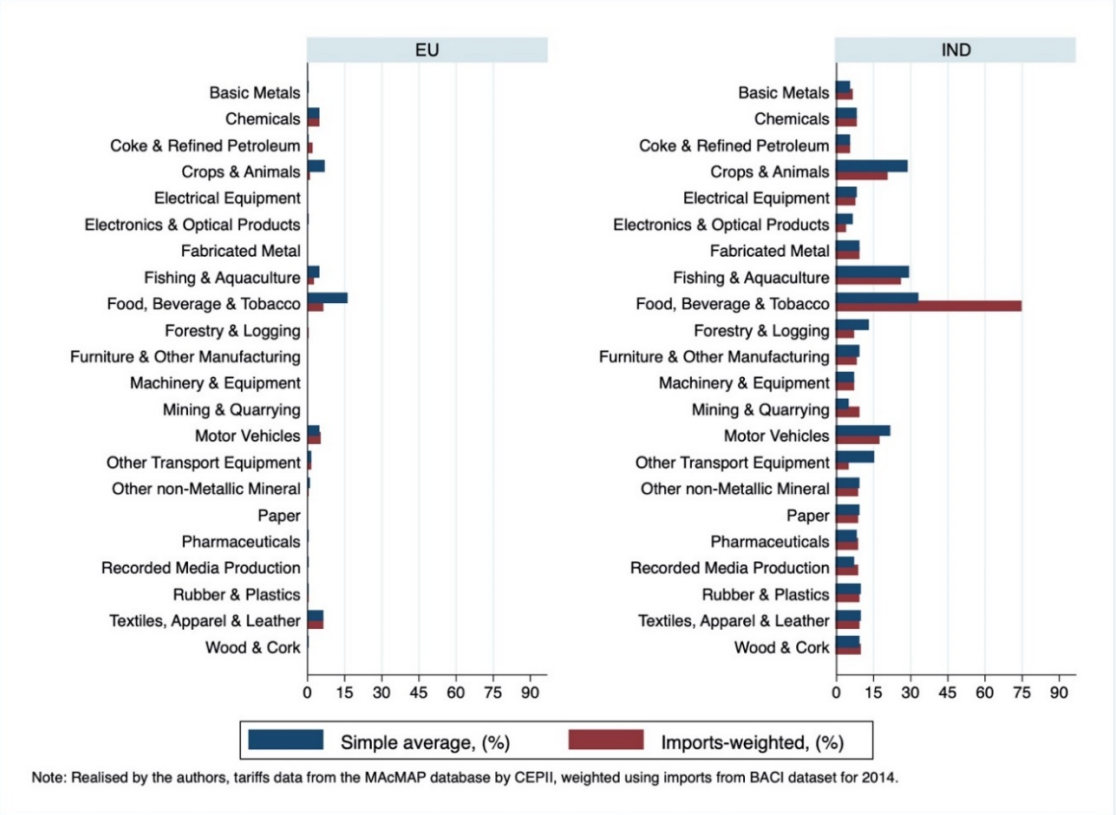



Source: Felbermayr et al. (2017b) from World Bank World development indicators.

Felbermayr et al. (2017b) indicate that India's tariff policy is voluntarily more liberal than its WTO commitment would require; still, India has been reluctant to reduce its tariff bindings and the level of tariff protection in India is usually considered to be relatively high (Felbermayr et al., 2017b). While almost all products imported by India from the EU are subject to tariffs, on the EU side the picture is more varied, and there is substantial heterogeneity across sectors (Figure 16). As indicated also by Felbermayr et al. (2017b), tariffs in most sectors have fallen below 15 % (especially after 1992); substantially higher tariffs exist for products from the agriculture and food sectors.

[54] The list of graduated products was updated in February 2020: https://trade.ec.europa.eu/doclib/docs/2018/january/tradoc_156536.pdf.

Figure 16 – Applied tariffs for trade in goods, by importer country[55]

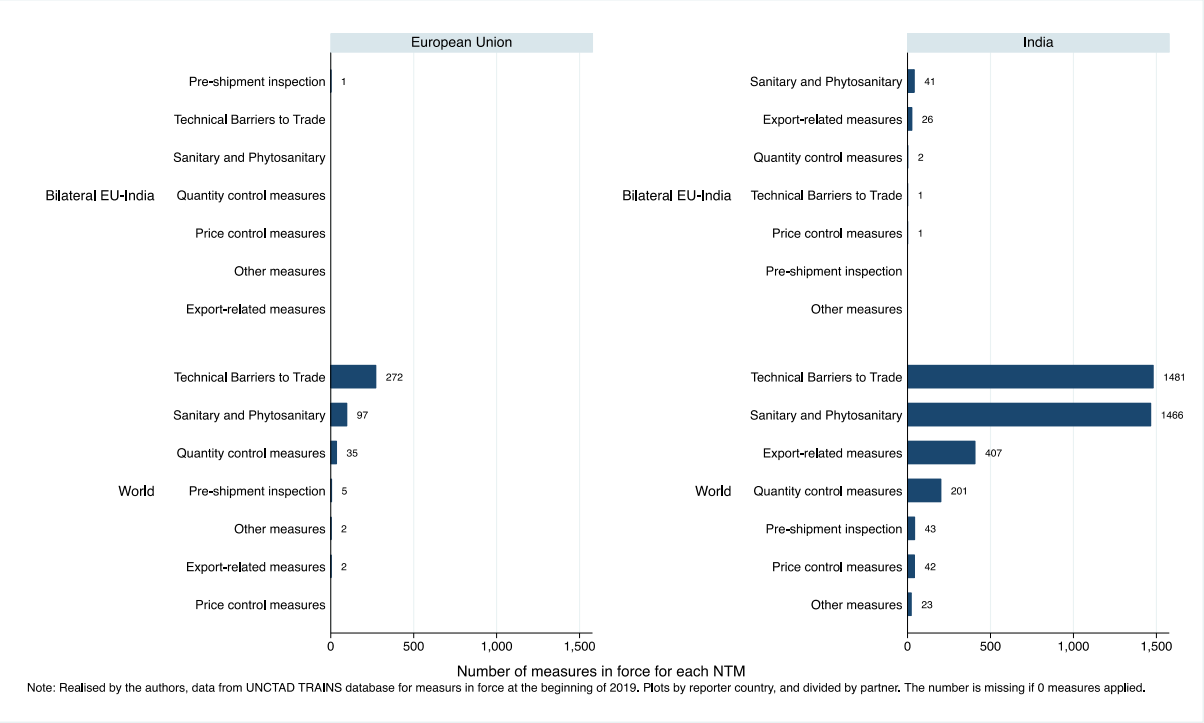



Source: Gallina et al. (2020) in the Appendix.

Figure 17 shows the number of non-tariff measures (NTMs) in force at the beginning of 2019. To its trade partners, the EU applies 272 measures, registered as technical barriers to trade (TBT), and 97 sanitary and phytosanitary (SPS) measures. India reports a more significant number of NTMs, at 1 481 and 1 466, respectively (India accounts for 11.07 % of the total number of sanitary and phytosanitary measures applied by countries in the world, while the EU accounts for 0.73 %).

[55] Both the simple and imports-weighted averages for each sector are included. The former puts more weight on goods that are barely traded between the EU and India, as it weighs equally all tariff lines, including products traded in very low volumes. The latter may underweigh highly protected products for which import flows are low because of high tariffs.

Figure 17 – Number of NTMs applied by the EU and India




Source: Gallina et al. (2020) in the Appendix.

From the EU side, India appears as the third country in the ranking by number of barriers to trade, with 25[56] barriers, as reported in the European Commission's Annual report on trade and investment barriers,[57] behind China and Russia. The report indicates that the most recent non-tariff measures that are considered by EU companies as new trade barriers concern the registration process for cosmetics and new standards for the automotive sector and for distilled alcoholic beverages, wines and beers.[58] Symmetrically, scholarly literature on the Indian side underlines that, if tariffs faced by Indian exports to the EU are lower than tariffs faced by EU products in India, the opposite is true when it comes to NTMs, especially among sanitary and phytosanitary measures (Singh et al., 2018).

## 2.2.2. EU-India trade relations and FTA negotiations

India established diplomatic relationships with the European Economic Community in 1962, and in 1983 a Delegation of the European Commission was established in its territory. Meetings between the European Parliament and the Lok Sabha, the lower chamber of the Indian Parliament, have taken place since 1981. In 2007, the European Parliament set up a Delegation for relations with India (D-IN).[59]

In 2004 India became an EU strategic partner;[60] this was followed by two action plans in 2005 and 2008, focusing on FTA negotiations, maritime transport negotiations and the climate change

[56] In the Market Access Database, the current number of barriers reported is 23.

[57] Annual Report on Trade and Investment Barriers, European Commission, 2018. It is based on problematic barriers to trade as reported by economic players. It is important to mention that it does not draw distinction as to whether these measures are discriminatory or illegitimate.

[58] During 2018, a new barrier was reported but also partially solved on mandatory veterinary certificates upon import of leather goods. The previous year, the new barriers reported to the Commission concerned in-country testing of toys, an import ban on fur and leather products, and tax measures on wines and spirits.

[59] https://www.europarl.europa.eu/delegations/en/d-in/about/history

[60] Communication from the Commission to the Council, the European Parliament and the European Economic and Social Committee of 16 June 2004: An EU-India Strategic Partnership [COM(2004) 430) final.

programme. The partnership is based on international cooperation through multilateralism, enhanced commercial and economic interaction and cooperation on sustainable development (D'Ambrogio, 2017[61]).

Since 1971, EU-India trade relations have been shaped by the generalised system of preferences[62]. In 2007, the two parties commenced negotiations on a broad-based trade and investment agreement (BTIA). These were driven by a 'deep integration' agenda (Khorana and Garcia, 2013) covering: tariff elimination on 90 % of tariff lines, service liberalisation in all modes,[63] investment, public procurement, technical regulations (TBT and SPS), intellectual property rights, competition, and dispute settlement provisions.

The European Parliament has supported both the strategic partnership and the FTA negotiations in its resolutions, especially in a resolution on the partnership, adopted in 2005, [64] and two resolutions on the BTIA adopted in 2008 and 2011.[65] In these resolutions, the European Parliament supports the dialogue between the two partners and the pursuit of an ambitious trade agreement, stressing the need for a binding trade and sustainable development chapter, and the relevance of human rights protection, democracy as essential elements of the relationship between the EU and India. These resolutions explicitly mention therefore that dialogue on open issues, with special reference to Kashmir, should be stepped up.

The BTIA negotiations reached deadlock in 2013 around a number of unresolved issues and different perspectives (see Section below on 'Main issues in the FTA negotiations').

In 2015, there was a renewed interest in reviving trade talks.[66] At the same time, several important issues, on which EU-India cooperation seemed encouraging, came to the forefront. A study prepared for the European Parliament (Sachdeva, 2015) argues that bilateral relations should not be hostage of the trade dimension. Accordingly, the areas of cooperation had a broad range, covering global governance, security and defence (especially counter-terrorism and maritime security), science and technology (where cooperation is still limited despite the 2001 Science and Technology Agreement), energy and renewables. Moreover, the human rights dimension is considered as central in EU-India relations: the EU aims to promote human rights in its external action; India has been criticised both internally and externally for breaches of human rights. At the time of the study (2015), the author argued that the increase in India's geopolitical ambitions might bring an increased sensitivity to allegations of human rights abuses.

After a four-year break, two annual EU-India summits took place in 2016 and 2017 (D'Ambrogio, 2019a). The 13th EU-India summit in March 2016 endorsed the EU-India Agenda for Action 2020,[67] and advanced bilateral relations in several areas, by adopting

- the Indo-EU water partnership,[68] supporting the 'Clean Ganga' and 'Clean India' initiatives;

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61 E. D'Ambrogio, India and prospects for closer EU ties, briefing, EPRS, European Parliament, 2017.

62 https://ec.europa.eu/taxation_customs/business/calculation-customs-duties/rules-origin/general-aspects-preferential-origin/arrangements-list/generalised-system-preferences_en

63 Trade in Services by GTAS Modes of Supply: Statistical Concepts and First EU Estimates, Chief Economist Note, DG TRADE, European Commission, 2016.

64 European Parliament resolution on EU-India relations: A Strategic Partnership (2004/2169(INI)).

65 European Parliament resolution of 26 March 2009 on an EU-India Free Trade Agreement (2008/2135(INI)) and European Parliament resolution of 11 May 2011 on the state of play in the EU-India Free Trade Agreement negotiations.

66 S. Khorana, The FTA: a strategic call for the EU and India?, briefing, European Council on Foreign Relations, 2015.

67 https://www.consilium.europa.eu/media/23671/20160330-agenda-action-eu-india.pdf

68 https://www.consilium.europa.eu/media/23672/20160330-joint-declaration-iewp.pdf

- the Indo-EU clean energy and climate partnership[69] supporting the climate dialogue and the cooperation on renewable energies;
- a common agenda on migration and mobility;[70]
- a joint declaration on the fight against terrorism;[71]

Moreover, on the occasion of the same summit, the European Investment Bank (EIB) announced a €450 million loan to fund the construction of the first metro line in the capital of Uttar Pradesh.[72]

At the 2017 14th summit (D'Ambrogio, 2019), joint declarations were adopted on:

- cooperation in counter-terrorism;[73]
- clean energy and climate change;[74]
- partnership for smart and sustainable urbanisation.[75]

These were accompanied by other documents in the fields of sustainable transport, renewable energies (solar), engineering and research, including EIB loans for the Bangalore metro.

Indeed, economic cooperation is ongoing in several areas, despite the lack of advancement of negotiations on an FTA, both on trade issues at the technical level, and on other economic issues. On the one hand, specific committees work on addressing specific market access bottlenecks, sanitary and phytosanitary measures and technical barriers to trade, and on investment facilitation. On the other hand, cooperation is ongoing on financial regulation and sustainable finance, on climate, digitisation and sustainable urbanisation.

Following the 14th summit, trade negotiators met in 2018, but the main challenges remain open. A crucial issue, that was raised in Sachdeva (2015) and again more recently in a comment by Lannoo and Benaglia (2019), is the extent to which the EU is seen as a unique actor in the geopolitical arena. According to these analysts, the EU lacks a unique voice in the eyes of Indian administration.

In 2018, the EU adopted a strategy on India,[76] aimed at reinforcing the 2004 strategic partnership, with a focus on sustainable modernisation, multilateral collaboration to consolidate a rule-based global order, and a search for common responses to security threats and regional issues. This strategy includes the aim to 'negotiate a balanced, ambitious and mutually beneficial agreement on trade and investment', and at the same time put it in a broader perspective where economic cooperation includes several other elements (cooperation on environmental issues, digitisation, urbanisation and infrastructures, etc.).

The new strategy acknowledged the European Parliament's position laid out in its 2017 resolution[77] that welcomed a broad partnership between the EU and India with a cooperation agenda on foreign and security policies. In this framework, the resolution encouraged the two parties to proceed with FTA negotiations 'in a spirit of reciprocity and mutual benefit and by taking into account the international standards to which both sides have committed, including those set out within the

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69 https://www.consilium.europa.eu/media/23673/20160330-joint-declaration-energy-climate.pdf

70 https://www.consilium.europa.eu/media/23674/20160329-joint-declaration-camm.pdf

71 https://www.consilium.europa.eu/media/23675/20160330-joint-declaration-terrorism.pdf

72 https://www.eib.org/en/press/all/2016-080-eib-strengthens-engagement-in-india.htm

73 https://www.consilium.europa.eu/media/23516/eu-india-joint-declaration-on-counter-terrorism.pdf

74 https://www.consilium.europa.eu/media/23517/eu-india-joint-declaration-climate-and-energy.pdf

75 https://www.consilium.europa.eu/media/23518/eu-india-joint-declaration-partnership-smart-and-sustainable-urbanisation.pdf

76 Joint Communication to the European Parliament and the Council Elements for an EU strategy on India, European Commission and High Representative of the Union for Foreign Affairs and Security Policy, 2018.

77 European Parliament resolution of 13 September 2017 on EU political relations with India (2017/2025(INI)).

framework of the WTO and International Labour Organisation, as well as the principle of corporate social responsibility', while also acknowledging that such an agreement 'can ensure that measures benefit both European and Indian citizens, including by fighting poverty and promoting respect for human rights'. According to some analysts, human rights are indeed central in the picture,[78] since they play an increasing role in EU trade policy, and the international community is increasingly concerned about the state of play regarding these rights in India. As discussed above, major issues include the situation in the India-administered Kashmir (see UN High Commissioner for Human Rights 2018 report[79]) and the 2019 Citizenship (Amendment) Act (see Section 2.1) and its potentially discriminatory aspects. The European Parliament had scheduled a vote on a resolution on the issue in March 2020, which was then postponed (the joint motion for a resolution highlighted the discriminatory risks inherent in the amendment act).[80]

## Main issues in the FTA negotiations

According to the numerous accounts of the BTIA negotiations (see especially Khorana and Garcia, 2013, Mukherjee et al., 2013, Wouters et al., 2014, Khorana, 2015, Sachdeva, 2015), the main issues that have caused disagreement between the two parties in the course of the FTA negotiations, and/or that have raised greater public concern, are:

- a certain degree of tariff liberalisation in trade in goods;
- services liberalisation, labour mobility and labour standards;
- public procurement and competition;
- intellectual property and pharmaceuticals;
- data safety;
- sustainable development and human rights protection.

As for tariffs, the previous Section illustrates the different profiles of the two trade partners and indicates that despite the substantial trade liberalisation that India has undertaken in recent decades, it nevertheless applies higher tariffs than the EU on average. From the EU's point of view, the main requests for India to revise its position have been related to automobiles and auto components (Khorana, 2015, Sachdeva, 2015). On the other hand, Indian industry fears that tariff cuts would lead to a flooding of the domestic market with EU cars, and thereby harm the country's manufacturing sector (Khorana, 2015).

The wines and spirits sector is yet another domain in which the EU seeks to obtain tariff reductions for its exports to India (Khorana and Garcia, 2013, Khorana, 2015). For this sector, India currently has an import duty of 60-100 %, plus state-level taxes (that are significant sources of tax revenues for the Indian states).

According to some observers, when negotiations opened (reported in Khorana and Garcia, 2013), neither party contemplated substantial agricultural liberalisation – a controversial matter – which was considered a positive start for negotiations; still, liberalisation in the dairy sector appeared to be an issue. The EU would have liked to obtain more liberal terms for its dairy products on the Indian market, but this risks having harmful consequences for the dairy workers in India who are mostly landless rural workers (Eberhardt and Kumar, 2010, Wouters et al., 2014).

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78 https://ifair.eu/2019/03/16/human-rights-abuses-in-kashmir-the-ultimate-impasse-to-an-eu-india-free-trade-agreement/

79 Office of the United Nations High Commissioner for Human Rights, 2018, Situation of Human Rights in Indian-Administered Kashmir and Pakistan-Administered Kashmir, updated in 2019.

80 http://www.europarl.europa.eu/doceo/document/RC-9-2020-0077_EN.pdf

What concerns restrictive measures that function as a barrier to their exporters, both partners raised issues to the other, especially regarding in-country testing and mandatory registration for IT in India, and regulation and standards on agricultural exports in the EU.

Services are a major area of discussion, given its importance for both economies. The EU is interested in a liberalisation of services in the areas of accountancy, legal matters, retail and banking. According to Khorana (2015), the Institute of Chartered Accountants of India and the Bar Council of India were opposed to the liberalisation of legal and accounting services. On the other hand, some scholars point at the dangers of liberalising banking services in the light of the 2008 financial crisis (Singh et al., 2009). India negotiated to obtain greater liberalisation of services delivered from one country to another (Mode 1 of trade in services) and services delivered via the movement of workers as service providers (Mode 4 of trade in services). The EU appeared reluctant, most probably for two main reasons: on the one hand, work permits and visas are within the remit of individual EU Member States. According to some scholars, this is also driven by the general opposition to immigration by some political forces, despite evidence that migration from India to the EU is not significant (Sachdeva, 2015) and that Mode 4 is supposed to be a source of temporary mobility.[81] A second issue is the concern expressed inter alia by the European Economic and Social Committee[82] (2011) of a worsening of working conditions in the EU due to Indian firms operating in its territory. As Wouters et al. (2014) point out, in the Doha Round of negotiations the EU accepted Mode 4 liberalisation, on the condition that working conditions, collective wages agreements and minimum wages reflect EU standards. Wouters et al. (2014) argue that keeping the level of these standards and ensuring compliance by Indiax firms may have an expansionary effect on trade and counteract the risk of declining labour conditions because of the FTA. According to Gupwell and Gupta (2008), India appeared to resist the inclusion of social standards, not because of a reluctance to social standards *per se*, but because of the political sensitivity to being pressured on these issues.

For the EU side, access to Indian public procurement is another relevant issue. India has not signed the WTO Agreement on Public Procurement[83] and does not have a public procurement law (some states have adopted one, but in most cases, it is the executive that decides). Several barriers to access to public procurement exist, and they are motivated by a range of policy reasons (to promote inclusive growth, employment generation, environmental sustainability, and more rarely to support weak State Owned Enterprises (SOEs)). Some, but not necessarily all barriers, actually discriminate between local and foreign companies. Reforms have taken place since 2011 to reduce barriers, but the pace of reduction seems to have slowed down. [84]

Another major issue raised by the EU is the introduction of measures to strengthen intellectual property rights protection in India (Khorana, 2015). The Indian position has been not to guarantee greater protection than the one guaranteed by the Trade-Related Aspects of Intellectual Property Rights (TRIPS) (Wouters et al., 2014). Moreover, civil society has pointed to the constraints that this may create for the production of generic pharmaceuticals:[85] Indian generic medicines (e.g. 80 % of medicines involved in the treatment of AIDS) are sold all over the developing world, and this has contributed to a substantial drop in generic medicines' prices in recent years. The sustainability impact assessment (SIA) of the BTIA (Ecorys, 2009) shows awareness of the risk for the production of generic pharmaceuticals and therefore for access to medicines, and some observers have pointed to the dangers inherent in the requests for data exclusivity made by members of the

[81] Interestingly, according to Sachdeva (2015), enabling the mobility of professionals can make an important contribution to bilateral trade.

[82] https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/role-civil-society-free-trade-agreement-between-eu-and-india

[83] https://www.wto.org/english/tratop_e/gproc_e/gp_gpa_e.htm

[84] Issues discussed at the International Public Procurement Initiative event held in Brussels on 13 November 2019.

[85] https://blogs.oxfam.org/en/blog/12-02-09-eu-india-free-trade-agreement-it-end-world-we-know-it/

pharmaceuticals business sector (Eberhardt and Kumar, 2010). The European Parliament intervened on the subject of intellectual property rights applying to pharmaceuticals in a 2017 resolution,[86] where it argued in favour of restricting the possibility of applying 'data exclusivity' to favour greater access to medicines.

According to several accounts (Khorana, 2015, Sachdeva, 2015), one of India's key objectives is to be recognised as a data-secure country. Despite reforms carried out in the 2000s and 2010s, India is not considered data secure from the standpoint of EU legislation. This, of course, limits Indian service providers' access to the EU markets. A new law on data protection was presented to the Indian parliament in December 2019,[87] stirring up major debates.[88]

According to Wouters et al. (2014), another point of disagreement between the EU and India are human rights, as well as environmental and social clauses. The EP resolution of 2011 on the India FTA[89] requested the introduction of binding trade and sustainable development (TSD) clauses with explicit reference to human rights (with special mention of the need to ensure dialogue on the Kashmir situation), democracy and security. India contested the inclusion of such a clause,[90] though scholars in India have different views on it (Wouters et al., 2014). At the same time, the EU has a human rights-oriented external policy (Articles 2, 3(5) and 21(1) TEU, which require the EU to uphold and promote human rights in its relations with the wider world. Article 207(1) TFEU reaffirms this for the common commercial policy), and this is a central component of the strategic partnership between the EU and India.

A horizontal criticism brought forward by both Indian and European civil society organisations is the lack of transparency of the negotiation process and risk of its being captured by specific interests (Maes, 2009, Eberhardt and Kumar, 2010, Wouters et al., 2014). The issue is more relevant whenever negotiated FTAs are 'deep', that is, they involve issues that are not specifically related to trade. The European Parliament itself has asked several times for more room for democratic scrutiny of trade agreements and for the availability of sustainability impact assessments before the start of negotiations, not at a later stage.

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86 European Parliament resolution of 2 March 2017 on EU options for improving access to medicines (2016/2057(INI)).

87 https://www.ft.com/content/df6fd8d4-1bf1-11ea-9186-7348c2f183af

88 https://carnegieindia.org/2020/03/09/will-india-s-proposed-data-protection-law-protect-privacy-and-promote-growth-pub-81217

89 European Parliament resolution of 11 May 2011 on the state of play in the EU-India Free Trade Agreement negotiations

90 https://ifair.eu/2019/03/16/human-rights-abuses-in-kashmir-the-ultimate-impasse-to-an-eu-india-free-trade-agreement/

# 3. Modelling the impact of an FTA on trade and welfare in the EU and India

## 3.1. The model to simulate an EU-India FTA

### 3.1.1. A new quantitative trade model: main mechanisms and assumptions

The ex-ante simulation of the economic impact of an EU-India FTA (see Gallina et al. in the Annex for details[91]) is conducted using a new quantitative trade model (NQTM) (Costinot & Rodríguez-Clare, 2014) (Head & Mayer, 2014). This class of models aims to avoid some of the problems posed by the most widespread computational (or computable) general equilibrium models. These problems arise in particular as a result of reliance on types of software that are 'black boxes' and on a wide number of parameters, which are either taken from the literature (raising questions about their ability to fit the actual data), and/or estimated (thus suffering possible estimation errors). The present model needs fewer parameters, which makes it easier to conduct sensitivity analyses and increases its transparency. The price to pay is that the model has to rely on some restrictive assumptions, and leaves out some aspects that are relevant for policy-making; this issue will be considered briefly in the next Sections. One of the main features of NQTMs is the gravity equation (see box below), which allows the estimation of the elasticity of trade with respect to trade costs (i.e. the way trade responds to changes in trade costs).[92]

The model allows for a comparison between trade flows and welfare at the equilibrium in a baseline scenario and in the simulated counterfactual scenario. The latter is obtained by introducing a shock to bilateral trade costs to simulate the impact of the potential trade agreement between the EU and India. Other countries in the world are in the model, to observe the possible trade diversion effects (reduction in trade from countries other than the partner ones). The main outcome variables are the change in trade flows (exports from the EU to India and exports from India to the EU), and the change in welfare, which is measured as real expenditure (expenditure divided by the price level).

Since the model is a 'general equilibrium' model, a number of variables change after the introduction of a change in trade costs. The mechanism underlying the model is the following: the demand for goods and services depends on country-specific characteristics and bilateral trade costs between countries. A trade agreement leads to a reduction in trade costs between the EU Member States and India, leading to lower prices of foreign goods and services for consumers, and thus increasing their consumption. On the supply side, the change in prices is magnified through tradable intermediates used in production. Moreover, countries that face an increase in the demand for their goods raise their production to satisfy it. Given the assumption of a perfectly competitive market structure, an increase in production is assumed to be entirely distributed to workers under the form of higher wages. Combined with an improvement of the terms of trade, countries' real income also goes up. Finally, the increase in real expenditures on goods and services from all the countries in the world reflects a lower domestic expenditure share ($\lambda_{jj,k}$ in the model) and an increase in the expenditure share on goods and services from trade partners.[93]

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[91] We use here the acronym FTA (free trade agreement) as a synonym of RTA (regional trade agreement), which is used in the Annex. This is simply for consistency with previous chapters.

[92] This equation is considered valuable in the academic literature because it is tractable and has proven able to satisfactorily explain the relationships between trade costs and trade flows in the actual available data.

[93] A crucial parameter in this estimate is the trade elasticity ($\epsilon_k$, in the model) determines whether domestic and foreign varieties are perceived as differentiated or close substitutes. The more the domestic and foreign varieties of the product are perceived as different, the more substantial will be the impact on welfare of a reduction in trade costs is

In this framework, an increase in production is entirely modelled as being reflected in a wage increase. Higher wages correspond to higher real income, which is used to increase expenditures on goods and services from all the countries in the world. However, a reduction in tariff revenues, which are also part of the expenditures, dampens the impact that an increase in income has on real expenditures.

To sum up the effects, the FTA reduces the share of expenditures used on goods and services produced domestically in favour of foreign varieties from specific countries. Besides this shift, the introduction of the trade agreement increases overall real expenditures, which in this framework correspond to real consumption. The effect on expenditures is composed of a negative effect on tariff revenues[94] and a positive effect on work income (wage); the two effects are transformed into real values using the country-level price index.

As said, the model assumes that all increases in production translate into wages, since it assumes that all production is sold (assumption of markets in equilibrium) and assumes perfect competition[95] (that implies that profit are zero), that is to say that all firms' revenues are considered as if they were transferred into wages. This is clearly a simplifying assumption and means that it is impossible from this model to know how the increase in income will be distributed between wages and profits. Moreover, it is assumed that there are no heterogeneous workers, so the distributional consequences of an increase in trade flows across different groups of workers cannot be addressed; it will be impossible to say if, following the introduction of the trade agreement, there would be a substantial increase in the wages of skilled workers relative to the wages of unskilled workers. The model is therefore silent about the potential costs in terms of inequalities and labour market changes.

It has to be taken into account that this framework also does not consider the transition costs leading to a new equilibrium, for example the possible increase in unemployment, and does not take into consideration the environmental aspects of FTAs. Nor does it account for an induced impact of the agreements on foreign direct investment. Some of these elements will be briefly examined qualitatively in the next Sections.

The model is static, comparing the levels of trade and welfare in the two situations, with and without an EU-India FTA. This means that it does not estimate the effect of the FTA on growth rates (the changes in welfare over time), but only on the levels of welfare which should then be compared with each other. The dynamic gains from trade are highly disputed in the literature (Rodriguez & Rodrik, 2000), and it is especially unclear whether it is possible to find clear-cut evidence on the effect of changes in trade policies (as opposed to trade volumes) on economic growth. Focusing on static gains appears then to be a more cautious choice. This of course does not mean that the static effects would result instantaneously after the FTA has entered into force. Decrease in tariffs and increased regulatory cooperation between the EU and India will be slowly phased in. As a consequence of the static nature of the model, endogenous changes in capital and therefore investments are not specifically modelled, i.e. the model does not register whether some imports of intermediate goods may favour innovation, or whether the increase in trade favours FDIs.

Among the other studies that use the same type of models, recently Felbermayr et al. (2017a) look at the effect of the trade agreement between the EU and Japan, and find that the average welfare change for the EU-28 is around 0.06 %, relative to baseline data from 2014. Dhingra et al. (2017) apply the same method to analyse the impact of Brexit and show a negative effect on the welfare of

more substantial. Gallina et al. (in Annex) use the values found by Caliendo & Parro (2015) and provide a wide range of sensitivity analysis on this parameter.

[94] This is captured in the most relevant scenarios, but not in some sensitivity analysis.

[95] Costinot and Rodríguez-Clare (2014) show that under imperfect competition gains are slightly larger but may be magnified or dampened for specific countries depending on their specialisation.

the EU-27, ranging from 0.14 % to 0.35 %. Mayer et al. (2019) conduct an ex-post evaluation of the welfare gains from EU membership: they establish the presence of a weighted welfare gain at the EU aggregate level, ranging from 1.3 % to 5.5 %.

Two trade models have been selected (see Gallina et al. in the Annex for details).[96]

- a **main model**, which is able to take into account the decrease in tariff revenues after trade liberalisation, and allows to distinguish between the effect of tariffs and non-tariff measures (NTMs), but relies on hypothetical scenarios of tariff and NTM reductions;
- a **second model**, included in the sensitivity analysis, which relies on the observed past effects of FTAs on trade flows, but does not distinguish between the effects produced by tariffs and NTMs, and does not take into account changes in tariff revenues for governments.

Despite the fact that the government budget is not specifically modelled, the first model allows to incorporate the decrease in tariff revenues that accrue to the partner countries' public sector and intervenes as a mitigation of the increase in expenditure. The capacity to account for this and to distinguish between the effects produced by tariffs and NTMs are the reasons why the first model is preferred to the second and is presented as the main one.

[96] The data used for the general equilibrium simulation have been generated by Timmer et al. (2015) and are stored in the World Input-Output Database (WIOD). This database covers the period from 2000 to 2014, and the data used are from the most recent year available. This source provides bilateral trade flows, production, and expenditures for 42 countries in 56 sectors (following the ISIC Rev. 4 classification). Service sectors are aggregated into two categories, tradable and non-tradable services, so that the analysis includes 42 countries and 24 sectors (22 sectors cover trade in goods and the remaining 2 are the tradable and non-tradable services).

### Effect of trade agreements on trade flows: ex-post analysis

As part of the study in the Annex (Gallina et al., 2020) the researchers have also conducted an ex-post analysis of the effect that already existing FTAs have had on bilateral trade between partner countries (Section 2 of the Annex), which is then used for part of the simulation of an EU-India FTA.

The analysis is based on the structural gravity equation that describes bilateral trade flows as a function of the value of production in the exporter country, the size of the market in the importer country, and trade costs between the two countries. This relationship is tested for every couple of countries each year between 1995 and 2017. That way, it is possible to assess the impact of bilateral characteristics that affect trade costs in the context of an FTA or a country's membership in the single market.

The result of this analysis is a 'Partial Trade Impact', meaning the impact of an FTA on trade, holding all other variables constant. The results obtained confirm that the presence of an FTA increases bilateral trade flows between two countries. The average FTA (among the FTAs entered into force between countries present in the dataset in the selected years) has a limited effect overall and increases trade by 6.93 %. The effect on trade of membership in the single market has substantially increased trade. The EU-Korea FTA had an impact significantly larger than an average FTA, having increased trade flows by almost 24 %. It should be kept in mind that both the effect of an average FTA and of the EU-Korea FTA is highly heterogeneous by sector.

| | Partial trade impact = effect of an FTA on bilateral trade flows |
|---|---|
| Average FTA | 6.93 %** |
| EU-Republic of Korea | 23.74 %*** |
| EU single market | 82 %*** |

Source: Gallina et al., 2020, paper in Appendix.

The estimates regarding the effects of FTAs can differ widely. A recent work on the topic is a study by Baier et al. (2019) that uses data gathered over the 1986-2006 period and establishes an average positive effect of an FTA on trade flows of 34 %. It finds that FTAs have positive effects on trade in 53.9%, negative effects in 7.6 % and insignificant effects in 38.5 % of the cases.

## 3.1.2. The scenarios

The reduction in trade costs is introduced differently in the two models.

In the **main model**, the scenarios differ for the extent of reduction of tariffs and NTMs. The scenarios modelled are presented in Table 1 below. It is important to note that these scenarios are hypothetical and are based on the available literature, since there are no ongoing negotiations between the EU and India. Therefore, this exercise should not to be regarded as an impact assessment of policy options actually under discussion.

Table 1 – Scenarios of the model accounting for tariff revenues

| Model | Scenario modelled: percentage reduction in average import tariff by sector |
|---|---|
| 1a | Tariff reduction in goods: 90 % in all sectors, but:<br>• motor vehicles and other transport equipment: 50 %<br>• crops and animals: the EU lowers import tariffs by 10 %, India by 20 %<br>• fishing and aquaculture: the EU lowers import tariffs by 90 %, India by 70 %<br>• food, beverage and tobacco: the EU lowers import tariffs by 40 %, India by 30 %<br>NTM reduction in goods and services: 3 % |
| 1b | Tariff reduction in goods: 90 % in all sectors, but:<br>• crops and animals: 40 %<br>• food, beverage and tobacco: 60 %<br>NTM reduction in goods and services: 3 % |
| 1c | Tariff reduction in goods as in Scenario 1, but no NTM reduction in goods and services (= no liberalisation in services) |

Source: author's elaboration based on Gallina et al., 2020 (in the Annex).

The scenarios[97] acknowledge the presence of sensitive sectors and take this into account to different extents. Scenario 1 introduces a reduction by 90 % of **tariffs** in all sectors, except for crops and animals, food, beverage and tobacco, fishing and aquaculture, motor vehicles and other transport equipment. In these sectors, tariffs are reduced, but to a smaller extent, and in some cases asymmetrically between the two partners.

The asymmetric reductions in Scenario 1 in the agriculture and food sectors are taken from Decreux & Mitaritonna (2007), where they are not assumed as fully liberalising since they are considered sensitive sectors. Agriculture and agriculture-related sectors are indeed discussed separately by some scholars who indicate that asymmetric and only partial liberalisation may be preferable from the Indian point of view. According to Achterbosch et al. (2008), from the Indian point of view, an asymmetric liberalisation, with the EU liberalising imports and India keeping relatively higher tariffs, would be preferable, especially for poverty reduction purposes. Similarly, Storm (2001) points out that India would benefit under a scenario of limited liberalisation of agriculture, with special attention to rice, wheat and commercial crops, together with increased investment in the sector.

Scenario 1 also assumes limited liberalisation of motor vehicles and other transport equipment sectors highlighted as sensitive in the report on the study done by Sachdeva for the European Parliament (2015), especially for the differences of views on Indian tariffs on EU cars. This sector is nevertheless assumed as liberalised at 90 % in Scenario 2.

In Scenarios 1 and 2, the reduction of **NTMs** is modelled as a 3 % reduction in protection of all sectors, including tradable services, which is a consequence of any type of cooperation reducing trade costs, other than tariffs, for example, negotiated equivalence on standards. Lower uncertainty between trade partners might also be part of the reduction in NTMs, as the trade agreement might reduce the difference between bound commitments and applied levels of protection; this is underlined especially in the case of services by Nilsson (2018), for which, in most cases, FTAs bind currently applied levels of protection rather than generating real market access. This approach is consistent with the one applied by Decreux & Fontagné (2013) in analysing the expected effect of the Doha Round. As explained by Gallina et al., 2020 (in the Annex), the assumption of a reduction of the ad-valorem equivalent of non-tariff measures by 3 % can be extended to all sectors, since it is

[97] For more details on the scenario selection, see Gallina et al. in the Annex, Section 3.1.4.

consistent with the findings of Dhingra et al. (2017) in the case of Brexit.[98] A focus on uncertainty and transparency is moreover justified by Unctad (2018),[99] where it is underlined that NTMs can serve legitimate precautionary and development-related (including SDGs-related) purposes, while increasing trade costs; a clearly defined, transparent, non-discriminatory nature of measures, and the focus on trade facilitation agenda, are key elements to keep the balance between the use of NTMs for development purposes and trade facilitation.

The NTM modelling chosen is of course a simplification with respect to the complex reality of NTMs, but the complexity of modelling them has been acknowledged by many in the literature, both in terms of tools and sophisticated data requirements (Nilsson, 2018, Unctad, 2018). The third scenario of Model 1 is meant to shows the sensitivity of the results to assumptions on NTMs, and therefore assumes the same tariff reduction as in Scenario 1, with no reduction in non-tariff measures.

The two scenarios considered more relevant are Scenario 1 and Scenario 2, both including a NTM reduction; as explained, a 3 % reduction in non-tariff trade costs is considered to be a reasonable assumption in the delicate NTMs matter.

The **second model**, instead of making assumptions on tariff- and NTM-related changes, relies on coefficients estimated ex-post for the observed effects of existing trade agreements. This assessment is illustrated in the box above. These coefficients are applied to the EU-India case, which means assuming that the EU-India FTA has the same trade effect as an average FTA or as the EU-Korea FTA. The downsides are that it cannot distinguish between the effect of tariff and NTM reductions, and therefore cannot take into account the reduction in tariff revenues deriving from liberalisation. An important input for the model is therefore the average effect of regional trade agreements on trade flows ($\beta_{1,k}$, in the model), which is used in the model as a measure of the expected change in in bilateral trade costs. The three modelled scenarios are summarised in Table 2.

Table 2 – Scenarios of the model not accounting for tariff revenues

| Model | Scenario modelled: which reduction in trade costs is assumed |
|---|---|
| 2a | Assumes a reduction in trade costs as the estimated effect of the EU-KOR FTA |
| 2b | Assumes a reduction in trade costs as the estimated effect of the average existing FTA |
| 2c | Assumes a reduction in trade costs as the estimated effect of the average existing FTA and Incorporates in the baseline the existence of CETA and the EU-Japan FTA |

Source: author's elaboration based on Gallina et al., 2020 (in the Annex).

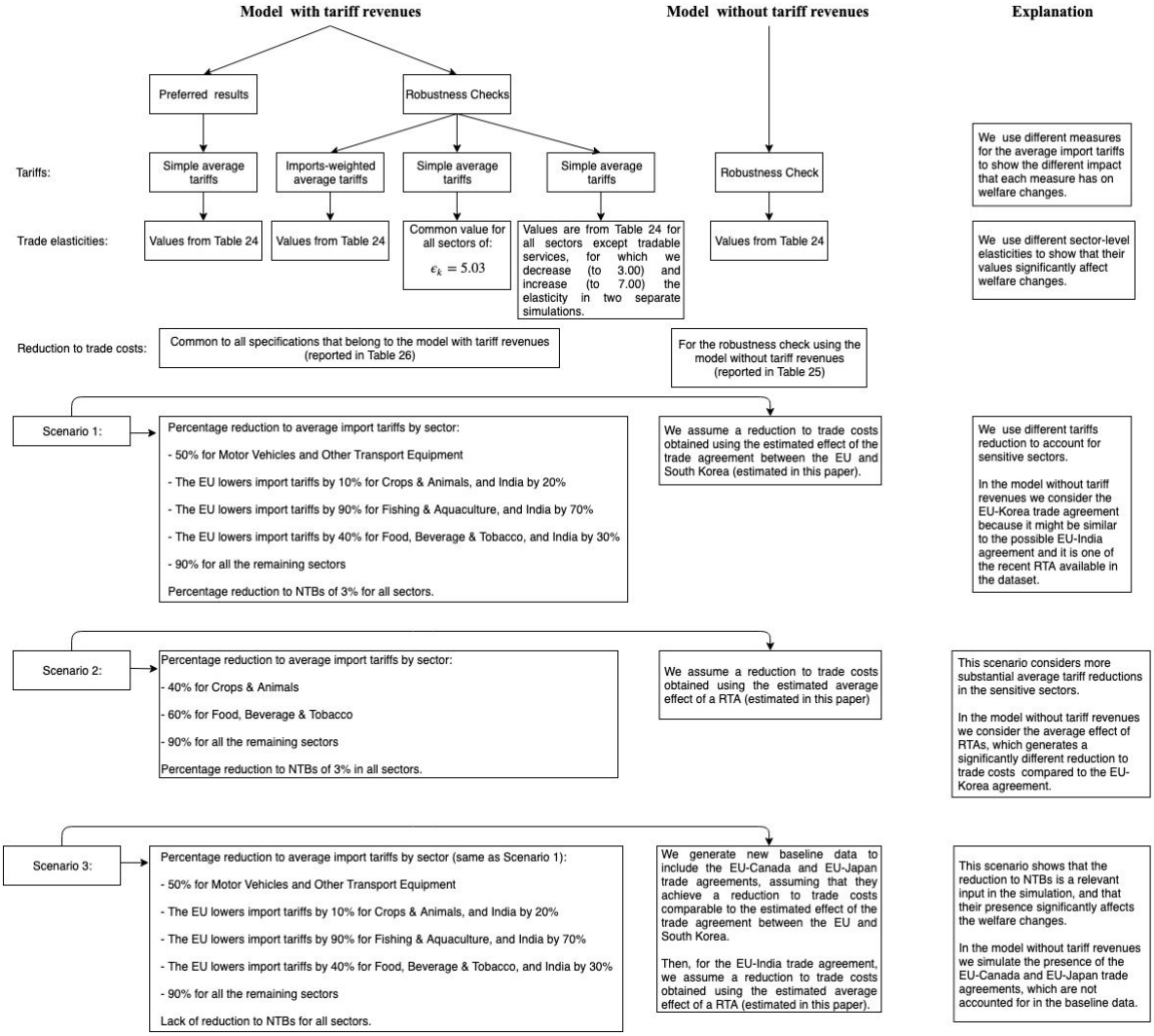
The first scenario projects on the EU-India FTA the same effect as the average FTA found in the ex-post analysis, while the second projects the effect on trade costs of the EU-Korea FTA. As seen in the box above, the former is substantially lower than the latter. Since the baseline data used do not include two major EU trade agreements – CETA and EU-Japan – Scenario 3 checks whether incorporating has an impact on the results, thus simulating the same case as Scenario 1, but on a baseline where the effect of these two FTAs has been simulated beforehand.

A summary of the main assumptions on the parameters, the scenarios, and the robustness checks of the two models is presented in Figure 18.

[98] The modelling of NTM reduction as 3 % of trade costs is moreover consistent with the decomposition of trade costs done by Anderson and van Wincoop (2004) and partially responds to some criticisms targeting other FTA estimations (Raza et al. 2014).

[99] Short version here: https://voxeu.org/article/implications-non-tariff-measures-developing-countries-exports.

Figure 18 – Summary of the scenarios used in the main specification and robustness checks




Source: Study by Gallina et al., 2020, in the Annex.

## 3.2. The results

The model allows to observe the simulated changes in trade flows and welfare in the EU (and Member States), India and selected third countries. The results are static-level effects on the variables of interest caused by the shift to a new equilibrium; these effects can be interpreted as long-term ones, but, as mentioned, they do not allow to model the transition path, and do not take into account some possible changes in the economy related to investments.

### 3.2.1. Effect on welfare

#### Welfare effects for the EU-28 and India: main specification

The overall result found is a limited positive effect of an EU-India FTA on welfare in the partner countries. This holds true both for the main model and for the second one.

The results of the main model, which accounts for the loss in tariff revenues, are displayed in Table 3 below. The aggregate welfare gain for the EU is between €3.68 billion and 8.54 billion, which is between 0.0177 % and 0.0276 % when looking at the simple average among EU Member States and between 0139 % and 0.0323 % when looking at the weighted average.

Overall, larger EU-28 countries gain more than smaller ones, since the consumption-weighted change, which accounts for the economic size of the Member States, is bigger than the simple average.

Welfare gains for India are similar in absolute value (€3.75 billion-€8.97 billion), but they represent a bigger share of the aggregate welfare (0.1258 %-0.3011 % with respect to the baseline).

Table 3 – Summary of changes to welfare for the EU-28 and India, model with tariff revenues

| | EU-28 | | | India | |
|---|---|---|---|---|---|
| Scenarios | Change (%) weighted | Change simple average (%) | Change (billion EUR) | Change (%) | Change (billion EUR) |
| 1a | 0.0303 | 0.0262 | 8.02 | 0.2733 | 8.14 |
| 1b | 0.0323 | 0.0276 | 8.54 | 0.3011 | 8.97 |
| 1c | 0.0139 | 0.0117 | 3.68 | 0.1258 | 3.75 |

Source: author's elaboration based on Gallina et al. 2020 in the Annex.

Note: The EU weighted result is obtained using the share of consumption of each Member State over the total consumption in the EU-28. The reduction in trade costs applied in each scenario is from Table 26 in the study by Gallina et al. 2020 in the Annex.

Scenarios 1 and 2 are very similar, which means that the differences in tariff liberalisation applied to sensitive sectors do not play a major role. The relevant difference between these two scenarios and Scenario 3, on the contrary, is that a reduction in NTMs potentially plays a major role (when NTM liberalisation is brought to zero, welfare impacts are more or less halved).

Because of possible trade diversion effects, other countries that are not part of the FTA may gain or lose in welfare terms (see Table 4 below). Overall, other countries included in the model have welfare gains, though smaller than the partner countries, while most Asian countries incur losses (although limited).

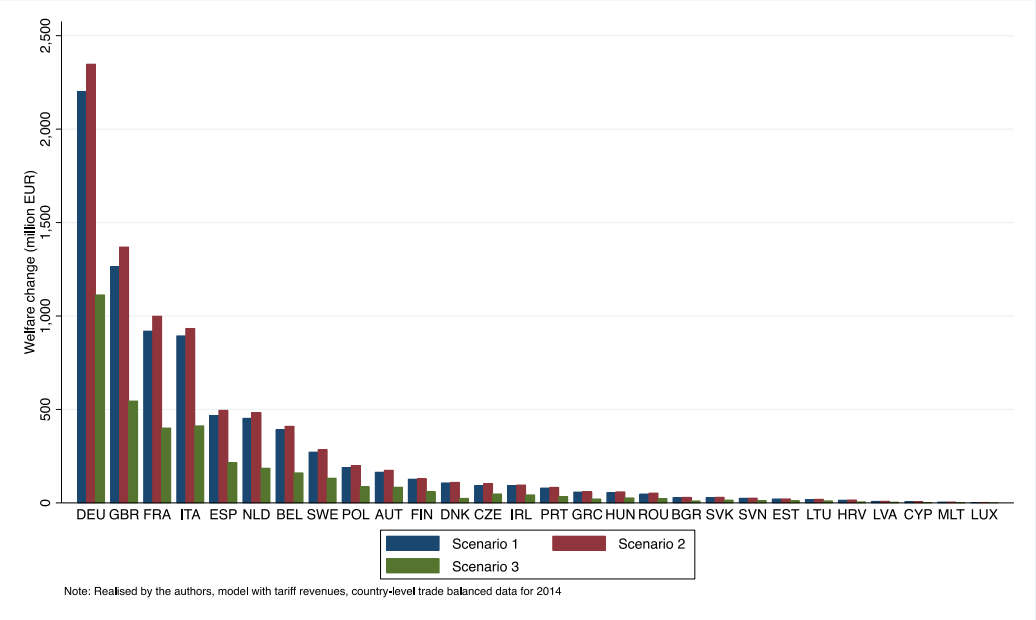
## Effects on welfare by individual EU Member States

Welfare gains are positive, although limited for all Member States,[100] with a great degree of heterogeneity.

Looking at absolute numbers (Figure 19 and Table 4 below), the largest benefit (in EUR) from the baseline is for Germany, for which welfare expands by about €2.2 billion. Overall, large EU-28 countries gain more than smaller ones. The table allows also to see changes in absolute numbers for selected third countries.

[100] Unfortunately, we cannot do the same disaggregation for the Indian states.

Figure 19 – Welfare change by Member State (million EUR)




Source: Gallina et al., 2020, study in the Annex.

Table 4 – Welfare change, model with tariff revenues (million EUR)

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | -0.47 | 8.31 | -3.72 | KOR | -90.58 | -87.35 | -59.22 |
| BRA | 25.06 | 30.91 | 20.80 | MEX | 43.23 | 60.71 | 30.18 |
| CAN | 27.16 | 37.84 | 16.94 | NOR | 7.41 | 12.05 | 0.17 |
| CHE | 16.35 | 22.87 | 3.55 | ROW | 116.58 | 513.12 | 183.68 |
| CHN | -495.54 | -444.84 | -323.32 | TUR | 8.58 | 55.39 | 68.80 |
| IDN | -16.41 | -12.17 | -10.45 | TWN | -10.43 | -6.64 | -2.91 |
| IND | 8 143.19 | 8 969.80 | 3 748.65 | USA | 423.41 | 505.85 | 280.55 |
| JPN | -42.61 | -28.37 | -13.35 | | | | |
| Member states of the EU-28 | | | | | | | |
| AUT | 163.72 | 174.31 | 83.85 | HUN | 54.64 | 58.72 | 26.47 |
| BEL | 391.29 | 409.52 | 160.42 | IRL | 91.55 | 95.26 | 42.48 |
| BGR | 28.15 | 29.15 | 10.10 | ITA | 893.47 | 933.10 | 412.04 |
| CYP | 5.22 | 5.55 | 1.64 | LTU | 17.80 | 18.89 | 10.54 |
| CZE | 92.64 | 102.96 | 47.48 | LUX | 1.58 | 2.25 | 0.27 |
| DEU | 2 199.83 | 2 347.34 | 1 112.63 | LVA | 7.87 | 8.28 | 3.77 |
| DNK | 106.62 | 109.44 | 23.79 | MLT | 4.12 | 4.31 | 1.36 |

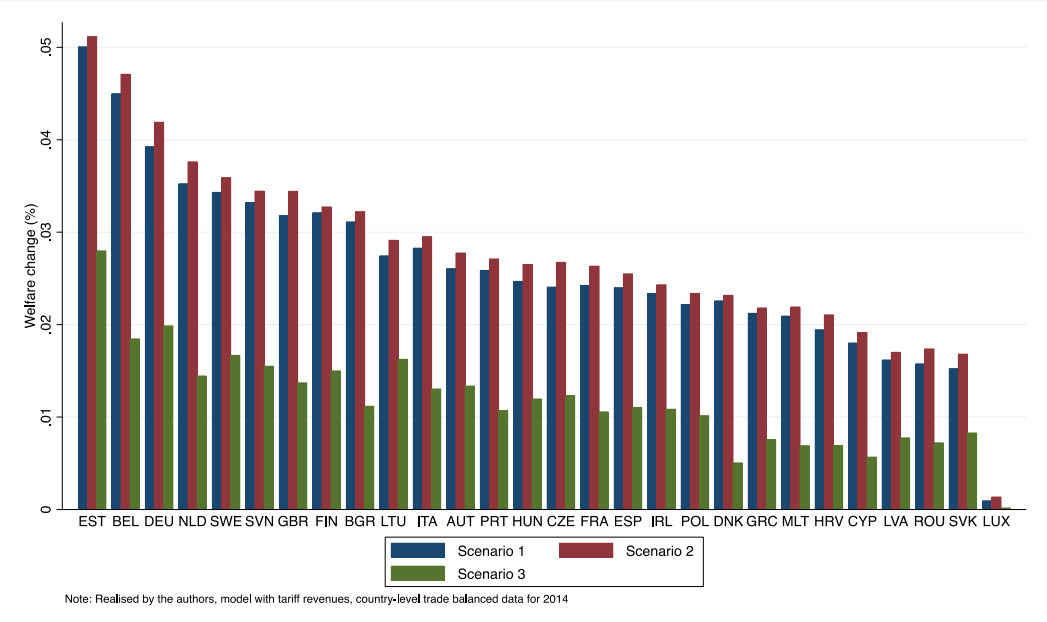
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| ESP | 466.13 | 495.12 | 214.37 | NLD | 452.13 | 482.44 | 185.21 |
| EST | 20.46 | 20.91 | 11.44 | POL | 187.96 | 198.12 | 86.01 |
| FIN | 126.39 | 128.85 | 59.01 | PRT | 79.14 | 82.91 | 32.75 |
| FRA | 918.88 | 998.33 | 400.32 | ROU | 47.10 | 51.93 | 21.54 |
| GBR | 1 264.81 | 1 368.93 | 544.75 | SVK | 27.11 | 29.90 | 14.71 |
| GRC | 57.46 | 59.05 | 20.50 | SVN | 24.12 | 25.01 | 11.25 |
| HRV | 13.92 | 15.07 | 4.96 | SWE | 271.38 | 284.05 | 131.86 |
| EU total | 8 015.49 | 8 539.70 | 3 675.51 | | | | |

Source: Gallina et al., 2020, study in the Annex.

Note: The welfare change is computed between a counterfactual scenario, where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country level. The values are in million EUR.

The welfare percentage changes for each country are presented in Figure 20 and in the map in Figure 21. In Scenario 1 of the main model, Luxembourg, the least affected Member State, has a consumption increase by 0.0009 %, or €1.58 million, while Estonia has an estimated increase in real expenditures by 0.0501 %, or €20.46 million, the largest in percentage terms.

Figure 20 – Welfare change by Member State (%)

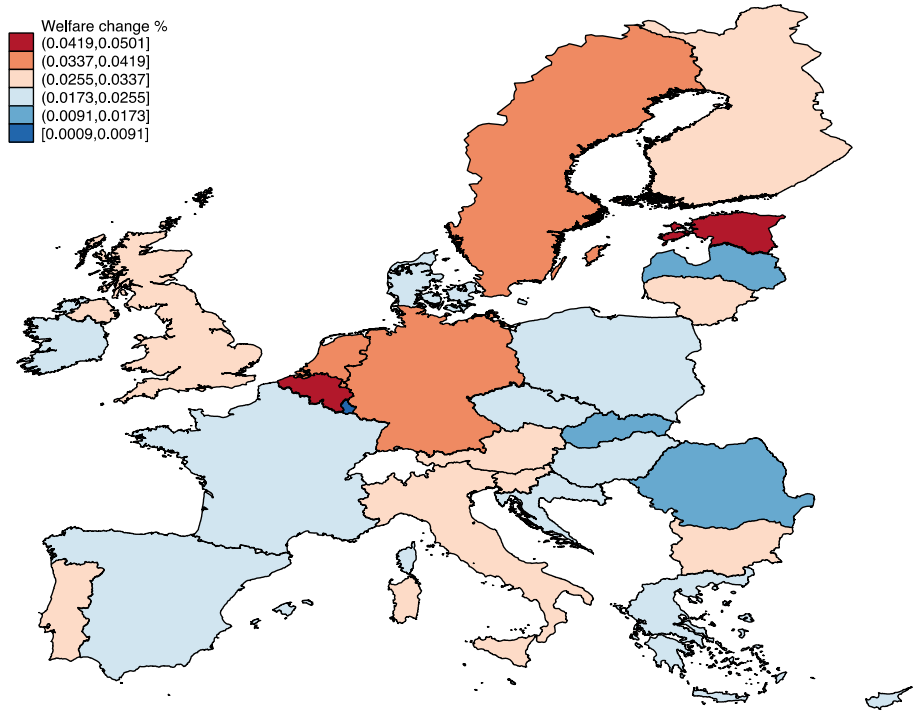



Source: Gallina et al., 2020, study in the Annex.

Figure 21 shows the welfare gains in percentage terms with respect to the baseline expenditure of each country. It represents Scenario 1 of the main model (blue bar in Figure 20)[101].

[101] The map for Scenario 2 is very similar and is included in the study in the Annex.

Figure 21 – Map of welfare gains, model with tariff revenues, Scenario 1




Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

Source: Gallina et al., 2020, study in the Annex.

## Welfare effects for the EU-28 and India: sensitivity analysis

The second model generates results that cover a broader range (Table 5 below). In Scenarios 2 and 3, where the estimated impact of an average FTA is used to simulate the potential impact of an EU-India FTA, the expected change in welfare is much smaller, lower than 0.01 % in the EU and then 0.1 % in India. Scenarios 2 and 3 produce a very similar result, indicating that taking into account CETA and the EU-Japan FTA does not substantially change the results. Whereas, if we look at Scenario 1, in which the EU-India FTA is expected to bring the same reduction in trade costs as the estimated effect of the EU-Korea FTA, we can see that the welfare changes are more significant. The gains for the EU-28 amount to €11.56 billion, while for India at around €13.14 billion. The explanation is that the trade barriers to imports from India decrease more in this model than in the previous one and that the model assumes that there would not be a potential negative impact on expenditure, since it does not account for the reduction in tariffs revenues.

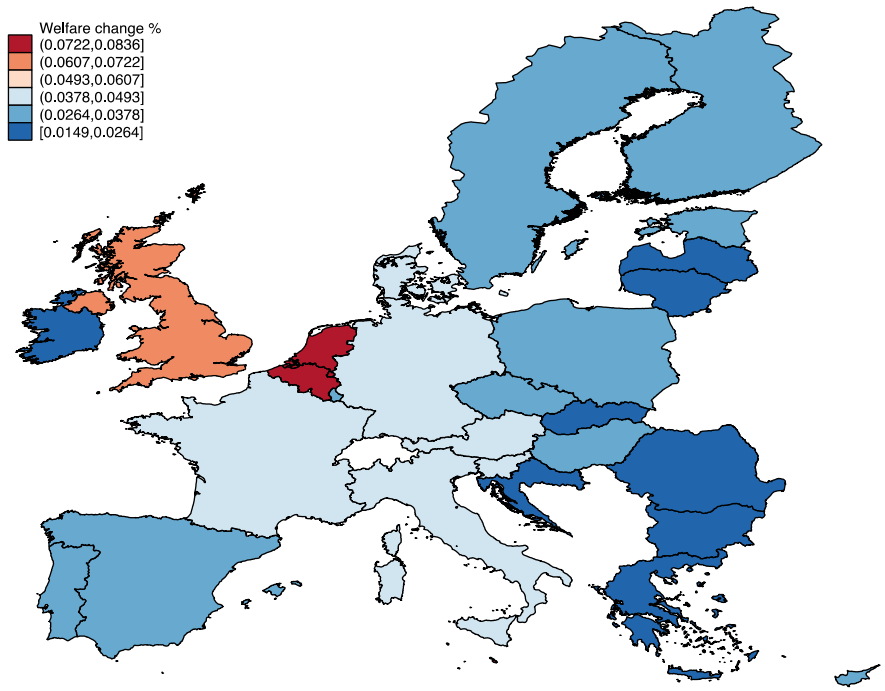
Table 5 – Summary of changes to welfare for the EU-28 and India, model without tariff revenues

| | EU-28 | | | India | |
|---|---|---|---|---|---|
| Scenarios | Change (%) weighted | Change simple average (%) | Change (billion EUR) | Change (%) | Change (billion EUR) |
| 1a | 0.0457 | 0.0374 | 11.56 | 0.4380 | 13.14 |
| 1b | 0.0096 | 0.0082 | 2.43 | 0.0817 | 2.45 |
| 1c | 0.0095 | 0.0082 | 2.40 | 0.0810 | 2.43 |

Source: author's elaboration based on the Gallina et al. 2020 study in the Annex.

Figure 22 allows for a comparison with Figure 20 and represents the distribution of gains across countries in the model where the same effect of the EU-Korea FTA is assumed, and the model does not account for tariff revenues. In the second map, changes are bigger, consistently with what was indicated in the previous paragraph.

Figure 22 – Map on welfare gains, model without tariff revenues, Scenario 1




Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

Source: Gallina et al., 2020, study in the Annex.

Moreover, the first model can be subjected to a number of robustness checks, first by using import-weighted tariffs instead of simple tariffs, in order to account for sectors where more trade occurs, then by changing the main exogenous parameter: trade elasticity. As shown in Table 6, these robustness checks do not provide substantially different results with respect to the main specification.

Table 6 – Comparison of the welfare changes (%) between the benchmark results and the robustness checks

| Robustness check | Change (%) weighted, EU-28 | Change (%) India | Sign of the difference with main model |
|---|---|---|---|
| Imports-weighted average tariffs | 0.0128 %-0.0304 % | 0.1232 %-0.2708 % | - |
| common trade elasticity across sectors | 0.0143 %-0.0350 % | 0.1401 %-0.3430 % | + |
| lower trade elasticity for tradable services | 0.0151 %-0.0341 % | 0.1295 %-0.3107 % | + |
| higher trade elasticity for tradable services | 0.0130 %-0.0310 % | 0.1232 %-0.2945 % | - |

Source: author's elaboration based on the study by Gallina et al. 2020 in the Annex.

### 3.2.2. Effect on trade flows

The potential FTA increases trade between the EU-28 and India.

For the sake of readability, this Section discusses in greater detail the results for Scenario 1 and 2 of the main model, that are considered to be more relevant (see Section 3.1.2 above).

In these scenarios (which include some reduction in NTMs), exports from the EU-28 to India increase by about 52-56 %, while imports from India increase between 33 % and 35 %. The overall amount in absolute terms is somehow comparable between the two partners (see Table 7).

Table 7 – Aggregate changes in bilateral trade flows (main model)

| Model | Change in EU export to India | | Change in EU import from India | |
|---|---|---|---|---|
| | EUR billion | % | EUR billion | % |
| 1a | 13.97 | 52 % | 13.24 | 33 % |
| 1b | 14.81 | 56 % | 13.92 | 35 % |
| 1c | 8.48 | 32 % | 5.97 | 15 % |

Source: author's elaboration based on Gallina et al., 2020 (in the Annex).

Looking at trade in goods (Figures 29, 30 and Table 33 in the study in the Annex), Germany is the EU Member State where the greatest increase in both imports and exports is expected to occur. Since exports are expected to increase more than imports, Germany's trade surplus with respect to India is projected to increase. After Germany, the countries that are expected to have the greatest increase in bilateral trade flows with India (both imports and exports) are the UK, France and Italy.

Looking at these figures as percentage changes, it has to be noted that, while imports in goods are expected to increase fairly homogenously across Member States, exports experience a greater variation, e.g. an important increase in the case of Estonia.

Looking at trade in services (Figures 27 and 28, and Table 32 in the Annex), a greater increase in bilateral exports from the EU-28 to India has to be expected in Germany, France and the UK. A high increase in imports is expected for these three Member States, together with Sweden.

Contrary to trade in goods, the percentage changes in bilateral trade in services are expected to be quite homogeneous across Member States.

An analysis **by sector** highlights potential changes in three trade flows:

1) bilateral EU-India trade;
2) trade between the EU and the rest of the world;
3) intra-EU trade.

While we expect 1) to always be positive, 2) and 3) can give an idea of the trade diversion effect.

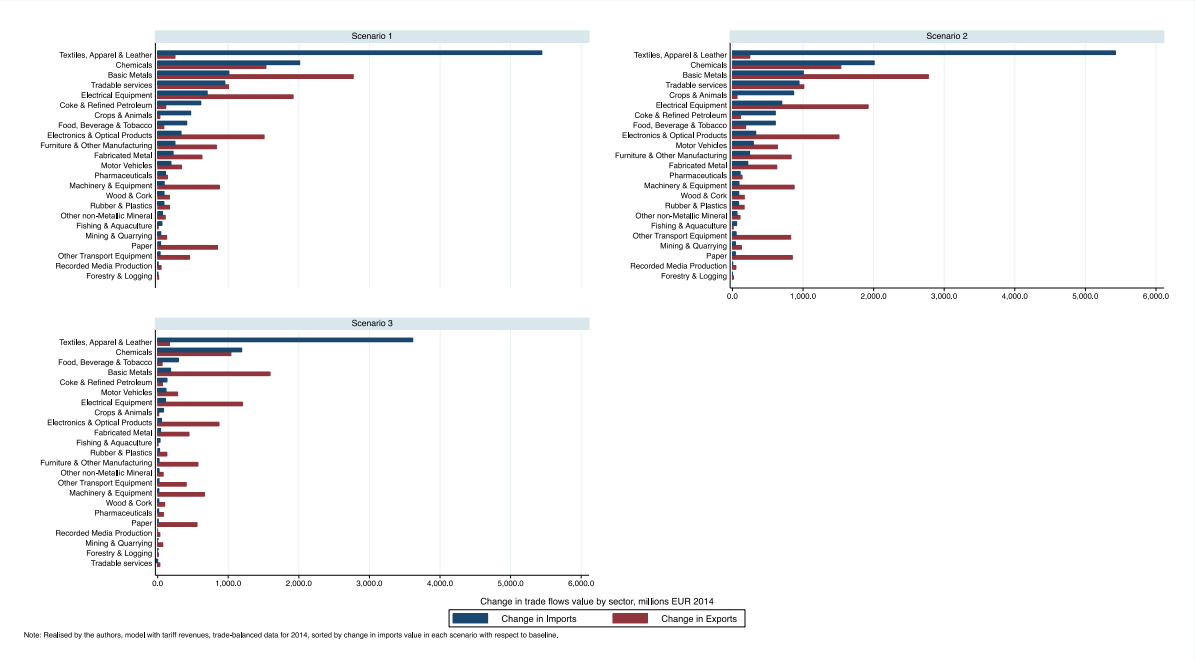
1) **EU-India trade flows**: the sectors where the increase in EU exports towards India is more substantial can be seen in Figure 23 below. In the baseline,[102] the three largest sectors by exports are, in descending order, tradable services, other transport equipment, and machinery and equipment. Tradable services in Scenario 1 is the most exported sector, with a value of around €6.3 billion. Despite the significant increase in exports for other transport equipment, it is overtaken

[102] In this case, the baseline is simulated to assume that trade is balanced; therefore, the baseline does not necessarily represent the status quo.

by basic metals, which moves from being the fourth-largest to the second-largest sector by the value of export flows to India, in the baseline and in Scenario 1 respectively. Exports of basic metals almost double, from €2.9 billion to €5.7 billion. Other relevant sectors by exports value increase are chemicals and, as previously mentioned, machinery and equipment.

Textiles are the sector where imports are expected to increase the most; this is the most imported sector both in the baseline and in the counterfactual scenarios. The imports of services increase by €953 million, while textiles imports increase by €5.4 billion. To see how relevant this sector is, note that the sum of all the changes in imports, excluding this sector, amounts to €7.8 billion.

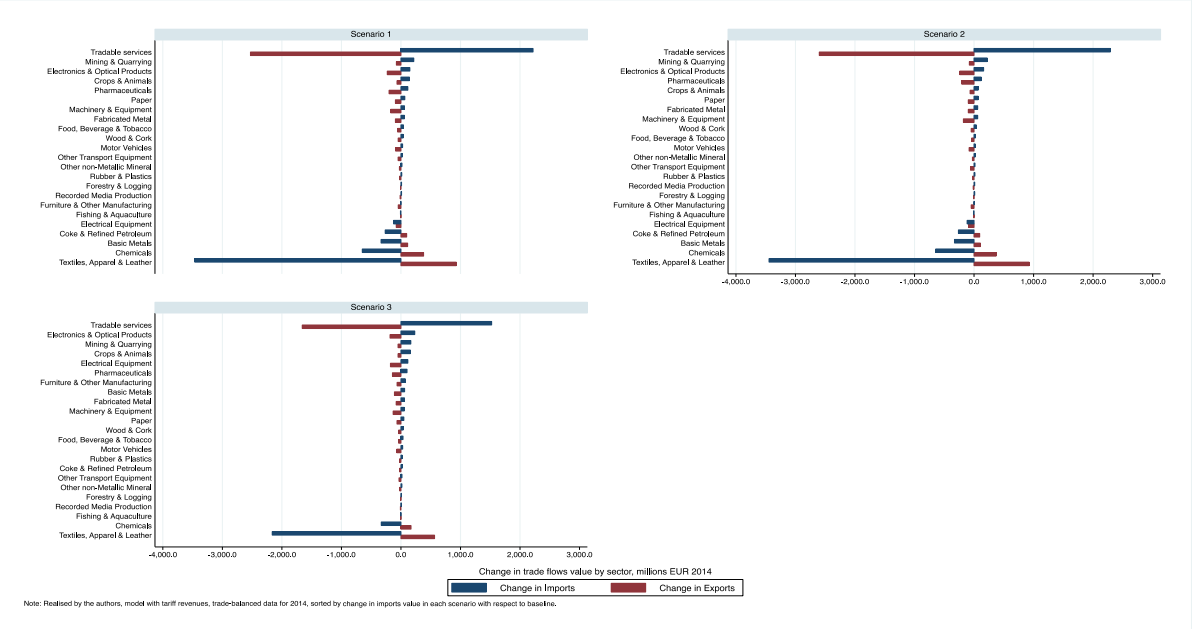
Figure 23 – Change in imports and exports (million EUR) between the EU and India, by sector




Source: Gallina et al., 2020, study in the Annex.

2) **the EU-28-rest of the world (excluding India):** as expected, the EU imports less from the rest of the world in sectors, such as the chemicals and textiles, for which trade with India increases substantially. For textiles, the trade diversion effect is significant, since imports decrease by €3.5 billion from the baseline value. On the exports side, at the same time, the textiles sector experiences the most significant expansion of exports to extra-EU countries, by around €928 million. The full picture can be seen in Figure 24.

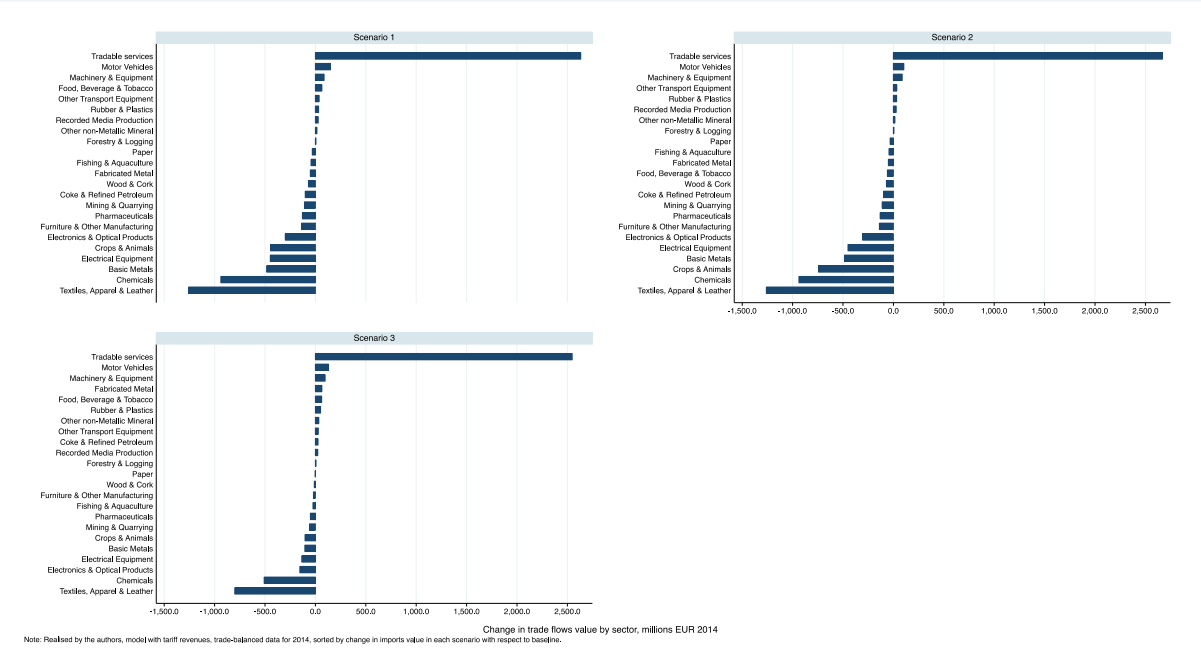
Figure 24 – Change in trade flows by sector, extra-EU partners, excluding India (million EUR)




Source: Gallina et al., 2020, study in the Annex.

3) **Intra-EU trade**: again, a reduction of trade flows is expected to take place in sectors where there is an expansion of trade with India (Figure 25), with the most considerable effect in the textiles sector, with a decrease in trade flows by approximately €1.26 billion in Scenario 1, followed by a €938 million decrease in trade flows for the chemicals sector. The reduction in the crops and animals depends on the extent of the liberalisation between the EU and India, which is different for Scenario 1 and Scenario 2. On the other hand, there are sectors for which intra-EU trade increases following the introduction of the FTA; this is particularly the case for tradeable services, which register an increase by €2.6 billion.

Figure 25 – Change in intra-EU trade flows, including intra-national trade (million EUR)




Source: Gallina et al., 2020, study in the Annex.

At sector level, it is possible to project the decline in tariff revenues (Table 40 and Figure 38 in the Annex): tariff revenues decline for the EU in all sectors, except for the crops and animals sector in Scenario 1, because the increase in trade flows compensates for the lower applied import tariff. For India, in Scenario 1, the most substantial decrease in tariff revenues is €320 million in the other transport equipment sector, and this loss reaches €626 million in the Scenario 2.

Table 8 – Changes in tariff revenues (main model)

| Model | EU | India |
|---|---|---|
| | EUR billion | EUR billion |
| 1a | -0.79 | -1.39 |
| 1b | -0.91 | -1.86 |
| 1c | -0.85 | -1.44 |

Source: author's elaboration based on Gallina et al., 2020 (in the Annex)

This can be read as a decline in public revenues for both the EU and India. At the same time, the model does not account for increased tax revenue due to higher income, so that this does not represent a complete account of changes in government revenues.

### 3.2.3. Comparison with other assessments

The results found by Gallina et al. (2020) are broadly consistent with what emerges from previous studies.

Three impact assessments were conducted around the time the EU-India FTA negotiations started. Their methodologies differed substantially both from each other and from the present study, so drawing proper comparisons is difficult. Overall, the results presented here are closer to some of the scenarios modelled by Achterbosch, Kuiper and Roza (2008). The two other studies done at the same time (Decreux and Mitaritonna, 2007, and Ecorys et al., 2009) estimate smaller welfare increases for the EU, while for India they diverge: Decreux and Mitaritonna (2007) find a smaller impact, while Ecorys et al. (2009) find a bigger one, especially in their long-run estimate.

The smaller impact found by these less recent studies is most probably due to the fact that both assume the completion of the Doha Round in the baseline; assuming a more liberalised trade in the baseline leads to a reduction in the incremental impact of an FTA. Indeed, Achterbosch et al. (2008) see the Doha Round as having a significant role in reducing gains from an EU-India FTA. Polaski et al. (2008) find small welfare effects, positive for the EU and negative for India. The small welfare loss in India is due to the decline in domestic consumption and the increase in taxes due to a decrease in tariff revenues. The total domestic production is expected to increase by 0.34 % in India and by 0.02 % in the EU.

Felbermayr et al. (2017b) estimate bigger effects by applying a similar methodology as the present study. The reason for the bigger results obtained by this study is likely to be found in the scenario it modelled,[103] especially what concerns NTM reduction, to which welfare is extremely sensitive, as shown in the previous Sections. In their preferred scenario, Felbermayr et al. assume a much bigger reduction in NTMs[104] if compared to the main model of Gallina et al. (2020). Furthermore, they (2017b) use a static general equilibrium model, which is similar to the one used in the sensitivity

[103] Detailed results are provided only for the most ambitious scenario, so it is impossible to compare welfare effects in scenarios with a smaller extent of liberalisation.

[104] In Gallina et al.'s main scenario (2020, in the Annex), NTMs are assumed to decline by 3 % uniformly across sectors.

analysis that is part of the study by Gallina et al. in the Annex, which is based on parameters estimated ex-post through analyses of existing FTAs. The difference between the two is that the study in the Annex estimates trade elasticities at a more aggregate level, which leads to smaller results (Imbs and Mejean, 2015).

Table 9 – Comparison with other impact assessments of an EU-India FTA

| Study | Model, assumptions and scenarios | Effects on welfare |
|---|---|---|
| Ecorys, Cuts, Centad, (2009) for DG TRADE | CGE using Francois, van Meijl, and van Tongeren (2005), implemented in GEMPACK.<br><br>Assumption of Doha Round completion.<br><br>Scenarios: 90-97 % tariff reduction in all goods; 25-75 % reduction in trade costs in services; trade facilitation measures corresponding to 1-3 % of volume of trade. | National income is the outcome variable:<br>Short run:<br>– EU 27: €2.9-4.4 billion<br>– INDIA: €1.5-5 billion<br><br>Long run:<br>– EU 27: €0.35-1.6 billion<br>– INDIA: €9.6-17.7 billion |
| Decreux and Mitaritonna, 2007 | CGE using CEPII's model 'MIRAGE'<br><br>Assumption of Doha Round completion.<br><br>Scenarios: tariffs brought to zero in most sectors, besides some sensitive sectors, where asymmetric and partial reduction occurs (agri-food, animals, cereals, crops, fish). Barriers to trade in services reduced by 10-25 %. | Welfare is the 0utcome variable is welfare:<br><br>Scenario 1:<br><br>– EU-25: 0.05 %<br>– INDIA: -0.025 %<br><br>Scenario 2:<br><br>– EU-25: 0.025 %<br>– INDIA: 0.025 % |
| Achterbosch, Kuiper, Roza, 2008 | CGE using GTAP<br><br>Scenarios: all-but-agriculture liberalisation, all liberalisation, non-agricultural liberalisation (with and without the Doha Round in place).<br><br>Different experiments involving tariff removals and finding the optimal scenario for each of the two partners. | Under India max scenario:<br><br>– EU: 0.02 %<br>– INDIA: 0.126-0.209 %<br><br>Under EU max scenario:<br><br>– EU: 0.005-0.011 %<br>– INDIA:0.017-0.145 % |
| Polaski et al. (2008) | CGE using the 'GLOBE' model using data from the Global Trade Analysis Project (GTAP) database<br><br>Scenarios: full liberalisation of agriculture and manufacturing. No change in domestic subsidies. No liberalisation of services. | Welfare (real income9 is the outcome variable is welfare (real income):<br><br>– EU: 0.03 %<br>– INDIA: -0.05 % |
| Felbermayr et al. (2017b) | New quantitative trade model, structural gravity model<br><br>Scenarios: 1. Only tariff elimination, no NTM reductions; 2. Tariff elimination in all sectors and a shallow reduction of | Welfare (real income) is the outcome variable is welfare (real income):<br><br>Under a deep agreement scenario (3): |

| | | |
|---|---|---|
| | NTMs; 3.Tariff elimination in all sectors, and a deep reduction of NTMs.<br><br>Baseline – 2011 | – EU: 0.14 % (€22.50 billion )<br>– INDIA: 1,3 % (€28.44 billion ) |

Source: author's elaboration based on references.

The model presented in the current study does not account for Brexit, which is of course likely to impact the potential gains from an EU-India FTA. This comparison with/without Brexit is made by Felbermayr et al. (2017b). In their analysis, Brexit significantly lowers India's potential gains from an FTA with the EU, by about 21 %. On the other hand, EU-27 gains from an FTA with India do not change substantially, but one of the countries that would have benefitted the most – the UK – is not a party to the deal anymore. Some EU Member States would gain more with Brexit than without Brexit from an EU-India FTA (this does not mean that they are gaining from Brexit in general). For example, Germany would see larger gains from the FTA since it would face smaller competition from UK competitors in the Indian market, e.g., for automobiles. Other countries would lose, one such example being Luxembourg, which offers financial products that are complementary to those provided by the UK (e.g. depository services) (Felbermayr et al., 2017b).

# 4. What is excluded from the scope of the model

### 4.1.1. More on non-tariff measures

As emerges from both Gallina et al. (2020, in the Annex) and Felbermayr et al. (2017b), different extents of reduction in NTMs strongly affect the results in terms of welfare impacts. The previous Section and the study in the Annex adopt a cautious approach of a 3 % reduction of trade costs due to NTMs, consistently with Anderson and van Wincoop (2004), Decreux and Fontagné (2013), and with the estimates on the impact of Brexit on NTMs done by Dhingra et al. (2017).

The main categories of NTMs usually considered are TBT, SPS and other technical measures. They may have implications on trade and, as indicated by Nilsson (2018), these implications can be the following:

- companies having to comply with requirements (which implies costs);
- a ban applied on certain products, implying supply shifting towards other products;
- mandatory disclosure of information to consumers, which may affect demand;
- aspects that horizontally affect trade costs and may be addressed through trade facilitation instruments.

Still, two caveats are to be made here. First, NTMs are inherently 'qualitative' and treating them – as models inevitably have to – as tariff-equivalents (i.e. translating them 'as if' they were tariffs) has important limitations. Second, they comprise a very vast range of issues that have several non-trade implications.

Critics of a strongly trade-centred approach to NTMs argue that NTMs are not necessarily designed to restrict or to encourage trade but to address non-trade regulatory objectives such as product safety, environmental protection, national security or intellectual property protection (De Melo and Nicita, 2018). If, on the one hand, some scholars argue that eliminating regulatory differences among nations reduces the transaction costs of trade, others criticise the idea that more demanding regulatory standards abroad than at home can be defined as 'non-tariff barriers', since they apply to both national and foreign companies (e.g. restriction on GMOs, Rodrik, 2018). Other authors argue that they do not always discourage trade: in some cases, by providing better information and improved trust, they may actually increase trade (de Melo and Nicita, 2018). Others, as Beghin et al. (2012), claim that many NTMs may indeed reduce trade, but they improve welfare in the presence of negative externalities (e.g. environmental or social effects) or informational asymmetries (e.g. quality and safety characteristics of products).

These are the reasons why scholars are reluctant to consider NTMs as trade barriers as a whole, since they may serve welfare and sustainable development purposes. As Hoeckman and Nicita (2018, p. 16) point out, 'policy coherence requires that trade facilitation efforts centre on reducing trade costs without undercutting the realisation of the social objectives that motivate the various NTMs that a country has put in place'. Accordingly, they consider trade facilitation programmes an important way forward, as a means to increase transparency and facilitate compliance, by minimising enforcement costs for traders. A clearly defined, transparent and non-discriminatory nature of measures (that is, they should apply to both national and foreign firms and products) are key elements to keeping the balance between the use of NTMs for development purposes and for

trade facilitation. Felbermayr et al. (2017b) indicate that both the EU and India have signed and ratified the WTO Trade Facilitation Agreement.[105]

The impact of NTMs on trade costs is likely to be stronger in cases of agreements between trade partners that are highly asymmetrical in terms of technological endowment and regulatory framework, but at the same time it may be costly for exporters from a developing country to comply with standards set in the importing country; therefore, scholars also indicate the relevance of international cooperation to support compliance in developing countries. As de Melo and Nicita (2018) point out, international cooperation and rules on NTMs generate benefits not just in terms of economic gains, but also in terms of environmental sustainability and global social policy.

More broadly, scholars point out that, since the deep inclusion of NTMs in trade agreements became a trend, the impact of FTAs has been more difficult to estimate: if in regards to tariffs the economic literature is able to provide indications on welfare-increasing changes, when NTMs become the focus of attention, assessment becomes more subjective and is rooted in the different national systems (Rodrik, 2018). The trade-creation effect, according to Rodrik, is no longer a parameter that allows making a clear-cut decision on these matters. This moreover leaves space for rent-seeking behaviours and the representation of special interests in trade negotiations, which can be both on the import-competing side and on the export side (although Rodrik argues that in modern negotiations, the second plays a major role).

A case in point, where striking a balance between different needs is a complex matter, are intellectual property rights. In its 2018 Trade and development report, Unctad underlines the fact that large transnational corporations that dominate international trade, benefit from 'intangible barriers to competition' (p. 54),[106] that indeed lower the survival rates of new and smaller entrant firms.

The 2020 European Commission 'Report on the protection and enforcement of intellectual property rights in third countries'[107] classifies India as a 'priority 2' country, i.e. belonging to a category of countries where 'serious systemic problems have been identified in the area of IP protection and enforcement ... causing significant harm to EU businesses'. At the same time, the report indicates progress on the Indian side, including the launch of an IPR dialogue agreed in July 2019. The EU-India Intellectual property cooperation project, managed by EUIPO,[108] is working in the direction of improved facilitation of procedures.

The report indicates that IPR protection in the Indian pharmaceuticals sector is particularly problematic; at the same time, pharmaceuticals are the very area where IPR protection has to go hand in hand with other needs, i.e. the right of access to medicines, especially in countries where poverty rates are high.[109] At the time when trade negotiations between the EU and India were ongoing, international civil society organisations did indeed point out that that an excessive IPR protection may increase prices of medicines in India and in low-income countries (by creating problems for the generic pharmaceuticals[110] that Indian companies develop and sell all over the developing world, as mentioned in Section 2.2.2). Some accounts highlight the risk of pressure by businesses to increase IPR protection, while allowing for data exclusivity protection measures

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105 The WTO Trade Facilitation Agreement, https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm, entered into force in 2017.

106 https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2227

107 Report on the protection and enforcement of intellectual property rights in third countries, Staff Working Document, European Commission, 8 January 2020.

108 https://www.ipc-eui.org/

109 https://www-cdn.oxfam.org/s3fs-public/file_attachments/bp-trading-away-access-medicines-290914-en.pdf

110 https://blogs.oxfam.org/en/blog/12-02-09-eu-india-free-trade-agreement-it-end-world-we-know-it/

(Eberhart and Kumar, 2010). The European Parliament intervened on the subject of IPR as it applies to pharmaceuticals in a 2017 resolution[111] calling for a restriction of the possibility to apply 'data exclusivity' in order to favour greater access to medicines.

### 4.1.2. Inequality and distribution of gains from trade

The model used in the previous Section is silent about the distribution of the expected gains from trade and therefore the impact of a possible FTA on inequality. The channels through which trade liberalisation can affect inequality are multiple and this Section examines some of them. Other channels that are not included here but may be equally relevant, are taxation and distribution across sectors (the latter is addressed in Section 4.1.3 from the employment perspective).

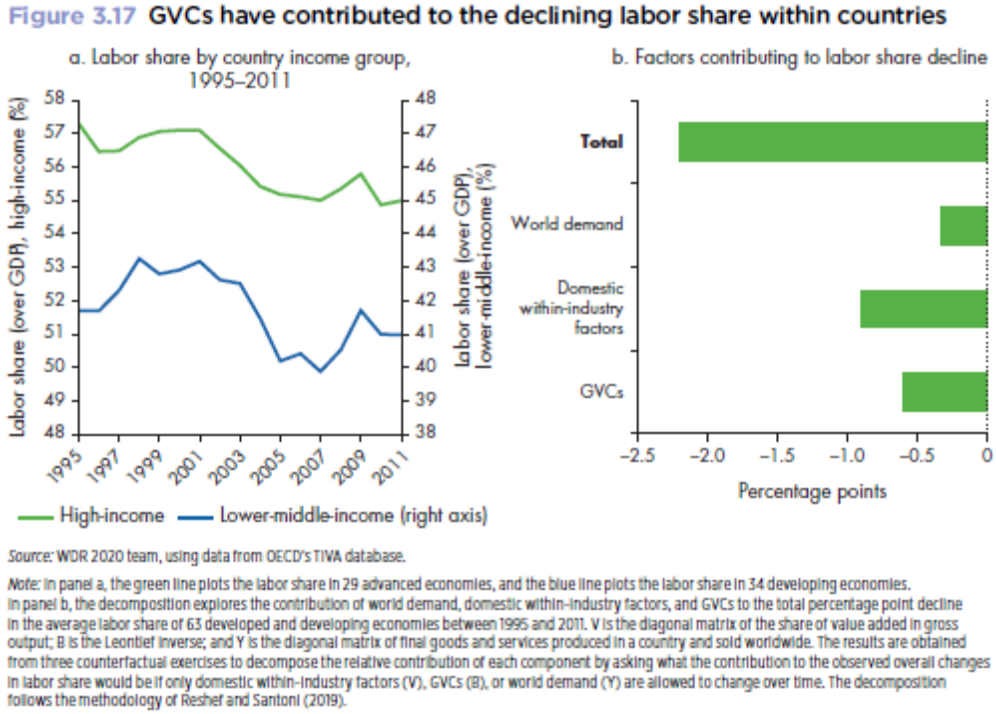
As indicated by Pavcnik (2017) and the World Bank (2020), while not usually considered the main driving factor behind inequality, trade may actually increase it, depending on the context. The angles that are explored in this Section are:

- inequality between factors of production;
- distribution among heterogeneous consumers via expenditure and price effects;
- distribution across wage and skill levels;
- gender inequalities.

The model does not allow to observe any **distributive effects between the factors of production** because it assumes that labour and capital shares of income are constant. On the other hand, we know that labour share in national income has been declining in most countries in recent decades. The extent to which this is related to trade liberalisation is highly discussed. One of the most recent contributions on this subject is the World Bank's 2020 World development report, which ascribes to integration in global value chains a little more than one fourth of the labour share decline worldwide (which has been of about 2 percentage points overall). The left panel of Figure 26 provides an overview of the decline in labour income relative to total incomes and highlights that this trend has been stronger in high income countries.

[111] European Parliament resolution of 2 March 2017 on EU options for improving access to medicines (2016/2057(INI)); see also M. Latek, L'accès aux médicaments dans les pays en développement, briefing, EPRS, European Parliament, 2016.

Figure 26 – Decline in labour share of income and the contribution of GVC



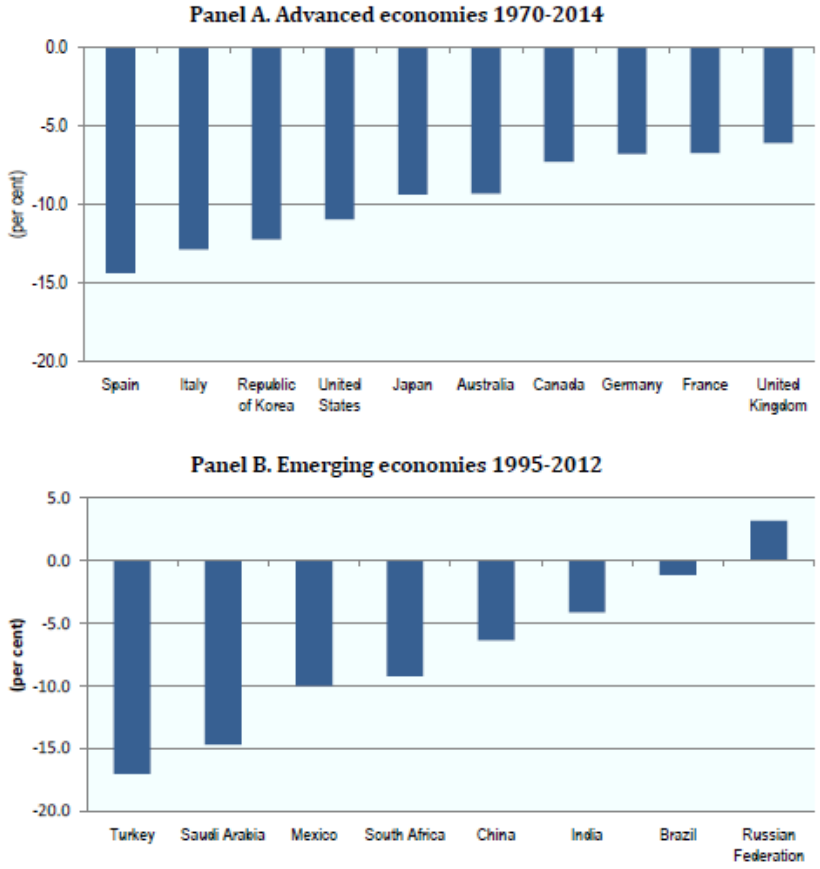

Source: World Bank (2020).

This observation has been confirmed by the OECD (2015),[112] which found a decrease of labour share in almost all G-20 economies, with different magnitudes. In particular, between 1995 and 2014 India experienced a decline of a bit less than 5 percentage points in this regard(Figure 27).[113]

[112] OECD and ILO, (2015), The Labour Share in the G20 economies, Report prepared for the G20 Employment Working Group Antalya, Turkey, 26-27 February 2015.

[113] The decrease in high-income countries is bigger, but it has to be noted that it is measured over a longer period of time.

Figure 27 – Decline in labour share in some of the G-20 economies

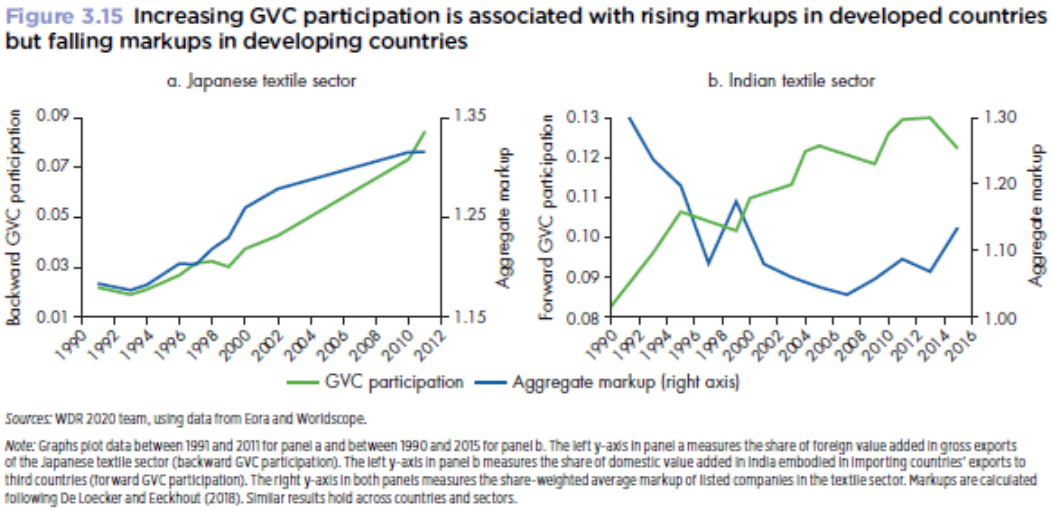



Source: The OECD and the ILO, The Labour Share in the G-20 economies, 2015. Change in the adjusted labour share. Data are from the ILO, based on the AMECO database and the ILO databases.[114]

The World Bank report argues that one of the mechanisms connecting integration in global value chains to a decrease in the part of national income that goes to labour is the increased mark-ups for firms: 'profits are rising, and the labour share is falling [...] It may be that producers are not passing on their cost savings to workers, as well as to the consumers' (p. 86). It has to be noted that this is the case especially for firms in high-income countries, while mark-ups for suppliers in developing and emerging economies appear to decrease as their economies integrate in GVCs. Figure 28 shows the difference between firms in the Japanese and the Indian textile sector: the former shows a positive correlation between integration and firms' profits, while the latter does not.

[114] Exceptions: Republic of Korea (1991-2014), Saudi Arabia (2002-2009), Turkey and Mexico (1995-2014), South Africa (1995-2013), and Brazil (1995-2009). Data refer to the adjusted labour income share except for China and the Russian Federation, where the unadjusted labour income share is used. Data for Argentina and Indonesia are not available. For periods prior to 1991, the adjusted labour income share in Germany refers to Western Germany (OECD and ILO, 2015).

Figure 28 – GVC participation and firms' mark-ups




Source: World Bank, World develpment report, 2020.

Another channel through which trade liberalisation affects inequality is the **relative change in prices that have different effects on consumers**. The problem raised, among others, by Nigai (2016), is that most trade models are based on the assumption of an 'average representative consumer'. The author demonstrates that this simplifying assumption overestimates the gains from trade for poor consumers and underestimates the gains for rich ones. This distortion is stronger in developing countries with low average income and high-income inequality. In the case of India,[115] gains under these simplifying assumptions are overestimated for the poorest 40 % of the population and underestimated for the top 40 %.

Another study, carried out by Fajgelbaum and Khandelwal (2016), analyses the potential effect of trade on inequality via a price effect. The study overall finds that trade benefits relatively poor consumers, but that this effect is not found in countries that specialise in low income-elastic goods, such as India.

Regarding the distribution of gains among workers of **different wage levels**, theory would have predicted that in developing countries, low-skilled workers would benefit more from an increase in trade than high-skilled workers. Nevertheless, according to more recent empirical literature, this prediction is not supported by sufficient evidence (Pavcnik, 2017, World Bank, 2020). In the case of trade associated to global value chains, processes outsourced to lower-income countries are considered skilled labour-intensive when compared with the outside opportunities of workers (World Bank, 2020). Overall, the expected low-skilled-wages increase in developing countries has not been observed in the waves of liberalisation of the past decades, or, at least, it has been very context specific. In the case of India, Pavcnik (2017) indicates that, after the wave of liberalisation in the 1990s, increased import competition reduced demand for labour so that the more exposed rural areas experienced a relative decline in wages both in agriculture and in industries in the liberalised sectors.

According to Helpman et al. (2017), inequality may also increase between firms operating in the same sectors depending on whether they participate or do not participate in international trade. This, together with a greater increase in high-skilled wages relative to low-skilled ones, may generate regional disparities in the distribution of gains. On the Indian side, this brings more gains to urban areas, especially if liberalisation occurs more in the service sector (Ecorys et al., 2009). Partly

[115] According to estimates illustrated in Table 5 in the study carried out by Nigai (2016).

correlated with trade openness – in the context of global value chains – is FDI inflow (which is not addressed in this study): according to Felbermayr et al. (2017b), this is actually very unequally distributed in India, where almost half of FDI is concentrated in Mumbai and New Delhi.[116] On the EU side, regional disparities may be more related to gain distribution across sectors (see Section 4.1.3 and Ecorys et al., 2009). The 2009 sustainability impact assessment made for the European Commission also underlined that negative effects on SMEs may occur.

Regarding **gender inequalities**, the World Bank World development report 2020 indicates that, on what concerns global value chains, firms tend to employ more women than other firms, but women are generally in lower value-added segments of the value chain, mostly in labour-intensive production jobs and in occupations that require lower skills and pay less. Banerjee and Veeramani (2015) analyse whether the 1990s trade liberalisation reforms in India led to an increase in women's labour participation. Observing 1998-2008 data, the authors first of all establish that women's employment in formal manufacturing in India is quite low (11 %), but that it is higher in industries that are unskilled, labour intensive and export oriented. The authors find that import tariff rates have a negative impact on the 'female employment index' (FEI)), supporting the hypothesis that firms, when exposed to international competition, tend to reduce costs by substituting men with women workers. Some scholars have raised the concerns that these patterns risk locking women in low-paid and casual jobs because firms exploit the 'comparative advantages of women's disadvantages' (Arizpe and Aranda's 1981). Still, according to Banerjee and Veeramani the increase in women's employment has not generated a substantial shift in this regard (the authors attribute this partly to the counteracting effect of the inflow of foreign technology).

### 4.1.3. Unemployment and labour market issues

As mentioned, when presenting the model in Section 3.1.1, one aspect that is left out of the analysis in the previous chapter are employment dynamics and the labour market. First, all increase in production is assumed to translate entirely into wages and, second, the movement of workers from contracting to expanding sectors is assumed to be frictionless.

Several models used to analyse trade share these characteristics, by making the neoclassical assumption of equilibrium on the labour market. Still, by observing some sectorial changes it is possible to have an idea of the adjustment costs. Since in the real world these processes are never frictionless, it is relevant for policy purposes to understand what sectors, areas and workers will need more support to face the shift without welfare losses.

Despite expectations that the overall employment effect in the EU will be very small (Ecorys et al., 2009 and Felbermayr et al. 2017b), changes can indeed be significant at the sector level. According to Felbermayr et al. (2017b), an increase in employment is expected in the following sectors: motor vehicles, machineries and equipment, chemicals, minerals and metals. Those that are expected to lose employment are the services sector, the textile and apparel sectors and the public administration and service sector.

In the framework used in this study and using the results on trade flows from the previous chapter, it is possible to identify the sectors where exports relative to imports are expected to increase or to decrease (the change in the trade balance of the sector). This is an imprecise measure of the overall performance of the sector and one cannot automatically infer from this what the effect on employment would be. Still, it can give the idea of the extent of redistributive intervention that would be needed.[117]

[116] Data from 2014-2015, Felbelmayr et al. (2017b), p. 28.

[117] This is obtained by summing up the changes in exports and imports by sector illustrated in Figure 23 and Figure 24, in order to obtain the expected change in extra-EU trade by sector.

The sectors where a negative effect on the trade balance is expected are, in particular, crops and animals, mining, food, beverages and tobacco, textile, apparels and leather, coke and refined petroleum, pharmaceuticals and tradeable services. In some cases, the expected changes in intra-EU trade will have an amplifying effect via trade diversion (e.g. textiles) or a reducing effect, via trade creation (e.g. services). On the other hand, sectors like electrical equipment and basic metals are expected to expand.[118]

This is relevant to making a comprehensive assessment of the Cost of Non-Europe in the field of international trade: if these changes in trade by sector translate into job displacement, they will have localised impacts that will occur across the EU; therefore, the redistributive action needed to minimise the social costs may occur for efficiency reasons at the EU level.

An example of the tools used to address such imbalances experienced by the EU is the European Globalisation Adjustment Fund (EGF).[119] According to the number of lost jobs indicated by Felbermayr et al. (2017b), and the EGF funds magnitude, it appears that the annual EGF funds expended per worker may be about €750; despite this being a rough estimate, it may indicate the need to increase the budget for this tool.

What concerns the Indian side, the sectors in which employment is expected to increase are business services, textile and apparel, while employment is expected to decline especially in the motor vehicles and public administration sectors (Felbermayr et al., 2017b). Both past impact assessments of a potential FTAs done by Ecorys in 2009 and Felbermayr et al. in 2017 underline that job displacement is expected to be greater in India than in the EU; in the long run, the overall impact on jobs is expected to be positive, but not in all sectors. This suggests that a redistributive action would be needed also on the Indian side.

According to the sustainability impact assessment made by Ecorys et al. (2009), the effect of an EU-FTA on labour standards and working conditions in the EU is expected to be insignificant, while for India this effect is uncertain. On the one hand, increased integration may lead to higher standards being introduced, while, on the other hand, higher demand may fuel sectors where labour protection is weak, especially in contexts where the informal economy plays an important role.

India is committed to the fundamental principles of the ILO, but it still has not ratified two of the eight core ILO conventions.[120] The six that have been ratified include, since 2017, the Minimum Age Convention that sets the minimum age limit at 14 years and the Worst Forms of Child Labour Convention. The two core conventions that India has not ratified are the Convention on Freedom of Association and Protection of the Right to Organise and the Right to Organise and Collective Bargaining Convention. The 2009 SIA (Ecorys et al., 2009) indicates that implementation of social standards varies a lot and, as Gupwell and Gupta (2008) underline, while India has active unions and social dialogue, major forms of discrimination are still present, including because of the enduring caste system.

According to the ILO Decent work country programme 2018-2022,[121] the three key aspects to be addressed on the Indian labour market are: the unexpected decline and low level of female labour force participation; the persistence of informality, also driven by new forms of employment in the formal sector; and the slow rate and regional imbalance in job creation (especially driven by the

[118] The impact on employment is further complicated by the global value chain integration. According to Eckhardt and Poletti (2016), EU import-dependent firms are expected to gain more from FTAs with Asian countries. This means, on the one hand, that an increase in imports may not be a good measure of impact on employment and, on the other hand, that firms having outsourced labour-intensive production segments may gain more from the agreement.

[119] https://ec.europa.eu/social/main.jsp?catId=326

[120] https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691

[121] ILO, 2018, India. Decent Work Country Programme (2018 – 2022).

smaller role for manufacturing in comparison to other industrialising economies). The low share of employment in manufacturing as well as the limited extent of formal employment can be seen in Table 10 below.

Table 10 – Main labour market indicators in India

**Key indicators – India's economy and labour market in a snapshot**

| Macroeconomic | 2007-11 (av.) | 2012-16 (av.) | 2016 |
|---|---|---|---|
| GDP growth rate (%) | 7.8 | 6.9 | 7.1 |
| GDP per capita, PPP (const. 2011 international $) | 4,115.20 | 5,427.60 | 6,092.60 |
| Inflation (%) | 9.3 | 7.3 | 4.9 |
| Labour market | 2004-05 | 2009-10 | 2011-12 |
| Labour force participation rate (%) | 63.7 | 57.1 | 55.9 |
| Male | 84.0 | 80.6 | 79.8 |
| Female | 42.7 | 32.6 | 31.2 |
| Unemployment rate (%) | 2.3 | 2.0 | 2.1 |
| Male | 2.1 | 1.9 | 2.1 |
| Female | 2.6 | 2.3 | 2.3 |
| Share of employment in manufacturing (%) | 11.6 | 11.0 | 12.5 |
| Male | 12.0 | 11.1 | 12.2 |
| Female | 11.0 | 10.8 | 13.2 |
| Share of regular wage and salaried workers (%) | 14.4 | 15.7 | 17.9 |
| Male | 17.3 | 17.8 | 19.9 |
| Female | 8.4 | 10.2 | 12.8 |
| Working poverty rate (%) | | | |
| <US$1.90 per day | 35.3 | 28.4 | 17.9 |
| >=US$1.90 & <US$3.10 per day | 36.5 | 37.5 | 35.0 |

***Source:*** *Macroeconomic - World Development Indicators databank; NSS 61st, 66th and 68th rounds, Employment and Unemployment Surveys, and Labour Bureau's 2015-16 annual employment-unemployment survey; ILO: Key Indicators of the Labour Market, 9th Edition (Geneva, 2015).*

Source: ILO Decent work country programme 2018-2022.

Another ILO tripartite committee recommendation to India concerns the enforcement side with a special focus on labour inspections. As underlined in an exchange of views at the European Parliament,[122] the main ILO recommendations to India in this regard are to improve labour inspectorates, to increase their resources and to give full power to unannounced inspections to initiate legal procedures. A very recent issue concerning the Indian labour market that has attracted a lot of criticism is the suspension of some labour laws in certain states,[123] supposedly to mitigate the crisis triggered by the coronavirus pandemic. The trade unions may approach the ILO on this issue.[124]

The ratification of all eight core ILO conventions is usually considered one of the pillars of the social chapter of an FTA. This plays a major role, since ratification is the mechanism that allows regular assessments by the ILO, even if the latter is not a sanctioning body and issues are subjected to political dialogue.

Another issue that may allow the FTA to leverage social rights is the negotiation on services liberalisation and movement of workers (Wouters et al., 2014). In the FTA negotiations, India

[122] Exchange of views with Karen Curtis, branch chief from the ILO NORMES Department, January, 2020.

[123] https://timesofindia.indiatimes.com/india/major-labour-laws-suspended-in-up-for-3-years/articleshow/75624732.cms

[124] https://economictimes.indiatimes.com/news/economy/policy/central-trade-unions-may-approach-ilo-on-labour-laws-suspension-in-some-states/articleshow/75675621.cms

negotiated for Mode 4 services liberalisation (movement of professionals), which is consistent with the need of jobs for a growing and skilled population. The European Economic and Social Committee[125] has expressed concern over the working conditions of these service providers temporarily residing abroad. Wouters et al. (2014) underline that in the Doha Round negotiations, the EU had accepted Mode 4 openness provided that it occurred under EU working conditions, collective wages agreements and minimum wages. Wouters et al. (2014) argue that both development goals in EU FTAs and the promotion of social standards would suggest not to exempt India from these rules in an FTA framework, but on the contrary, to encourage and support its compliance with these rules. This may have an expansionary effect on trade as well as counteract the risk of declining labour conditions because of the FTA. According to Gupwell and Gupta (2008), India appeared to resist to the inclusion of social standards, not because of a reluctance to social standard per se, but because of the political sensitivity to being pressured on these issues.

### 4.1.4. Development and poverty reduction

Despite the fact that India has enjoyed very substantial rates of growth in recent decades, its per capita income is more than six times lower than the EU's[126] and, despite important improvements, the number of people living in poverty is high(see Section 2.1). An FTA has therefore to take into account the specific risks that are present when it takes place between such asymmetric partners (see also Powell, 2008).

According to the 2009 SIA (Ecorys et al., 2009), the impact of an EU-India FTA is expected to have a 'moderate' pro-poor effect. This effect is calculated using a CGE model where the poverty line is endogenous and depends on the changes in income and prices due to the trade shock. In the short run, the reduction in the poverty headcount ratio (the number of people living below the poverty line as a share of total population) is expected to be between 0.13 % and 0.18 %, more due to a decrease in prices than to an increase in income. This effect is stronger in the long run, because the increase in income is expected to offset the increase in consumer prices (the decrease in poverty headcount ratio is expected to be 0.38-0.44 %). Poverty is expected to decrease both in urban and rural areas, but the distribution of poverty reduction differs between short- and long-run estimations. In the long run, by comparing their results to those of other studies, Ecorys et al. suggest that the most significant reduction in poverty is expected to occur in urban areas.

The abovementioned study quantifies poverty as the headcount of people living below the poverty line, and the study itself warns that people just above the line may be extremely vulnerable, e.g. to volatility of food prices. Something to bear in mind is that modern India has made big achievements in terms of headcount poverty reduction, while major challenges remain in promoting the conditions of people just above the poverty line. According to Table 10 above, indeed, while the proportion of working people living below the US$1.90/day line has been decreasing sharply since 2007, the proportion of working poor who earn between US$1.90 and US$3.10 per day has been roughly stable in the past decade, at around 35 %. As also mentioned in Section 2.1 above, Dang and Lajouw (2018) argue that, despite a rising income mobility, the large numbers who have exited poverty in recent decades remain vulnerable, and that structural factors have to be addressed to reduce poverty further, while growth alone may not be enough.

At the same time, as mentioned in Section 4.1.2 above, some authors, such as Pavcnik (2017), point to the fact that the wave of liberalisation in India in the 1990s, by leading to a decline in agricultural wages and in industries in the liberalised sectors, did not always reduce poverty in relative terms. Pavcnik contrasts India and Vietnam in this respect, to indicate that openness to international trade

[125] https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/role-civil-society-free-trade-agreement-between-eu-and-india

[126] https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=IN-EU

can have different impacts on poverty, and indicating that in Vietnam these results have been more promising than in India. Powell (2008) goes in the same direction, indicating some potential risks in terms of an adverse impacts on the poor. These are especially related to the liberalisation of some sensitive Indian sectors (agriculture, dairy and light manufacturing, such as paper, but also the auto-parts sector) and of the Indian retail sector and its concentration effects that risk to hit the poorest who work in the informal retail economy. As already mentioned in Section 4.1.3, the sectors that are expected to see increased employment are business services, textile and apparel, while employment is expected to decline especially in the motor vehicles and public administration sectors (Felbermayr et al., 2017b). While the increase in employment in the textile sector may have a pro-poor effect, the impact on the motor vehicles sector may have a negative effect (see also Powell, 2008).

A major aspect relevant to international trade agreements and development is the policy space that is left to governments in developing countries to support development policies, structural transformation and food security. As mentioned by Powell (2008), the restrictions to the scope of potential regulations that India may need for development purposes, e.g. in the public procurement sector, should be taken into consideration.[127] Similarly, according to Powell (2008) the liberalisation of the retail- and banking sectors may be sensitive from a poverty reduction and development perspectives. The liberalisation of the retail sector risks crowding out small shops that provide the livelihood of vulnerable people and increasing inequality among local producers that supply retailers. As regards the banking sector, the abovementioned report indicates that since the 1990s the Indian government has substantially liberalised the financial sector, but that this had negative effects on the share of loans going to SMEs and rural areas. The study recommends that regulations are established that ensure access to finance for the poor.

The Indian economy is characterised by a broad informal sector. The informal economy is usually very complex and diversified internally, but a lot of working poor often resort to its employment opportunities to complement their incomes. According to some scholars, trade liberalisation may have adverse effects on people employed in the informal sector via a price channel: informal workers have little wage indexation (they are not covered by any collective bargaining scheme) and are highly vulnerable to sudden changes in prices (Storm, 2011).

On the other hand, it is quite consistently upheld in the literature that trade liberalisation does not necessarily bring about a reduction in the size of the informal sector; together with formalisation processes, there are 'informalisation' ones. According to Harriss-White and Sinha (2007) – who extensively studied the Indian informal economy – also after the big reforms and liberalisation processes, there is evidence of a rapid expansion of the informal sector, as a permanent (and not 'residual') feature of growth processes. Though it provides a livelihood for a large number of low-skilled labour, it also poses the following problems: lack of social security and great wage disparity with the formal sector. Overall, several studies indicate that, while trade liberalisation reforms in India did not produce a decline in the informal sector, they did produce internal differentiation, with some firms and sectors growing and increasing productivity (Marjit et al., 2007, Nataraj, 2011).

An important element to be considered when analysing the impact of trade on development is the substantial share of the Indian population living in rural areas and their reliance on agriculture. In 2018, almost 66 % of Indians (compared to 25 % of people in the EU), live in rural areas.[128] That same year, the share of employment in agriculture was 44 % in India and roughly 4 % in the EU.[129] This means that the expected effect of trade liberalisation on agriculture is a major issue among the

[127] Powell (2008). This issue also emerged during the International Public Procurement Initiative event held in Brussels on 13 November 2019.

[128] https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?end=2018&locations=IN-EU&start=1990

[129] https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?end=2018&locations=IN-EU&start=1990

development implications of the FTA. According to Achterbosch et al. (2008), the consequences of agricultural trade liberalisation for India crucially depend on the extent of EU liberalisation, since India does not seem to benefit from own agricultural liberalisation. According to this simulation, a more pro-poor agreement leaves agricultural liberalisation at the *status quo* and liberalises the manufacturing sector. Similarly, Storm (2001) argues that a 'close' integration of the Indian agricultural market with the world markets may hurt the poor because of the risk of sudden increases in food prices.

Development and poverty reduction are closely related to social inclusion and human rights protection. Human rights protection is at the core of EU external policy; furthermore, EU-India relations are based on the fact that both are democracies and multicultural entities.

In 2011, the European Economic and Social Committee, [130] called for a serious scrutiny of the sustainable development chapter of a potential EU-India FTA, and especially called for 'an effective human rights clause in line with the EU's past practice and stated policy', while also recommending that a strong civil society monitoring mechanism of the FTA be established. In the two resolutions on the Free Trade Agreement adopted in 2009 and 2011, [131] the European Parliament stresses the need for a binding trade and sustainable development chapter, and the relevance of human rights protection and democracy as essential elements of the relationship between the EU and India. These resolutions explicitly mention therefore that dialogue on open issues, with special reference to Jammu and Kashmir, should be stepped up. According to some observers, the 2011 resolution had some impact on India-Pakistan diplomacy at the time. [132]

As mentioned in Section 2, a number of human rights-related aspects and risks of discriminatory policies have been raised by the Indian and international civil society and international organisations in the past few years, ranging from human rights monitoring in Jammu and Kashmir, to the most recent reform of the Citizenship Act. Concerning the former, after the withdrawal of Article 370 of the Indian Constitution – which had guaranteed Jammu and Kashmir a high degree of autonomy – the adoption of the Jammu and Kashmir Reorganisation Act and the arrests of a number of political leaders and activists, the then High Representative of the EU for Foreign Affairs and Security Policy met in Brussels with India's Foreign Minister and reaffirmed the EU's support for a peaceful solution to the crisis, while also stressing the importance of steps that needed to be taken to restore the rights and freedoms of the population in Kashmir. [133] Concerning the Citizenship Amendment Act, the European Parliament had scheduled a vote on a resolution on the issue in March 2020, which was postponed.

### 4.1.5. Environmental issues

The entire south Asian region is threatened by climate change and India is at the core of this trend: it ranks 5th in the latest global climate risk index [134] developed by Germanwatch and referring to 2018. That year, it was the world's most affected country in terms of casualties related to extreme weather.

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130 https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/role-civil-society-free-trade-agreement-between-eu-and-india

131 European Parliament resolution of 26 March 2009 on an EU-India Free Trade Agreement (2008/2135(INI)) and European Parliament resolution of 11 May 2011 on the state of play in the EU-India Free Trade Agreement negotiations.

132 https://www.bilaterals.org/?eu-parliament-resolution-on-the-eu&lang=es

133 E. D'Ambrogio, India-administered Kashmir: current situation, briefing, EPRS, European Parliament, 2019.

134 D. Eckstein, V. Künzel, L. Schäfer and M. Winges, 2019, Global Climate Risk Index 2020. Who Suffers Most From Extreme Weather Events? Weather-related Loss Events in 2018 and 1999 to 2018, Germanwatch.

There are other environmental concerns as well. Air quality in Indian cities has been deteriorating. Greenpeace's 2019 World air quality report[135] points to a very serious situation in terms of air pollution: 21 out of the top 30 most polluted cities in the world are located in India. Other sources (D'Ambrogio, 2019b) draw attention to the environment's strong impact on health indicators. A 2016 study shows that particulate pollution shortens the average Indian's life expectancy by more than four years relative to what it would be if World Health Organization (WHO) air quality guidelines were met.[136] This is also related to poverty, since a large part of the Indian population cannot afford cooking systems other than those based on burning biomass (i.e. charcoal, wood, etc.) which are polluting and damaging for the health (D'Ambrogio, 2019b).

Deforestation and forest degradation is another major issue, as stated in the Indian parliament (D'Ambrogio, 2019b) after the issuance of the 2019 India State of the forest report.[137] While the report highlights an overall increase in forest cover with respect to the 2017 report, this improvement seems highly unequally distributed, since a decrease is still ongoing within the recorded forest areas in tribal districts and in the north-eastern regions.

Water pollution and waste management are other major challenges. Untreated sewage that ends up in rivers and lakes can reach 60 % in urban areas (D'Ambrogio, 2019b); moreover, heavy metals pollution in rivers is high, including in the Ganges River (*Ganga*, which is the Hindus holy river, is where many people bathe daily). The depletion of clean water reserves after years of draught is confronting India with a major water crisis, according to a report from a government think tank.[138]

In the past two decades, India has put in place several policies to face environmental issues. In 2008, it released its first National plan on climate change.[139] Moreover, India is committed to the Paris Agreement and is on track to achieve the goals set under this framework (D'Ambrogio, 2019b). Other measures are taken, especially to tackle air pollution, water pollution and issues specific to urban areas, such as mobility (D'Ambrogio, 2019b). After the EU-India 2016 summit, two joint declarations were issued: on a water partnership[140] and on climate and clean energy;[141] in their framework, the EU supports projects on solar and eolic energy (D'Ambrogio, 2019b). The EU supports actions aimed at achieving sustainable urbanisation[142] and resource efficiency.[143]

How this situation and policies relate to trade is a complex, yet relevant, debate, and it is difficult to quantify the impact of an EU-India FTA in terms of its environmental dimensions. Consumption-based accounting of CO2 emissions shows that production-based accounts do not properly consider the international trade dimension of emissions. A substantial part of CO2 emissions is traded internationally, mainly from emerging economies to richer countries, where consumption takes place (US, Japan and Western Europe).

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135 Greenpeace, 2019 World Air Quality Report 2020.

136 Air Quality Life Index, India Fact Sheet 2019.

137 Status of Forests in India, Rajva Sabha, Department-related Parliamentary Standing Committee on Science and Technology, Environment and Forests, 12 February 2019.

138 NITI Aayog, Composite Water Management Index. A tool for Water Management, 2018.

139 Government of India, National Action Plan on Climate Change.

140 https://www.consilium.europa.eu/media/23672/20160330-joint-declaration-iewp.pdf

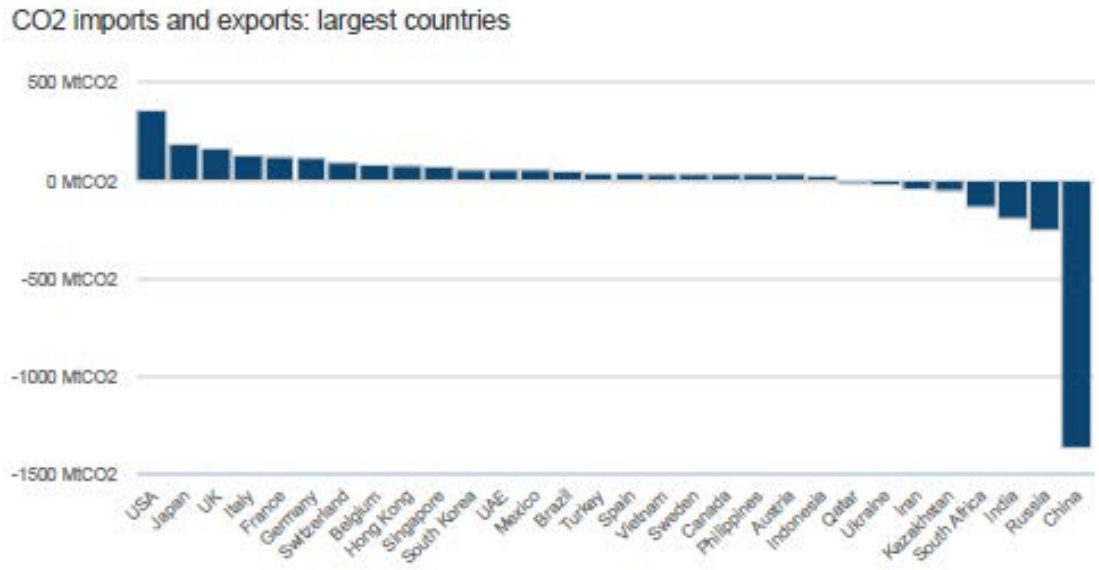
141 https://www.consilium.europa.eu/media/23673/20160330-joint-declaration-energy-climate.pdf

142 https://www.consilium.europa.eu/media/23518/eu-india-joint-declaration-partnership-smart-and-sustainable-urbanisation.pdf. On 19 September 2019, during the first India-EU Urban Forum and the first Joint Working Group on Sustainable Urban Development, the EU and India agreed on a Joint Action Plan 2019-2020 on Smart and Sustainable Urbanization.

143 https://eeas.europa.eu/delegations/india/50296/eu-and-india-closetheloop-circular-economy-better-tomorrow_en

India is one of the world's major exporters of CO2 emissions embodied in trade, after China and Russia (see Figure 29). By looking at the per capita emissions indicators, India ranks substantially lower.[144] After the world's top importers of CO2 emissions – the US, Japan and the UK – , the top three EU countries in this respect are Italy, France and Germany. On a per capita basis, the more affluent and less populous Western European countries rank at the top.[145] Davies and Caldeira (2010) go into greater detail, using 2004 data: what is especially high in emerging economies is the carbon intensity of trade[146] and especially the carbon intensity of exports rather than imports. As Davies and Caldeira (2010) point out, India in particular (but also other emerging economies in general) contributes to both consumption and production of emissions to a smaller extent than it contributes to the global population, while the opposite is true for Western Europe and the US, which contribute more to emission production and consumption than to the global population.

Figure 29 – CO2 emissions embodied in trade




Source: Carbonbrief, Based on data from the Global Carbon Project, 2017.

In this framework, an increase in trade volumes may deteriorate the environmental parameters unless specific provisions are taken. The sustainability impact assessment (Ecorys et al., 2009) indeed warns against some possibly negative environmental impacts of an FTA in India (while an overall small effect is expected in the EU). Regarding a less localised effect, i.e. the impact on the atmosphere, the study argues that the effect can be moderately negative because of increased textile production in India (chemicals dispersed), even if this may be mitigated by a greater expected increase in the apparel sector, which is more labour intensive and less polluting than the textile sector. Increased textile trade and production can also have negative effects on the quality of water and consequently on biodiversity. Increased use of fertilisers is expected to have a negative impact both on the atmosphere and on the quality of the land. An increase in maritime transport is expected due to an increased trade in grains; this will have polluting effects, albeit smaller than air transport. Increased trade flows in the services sector can have a negative impact on the atmosphere both via energy consumption and via greater use of electronic equipment. This may also lead to a greater disposal of electronic waste. Another reason why India's waste management can be put under

144 http://www.globalcarbonatlas.org/en/CO2-emissions

145 According to Davis and Caldeira (2010), a consumer in Western Europe imports as many emissions as are exported by 5-10 people in China (p. 5 689).

146 The product of CO2 emissions per unit of energy and energy consumption per US$ of trade.

pressure is the trade in waste per se, which has already substantially increased from the EU to the country.[147]

A potential FTA should take into account the above negative external effects. On the positive side, there is evidence that collaboration on environmental issues and in tackling climate change can lead to good results. Climate change, being a global public good (or 'public bad') implies clearly a cost-of-non-collaboration. The collaboration in this direction between two economic entities that are important in terms of population, GDP, and emission content of trade (from export vs import side) is therefore particularly relevant.

[147] https://www.euronews.com/2019/03/12/where-does-the-eu-export-most-waste-outside-the-bloc

# 5. Conclusion

As mentioned in the introduction of this study, economic cooperation and trade between the EU and India are central issues, given that the two partners are major players in the international economic and political arena.

As regards trade, India is the 9th commercial partner for trade in goods for the EU; it became 10th since the UK entered in the ranking as a separate country after Brexit. Both imports from and exports to India account for about 2 % of the respective totals for the EU. The EU is a more relevant partner for Indian trade: in terms of overall trade, the EU ranks first among India's partners with a value of trade in goods that is 13 % of the total (about 11 % after Brexit).

Since 2004, the EU and India are strategic partners, and in 2007 they started negotiations on a broad-based trade and investment agreement. These reached a deadlock in 2013 around a number of unresolved issues that are examined in Section 2.2.2. Nevertheless, cooperation between the two partners is ongoing. According to analysts (Lannoo and Benaglia, 2019), the two countries share a common interest in a rule-based multilateral trading system, therefore scaling up their cooperation is relevant for both sides. In this direction, in 2018, the EU adopted a strategy on India, aimed at reinforcing the strategic partnership, with a focus on sustainable modernisation and a collaboration towards multilateralism. This document again puts the negotiation of a trade agreement in the spotlight, in the framework of this broader collaboration.

Even if trade barriers remain,, trade costs between the EU and India have decreased substantially in recent decades, especially after the significant wave of trade liberalisation in India since the 1990s. Tariffs have dropped below 15 % in most sectors in India, although they may get to high levels in some sub-sectors.

The present study provides an estimate of the **potential effects of an FTA** that partly liberalises trade between the EU and India, both on welfare and on trade volumes, for both partners.[148] The model used belongs to the group of new quantitative trade models and measures changes with respect to baseline data in 2014, comparing – in a static way – a hypothetical situation where an FTA is in place, with a counterfactual where there is no FTA. In the model, demand for goods and services is defined by a structural gravity equation, which links trade flows to country-specific characteristics and bilateral trade costs between countries. The main mechanism assumed by the model is the following: the reduction in trade costs due to the FTA lowers the prices of foreign goods and services for consumers and increases their demand. Countries increase (or decrease) their production to satisfy the change in the demand for their goods and services. An increase in production is assumed to translate into higher real income (via wages), which is used to increase expenditures on goods and services from all countries worldwide. The main specification of the model takes into account a reduction in tariff revenues, which dampens the impact that an increase in income has on real expenditures.

The potential FTA is expected to help increase trade between the EU-28[149] and India: in the most relevant scenarios, exports from the EU-28 are expected to increase by about 52-56 %, while imports from India to increase between 33 % and 35 %. For the overall effect, including the changes in trade with other countries and intra-EU trade, at the sector level, more detail is provided in Section 3.2.2. Information on the disaggregation of the welfare effects by EU Member State is provided in Section 3.2.1.

[148] This study cannot be considered an impact assessment of scenarios that are actually negotiated; it is rather a modelling exercise of a stylised agreement.

[149] The UK is still considered part of the EU in the model.

Under the most relevant scenarios, the EU's gains from increased trade are **between €8 billion and €8.5 billion** (that is, a roughly 0.03 %[150] increase with respect to the baseline). A similar increase in absolute terms is to be expected on the Indian side, which represents a greater share of the initial welfare (about 0.3 %). These scenarios assume a heterogeneous decrease in bilateral import tariffs (in the more ambitious scenario, most sectors are expected to decrease tariffs by 90 %, while the crops and animals sectors by 40 %, and the and food, beverages and tobacco sectors, by 60 %). In both scenarios it is assumed that there will be a homogeneous and symmetric reduction of the ad-valorem-equivalent of non-tariff measures by 3 % for both goods and services.

Alternative scenarios provide lower figures when no decrease is assumed for NTMs, or if it is assumed that the FTA's effect on trade would be the effect of the 'average FTA'. The scenario where it is assumed that an EU-India FTA may have the same trade effect as the one between the EU and South Korea, but where the decrease in tariff revenues is not taken into account, provides a higher figure (a €11.6 billion gain for the EU, i.e. 0.045 %, and €13.1 billion gain for India, i.e. 0.43 %).

The estimates discussed here are consistent with previous studies and fall in the range of existing estimates (see Table 9). Less recent studies find smaller welfare impacts (and sometimes negative ones for India), usually assuming the completion of the Doha Round, thus assuming a more liberalised baseline scenario. The more recent among the other studies are more comparable with the present one and establish a larger effect, which is likely due to the modelled scenarios and some technical aspects related to the estimation of trade elasticities.

The model presented in the present study does not account for Brexit, which is of course likely to affect the potential gains of an EU-India FTA. This comparison with/without Brexit is made by Felbermayr et al. (2017b): in their analysis, Brexit lowers India's potential gains from an FTA with the EU by about 21 %. On the EU side, the effects are heterogeneous across Member States.

Some caveats about the quantitative analysis have to be underlined: it builds on an analysis of gains from trade deriving from a potential FTA between the EU and India, where foreign direct investment, potential costs in terms of inequalities or unemployment, the transition to the new equilibrium, the environmental consequences of the FTA, as well as any potential dynamic gains from trade, are left aside. Some of these aspects are treated in a qualitative way to afford a broader view of the major components of the Cost of Non-Europe, but not all of them could be addressed. Indeed, some policy-relevant elements that are not included in the model and may **represent possible side effects of trade liberalisation or policy areas different from trade that would nevertheless be affected**. These fall into the following domains:

- redistributive issues of gains from trade and impact on inequality;
- employment and social impacts;
- environmental impacts;
- development aspects and impacts on poverty.

A full picture of the Cost of Non-Europe in the area of international trade is indeed provided by the foregone benefits of potential gains from trade and by the costs incurred if a common strategy to address these related issues is missing.

One aspect about which the model is silent is how the gains from trade are distributed, and what would be the expected impact of trade liberalisation on **inequalities**. Looking at the academic literature and at India's experience during previous waves of liberalisation, it appears that the effects of trade liberalisation on inequality can be mixed and are not unambiguously pro-poor. They are indeed context specific. Trade liberalisation may affect inequalities on several dimensions, some of which are discussed in the study: inequalities between factors of production (labour and capital

[150] Using the weighted average among Member States.

share of national income – where recent years have seen a decline in the labour share in both high-income and emerging economies), among consumers across the income distribution, among workers across skill levels, and along the gender dimension.

Relatedly, the model does not tell how big the 'costs of adjustment' to the new equilibrium are expected to appear and how big they will be. An area with important benefits deriving from common action is the support to **employment** – e.g. via the Globalisation Adjustment Fund[151] – wherever jobs risk being lost due to changes driven by trade shocks. Some sectors are expected to face a net positive change in trade balance and others a negative one, when taking into account the change in trade with India and with the rest of the world. In some cases, these effects are amplified by expected changes in intra-EU trade, while in others they are reduced. Although we cannot assume that the trade balance is a direct indicator of the sector's economic performance, these changes may translate into employment effects that are local and capable of increasing or reducing territorial inequalities[152] at the EU level; given that international trade is an exclusive competence of the EU, several scholars have underlined that the EU 'should assume some budgetary responsibility for the economic displacement that globalisation entails.' (Claeys and Sapir, 2018).

Another source of foregone benefit in the absence of coordinated EU action are the costs associated with the lack of policy coherence; according to Article 208 TFEU, this means that 'The Union shall take account of the objectives of **development** cooperation [poverty eradication] in the policies that it implements which are likely to affect developing countries.' The impact of an FTA on poverty is difficult to predict. On the one hand, the 2009 SIA expected an EU-India FTA to have a 'moderate' pro-poor effect in India. On the other hand, some authors (Pavcnik, 2017) point to the fact that the wave of liberalisation in India in the 1990s did not always reduce poverty in relative terms. Moreover, the large share of rural population and of people relying on incomes from the informal sector are relevant characteristics that shape the vulnerability to price changes of part of the Indian population. Trade shocks can also have side effects on **labour conditions and the environment.** As regards the former, again, it is difficult to forecast an outcome, but some of the fragilities of the Indian labour market have been highlighted (while India has active unions and social dialogue, there are still cases of major discrimination, two of the eight ILO core conventions have not been ratified, and there are outstanding issues regarding the high number of working poor and the widespread gender inequality in the labour market). As for the latter, the risks of emissions embodied in trade is the main highlighted issue. Taking into account these aspects is both an issue of policy coherence and of gains from reducing coordination externalities related to global public goods, such as environmental and labour standards (Hoeckman and Nicita, 2018).

The benefits of avoiding a 'race to the bottom' and, conversely, of entering into a path of upward convergence in social and environmental standards, have important externalities and, from an economic perspective, display important gains from coordination. As indicated by Reddy (2015), across countries, labour and environmental standards are 'strategic complements': the higher these standards are in the trading partner country, the lower the cost (in terms of trading opportunities) is of maintaining these standards at home. There is indeed a gain from coordinated action aimed to reduce the incentives to lower these standards, as is also acknowledged in the European Commission's 2017 reflection paper on harnessing globalisation.[153]

[151] https://ec.europa.eu/social/main.jsp?catId=326

[152] The analysis in Section 4.1.3 indicates the expected effect by sector. The translation in terms of employment and in territorial effects is not addressed at this stage.

[153] https://ec.europa.eu/commission/sites/beta-political/files/reflection-paper-globalisation_en.pdf

In this regard, the Parliament[154] has demanded the inclusion of a sustainable development chapter in the EU-India FTA: an 'ambitious chapter which reflects the common commitment to promoting sustainable development and inclusive growth on the basis of shared values'. The debate on the effectiveness of TSD chapters in FTAs is broad and retracing it is beyond the scope of this work;[155] one of the elements of this debate is the enforceability of TSD clauses. In this respect, in its 2011 resolution the Parliament 'urges the Commission to include legally binding clauses on human rights, social and environmental standards and their enforcement, with measures in the event of infringement'. Human rights deserve a specific attention in this context, since recent developments have raised concerns on possible breaches in India, especially regarding the situation in Indian-administered Kashmir and the 2019 Citizenship (Amendment) Act.

To sum up, the Cost of Non-Europe in EU-India trade relations is larger than the gains from trade liberalisation and includes the foregone gains from a common approach to international economic cooperation, including a common approach to addressing the side effects of trade liberalisation on the distribution of the gains from trade, and increased coordination on the provision of global public goods (see Figure 30).

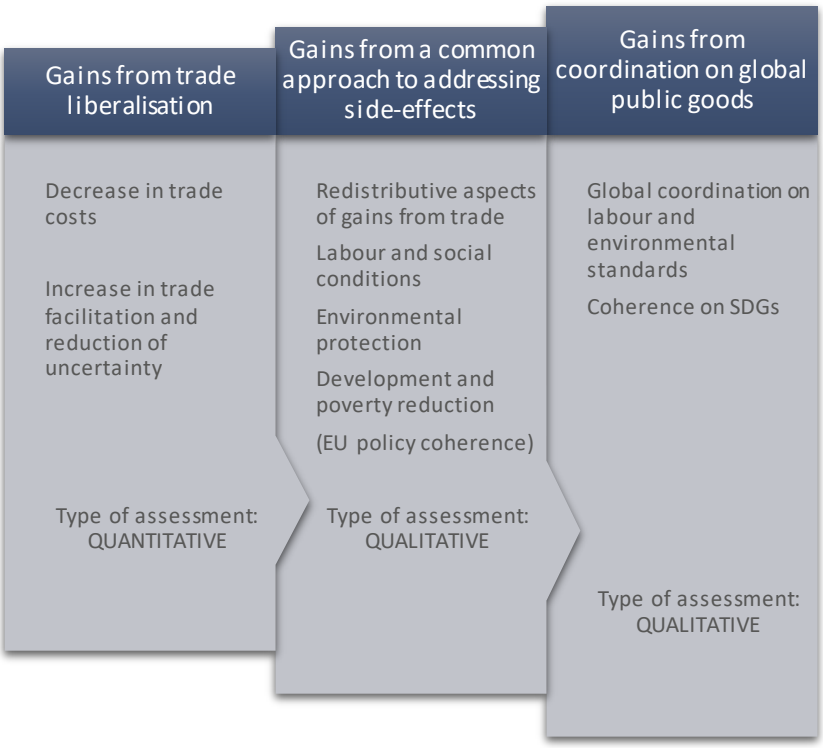
An aspect that is not explicitly treated in this study are EU-India relations in the context of the global value chain. This aspect nevertheless appears of major importance in the light of the coronavirus crisis, which has shown some major vulnerabilities of value chains to shocks. This has been especially relevant in the case of pharmaceuticals and medical supplies, the former being very relevant for India.[156] This can be considered an area where coordinated governance action at the international and multilateral level may produce further coordination gains.

[154] European Parliament resolution of 11 May 2011 on the state of play in the EU-India Free Trade Agreement negotiations.

[155] See, for example, a Policy Department for External Relations workshop report and an ex-post assessment in the case of Central America.

[156] https://www.ft.com/content/c30eb13a-f49e-4d42-b2a8-1c6f70bb4d55

Figure 30 – Summary of foregone gains from the absence of EU coordinated action in EU-India trade relations




Source: author's elaboration.

Moreover, the relevance of a broad approach to cooperation between the EU and India is also at the basis of the 2018 EU strategy on India, and is underlined by the shared commitment to multilateralism. Several successful initiatives have been put forward until now, as underlined in Section 2.2, in the broad field of economic cooperation. In this regard, most analysts identify a lack of a unified EU voice. India does not see the EU as a single player in the geopolitical arena (Sachdeva 2015, Lannoo and Benaglia, 2019[157]). According to Lannoo and Benaglia, this lack of a single voice beyond trade has the consequence that the Indian administration focuses its attention more on Member States than on the EU and this hinders the potential of the EU-India strategic partnership.

[157] https://www.ceps.eu/could-the-eu-and-india-jointly-shape-the-world/

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Annex

# Assessing the potential impact of an EU-India trade agreement

## Analysis of the Economic Impact

This research paper estimates the expected benefits from a trade agreement between the EU and India. Our analysis uses a new quantitative trade model to simulate the impact of a reduction in tariffs and non-tariff barriers induced by the agreement on trade flows and real consumption. Overall, our simulations show a limited impact of an EU-India trade agreement: we find an impact ranging between 0.0117% and 0.0276% as an average gain in real consumption for the EU, and 0.1258% to 0.3011% for India. In euro terms, the total increase in real consumption for the EU is between €3 676 and 8 540 million. We find comparable results for India, ranging from €3 749 to €8 970 million.

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**AUTHORS**

This study has been written by Federico Gallina of Université Libre de Bruxelles (ULB), Professor Mathieu Parenti of Université Libre de Bruxelles (ULB), and Professor Vincent Vicard of the Centre d'Études Prospectives et d'Informations Internationales (CEPII) at the request of the European Added Value Unit of the Directorate for Impact Assessment and European Added Value, within the Directorate-General for Parliamentary Research Services (EPRS) of the Secretariat of the European Parliament.

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To contact the publisher, please e-mail eprs-europeanaddedvalue@ep.europa.eu

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eprs@ep.europa.eu
http://www.eprs.ep.parl.union.eu (intranet)
http://www.europarl.europa.eu/thinktank (internet)
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# Executive summary

This research paper presents an estimation of the trade-induced gains for the European Union (EU28) overall and all the member states separately of a trade agreement between the EU and India, using a new quantitative trade model.

We first present some evidence of the heterogeneous trade impact of existing regional trade agreements on trade in goods over the 1995 to 2017 period. We then describe the model used in the simulation of the counterfactual scenarios in a General Equilibrium framework. This model belongs to the class of new quantitative trade models in general equilibrium which have been used for the evaluation of trade policy. The new quantitative trade models have two advantages over the use of the so-called Computational General Equilibrium (CGE) models. First, they can be taken directly to the data: these models provide some guidance to estimate their key parameters and need not rely on outside estimates. This is made possible as they are more parsimonious than CGE models: they trade off some realism for greater transparency and yet, they still capture first-order effects on trade and welfare. These models have clear microeconomic foundations: this allows us to discuss the importance of the different assumptions they rely upon and offer a critical assessment when commenting on our results. Equipped with these models, we draw some comparative statics on the value of the variables of interest (trade and real consumption) between the equilibrium in the pre-agreement, baseline scenario and the simulated general equilibrium in the counterfactual scenario. The latter is obtained by introducing a shock to bilateral trade costs to simulate the impact of the trade agreement between the EU and India.

The main scenarios used in the simulation assumes an heterogeneous decrease in ad-valorem bilateral import tariffs applied by the EU and India in 22 sectors for trade in goods, defined using the International Standard Industrial Classification, Revision 4 (ISIC Rev. 4). In our two main scenarios, we apply different reductions to average import tariffs in sensitive sectors for both trade partners. In the first scenario, for most sectors, we assume that both the EU and India lower their import tariffs by 90%, besides the Motor Vehicles and Other Transport Equipment sectors, in which import tariffs decrease by 50%. For the Fishing & Aquaculture sector, we apply a reduction of 90% to import tariffs in the EU, while a decrease of 70% on the Indian side. Instead, in the Crops & Animals and Food, Beverage & Tobacco sectors, the EU lowers its import tariffs by 10% and 40%, respectively. Whereas, for these same sectors, India decreases tariffs by 20% and 30%, respectively. In the second scenario, we apply more substantial, and symmetric, reductions to average import tariffs in sensitive sectors for both the EU and India: a decrease of 40% for Crops and Animals, 60% for Food, Beverage & Tobacco, and 90% for Fishing & Aquaculture, Motor Vehicles and Other Transport Equipment. For the remaining sectors of the economy, we maintain the same decrease to average import tariffs as in the first scenario. Moreover, in both scenarios, we assume a homogeneous and symmetric reduction of the ad-valorem equivalent of non-tariff measures by 3%, for both trade in goods and services. We also present several sensitivity exercises, including simulations using ex-post estimates of the impact of standard regional trade agreements on trade, which we estimate using data for trade in goods from 1995 to 2017.

The results are expressed as changes from the baseline data in 2014. They are static level effects on the variables of interest caused by the shift to a new equilibrium, that can be interpreted as long-term effects but do not allow us to model the transition path. We compare the values of the variable at a given point in time between the baseline and counterfactual scenarios. For example, when we state that real consumption in India increases by 8,143 million EUR, it means that the level of the real consumption in the counterfactual scenario is higher, by 8,143 million EUR, than its level value in the baseline scenario.

In the model, demand for goods and services is defined by a structural gravity equation, which links trade flows to country-specific characteristics and bilateral trade costs between countries. The

reduction in trade costs induced by the implementation of an RTA lowers prices of foreign goods and services to consumers and increase their demand. The change in prices is magnified through tradable intermediates used in production. Countries increase (resp. lower) their production to satisfy the increase (resp. decrease) in the demand for their goods and services. In this framework, an increase in production is entirely reflected in a wage increase. The higher wage corresponds to higher real income, which is used to increase expenditures on goods and services from all countries worldwide. However, a reduction in tariff revenues, which are also part of expenditures, dampens the impact that an increase in income has on real expenditures. To sum up the effects, the RTA reduces the share of expenditures used on goods and services produced domestically in favour of foreign varieties from specific countries, in particular EU imports from India. Moreover, the introduction of a trade agreement increases real expenditures, which, in our framework, boils down to an increase in real consumption. Expenditures consist of tariff revenues and labour income, which we will express in real terms using a country-level price-index.

The model in the present research paper leaves aside foreign direct investments, potential costs in terms of inequalities or unemployment, the transition to the new equilibrium, the environmental aspects of RTAs, as well as any potential dynamic gains from trade, the quantification of which vary substantially in the literature. We also maintain the assumption of Cobb-Douglas preferences and perfect competition - Costinot and Rodríguez-Clare (2014) show that under imperfect competition gains are slightly larger on average but may be magnified or dampened for specific countries depending on their specialization. Adding more dimensions of trade gains (or losses) and more outcome variables would require a larger set of parameters; here we choose to preserve instead the parsimony of new quantitative trade models.

The main findings are the following:

- The simple and import-weighted average tariffs applied by the EU and India to each other are asymmetric and heterogeneous across sectors, according to data from 2014. The import tariffs are significantly higher in India: for example, in the Food, Alcohol & Tobacco sector, the simple average import tariffs applied by India is 33.19%, while for the EU it is 16.45%.
- The ex-post analysis of RTAs shows first that the average RTA has had a small impact on trade flows for trade in goods between 1995 and 2017. Second, the effect is heterogeneous across sectors of the economy, and it is lower than the estimated impact of the EU Single Market, which provides a much deeper integration than the average RTA. We estimate the impact of the trade agreement between the EU and South Korea to be significantly larger than the average RTA.
- Our preferred counterfactual simulation shows a limited impact of an EU-India trade agreement on welfare: our simulations show a gain in real consumption between 0.0117% and 0.0276% as an average gain for the EU, and 0.1258% to 0.3011% for India. In euro terms, the total increase in consumption for the EU is estimated between 3,676 and 8,540 million EUR, and between 3,749 and 8,970 million EUR for India.
- In the first scenario, we estimate a total increase in consumption for the EU and India of 8,015 and 8,143 million EUR, that is a 0.0262% and 0.2733% increase from the baseline, respectively. For the EU, we estimate the largest increase in exports and imports with India for the Basic Metals and Textiles, Apparel & Leather sectors, respectively. The former has a substantial increase in exports to India, at a value of 2,772 million EUR, or a percentage increase of about 96% from the baseline. Instead, the latter, reports an increase in imports of the EU from India at 5,443 million EUR, that is an increase in imports of 66% from the baseline. Overall, the EU increases its exports and imports to (from) India by 13,972 and 13,242 million EUR, respectively. Alternatively, using percentage changes from the baseline, the increase in exports and imports is about 52% and 33%, respectively.

- In the second scenario, we obtain a larger increase in consumption since the EU and India benefit from a more extensive liberalization in sensitive sectors. To be precise, in this scenario, the total increase in consumption for the EU and India amounts to 8,540 and 8,970 million EUR, respectively. In percentage terms, the increase in consumption from the baseline is 0.0276% as an average gain for the EU, and 0.3011% for India. For the EU, the most significant increase in exports with India is, as in the first scenario, in the Basic Metals, at around 2,777 million EUR. Instead, for imports from India, the Textiles, Apparel & Leather sector reports an increase of 5,426 million EUR, which is still the most significant increase across sectors. As expected, we find significant differences in trade flows in sensitive sectors. For example, in the Motor Vehicles sector, between the baseline and the counterfactual scenario the EU increases its exports to India by 638 million EUR (or 45.57%), while this increase is 339 million EUR (or 24.21%) in the first scenario. For that same sector, the EU increases its imports from India by 298 million EUR (or 13.83%), up from the value of 189 million EUR (or 8.80%) of the first scenario. Overall, the EU increases its exports and imports to (from) India by 14,813 and 13,918 million EUR, respectively. Alternatively, using percentage changes from the baseline, the increase in exports and imports is about 56% and 35%, respectively.

# List of abbreviations

| | |
|---|---|
| **AVE** | Ad-Valorem Equivalent |
| **BACI** | Base pour l'Analyse du Commerce International |
| **BTIA** | Broad-based Trade and Investment Agreement |
| **CEPII** | Centre d'Études Prospectives et d'Informations Internationales |
| **CES** | Constant Elasticity of Substitution |
| **CGE** | Computational General Equilibrium |
| **CU** | Customs Union |
| **EEA** | European Economic Area |
| **EIA** | Economic Integration Agreement |
| **EU or EU28** | European Union, with 28 Member States |
| **FTA** | Free Trade Agreement |
| **GATT** | General Agreement on Tariffs and Trade |
| **GDP** | Gross Domestic Product |
| **GE** | General Equilibrium |
| **GEMPACK** | General Equilibrium Modelling PACKage |
| **HS** | Harmonized Commodity Description and Coding System |
| **ISIC Rev. 4** | International Standard Industrial Classification of All Economic Activities, Revision 4 |
| **IT** | Information Technology |
| **MAcMap** | Market Access Map |
| **MIRAGE** | Modelling International Relationships in Applied General Equilibrium |
| **NQTMs** | New Quantitative Trade Models |
| **NTBs** | Non-Tariff Barriers |
| **NTMs** | Non-Tariff Measures |
| **OECD** | Organisation for Economic Co-operation and Development |
| **OLS** | Ordinary Least Squares |
| **PPML** | Poisson Pseudo-Maximum Likelihood |
| **PTI** | Partial Trade Impact |
| **PS** | "Partial Scope" agreement |
| **RoW** | Rest of the World |
| **RTA** | Regional Trade Agreement |
| **STAN** | STructural ANalysis database |
| **TTIP** | Transatlantic Trade and Investment Partnership |
| **U.K.** | The United Kingdom |
| **UN** | United Nations |
| **USD** | United States Dollars |
| **WIOD** | World Input-Output Database |
| **WIOT** | World Input-Output Table |
| **WTO** | World Trade Organization |

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# 1. ntroduction

In 2007, the European Union started negations on a Broad-based Trade and Investment Agreement (BTIA) with India. The last round of negotiations was in 2013 and, since then, there have been no further formal negotiations on the FTA between the EU and India.[1] During the negotiations, numerous studies have been realised to assess the economic gains or losses, that the successful introduction of the trade agreement would bring to its members.[2] In Table 5, we can see that, in 2018, India was one of the main trade partners of the EU, ranked ninth according to trade flows for trade in goods, both for imports and exports. The other main trade partners that do not have a trade agreement with the EU are the United States, China (except Hong Kong), and Russia. Instead, since 2007, the EU successfully negotiated trade agreements with other relevant trade partners: South Korea, Canada and Japan.

Given the relevance of India as a trade partner of the EU, it is important to provide new estimates for the effects of a potential trade agreement between the EU and India. In this research paper, we rely on recent trade data and *new quantitative trade models* to provide new estimates for the "welfare" (defined as total real income) changes derived by the introduction of an EU-India trade agreement.

Before turning to the actual simulations, we introduce the gravity equation which was first developed as an empirical tool to assess the impact of barriers to trade on trade flows. It then evolved into a theoretical result from various models of international trade, allowing thereby a counterfactual analysis of trade policy changes.

In this research paper, we start by producing estimates of the average ex-post impact of Regional Trade Agreements (RTAs hereafter)[3] on sectoral trade flows. We then conduct a series of counterfactual scenarios assessing the impact of an EU-India trade agreement. We highlight along the way the consequences of our various modelling assumptions.

The results of the first part of our analysis, regarding the impact of RTAs on trade flows, show primarily two effects. First, the average RTAs has had a small impact on trade flows for trade in goods between 1995 and 2017. Second, while the impact is heterogeneous across different sectors of the economy, it remains lower than the effect of the trade agreement between the EU and South Korea and, unsurprisingly, below the estimated impact of the EU Single market.

We then provide our estimated impacts of an EU-India trade agreement based on the simulations of two models in general equilibrium in the counterfactual scenarios. We first realise the counterfactual simulations using a model that includes tariff revenues relying on observed tariffs and assumptions on their decrease based on existing studies and documentations reporting available elements of the negotiations of the trade agreement. It is important to note that measures such as rules of origin requirements or other customs procedures, which cannot be accounted in such framework, might reduce the impact of tariffs cuts on trade. Alternatively, we use the results from the empirical analysis of the first part as input in the simulation of the counterfactual scenarios. Our ex-post estimated impact of RTAs however cannot be decomposed into the contribution of tariffs and non-tariffs barriers in lowering bilateral trade costs between countries. This second strategy is thus likely to magnify the expected gains from the trade agreement.

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[1] See the report by the Directorate-General for External Policies, Policy Department (2015) for a discussion on the strategic partnership between the EU and India. There, the authors state that the last full round of negotiations took place in 2012, and that the negotiations reached a standstill in 2013.

[2] See, for example, Ecorys (2009) and Achterbosch et al. (2008).

[3] In section 2.3 we describe the dataset used in the empirical analysis realized in section 2. We include RTAs in force between 1995 and 2017 for countries that are part of the dataset.

It is worth stressing a few limits of our methodology. First, both models do not account for an induced impact of the agreements on foreign direct investment. Second, they do not deal either with the potential costs arising from an increase in inequality across sectors or within sectors across workers. Last, the environmental implications of this trade agreement are not quantified. Our analysis is more likely to provide an upper bound of the aggregate expected gains since it does not capture these costs.

This framework however abstracts from the dynamic impact of the agreement, ruling out adjustment costs of the economy towards a new equilibrium, but also its impact on economic growth. Such an impact, however, is difficult to sign and typically relies on more ad-hoc assumptions (Rodrik, 2017). For these reasons, we follow the literature and retain the static feature of new quantitative trade models.

In the Figures from 21 to 24, we present the welfare changes, measured as changes in real expenditure, obtained in our main scenarios, using the model with and without tariff revenues for the member states of the EU. These changes are heterogeneous across member states of the EU. Overall, the counterfactual simulations for the model with tariff revenues show a limited impact of an EU-India trade agreement on real consumption, between 0.0117% and 0.0276% as an average gain for the EU, and 0.1258% to 0.3011% for India. Instead, as we mentioned above, we obtain slightly larger gains in the model without tariff revenues, with an average change in real consumption for the EU at 0.0374% and 0.4380% for India, or around 11,556 and 13,142 million EUR, respectively.

The present research paper is organised as follows. In the rest of this section, we first provide an overview of trade in goods and services between the EU and India. Moreover, we include an introduction of the related literature in this field. In the second section, we introduce the gravity equation and the empirical methodology used to estimate the impact of the average RTAs on trade flows, presenting the results obtained using our dataset. Then, we describe the general equilibrium framework used in the counterfactual simulations, focusing on the model with tariff revenues, which allow us to distinguish between the effect of tariffs and non-tariffs barrier in lowering bilateral trade costs, and to account for the effect of lower tariffs on tariff revenues. In the last part of this third section, we report the assumptions that we make, for each simulated scenario, regarding the reductions to trade costs following the introduction of the trade agreement. In the fourth section, we present the results for the changes in real consumption, aggregated trade flows at the member states level, sector-level trade flows and tariff revenues for the EU as a whole. Furthermore, we compare these results for the welfare changes to other estimates obtained using the same model under different assumptions. Specifically, we assess the sensitivity of our estimates to reductions in trade costs, and the importance of tariff revenues. Section 5 concludes.

## 1.1. Overview of the aggregate EU trade with India

We start our overview of trade flows between the EU and India by looking at the share of imports and exports for trade in goods out of the total extra-EU trade, and comparing it with other relevant trade partners which, recently, signed a trade agreement with the EU.[4] In Figure 2 we can see that imports from India represented about 2.32% of total extra-EU imports in 2013, and reaching a peak of 2.56% in 2017. The share of imports from India is more substantial than the one with Canada, which reaches its lowest value in 2017, at around 1.28%. Turning to exports, the share of India and

[4] We use data from 2013 to 2017 from the BACI dataset by CEPII to consider the current composition of the EU28. In section 2.3, we discuss the data included and the correspondence table used to match these data from their original product classification to the ISIC Rev. 4. Given the time interval, we only capture the trade agreement between the EU and South Korea.

Canada are comparable. The former is stable from 2013 to 2017, having at both endpoints a value close to 2.20%. Instead, the latter saw a slight increase from 2.29% in 2013 to 2.30% in 2017.

We now summarize trade flows at the member state level in 2017. First, for trade in goods, in Figure 3, and Table 6, we can see that the relevance of India as a trade partner is heterogeneous across member states. For instance, it accounts for around 6,98% of Belgium's extra-EU exports while, for Slovakia, this share is only 0.57%. On the imports side, Portugal reported an inflow of 770 million USD worth of goods from India which amounts to around 3.94% of its total extra-EU imports in 2017, that is the largest share among all member states, closely followed by Belgium at 3.83%. The overall picture is very different for services: in Table 7 and Figure 6, we see that the share of exports and imports with India, as a share of total extra-EU exports and imports, is equal to 0.23% and 9.57% for Cyprus, making it the country with the most substantial share of imports and the lowest share of exports. The largest share of services exports to India is 5.71% for Finland.

In Table 6, we can also see that Germany has the largest share of imports and exports to India for a single member state, out of the total EU trade flows with India, for trade in goods. Overall, exports from Germany account for 27.35% of total EU exports to India, while the share for imports is lower, at 18.11%. As regards to trade in services, Table 7, Germany imported 3,552 million EUR in 2017, which, at around 20.81%, is the most substantial share of imports from India for that year, followed by the United Kingdom at 20.59%. For the exports of services, the two most significant shares are 18.01% and 17.93%, for the United Kingdom and Ireland, respectively. Together, these two countries account for 35.94%, or 5,957 million Euro, of the total exports of services to India from the EU.

## 1.2. Overview of the sectoral EU trade with India

We now look at the sector-level trade in goods between the member states and India. As we have seen in the previous section, a substantial share of extra-EU exports from Belgium is directed to India. In Figure 4, we can see that two sectors, Mining & Quarrying and Chemical, account for around 79% of total exports from Belgium to India, the share of the former sector alone is 70.90%. Overall, the contribution of each sector to the exports to India is heterogeneous across member states and a few sectors account for substantial exports from multiple member states. The Chemical sector represents around 52% of exports from Lithuania to India. Furthermore, for almost all the member states, this sector cover at least 5% of their exports to India. A similar argument applies to the Machine & Equipment sector, which represents around 65% of the export from Croatia to India, and it exceeds the 5% threshold value used in Figure 4 for 25 out of 28 member states. On the imports side, Figure 5 shows that, for almost all member states, a significant share of imports from India is in the Textiles, Apparel & Leather and Chemicals sector. For the former, the larger share is around 56% for Slovakia, while the latter sector accounts for around 57% of the imports from India to Croatia.

For the aggregate EU28 trade in goods with India, we can see in Figure 7 and Table 8, that around 19% of the total exports to extra-EU countries for the Mining & Quarrying sector goes to India. As we previously mentioned, Belgium, and also Latvia, are the countries with a large share of exports to India in this sector. The least exported sector by the EU to India is the Fishing & Aquaculture, at 3 million USD out of the extra-EU exports for this sector of 1,293 million USD, so the share going to India is around 0.21%. As we have seen, the Chemicals and Machinery & Equipment sectors account for a large share of the member states exports to India. However, the exports for India in these two sectors represent only 3.02% and 2.92% of the total extra-EU exports, respectively. As regards imports, the Textiles, Apparel & Leather sector reports a value of 14,415 million USD, that is 7.17% of the total EU28 imports from extra-EU countries in this sector, which amount to 200,949 million USD. This sector is by far the most significant source of imports for the EU from India, as the second-largest sector, by imports value, is Chemicals, at around 6,165 million USD, so about 4.35% of the total imports from extra-EU countries. This difference is striking in Figure 8, where we can see that 26.26%

of the total imports of the EU from India are from the Textiles, Apparel & Leather sector, followed by the Chemicals at 11.23%.

In Figure 7, it is clear that the EU is a relevant trade partner for India, as in most sectors we find that imports and exports between EU and India account for a significant share of Indian trade with the rest of the world. For example, looking at the imports by India, we can see that 47.61% of total imports in the Other Transport Equipment sector are from the EU. Other relevant sectors, above a 30% threshold, are Machine & Equipment, Pharmaceuticals, and Motor Vehicles. As we have previously mentioned, the EU is a large importer of products in the Textiles, Apparel & Leather sector. From Figure 7, we see that these trade flows account for a significant share of total exports for India in that sector, at around 34.41% of the total exports to the world. There are numerous sectors for which the EU is above a 20% threshold of the total exports from India to the rest of the world, to name a few, we have Electrical Equipment, Electronics & Optical Products, and Rubber & Plastics.

Last, regarding the trade in services between the EU and India, from Figure 9 and Table 9, we see that the EU imports 3,715 million EUR worth of services for the Telecommunications sector from India. This amount is around 7.45% of the total imports from extra-EU countries in this sector. At the same time, for this sector, almost 4% of the exports by the EU to extra-EU countries are directed to the Indian market. Another relevant sector is the Other Business services,[5] for which imports from India account for 3.60% of the total extra-EU imports. Overall, in 2017, the EU imports and exports with India were worth 17,065 and 16,298 million EUR, that is around 2.37% and 1.79% of the total imports and exports in services for the EU, respectively. Out of the total trade in services with India, in Figure 10, we can see that two sectors, Other Business and Telecommunications services, account for almost 68% of the imports by the EU, to be precise, about 46% and 22%, respectively. As regards exports from the EU to India, the two main sectors are Telecommunications and Transport services, which combined account for almost 57% of the total exports to India.

### 1.2.1. Tariffs on trade between the EU and India

We now look at the existing obstacles to trade between the EU and India. In Figure 14, we report the import tariffs applied by the EU and India. We include both the simple and imports-weighted averages for each sector. The former puts more weight on goods that are barely traded between the EU and India, as it weights equally all tariffs lines including hardly traded products. The latter may underweight highly protected products for which import flows are low because large tariffs are applied. For instance, we see that, for the EU, the highest import-weighted tariff is applied in the Textiles, Apparel & Leather sector which represents a significant share of the EU imports from India (see Figure 8). Nonetheless, its weighted tariff is almost the same as the Food, Beverage & Tobacco sector, which represents only 5.96% of the EU imports from India. Still, the latter has high headline tariffs applied to its products, so that both sectors have import-weighted tariffs close to 7%.

In 2014, the EU imported and exported from India 4,413 and 4,464 products, respectively. As we can see in Figure 12 the Textiles sector accounts for the largest share of traded products imported by the EU from India (18%). However, the average tariff in that sector is well below the one for the Food, Beverage & Tobacco sector, which represents only 8.5% of the total products traded. From Figure 13 we can see that there is a lower share of traded products protected in the Food sector, compared to the Textiles, but they have higher applied ad-valorem import tariffs on average.

Figure 13 shows that almost all products imported by India from the EU are subject to tariffs. Whereas, for the EU, we have substantial heterogeneity across sectors. For example, in the Paper sector the EU imported only one product subject to a positive tariff, out of 93 products imported

[5] Under the sixth edition of the Balance of Payments classification, this sector includes: "Research and development services"; "Professional and management consulting services"; "Technical, trade-related, and other business services".

from India in that sector. Instead, for the Textiles sector, around 94% of the imported products is subject to positive import tariffs, that is 743 out of 793 traded products.

Overall, for both measures used in Figure 14, the import tariffs are asymmetric. On all sectors, the EU reports lower import tariffs than India, and this difference is massive for some sectors such as Food, Beverage & Tobacco. In the Other Transport Equipment and Motor Vehicles sector, we find significant simple average import tariffs, at 22.05% and 15.54%, respectively. As previously mentioned, these are sectors for the EU accounts for a large share of India's imports. Two sectors with high imports tariffs in India, using the simple average, are the Crops & Animals and Fishing & Aquaculture, both close to 29%.

In Figure 15, we report the number of NTMs in force at the beginning of 2019. The EU applies 272 measures registered as Technical Barriers to Trade on its trade partners, and 97 Sanitary and Phytosanitary measures. India reports a more significant number of NTMs, at 1,481 and 1,466, respectively. In Figure 16, we show that India accounts for 11.07% of the total number of Sanitary and Phytosanitary measures applied by countries in the world, while the EU a share of 0.73%. As regards Technical Barriers to Trade, the share of measures applied by the EU out of the total measures in the world increases to 1.09%. Whereas, India, for the same group of NTMs, covers 5.92% of the world total. Overall, as we report in Table 10, the EU and India apply a total of 413 and 3,663 NTMs, respectively.

For the Sanitary and Phytosanitary classification, we find 41 measures that are specific to bilateral trade with the EU, together with 26 Export-Related Measures, 2 Quantity Control Measures, 1 Technical Barriers to Trade, and 1 Price Control Measures. Whereas, the EU, applies only 1 measure as Pre-Shipment Inspection specific to bilateral EU-India trade, and, as specified in Table 10, it covers products in the Iron & Steel and Iron & Steel Articles classifications according to the Harmonized System (HS).

In Figure 17 and Table 10, we consider four groups of products that might be sensitive to the presence of NTMs. First, for the EU, we find a total of 110 and 119 NTMs for the Vegetable and Food[6] products, respectively. The bulk of these NTMs are Sanitary and Phytosanitary, around 63.64% of the total for the Vegetable products, and 59.66% for the Food products. The Sanitary and Phytosanitary measures cover a more substantial share of total measures for Animal products, to be precise 69.62%. For these three sectors, the Sanitary and Phytosanitary measures are the main group of NTMs, followed by the Technical Barriers to Trade and the Quantity Control measures. Whereas, for the Pharmaceutical products, exactly 24 measures, or 50% of the NTMs applied to this group of products, are Technical Barriers to Trade. We also find 11 Sanitary and Phytosanitary measures and 10 Quantity Control measures. The 2 Export-related measures applied by the EU affect Pharmaceutical products. Overall the Vegetable and Food products are subject to more NTMs than the two remaining sectors, primarily using Sanitary and Phytosanitary measures.

If we look at the NTMs by the group of products for India, we see that the Vegetable and Food products are covered by a more substantial number of measures, at 1,346 and 954, respectively. However, the share of the total measures covered by Sanitary and Phytosanitary measures, and also Technical Barriers to trade, are comparable to what we previously reported for the EU. The main difference is that, in these sectors, the third-largest share of measures are Export-Related, and not Quantity Control measures like in the EU. For the Animal products, India applies in total 596 measures, 35.07% of which are Sanitary and Phytosanitary measures, which amounts to almost half

[6] This group includes Food, Alcohol and Tobacco products.

of what we found for the EU. Other relevant measures are Technical barriers, 31.88%, and Export-Related, 28.02%.

The discussion in section 3.4 of the report by the Directorate-General for External Policies, Policy Department (2015) mentions some of the aspects that contributed to the halt of the negotiations between the EU and India in 2013. From the EU, there was a request to lower tariffs on specific products, such as cars and wines, which belong to sectors with high simple or import-weighted tariffs, as we reported in Figure 14. Moreover, the EU aims at an easier access for EU companies to government procurement in India. Instead, India demands lower tariffs for the Textiles sector, which is the largest sector by exports to the EU from India, and lower NTBs on Agricultural and Pharmaceutical products. Additionally, India aims at receiving the status of "Data Secure" country from the EU, which would significantly reduce the NTBs for the Telecommunications, computer, and information services, which, as we have seen in Figure 10, is a large share of the exports of services from India to the EU. Another essential aspect for India is easier access to worker visa under the Mode 4 regime, which would substantially impact the IT sector as well as other professional workers that would like to reside and work in the EU temporarily.

## 1.3. Related literature

Until the 1990s, simulations on the impact of trade agreements were mainly realised using Computational General Equilibrium (CGE) models. However, over the years, these models were questioned on two grounds. First, the software used for the CGE simulations is often regarded as a black box: in its attempt to handle a general equilibrium framework with a high dimension of complexity, this type of model gives up on transparency.

The second critique follows from the first, the more complex the economic features that the model tries to explain, the higher the number of parameters are needed as input for the simulation. While some parameters required for the simulation can be found in the existing literature, they would be typically estimated on a different model than the CGE, so that its quantitative predictions would no longer be internally consistent. Furthermore the use of a large number of estimated parameters, which might suffer from estimation errors given that they are obtained using a limited set of data, increases the exposure of the CGE simulation to this type of errors.

Notwithstanding the criticisms received, the CGE models are widely used because they often work in a dynamic framework and provide results for a wide range of economic indicators. For example, in their counterfactual simulations, Ecorys (2009) utilises a CGE, implemented in GEMPACK, to estimate a potential trade agreement between the EU and India. Instead, Bellora et al. (2017) and Decreux et al. (2010) rely on the MIRAGE software (see Decreux and Valin (2007); Bchir et al. (2002)). The former estimates the trade-induced impact of Brexit on the agricultural sector in the EU27 and U.K., while the latter estimates, ex-ante, the effects of the EU-South Korea trade agreement.

New quantitative trade models tackle some criticisms directed to the CGE models. In their introduction, Costinot and Rodríguez-Clare (2014) briefly discuss the differences between the two classes of models. One of the advantages of the new class of models is their direct link with micro-theoretical foundations, as we show in section 3 of this paper, and the fact that they gain in transparency by treating less economic features than the CGE models. However, the economic features included in the new models still account for first-order effects on trade and welfare, so that the results from the simulation are relevant from a policy-making perspective. Additionally, the similarities between the underlying structure of new quantitative trade models and CGE models lead to comparable orders of magnitude in the effects analysed by both classes of models.

Furthermore, the new quantitative trade models need a few structural parameters to realise counterfactual analysis. The requirement of few parameters to assess the gains (or losses) obtained by moving from a baseline to a counterfactual scenario is a consequence of the "*Exact Hat Algebra*",

discussed in Dekle et al. (2008). In their influential paper, they show that the *change* in a variable of interest between its equilibrium values in the counterfactual and baseline scenario requires many less parameters than solving for both equilibra where the variable of interest is in *level*. Defining the variable in changes eliminate the requirement for some of the exogenous parameters which may be hard to estimate or might suffer from measurement error.

The seminal work by Arkolakis et al. (2012), and later the literature review by Costinot and Rodríguez-Clare (2014), show that a wide range of trade models[7] yields a formula to compute changes in welfare, defined as real expenditure. This welfare change can be assessed from two sufficient statistics, the trade elasticity and the change in the share of domestic expenditure. Furthermore, in their literature review, Head and Mayer (2014) show that the models described in Arkolakis et al. (2012) are a subset of a class of models that lead to equations satisfying the *"structural gravity"* form. Generally, the gravity equation links bilateral trade flows to bilateral trade costs and exporter- and importer-specific characteristics. Depending on the underlying model considered for the general equilibrium framework, the estimation of bilateral trade flows on numerous variables, mainly linked to trade costs, is the first step of the counterfactual analysis. An appealing property of the gravity model is that it fits the data reasonably well[8] as we show in the next section.

Another advantage from this approach is that the existing literature provides theoretical foundations to the gravity model which enables its use in general equilibrium settings to answer policy-related questions. The magnitude of the results in the counterfactual analysis may depend on the underlying model. For example, Costinot and Rodríguez-Clare (2014) and Ottaviano (2014) show that different types of market structure e.g., monopolistic and perfect competition, lead to different estimates for welfare changes. The introduction of multiple sectors and intermediates also leads to different estimates and typically magnify the welfare gains from trade (see Costinot and Rodríguez-Clare, 2014). Recent works apply different models to estimate the ex-ante effect of trade policies or the ex-post gains from economic integration.

The models discussed in Costinot and Rodríguez-Clare (2014) yield a system of equations, which differs between models, used to estimate static general equilibrium effects, that is the difference between the equilibrium in a baseline scenario and the simulated general equilibrium in the counterfactual scenario.[9] We briefly report some of the results in the recent literature, obtained using comparative statics in new quantitative trade models.

Aichele et al. (2014) evaluate the potential impact of the introduction of the TTIP using the framework discussed in Caliendo and Parro (2015), their preferred result point to a welfare increase of 2.12% for the EU27. Instead, Felbermayr et al. (2015), using a single sector model with monopolistic competition, find that the introduction of TTIP could lead to a positive welfare change of 3.94% for the EU28. Another ex-ante analysis realised by Felbermayr et al. (2017), look at the effect of the trade agreement between the EU and Japan, using a multiple-sector model that also includes tariff revenues. They find that the average welfare change for the EU28 is around 0.06%, relative to baseline data from 2014. Dhingra et al. (2017), building on the model by Eaton and Kortum (2002), show a negative effect on the welfare of the EU27 (excluding the U.K.) of 0.14% and 0.35% under "soft" and "hard" Brexit, respectively. Mayer et al. (2019) consider a static general equilibrium framework with multiple sectors and perfect competition to realise an ex-post evaluation of the welfare gains from the EU membership.[10] They show that the gains are heterogeneous across

[7] The class of models includes Anderson (1979), Krugman (1980), Eaton and Kortum (2002), and Melitz (2002).

[8] Head and Mayer (2014) provide an overview of empirical results in the literature obtained using the gravity model.

[9] See Anderson et al. (2015) and Caliendo et al. (2015) for recent attempts at introducing a dynamic framework in theory consistent structural gravity models.

[10] Felbermayr et al. (2018) realise a similar research on the effects of the European integration on trade flows and welfare.

member states, and the weighted welfare gains at the EU aggregate level range from 1.3% to 5.5%, depending on the counterfactual scenario considered.

Similarly to the studies presented in this review of the recent literature in new quantitative trade models, our analysis looks at the ex-ante effect of trade policy, in this case, the introduction of a potential trade agreement between the EU and India. To be more precise, the model adopted in this report is close to the NTQMs of Ottaviano (2014) , Caliendo and Parro (2015) and Dhingra et al. (2017). Compared to Dhingra et al. (2017), our model is simplified, which decreases thereby the number of parameters required in the simulations. Specifically, the IO linkages follow the "roundabout production" assumption from Krugman and Venables (1995).

Among the remaining parameters, using a series of sensitivity analysis and simulated scenarios, we show that the values of the trade elasticities and the reductions of sector-level NTBs drive our results. In particular, shifting the reduction of sector-level NTBs from a value of 3% to 0%, that is a lack of agreement on the reduction of NTBs, we obtain a decrease by half to the welfare gains for India and the aggregate EU. Whereas, modifying the values of the trade elasticities has a more modest, but still significant, impact on the welfare gains of the liberalising countries. A decrease or increase in the value of the trade elasticity means that consumers perceive domestic and foreign varieties as more differentiated or closer substitutes, respectively.

The trade elasticities used in the simulation, as well as the assumed reductions to tariffs and NTBs, are also inputs that substantially affect the results obtained using CGEs such as MIRAGE and GEMPACK. Additionally, the latter software considers a dynamic framework, which increases the number of parameters required. For example, in the GEMPACK software, the value of the saving rate might significantly affect the results, as it influences the changes in investments over time. Other aspects included in GEMPACK that might require additional inputs, and which might drive the results, are the taxes included in the model, for example, production or final consumption taxes; the presence of labour mobility and workers with heterogeneous skill levels; and market frictions to determine the unemployment level. Overall, if compared to the new quantitative trade model used in this paper, the GEMPACK software captures a more complex economic structure at the cost of being more vulnerable to the choice of the values used for a large set of parameters.

# 2. Structural gravity estimates for the impact of RTAs

## 2.1. Methodology

The gravity equation has been central to many applications in international economics for at least three decades. The literature typically attributes its first application to Tinbergen (1962). In the following years, empirical research using the gravity model emerged in the international trade literature, estimating the effect of importer and exporter characteristics on bilateral trade. Those early applications however lacked a solid theoretical foundation for the gravity equation and the theoretical strand of the literature evolved on a different, parallel path. The use of the gravity equation became mainstream as the two strands converged, i.e. with the first micro-foundations of the gravity equation.[11] Head and Mayer (2014), Costinot and Rodríguez-Clare (2014) and Yotov et al. (2016) provide an overview of the theoretical and empirical contributions in this domain on which the subsequent methodology is based.

Head and Mayer (2014) adopt the following taxonomy: a gravity equation can fall into the *Naïve*, the *Structural* or the *General gravity* category. The Naïve gravity equation explains trade flows between any pair of countries as a function of their market size[12] and their proximity only.[13] It ignores for instance the role of countries' other trade partners. For example, a country which is close to many other large destination markets will export less to any given country, *ceteris paribus*. The first attempts to provide a solid microfoundation to the gravity equation emphasized instead the importance of *multilateral resistance terms* i.e. sufficient statistics that capture the centrality or the remoteness of each country compared to all its trading partners. This is the so-called structural gravity model, as defined by Head and Mayer (2014) which can be rationalized by numerous theoretical models used in international trade: while they rely on a different set of assumptions, they all predict that bilateral trade flows depend on bilateral trade costs and importer- and exporter-specific characteristics. This theory-based gravity equation, in turn, provides a unified guidance to estimate the trade elasticity i.e. how trade flows react to variations in trade costs. They may also lead to similar counterfactual trade policy predictions such as the application to the EU-India trade agreement conducted in this research paper. These aspects allow us to remain vague at this stage about the exact model underlying the structural gravity equation that we will estimate by PPML and OLS. We come back to the underlying model in section 3 when discussing simulations in general equilibrium.

In the rest of this section, we follow closely Head and Mayer (2014) and show how the structural gravity equation is derived.

There are $n$ countries and we denote the exporter and importer using the subscripts $i$ and $j$, respectively. The value of goods and services exported from country $i$ to $j$ at time $t$ is $X_{ijt}$. When $i = j$ $X_{jjt}$ denotes the expenditure of country $j$ on domestic goods and services. We denote by $X_{jt}$ the sum of international and intranational expenditures for importer $j$ at time $t$. *It* is linked to bilateral flows through the following identity:

$$X_{ijt} = \lambda_{ijt} X_{jt} \qquad (1)$$

where $\lambda_{ijt}$ is the share of total expenditures of the importer $j$ allocated, at time $t$, to goods and services produced by country $i$. The shares $\lambda_{ijt}$ are such that $\lambda_{ijt} \geq 0$ and verify $\sum_{i=1}^{n} \lambda_{ijt} = 1$.

[11] Eaton and Kortum (2002) and Anderson and van Wincoop (2003) offer two of the most popular microfoundations.

[12] It is measured as the Gross Domestic Product (GDP) of the countries.

[13] The latter includes all the variables that impact trade costs between trade partners. For example, it includes the geographical distance between countries and ad valorem tariffs.

Deriving the structural gravity equation the following assumption on the functional form of the expenditure share:

$$\lambda_{ijt} = \frac{S_{it}\phi_{ijt}}{\Phi_{jt}} \quad (2)$$

where

$$\Phi_{jt} = \sum_{i=1}^{n} S_{it}\phi_{ijt} \quad (3)$$

The variable $S_{it}$ measures the supply capability of *i* which depends on exporter-time specific characteristics such as the value of production. Mayer, et al. (2018) states that the supply capability includes different exporter characteristics depending on the micro-foundations considered, for example, in Eaton and Kortum (2002) it depends on the technology level of country *i*. Instead, in the micro-foundations that we consider in the next section of this paper, the variable $S_{it}$ captures the domestic price,[14] in country *i*, of the good or service considered, and the price elasticity, which controls how demand for that product adjusts to changes in the domestic price. For consumers around the world it is more attractive to buy from exporters with lower domestic prices, so $S_{it}$ measures the attractiveness of goods and services exported by country *i* at time *t* to all its trade partners, including the home market. However, consumers in country *j* also consider the accessibility, measured as bilateral trade costs, to goods and services from country *i*. Therefore, in equation (2), the attractiveness term, $S_{it}$, is weighted by the trade costs to export from *i* to *j* at time *t*, $\phi_{ijt}$. The term $\Phi_{jt}$ is the sum, over the *n* exporters, of the exporter-specific attractiveness weighted by bilateral trade costs, at time *t*. In other words, this term aggregates all the bilateral costs between importer *j* and its trade partners and, as stated in Head and Mayer (2014), it can be considered as a measure of the degree of competition in the considered market of country *j*. The definition of $\Phi_{jt}$ is such that the expenditure shares $\lambda_{ijt}$ sum to one when considering the expenditure of importer *j* allocated, at time *t*, to all the exporters, including the domestic market. As pointed out in Head and Mayer (2014), the important aspect of the assumption on the functional form of the expenditure share, $\lambda_{ijt}$, is that it does not depend on a country's income. This follows from the assumption of homothetic preferences in trade models which imply that as a country gets richer, it increases its imports proportionally from all its trade partners.

We provide an example to see the link between variables in equation (2) and (3). Consider an importer *j*, keeping everything else constant, an increase in the attractiveness of a generic exporter *k*, $S_{kt,}$ leads to an increase of $\Phi_{jt}$, in turn lowering the expenditure share $\lambda_{ijt}$ for $i \neq k$, but increasing it for $\lambda_{kjt}$, since the country *k* is more attractive for consumers in country *j*.

Last, we assume market clearing for each exporter. It implies that the value of production in country *i* equals the sum of the expenditures by importing countries on goods and services produced by *i*.[15] Defining the value of production of country *i* at time *t* as $Y_{it}$, we can write the market-clearing condition as:

$$Y_{it} = \sum_{j=1}^{n} X_{ijt} \quad (4)$$

[14] Depending on the assumed market structure, the domestic price will be equal to the marginal cost of production, or to the marginal cost plus a markup.

[15] Prices adjust to obtain that, in equilibrium, all the resources in the economy are used, and that there is no excess in supply or demand for goods and services: the production of a country *i* (its supply of goods and services) is equal to the expenditures of all the countries in the world on goods and services produced by country *i* (that is the demand side).

Using equation (2) in (1), and then substituting in equation (4) we get:

$$Y_{it} = S_{it} \cdot \sum_{j=1}^{n} \frac{X_{jt}\phi_{ijt}}{\Phi_{jt}} \tag{5}$$

The ratio $\frac{\phi_{ijt}}{\Phi_{jt}}$ is the relative access to individual market *j* from a country *i*, defined as the trade costs to export from *i* to *j* divided by the degree of competition in market *j* and, using equation (3), it is possible to rewrite it as $\frac{\phi_{ijt}}{\sum_{i=1}^{n} S_{it}\phi_{ijt}}$. The overall market access of country *i* is then obtained by adding-up the relative access to country *i*'s trading partners weighted by total importer expenditures:

$$\Omega_{it} = \sum_{j=1}^{n} \frac{X_{jt}\phi_{ijt}}{\Phi_{jt}} \tag{6}$$

The production value of country *i* is the product between the attractiveness of *i*'s exports, $S_{it}$, and the expenditure-weighted average of relative access, $\Omega_{it}$. Hence, we can write equation (5) as:

$$Y_{it} = S_{it}\Omega_{it} \tag{7}$$

Notice that equation (7) includes only exporter-time variables. Plugging (7) in equation (2) and using equation (1) leads to the structural gravity equation:

$$X_{ijt} = \frac{Y_{it}}{\Omega_{it}} \frac{X_{jt}}{\Phi_{jt}} \phi_{ijt} \tag{8}$$

We know from equation (7) that $S_{it} = \frac{Y_{it}}{\Omega_{it}}$. Additionally, we can define $M_{jt} = \frac{X_{jt}}{\Phi_{jt}}$, which is the ratio between the total expenditures by country *j* at time *t* and the term capturing the exporter-attractiveness weighted by bilateral trade costs. Notice that $M_{jt}$ depends only on importer-year variables. Equation (8) is the main specification used in the literature for the structural gravity; it describes bilateral trade flows as a function of importer- and exporter-year variables, and bilateral trade costs. The expenditure of country *j* on products from country *i* is positively related to the size of market *j* and the value of production in country *i*, and negatively related to bilateral trade costs between *i* and *j*. Furthermore, we can rewrite the trade shares as:

$$\lambda_{ijt} = \frac{Y_{it}}{\Omega_{it}} \frac{\phi_{ijt}}{\Phi_{jt}} \tag{9}$$

Grouping country-time and country-pair variables together leads more generally to:

$$X_{ijt} = S_{it}M_{jt}\phi_{ijt} \tag{10}$$

The multiplicative form obtained in equation (10) resembles the definition of general gravity equation described in Head and Mayer (2014). It is an useful form, as we show below that it is possible to log-linearise the gravity equation, and to include a set of fixed effects in the estimation of the gravity equation to tackle the omitted variables bias. To obtain the general gravity, it is enough to augment equation (10) introducing multiplicatively a time-varying term $G_t$, which is defined as "*gravitational constant*". The difference between the general and structural gravity is that the latter is a subset of the first, as it adopts additional assumptions, which we described above, to provide a micro-foundation for the exporter and importer characteristics captured by $S_{it}$ and $M_{jt}$, respectively.

Going back to the structural gravity, we can also substitute $S_{it} = \frac{Y_{it}}{\Omega_{it}}$ in equation (3) to obtain:

$$\Phi_{jt} = \sum_{i=1}^{n} \frac{Y_{it}\phi_{ijt}}{\Omega_{it}} \tag{11}$$

The terms $\Phi_{jt}$ and $\Omega_{it}$ are defined in the existing literature as *inward multilateral resistance* and *outward multilateral resistance*, respectively. These terms capture the effect that trade costs have on the relative attractiveness of each country compared to all its trading partners.[16] For example, on the one hand, an RTA creates trade between its members by reducing import prices through lower trade costs; thus, increasing bilateral trade flows. On the other hand, the introduction of the RTA reduces trade with countries outside of the agreement as consumption from them is now relatively expensive.

## 2.2. Structural Gravity Estimation

Log-linearizing equation (8) and defining bilateral trade costs as:

$$\phi_{ijt} = exp\left(\beta_1 RTA_{ijt} + \boldsymbol{\beta Z}_{ijt} + \boldsymbol{\delta} D_{ij}\right) \tag{12}$$

we can rewrite the structural gravity as:

$$ln\left(X_{ijt}\right) = ln(Y_{it}) + ln\left(X_{jt}\right) + ln(\Omega_{it}) + ln\left(\Phi_{jt}\right) + \beta_1 RTA_{ijt} + \boldsymbol{\beta Z}_{ijt} + \boldsymbol{\delta D_{ij}} \tag{13}$$

where $X_{ijt}$ is the value of exports of country *i* to *j* at time *t*; the vector $\boldsymbol{Z_{ijt}}$ contains other dummy variables that might affect trade costs, for example, both countries *i* and *j* being members of the Euro Area, European Union, or the WTO at time *t*; the vector $\boldsymbol{D_{ij}}$ includes control variables that are country-pair specific, such as the geographical distance between two countries. We are interested in the estimates of the coefficient $\beta_1$, which captures the elasticity of trade costs with respect to trade agreements.

We estimate equation (13) on sectoral data using OLS[17] as follows:

$$ln\left(X_{ijt}\right) = \pi_{ij} + \chi_{jt} + \mu_{ij} + \beta_1 RTA_{ijt} + \boldsymbol{\beta Z}_{ijt} + \varepsilon_{ijt} \tag{14}$$

where $X_{ijt}$ is the bilateral trade flow from country *i* to *j* at time *t*; $\pi_{it}$ and $\chi_{jt}$ are exporter- and importer-time fixed effects, which capture the exporter production, $Y_{it}$, the importer expenditure, $X_{jt}$, and multilateral resistance terms.[18]

Country-pair fixed effects $\mu_{ij}$ address potential endogeneity problems by controlling for unobserved variables, such as a good political relationship, potentially correlated to both the likelihood of a country-pair to sign an RTA and the level of bilateral trade (Baier and Bergstrand,

[16] See the handbook section by Krugman (1995), in which the author provides a famous example to describe the concept of remoteness between trading partners.

[17] In the section "Regression results, PPML" in the Table Appendix, we provide results obtained using the PPML estimator (Santos-Silva and Tenreyro, 2006). Head and Mayer (2014) provide a discussion on how different sample sizes and standard errors structures influence the estimates from multiple estimators, including the PPML and OLS. Our choice of focusing on OLS follows from the puzzling results that we obtain for the RTA dummy variable using the PPML estimator at the sector-level. Some of the results, when they are statistically significant, suggest that, on average, an RTA reduced trade flows. The results we obtain are consistent with the existing literature, (e.g. Felbermayr et al., 2018).

[18] See Baldwin and Taglioni (2006) for a complete discussion regarding the importance of accounting for the multilateral resistance terms through the use of importer- and exporter-time fixed effects with panel data.

2007). The use of such fixed effects is now a standard approach in the literature when the variable of interest is, for example, the membership to an RTA, the EU, the Euro Area.[19]

## 2.3. Data

The trade flow data used in this part of the analysis are from the BACI dataset by Gaulier and Zignano (2010), which covers international trade in goods from 1995 to 2017. For that time interval, the trade data available are associated with the 1992 version of the Harmonized System (HS) nomenclature, with six-digit product level. We use a correspondence table developed by the *STAN Databases Team* of the *OECD,*[20] which allow us to map the trade flows from the HS1992 to the International Standard Industrial Classification Revision 4 (ISIC Rev. 4) classification.[21] We decide to use the ISIC Rev. 4 as product classification because it is the same classification applied in the World Input-Output Database (WIOD), from which we extract the data for the General Equilibrium (GE) simulation.[22] In this way, the estimates of $\beta_1$ from equation (14) can be used in their respective sectors in the GE simulation since the sectors classification is the same.

The Table Appendix reports the 22 ISIC Rev. 4 sectors covered by the dataset, in Table 15, as well as a list of the 217 countries included in the dataset, from Table 11 to 13. Across all the sectors, the total number of observations is 13,652,302, including trade flows with a reported value of zero, which represent around 60% of the total observations. The BACI dataset reports trade flows with a value of zero for a given year only at the country-pair level and not country-pair-sector level. Hence, we expand the zero trade flows to all the 22 sectors when the country-pair level value is zero.

As regards control variables, we use the WTO membership dummy variable from the Gravity dataset by Head et al. (2010) and Head and Mayer (2014). Moreover, we extract the common currency dummy variable from the dataset published by de Sousa (2012). These dummy variables are equal to one for country pairs in which both, the exporter and importer, are members of the WTO or share a common currency at time *t*. We extend the Gravity dataset up to 2017 and for countries not included using information from the WTO database,[23] as well as other sources, to fill in the missing values.

We also include a dummy variable to control for both countries being members of the Euro Area. As before, this variable is equal to one if *i* and *j*, at time *t*, share the Euro as currency. Otherwise, we

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[19] However, these fixed effects do not capture possible country-pair trends; for example, an increase in bilateral trade flows between the UK and India that is time-varying. We might expect countries with an upward trend in their bilateral trade flows to introduce a trade agreement if they do not already share one.

[20] We access this data from: http://www.oecd.org/sti/ind/bilateraltradeingoodsbyindustryandend-usecategory.htm

[21] To be precise, this correspondence table maps from the HS to the ISIC Rev. 4 industry codes and end-use categories, such as consumption, capital goods, and intermediate inputs. This classification also contains additional codes for wastes produced by industries, for example, textile and paper products. Since we observe trade flows in the BACI dataset for products classified as wastes, we believe they might be traded to be recycled, and likely used again as inputs for production. Therefore, we make some adjustment to the original correspondence table to include the wastes to the sector that is producing them. On request, we can provide a list of the applied changes. We acknowledge that this correspondonce table might not be accurate. However, the Statistics Division of the United Nations, for the moment, did not publish an available table that maps HS to ISIC Rev. 4.

[22] To provide results for a wider set of countries and sectors, we decide to use the Word Input-Output Table (WIOT) based on the ISIC Rev. 4 product classification, despite the lack of an official correspondence table by the UN. The alternative would be to use the WIOT based on the ISIC Rev. 3, for which the UN published a correspondence table. However, doing so would lead to *(i)* data for the year 2011 instead of 2014; *(ii)* less countries covered in the GE simulation and, in particular, Croatia would not be included in the sample; and *(iii)* a lower level of sectors disaggregation.

[23] We access this data from: https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

assign a value of zero to the variable. We modify the previous common currency dummy variable from the Gravity dataset so that it is equal to zero when the Euro Area dummy is equal to one.

The control variable of interest is a dummy variable equal to one if *i* and *j* share an RTA at time *t*. It is obtained from Mario Larch's Regional Trade Agreements Database from Egger and Larch (2008).[24] This Database has been updated by the author to cover a time interval up to 2017. Therefore, it covers the entire period for which we have data on bilateral trade flows. Additionally, it also covers all the country pairs included in the BACI dataset. Furthermore, among all the RTAs, we isolate five of them, the European Union, the European Economic Area (EEA), the EU-Switzerland Agreement, the EU-Turkey Agreement, and the EU-South Korea Agreement. For these five agreements, we include separate dummy variables that are equal to unity if the country pair *ij* is part of the agreement at time *t*. For the regressions that include the full set of control variables, we switch the RTA variable to zero if one of the separate five agreements is equal to unity. Moreover, the EEA variable is set to zero if the dummy variable that denotes trade between members of the European Union is equal to one.

## 2.4. Results

In this section, we present the results obtained from the estimation of equation (14). First, we will discuss the common effect of the variable of interest across sectors using a pooled regression. However, trade policies have heterogeneous effects across sectors since negotiations on tariffs and NTMs are realised at the sector-level. Therefore, later in this section, we will move to the sector-level dimension, where we report sector-specific estimates for the 22 ISIC Rev. 4 sectors included in our sample. As customary in the literature, we present side by side the results for a different set of control variables (the vector $\boldsymbol{Z}_{ijt}$ in equation (14)) which are all country-pair-time dimension and thus not absorbed by bilateral fixed effects. In all the reported specifications, we consider the dummy variable for both countries sharing the EU membership at time *t* separately from the RTA dummy. Furthermore, in the main specification with the full set of control variables, we isolate four additional trade agreements from the RTA dummy variable.

### 2.4.1. Pooled sectors analysis

In Table 17 we pool the data across sectors and, as suggested by Yotov et al. (2016), we add the sectoral dimension to the set of fixed effects (exporter-year-sector and importer-year-sector fixed effects) and standard error clustering. For each variable, the estimates that we obtain in this setting are common across sectors. In column (1) of Table 17, we see that sharing an RTA has a positive effect on trade; that is a common result in the existing literature. In our dataset, the presence of an RTA, on average, raises bilateral trade flows by about 7.25%.[25] This result is a Partial Trade Impact (PTI) as defined by Head and Mayer (2014) since the change in bilateral trade costs between liberalising countries does not ripple to changes in multilateral resistance terms, which also affect third-countries. We can see that the RTA estimate is stable following the introduction of separate control variables in column (2) of Table 17, or in the last row of Table 1.

We want to emphasize that we refer to the average effect of an RTA. We do not distinguish between shallow and deep agreements, as realised by Felbermayr et al. (2017) and Aichele et al. (2014), or

[24] The documentation attached to Mario Larch's dataset further explains that the RTA dummy is equal to one if at least one of the following types of agreement is in place: A Free Trade Agreemnt (FTA); A Customs Union (CU); An Economic Integraation Agreement (EIA); A "Partial Scope" Agreement (PS). On request, we can provide results for the estimation of equation (14) with the FTA, CU, EIA, and PS dummy variables instead of the RTA control variable.

[25] This value is obtained as $[(exp(0.070) - 1) * 100]$. We use the same methodology to obtain the effect on trade flows of the other dummy variables, according to the estimated coefficients.

direction-specific RTA estimates as in Baier et al. (2019).[26] We distinguish however specific agreements and show that the RTAs effects are indeed heterogeneous. The membership to the EU entails a deeper integration than a standard RTA, and, since the dataset runs from 1995 to 2017, it captures the effect that recent developments on the Single Market had on trade in goods. In the existing literature, numerous works, including, recently, Mayer et al. (2019), obtain estimates for the effect of being part of the EU, and its Single Market, that are significantly larger than the results for other RTAs. Our estimates indicate that, everything else equal, the EU membership increases trade in goods by around 82%. As for the RTA variable, the introduction of few individual EU trade agreements with third countries does not significantly affect the result for the EU dummy variable, which in column (2) points to a 88% increase in trade flows.

Looking at the set of additional controls in column (2) of Table 17, we can see that the EEA positively affects trade flows. It also impacts positively Iceland and Norway as they can access the Single Market.[27] As regards the other agreements, we find positive, and statistically significant, results. The EU-CHE[28] variable promotes trade by 19%. This effect is lower than the EU-TUR and EU-KOR agreements, which increase trade flows by around 33% and 24%, respectively.[29]

### 2.4.2. Sector-level analysis

In this section, we bring our analysis to the sector-level. We want to emphasize that the 22 sectors in this analysis match the sectors for trade in goods that are included in the GE simulation. Hence, we are able to obtain estimates for the average effect of a standard RTA on trade flows for each sector. These estimates represent the inputs to obtain the trade shock derived from the introduction of a trade agreement between the EU and India. We will focus on the results for the regressions with the full set of control variables since we will use the effect that we estimate for a specific trade agreement, EU-KOR, in one of the counterfactual scenarios considered for the GE simulation.[30] We discuss the results using our preferred specification, with the full set of control variables.[31] Table 1 provides a summary of the PTIs in each sector, and in the pooled sectors regression, using the estimated coefficients for the RTA and EU-KOR dummy variables.

In Table 18 we can see that the EU has increased trade in goods significantly. The results for this dummy variable range from an increase in trade flows of around 34% for Forestry and Logging (sector A02) to about 209% for trade in Pharmaceuticals products. In some sectors, the EEA promoted trade more than being part of the EU, for example, for trade in Manufacturing of paper products (C17), where the former has a PTI of around 239%, while the latter increased trade flows by 113%. However, overall, while the EU positively affected trade in all sectors, we can't say the same for the EEA since few sectors have coefficients that are not statistically different from zero.

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[26] Baier et al. (2019) consider that effects within country-pairs depend on the direction of the trade flow. For example, for the country-pair Mexico-Japan, the authors estimate separately the effect of the trade agreement on exports from Japan to Mexico and for exports from Mexico to Japan. Moreover, to obtain estimates of the RTA variable, we rely on a few observations per country-pair, and as pointed out in Limão (2016) this might cause a small sample bias.

[27] This group of countries should also include Liechtenstein. However, in the dataset, we do not have separate observations for this country, so we are not able to identify the full effect of the EEA membership.

[28] This result is influenced by the presence of Liechtenstein, as the BACI dataset reports trade flows for CHE as aggregate values from Switzerland and Liechtenstein.

[29] Note that the PPML estimator yields similar point estimates (see Table 21), except for the common currency and EU-CHE dummy variables.

[30] It is reasonable to expect that the reduction in trade costs derived from the potential EU-India agreement may be closer to what we estimate for the EU-KOR agreement than to a standard RTA.

[31] On request, we can provide the results obtained for the specification with the reduced set of control variables, in which we do not include separate dummy variables for the EEA or specific trade agreements signed by the EU.

Regarding the RTA dummy, the results are substantially lower than those obtained for the EU, for all sectors. Moreover, there is a negative effect of RTA on trade flows for trade in Forestry and Logging, which would correspond to a reduction of trade flows by around 16%. Whereas, for the remaining statistically significant results, a standard RTA promotes trade, ranging from 6% in the Manufacturing of Chemical products to about 13% for basic metals. In Figure 18, we compare the estimates for the EU-Korea agreement to the standard RTA. We can see that, for the sectors in which both coefficients are statistically significant, the EU-Korea agreement predicts a larger increase to trade than the RTA dummy variable. We emphasize the fact that we do not capture the full effect of the EU-Korea agreement due to the phase-in phase of such agreements, which is not entirely accounted for since our dataset covers trade flows until 2017.

As regards the remaining control variables, Table 19 shows that the WTO, the Euro, and the EU-Turkey agreement, have a positive effect on trade flows, and they are heterogeneous across sectors. On the other hand, sharing a non-Euro common currency decreases trade, by as much as 63% for trade of pharmaceuticals products. The results are mixed for the Schengen area but most sectors show negative and significant coefficients. Instead, the EU-CHE agreement promotes trade in most sectors, but hampers it for two sectors, Crops & Animals and Furniture & Other Manufacturing.

Table 1: Partial Trade Impact of Regional Trade Agreements (RTA) and the EU-South Korea trade agreement

| Sectors | Classification | Partial Trade Impact (RTA), (%) | Partial Trade Impact (EU-KOR), (%) |
|---|---|---|---|
| Crops & Animals | A01 | 3.67 | 54.81 |
| Forestry & Logging | A02 | -14.10 | 43.05 |
| Fishing & Aquaculture | A03 | 7.36 | -24.72 |
| Mining & Quarrying | B | 3.05 | 50.98 |
| Food, Beverage & Tobacco | C10-C12 | 11.63 | 9.20 |
| Textiles, Apparel & Leather | C13-C15 | 4.50 | 35.53 |
| Wood & Cork | C16 | 11.85 | 16.77 |
| Paper | C17 | -2.86 | 41.20 |
| Recorded Media Production | C18 | 6.93 | 9.97 |
| Coke & Refined Petroleum | C19 | 7.36 | 122.11 |
| Chemicals | C20 | 6.08 | 4.08 |
| Pharmaceuticals | C21 | 0.80 | 65.04 |
| Rubber & Plastics | C22 | 9.64 | 85.34 |
| Other non-Metallic Mineral | C23 | 8.76 | 38.40 |
| Basic Metals | C24 | 12.75 | 11.18 |
| Fabricated Metal | C25 | 10.19 | 25.48 |
| Electronics & Optical Products | C26 | 11.07 | 0.20 |
| Electrical Equipment | C27 | 9.09 | 3.05 |
| Machinery & Equipment | C28 | 3.05 | -0.30 |
| Motor Vehicles | C29 | 9.86 | -16.22 |
| Other Transport Equipment | C30 | 1.21 | 24.36 |
| Furniture & Other Manufacturing | C31-C32 | 11.29 | 30.73 |
| Pooled sectors | | 6.93 | 23.74 |

Note: This Table reports the Partial Trade Impact (PTI) reported in Table 20 in the Appendix. The results reported here are from Table 17 for the pooled sectors and Table 18 for the single sectors. The characteristics, such as set of fixed effects included, can be found in Tables 17 and 18. The Partial Trade Impact (PTI) is computed as $[(exp(\beta_k) - 1) * 100]$, where $\beta_k$ is the estimated coefficient relevant for that sector and variable. We include the PTI also for sectors for which the estimated coefficient is not statistically different from zero. The reported significance levels are: * 10%, ** 5%, *** 1%.

# 3. General Equilibrium Framework: assessing the impact on trade and welfare

In this section, we present the model used to assess the changes from the introduction of a possible RTA between the EU and India. We compare observed data, for which the RTA is not in place, to the data generated for a counterfactual scenario in which the RTA has been introduced successfully. The simulation generating the counterfactual data relies on the structural gravity equation. An appealing feature of this equation, presented in the previous section, is that it is obtained from multiple trade models. However, for the general equilibrium simulation, we need to be more precise about the structure of the underlying trade model.

We describe the assumptions and the features of the two trade models on which we rely on for the GE simulation. The models have a similar structure, and the main difference is that, in the first model, we introduce tariff revenues in the budget balance of the countries. In this section we introduce the model with tariff revenues, while the other model is described in the Model Appendix. Then, we present the data and the different scenarios used in the simulation. The scenarios assume different reductions of trade costs following the introduction of the trade agreement between the EU and India, both in the magnitude of the trade costs reduction and in the sectors affected.

## 3.1. The General Equilibrium model

### 3.1.1. Theory description for the model including tariff revenues

The model used in the present research paper is close to the one introduced by Ottaviano (2014), Caliendo and Parro (2015) and Dhingra et al. (2017). We share with them our modelisation of trade balance. In contrast to their paper however, we stick to the "roundabout production" assumption by Krugman and Venables (1995) for IO linkages.

The main assumptions of the model that we use for our analysis are *(i)* multiple sectors, *(ii)* tradable intermediates, and *(iii)* a perfectly competitive market structure. Furthermore, we consider the presence of tariff revenues at the country-level.

To describe preferences, we consider a Cobb-Douglas upper-tier utility function and a Constant Elasticity of Substitution (CES hereafter) for the lower-tier. The upper-tier determines the allocation of expenditure across different sectors while the lower-tier determines demand for each variety within each sector. Two-stage budgeting applies: first, identical consumers maximize the Cobb-Douglas upper-tier utility function

$$C_j = \prod_{k=1}^{S} (C_{j,k})^{\gamma_{j,k}} \tag{15}$$

where $C_{j,k}$ is the CES-consumption index in sector $k = 1, \ldots, S$ in country *j*. Utility maximization results in constant expenditure shares across sector given by the Cobb-Douglas weight with $\sum_{k=1}^{S} \gamma_{j,k} = 1$.

Once total expenditures have been allocated, each consumer maximizes its CES consumption index in each sector

$$\max_{c_{ij,k}} C_{j,k} = \left( \sum_{i=1}^{n} (c_{ij,k})^{\frac{(\sigma_k - 1)}{\sigma_k}} \right)^{\frac{\sigma_k}{(\sigma_k - 1)}} \tag{16}$$

subject to the budget constraint

$$s.t. \quad \sum_{i=1}^{n} p_{ij,k}\, c_{ij,k} = \gamma_{j,k} E_j \tag{17}$$

where $\sigma_k > 1$ is the elasticity of substitution between the good of sector *k* from different countries. That the consumer perceives varieties as imperfect substitutes implies that she displays a love for variety and will have a strictly positive demand for all goods within a sector. The constraint in equation (17) is used to ensure budget balance for country *j* in sector *k*, so all the revenue available to the representative consumers in country *j* are spent on consumption goods and services. On the left-hand side of equation (17), we have the value of *j*'s imports of good *k*, including the domestic expenditure. On the right-hand side we have the expenditure share for sector *k* times the country-level expenditures, which we could rewrite as sector-level expenditure as

$$E_{j,k} = \gamma_{j,k} E_j \tag{18}$$

The countries apply bilateral import tariffs, which are sector-specific, and we denote the ad-valorem tariffs as $t_{ij,k}$, with $t_{ij,k} \geq 0$. The presence of import tariffs generates tariff revenues, which enter the budget balance at the country-level in the following way:

$$E_j = Y_j + T_j + D_j \tag{19}$$

Where $T_j \equiv \sum_{k=1}^{S} \sum_{i=1}^{n} \frac{t_{ij,k}}{1+t_{ij,k}} X_{ij,k}$ denotes total tariff revenues in country *j*. Instead, $Y_j$ and $D_j$ denote the value of *j*'s production, net of tariff revenues, and the trade imbalance, respectively. The value of production, $Y_j$, is exported to other countries or used for domestic consumption. The total expenditure by country *j*, $E_j$, is the value of all the imports to country *j*, defined as $E_j \equiv \sum_{k=1}^{S} \sum_{i=1}^{n} X_{ij,k}$.

Under a perfectly competitive market structure, the value of production is equal to the cost of labor:

$$Y_j = w_j L_j \tag{20}$$

Where $w_j$ is the wage per worker employed in country *j*; and $L_j$ represents the number of workers in country *j*. This implies that a trade shock that would raise production will translate necessarily into higher wages for the exporter. In other words, the increase in the value of production is entirely distributed to workers as an increase in their wage. Here, we do not have heterogeneous workers, so the distributional consequences of an increase in trade flows across different groups of workers cannot be addressed within this framework. For example, we cannot say if, following the introduction of the trade agreement, there is a substantial increase in the wage for skilled workers relative to the wage of unskilled workers.

At the sector level, we define the trade imbalance $D_{j,k}$ as

$$\sum_{i=1}^{n} \frac{1}{1+t_{ji,k}} X_{ji,k} = \sum_{i=1}^{n} \frac{1}{1+t_{ij,k}} X_{ij,k} - D_{j,k} \tag{21}$$

Where the left-hand side is the expenditure of countries in the world on good *k* produced by country *j*, net of tariff payments. Instead, on the right-hand side, we have the value of country *j*'s imports, again net of tariff payments, minus the trade imbalance.[32] Following this definition, we have a deficit

[32] In this expression, the country *j* appears as exporter on the left-hand side and as importer on the right-hand side, this is why we invert the standard notation of *ij* to *ji* on the left-hand side.

for $D_{j,k} > 0$, and a surplus when $D_{j,k} < 0$. We can think of $D_{j,k}$ as lump-sum transfers across countries.[33]

At the country-level we assume that trade is balanced, so $D_j = 0$,[34] where $D_j$ is defined as the sum of the sectoral trade imbalances, $D_j = \sum_{k=1}^{S} D_{j,k}$. This condition also ensures that trade is balanced at the world-level, meaning that $D = 0$, with $D = \sum_{j=1}^{n} D_j$.
Combing the balanced trade assumption at the country-level and equation (19), we can rewrite equation (18) as

$$E_{j,k} = \gamma_{j,k} \cdot (Y_j + T_j) \tag{22}$$

This expression establishes a link between variables at the aggregate- and sector-level. From equation (22), we can see that even if a sector does not produce tariff revenues, such as the tradable and non-tradable services, it still receives a fraction, $\gamma_{j,k} T_j$ , of aggregate tariff revenues. This model does not include any tax on the income of workers, $w_j$.

The solution to the maximisation problem introduced in equation (16) is

$$X_{ij,k} = \left(\frac{p_{ij,k}}{P_{j,k}}\right)^{1-\sigma_k} \cdot E_{j,k} \tag{23}$$

where $P_{j,k} = \left(\sum_{i=1}^{n} (p_{ij,k})^{1-\sigma_k}\right)^{\frac{1}{1-\sigma_k}}$ is the sector-specific price index for sector *k* in country *j*; $p_{ij,k}$ is the price for a good from sector *k* produced in country *i* and exported to *j*, and it is equal to the domestic price in country *i* augmented by the trade costs to export from *i* to *j*:

$$p_{ij,k} = p_{i,k} \phi_{ij,k} \tag{24}$$

with $\phi_{ij,k}$ denoting bilateral trade costs to export from *i* to *j*. Following the assumption of perfect competition, the domestic price $p_{i,k}$ equals the unit costs of production in country *i* for good *k*. We use the assumption made in Mayer et al. (2019) that firms in the country *i* use labour and tradable intermediates in their production, in proportion $\mu_k$ and $1 - \mu_k$, respectively. The value of $\mu_k$ is the same across all countries, as it is defined as the average share of value-added in the output of sector *k* at the world level.[35] Then, we can write the domestic price as:

$$p_{i,k} = (w_i)^{\mu_k} (P_{i,k})^{1-\mu_k} \tag{25}$$

where we use the "*roundabout production*" from Krugman and Venables (1995). This assumption leads to a simplification of the input-output linkages, so that the price of the good from sector *k* is influenced only by the price index for that same sector *k* in country *i*, and not from the price index of sectors different from *k*. In other words, the Input-Output matrix is diagonal.

We emphasize the fact that our assumption includes labour as a factor of production for the firms, but it does not distinguish between the use of unskilled and skilled labour in production.

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[33] Dekle, et al, (2008) and Costinot and Rodríguez-Clare (2014) discuss the treatment of trade deficits and surpluses as lump-sum transfers in a static model.

[34] In the observed data, the condition is not satisfied, as countries around the world report a surplus or deficit. In the next section we describe how we generate the balanced trade data that are used as baseline instead of the directly observed data for 2014.

[35] Define the value-added in sector *k* by country *i* as $v_{i,k}$, so that if we sum the valued-added in sector *k* by all the countries in the world we get $\sum_{i=1}^{n} v_{i,k} = v_k$. Then, we have $\mu_k = \frac{v_k}{Y_k}$ , where the world output for sector *k* is $Y_k = \sum_{i=1}^{n} Y_{i,k}$.

Consequently, it is not possible to distinguish between the wages received by skilled and unskilled workers, and whether the difference between them increases or decreases following the introduction of a trade agreement.

Given the presence of bilateral import tariffs, we define the total trade costs between country *i* and *j* for good *k* as $\phi_{ij,k} = \tau_{ij,k} \cdot (1 + t_{ij,k})$. All the other components that affect trade costs, for example, ad-valorem equivalent of NTMs, are captured by the iceberg trade cost term, $\tau_{ij,k}$.[36] Using the definition of trade costs and domestic price in equation (24) we obtain

$$p_{ij,k} = (w_i)^{\mu_k} \left(P_{i,k}\right)^{1-\mu_k} \cdot \tau_{ij,k} \cdot (1 + t_{ij,k}) \tag{26}$$

Additionally, we introduce the defintion of the trade elasticity for sector *k*, $\epsilon_k > 0$, which is closely linked to the elasticity of substitution as $\epsilon_k = \sigma_k - 1$.[37] Then, the bilateral trade flow for good *k* between *i* and *j* in equation (23) can be written as:

$$X_{ij,k} = \frac{\left((w_i)^{\mu_k} \left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n} \left((w_i)^{\mu_k} \left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}} \cdot E_{j,k} \tag{27}$$

Now that we have provided a microfundation to the structural gravity equation introduced in the previous section, we describe the steps leading to the counterfactual analysis. First, as we did in equation (1), we define the trade share $\lambda_{ij,k}$ as the ratio between the trade flow from *i* to *j* for good from sector *k* and the total expenditure of country *j* on good from sector *k*:

$$\lambda_{ij,k} = \frac{X_{ij,k}}{E_{j,k}} \tag{28}$$

Relevant trading partners for *j* in sector *k* have a high value of $\lambda_{ij,k}$. Using equation (27) we can see that the trade shares are given by:

$$\lambda_{ij,k} = \frac{\left((w_i)^{\mu_k} \left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n} \left((w_i)^{\mu_k} \left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}} \tag{29}$$

We can obtain the domestic expenditure share, $\lambda_{jj,k}$.[38] Combining equation (28) and the domestic trade flows from equation (27), we obtain:

$$\lambda_{jj,k} = \left(\frac{w_j}{P_{j,k}}\right)^{-\mu_k \epsilon_k} \tag{30}$$

where we used that, for domestic trade, $p_{jj,k} = p_{j,k}$ since $\phi_{jj,k} = 1$, and the definition of the sector-specific price index for sector *k* in country *j*.

The next step is to use the bilateral trade flows in equation (27) in the market clearing-condition, $Y_{i,k} = \sum_{j=1}^{n} \frac{1}{1+t_{ij,k}} X_{ij,k}$. The market-clearing condition ensures that the value of production for the

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[36] According to the definition of iceberg trade costs, part of the good shipped from *i* to *j* is going to "*melt*". Therefore, firms in country *i* must send $\tau_{ij,k} \geq 1$ units of the good to deliver exactly one unit of that good *k* to the consumer in country *j*.

[37] The trade elasticity $\epsilon_k$ is the elasticity of imports relative to domestic demand with respect to bilateral trade costs (see Costinot and Rodríguez-Clare (2014)).

[38] Using the domestic expenditure share, $\lambda_{jj,k}$, we can obtain the share of expenditure of country *j* in sector *k* on imports from the rest of the world as $\sum_{i \neq j}^{n} \lambda_{ij,k} = 1 - \lambda_{jj,k}$.

exporter *i* is equal to the value of its exports to all the countries, net of the import tariffs, including the domestic market. Then, we can write the expression for the production of the exporter country *i* in sector *k* as:

$$Y_{i,k} = \sum_{j=1}^{n} \frac{1}{1+t_{ij,k}} \cdot \frac{\left((w_i)^{\mu_k}\left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n}\left((w_i)^{\mu_k}\left(P_{i,k}\right)^{1-\mu_k} \cdot \phi_{ij,k}\right)^{-\epsilon_k}} \cdot E_{j,k} \tag{31}$$

As last element, we introduce the definition of share of tariff revenues in country *j*'s total expenditures, $\pi_j \equiv \frac{T_j}{E_j}$, with $\pi_j \in (0,1)$. Combining the definition of the share of tariff revenues with equation (20) and (22), we can write:

$$E_{j,k} = \frac{\gamma_{j,k} w_j L_j}{1-\pi_j} \tag{32}$$

In equation (32) we can see that the sector-level expenditures in country *j* are given by *(i)* the share of total expenditures used to buy goods and services from sector *k*, *(ii)* the total income of workers in country *j* which, under the perfectly competitive market structure, is equal to the value of production in *j*, and *(iii)* the tariff revenues, which are allocated to consumers to buy goods and services, through the term $\pi_j$ at the denominator.

So far, we have described the equations for the baseline scenario, in which there is no RTA between the EU and India. Since we are interested in the possible gains (or losses) obtained by the introduction of a trade agreement between the EU and India, we have to look at a counterfactual scenario in which the agreement is in place. To do so, we introduce the "Exact Hat Algebra" discussed in Dekle et al. (2008). The change in a variable of interest *x* is defined as:

$$\hat{x} = \frac{x'}{x} \tag{33}$$

Where $x'$ and $x$ are the equilibrium values of the variable of interest in the counterfactual and baseline scenario, respectively, if $\hat{x} > 1$ it means that the value of the variable in the counterfactual scenario is higher than in the baseline scenario.

The starting point of the simulation is to specify the exogenous parameters that we should expect to change between the baseline and the counterfactual scenario. In this analysis, the difference between the two scenarios is the introduction of an RTA between the EU and India, which impacts their bilateral trade costs, $\phi'_{ij,k}$. The change in trade costs can be computed as:

$$\hat{\phi}_{ij,k} = \hat{\tau}_{ij,k} \cdot \frac{\left(1+t'_{ij,k}\right)}{\left(1+t_{ij,k}\right)} \tag{34}$$

where $t'_{ij,k}$ is the ad-valorem import tariff in the counterfactual equilibrium. Countries that are not part of the trade agreement do not face any change in their trade costs, so $\hat{\phi}_{ij,k} = 1$ if the country-pair does not include India and a member of the EU-28. The introduction of a trade agreement lowers the ad-valorem tariff faced by its members when trading with each other, so $t'_{ij,k} < t_{ij,k}$, leading to a ratio smaller than one in equation (34). Furthermore, the trade agreement aims at reducing NTMs between trade partners, which we capture through a reduction in $\hat{\tau}_{ij,k}$. For example, if we assume that the trade agreement reduces the ad-valorem equivalent of NTMs by 1% in all sectors, we set a value of $\hat{\tau}_{ij,k} = 0.99$ for all *k*. Notice that we are not specifying which NTM is contributing to this reduction of $\hat{\tau}_{ij,k}$ so, in each sector, it might be a consequence of changes in different NTMs. For the non-tradable, there is no change in trade costs, as these services are sold

entirely to the domestic market, for which trade is frictionless, meaning that trade costs are always equal to 1.

Now, we introduce some of the results obtained using the Exact Hat Algebra in the budget balance and in the definition of country-level production, $Y_i$. The first result is that, if the number of workers employed in country *i* is the same between the counterfactual and baseline scenarios, that is $L_i = L_i'$, we obtain:

$$\hat{Y}_i = \frac{Y_i'}{Y_i} = \frac{w_i' L_i'}{w_i L_i} = \frac{w_i'}{w_i} = \hat{w}_i \tag{35}$$

The constant level of employment is assumed not only for the sake of simplicity but also because a careful analysis of the impact of trade on the labour market would require a theoretical explanation for the initial level of unemployment in each country. In this standard framework, potential effects on the unemployment rate are absorbed instead by a change in wages, underestimating thereby the adjustment costs on the labour market.

Another result is that since the share of the total expenditure of country *j* going to sector *k* is the same in the counterfactual and baseline scenario, from equation (18) we can see that $\hat{E}_{j,k} = \hat{E}_j$. Then, using equation (32) and (35), we can write the change in expenditures as

$$\hat{E}_j = \hat{E}_{j,k} = \frac{(1 - \pi_j)}{(1 - \pi_j')} \cdot \hat{w}_j \tag{36}$$

We want to emphasize that this has an impact on the change in expenditures for the non-tradable services, which is different from one, as it is influenced by the effect of the trade agreement on the other sectors through country-level variables.

We close the model by deriving the equation to compute welfare changes, where the welfare is defined as real expenditure:

$$C_{j,k} = \frac{E_{j,k}}{P_{j,k}} \tag{37}$$

From equation (30) and (18) respectively, we plug in the above equation the domestic expenditure share as well as the sector-level expenditures and obtain:

$$\lambda_{jj,k} = \left(\frac{w_j C_{j,k}}{\gamma_{j,k} E_j}\right)^{-\mu_k \epsilon_k} \tag{38}$$

Rearranging the terms to isolate $C_{j,k}$ leads to:

$$C_{j,k} = \lambda_{jj,k}^{-\left(\frac{1}{\mu_k \epsilon_k}\right)} \cdot \frac{\gamma_{j,k} E_j}{w_j} \tag{39}$$

The last step is to use the Exact Hat Algebra and equation (36):

$$\hat{C}_{j,k} = \hat{\lambda}_{jj,k}^{-\left(\frac{1}{\mu_k \epsilon_k}\right)} \cdot \frac{(1 - \pi_j)}{(1 - \pi_j')} \tag{40}$$

The expression that we derived for the welfare change is similar to the results obtained by Ottaviano (2014) and, falls more generally in the class of trade models studied in the seminal work of Arkolakis et al. (2012) and extended by Costinot and Rodríguez-Clare (2014). The trade elasticity for sector *k*, $\epsilon_k$, and the change in the share of domestic expenditure, $\hat{\lambda}_{jj,k}$, are sufficient statistics to compute

changes in welfare. Moreover, the welfare change depends on tariff revenue shares. For non-tradable services, we have $\hat{\lambda}_{jj,k} = 1$ by definition so real consumption in that sector will only be affected by the change in expenditure induced by tariff revenue changes.

In the upper-tier, use equation (40) to get:

$$\hat{C}_j = \frac{(1 - \pi_j)}{(1 - \pi'_j)} \cdot \prod_{k=1}^{S} (\hat{\lambda}_{jj,k})^{-\frac{\gamma_{j,k} a_{j,kk}}{\epsilon_k}} \quad (41)$$

At the aggregate level, we consider the change in real expenditure for each sector *k*, weighted by the Cobb-Douglas parameter, $\gamma_{j,k}$ . Additionally, given the presence of tradable intermediates, we have the term $a_{j,kk}$, as it is common in the literature, to denote the elements on the diagonal of an inverse Leontief matrix of input-output linkages $(I - A_n)^{-1}$. As in Mayer et al. (2019), we simplify the structure of the input-output linkages, so that, for a sector *k*, the intermediate inputs are sourced from that same sector *k*.[39] The elements on the diagonal of the matrix $A_n$ are the technology parameters $\alpha_{j,kk}$, which are equal to $\frac{1}{\mu_k}$.

The ratio on the right-hand side of equation (41) is related to tariff revenue. In the case of the implementation of an RTA, tariff cuts on trade between members would reduce tariff revenue compared to the initial situation, dampening the gains generated by additional bilateral trade flows since tariff revenue is redistributed to consumers.

Following the reduction in trade costs, consumers face lower prices, so they increase their demand for goods and services. This change in prices also affects the tradable intermediates used in production. On the supply side, given the perfectly competitive market structure, we know from equation (35) that an increase (respectively a decrease) in production is entirely distributed to workers under the form of a higher (lower) wage. The changes in income and prices influence the domestic expenditure share, $\lambda_{jj,k}$, since, from equation (30), we know that it is a function of the wage and the sector-specific price index. The trade elasticity, $\epsilon_k$, determines whether domestic and foreign varieties are perceived as differentiated or close substitutes. In the former case, the impact on welfare of a reduction in trade costs is more substantial, while in the latter case, as $\epsilon_k$ increases, the impact is less severe.

To sum up, the model described in this section yields a structural gravity equation for the demand of goods and services, which depends on country-specific characteristics and bilateral trade costs between countries. A trade agreement leads to a reduction in trade costs between the EU member states and India, leading to lower prices of foreign goods and services to consumers; thus, increasing their consumption. On the supply side, the change to prices is magnified through tradable intermediates used in production. Moreover, countries that face an increase in the demand for their goods raise their production to satisfy it. In turn, the increase in production leads to an increase in the wage in that country. Combined with an improvement of the terms of trade, countries real income also goes up. The reduction in tariff revenues however mitigates the increase in expenditures. Finally, the increase in real expenditures on goods and services from all the countries in the world reflects a lower domestic expenditure share, $\lambda_{jj,k}$, and an increase in the expenditure share on goods and services from trade partners, in particular, for the EU, on imports from India.

### 3.1.2. Simulation of the model with tariff revenues

In the observed data, the country-level condition for balanced trade is not satisfied, as countries around the world report a surplus or deficit. Following the literature, we realise a preliminary

[39] Then, the final product of sector *k* can be either used for final consumption or as input for production.

simulation of this model where we eliminate $D_j$ keeping bilateral trade costs fixed. We obtain a counterfactual equilibrium which features bilateral balanced trade.[40] We then use it as our new baseline data to simulate the effect of the trade agreement which consists in a negative shock on trade costs.[41] In this section, we omit therefore the deficits as the baseline data is considered to be balanced.

Before describing the algorithm, we introduce two results obtained using the Exact Hat Algebra. The first is that the change to trade shares is computed as:

$$\hat{\lambda}_{ij,k} = \frac{(\hat{w}_i)^{\mu_k}\left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\cdot\hat{\phi}_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n}\lambda_{ij,k}\cdot(\hat{w}_i)^{\mu_k}\left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\cdot\hat{\phi}_{ij,k}\right)^{-\epsilon_k}} \tag{42}$$

The second result is the change in the price-index at the sector-level which is given by:

$$\hat{P}_{j,k} = \left(\sum_{i=1}^{n}\lambda_{ij,k}\cdot(\hat{w}_i)^{\mu_k}\left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\cdot\hat{\phi}_{ij,k}\right)^{-\epsilon_k}\right)^{-\frac{1}{\epsilon_k}} \tag{43}$$

In Figure 19, we introduce the steps used in the simulation for the model with tariff revenues, which uses the fixed point iteration adopted by Mayer et al. (2019). We first initialize the changes in the price-index and country-level wages. Moreover, we also set the change in country-level tariff revenues to be equal to one, since we use them in step 2) to compute the counterfactual sector-level expenditures.

In step 1), the initialized values are used to compute the counterfactual trade shares, which represent the input for step 2). The second step uses the Exact Hat Algebra to compute the counterfactual trade flows as:

$$X'_{ij,k} = \lambda'_{ij,k}\cdot E'_{j,k} \tag{44}$$

where $E'_{j,k} = \gamma_{j,k}(\hat{Y}_j\cdot Y_j + \hat{T}_j\cdot T_j)$. For the variables on the right-hand side, we use results from step 1) and the new expenditures. Then, in step 3), we obtain counterfactual exports by country *i*, net of tariff revenues, and sector-level tariff revenues using the counterfactual trade flows and import tariffs in the definition of tariff revenues. We use step 4) to compute, and update, the initialized sector-level price-index.

Then, we move to the country-level variables. In step 5) we use sector-level results to sum across sectors, obtaining aggregate counterfactual values. Notice that trade is assumed to be balanced at the country-level, so imports equal exports (net of tariffs). In other words:

$$\sum_{k=1}^{S}\sum_{i=1}^{n}\frac{1}{1+t'_{ji,k}}X'_{ji,k} = \sum_{k=1}^{S}\sum_{i=1}^{n}\frac{1}{1+t'_{ij,k}}X'_{ij,k} \tag{45}$$

Therefore, we can obtain the value of imports, net of tariff revenues, as the sum across sectors of production at the sector-level, which we obtained using the market-clearing condition. In step 6) we use the Exact Hat Algebra to compute the change in wages and tariff revenues, which we

[40] We do not obtain *exactly* $D_j^{'} = 0$ due to observations with zero production, $Y_j = 0$. However, the results are very close to zero for most countries in the sample, except for a small group of countries for which we obtain $-2 \leq D_j^{'} \leq 2$, where the numbers are to be interpreted as million USD. For example, $D_j^{'} = 2$ is a deficit for country *j* of 2 million USD.

[41] In their analysis, Dhingra et al. (2017) use the same approach to generate data with country-level balanced trade.

substitute in the initial values. Step 7) uses the results from step 5) to compute the counterfactual share of tariff revenues, which is required to obtain the welfare change at the end of the simulation.

We go back to the sector-level to use the results from step 6) and 4) to compute new changes in trade share, as in equation (42). In step 9) we compare the new trade shares from step 8) with the initial values at step 1). We repeat this comparison for each sector *k* included in the simulation. Remember that now the non-tradable services are part of the simulation since their expenditures depend on the country-level variables.

To end the simulation, we check if the difference between trade shares, computed in step 9), are close to zero. If so, it means the algorithm is close to reaching a fixed point, as updating the price-index and wages leads to almost no variation in trade shares. To conclude, we proceed with the computation of the welfare change for each country, first at the sector-level and then at the country-level.

### 3.1.3. Data

The data used for the GE simulation are from the World Input-Output Database (WIOD) by Timmer et al. (2015). This database covers the period from 2000 to 2014, and we use data for the most recent year available.[42] From this source, we obtain bilateral trade flows, production, and expenditures for 42 countries in 56 sectors following the ISIC Rev. 4 classification.[43] We aggregate the service sectors into two aggregate categories, the tradable and non-tradable services, so that our analysis includes 42 countries and 24 sectors: 22 sectors cover trade in goods and the remaining 2 are the tradable and non-tradable services. When presenting the simulated scenarios, we specify if we disaggregate the tradable services to assume heterogeneous trade costs shocks on those sectors. Moreover, we use the WIOD data to compute the technology parameters, $\alpha_{j,kk}$, and the average share of value-added in world production by each sector, $\mu_k$.

A crucial parameter in our new quantitative trade model framework is the trade elasticity $\epsilon_k$, i.e. the elasticity of imports with respect to bilateral trade costs. This parameter can be recovered from the estimates of the structural gravity equation if data on ad-valorem bilateral tariffs are included in the regressions. In our case, in the empirical analysis, we do not have data on bilateral tariffs that match the set of countries, time interval and sectors included in our dataset, so we are not able to recover the trade elasticities. Therefore, we use sector-specific trade elasticity estimated by Caliendo and Parro (2015, Table 1). As the data in our analysis cover a broader, and more disaggregated range of sectors, we match their trade elasticities to the sectors in our model.[44] For the simulation of the model without tariff revenues, we set the trade elasticities for two sectors, denoted as B and C19,[45] to the standard value of $\epsilon_k = 5.03$ reported in Head and Mayer (2014). We apply this adjustment to solve a problem of convergence to the fixed point for the change in bilateral trade shares, which was caused by the large values of $\epsilon_k$ reported in Caliendo and Parro (2015). As a robustness check, we provide results for simulations in which we set the trade elasticities $\epsilon_k = 5.03$ for all sectors in the economy.

We also include a sensitivity analysis in which we modify only the trade elasticity of the aggregate tradable services. To be more specific, in this sector, we apply the value of $\epsilon_k = 5.03$ in the

[42] The interval from 2000 to 2014 is covered by the 2016 release of the WIOD. We access this data from: http://www.wiod.org/database/wiots16

[43] The Table Appendix includes a list of the countries, in Table 14, and sectors covered, in Tables 15 and 16. We aggregate data for Russia to the Rest of the World (ROW), as numerous sectors in Russia report production of zero.

[44] In Table 24 we include a list of the values of $\epsilon_k$ and $\mu_k$ for each sector *k*.

[45] To be more precise, sector B denotes "Mining and quarrying", while C19 is "Manufacture of coke and refined petroleum products".

benchmark results since Caliendo and Parro (2015), Dhingra et al. (2017) and Costinot and Rodríguez-Clare (2014) do not provide specific estimates for this parameter for the service sector.[46] Then, in the sensitivity analysis, we vary the trade elasticity for tradable services between $\epsilon_k = 3.00$, and $\epsilon_k = 7.00$.[47]. The use of a lower value for the trade elasticity causes domestic and foreign varieties in the tradable services to be perceived by the consumer as more differentiated. In contrast, a higher value of the trade elasticity causes the varieties to be closer substitutes.

An important input for the model without tariff revenues is the average effect of regional trade agreements on trade flows, $\beta_{1,k}$, [48] used in equation (54) in the Model Appendix to set the shocks on the change for bilateral trade costs. We obtain the sector-specific values of $\beta_{1,k}$ from the results presented in Tables 18 and 19 for the OLS regressions. As a robustness check, we repeat the simulation using values of $\beta_{1,k}$ estimated via PPML, in Tables 22 and 23.[49] We specify in the simulated scenarios if we assume a different impact on change in trade costs. For example, we might use the estimates for the effect of the EU-Korea trade agreement on bilateral trade flows, instead of the average effect of RTAs. In all the scenarios considered, we use the estimates from Table 17 to compute the shocks to bilateral trade costs for sectors that report negative RTA or EU-KOR coefficients. As we do not have data on trade in services, we are not able to estimate $\beta_{1,k}$ for these sectors. To overcome this problem, we use the estimates from the pooled regression across sectors from Table 17 and follow Mayer et al. (2019) in assuming that the average effect of RTAs on trade in services is half the average impact estimated for trade in goods , that is $\beta_{1,serv} = \frac{\beta_{1,goods}}{2}$. [50]

For the model with tariff revenues, we obtain bilateral tariffs data for the year 2014 from an extended version of the MAcMap database by Guimbard et al. (2012) and Bouët et al. (2008). This dataset utilises the Harmonized System 6 digits, revision 2012, as product classification. In the WIOD data, the countries that are not included as single countries are aggregated into the Rest of the World (RoW). To obtain bilateral import tariffs of the countries in the WIOD table for the RoW, we first weight the tariffs at the HS 6 digits product level using trade flows, [51] both import and export values, from the BACI dataset used in the previous section.[52] Then, as we did for the BACI dataset, we use a correspondence table released by the OECD to map the products to the ISIC Rev. 4 classification. Each sector in the ISIC Rev. 4 includes an ad valorem equivalent of the preferential applied tariff that is obtained as an average of the tariffs reported for the HS 6 digits products which compose that sector according to the correspondence table. As a robustness check, we also compute bilateral import tariffs weighted by imports for each country-pair in WIOD.

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46 Dhingra et al. (2017) and Costinot and Rodríguez-Clare (2014) also use a value of 5 for the trade elasticity in the service sector.

47 These two values are part of the range of trade elasticities, which goes from around 3 to 8, estimated in the literature using extensions of the methodology in Eaton and Kortum (2002).

48 $\beta_{1,k}$ is the combination of the ad-valorem tariffs equivalent cut in trade costs of the regional trade agreement and the trade elasticity, $\epsilon_k$.

49 On request we can present the results from this simulation.

50 This approach is similar to what Mayer et al. (2019) use in their analysis. The difference is that they have data for trade in services, and they obtain that the effect of the EU is half of what they observe for trade in goods. Hence, they are using aggregate trade in goods, and not the result from a pooled regression across sectors.

51 We apply this correction to the bilateral tariffs only for the countries that are part of the Rest of the World. For the remaining country pairs included in WIOD, we maintain the bilateral preferential tariffs reported in the dataset at the product-level, for example, for imports to India from Germany.

52 As a consequence, the tariffs assigned to the Rest of the World are constructed using the countries for which we can match the bilateral tariffs in the MAcMap dataset to the trade flows in the BACI dataset. We do not take the simple average because that would give the same weight to the import tariffs applied by, for example, Russia and Nepal, which are both countries in the Rest of the World aggregate.

### 3.1.4. Counterfactual Scenarios

In this section, we provide an overview of the simulated scenarios. For each scenario, we make assumptions on *(i)* the reduction in ad-valorem bilateral import tariffs and Non-Tariff Barriers (NTBs), and *(ii)* whether the impact is homogenous or heterogenous on the sectors of the economy. Unless specified otherwise, we apply to both parties of the RTA the same reduction in the ad-valorem import tariffs or NTBs (in relative terms).

Under Article XXIV of GATT, an RTA, should cover "*substantially all the trade*"[53] in goods to be compatible with WTO rules. This expression is usually interpreted as saying that the RTA should *(i)* cover at least 90% of the total trade in goods between the liberalizing countries and *(ii)* bring 90% of the tariff lines at the product-level to 0% over a time interval of fifteen years.

We can easily verify if the first condition is satisfied while checking whether we satisfy the condition of 90% of tariff lines reduced to 0% or not is difficult since we use data at the sector-level. As we discuss below, in the scenarios, we apply a bilateral reduction in the average imports-weighted tariffs at the sector-level, but we are not able to distinguish which tariff lines contribute to this result. Therefore, for each sector, we are not able to check the number of tariff lines reduced to 0%. There are multiple combinations of reductions to product-level tariff lines that might lead to the same percentage reduction at the sector-level. For example, in the Food, Beverage & Tobacco sector, we see from Figure 14 that India reports a simple average import tariff close to 33.19%. In one of the simulated scenarios, which we discuss below, we assume that India applies a 30% reduction in its import tariffs in that sector. Therefore, in the counterfactual scenario, the simple average tariff for the Food sector is around 23.23%, which corresponds to a 30% reduction from the baseline value.

As regards the first condition, in Figure 11, we can see the share of sector-level imports out of total trade in goods between the EU and India in 2014. To satisfy the criteria set by the WTO, we can see that, for example, the Textiles, Apparel & Leather sector must be included in the trade agreement, and therefore in the simulation, as it represents 25.6% of the total imports of the EU from India in 2014. As regards India, four sectors are above the 10% imports share threshold, and combined they represent 62.2% of the imports by India from the EU. There is only one sector that is relevant to both countries above a 10% threshold value, and it is the Manufacture of Chemicals and Chemical products.

For the model with tariff revenues, we use as shocks to trade costs the percentage change to import tariffs and ad-valorem equivalent of NTBs for each sector. Unless specified otherwise, the percentage reduction is applied to both, the member states of the EU and India. Moreover, we consider the presence of a customs union between the EU and Turkey. Therefore, we lower the duties that Turkey applies to imports from India by the same percentage as for the EU while India does not change its tariffs applied to imports from Turkey. Figure 1 summarizes the scenarios considers for our preferred results and for the different robustness checks.

In Table 26, we report the shocks applied to trade costs in the model with tariff revenues.[54] In Scenario 1, our preferred one, we apply a symmetric reduction in the average import tariffs by 90% in most sectors. For the Crops & Animals and Food, Beverage & Tobacco, we apply limited reductions to average sector-level import tariffs to match the decrease in tariffs applied in Decreux and Mitaritonna (2007), taking into account that their industry classification differs from ours. The authors describe these sectors as including sensitive products for both, the EU and India, so the reduction in tariffs is limited and asymmetric. These sensitive products, which have large import

[53] This is part of provision 8.b) of Article XXIV of the GATT.

[54] We want to emphasize that the assumptions on the reductions of sector-level average import tariffs applied in each scenario are not part of an official tariff plan.

tariffs, drive the resulting average import tariff at the sector-level. The lack of (or the limited) reduction of tariffs on sensitive products leads to a limited decrease in the average import tariffs. We also apply an asymmetric reduction in the Fishing & Aquaculture sector, with India reducing tariffs by 70% while the EU by 90%. In the Motor Vehicles and Other Transport Equipment, which are also considered as sensitive sectors, we apply a symmetric reduction of tariffs by 50%.

We want to emphasize that the Motor Vehicles and Other Transport Equipment are not considered as including sensitive products in Decreux and Mitaritonna (2007) so the limited reductions applied may seem puzzling at first. The report by the Directorate-General for External Policies, Policy Department (2015) however, mentions that the EU has concerns over the high import tariffs applied to cars in India. To investigate this aspect, we used the MAcMap database by Guimbard et al. (2012) and Bouët et al. (2008) to look at the import tariffs applied in 2014 (our baseline year) on products traded between the EU and India in the Motor Vehicles and Other Transport Equipment sectors. We find that India applies ad-valorem import tariffs of 100% to a small group of products in both sectors, while the remaining products have substantially lower tariffs. As regards the EU, in these two sectors, we find a few products with ad-valorem import tariffs around 15%, which are significantly lower than the import tariffs applied by India, but it is large compared to other import tariffs applied by the EU in these sectors, which are close to 4%. Therefore, the presence of sensitive products seems to apply also to these two sectors, in particular for India. Then, in these sectors, we consider a tariff reduction that would match a total removal of tariffs for 90% of the tariff lines over fifteen years. For example, in the Motor Vehicles sector, we decrease Indian import tariffs to zero for all products with import tariffs lower than 100%. However, this is not enough to reach the threshold of 90% tariff lines, which requires instead to liberalise part of the sensitive products.[55] As a result, we obtain a decrease in the simple average import tariffs at the sector-level that is close to 50%. We find similar results for the Other Transport Equipment sector.

In the end, we consider the assumption on the reduction in average sector-level import tariffs in the first scenario to be consistent with a limited reduction of import tariffs on sensitive products.[56] We use the second scenario to simulate the possibility of a more substantial decrease in import tariffs on sensitive products, which might be achieved during the negotiations.

As regards NTBs, we apply a 3% reduction in protection to all sectors,[57] including tradable services, which is a consequence of any type of cooperation reducing trade costs, other than tariffs, for

[55] For example, lowering tariffs only for 2 sensitive products means that we are close to the 90% threshold but slightly below it. Instead, using 3 products, we slightly exceed the 90% tariff lines threshold. However, we do not know if negotiators allow for small deviations (in both directions) from the threshold considered. Therefore, we consider both scenarios to be possible.

[56] In the Motor Vehicles and Other Transport Equipment sectors there are also combinations of reductions to product-level import tariffs on sensitive products that yield decreases in the average sector-level import tariffs larger than 50%. However, increasing the reductions of the average sector-level import tariffs for these two sectors, while leaving the assumptions on the other sectors unchanged, would generate results for the welfare changes of India and aggregate EU that range between our values reported for scenario 1 and 2. Since also the assumptions on other sectors are modified when moving from scenario 1 to scenario 2, for example in the Food sector, the results obtained by decreasing the Motor Vehicles and Other Transport Equipment sectors by more than 50% might only approach the values reported for scenario 2. On request, we can provide the results obtained in a simulation similar to scenario 1, in which the average sector-level import tariffs in the Motor Vehicles and Other Transport Equipment sectors are decreased by 90% instead of 50%. As we discussed, the results for such simulation approach the results that we report for scenario 2.

[57] We do not use our ex-post estimates of RTAs and EU-Korea to obtain ad-valorem tariff equivalent reductions values for three reasons. First, in the empirical part, we lack data on observed tariffs, which are unavailable at the product-level over the period 1995-2017, so our ex-post estimate of RTAs does not disentangle the effect of a reduction in ad-valorem tariffs from the one in the ad-valorem equivalent of NTBs. Although we cannot disentangle the two effects, we acknowledge that our ex-post estimates of RTAs and EU-Korea might yield an ad-valorem tariff equivalent of RTAs in which the contribution of a reduction in NTBs dominates the effect of lower ad-valorem tariffs. Second, we find

example, negotiated equivalence on standards. Lower uncertainty between trade partners might also be part of the reduction in NTBs, as the trade agreement might reduce the difference between bound commitments and applied levels of protection (see Decreux & Fontagné, 2013; Nilsson, 2018). In Decreux and Fontagné (2013), the authors report that they lack precise information to quantify the potential reduction in the protection of services, so, in their simulation using the MIRAGE model, they decide to apply a reduction of 3%. We extend this reduction of the ad-valorem equivalent of non-tariff measures by 3% to all sectors since this value falls in the range of possible NTBs reductions obtained using a methodology similar to what has been used by Dhingra et al. (2017, Table 2).[58]

We do not use the values of 10% and 25% of reduction in NTBs in services as realised by Decreux and Mitaritonna (2007) for two reasons. First, the authors adopt these values following the assumption of a successful Doha Round. Second, these reductions seem quite significant in comparison to the NTBs cost in services between the EU and USA reported in Dhingra et al. (2017, Table 2). Moreover, once we account for what we consider as non-tradable services,[59] the values of 10% and 15% remain large in comparison to the assumed NTBs reductions in services in Felbermayer et al. (2017) in the context of the EU-Japan FTA.

Given the expression of trade costs in equation (34), the changes in NTBs contribute to a change in trade costs through the term $\hat{\tau}_{ij,k}$. We maintain the homogeneous reduction of 3% to NTBs in both scenario 1 and 2. In a third scenario we apply the same reduction in tariffs used for scenario 1, but now we remove the reduction in NTBs to show how this assumption affects the results. Notice that, by removing the reduction in NTBs, there is no trade liberalisation on the tradable service sector.

We now discuss the scenarios for the model without tariff revenues, and the result obtained with this model are reported in section 4.2 as part of the sensitivity analysis. In Table 25, we present the scenarios applied to the model without tariff revenues, where the shock to bilateral trade costs follows equation (54) in the Model Appendix. The scenarios discussed for this model differ from what we have described in this section. In equation (54), the changes in bilateral trade costs do not consider tariffs as a separate component from the iceberg trade costs term. Therefore, in this model, we use the results that we obtained in the empirical analysis to set a reduction in bilateral trade costs between liberalising countries, without disentangling between a specific percentage decrease in import tariffs and/or NTBs. In scenario 1, we assume a reduction in trade costs obtained using the estimated effect of the trade agreement between the EU and South Korea, which entered into force in 2011. According to Felbermayr et al. (2017), the bulk of the increase for trade in goods between the EU and Korea, following the introduction of the agreement, is a consequence of reductions to NTBs. We might consider this scenario to be more realistic than the others if the potential EU-India trade agreements manage to achieve at least a similar reduction in trade costs. We want to emphasize that this does not imply that the two agreements should achieve the same reduction in NTBs, as the total reduction in trade costs is a combination of reduction in NTBs and import tariffs. In scenario 2, we assume that the EU-India trade agreement achieves a reduction of trade costs,

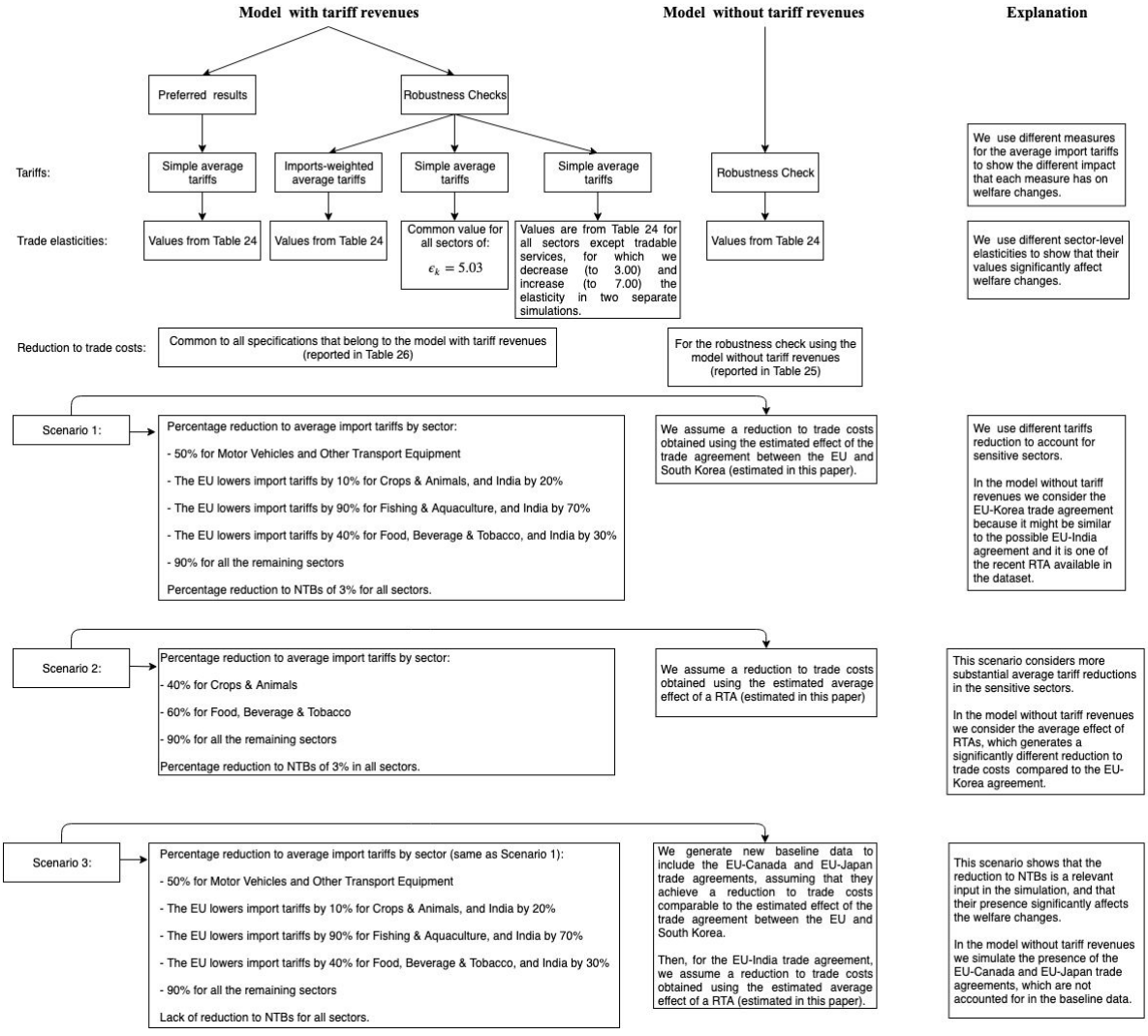
questionable results of ad-valorem tariff equivalent of RTAs and EU-Korea for two sectors, namely the Rubber & Plastics and the Other Transport Equipment. In both sectors, our results are driven by very low trade elasticities. Third, but closely related to the first two reasons, to successfully compute the ad-valorem tariff equivalent of RTAs and EU-Korea we would need to estimate our own trade elasticities so that the estimates of the agreements and the elasticities are obtained from the same estimation. However, we cannot estimate them due to the unavailability of product-level data on tariffs for the time period considered in our empirical analysis.

[58] Here we use the same tariff equivalent of NTBs and reducible share of NTBs as Dhingra et al. (2017, Table 2), and we follow their methodology to compute the overall weighted average across sectors using as weights the total trade by sector between the EU and India.

[59] In Felbermayr et al. (2017, Figure 17), the authors report NTBs reductions higher than 10% for the Electricity, Water Collection, and Human Health and Social Work sectors. In our analysis, these sectors are part of the non-tradable services.

through a reduction of both tariffs and NTBs, that is comparable to the average effect of standard RTA. In the third scenario, we use the same reduction in trade costs as in the second scenario. However, we consider that the observed data refer to the year 2014, so the effects of the EU-Canada and EU-Japan trade agreements are not present in the data. To include them, we generate new baseline data for the EU-India simulation. These new data are the results of preliminary simulations, using the observed 2014 data, in which we introduce the EU-Canada and EU Japan agreements.[60] We assume that both agreements lead to the same reduction in trade costs, and that it is equal to the estimated effect of the EU-Korea trade agreement.

Figure 1: Summary of the scenarios used in the main specification and robustness checks




Note: Illustration realised by the authors using draw.io

[60] We realise one simulation per trade agreement, and we follow the date of entry into force of those trade agreements to choose the order of the simulations. Therefore, we first introduce the EU-Canada agreement, and then we use the generated data as the baseline for the simulation with the EU-Japan trade agreement.

# 4. Results for the general equilibrium analysis

We now apply the scenarios described in the previous section to their respective general equilibrium model. We first discuss the welfare change for each country, followed by the change in aggregate flows for trade in goods and services for each member states of the EU. Then, we present the disaggregated changes at the sector-level for trade flows between the EU28 and India.

The results are static level effects on the variables of interest caused by the shift to a new equilibrium, that can be interpreted as long-term effects but do not allow to model the transition path. Here, we compare the values of the variable at a given point in time between its value in the baseline and counterfactual scenarios. For example, when we state that real consumption in India increases by 8,143 million EUR, it means that the level of the real consumption in the counterfactual scenario is higher, by 8,143 million EUR, than its level value in the baseline.

One limit of the present approach is that we abstract from potential dynamic effects whereby an EU-India FTA could impact countries' growth rates. These dynamic effects, however, are much less understood in the literature and can lead quickly to very large gains or losses. We choose purposedly to remain agnostic about them, as is standard in the literature.

In this section, using a series of sensitivity analysis and simulated scenarios, we show that the values of the trade elasticities and the reductions to sector-level NTBs drive our results. In particular, going from scenario 1 to scenario 3, that is a shift on the reduction of NTBs from 3% to 0%, decreases by half the welfare gains for India and the EU overall. Changing the values of the trade elasticities has a lower but still significant impact on the welfare gains of the liberalising countries. A decrease or increase in the value of the trade elasticity means that consumers perceive domestic and foreign varieties as more differentiated or closer substitutes, respectively.

## 4.1. Results for the model with tariff revenues

### 4.1.1. Welfare change

We start by describing the results for the model that takes into account the effect of tariff revenues, using the simple average of bilateral import tariffs for each sector. For scenario one, we report, in details, the results for the welfare change, defined as the change in real expenditures, and for trade flows. For the remaining scenarios, we discuss their results if they are significantly different from what we obtain in the first scenario.

In Tables 27 and 28, we report the welfare changes for all the countries in the sample, as both, changes in percentage or million EUR[61] from the baseline values. First, we can notice that the welfare changes are heterogeneous across countries, and, as expected, the magnitude of the effect on the members of the trade agreement is substantial compared to the rest of the world.

As regards the liberalising countries, in Figures 25 and 26, we illustrate the welfare gains for the member states of the EU28. Overall, estimated gains are limited: Luxembourg, the least affected member state, has a consumption increase by 0.0009%, or 1.58 million EUR while Estonia has an estimated increase in real expenditures by 0.0501%, that is 20.46 million EUR. The largest difference (in EUR) from the baseline is for Germany, for which consumption expands by about 2,200 million EUR. Overall, large countries of the EU28 gain more than smaller countries, since we can see that the consumption-weighted change, which accounts for the economic size of the member states, is close

[61] In this section the results are reported in million EUR. Since the original data are in USD for the year 2014, we convert the results using the annual average exchange rate of 1 EUR = 1.3285 USD for 2014 retrieved from the tables on bilateral exchange rates from Eurostat.

to 0.0303%, while the simple average across the member states is significantly lower, at 0.0262%. The total gain for the EU amounts to 8,015 million EUR. Outside of the EU28, India reports an increase of real expenditures by 0.2733% or 8,143 million EUR.

In Table 29, we report the rank correlation between the three scenarios considered for welfare changes, in percentages and million EUR, reported by the member states of the EU. We can see that the ranking of countries between the first and second scenario have a positive correlation close to one. Indeed, from Table 27, we can see that, for each country, the gains are now higher, but the increase is heterogenous across countries. Overall, for the EU consumption expands by around 8,540 million EUR, that is almost 525 million EUR higher than the previous scenario. Whereas, for India, the difference between the two scenarios is close to 827 million EUR, since its consumption increases by 8,970 million EUR in the second scenario.

We now show how our assumption for scenario 1 on the homogeneous reduction of trade costs by 3% on all sectors, due to lower NTBs, matters for the results. In the third scenario, we maintain the reduction in bilateral import tariffs of scenario 1 while removing the reduction in NTBs. As we can see in Tables 27 and 28, the difference is important. Starting from the consumption-weighted and simple average for the EU28, we can see that the results are less than half of what we reported for the first scenario. The former decreases from 0.0303% to 0.0139%, while the simple average from 0.0262% to 0.0117%. For most of the member states, half or more of the welfare gain is wiped out, as the prices to sell or buy goods and services from India are higher than in scenario 1 as there is no reduction in trade costs, dampening thereby the positive change in real expenditure. Two member states are heavily affected: for Denmark and Luxembourg the welfare change in scenario 3 is almost one-quarter of the effect of scenario 1. The former country now reports an increase in real expenditures by 23.79 million EUR, down from 106.62 million EUR, while the latter approaches a null effect of the trade agreement as in the third scenario its consumption increases by 0.0002%. Overall, the aggregate gain for the EU28 is 3,676 million EUR, which is comparable to the increase of 3,749 million EUR in India, which is also significantly affected by the assumption in the third scenario.[62]

Overall, from the analysis of the welfare change, we notice that EU countries and India would benefit from the implementation of an RTA in terms of real consumption, but gains are limited.[63] Moreover, we show that changing the assumption on the reduction of import tariffs for sensitive sectors has heterogeneous, but not substantial, effects on the welfare changes. Finally, with scenario 3, we illustrate the assumption about the reduction of NTBs influence the results heavily. Table 2 below summarizes the changes in real expenditures discussed in this section for the EU28 and India.

[62] In Turkey, the welfare gains jump from 0.0008% to 0.0061%, that is from 8.58 to 68.80 million EUR. The explanation for this increase is that Turkey, in relative terms, is now a closer trade partner to India than in scenario 1. In both scenarios, the reduction of the tariffs adopted by the EU28 also applies, unilaterally, to Turkey, but it is not the case for reduction in NTBs. Therefore, in scenario 1, the member states of the EU28 were less remote to India relative to Turkey, as their prices on goods and services were also affected by the reduction in NTBs. Instead, in scenario 3, there is no reduction in trade costs, other than for the import tariffs, which benefits trade flows between India and Turkey, leading to higher welfare gains for the latter.

[63] While average gains from trade openness may be significant, any further trade liberalization between distant partners in an already low tariffs environment is expected to yield small gains from trade.

Table 2: Summary of changes to welfare for EU28 and India, model with tariff revenues

| | EU28 | | | India | |
|---|---|---|---|---|---|
| | Change (%) weighted | Change (%) simple average | Change (million EUR) | Change (%) | Change (million EUR) |
| Scenario 1 | 0.0303 | 0.0262 | 8,015.49 | 0.2733 | 8,143.19 |
| Scenario 2 | 0.0323 | 0.0276 | 8,539.70 | 0.3011 | 8,969.80 |
| Scenario 3 | 0.0139 | 0.0117 | 3,675.51 | 0.1258 | 3,748.65 |

Note: The results reported here are from our preferred results, that is from the model with tariff revenues with simple average tariffs and heterogenous trade elasticity across sectors. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28. The reduction in trade costs applied in each scenario are from Table 26.

### 4.1.2. Trade flows change for member states of the EU28

All the member states expand their imports and exports with India for trade in goods and services. In Figure 28, we see that for the imports and exports of services, the increase in percentage terms from the baseline is almost homogeneous across the member states, ranging from 14.16% to 14.73% for imports, and from 18.73% to 19.26% for exports. Instead, for trade in goods, in Figure 30, the changes are heterogeneous, in an interval between 43% and 169% for exports, and between 31% to 46% for imports.

We now present more in details the changes to trade flows between the EU28 and India. The baseline data that we report in this section and the following one result from a simulation of a new equilibrium where we have eliminated trade deficits. Therefore, the baseline values below do not represent the observed data from 2014. In Figures 27 and 28, we show the changes between the baseline and counterfactual trade flows in trade in services for the member states of the EU28 and India.[64] Germany is the largest importer of services from India, for a value of 1,312 million EUR while on the other end, Latvia is the smallest importer, with 0.34 million USD. In scenario 1, Germany's imports reach 1,503.76 million EUR following the agreement, that is an increase of 192 million EUR or a proportional change close to 14.59% from the baseline value, and it is still the largest importer. It is followed by France which imports 1,253.75 million EUR. Instead, Latvia maintains its position as the smallest importer, with an increase in imports in services of 0.05 million EUR, which in percentage term is a positive change of 14.33%. In Figure 28 we show the percentage change for the import of services from India, as we can see the values are almost homogeneous across the member states, and they all fall in an interval between 14.16% and 14.73%. However, we have seen with Germany and Latvia that changes in percentage terms are not a good comparison as they report similar percentages while the value of trade flows in EUR is substantially different. Therefore, in the rest of the analysis, we report changes between trade flows in EUR, and limit the use of results in percentage terms to comment on the direction and heterogeneity of the effects.

Looking at exports of services, France has the most significant bilateral trade flow with India in the baseline data, at around 1,074 million EUR. Whereas, the smaller exporter is Cyprus, with flows close to 0.09 million EUR. Following the introduction of the agreement, in scenario 1, all countries expand their exports to India. France increases its exports by approximately 203.92 million EUR, while the second-largest increase is for Germany, at around 179.20 million EUR. The United Kingdom reports

[64] Table 32 reports the data for trade in services between the member states and India, for the three scenarios considered.

exports of 886 and 1,053 million EUR in the baseline and scenario 1 respectively. For Cyprus, the exports increase to 0.11 million EUR, an increase of 0.02 million EUR from the baseline.

The counterfactual imports and exports from scenario 1 and 2 are comparable, both in their magnitude and changes from the most to the least affected member state. They differ significantly from scenario 3 however, the results are reported in Table 32. Without a reduction in trade costs for tradable services in scenario 3, our results show that for the member states, the imports of services from India decrease. However, the decrease in imports ranges from 0.002 to 5.582 million EUR, for Latvia and Germany, respectively. Instead, as Figures 27 and 28 show, the direction of the change in exports is the same, but the value of the increase is significantly lower, at 6.48 million EUR for France.

We now discuss the changes in trade flows for trade in goods between the member states and India. Figures 29 and 30, and the associated data in Table 33 shows that Germany is the largest importer and exporter of goods from India, for 6,694 and 6,834 million EUR, respectively. Hence, we can see that Germany reports a surplus of around 140 million USD on trade in goods with India. As for trade in services, in scenario 1, all the member states increase their imports and exports of goods from India. The most significant increase in trade flows is for Germany, by 2,647 and 4,006 million EUR for imports and exports, respectively. Therefore, the surplus of Germany vis-à-vis India increases to 1,359 million EUR. The lowest change in exports is obtained for Cyprus, which traded initially only 0.75 million EUR worth of goods with India, which increase by 0.50 million EUR in the counterfactual scenario. On the other hand, Luxembourg reports the smallest increase, in absolute values, in imports from India, at around 4.69 million EUR, which is quite substantial in percentage terms (about 41%) since it imports 11.44 million EUR worth of goods in the baseline.

The rank correlation in Table 31 shows that, contrary to trade in services, the ordering of the member states from the highest to lowest change in imports in percentages terms is profoundly affected by the different shocks to trade costs. As regards changes in exports or imports, in million EUR, Table 33 reports that the first and second scenario yield similar results, while the third scenario now reports results that follow the same direction of scenario 1, but with lower magnitudes. The least impacted country is Cyprus which increases its exports by 0.34 million EUR in scenario 3; by comparison, this is 0.16 million EUR lower than the results obtained in scenario 1. The difference is significant for trade flows between Germany and India. Again, Germany reports the highest increase in goods trade flows but the difference from the baseline values is now at 1,309 and 2,662 million EUR for imports and exports respectively. Hence, we can see that the increase in imports from India in the first scenario, which we mentioned above, is about twice as large as what we find when not taking into account a reduction in NTBs.

### 4.1.3. Trade flows change by sector for the EU

We now report the results at the sector-level for the EU28 as a whole.[65] We divide the results into three different groups, based on the trade partner: first, we consider trade between the EU and India; then, we describe changes for trade flows between the EU and the rest of the world, excluding India; and last we consider intra-EU trade. The second and third group give an idea about the trade diversion effect.

[65] In Table 41 we report the ratio between the sector-level production over the total production for the EU28 and India in the baseline. Moreover, we report the percentage change between the baseline and scenario 1. Instead, in Table 42, we report the sector- and country-level openness for the EU28 and India in the baseline data, as well as its percentage change between the baseline and scenario 1. The openness is computed as sectoral exports over the sector-level production.

Table 3: Summary of percentage changes in scenario 1 for trade flows between the EU and India, by sector

| EU28 imports from India (%) | | EU28 exports to India (%) | |
|---|---|---|---|
| Sectors with a percentage change lower than 40% *(I)* | Sectors with a percentage change higher than 40% *(II)* | Sectors with a percentage change lower than 100% *(III)* | Sectors with a percentage change higher than 100% *(IV)* |
| Basic Metals (C24) | Paper (C17) | Basic Metals (C24) | Crops & Animals (A01) |
| Pharmaceuticals (C21) | Chemicals (C20) | Furniture & Other Manufacturing (C31-C32) | Textiles, Apparel & Leather (C13-C15) |
| Food, Beverage & Tobacco (C10-C12) | Wood & Cork (C16) | Fabricated Metal (C25) | Paper (C17) |
| Crops & Animals (A01) | Electronics & Optical Products (C26) | Recorded Media Production (C18) | Electronics & Optical Products (C26) |
| Forestry & Logging (A02) | Electrical Equipment (C27) | Chemicals (C20) | Pharmaceuticals (C21) |
| Coke & Refined Petroleum (C19) | Textiles, Apparel & Leather (C13-C15) | Coke & Refined Petroleum (C19) | Electrical Equipment (C27) |
| Recorded Media Production (C18) | Fishing & Aquaculture (A03) | Mining & Quarrying (B) | Forestry & Logging (A02) |
| Fabricated Metal (C25) | | Other non-Metallic Mineral (C23) | Wood & Cork (C16) |
| Furniture & Other Manufacturing (C31-C32) | | Food, Beverage & Tobacco (C10-C12) | Fishing & Aquaculture (A03) |
| Mining & Quarrying (B) | | Rubber & Plastics (C22) | |
| Tradable Services (serv) | | Motor Vehicles (C29) | |
| Other non-Metallic Mineral (C23) | | Machinery & Equipment (C28) | |
| Motor Vehicles (C29) | | Tradable Services (serv) | |
| Rubber & Plastics (C22) | | Other Transport Equipment (C30) | |
| Machinery & Equipment (C28) | | | |
| Other Transport Equipment (C30) | | | |

Note: The change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline. The percentages used for this Table refer to our preferred results for scenario 1, which are reported in Table 34. In column *(I)* and *(III)* the

sectors are reported in a decreasing order, so they range from the sector with a percentage change closer to the threshold considered towards 0%. In column *(II)* and *(IV)* we sort the sectors in an increasing order, so we go from sectors closer to the threshold values to the highest sector as regards percentage change in imports or exports with India.

First, we look at trade flows between the EU28 and India. In Figures 31 and 32, we can see that as for the trade flows in the previous section, looking only at percentage changes might be misleading. The exports of the Fishing & Aquaculture sector increases significantly in percentage terms, by around 543% and 968% in scenario 1 and 2, respectively. Looking at export values however, we see that in the baseline, the EU28 exports in that sector to India are the lowest, around 1 million EUR and that they increases up to 13 million EUR in the second scenario. Table 3 provides a brief overview of the percentage changes for scenario 1 for trade flows between the EU and India. In the baseline, the three largest sectors by exports are, in order, Tradable services, Other Transport Equipment, and Machinery & Equipment. For Tradable services, the baseline value is close to 5,292 million EUR, and in scenario 1 it is still the most exported sector, with a value of around 6,296 million EUR. As regards trade in the Other Transport Equipment sector, the baseline value for this sector is around 4,568 million EUR, and exports increased by 453 million EUR after the introduction of the trade agreement. Despite the significant increase in exports for this sector, it is overtaken by the Basic Metals, which moves from being the fourth-largest sector to the second-largest sector by the value of export flows to India, in the baseline and scenario 1 respectively. In Table 35, we see that exports of Basic Metals almost double from 2,878 to 5,650 million EUR. Other relevant sectors by exports value in the baseline are Chemicals and, as we previously mentioned, the Machinery & Equipment sector. The former is the fifth-largest sector by exports to India, with 2,156 million EUR in the baseline. In scenario 1, its exports increased by 1,534 million EUR. The latter sector starts at around 4,179 million EUR and reaches 5,053 million EUR after the introduction of the trade agreement.

On the imports side, in the baseline data with balanced trade at the country-level, the EU28 imports 8,250 million EUR from the Textiles sector alone. This value is significantly larger than the second most imported sector, the aggregated Tradable services, which account for 6,581 million EUR. The gap between Textiles and the remaining sectors increases even further in scenario 1 as the imports of services increase by 953 million EUR, while the Textiles imports grow by 5,443 million EUR. The substantial increase in trade flows follows from India's comparative advantage in this sector, and as we discuss below, it comes at the expense of intra- and extra-EU trade in Textiles. To see how relevant this sector is, note that the sum of all the changes in imports, excluding this sector, amounts to 7,799 million EUR. If we look at the Food sector, we can see in Table 35 that the initial value of imports is about 1,297 million EUR, and it is the eleventh-largest sector by import value. However, we have seen in Figure 14 that both the EU28 and India apply high average import tariffs on this sector. In the first scenario, where we apply an asymmetric change in import tariffs in the Food sector, we can see an increase in imports by around 412 million EUR. Another sensitive sector to which we apply a limited reduction in tariffs is the Crops & Animals sector, for which we find an increase in imports of 468 million EUR.

As regards EU28 trade with the rest of the world, excluding India, we can see in Figures 33 and 34[66] that the changes in imports and exports have different signs, except for two sectors, Fishing & Aquaculture and Electrical Equipment, for which there is a decline in both exports and imports to the rest of the world. As expected, the EU imports less from the rest of the world in sectors for which trade with India increases substantially, such as the Chemicals and Textiles sectors. For the latter, the trade diversion effect is significant since imports decrease by 3,463 million EUR from the baseline value. Additionally, the Textiles sector experiences the most significant expansion of exports to extra-EU countries, by around 928 million EUR. As for intra-EU[67] trade, in Figures 35 and 36[68], we see

[66] Tables 36 and 37 report the data used in these two plots.

[67] In this group, we include both trade flows between members states and intranational trade flows.

[68] Tables 38 and 39 report the data used in these two plots.

a significant reduction of trade flows in sectors in which there is an expansion of trade with India. Again, the most considerable effect is in the Textiles sector, with a decrease in trade flows by approximately 1,259 million EUR in the first scenario, followed by a decrease in trade flows for the Chemicals sector of 938 million EUR. On the other hand, there are sectors for which intra-EU trade increases following the introduction of the agreement. In terms of trade flows, the most significant gains are in the aggregate tradable services, with an expansion of 2,632 million EUR.

In the second scenario, the results are comparable to scenario 1 except for the sensitive sectors on which we apply a limited reduction in tariffs in the first scenario. Starting from the Crops & Animals

Table 4: Comparison of the welfare changes (%) between the benchmark results and robustness checks

| Robustness check for the model without tariff revenues | | | |
|---|---|---|---|
| | EU28 | | India |
| | Change (%) weighted | Change (%) simple average | Change (%) |
| Scenario 1 | Higher | Higher | Higher |
| Scenario 2 | Lower | Lower | Lower |
| Scenario 3 | Lower | Lower | Lower |
| Robustness check for the model with tariff revenues and imports-weighted average tariffs | | | |
| | EU28 | | India |
| | Change (%) weighted | Change (%) simple average | Change (%) |
| Scenario 1 | Lower | Lower | Lower |
| Scenario 2 | Higher | Lower | Higher |
| Scenario 3 | Lower | Lower | Lower |
| Robustness check for the model with tariff revenues, simple average tariffs and common trade elasticity across sectors | | | |
| | EU28 | | India |
| | Change (%) weighted | Change (%) simple average | Change (%) |
| Scenario 1 | Higher | Lower | Higher |
| Scenario 2 | Higher | Higher | Higher |
| Scenario 3 | Lower | Lower | Lower |
| Robustness check for the model with tariff revenues, lower trade elasticity for tradable services | | | |
| | EU28 | | India |
| | Change (%) weighted | Change (%) simple average | Change (%) |
| Scenario 1 | Higher | Higher | Higher |
| Scenario 2 | Higher | Higher | Higher |
| Scenario 3 | Lower | Lower | Lower |

| Robustness check for the model with tariff revenues, higher trade elasticity for tradable services | | | |
|---|---|---|---|
| | EU28 | | India |
| | Change (%) weighted | Change (%) simple average | Change (%) |
| Scenario 1 | Lower | Lower | Lower |
| Scenario 2 | Higher | Higher | Higher |
| Scenario 3 | Lower | Lower | Lower |

Note: The results of each scenario, for all the robustness checks included, are compared to the benchmark results obtained in scenario 1 for the model with tariff revenues, simple average tariffs and heterogenous trade elasticity across sectors (reported in Tables 27 and 28). All the results for the robustness checks are reported in separate tables, from Table 43 and 44, and from Table 47 to 54. We use the term"Higher" if the value of the change in the considered scenario and robusteness check is higher than what we find in our benchmark results, while we use the term "Lower" if the change is lower than the benchmark result.

sector, we now find an increase of 869 and 66 million EUR, for imports and exports to India, respectively. These numbers are almost twice as large as what we did find in scenario 1, where the increases were 468 and 31 million EUR, for imports and exports respectively. In the Fishing & Aquaculture sector, we predict the same increase to imports, while the exports change by 12 million EUR in scenario 2; that is a more substantial increase in exports compared to the value of 7 million EUR in scenario 1. On the imports side, another relevant difference is for the Food sector, where we find an increase in imports of 608 million EUR, up from 412 million EUR in scenario 1. For the same sector on the exports side, the second scenario yields a more considerable positive change, at 188 instead of 88 million EUR. For the Motor Vehicles and Other Transport Equipment sectors, which are relevant imports for the Indian market, the counterfactual exports values increase substantially between the first and second scenario. For the former sector, we now find and increase of 638 and 298 million EUR, for exports and imports, respectively. Instead, in scenario 1, the respective values were 339 and 189 million EUR. Therefore, the exports from the EU to India almost double with a reduction in import tariffs of 90% instead of 50%. The effect is even more severe for the Other Transport Equipment: in scenario 1, the exports increased by 453 million EUR, while in scenario 2 by 826 million EUR. On the EU side, the imports for this sector increased from 36 to 53 million EUR, in scenario 1 and 2 respectively.

In the third scenario, without taking into account the reduction in NTBs, the expansions of imports and exports are significantly dampened. For the Mining and Quarrying sectors, the increase to imports is almost wiped out, as we find an increase close to 0.02 million EUR, down from the increase of 45 million EUR in scenario 1. For imports in the Textiles sector, the massive effect that we previously reported is now lower, around 1,829 million EUR. On the export side, for the EU, the most substantial decrease is in the Basic Metals sector where the increase in exports, relative to the baseline, is of 1,593 and 2,772 million EUR for scenario 3 and 1 respectively. Hence, the difference is close to 1,177 million EUR.

In Table 40 and Figure 38, we find that tariff revenues, in scenario 2 and 3, decrease in all sectors for trade flows with India. Instead, in scenario 1, we find a decrease on tariff revenues from all sectors except for the Crops & Animals, where tariff revenues on imports from India increase by almost 20 million EUR. This is because the increase in trade flows compensate for the lower applied import tariff. However, there are substantial losses in other sectors, the most significant being, as expected, in the Textiles sector, with a decrease of almost 471 million EUR (Figure 37). For India, in scenario 1, the most substantial decrease in tariff revenues is 320 million EUR in the Other Transport Equipment sector, and this loss reaches 626 million EUR in the second scenario. Overall, for the EU, we see in Figures 39 and 40 that there is a decrease in import tariff revenues in almost all sectors from the rest of the world, including India.

## 4.2. Sensitivity analysis

In this section, we present alternative simulations to illustrate important assumptions of the GE model and trade costs changes. First, we present results for the model without tariff revenues, using the EU-Korea or regular RTAs as benchmarks for the reduction in trade costs. Second, we apply the import-weighted tariffs to the simulation presented in section 4.1. Then, we change the trade elasticities applied to each sector to the same value of $\epsilon_k = 5.03$ [69] to illustrate how important assumptions about the trade elasticities are in new quantitative trade models. Moreover, we realise a sensitivity analysis in which we modify the trade elasticity for the tradable services while keeping the elasticities for the remaining sectors of the economy as in our benchmark results. In this analysis, we realise two simulations: first with a lower value of the trade elasticity, at $\epsilon_k = 3.00$, and second with an increase to $\epsilon_k = 7.00$. In Table 4, we compare our preferred specification with the outcome of these robustness checks that we will now describe in details.

### 4.2.1. Model without tariff revenues simulated from ex-post estimates of existing RTAs

In this model and contrary to the model with tariff revenues, we cannot decompose the change in bilateral trade costs into NTBs and tariffs. Accordingly, the model no longer features tariff revenues as a component of the budget balance of the representative consumer in each country.[70] In Tables 43 and 44, we show the welfare change for the three scenarios considered. The results obtained for the second and third scenario are similar despite the use of different baseline data because the shock to trade costs is the same in both scenarios. Whereas, if we look at the first scenario, in which the trade agreement is expected to bring the same reduction in trade costs as the estimated effect of the EU-Korea agreement, we can notice that the welfare changes are more significant, both for gains and losses. In the second and third scenarios, all countries that are not part of the agreement have positive welfare changes, except Turkey. Under the first scenario, the gains for the EU28 amount to 11,556 million EUR, while for India at around 13,142 million EUR. Notice that, for the EU, the first scenario predicts a more substantial gain for all countries, around 3,541 million EUR higher than the optimistic scenario of the previous model. The explanation is that now the reduction in trade costs is symmetric, so the trade barriers to imports from India decrease more in this model than in the previous one. This has a positive impact on trade between the two countries. Moreover, the model assumes away any potential impact on tariffs revenues. Once we move to scenario 2 and 3, the total increase in consumption for the EU declines to around 2,400 million EUR, which is lower than scenario 3 in the previous model, where we assumed no reduction in NTBs, by around 1,275 million EUR.

Overall, using the estimated effect of the EU-Korea trade agreement, we find that the EU increases its exports and imports to (from) India by 7,696 and 13,018 million EUR, respectively. Alternatively, using percentage changes from the baseline, the increase in exports and imports is about 18% and 27%, respectively. Instead, for the second and third scenarios, the changes in trade flows are substantially lower compared to the first scenario: the EU increases its exports to India by about 2,437 million EUR (or around 5.79%) and its imports from India by about 2,940 million EUR (or around 6.19%).

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[69] See Head and Mayer (2014) for a discussion on how this standard value of the trade elasticity has been estimated.

[70] In Table 45 we report the ratio between the sector-level production over the total production for the EU28 and India in the baseline. Moreover, we report the percentage change between the baseline and scenario 1. Instead, in Table 46, we report the sector- and country-level openness for the EU28 and India in the baseline data, as well as its percentage change between the baseline and scenario 1. The openness is computed as sectoral exports over the sector-level production.

### 4.2.2. Model with tariff revenues using import-weighted tariffs

Tables 27 and 47 show that, in the first scenario, most countries report welfare changes with effects that differ only in the magnitude and not in the direction. As regards India, we see a positive and significant impact confirming our initial results. In Table 48, the gains from the introduction of the trade agreement amount to 7,658 million EUR in scenario 1, which is marginally lower than our benchmark result of 8,015 million EUR. The same holds for the EU, as the more optimistic scenario 2 yields an increase in consumption of 8,044 million EUR, which is below the value of about 8,540 million EUR in Table 28. In all the three scenarios considered the simulation with simple average tariffs yield gains at the EU level, both consumption-weighted and simple average, that are higher than the results from Table 47. Moreover, we still find that not reducing NTBs impacts greatly the results in scenario 3 as the gains are halved compared to the first scenario.

### 4.2.3. Model with tariff revenues, common trade elasticity

Here we check the sensitivity of our estimated gains from trade to the trade elasticity. As is well known from new quantitative trade models, this parameter is essential for any quantitative assessment of trade policy. We have applied an elasticity of 5.03 to all sectors, which is the average elasticity taken from the meta analysis of Head and Mayer (2014).[71] Results are presented in Tables 49 and 50. The use of the standard trade elasticity in all sectors slightly amplifies the effects in our benchmark results: the positive effect for India and the EU is magnified. The former increases its country-level consumption by 8,751 million EUR, up from the value of 8,143 million EUR in scenario 1 of our main results. For the EU, the increase is smaller, moving from an increase in consumption of 8,015 in Table 28 to 8,092 in Table 50. One important thing to notice looking at the welfare changes in percentage term is that in the first and third scenario the simple average for the EU is lower than in our benchmark results, while the EU consumption-weighted mean is higher. Hence, the increase in consumption for the member states is more heterogeneous, and the larger countries, by consumption value, gain more in the robustness check than in our main GE simulation.

### 4.2.4. Model with tariff revenues, changes to trade elasticity in the tradable service sector

We first look at the results obtained when decreasing the trade elasticity in the tradable service sector, from its benchmark value of 5.03 to 3.00. As the trade elasticity decreases, the domestic and foreign varieties are perceived by consumers as more differentiated. The consumers benefit from a reduction in trade costs since it translates into lower prices, which, in turn, lead to higher consumption of all varieties. Therefore, the expectation is that the welfare changes in this sensitivity analysis are more substantial than the one in our benchmark results.

The values reported in Tables 51 and 52 confirm this expectation since the positive effects for India and the EU are found to be larger. In the first scenario, India's consumption increases by 8,405 million EUR (i.e., an increase of 0.2822%), to be compared with the 8,143 million EUR (or 0.2733%) obtained in our benchmark case. As for the EU, here we find an increase in consumption of 8,534 million EUR (Table 52), while it was 8,015 million EUR in the benchmark case (Table 28). Additionally, we can notice that the simple and consumption-weighted averages increase in the EU in the first scenario of the sensitivity analysis are almost as large as our benchmark results for the second scenario. Therefore, at the EU-level, a more substantial reduction in average import tariffs in sensitive sectors has almost the same effect as a decrease in the substitutability of varieties in the tradable services sector. Notice that at the member state-level, there is a significant difference in the distribution of the gains across member states compared to the benchmark results. In Table 51, we can see that

[71] Note that the elasticity of 5.03 is lower than the average of sector specific elasticities (5.63) used in the benchmark simulations.

consumption decreases by 3 million EUR in Luxembourg, for all the scenarios considered, probably due to trade diversion effects, as varieties in tradable services are perceived as more differentiated.

Next, we consider instead an increase in the trade elasticity for the tradable services from the value of 5.03 to 7.00. An increase in this trade elasticity causes the domestic and foreign varieties to be perceived as closer substitutes, shrinking the welfare changes for consumers following the changes to prices.

Tables 53 and 54 report the results for this simulation, and we can notice that gains are significantly dampened compared to the benchmark results (Tables 27 and 28). In the first scenario, India increases its consumption by only 7,963 million EUR, down from 8,143 million EUR in the benchmark simulation. For the EU, in all the scenarios, the simple and consumption-weighted average gains in the sensitivity analysis are lower than in the benchmark results. As before, the distribution of the welfare gains at the member state level is substantially different. We note that, for Luxembourg, we find gains in the sensitivity analysis that are more than twice as large as the ones reported in Table 28. For example, in the first scenario of the sensitivity analysis, Luxembourg increases its consumption by 0.0025%, while the corresponding value in the benchmark results is 0.0009%.

# 5. Conclusion

In this paper, we have first described the new quantitative trade model framework used to perform counterfactual simulations and estimate the impact of a trade agreement between the EU and India. In the model, demand for goods and services is defined by a structural gravity equation, which links trade flows to country-specific characteristics and bilateral trade costs between countries. The reduction in trade costs induced by the implementation of a trade agreement lowers prices of foreign goods and services to consumers and increases their demand. The change in prices is magnified through tradable intermediates used in production. Countries increase (lower) their production to satisfy the increase (reduction) in the demand for their goods and services. In this framework, an increase in the production is entirely reflected in a wage increase. The improvement of the terms of trade leads to a higher real income, and real expenditures increase on goods and services from all the countries in the world. However, a reduction in tariff revenues, which impacts total expenditures, dampens the impact that an increase in income has on expenditures. To sum up, the trade agreement reduces the domestic expenditure share, $\lambda_{jj,k}$, in favour of foreign varieties from specific countries, in particular EU imports from India, and increases real expenditures.

The model used here leaves aside foreign direct investments, potential costs in terms of inequalities or unemployment, environmental aspects of trade agreements, the transition to the new equilibrium, as well as any potential dynamic gains from trade. We have also maintained the assumption of Cobb-Douglas preferences and perfect competition - Costinot and Rodríguez-Clare (2014) show that under imperfect competition gains would be slightly larger on average although they could be magnified or dampened for specific countries depending on their specialization. Adding more dimensions of trade gains (or losses) and more outcome variables would require a larger set of parameters; here we retain the parsimonious nature of new quantitative trade models.

Our preferred counterfactual simulation is based on a scenario of heterogeneous reduction in tariffs across sectors and a 3% decrease in NTBs for all sectors in a model including tariff revenues and heterogeneous trade elasticities. We find a limited impact of an EU-India trade agreement on welfare: our simulations show a gain in real consumption between 0.01% and 0.03% as an average gain for the EU, and 0.13% to 0.30% for India. The corresponding figures in euro terms are between 3,675 and 8,540 million EUR for the EU and 3,749 and 8,970 million EUR for India. The EU increases its trade flows with India in all sectors following the introduction of the trade agreement.

In our two main scenarios, we consider different reductions in the average import tariffs in sensitive sectors to both the EU and India. In our first scenario, for the EU, we estimate the most substantial increase in exports and imports with India for the Basic Metals and Textiles, Apparel & Leather sectors, respectively. The former increases its exports substantially to India, at a value of 2,772 million EUR. Instead, the latter reports an increase in imports of the EU from India at 5,443 million EUR. Overall, the EU increases its exports and imports to (from) India by 13,972 and 13,242 million EUR respectively. We obtain comparable results in the second scenario for sectors such as Basic Metals and Textiles, Apparel & Leather. Instead, in sensitive sectors, we find substantially different results. For example, in the Motor Vehicles sector, the increase in exports from the EU to India is 339 and 638 million EUR, from the first and second scenario respectively. As regards imports of Motor Vehicles from India, the increase in the second scenario is 298 million EUR, up from the value of 189 million EUR of the first scenario. Overall, the EU increase in total exports and imports to (from) India is more substantial in the second scenario compared to the first, at values of 14,813 and 13,918 million EUR respectively.

We have conducted a sensitivity analysis to show the relevance of different assumptions made, on the reduction in trade costs considered in the different scenarios. The increase in real consumption obtained in our preferred scenario is reduced by almost half if we assume that there is no impact of the trade agreement on NTBs. When simulating the model using the estimated ex-post impact of

existing RTAs, the estimates significantly alter the pattern of trade flows, as they substantially reduce trade costs in one sector but not in others, leading to a heterogeneous distribution of welfare gains across member states. Only when we consider an impact similar to the EU-Korea trade agreement and assume away tariffs revenues, we get significantly larger gains than in the baseline scenario. Our sensitivity analysis has also emphasized the importance of the trade elasticity in our simulations, although the estimated impact of the EU-India trade agreement remains limited.

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# 7. Model Appendix

## 7.1. General Equilibrium model without tariff revenues

The model that we present here follows the framework introduced by Mayer et al. (2019). As we did for the model with tariff revenues, we retain the main assumptions of including into the analysis *(i)* multiple sectors, *(ii)* tradable intermediates, and *(iii)* a perfectly competitive market structure.

As regards preferences, we consider again, as in equation (15), a Cobb-Douglas upper-tier which nests a CES lower-tier utility functions. The maximization problem in equation (16) in now subject to the following budget constraint

$$\text{s.t.} \quad \sum_{i=1}^{n} p_{ij,k}\, c_{ij,k} = Y_{j,k} + D_{j,k} \tag{46}$$

Which, now, does not depend on country-level tariff revenues, but on sector-specific production and trade imbalance. The value of $D_{j,k}$ is obtained as:

$$\sum_{i=1}^{n} X_{ji,k} = \sum_{i=1}^{n} X_{ij,k} - D_{j,k} \tag{47}$$

In other words, we have that the difference between the imports and trade imbalance for country *j* is equal to the exports for that same country. As for the previous model, we have a deficit for $D_{j,k} > 0$, and a surplus when $D_{j,k} < 0$.

We now assume that output value is entirely distributed to workers at the sector-level:

$$Y_{j,k} = w_{j,k} L_{j,k} \tag{48}$$

Where $w_{j,k}$ is the wage per worker employed in sector *k* in country *j*; and $L_{j,k}$ represents the number of workers in sector *k*. The assumption on the trade imbalance is different from the one in the previous model, as now we assume that the the trade imbalance is a fixed fraction $d_{j,k}$, exogenously given, of the output of country *j* in sector *k*[72]:

$$D_{j,k} = d_{j,k} Y_{j,k} \tag{49}$$

The maximization problem yields the expression in equation (23), and also the same expression for the price-index $P_{j,k}$. The trade costs to export from *i* to *j* do not include ad-valorem import tariffs now, so we have:

$$p_{ij,k} = p_{i,k} \tau_{ij,k} \tag{50}$$

Where, $\tau_{ij,k}$ denotes iceberg trade costs to export from *i* to *j*. We maintain the same assumption of "*roundabout* production" from Krugman and Venables (1995), as in the previous model, and the same inputs for the production function. Therefore, the domestic price is given by the expression in equation (25).

We substitute equation (50) and the domestic price in the trade flows from equation (23) to obtain bilateral trade flows as:

[72] As a consequence of this assumption, the trade imbalance will change at the same rate as production. Therefore, it is not guaranteed that trade is balanced at the country- and world- level.

$$X_{ij,k} = \frac{\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n}\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}} \cdot E_{j,k} \quad (51)$$

The trade shares are now given by the following expression:

$$\lambda_{ij,k} = \frac{\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n}\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}} \quad (52)$$

Where the difference from the previous model is the definition of trade costs, which also impacts the price-index. For the import penetration share, $\lambda_{jj,k}$, we obtain equation (30), since also in this case $\tau_{jj,k} = 1$.

The market-clearing condition ensures that the production in sector *k* of country *i* is equal to the value of *i*'s exports to all countries in the world, including the domestic market, and is now equal to $Y_{i,k} = \sum_{j=1}^{n} X_{ij,k}$ as it does not include values net of import tariffs. Using equation (51) we can write:

$$Y_{i,k} = \sum_{j=1}^{n} \frac{\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}}{\sum_{i=1}^{n}\left((w_{i,k})^{\mu_k}(P_{i,k})^{1-\mu_k} \cdot \tau_{ij,k}\right)^{-\epsilon_k}} \cdot E_{i,k} \quad (53)$$

As before, we use the Exact Hat Algebra to define the change between values in the baseline and counterfactual equilibrium. We start for the change to trade costs, which are now defined as:

$$\left(\hat{\tau}_{ij,k}\right)^{-\epsilon_k} = \hat{\phi}_{ij,k} = exp\{\beta_{1,k}\left(RTA'_{ij} - RTA_{ij}\right)\} \quad (54)$$

Where $\beta_{1,k}$ is the average effect of the Regional Trade Agreements on bilateral trade flows, through the reduction of bilateral trade costs. The value of $\beta_{1,k}$ is sector-specific since the RTAs have a heterogeneous effect on trade costs in each sector, as the reduction of tariffs and NTMs caused by RTAs might have promoted trade in one sector more, or less, than in the remaining sectors of the economy.

We now consider as assumption that the number of workers employed in the country *i* in sector *k* is the same between the counterfactual and baseline scenarios, that is $L_{i,k} = L'_{i,k}$ so that we obtain:

$$\hat{Y}_{i,k} = \frac{Y'_{i,k}}{Y_{i,k}} = \frac{w'_{i,k}L'_{i,k}}{w_{i,k}L_{i,k}} = \frac{w'_{i,k}}{w_{i,k}} = \hat{w}_{i,k} \quad (55)$$

Furthermore, using the budget balance, equation (48) and (49) we can write sectoral expenditures as:

$$E_{j,k} = w_{j,k}L_{j,k} \cdot \left(1 + d_{j,k}\right) \quad (56)$$

Using the Exact Hat Algebra together with the assumptions of fixed number of workers in each sector and trade imbalanced being a fixed fraction of sectoral output, we can write[73]:

$$\hat{E}_{j,k} = \hat{w}_{j,k} \quad (57)$$

The change in bilateral trade share, $\hat{\lambda}_{ij,k}$, can be computed as:

[73] From equation (55) we know that the variation in wages is equal to the change in production, so we could also write $\hat{E}_{j,k} = \hat{Y}_{j,k}$.

$$\hat{\lambda}_{ij,k} = \frac{\left(\left(\hat{w}_{i,k}\right)^{\mu_k}\left(\hat{P}_{i,k}\right)^{1-\mu_k}\right)^{-\epsilon_k} \cdot \hat{\phi}_{ij,k}}{\sum_{i=1}^{n} \lambda_{ij,k} \cdot \left(\left(\hat{w}_{i,k}\right)^{\mu_k}\left(\hat{P}_{i,k}\right)^{1-\mu_k}\right)^{-\epsilon_k} \cdot \hat{\phi}_{ij,k}} \tag{58}$$

Where we have used the fact that $\left(\hat{\tau}_{ij,k}\right)^{-\epsilon_k} = \hat{\phi}_{ij,k}$.

As before, combine equation (28) and (37) to define the import pentration share as:

$$\lambda_{jj,k} = \left(\frac{w_{j,k}C_{j,k}}{E_{j,k}}\right)^{-\mu_k\epsilon_k} \tag{59}$$

Rearrange the terms in equation (59) to isolate the consumption term:

$$C_{j,k} = \lambda_{jj,k}^{-\left(\frac{1}{\mu_k\epsilon_k}\right)} \cdot \frac{E_{j,k}}{w_{j,k}} \tag{60}$$

As last step, use the Exact Hat Algebra and the result obtained in equation (57) to write:

$$\hat{C}_{j,k} = \left(\hat{\lambda}_{jj,k}\right)^{-\frac{1}{\mu_k\epsilon_k}} \tag{61}$$

As for the previous model, we yield an equation similar to the expression for the welfare change in Arkolakis et al. (2012). Moreover, we still have that the trade elasticity for sector *k*, $\epsilon_k$, and the change in the share of domestic expenditure, $\hat{\lambda}_{jj,k}$, are two sufficient statistics to compute changes in welfare at the sector level.

Given the Cobb-Douglas structure in the upper-tier, the total change in welfare for country *j* is:

$$\hat{C}_j = \prod_{k=1}^{S}\left(\hat{\lambda}_{jj,k}\right)^{-\frac{\gamma_{j,k}a_{j,kk}}{\epsilon_k}} \tag{62}$$

### 7.1.1. Simulation of the model without tariff revenues

We now illustrate how the algorithm generates the counterfactual data and the changes in different variables. First, we have to introduce a few additional results obtained using the Exact Hat Algebra. The sector-specific price index for sector *k* in country *j* is defined as:

$$\frac{P'_{j,k}}{P_{j,k}} = \hat{P}_{j,k} = \left(\sum_{i=1}^{n} \lambda_{ij,k} \cdot \left(\hat{w}_{i,k}\right)^{\mu_k}\left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\right)^{-\epsilon_k} \cdot \hat{\phi}_{ij,k}\right)^{-\frac{1}{\epsilon_k}} \tag{63}$$

Where we used the fact that $\left(\hat{\tau}_{ij,k}\right)^{-\epsilon_k} = \hat{\phi}_{ij,k}$.

Starting from the market-clearing condition in the counterfactual equilibrium, we have that $Y'_{i,k} = \sum_{j=1}^{n} X'_{ij,k}$. Furthermore, we use the defition of bilateral trade shares in the counterfactual equilibrium, which we can rewrite as $\lambda'_{ij,k}E'_{j,k} = X'_{ij,k}$. Combining these two conditions and using the Exact Hat Algebra we can write:

$$\hat{Y}_{i,k} \cdot Y_{i,k} = \sum_{j=1}^{n} \hat{\lambda}_{ij,k} \cdot \lambda_{ij,k} \cdot \hat{E}_{j,k} \cdot E_{j,k} \tag{64}$$

As final steps, divide both sides by $Y_{i,k}$, and use equations (57) and (58) to get:

$$\hat{Y}_{i,k} = \frac{1}{Y_{i,k}} \sum_{j=1}^{n} \lambda_{ij,k} \cdot \frac{\left(\hat{w}_{i,k}\right)^{\mu_k} \left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\right)^{-\epsilon_k} \cdot \hat{\phi}_{ij,k}}{\sum_{i=1}^{n} \lambda_{ij,k} \cdot \left(\hat{w}_{i,k}\right)^{\mu_k} \left(\left(\hat{P}_{i,k}\right)^{1-\mu_k}\right)^{-\epsilon_k} \cdot \hat{\phi}_{ij,k}} \cdot \hat{w}_{j,k} \cdot E_{j,k} \qquad (65)$$

As we can see from equation (58), (63), and (65), observing the change in trade costs, $\hat{\phi}_{ij,k}$, is not enough to compute the change for the other variables, as they also depend on the changes in the price-index and wages. For example, to compute the value of $\hat{P}_{j,k}$ using equation (63) we are missing the values of $\hat{w}_{i,k}$ and $\hat{P}_{i,k}$, since we get $\hat{\phi}_{ij,k}$ from equation (54) and observe $\lambda_{ij,k}$ in the data.

We follow the steps used by Mayer et al. (2019), in their algorithm to simulate counterfactual scenarios. Figure 20 illustrates how we obtain the country-level welfare change using their algorithm.

First, we set the initial changes of $\hat{w}_{i,k}$ and $\hat{P}_{i,k}$ to be equal to one. Then, in step 1) of Figure 20, we use the initialized values to compute the changes in trade shares. In step 2), we proceed to generate new values of the sector-specific price-index and production, which we use to update the initialized value of $\hat{w}_{i,k}$ and $\hat{P}_{i,k}$.[74] Hence, we set the values of $\hat{w}_{i,k}$ and $\hat{P}_{i,k}$ to be equal to one only for the first iteration of changes in the variables of interest. In the following step, we use the updated values to compute new $\hat{\lambda}_{ij,k}$.

In step 4), we check the difference between the changes in trade share computed in Step 1) and Step 3). The algorithm stops when the difference between the change in bilateral trade shares is close to zero. In other words, we approach the value of the fixed point for $\hat{\lambda}_{ij,k}$ since updating $\hat{w}_{i,k}$ and $\hat{P}_{i,k}$ leads to almost no adjustment of the change in trade shares. If we are close enough to the fixed point, we move to step 5), where the sector-specific change in real expenditure is computed. These five steps are repeated for each sector *k* included in the simulation.[75] Once we have the changes in welfare for each sector, we use equation (62) to generate the change in real expenditure for country *j*.

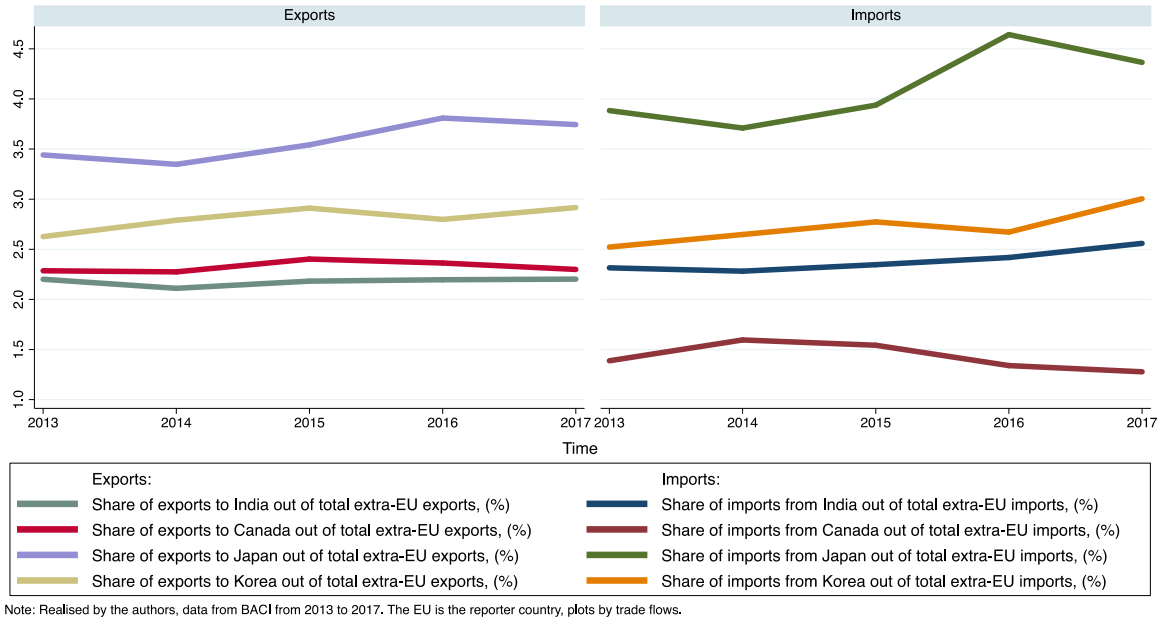
[74] In the model presented in this section, we know from equation (55) that $\hat{Y}_{i,k} = \hat{w}_{i,k}$, so we can update the initialized change in wages using the result for production. We alternatively use the two variables in the simulation.

[75] We do not include the non-tradable services since they are entirely consumed by the domestic market, meaning that $\hat{\lambda}_{jj,k} = 1$ leading to $\hat{C}_{j,k} = 1$.

# 8. Figures Appendix

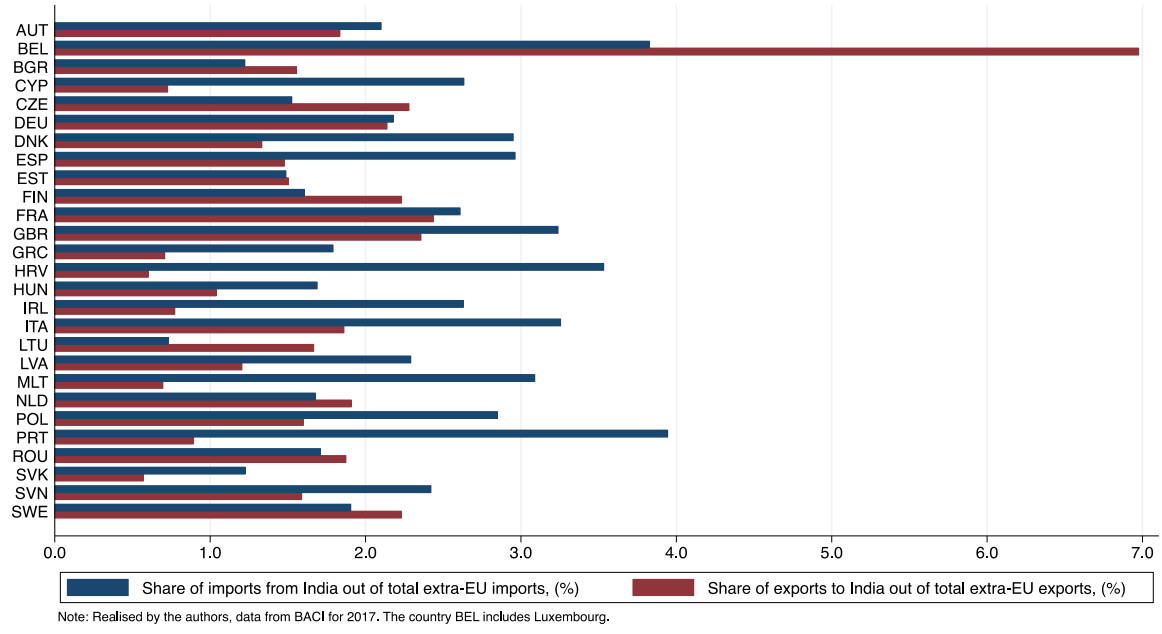
## 8.1. Trade flows between EU and India

Figure 2: Share of trade flows for extra-EU trade in goods, from 2013 to 2017




Note: Realised by the authors, data from BACI from 2013 to 2017. The EU is the reporter country, plots by trade flows.

Figure 3: Share of trade flows for extra-EU trade in goods, by member state, in 2017




Note: Realised by the authors, data from BACI for 2017. The country BEL includes Luxembourg.

Figure 4: Share of exports to India for trade in goods, by sector and member state

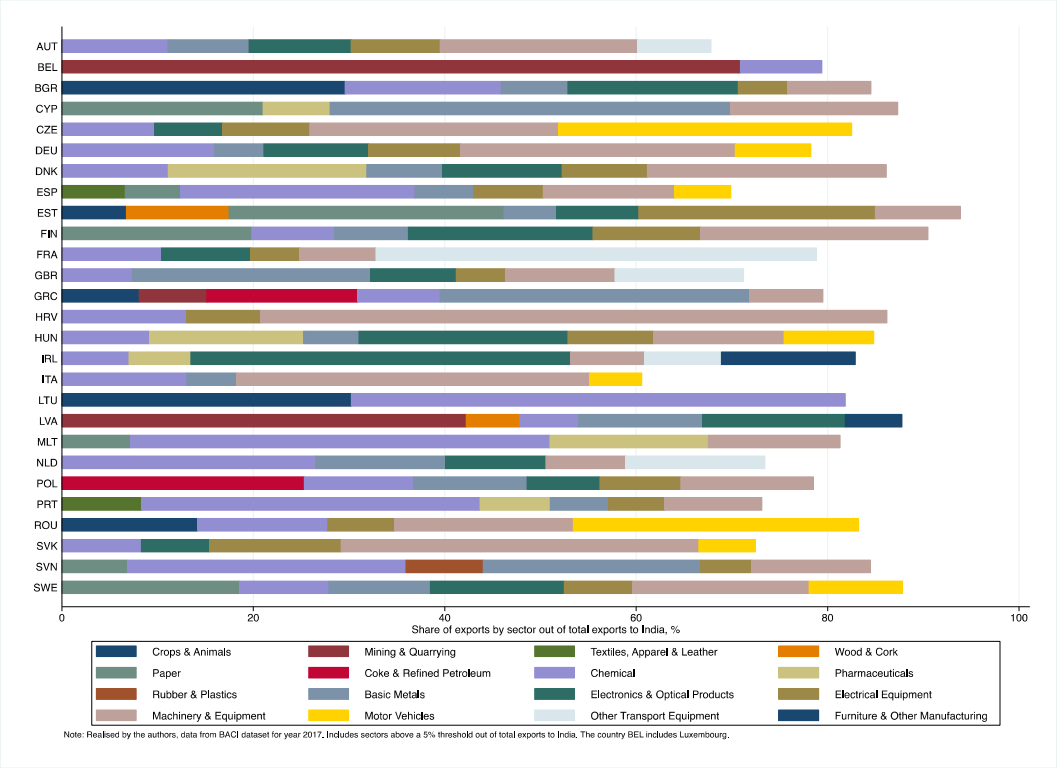



Figure 5: Share of imports from India for trade in goods, by sector and member state

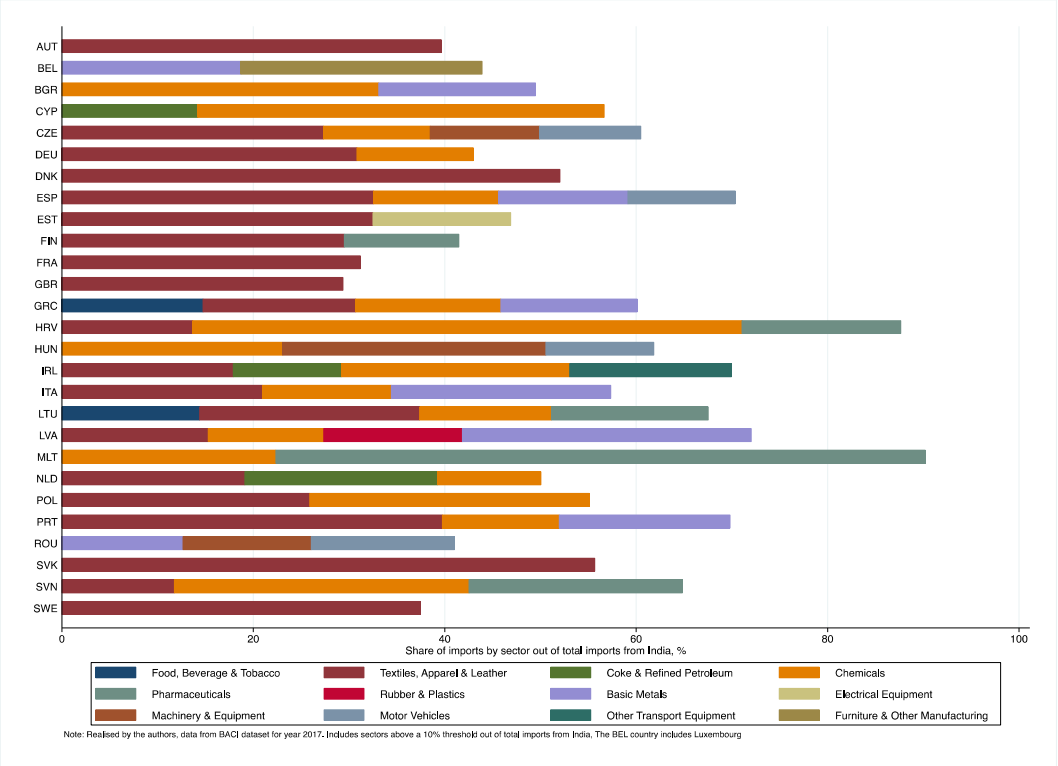
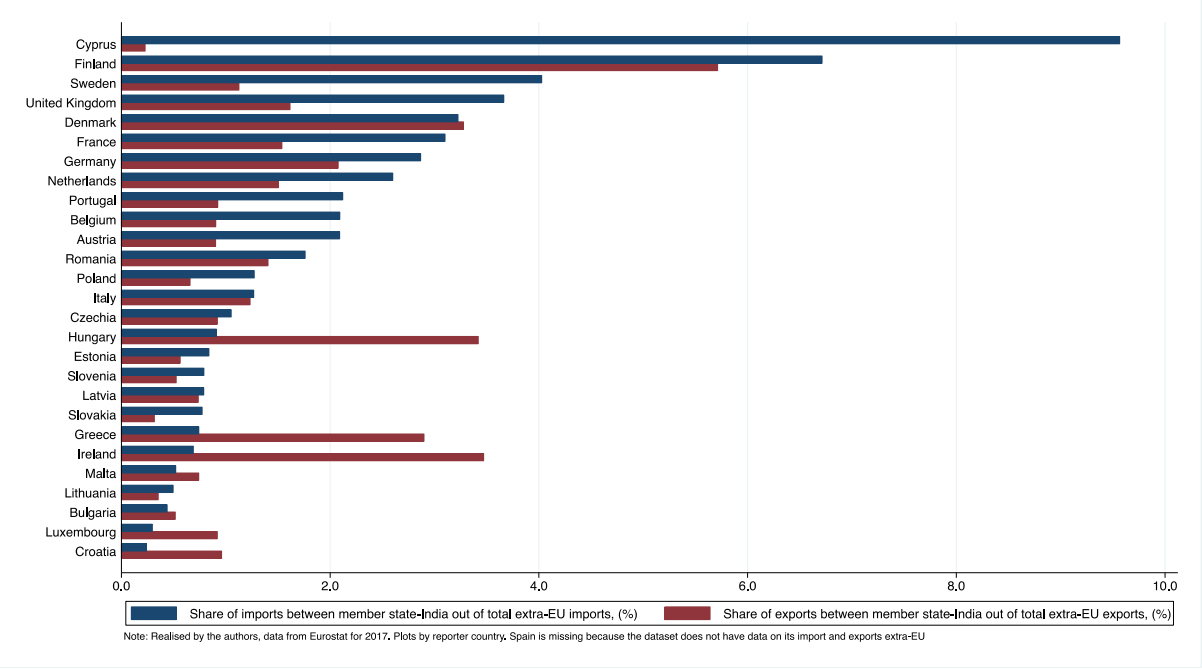
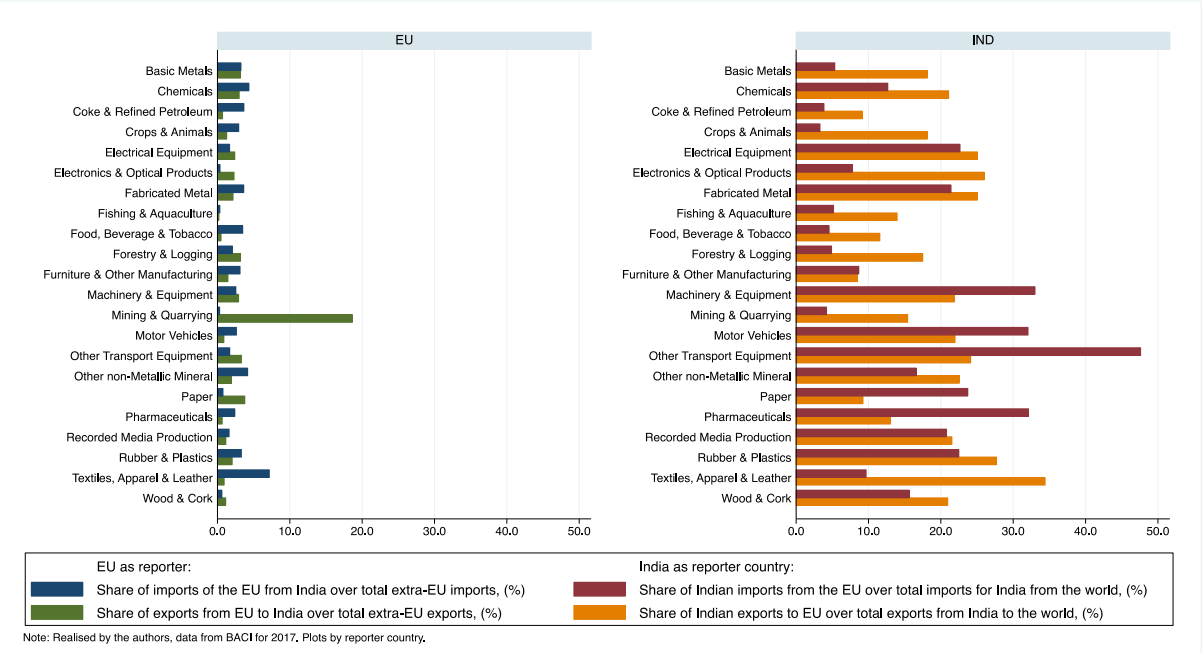


Figure 6: Share of trade flows for trade in services with India, by member state



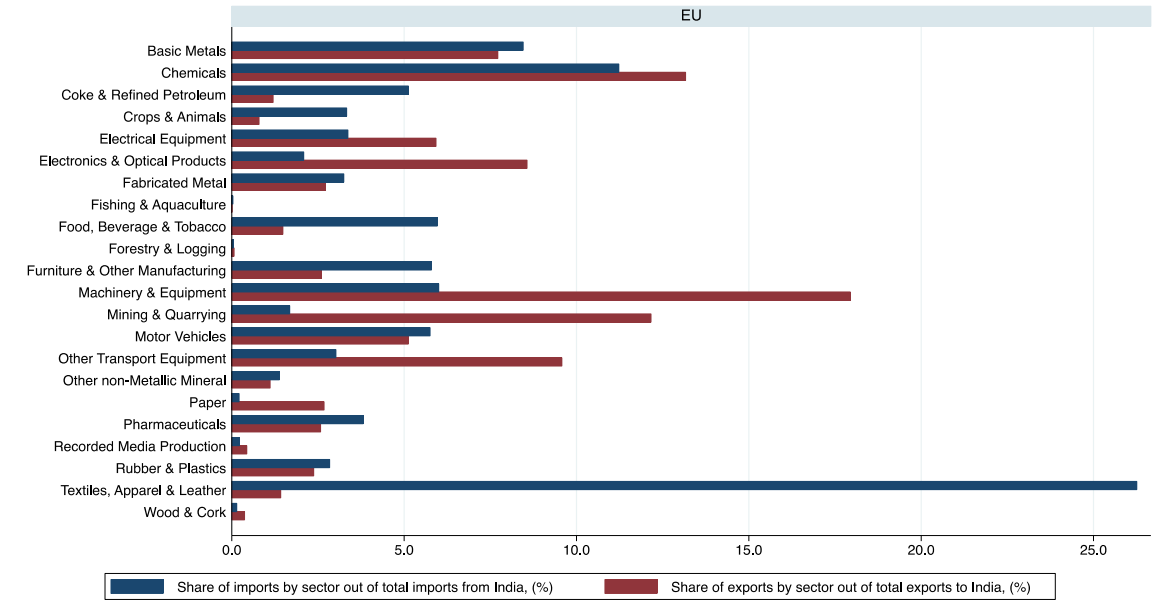

Note: Realised by the authors, data from Eurostat for 2017. Plots by reporter country. Spain is missing because the dataset does not have data on its import and exports extra-EU

Figure 7: Share of trade in goods between the EU and India, by sector



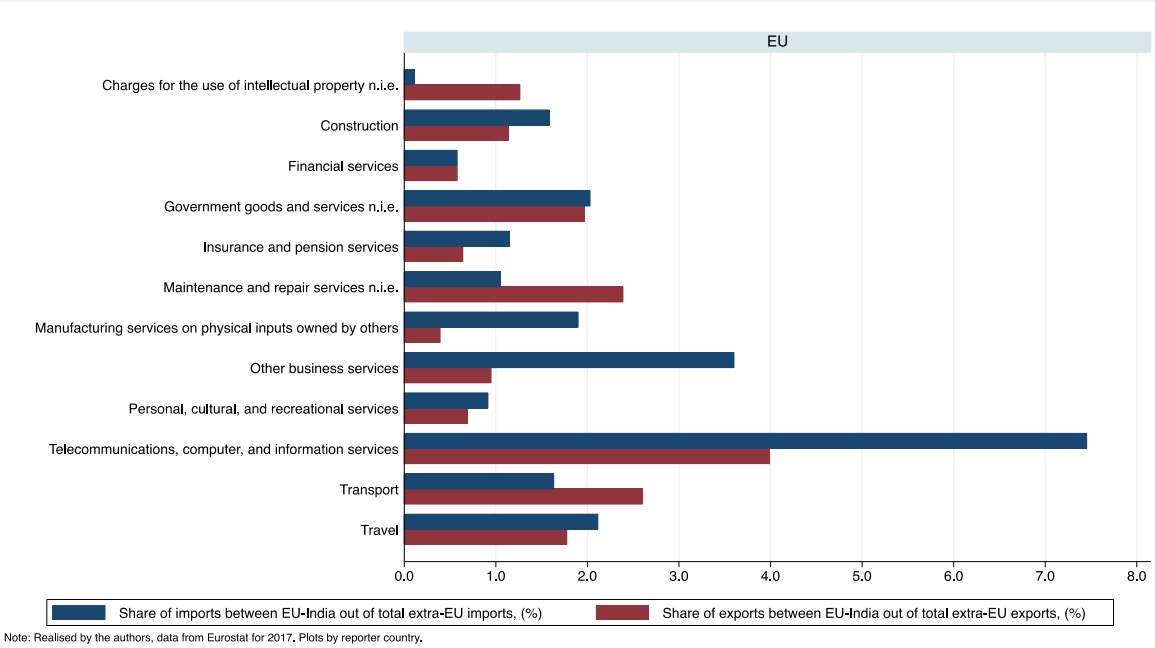

Note: Realised by the authors, data from BACI for 2017. Plots by reporter country.

Figure 8: Share of trade flows for the EU over total trade with India, trade in goods



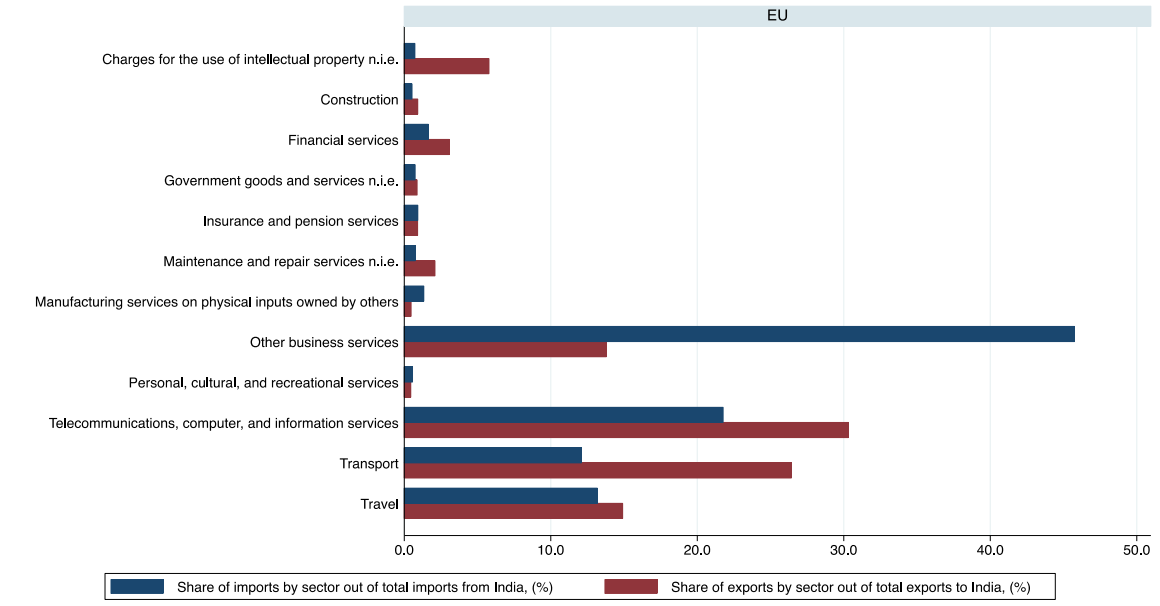

Note: Realised by the authors, data from BACI for 2017.

Figure 9: Share of trade flows between the EU and India over extra-EU trade, trade in services



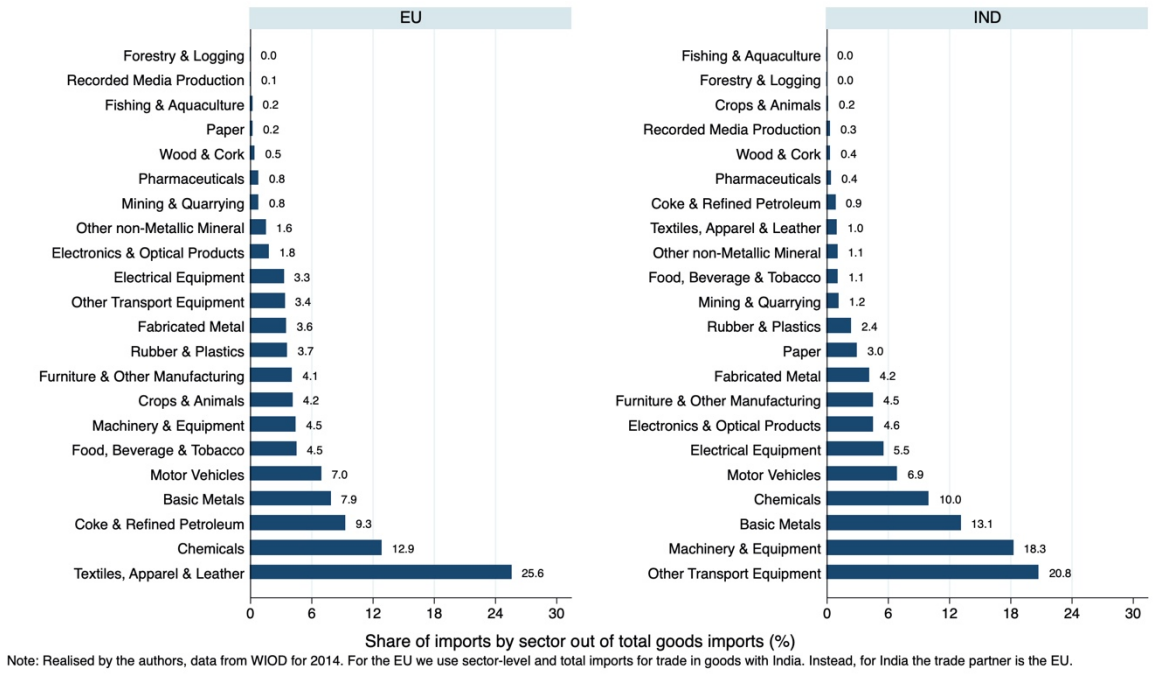

Note: Realised by the authors, data from Eurostat for 2017. Plots by reporter country.

Figure 10: Share of trade flows between the EU and India, trade in services



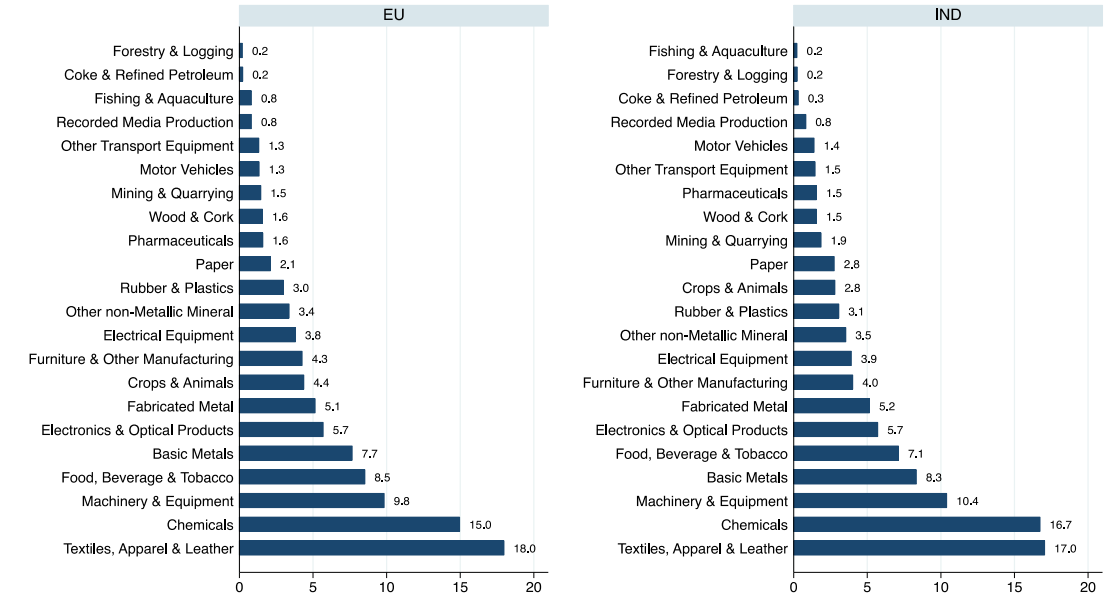

Note: Realised by the authors, data from Eurostat for 2017. Plots by reporter country.

Figure 11: Share of imports for trade in goods, by importer country




Note: Realised by the authors, data from WIOD for 2014. For the EU we use sector-level and total imports for trade in goods with India. Instead, for India the trade partner is the EU.

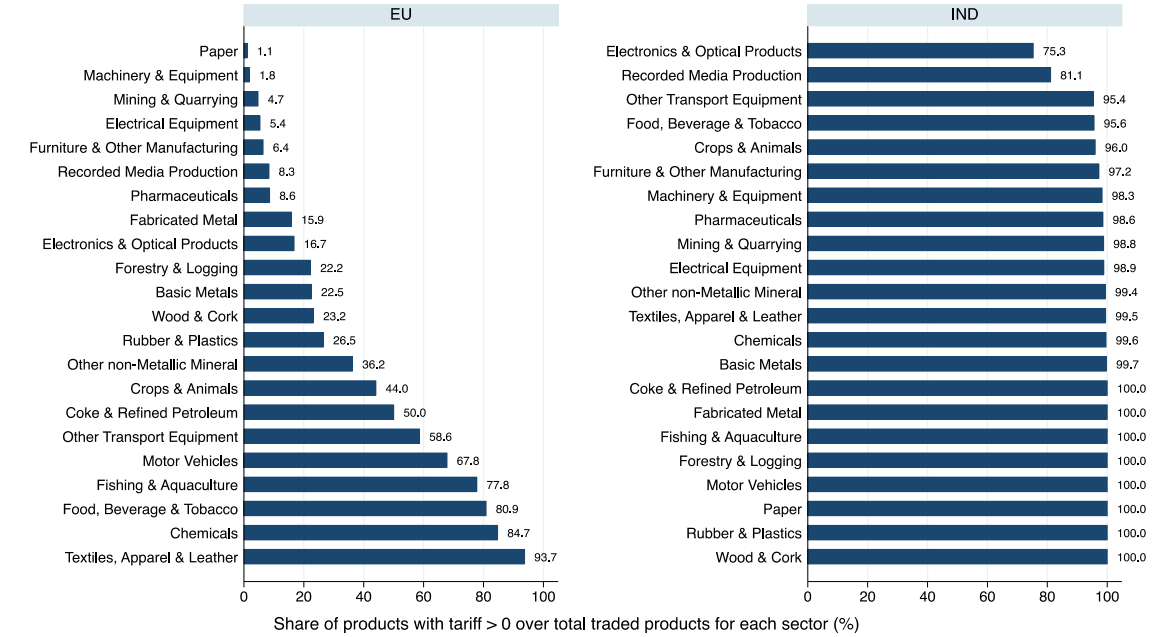
Figure 12: Share of traded products in each sector out of total traded products between the EU and India




Note: Realised by the authors, data on tariffs from MAcMap, matched with observed trade flows from BACII for 2014. Imports for the EU from India, and for India from the EU.

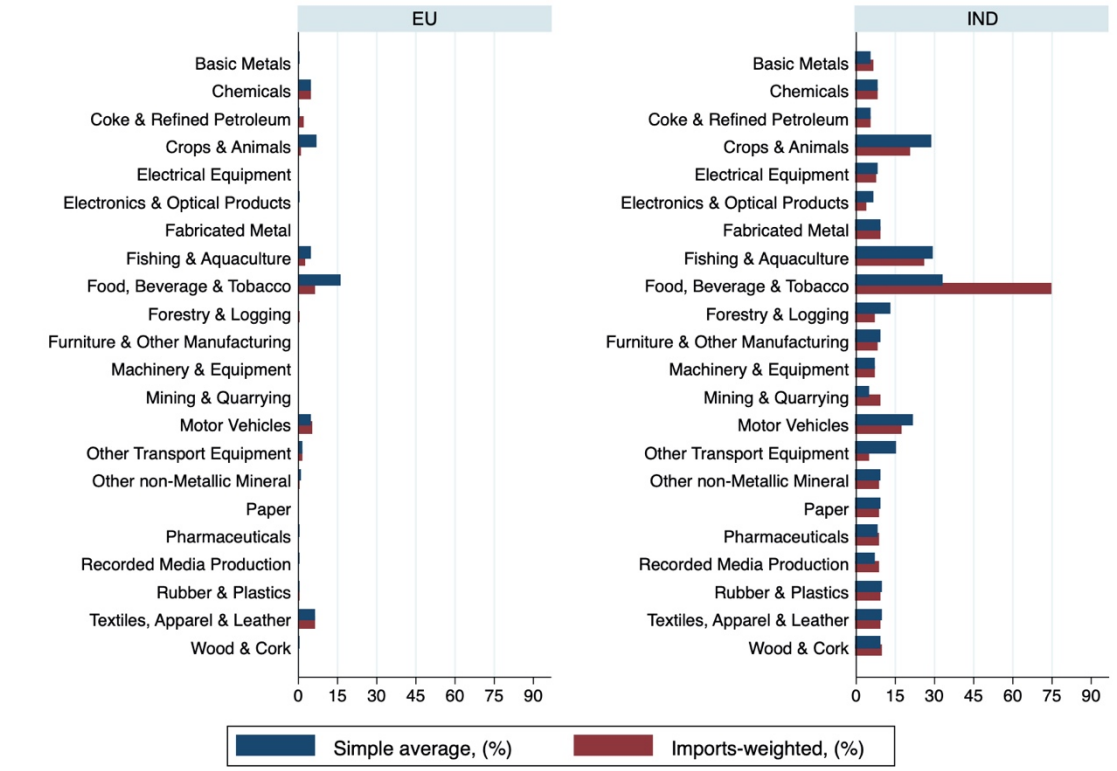
## 8.2. Trade barriers between the EU and India

Figure 13: Share of products subject to tariffs out of total products traded in each sector



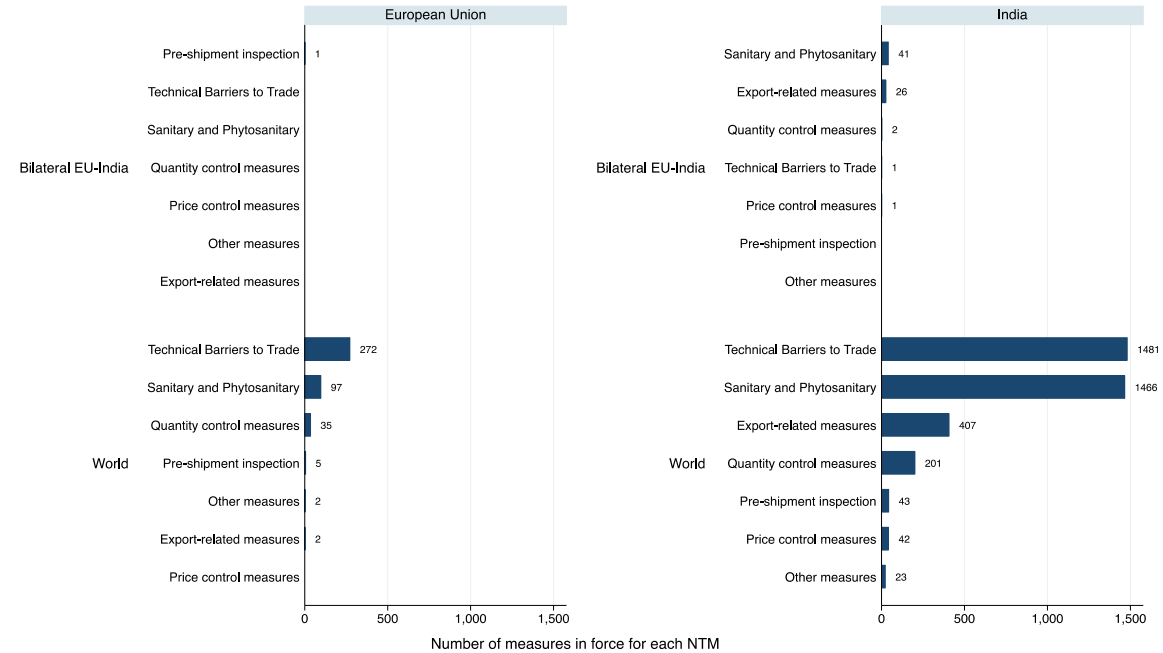

Note: Realised by the authors, data on tariffs from MAcMap, matched with observed trade flows from BACII for 2014. Imports for the EU from India, and for India from the EU.

Figure 14: Applied tariffs for trade in goods, by importer country



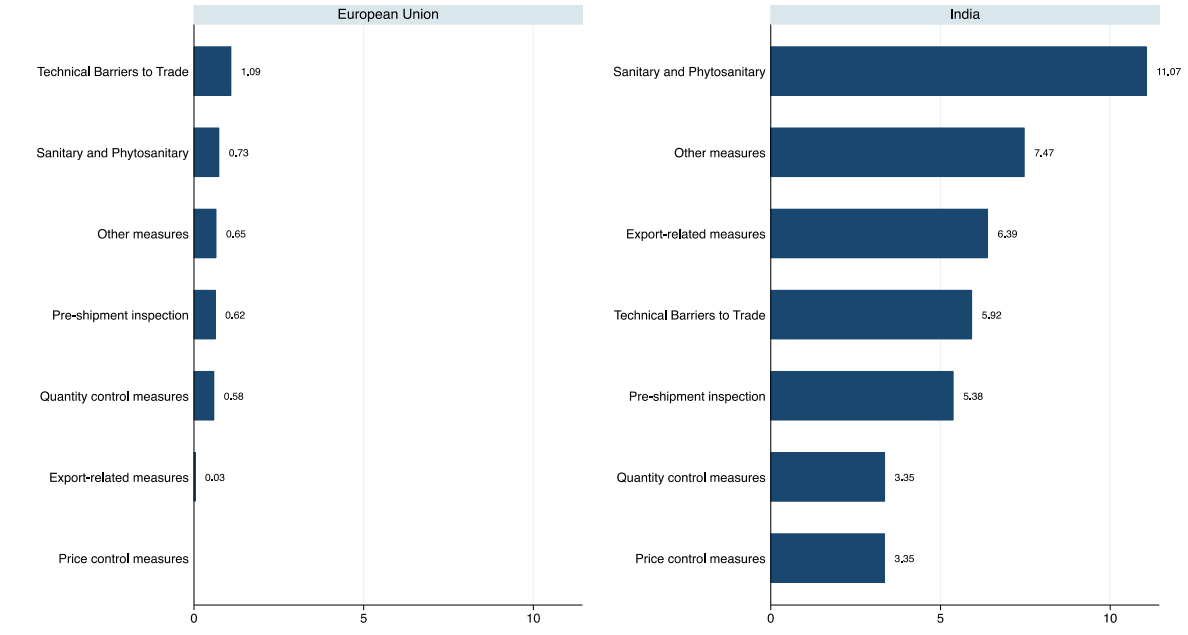

Note: Realised by the authors, tariffs data from the MAcMAP database by CEPII, weighted using imports from BACI dataset for 2014.

Figure 15: Number of NTMs applied by the EU and India



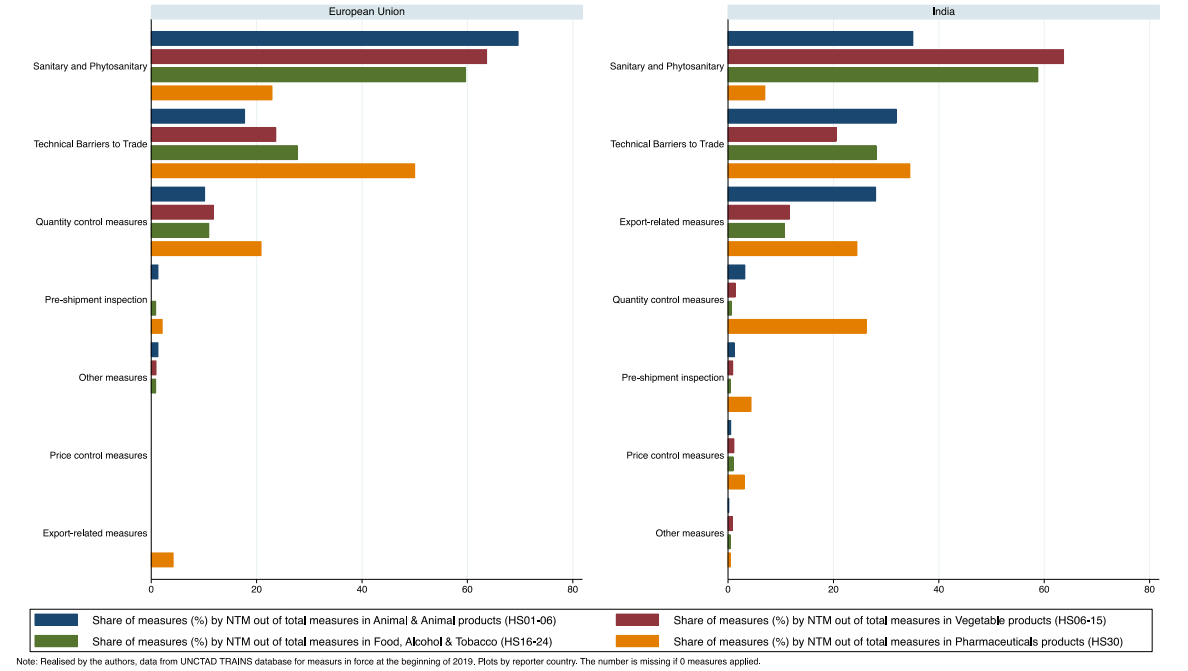

Note: Realised by the authors, data from UNCTAD TRAINS database for measurs in force at the beginning of 2019. Plots by reporter country, and divided by partner. The number is missing if 0 measures applied.

## Figure 16: Share of NTMs applied by the EU and India



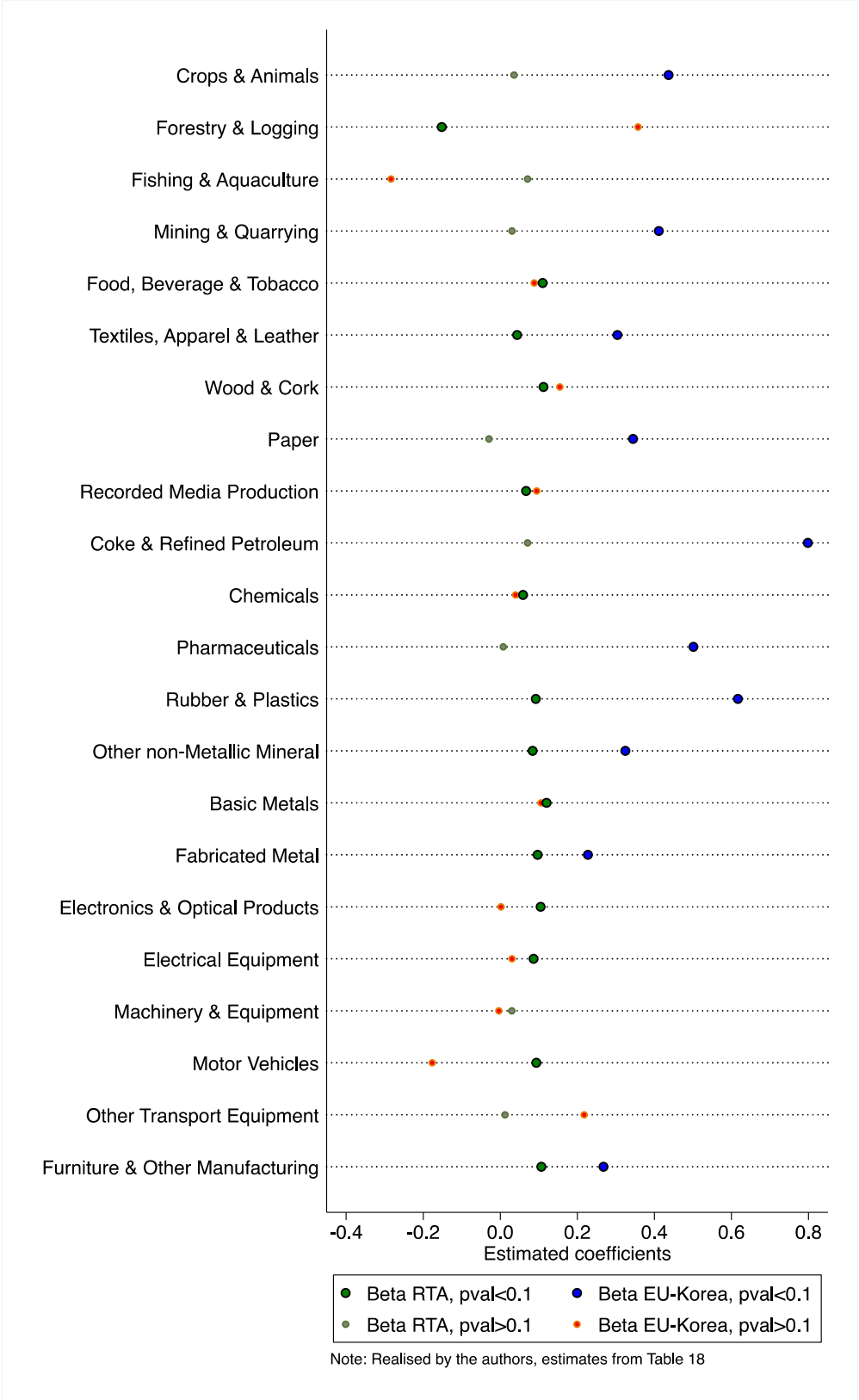

Note: Realised by the authors, data from UNCTAD TRAINS database for measurs in force at the beginning of 2019. Plots by reporter country. The number is missing if 0 measures applied.

## Figure 17: Share of NTM between EU and India, for products from HS01-24 and HS30




Note: Realised by the authors, data from UNCTAD TRAINS database for measurs in force at the beginning of 2019. Plots by reporter country. The number is missing if 0 measures applied.

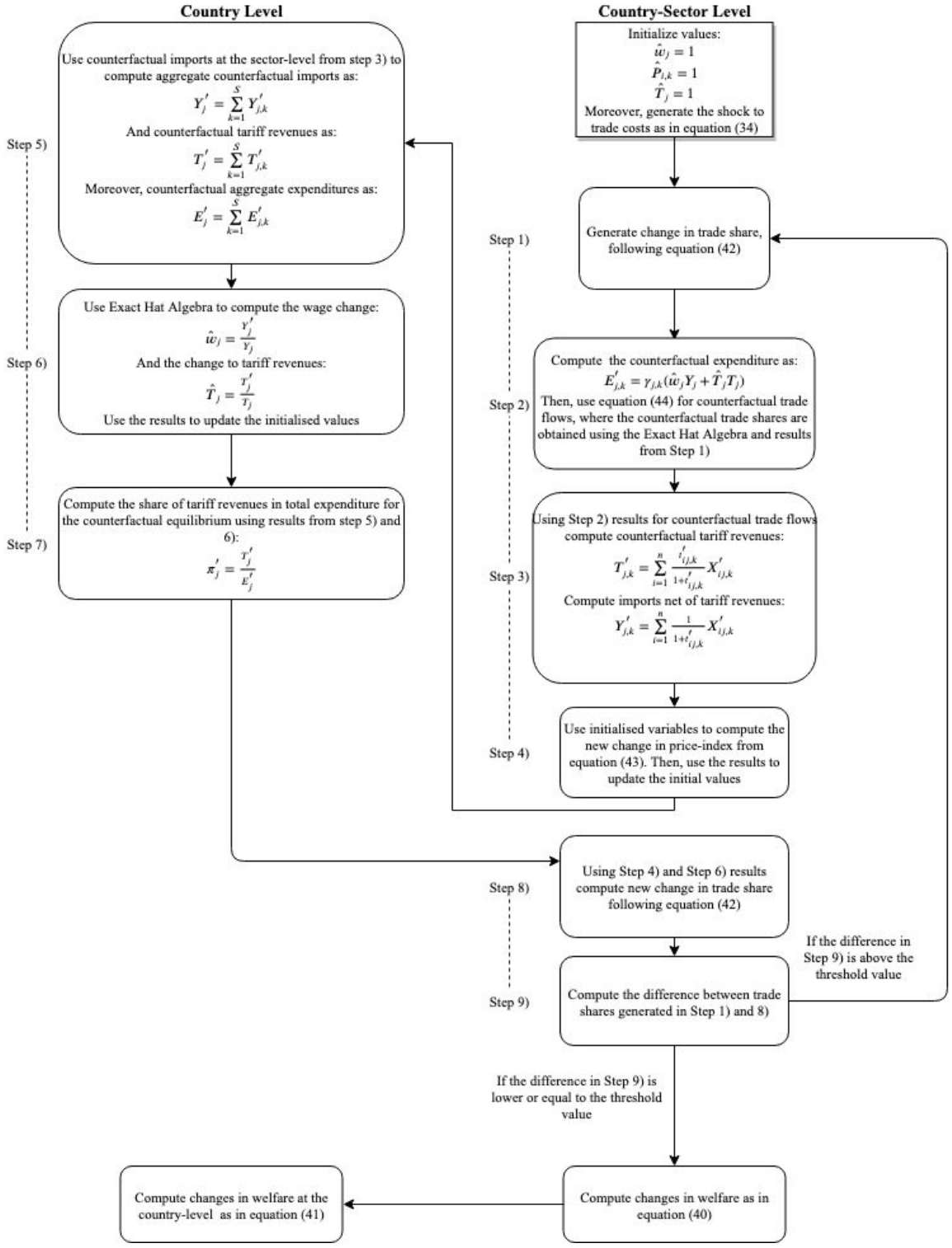
Figure 18: OLS estimates at the sector-level




Note: Realised by the authors, estimates from Table 18

## 8.3. Structural gravity estimates

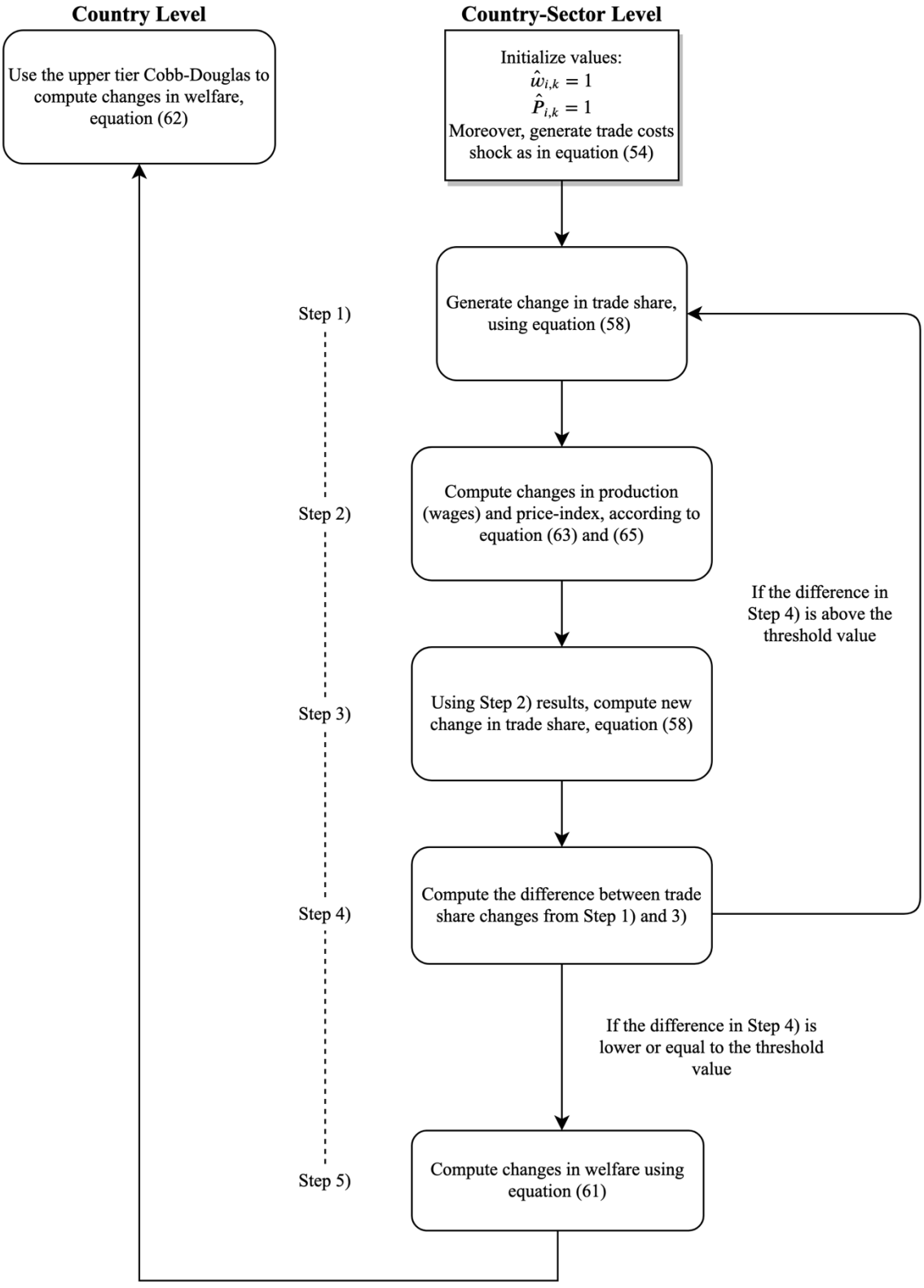
Figure 19: Flowchart simulation, model with tariff revenues




Note: Illustration realised by the authors using draw.io

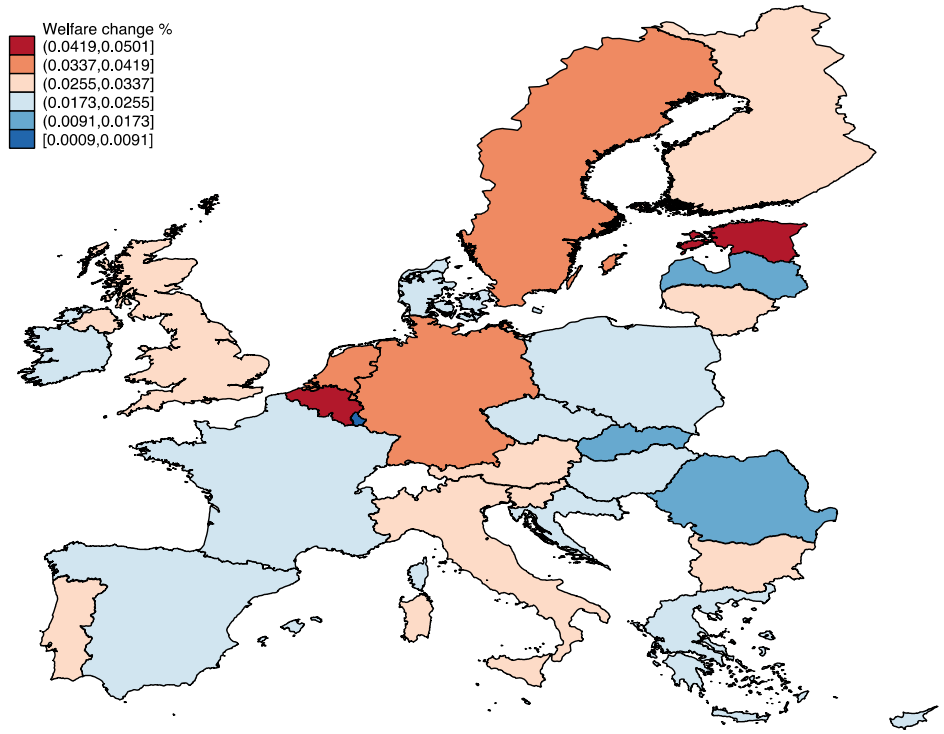
## 8.4. Flowcharts for the general equilibrium models

Figure 20: Flowchart simulation, model without tariff revenues




Note: Illustration realised by the authors using draw.io

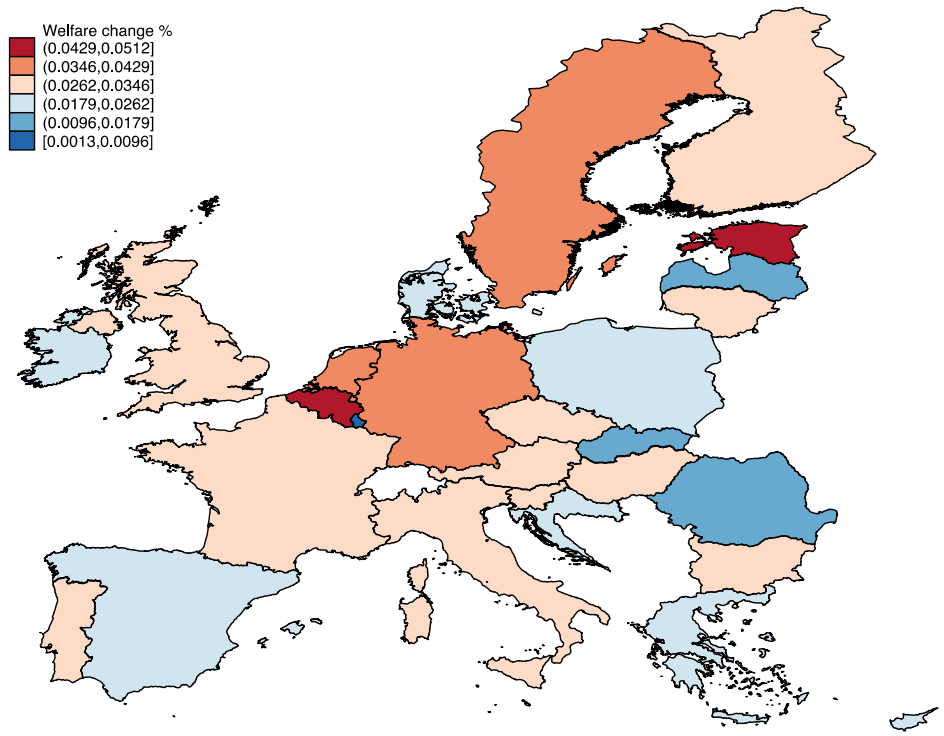
Figure 21: Map on welfare change, model with tariff revenues, scenario 1




Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

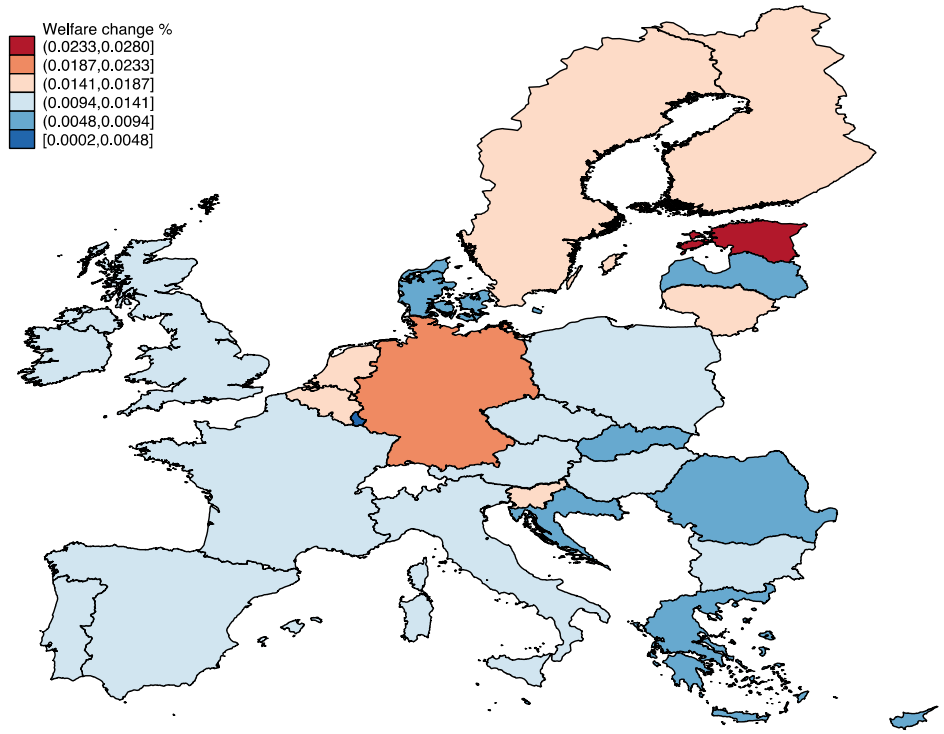
## 8.5. Welfare change

Figure 22: Map on welfare change, model with tariff revenues, scenario 2



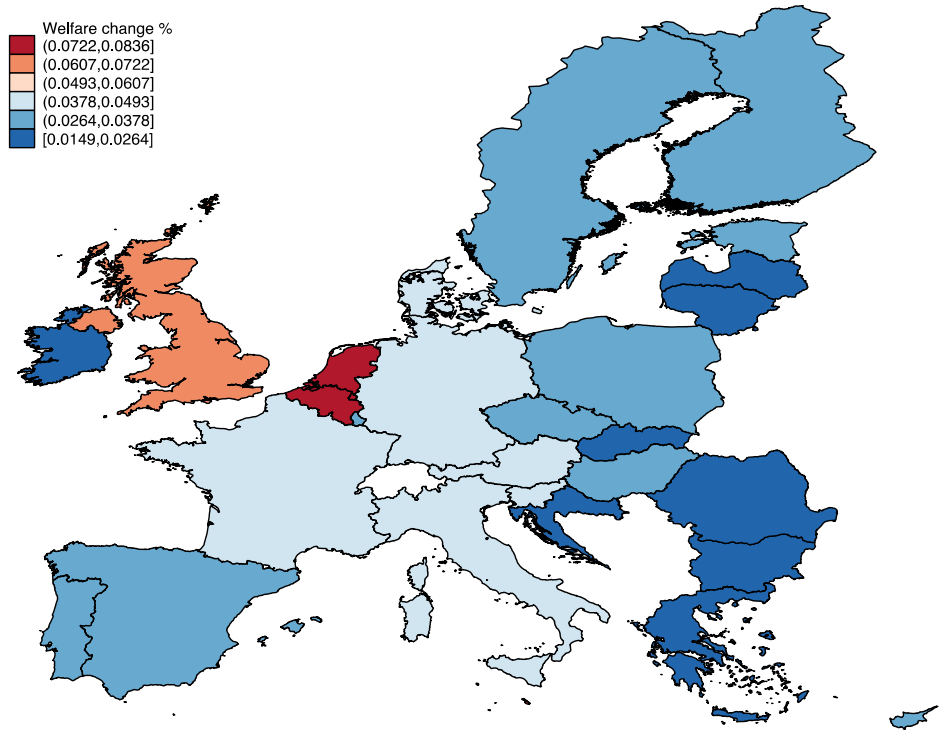

Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

Figure 23: Map on welfare change, model with tariff revenues, scenario 3



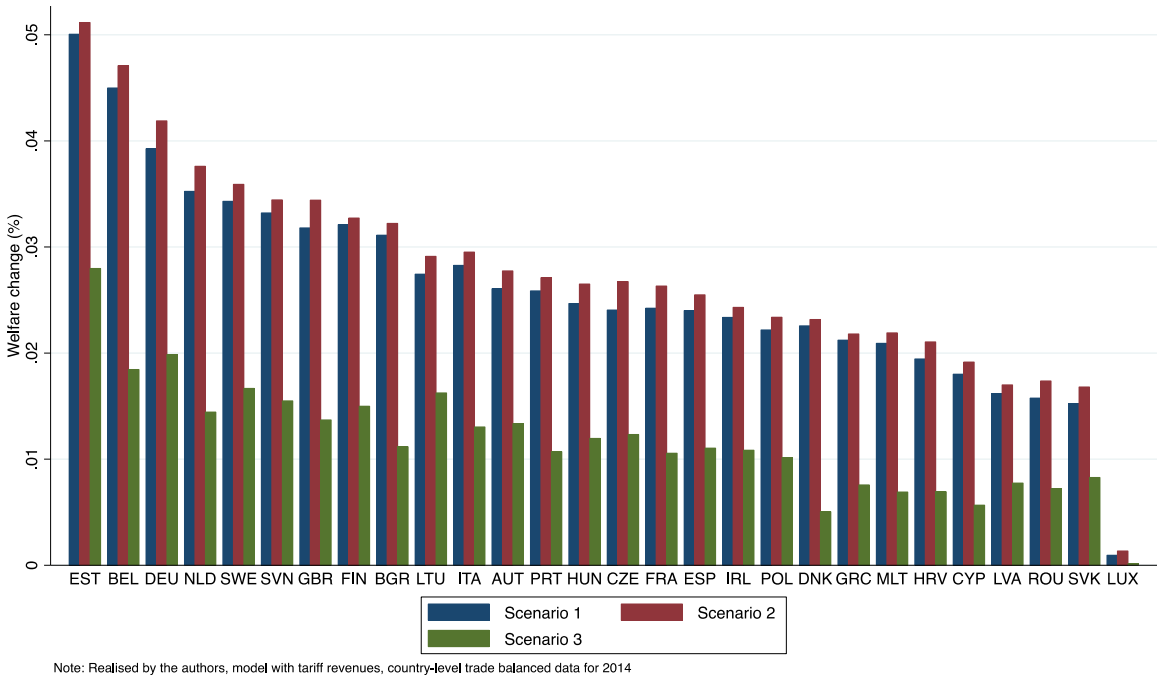

Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

Figure 24: Map on welfare change, model without tariff revenues, scenario 1



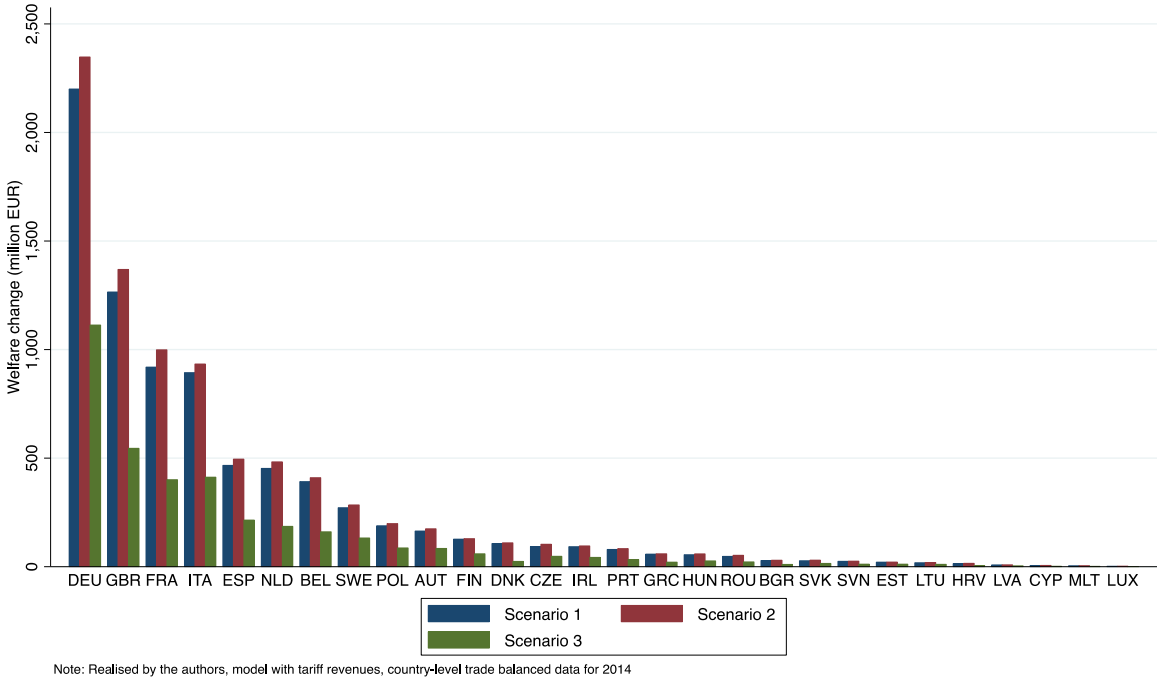

Note: Illustration realised by the authors, changes between the baseline and counterfactual equilibrium.

Figure 25: Welfare change (%), by member state




Note: Realised by the authors, model with tariff revenues, country-level trade balanced data for 2014

Figure 26: Welfare change (million EUR), by member state




Note: Realised by the authors, model with tariff revenues, country-level trade balanced data for 2014

Figure 27: Change to trade in services (million EUR) between member states and India


## 8.6. Trade flows changes

Figure 28: Changes to trade in services (%) between member states and India

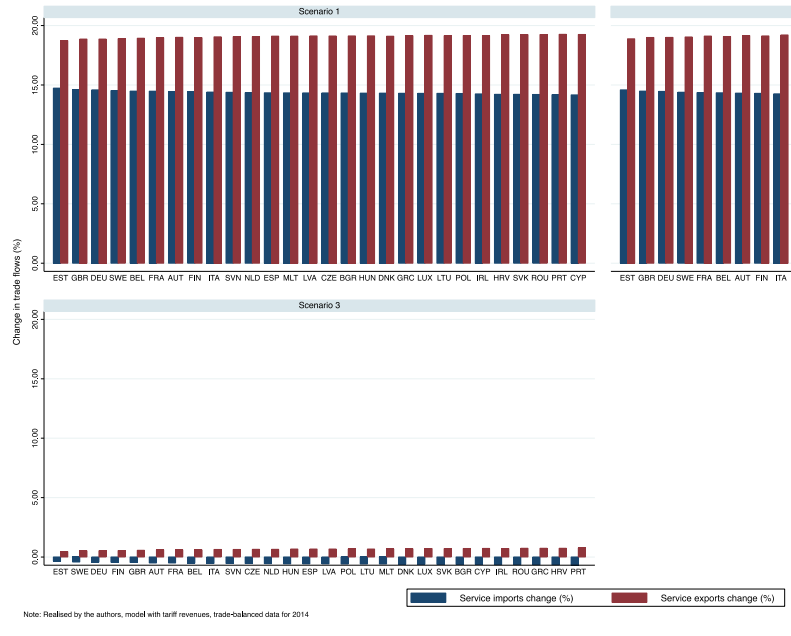


Figure 29: Change to trade in goods (million EUR) between member states and India

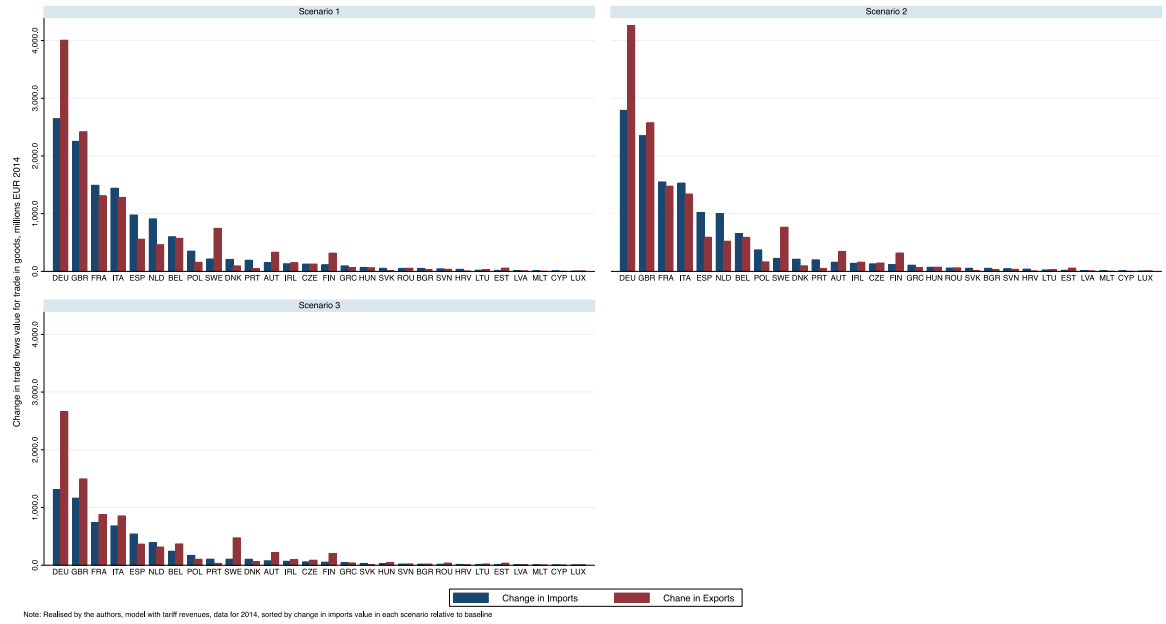



Figure 30: Change to trade in goods (%) between member states and India

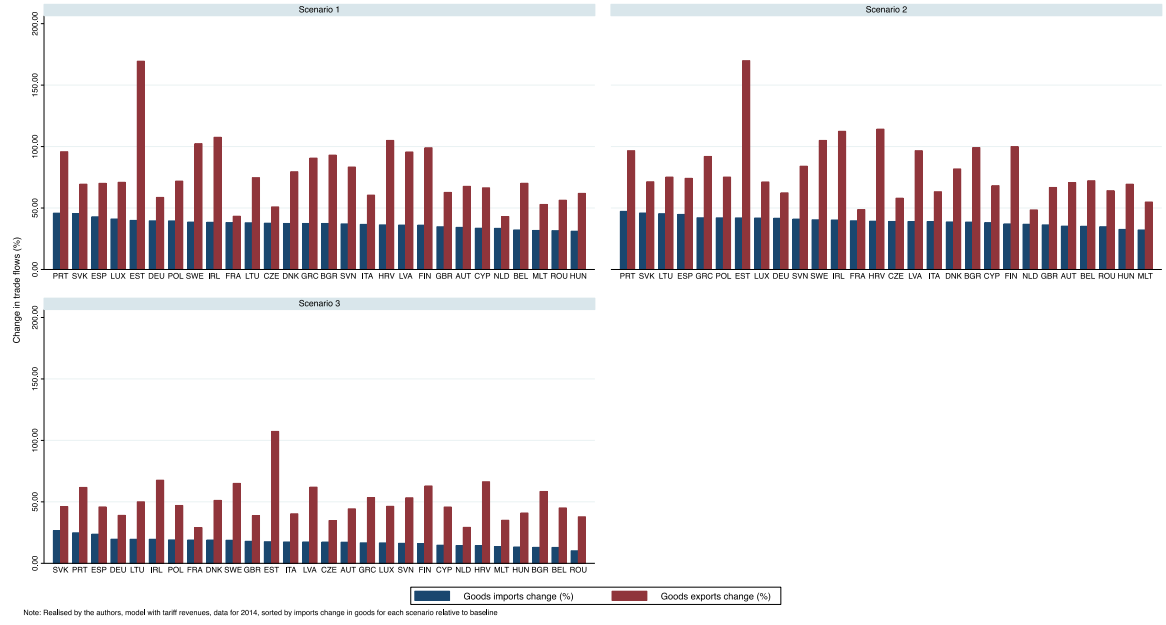


Figure 31: Change to imports and exports (million EUR) between EU and India, by sector

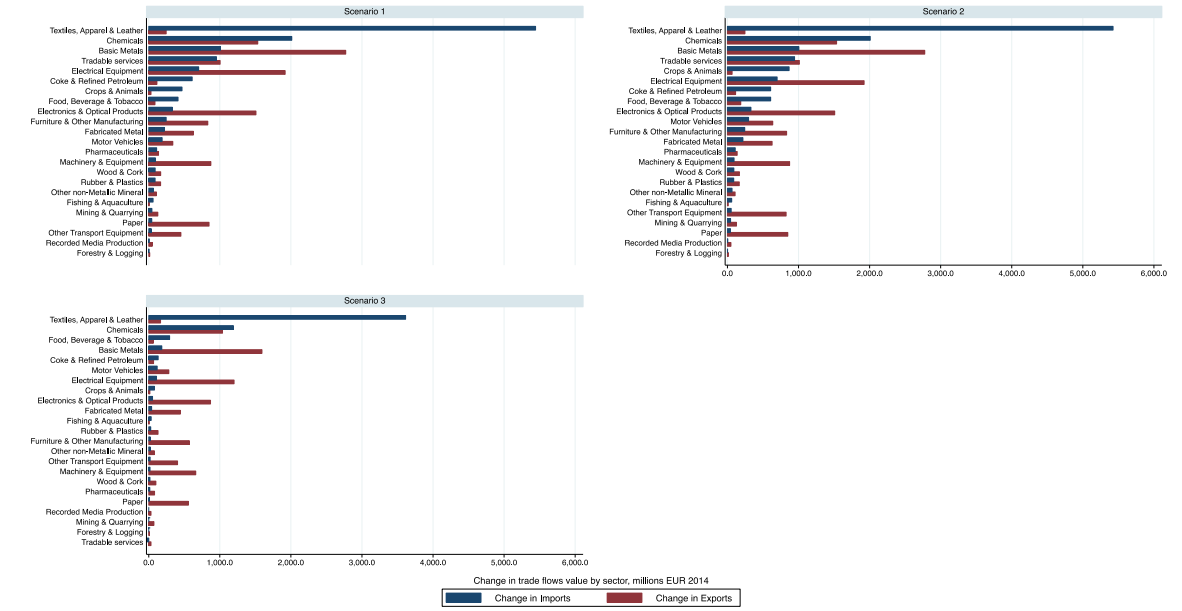



Figure 32: Change to imports and exports (%) between EU and India, by sector

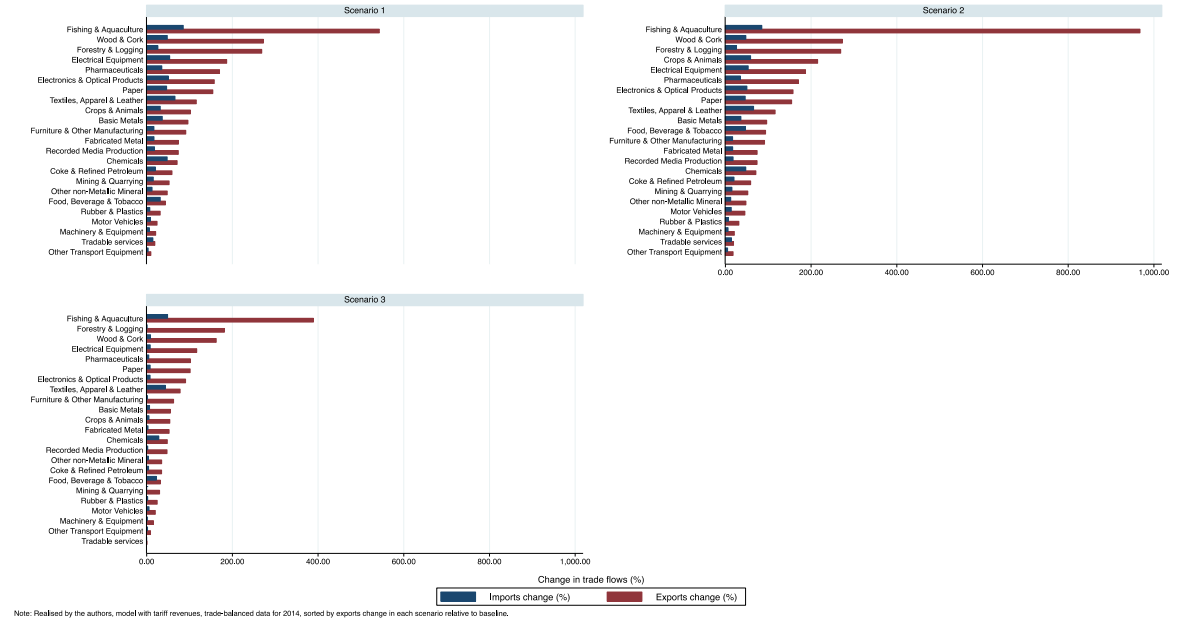


Figure 33:Change to trade flows by sector (million EUR), partner extra-EU, excluding India

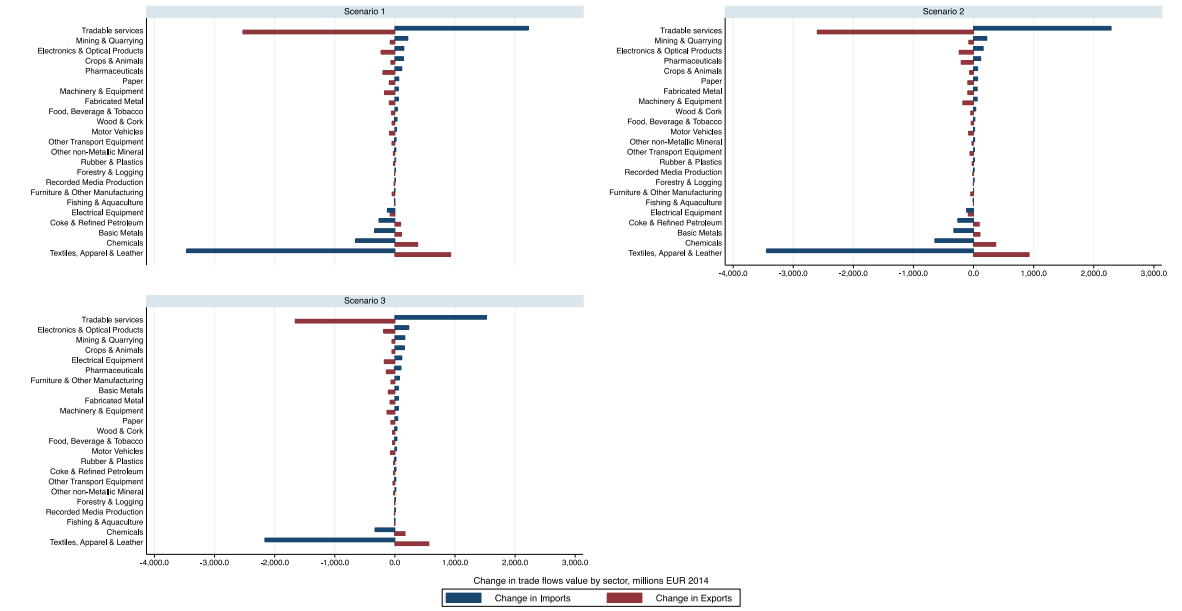



Figure 34: Change to trade flows by sector (%), partner extra-EU, excluding India

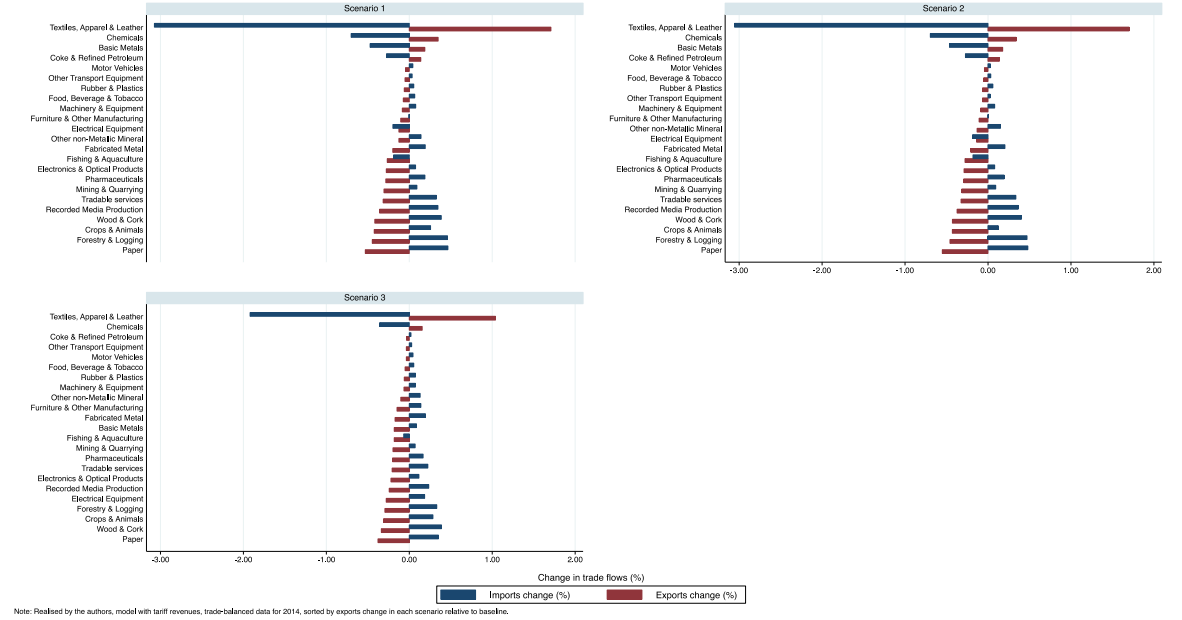


Figure 35: Change to intra-EU trade flows (million EUR), including intranational trade

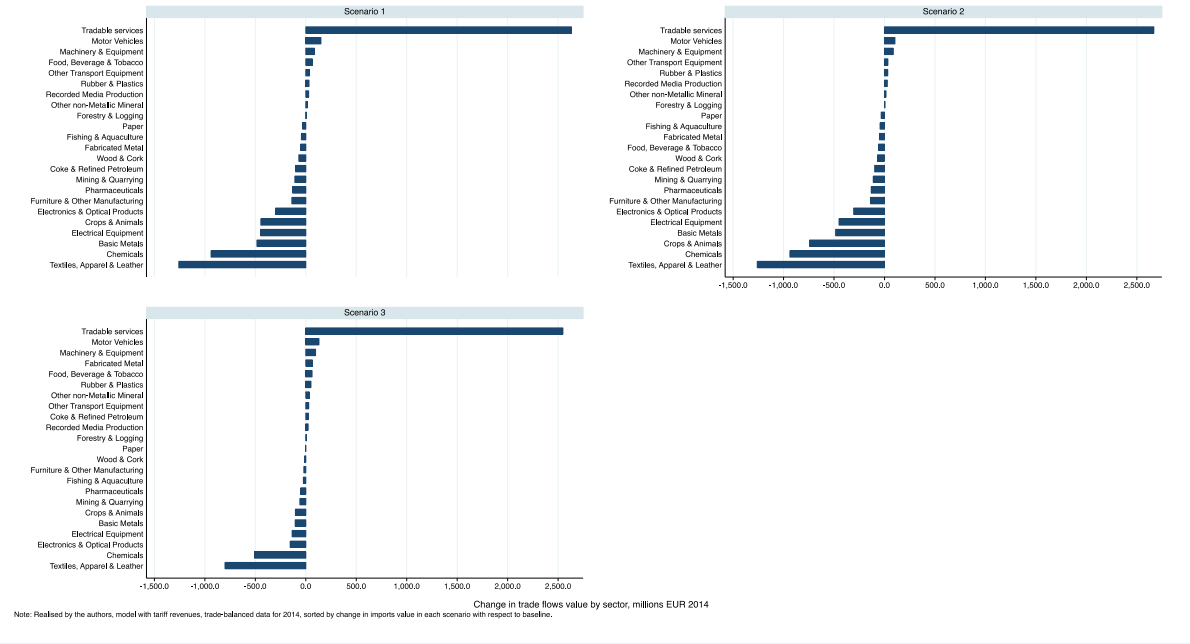



Figure 36: Change to intra-EU trade flows (%), including intranational trade

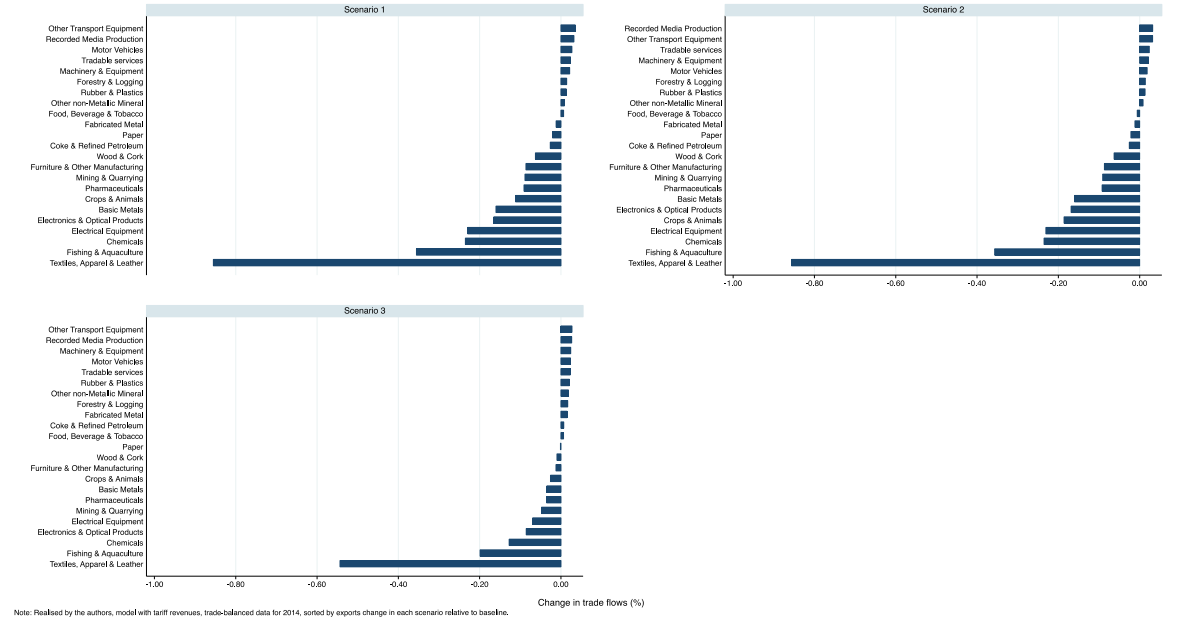
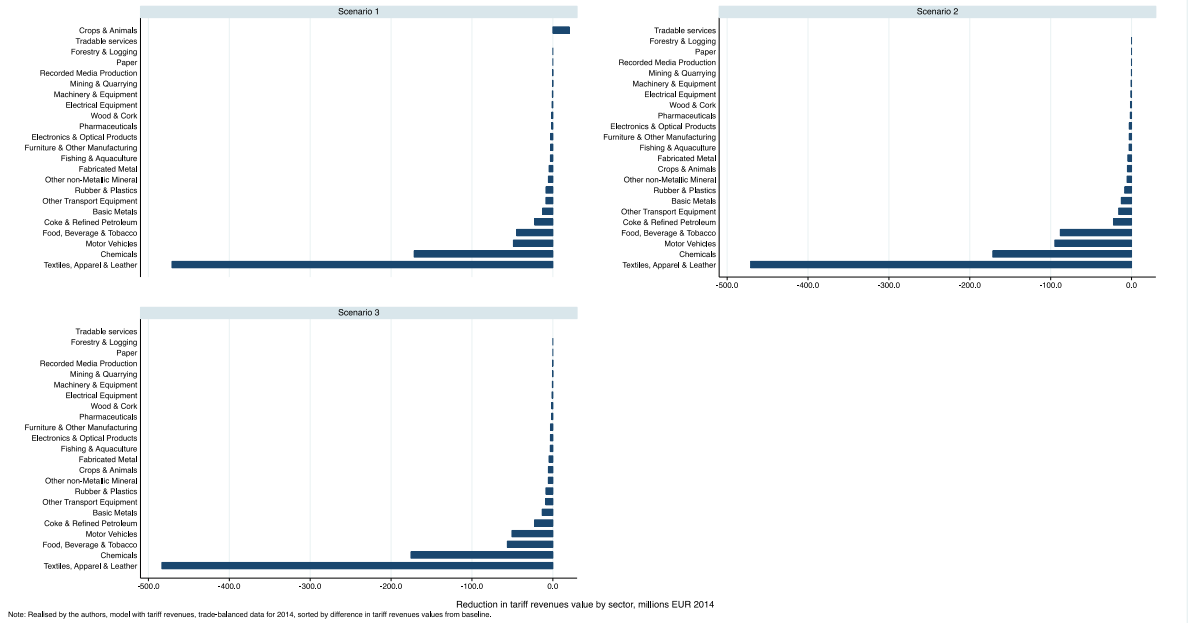
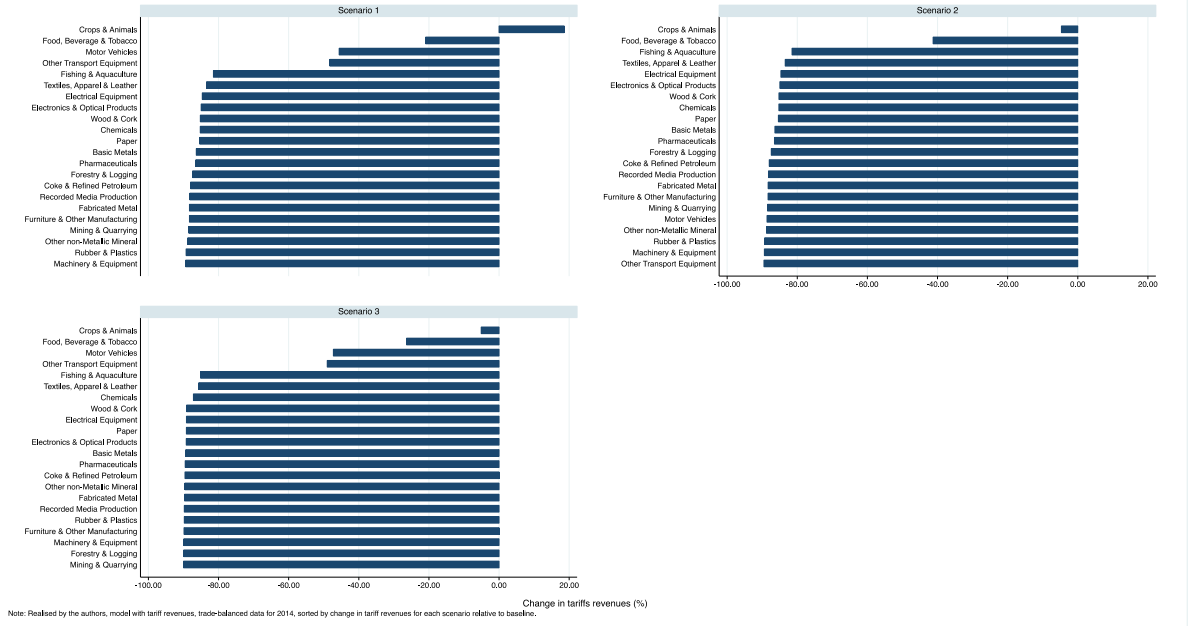


Figure 37: Change to tariff revenues (million EUR) on imports from India



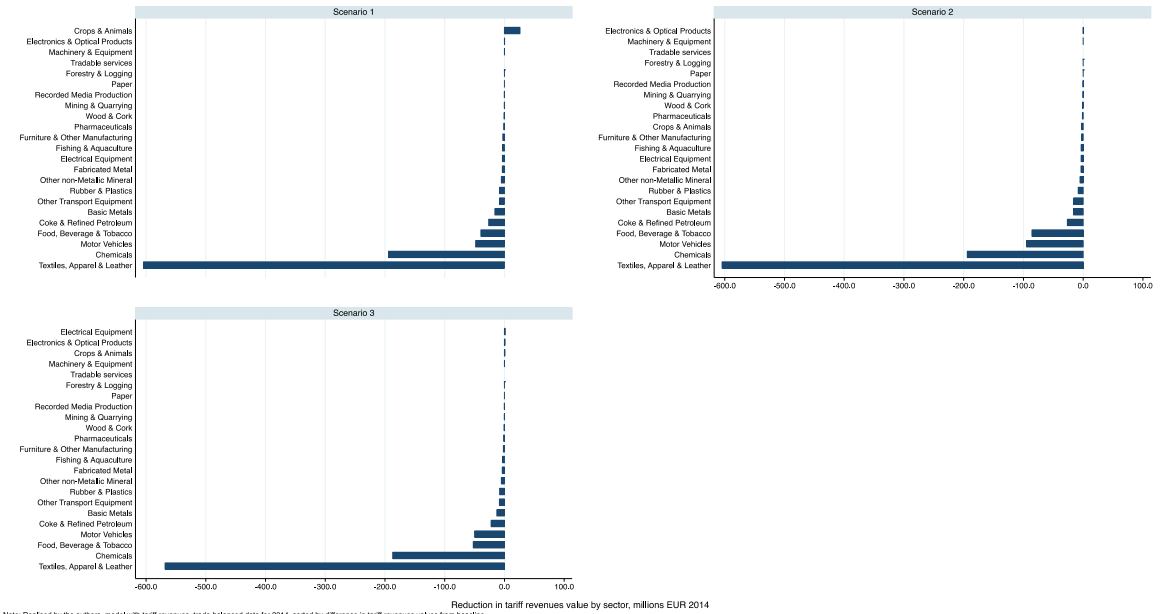
Note: Realised by the authors, model with tariff revenues, trade-balanced data for 2014, sorted by difference in tariff revenues values from baseline.

Figure 38: Change to tariff revenues (%) on imports from India



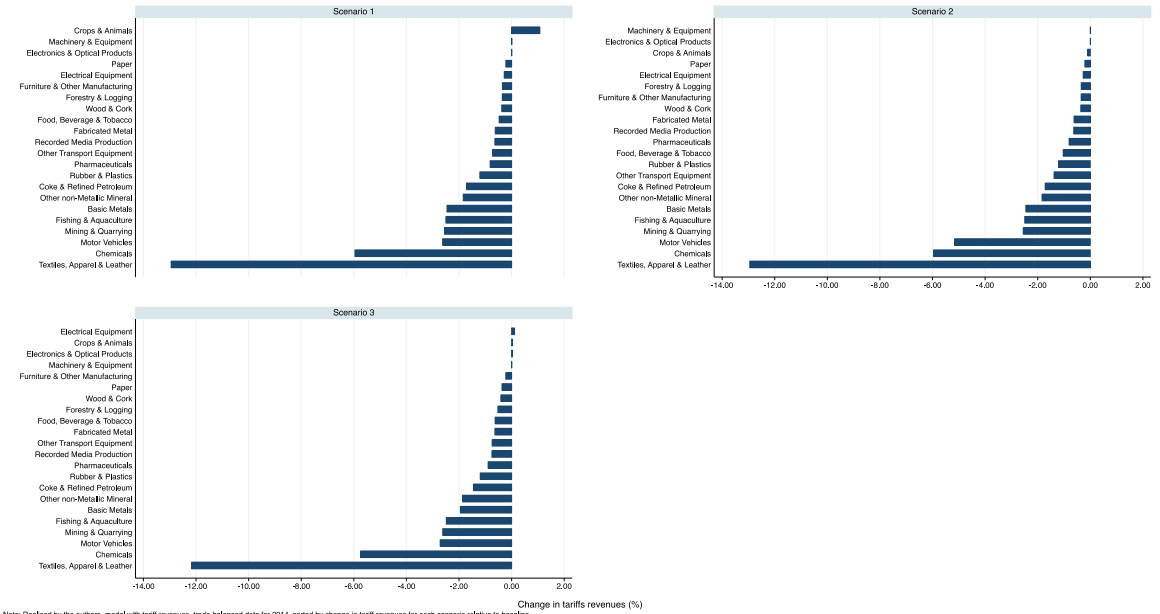
Note: Realised by the authors, model with tariff revenues, trade-balanced data for 2014, sorted by change in tariff revenues for each scenario relative to baseline.

Figure 39: Changes to tariff revenues (million EUR) on imports from the rest of the world, including India




Note: Realised by the authors, model with tariff revenues, trade-balanced data for 2014, sorted by difference in tariff revenues values from baseline.

Figure 40: Changes to tariff revenues (%) on imports from the rest of the world, including India




Note: Realised by the authors, model with tariff revenues, trade-balanced data for 2014, sorted by change in tariff revenues for each scenario relative to baseline.

# 9. Tables Appendix

## 9.1. Trade overview

Table 5: Trade agreements in force between the EU and its main trade partners, ranked by extra-EU28 exports in 2018

| Partner Country[a] | *Agreements in force[b,c]* | *Share of extra-EU28 exports, Percentages (Rankings)* | *Share of extra-EU28 imports, Percentages (Rankings)* |
|---|---|---|---|
| United States | | 20.78 (1) | 13.50 (2) |
| China, except Hong Kong | | 10.73 (2) | 19.94 (1) |
| Switzerland | FTA (1973) | 8.00 (3) | 5.50 (4) |
| Russia | | 4.36 (4) | 8.50 (3) |
| Turkey | CU (1996) | 3.95 (5) | 3.84 (6) |
| Japan | FTA & EIA (2019) | 3.31 (6) | 3.55 (7) |
| Norway | FTA (1973) | 2.76 (7) | 4.23 (5) |
| South Korea | FTA & EIA (2011) | 2.53 (8) | 2.58 (8) |
| India | | 2.34 (9) | 2.31 (9) |
| Canada | FTA & EIA (2017) | 2.11 (10) | 1.57 (12) |
| Mexico | FTA & EIA (2000) | 2.01 (11) | 1.31 (15) |
| United Arab Emirates | | 1.93 (12) | 0.56 (32) |
| Singapore | | 1.90 (13) | 1.06 (21) |
| Hong Kong | | 1.87 (14) | 0.50 (35) |
| Australia | | 1.84 (15) | 0.59 (30) |
| Brazil | | 1.72 (16) | 1.60 (11) |
| Saudi Arabia | | 1.56 (17) | 1.54 (13) |
| South Africa | FTA (2000) | 1.24 (18) | 1.22 (17) |
| Morocco | FTA (2000) | 1.19 (19) | 0.81 (28) |
| Ukraine | FTA & EIA (2014) | 1.13 (20) | 0.91 (23) |

Note: [a]: The list of partners includes the first twenty countries by share of extra-EU28 exports, from the EU28 to the partner country. Instead, the extra-EU28 imports cover imports by the EU28 from the partner country considered. The rankings are based on the aurthors' computations using data retrieved from the international trade in goods archive by Eurostat for trade flows in 2018. [b]: The data are from the RTA database by the World Trade Organization. [c]: The year inside the brackets indicate the "*date of entry into force*". The agreement types are: Free Trade Agreement (FTA), Customs Union (CU), Economic Integration Agreement (EIA), Partial Scope Agreement (PSA).

Table 6: Overview of trade in goods with India and extra-EU for the member states

| Trade Flow | Exports (flows in mln USD, share in %) | | | | Imports (flows in mln USD, share in %) | | | |
|---|---|---|---|---|---|---|---|---|
| Country/Partner | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share member state EU trade with India* | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share member state EU trade with India* |
| AUT | 48,327 | 887 | 1.83 | 2.02 | 42,690 | 897 | 2.10 | 1.63 |
| BEL | 97,576 | 6,806 | 6.98 | 15.53 | 145,002 | 5,548 | 3.83 | 10.10 |
| BGR | 11,332 | 176 | 1.56 | 0.40 | 13,827 | 169 | 1.22 | 0.31 |
| CYP | 1,901 | 14 | 0.73 | 0.03 | 3,575 | 94 | 2.63 | 0.17 |
| CZE | 30,762 | 701 | 2.28 | 1.60 | 52,040 | 794 | 1.53 | 1.45 |
| DEU | 560,873 | 11,991 | 2.14 | 27.35 | 456,478 | 9,944 | 2.18 | 18.11 |
| DNK | 32,799 | 437 | 1.33 | 1.00 | 24,159 | 713 | 2.95 | 1.30 |
| ESP | 106,350 | 1,572 | 1.48 | 3.58 | 146,890 | 4,351 | 2.96 | 7.93 |
| EST | 5,279 | 79 | 1.50 | 0.18 | 5,995 | 89 | 1.49 | 0.16 |
| FIN | 30,008 | 670 | 2.23 | 1.53 | 25,566 | 410 | 1.61 | 0.75 |
| FRA | 214,585 | 5,228 | 2.44 | 11.93 | 231,938 | 6,050 | 2.61 | 11.02 |
| GBR | 203,367 | 4,792 | 2.36 | 10.93 | 282,841 | 9,161 | 3.24 | 16.69 |
| GRC | 14,512 | 103 | 0.71 | 0.23 | 24,682 | 442 | 1.79 | 0.81 |
| HRV | 2,475 | 15 | 0.60 | 0.03 | 2,434 | 86 | 3.53 | 0.16 |
| HUN | 25,039 | 260 | 1.04 | 0.59 | 24,056 | 406 | 1.69 | 0.74 |
| IRL | 79,866 | 617 | 0.77 | 1.41 | 34,012 | 894 | 2.63 | 1.63 |
| ITA | 222,357 | 4,138 | 1.86 | 9.44 | 176,607 | 5,749 | 3.26 | 10.47 |
| LTU | 10,834 | 181 | 1.67 | 0.41 | 9,534 | 70 | 0.73 | 0.13 |
| LVA | 4,031 | 49 | 1.20 | 0.11 | 4,502 | 103 | 2.29 | 0.19 |
| MLT | 2,016 | 14 | 0.70 | 0.03 | 6,631 | 205 | 3.09 | 0.37 |
| NLD | 122,101 | 2,330 | 1.91 | 5.32 | 233,563 | 3,918 | 1.68 | 7.14 |
| POL | 47,044 | 753 | 1.60 | 1.72 | 83,521 | 2,379 | 2.85 | 4.33 |
| PRT | 18,651 | 167 | 0.89 | 0.38 | 19,518 | 770 | 3.94 | 1.40 |
| ROU | 19,993 | 375 | 1.87 | 0.85 | 20,144 | 344 | 1.71 | 0.63 |
| SVK | 13,766 | 78 | 0.57 | 0.18 | 25,280 | 310 | 1.23 | 0.56 |
| SVN | 6,213 | 99 | 1.59 | 0.23 | 10,600 | 257 | 2.42 | 0.47 |
| SWE | 58,650 | 1,308 | 2.23 | 2.98 | 39,356 | 750 | 1.90 | 1.37 |

Note: Data for 2017 from BACI. The country BEL includes Belgium and Luxembourg.

Table 7: Overview of trade in services with India and extra-EU for the member state

| Trade Flow | Exports (flows in mln EUR, share in %) | | | | Imports (flows in mln EUR, share in %) | | | |
|---|---|---|---|---|---|---|---|---|
| Country/Partner | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share member state EU trade with India* | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share member state EU trade with India* |
| AUT | 13,734 | 124 | 0.90 | 0.75 | 10,184 | 213 | 2.09 | 1.25 |
| BEL | 32,731 | 296 | 0.90 | 1.79 | 22,986 | 481 | 2.09 | 2.82 |
| BGR | 2,863 | 15 | 0.52 | 0.09 | 1,985 | 9 | 0.44 | 0.05 |
| CYP | 4,830 | 11 | 0.23 | 0.07 | 3,042 | 291 | 9.57 | 1.70 |
| CZE | 8,065 | 74 | 0.92 | 0.45 | 5,729 | 60 | 1.05 | 0.35 |
| DEU | 135,693 | 2,819 | 2.08 | 17.00 | 123,867 | 3,552 | 2.87 | 20.81 |
| DNK | 31,619 | 1,036 | 3.28 | 6.25 | 23,528 | 759 | 3.23 | 4.45 |
| ESP | --- | 471 | --- | 2.84 | --- | 346 | --- | 2.03 |
| EST | 1,775 | 10 | 0.56 | 0.06 | 907 | 8 | 0.84 | 0.04 |
| FIN | 13,373 | 764 | 5.71 | 4.61 | 8,266 | 555 | 6.71 | 3.25 |
| FRA | 112,897 | 1,736 | 1.54 | 10.47 | 79,721 | 2,472 | 3.10 | 14.48 |
| GBR | 184,761 | 2,985 | 1.62 | 18.01 | 95,946 | 3,516 | 3.66 | 20.59 |
| GRC | 17,220 | 499 | 2.90 | 3.01 | 8,318 | 62 | 0.74 | 0.36 |
| HRV | 3,854 | 37 | 0.96 | 0.22 | 1,992 | 5 | 0.24 | 0.03 |
| HUN | 7,095 | 243 | 3.42 | 1.46 | 4,378 | 40 | 0.91 | 0.23 |
| IRL | 85,629 | 2,972 | 3.47 | 17.93 | 115,863 | 799 | 0.69 | 4.68 |
| ITA | 43,187 | 533 | 1.23 | 3.21 | 36,634 | 464 | 1.27 | 2.72 |
| LTU | 2,945 | 10 | 0.35 | 0.06 | 1,895 | 9 | 0.50 | 0.06 |
| LUX | 24,695 | 227 | 0.92 | 1.37 | 23,930 | 71 | 0.30 | 0.42 |
| LVA | 1,763 | 13 | 0.74 | 0.08 | 887 | 7 | 0.79 | 0.04 |
| MLT | 3,642 | 27 | 0.74 | 0.16 | 2,689 | 14 | 0.52 | 0.08 |
| NLD | 71,596 | 1,077 | 1.50 | 6.50 | 88,748 | 2,308 | 2.60 | 13.52 |
| POL | 16,056 | 106 | 0.66 | 0.64 | 7,084 | 90 | 1.27 | 0.53 |
| PRT | 8,667 | 80 | 0.92 | 0.48 | 4,951 | 105 | 2.12 | 0.62 |
| ROU | 3,908 | 55 | 1.40 | 0.33 | 2,289 | 40 | 1.76 | 0.24 |
| SVK | 2,085 | 7 | 0.32 | 0.04 | 1,396 | 11 | 0.77 | 0.06 |
| SVN | 1,467 | 8 | 0.53 | 0.05 | 1,075 | 9 | 0.79 | 0.05 |
| SWE | 30,601 | 345 | 1.13 | 2.08 | 19,296 | 777 | 4.03 | 4.55 |

Note: Data for 2017 from Eurostat. For Spain, data on trade with the Rest of the World are not available. The total value for trade in services includes the sector classified as "Services not allocated" in the database on Eurostat.

Table 8: Overview of trade in goods with India and extra-EU for the EU, by sector

| Trade Flow | Exports (flows in mln USD, share in %) | | | | Imports (flows in mln USD, share in %) | | | |
|---|---|---|---|---|---|---|---|---|
| Sector/Partner | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share trade with India by sector over total trade with India* | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share trade with India by sector over total trade with India* |
| Crops & Animals | 27,148 | 347 | 1.28 | 0.79 | 62,052 | 1,829 | 2.95 | 3.33 |
| Forestry & Logging | 920 | 29 | 3.19 | 0.07 | 1,272 | 26 | 2.07 | 0.05 |
| Fishing & Aquaculture | 1,293 | 3 | 0.21 | 0.01 | 5,308 | 18 | 0.34 | 0.03 |
| Mining & Quarrying | 28,564 | 5,332 | 18.67 | 12.16 | 305,667 | 923 | 0.30 | 1.68 |
| Food, Beverage & Tobacco | 130,802 | 650 | 0.50 | 1.48 | 93,755 | 3,273 | 3.49 | 5.96 |
| Textiles, Apparel & Leather | 66,877 | 622 | 0.93 | 1.42 | 200,949 | 14,415 | 7.17 | 26.26 |
| Wood & Cork | 14,195 | 162 | 1.14 | 0.37 | 12,898 | 79 | 0.61 | 0.14 |
| Paper | 31,001 | 1,174 | 3.79 | 2.68 | 15,324 | 117 | 0.77 | 0.21 |
| Recorded Media Production | 16,392 | 191 | 1.16 | 0.43 | 7,583 | 122 | 1.62 | 0.22 |
| Coke & Refined Petroleum | 74,221 | 526 | 0.71 | 1.20 | 76,869 | 2,813 | 3.66 | 5.12 |
| Chemicals | 191,362 | 5,772 | 3.02 | 13.17 | 141,714 | 6,165 | 4.35 | 11.23 |
| Pharmaceuticals | 170,608 | 1,129 | 0.66 | 2.58 | 87,041 | 2,093 | 2.40 | 3.81 |
| Rubber & Plastics | 51,105 | 1,041 | 2.04 | 2.37 | 47,105 | 1,559 | 3.31 | 2.84 |
| Other non-Metallic Mineral | 25,132 | 488 | 1.94 | 1.11 | 18,149 | 757 | 4.17 | 1.38 |
| Basic Metals | 106,094 | 3,383 | 3.19 | 7.72 | 142,632 | 4,641 | 3.25 | 8.45 |
| Fabricated Metal | 55,282 | 1,190 | 2.15 | 2.71 | 49,042 | 1,784 | 3.64 | 3.25 |
| Electronics & Optical Products | 163,059 | 3,754 | 2.30 | 8.56 | 318,422 | 1,145 | 0.36 | 2.09 |
| Electrical Equipment | 108,477 | 2,597 | 2.39 | 5.92 | 110,387 | 1,849 | 1.68 | 3.37 |
| Machinery & Equipment | 269,408 | 7,866 | 2.92 | 17.94 | 129,527 | 3,296 | 2.54 | 6.00 |
| Motor Vehicles | 253,568 | 2,245 | 0.89 | 5.12 | 120,154 | 3,159 | 2.63 | 5.75 |
| Other Transport Equipment | 126,597 | 4,198 | 3.32 | 9.58 | 97,829 | 1,659 | 1.70 | 3.02 |
| Furniture & Other Manufacturing | 78,599 | 1,140 | 1.45 | 2.60 | 101,760 | 3,179 | 3.12 | 5.79 |

Note: Data for 2017 from the BACI dataset by CEPII. On request we can provide the data for India.

Table 9: Overview of trade in services with India and extra-EU for the EU, by sector

| Trade Flow | Exports (flows in mln EUR, share in %) | | | | Imports (flows in mln EUR, share in %) | | | |
|---|---|---|---|---|---|---|---|---|
| Sector/Partner | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share trade with India by sector over total trade with India* | *Extra EU28* | *India* | *Share India over Extra EU28* | *Share trade with India by sector over total trade with India* |
| Charges for the use of intellectual property n.i.e. | 74,632 | 942 | 1.26 | 5.78 | 112,091 | 123 | 0.11 | 0.72 |
| Construction | 13,160 | 150 | 1.14 | 0.92 | 5,722 | 91 | 1.58 | 0.53 |
| Financial services | 86,669 | 501 | 0.58 | 3.07 | 48,480 | 280 | 0.58 | 1.64 |
| Government goods and services n.i.e. | 7,270 | 143 | 1.97 | 0.88 | 6,234 | 127 | 2.03 | 0.74 |
| Insurance and pension services | 23,167 | 148 | 0.64 | 0.91 | 13,795 | 158 | 1.15 | 0.93 |
| Maintenance and repair services n.i.e. | 14,285 | 341 | 2.39 | 2.09 | 12,190 | 128 | 1.05 | 0.75 |
| Manufacturing services on physical inputs owned by others | 19,404 | 76 | 0.39 | 0.47 | 12,004 | 228 | 1.90 | 1.34 |
| Other business services | 237,180 | 2,248 | 0.95 | 13.79 | 216,783 | 7,807 | 3.60 | 45.74 |
| Personal, cultural, and recreational services | 10,492 | 72 | 0.69 | 0.44 | 10,533 | 96 | 0.91 | 0.56 |
| Telecommunications, computer, and information services | 123,910 | 4,940 | 3.99 | 30.31 | 49,845 | 3,715 | 7.45 | 21.77 |
| Transport | 165,576 | 4,307 | 2.60 | 26.43 | 126,477 | 2,065 | 1.63 | 12.10 |
| Travel | 136,950 | 2,429 | 1.77 | 14.91 | 106,339 | 2,249 | 2.11 | 13.18 |
| Total | 912,695 | 16,298 | 1.79 | --- | 720,492 | 17,065 | 2.37 | --- |

Note: Data for 2017 from Eurostat, BPM6 classification. The total value for trade in services does not include the sector classified as "Services not allocated" in the database on Eurostat.

Table 10: NTMs applied by the EU and India

| NTM/Measures | European Union | | | | | |
|---|---|---|---|---|---|---|
| | World | Bilateral EU-India | Animal[a] | Vegetable[b] | Food[c] | Pharmaceuticals[d] |
| Export-related measures | 2 | --- | --- | --- | --- | 2 (4.17%) |
| Other measures | 2 | --- | 1 (1.27%) | 1 (0.91%) | 1 (0.84%) | --- |
| Pre-shipment inspection | 5 | 1* | 1 (1.27%) | --- | 1 (0.84%) | 1 (2.08%) |
| Price control measures | --- | --- | --- | --- | --- | --- |
| Quantity control measures | 35 | --- | 8 (10.13%) | 13 (11.82%) | 13 (10.92%) | 10 (20.83%) |
| Sanitary and Phytosanitary | 97 | --- | 55 (69.62%) | 70 (63.64%) | 71 (59.66%) | 11 (22.92%) |
| Technical Barriers to Trade | 272 | --- | 14 (17.72%) | 26 (23.64%) | 33 (27.73%) | 24 (50.00%) |
| Total | 413 | 1 | 79 | 110 | 119 | 48 |
| NTM/Measures | India | | | | | |
| | World | Bilateral EU-India | Animal[a] | Vegetable[b] | Food[c] | Pharmaceuticals[d] |
| Export-related measures | 407 | 26 | 167 (28.02%) | 157 (11.66%) | 102 (10.69%) | 56 (24.45%) |
| Other measures | 23 | --- | 1 (0.17%) | 11 (0.82%) | 4 (0.42%) | 1 (0.44%) |
| Pre-shipment inspection | 43 | --- | 7 (1.17%) | 12 (0.89%) | 4 (0.42%) | 10 (4.37%) |
| Price control measures | 42 | 1 | 3 (0.50%) | 15 (1.11%) | 9 (0.94%) | 7 (3.06%) |
| Quantity control measures | 201 | 2 | 19 (3.19%) | 18 (1.34%) | 6 (0.63%) | 60 (26.20%) |
| Sanitary and Phytosanitary | 1,466 | 41 | 209 (35.07%) | 857 (63.67%) | 561 (58.81%) | 16 (6.99%) |
| Technical Barriers to Trade | 1,481 | 1 | 190 (31.88%) | 276 (20.51%) | 268 (28.09%) | 79 (34.50%) |
| Total | 3,663 | 71 | 596 | 1,346 | 954 | 229 |

Note: Data for measures in force on the first of January 2019 from UNCTAD TRAINS database. Number of measures outside of the parentheses, while inside them we report the share of measures in the associated group of products out of the total measures applied for that same group. [a]: This group covers Animal and Animal products, from HS01 to HS05. [b]: This group covers Vegetable products, from HS06 to HS15. [c]: This group covers Food, Alcohol and Tobacco products, from HS16 to HS24. [d]: This group covers Pharmaceuticals products in HS30. *: This measure is applied to the Iron & Steel (HS72) and Iron or Steel Articles (HS73) products.

## 9.2. Data overview

Table 11: List of countries in the BACI dataset (first part)

| Country Name | ISO code | Country Name | ISO code | Country Name | ISO code |
|---|---|---|---|---|---|
| Aruba | ABW | Belize | BLZ | Germany | DEU |
| Afghanistan | AFG | Bermuda | BMU | Djibouti | DJI |
| Angola | AGO | Bolivia | BOL | Dominica | DMA |
| Anguilla | AIA | Brazil | BRA | Denmark | DNK |
| Albania | ALB | Barbados | BRB | Dominican Republic | DOM |
| Andorra | AND | Brunei Darussalam | BRN | Algeria | DZA |
| Netherland Antilles and Aruba | ANT | Bhutan | BTN | Ecuador | ECU |
| United Arab Emirates | ARE | Central African Republic | CAF | Egypt | EGY |
| Argentina | ARG | Canada | CAN | Eritrea | ERI |
| Armenia | ARM | Cocos (Keeling) Islands | CCK | Spain | ESP |
| American Samoa | ASM | Switzerland-Liechtenstein | CHE | Estonia | EST |
| Antigua and Barbuda | ATA | Chile | CHL | Ethiopia | ETH |
| French Southern Antartic territories | ATF | China | CHN | Finland | FIN |
| Australia | AUS | Côte d'Ivoire | CIV | Fiji | FJI |
| Austria | AUT | Cameroon | CMR | Falkland Islands (Malvinas) | FLK |
| Azerbaijan | AZE | Democratic Republic of the Congo | COD | France | FRA |
| Burundi | BDI | Congo | COG | Micronesia (Federated States of) | FSM |
| Belgium-Luxembourg | BEL | Cook Islands | COK | Gabon | GAB |
| Benin | BEN | Colombia | COL | United Kingdom | GBR |
| Bonaire, Saint Eustatius and Saba | BES | Comoros | COM | Georgia | GEO |
| Burkina Faso | BFA | Cape Verde | CPV | Ghana | GHA |
| Bangladesh | BGD | Costa Rica | CRI | Gibraltar | GIB |
| Bulgaria | BGR | Cuba | CUB | Guinea | GIN |
| Bahrain | BHR | Curaçao | CUW | Gambia | GMB |
| Bahamas | BHS | Christmas Island | CXR | Guinea-Bissau | GNB |
| Bosnia and Herzegovina | BIH | Cayman Islands | CYM | Equatorial Guinea | GNQ |
| Saint Barthélemy | BLM | Cyprus | CYP | Greece | GRC |
| Belarus | BLR | Czech Republic | CZE | Grenada | GRD |

Table 12: List of countries in the BACI dataset (second part)

| Country Name | ISO code | Country Name | ISO code | Country Name | ISO code |
|---|---|---|---|---|---|
| Greenland | GRL | Kuwait | KWT | Malaysia | MYS |
| Guatemala | GTM | Lao People's Democratic Republic | LAO | New Caledonia | NCL |
| Guam | GUM | Lebanon | LBN | Niger | NER |
| Guyana | GUY | Liberia | LBR | Norfolk Island | NFK |
| Hong Kong (SARC) | HKG | Libyan Arab Jamahiriya | LBY | Nigeria | NGA |
| Honduras | HND | Saint Lucia | LCA | Nicaragua | NIC |
| Croatia | HRV | Sri Lanka | LKA | Niue | NIU |
| Haiti | HTI | Lithuania | LTU | Netherlands | NLD |
| Hungary | HUN | Latvia | LVA | Norway | NOR |
| Indonesia | IDN | Macau | MAC | Nepal | NPL |
| India | IND | Morocco | MAR | Nauru | NRU |
| British Indian Ocean Territory | IOT | Moldova, Rep.of | MDA | New Zealand | NZL |
| Ireland | IRL | Madagascar | MDG | Oman | OMN |
| Iran (Islamic Republic of) | IRN | Maldives | MDV | Pakistan | PAK |
| Iraq | IRQ | Mexico | MEX | Panama | PAN |
| Iceland | ISL | Marshall Islands | MHL | Pitcairn | PCN |
| Israel | ISR | The former Yugoslav Rep. of Macedonia | MKD | Peru | PER |
| Italy | ITA | Mali | MLI | Philippines | PHL |
| Jamaica | JAM | Malta | MLT | Palau | PLW |
| Jordan | JOR | Myanmar | MMR | Papua New Guinea | PNG |
| Japan | JPN | Montenegro | MNE | Poland | POL |
| Kazakstan | KAZ | Mongolia | MNG | Korea, Dem. People's Rep. of | PRK |
| Kenya | KEN | Northern Mariana Islands | MNP | Portugal | PRT |
| Kyrgyzstan | KGZ | Mozambique | MOZ | Paraguay | PRY |
| Cambodia | KHM | Mauritania | MRT | State of Palestine | PSE |
| Kiribati | KIR | Montserrat | MSR | French Polynesia | PYF |
| Saint Kitts and Nevis | KNA | Mauritius | MUS | Qatar | QAT |
| Korea, Rep. of Korea | KOR | Malawi | MWI | Roumania | ROU |

Table 13: List of countries in the BACI dataset (third part)

| Country Name | ISO code | Country Name | ISO code |
|---|---|---|---|
| Russian Federation | RUS | Thailand | THA |
| Rwanda | RWA | Tajikistan | TJK |
| Saudi Arabia | SAU | Tokelau | TKL |
| Yugoslavia | SCG | Turkmenistan | TKM |
| Former Sudan | SDN | East Timor | TLS |
| Sudan | SDN | Tonga | TON |
| Senegal | SEN | Trinidad and Tobago | TTO |
| Singapore | SGP | Tunisia | TUN |
| Saint Helena | SHN | Turkey | TUR |
| Solomon Islands | SLB | Tuvalu | TUV |
| Sierra Leone | SLE | Taiwan, Province of (China) | TWN |
| El Salvador | SLV | Tanzania, United Rep. of | TZA |
| San Marino | SMR | Uganda | UGA |
| Somalia | SOM | Ukraine | UKR |
| St. Pierre and Miquelon | SPM | Uruguay | URY |
| Serbia | SRB | United States of America | USA |
| South Sudan | SSD | Uzbekistan | UZB |
| Sao Tome and Principe | STP | Saint Vincent and the Grenadines | VCT |
| Suriname | SUR | Venezuela | VEN |
| Slovakia | SVK | British Virgin Islands | VGB |
| Slovenia | SVN | Viet Nam | VNM |
| Sweden | SWE | Vanuatu | VUT |
| Saint Maarten (Dutch part) | SXM | Wallis and Futuna | WLF |
| Seychelles | SYC | Samoa | WSM |
| Syrian Arab Republic | SYR | Yemen | YEM |
| Turks and Caicos Islands | TCA | South Africa | ZAF |
| Chad | TCD | Zambia | ZMB |
| Togo | TGO | Zimbabwe | ZWE |

Table 14: Countries in the WIOD tables

| Country Name | ISO code | Country Name | ISO code |
|---|---|---|---|
| Austalia | AUS | Korea, Republic of | KOR |
| Brasil | BRA | Mexico | MEX |
| Canada | CAN | Norway | NOR |
| Switzerland | CHE | Rest of the World | ROW |
| China | CHN | Turkey | TUR |
| Indonesia | IDN | Taiwan | TWN |
| India | IND | United States of America | USA |
| Japan | JPN | | |
| Member states of the EU28 | | | |
| Austria | AUT | Hungary | HUN |
| Belgium | BEL | Ireland, Republic of | IRL |
| Bulgaria | BGR | Italy | ITA |
| Cyprus | CYP | Lithuania | LTU |
| Czech Republic | CZE | Luxembourg | LUX |
| Germany | DEU | Latvia | LVA |
| Denmark | DNK | Malta | MLT |
| Spain | ESP | The Netherlands | NLD |
| Estonia | EST | Poland | POL |
| Finland | FIN | Portugal | PRT |
| France | FRA | Romania | ROU |
| The United Kingdom | GBR | Slovakia | SVK |
| Greece | GRC | Slovenia | SVN |
| Croatia | HRV | Sweden | SWE |

Note: Russia is part of the Rest of the World (RoW).

Table 15: Sectors for trade in goods, ISIC Rev.4 classification

| Sectors | Classification |
|---|---|
| Animal production, hunting & related service activities | A01 |
| Forestry & Logging | A02 |
| Fishing & Aquaculture | A03 |
| Mining & Quarrying | B |
| Manufacture of food products, beverages & tobacco products | C10-C12 |
| Manufacture of textiles, wearing apparel & leather products | C13-C15 |
| Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw & plaiting materials | C16 |
| Manufacture of paper & paper products | C17 |
| Printing & reproduction of recorded media | C18 |
| Manufacture of coke & refined petroleum products | C19 |
| Manufacture of chemicals and chemical products | C20 |
| Pharmaceutical products & pharmaceuticals preparations | C21 |
| Manufacture of rubber & plastic products | C22 |
| Manufacture of other non-metallic mineral products | C23 |
| Manufacture of basic metals | C24 |
| Manufacture of fabricated metal products, except machinery & equipment | C25 |
| Manufacture of computer, electronic & optical products | C26 |
| Manufacture of electrical equipment | C27 |
| Manufacture of machinery & equipment n.e.c. | C28 |
| Manufacture of motor vehicles, trailers and semi-trailers | C29 |
| Manufacture of other transport equipment | C30 |
| Manufacture of furniture; other manufacturing | C31-C32 |

Note: The sectors in this table are part of both, the WIOD and BACI dataset.

Table 16: Service sectors, ISIC Rev. 4 classification

| Sectors | Classification | WTO | Classification |
|---|---|---|---|
| Repair and installation of machinery & equipment | C33 | Computer programming, consultancy & related activities; information service activies | J62-J63 |
| Electricity, gas, steam & air conditioning supply | D35* | Financial service activities, except insurance & pension funding | K64 |
| Water collection, treatment & supply | E36* | Insurance, reinsurance & pension funding, except compulsory social security | K65 |
| Sewereage; waste collection, treatment & disposal activities; materials recovery; remediation activities & other waster management services | E37-E39* | Activities auxiliary to financial services & insurance activites | K66 |
| Construction | F* | Real estate activites | L68 |
| Wholesale & retail trade & repair of motor vehicles & motorcycles | G45 | Legal & accounting activities; activities of head offices; management consultancy activities | M69-M70 |
| Wholesale trade, except of motor vehicles & motorcycles | G46 | Architectural & engineering activities; technical testing & analysis | M71 |
| Retail trade, except of motor vehicles & motorcycles | G47 | Scientific research & development | M72 |
| Land transport & transport via pipelines | H49 | Advertising & market research | M73 |
| Water transport | H50 | Other professional, scientific & technical activities; veterinary activities | M74-M75 |
| Air transport | H51 | Administrative & support service activities | N |
| Warehousing & support activities for trasportation | H52 | Public administration & defence; compulsory social security | O84* |
| Postal & courier activities | H53 | Education | P85* |
| Accommodation & food service activities | I | Human health & social work activities | Q* |
| Publishing activities | J58 | Other service activities | R_S* |
| Motion picture, video & television programme production, sound recording & music publishing activities; programming & broadcasting activities | J59-J60 | Activities of households as employers; undifferentiated goods- & services-producing activities of households for own use | T* |
| Telecommunications | J61 | Activities of extraterritorial organizations & bodies | U* |

Note: The table includes the service sectors in the WIOD table. * : This sector is part of the non-tradable services classification.

## 9.3. Regression results, OLS

Table 17: OLS estimates, pooled sectors

| Dependant variable: | Log of bilateral imports | |
|---|---|---|
| Estimator: | OLS | |
| Variables | (1) | (2) |
| RTA | 0.070*** | 0.067** |
| | (0.006) | (0.006) |
| EU | 0.601*** | 0.629*** |
| | (0.015) | (0.015) |
| WTO | 0.140*** | 0.141*** |
| | (0.014) | (0.014) |
| Currency | -0.118 | -0.114 |
| | (0.081) | (0.081) |
| Euro | 0.112*** | 0.120*** |
| | (0.014) | (0.013) |
| Schengen | -0.022* | -0.042*** |
| | (0.011) | (0.011) |
| EEA | | 0.468*** |
| | | (0.042) |
| EU-TUR | | 0.284*** |
| | | (0.042) |
| EU-CHE | | 0.173*** |
| | | (0.044) |
| EU-KOR | | 0.213*** |
| | | (0.035) |
| Observations | 5,426,502 | 5,426,502 |
| $R^2$ | 0.868 | 0.868 |
| RMSE | 1.260 | 1.260 |

Note: All columns include exporter-year-sector (*itk*), importer-year-sector (*jtk),* and country-pair-sector (*ijk*) fixed effects. The standard errors are reported in parantheses below the estimated coefficients, they are clustered at the country-pair-sector level (*ijk*) to allow for correlation within country-pair-sector. The reported significance levels are: * 10%, ** 5%, *** 1%.

Table 18: OLS estimates, sector-level results (part one)

| Sectors | Classification | RTA | EU | EEA | EU-KOR |
|---|---|---|---|---|---|
| Crops & Animals | A01 | 0.036 | 1.055*** | 0.425* | 0.437** |
| Forestry & Logging | A02 | -0.152*** | 0.294** | -0.245 | 0.358 |
| Fishing & Aquaculture | A03 | 0.071 | 0.918*** | -0.204 | -0.284 |
| Mining & Quarrying | B | 0.030 | 0.364*** | 0.054 | 0.412* |
| Food, Beverage & Tobacco | C10-C12 | 0.110*** | 1.088*** | 0.482*** | 0.088 |
| Textiles, Apparel & Leather | C13-C15 | 0.044* | 0.446*** | 0.168 | 0.304*** |
| Wood & Cork | C16 | 0.112*** | 0.362*** | 0.639*** | 0.155 |
| Paper | C17 | -0.029 | 0.755*** | 1.220*** | 0.345** |
| Recorded Media Production | C18 | 0.067** | 0.600*** | 0.987*** | 0.095 |
| Coke & Refined Petroleum | C19 | 0.071 | 0.295** | -0.523 | 0.798*** |
| Chemicals | C20 | 0.059** | 0.578*** | 0.231 | 0.040 |
| Pharmaceuticals | C21 | 0.008 | 1.128*** | 0.837*** | 0.501** |
| Rubber & Plastics | C22 | 0.092*** | 0.515*** | 0.274** | 0.617*** |
| Other non-Metallic Mineral | C23 | 0.084*** | 0.405*** | 0.394** | 0.325** |
| Basic Metals | C24 | 0.120*** | 0.867*** | 0.576*** | 0.106 |
| Fabricated Metal | C25 | 0.097*** | 0.617*** | 0.911*** | 0.227** |
| Electronics & Optical Products | C26 | 0.105*** | 0.808*** | 0.740*** | 0.002 |
| Electrical Equipment | C27 | 0.087*** | 0.495*** | 0.354*** | 0.030 |
| Machinery & Equipment | C28 | 0.030 | 0.325*** | 0.360** | -0.003 |
| Motor Vehicles | C29 | 0.094*** | 0.890*** | 0.698*** | -0.177 |
| Other Transport Equipment | C30 | 0.012 | 0.373*** | 0.507 | 0.218 |
| Furniture & Other Manufacturing | C31-C32 | 0.107*** | 0.487*** | 0.386*** | 0.268** |

Note: Exporter-year (*it*), importer-year (*jt*), and country-pairs (*ij*) fixed effect included but not reported. The standard errors are not reported, they are clustered at the country-pair level (*ij*) to allow for correlation within country-pairs. Not all variables are reported, in Table 19 we report the WTO, Currency, Euro, Schengen, EU-TUR, and EU-CHE variables. The number of observations ranges from 88,912 for Forestry & Logging to 359,743 for Food, Beverage & Tobacco. The reported significance levels are: * 10%, ** 5%, *** 1%.

Table 19: OLS estimates, sector-level results (part two)

| Sectors | Classification | WTO | Currency | Euro | Schengen | EU-TUR | EU-CHE |
|---|---|---|---|---|---|---|---|
| Crops & Animals | A01 | 0.027 | 0.170 | 0.037 | 0.369*** | 0.656*** | -0.609** |
| Forestry & Logging | A02 | 0.268* | -0.605* | 0.069 | 0.221*** | 0.014 | 0.258 |
| Fishing & Aquaculture | A03 | -0.232 | -0.743 | 0.392*** | 0.181** | 0.262 | 0.043 |
| Mining & Quarrying | B | -0.087 | -0.058 | 0.279*** | -0.110 | 0.176 | 0.255 |
| Food, Beverage & Tobacco | C10-C12 | 0.019 | 0.393 | 0.257*** | 0.187*** | 0.030 | -0.141 |
| Textiles, Apparel & Leather | C13-C15 | 0.141*** | 0.268 | 0.165*** | -0.264*** | -0.005 | 0.160 |
| Wood & Cork | C16 | 0.099 | 0.416 | 0.058 | 0.041 | 0.736*** | 0.179 |
| Paper | C17 | 0.199*** | -0.332 | 0.055 | 0.016 | -0.150 | 0.576*** |
| Recorded Media Production | C18 | -0.005 | 0.210 | 0.076 | -0.003 | 0.346* | 0.326* |
| Coke & Refined Petroleum | C19 | -0.142 | 0.043 | 0.441*** | 0.030 | -0.373 | -0.129 |
| Chemicals | C20 | 0.261*** | 0.211 | 0.276*** | -0.124*** | 0.005 | -0.083 |
| Pharmaceuticals | C21 | 0.006 | -0.986** | 0.209*** | 0.302*** | 0.011 | 0.271 |
| Rubber & Plastics | C22 | 0.218*** | 0.495 | 0.014 | -0.109*** | 0.506*** | 0.302* |
| Other non-Metallic Mineral | C23 | 0.117* | -0.031 | 0.071 | 0.019 | 0.321** | 0.446*** |
| Basic Metals | C24 | 0.021 | -0.569* | 0.111* | 0.124** | 0.956*** | -0.152 |
| Fabricated Metal | C25 | 0.129** | -0.186 | 0.050 | -0.192*** | 0.092 | 0.630*** |
| Electronics & Optical Products | C26 | 0.292*** | -0.925* | 0.161*** | -0.329*** | 0.472** | 0.153 |
| Electrical Equipment | C27 | 0.238*** | -0.279 | 0.002 | -0.244*** | 0.187 | 0.304** |
| Machinery & Equipment | C28 | 0.221*** | -0.117 | 0.085** | -0.290*** | 0.005 | 0.051 |
| Motor Vehicles | C29 | 0.404*** | -0.603 | 0.008 | -0.140*** | 0.600*** | 0.696*** |
| Other Transport Equipment | C30 | 0.279*** | -0.530 | -0.040 | -0.027 | 0.300 | 0.674*** |
| Furniture & Other Manufacturing | C31-C32 | 0.187*** | -0.237 | 0.049 | -0.118*** | 0.672*** | -0.586*** |

Note: Exporter-year (*it*), importer-year (*jt*), and country-pairs (*ij*) fixed effect included but not reported. The standard errors are not reported, they are clustered at the country-pair level (*ij*) to allow for correlation within country-pairs. Not all variables are reported, in Table 18 we report the RTA, EU, EEA, and EU-KOR variables. The number of observations ranges from 88,912 for Forestry & Logging to 359,743 for Food, Beverage & Tobacco. The reported significance levels are: * 10%, ** 5%, *** 1%.

Table 20: Summary of estimates and Partial Trade Impacts (PTI), by sector and for pooled sectors

| Sectors | Classification | Regional Trade Agreements (RTA) | Partial Trade Impact (RTA), (%) | Trade agreement between EU and South Korea (EU-KOR) | Partial Trade Impact (EU-KOR), (%) |
|---|---|---|---|---|---|
| Crops & Animals | A01 | 0.036 | 3.67 | 0.437** | 54.81 |
| Forestry & Logging | A02 | -0.152*** | -14.10 | 0.358 | 43.05 |
| Fishing & Aquaculture | A03 | 0.071 | 7.36 | -0.284 | -24.72 |
| Mining & Quarrying | B | 0.030 | 3.05 | 0.412* | 50.98 |
| Food, Beverage & Tobacco | C10-C12 | 0.110*** | 11.63 | 0.088 | 9.20 |
| Textiles, Apparel & Leather | C13-C15 | 0.044* | 4.50 | 0.304*** | 35.53 |
| Wood & Cork | C16 | 0.112*** | 11.85 | 0.155 | 16.77 |
| Paper | C17 | -0.029 | -2.86 | 0.345** | 41.20 |
| Recorded Media Production | C18 | 0.067** | 6.93 | 0.095 | 9.97 |
| Coke & Refined Petroleum | C19 | 0.071 | 7.36 | 0.798*** | 122.11 |
| Chemicals | C20 | 0.059** | 6.08 | 0.040 | 4.08 |
| Pharmaceuticals | C21 | 0.008 | 0.80 | 0.501** | 65.04 |
| Rubber & Plastics | C22 | 0.092*** | 9.64 | 0.617*** | 85.34 |
| Other non-Metallic Mineral | C23 | 0.084*** | 8.76 | 0.325** | 38.40 |
| Basic Metals | C24 | 0.120*** | 12.75 | 0.106 | 11.18 |
| Fabricated Metal | C25 | 0.097*** | 10.19 | 0.227** | 25.48 |
| Electronics & Optical Products | C26 | 0.105*** | 11.07 | 0.002 | 0.20 |
| Electrical Equipment | C27 | 0.087*** | 9.09 | 0.030 | 3.05 |
| Machinery & Equipment | C28 | 0.030 | 3.05 | -0.003 | -0.30 |
| Motor Vehicles | C29 | 0.094*** | 9.86 | -0.177 | -16.22 |
| Other Transport Equipment | C30 | 0.012 | 1.21 | 0.218 | 24.36 |
| Furniture & Other Manufacturing | C31-C32 | 0.107*** | 11.29 | 0.268** | 30.73 |
| Pooled sectors | | 0.067** | 6.93 | 0.213*** | 23.74 |

Note: The results reported here are from Tables 17 and 18. The characteristics, such as set of fixed effects included, can be found in Table 17 and 18. The PTI is computed as $[(exp(\beta_k) - 1) * 100]$, where $\beta_k$ is the estimated coefficient relevant for that sector and variable. We include the PTI also for sectors for which the estimated coefficient is not statistically different from zero. The reported significance levels are: * 10%, ** 5%, *** 1%.

## 9.4. Regression results, PPML

Table 21: PPML estimates, pooled sectors

| Dependant variable: | Bilateral imports | |
|---|---|---|
| Estimator: | PPML | |
| Variables | (3) | (4) |
| RTA | 0.001 | -0.001 |
| | (0.023) | (0.024) |
| EU | 0.169*** | 0.176*** |
| | (0.032) | (0.034) |
| WTO | -0.017 | -0.017 |
| | (0.041) | (0.041) |
| Currency | -0.413*** | -0.413*** |
| | (0.123) | (0.123) |
| Euro | -0.010 | -0.009 |
| | (0.016) | (0.016) |
| Schengen | -0.071*** | -0.073*** |
| | (0.017) | (0.017) |
| EEA | | 0.346*** |
| | | (0.072) |
| EU-TUR | | 0.029 |
| | | (0.049) |
| EU-CHE | | -0.059 |
| | | (0.059) |
| EU-KOR | | 0.025 |
| | | (0.047) |
| Observations | 6,938,379 | 6,938,379 |
| $R^2$ | 0.983 | 0.983 |

Note: All columns include exporter-year-sector (*itk*), importer-year-sector (*jtk),* and country-pair-sector (*ijk*) fixed effects. The standard errors are reported in parantheses below the estimated coefficients, they are clustered at the country-pair-sector level (*ijk*) to allow for correlation within country-pair-sector. The reported significance levels are: * 10%, ** 5%, *** 1%.

Table 22: PPML estimates, sector-level results (part one)

| Sectors | Classification | RTA | EU | EEA | EU-KOR |
|---|---|---|---|---|---|
| Crops & Animals | A01 | -0.009 | 0.767*** | 0.505 | -0.043 |
| Forestry & Logging | A02 | -0.117 | -0.150 | -0.249 | -0.066 |
| Fishing & Aquaculture | A03 | 0.133 | 0.704*** | 1.013** | -0.818*** |
| Mining & Quarrying | B | -0.119* | 0.354 | 0.554** | 2.605*** |
| Food, Beverage & Tobacco | C10-C12 | 0.012 | 0.851*** | 0.132 | -0.002 |
| Textiles, Apparel & Leather | C13-C15 | -0.134 | -0.363*** | 0.046 | 0.208 |
| Wood & Cork | C16 | 0.039 | 0.031 | 0.665*** | 0.283 |
| Paper | C17 | -0.135** | 0.262*** | 0.788*** | 0.199 |
| Recorded Media Production | C18 | -0.062 | 0.426** | 1.078*** | 0.597** |
| Coke & Refined Petroleum | C19 | 0.138** | 0.255* | -0.285 | 0.581*** |
| Chemicals | C20 | -0.001 | 0.304*** | 0.165 | 0.168*** |
| Pharmaceuticals | C21 | 0.140** | 0.937*** | 1.030*** | 0.345** |
| Rubber & Plastics | C22 | 0.018 | 0.201** | 0.194 | -0.093 |
| Other non-Metallic Mineral | C23 | 0.037 | 0.133 | 0.242 | -0.175* |
| Basic Metals | C24 | 0.186** | 0.570*** | 0.724*** | 0.292 |
| Fabricated Metal | C25 | 0.054 | 0.115 | 0.694*** | 0.074 |
| Electronics & Optical Products | C26 | -0.047 | 0.081 | 0.138 | -0.246** |
| Electrical Equipment | C27 | -0.047 | -0.155* | 0.044 | 0.005 |
| Machinery & Equipment | C28 | 0.01 | 0.049 | 0.077 | 0.026 |
| Motor Vehicles | C29 | 0.141*** | 0.230** | 0.428*** | 0.071 |
| Other Transport Equipment | C30 | -0.064 | -0.259** | 0.091 | -0.124 |
| Furniture & Other Manufacturing | C31-C32 | -0.124 | -0.032 | 0.195 | -0.075 |

Note: Exporter-year (*it*), importer-year (*jt*), and country-pairs (*ij*) fixed effect included but not reported. The standard errors are not reported, they are clustered at the country-pair level (*ij*) to allow for correlation within country-pairs. Not all variables are reported, in Table 23 we report the RTA, EU, EEA, and EU-KOR variables. The number of observations ranges from 101,366 for Forestry & Logging to 486,810 for Food, Beverage & Tobacco. The reported significance levels are: * 10%, ** 5%, *** 1%.

Table 23: PPML estimates, sector-level results (part two)

| Sectors | Classification | WTO | Currency | Euro | Schengen | EU-TUR | EU-CHE |
|---|---|---|---|---|---|---|---|
| Crops & Animals | A01 | 0.041 | 0.274 | 0.073 | 0.125*** | 0.099 | -0.978*** |
| Forestry & Logging | A02 | -0.666** | 2.455*** | -0.137 | 0.122 | -0.330 | 0.158 |
| Fishing & Aquaculture | A03 | -0.797*** | 0.546 | 0.075 | -0.194* | 0.148 | 0.043 |
| Mining & Quarrying | B | -0.343 | 2.690*** | 0.148 | 0.228 | 0.164 | 1.573*** |
| Food, Beverage & Tobacco | C10-C12 | 0.024 | -0.380 | 0.053 | 0.044 | 0.247* | -0.201 |
| Textiles, Apparel & Leather | C13-C15 | -0.153 | 0.062 | -0.071 | -0.283*** | -0.165 | -0.230 |
| Wood & Cork | C16 | -0.138 | 0.375* | 0.013 | -0.036 | 0.308 | 0.281 |
| Paper | C17 | 0.157 | 0.697*** | -0.006 | 0.018 | -0.211 | 0.233 |
| Recorded Media Production | C18 | 0.341 | 0.631*** | 0.062 | -0.173*** | 0.364* | -0.073 |
| Coke & Refined Petroleum | C19 | -0.286** | 0.216 | -0.011 | 0.197 | 0.211 | -1.204** |
| Chemicals | C20 | 0.049 | -0.874 | -0.029 | -0.066 | -0.182 | -0.221* |
| Pharmaceuticals | C21 | -0.196** | -0.493** | 0.041 | -0.140* | 0.193 | 0.431*** |
| Rubber & Plastics | C22 | 0.247 | 0.705** | -0.020 | -0.011 | 0.248* | 0.157 |
| Other non-Metallic Mineral | C23 | -0.076 | -0.444** | -0.034 | -0.019 | 0.146 | 0.278* |
| Basic Metals | C24 | 0.232* | -0.344 | 0.274*** | -0.039 | 0.244* | 0.165 |
| Fabricated Metal | C25 | 0.026 | -0.439** | 0.020 | -0.107*** | -0.031 | 0.338*** |
| Electronics & Optical Products | C26 | -0.340*** | -1.404*** | 0.014 | -0.144*** | -0.178 | -0.319 |
| Electrical Equipment | C27 | -0.021 | -0.509*** | -0.034 | -0.107*** | -0.219 | -0.097 |
| Machinery & Equipment | C28 | 0.231* | -0.221 | -0.011 | -0.057** | 0.005 | -0.066 |
| Motor Vehicles | C29 | 0.504*** | -0.787*** | -0.146* | -0.005 | 0.311 | 0.297 |
| Other Transport Equipment | C30 | 0.083 | -0.372 | -0.032 | -0.102 | -0.017 | 0.294 |
| Furniture & Other Manufacturing | C31-C32 | -0.203 | -0.301 | -0.109 | -0.218*** | 0.007 | -0.707*** |

Note:Exporter-year (*it*), importer-year (*jt*), and country-pairs (*ij*) fixed effect included but not reported. The standard errors are not reported, they are clustered at the country-pair level (*ij*) to allow for correlation within country-pairs. Not all variables are reported, in Table 22 we report the RTA, EU, EEA, and EU-KOR variables. The number of observations ranges from 101,366 for Forestry & Logging to 486,810 for Food, Beverage & Tobacco. The reported significance levels are: * 10%, ** 5%, *** 1%.

## 9.5. General Equilibrium simulations, data and results

Table 24: Trade elasticities and share of value-added used in the simulations, by sector

| Sectors | Classification | $\epsilon_k$ | $\mu_k$ |
|---|---|---|---|
| Crops & Animals | A01 | 8.11 | 0.58 |
| Forestry & Logging | A02 | 8.11 | 0.56 |
| Fishing & Aquaculture | A03 | 8.11 | 0.62 |
| Mining & Quarrying | B | 5.03 | 0.56 |
| Food, Beverage & Tobacco | C10-C12 | 2.55 | 0.25 |
| Textiles, Apparel & Leather | C13-C15 | 5.56 | 0.24 |
| Wood & Cork | C16 | 10.83 | 0.27 |
| Paper | C17 | 9.07 | 0.26 |
| Recorded Media Production | C18 | 5.03 | 0.38 |
| Coke & Refined Petroleum | C19 | 5.03 | 0.14 |
| Chemicals | C20 | 4.75 | 0.23 |
| Pharmaceuticals | C21 | 8.98 | 0.37 |
| Rubber & Plastics | C22 | 1.66 | 0.26 |
| Other non-Metallic Mineral | C23 | 2.76 | 0.29 |
| Basic Metals | C24 | 7.99 | 0.17 |
| Fabricated Metal | C25 | 4.30 | 0.30 |
| Electronics & Optical Products | C26 | 10.60 | 0.28 |
| Electrical Equipment | C27 | 10.60 | 0.22 |
| Machinery & Equipment | C28 | 1.52 | 0.29 |
| Motor Vehicles | C29 | 1.01 | 0.22 |
| Other Transport Equipment | C30 | 0.37 | 0.28 |
| Furniture & Other Manufacturing | C31-C32 | 5.03 | 0.37 |
| Tradable services | Serv | 5.03 | 0.59 |

Note: We apply the same trade elasticities to both models, with and without tariff revenues. For the robustness check in which we apply the same elasticity to every sector, we choose the standard value of $\epsilon_k = 5.03$ reported by Head and Mayer (2014). As regards the average share of value-added in the output of sector *k* at the world-level, $\mu_k$, we apply the same values to all the simulations.

Table 25: Input for shocks to trade costs, model without tariff revenues

| Scenario | | Scenario 1[a] | Scenario 2[b] | Scenario 3[c] | |
|---|---|---|---|---|---|
| Sectors | Classification | $\beta_k$ | $\beta_k$ | $\beta_k$ preliminary simulations | $\beta_k$ EU-India simulation |
| Crops & Animals | A01 | 0.437 | 0.036 | 0.437 | 0.036 |
| Forestry & Logging | A02 | 0.358 | 0.067 | 0.358 | 0.067 |
| Fishing & Aquaculture | A03 | 0.213 | 0.071 | 0.213 | 0.071 |
| Mining & Quarrying | B | 0.412 | 0.030 | 0.412 | 0.030 |
| Food, Beverage & Tobacco | C10-C12 | 0.088 | 0.110 | 0.088 | 0.110 |
| Textiles, Apparel & Leather | C13-C15 | 0.304 | 0.044 | 0.304 | 0.044 |
| Wood & Cork | C16 | 0.155 | 0.112 | 0.155 | 0.112 |
| Paper | C17 | 0.345 | 0.067 | 0.345 | 0.067 |
| Recorded Media Production | C18 | 0.095 | 0.067 | 0.095 | 0.067 |
| Coke & Refined Petroleum | C19 | 0.798 | 0.071 | 0.798 | 0.071 |
| Chemicals | C20 | 0.040 | 0.059 | 0.040 | 0.059 |
| Pharmaceuticals | C21 | 0.501 | 0.008 | 0.501 | 0.008 |
| Rubber & Plastics | C22 | 0.617 | 0.092 | 0.617 | 0.092 |
| Other non-Metallic Mineral | C23 | 0.325 | 0.084 | 0.325 | 0.084 |
| Basic Metals | C24 | 0.106 | 0.120 | 0.106 | 0.120 |
| Fabricated Metal | C25 | 0.227 | 0.097 | 0.227 | 0.097 |
| Electronics & Optical Products | C26 | 0.002 | 0.105 | 0.002 | 0.105 |
| Electrical Equipment | C27 | 0.030 | 0.087 | 0.030 | 0.087 |
| Machinery & Equipment | C28 | 0.213 | 0.030 | 0.213 | 0.030 |
| Motor Vehicles | C29 | 0.213 | 0.094 | 0.213 | 0.094 |
| Other Transport Equipment | C30 | 0.218 | 0.012 | 0.218 | 0.012 |
| Furniture & Other Manufacturing | C31-C32 | 0.268 | 0.107 | 0.268 | 0.107 |
| Tradable services | serv | 0.107 | 0.034 | 0.107 | 0.034 |

Note: We omit the non-tradable services as they are not affected by shocks to trade costs. [a]: We assume as $\beta_k$ the estimates from the EU-KOR dummy variable; [b]: We assume as $\beta_k$ the estimates from the RTA dummy variable; [c]: For the prelimary simulations, in which we simulate the EU-Canada and EU-Japan agreements, we assume as $\beta_k$ the estimates from EU-KOR. Instead, for the main simulation $\beta_k$ is from the RTA.

Table 26: Input for shocks to trade costs, model with tariff revenues

| Scenario | | Scenario 1 | | Scenario 2 | | Scenario 3 | |
|---|---|---|---|---|---|---|---|
| Sectors | Classification | $t$ | $\tau$ | $t$ | $\tau$ | $t$ | $\tau$ |
| Crops & Animals | A01 | 10%/20%* | 3% | 40% | 3% | 10%/20%* | - |
| Forestry & Logging | A02 | 90% | 3% | 90% | 3% | 90% | - |
| Fishing & Aquaculture | A03 | 90%/70%* | 3% | 90% | 3% | 90%/70%* | - |
| Mining & Quarrying | B | 90% | 3% | 90% | 3% | 90% | - |
| Food, Beverage & Tobacco | C10-C12 | 40%/30%* | 3% | 60% | 3% | 40%/30%* | - |
| Textiles, Apparel & Leather | C13-C15 | 90% | 3% | 90% | 3% | 90% | - |
| Wood & Cork | C16 | 90% | 3% | 90% | 3% | 90% | - |
| Paper | C17 | 90% | 3% | 90% | 3% | 90% | - |
| Recorded Media Production | C18 | 90% | 3% | 90% | 3% | 90% | - |
| Coke & Refined Petroleum | C19 | 90% | 3% | 90% | 3% | 90% | - |
| Chemicals | C20 | 90% | 3% | 90% | 3% | 90% | - |
| Pharmaceuticals | C21 | 90% | 3% | 90% | 3% | 90% | - |
| Rubber & Plastics | C22 | 90% | 3% | 90% | 3% | 90% | - |
| Other non-Metallic Mineral | C23 | 90% | 3% | 90% | 3% | 90% | - |
| Basic Metals | C24 | 90% | 3% | 90% | 3% | 90% | - |
| Fabricated Metal | C25 | 90% | 3% | 90% | 3% | 90% | - |
| Electronics & Optical Products | C26 | 90% | 3% | 90% | 3% | 90% | - |
| Electrical Equipment | C27 | 90% | 3% | 90% | 3% | 90% | - |
| Machinery & Equipment | C28 | 90% | 3% | 90% | 3% | 90% | - |
| Motor Vehicles | C29 | 50% | 3% | 90% | 3% | 50% | - |
| Other Transport Equipment | C30 | 50% | 3% | 90% | 3% | 50% | - |
| Furniture & Other Manufacturing | C31-C32 | 90% | 3% | 90% | 3% | 90% | - |
| Tradable services | serv | - | 3% | - | 3% | - | - |

Note: We omit the non-tradable services as they are not affected by shocks to trade costs. All the scenarios are applied to both, simple and imports weighted average tariffs. The percentages represent the reductions applied to the respective variable. *: We apply asymmetric changes to tariffs, the first percentage refers to import tariffs by the EU, the second to India.

Table 27: Welfare change (%), model with tariff revenues

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | 0.0000 | 0.0004 | -0.0002 | KOR | -0.0034 | -0.0033 | -0.0022 |
| BRA | 0.0008 | 0.0010 | 0.0007 | MEX | 0.0027 | 0.0038 | 0.0019 |
| CAN | 0.0011 | 0.0016 | 0.0007 | NOR | 0.0011 | 0.0018 | 0.0000 |
| CHE | 0.0015 | 0.0021 | 0.0003 | ROW | 0.0005 | 0.0024 | 0.0009 |
| CHN | -0.0020 | -0.0018 | -0.0013 | TUR | 0.0008 | 0.0049 | 0.0061 |
| IDN | -0.0013 | -0.0009 | -0.0008 | TWN | -0.0011 | -0.0007 | -0.0003 |
| IND | 0.2733 | 0.3011 | 0.1258 | USA | 0.0019 | 0.0022 | 0.0012 |
| JPN | -0.0007 | -0.0004 | -0.0002 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0261 | 0.0277 | 0.0133 | HUN | 0.0247 | 0.0265 | 0.0120 |
| BEL | 0.0450 | 0.0471 | 0.0184 | IRL | 0.0234 | 0.0243 | 0.0108 |
| BGR | 0.0311 | 0.0322 | 0.0112 | ITA | 0.0283 | 0.0295 | 0.0130 |
| CYP | 0.0180 | 0.0191 | 0.0057 | LTU | 0.0274 | 0.0291 | 0.0162 |
| CZE | 0.0241 | 0.0267 | 0.0123 | LUX | 0.0009 | 0.0013 | 0.0002 |
| DEU | 0.0393 | 0.0419 | 0.0199 | LVA | 0.0162 | 0.0170 | 0.0077 |
| DNK | 0.0226 | 0.0232 | 0.0050 | MLT | 0.0209 | 0.0219 | 0.0069 |
| ESP | 0.0240 | 0.0255 | 0.0110 | NLD | 0.0352 | 0.0376 | 0.0144 |
| EST | 0.0501 | 0.0512 | 0.0280 | POL | 0.0222 | 0.0234 | 0.0101 |
| FIN | 0.0321 | 0.0327 | 0.0150 | PRT | 0.0259 | 0.0271 | 0.0107 |
| FRA | 0.0242 | 0.0263 | 0.0106 | ROU | 0.0158 | 0.0174 | 0.0072 |
| GBR | 0.0318 | 0.0344 | 0.0137 | SVK | 0.0152 | 0.0168 | 0.0083 |
| GRC | 0.0212 | 0.0218 | 0.0076 | SVN | 0.0332 | 0.0344 | 0.0155 |
| HRV | 0.0194 | 0.0211 | 0.0069 | SWE | 0.0343 | 0.0359 | 0.0167 |
| EU weigh. | 0.0303 | 0.0323 | 0.0139 | | | | |
| EU mean | 0.0262 | 0.0276 | 0.0117 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28.

Table 28:Welfare change (million EUR), model with tariff revenues

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | -0.47 | 8.31 | -3.72 | KOR | -90.58 | -87.35 | -59.22 |
| BRA | 25.06 | 30.91 | 20.80 | MEX | 43.23 | 60.71 | 30.18 |
| CAN | 27.16 | 37.84 | 16.94 | NOR | 7.41 | 12.05 | 0.17 |
| CHE | 16.35 | 22.87 | 3.55 | ROW | 116.58 | 513.12 | 183.68 |
| CHN | -495.54 | -444.84 | -323.32 | TUR | 8.58 | 55.39 | 68.80 |
| IDN | -16.41 | -12.17 | -10.45 | TWN | -10.43 | -6.64 | -2.91 |
| IND | 8,143.19 | 8,969.80 | 3,748.65 | USA | 423.41 | 505.85 | 280.55 |
| JPN | -42.61 | -28.37 | -13.35 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 163.72 | 174.31 | 83.85 | HUN | 54.64 | 58.72 | 26.47 |
| BEL | 391.29 | 409.52 | 160.42 | IRL | 91.55 | 95.26 | 42.48 |
| BGR | 28.15 | 29.15 | 10.10 | ITA | 893.47 | 933.10 | 412.04 |
| CYP | 5.22 | 5.55 | 1.64 | LTU | 17.80 | 18.89 | 10.54 |
| CZE | 92.64 | 102.96 | 47.48 | LUX | 1.58 | 2.25 | 0.27 |
| DEU | 2,199.83 | 2,347.34 | 1,112.63 | LVA | 7.87 | 8.28 | 3.77 |
| DNK | 106.62 | 109.44 | 23.79 | MLT | 4.12 | 4.31 | 1.36 |
| ESP | 466.13 | 495.12 | 214.37 | NLD | 452.13 | 482.44 | 185.21 |
| EST | 20.46 | 20.91 | 11.44 | POL | 187.96 | 198.12 | 86.01 |
| FIN | 126.39 | 128.85 | 59.01 | PRT | 79.14 | 82.91 | 32.75 |
| FRA | 918.88 | 998.33 | 400.32 | ROU | 47.10 | 51.93 | 21.54 |
| GBR | 1,264.81 | 1,368.93 | 544.75 | SVK | 27.11 | 29.90 | 14.71 |
| GRC | 57.46 | 59.05 | 20.50 | SVN | 24.12 | 25.01 | 11.25 |
| HRV | 13.92 | 15.07 | 4.96 | SWE | 271.38 | 284.05 | 131.86 |
| EU total | 8,015.49 | 8,539.70 | 3,675.51 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The values are in million EUR.

Table 29: Welfare change (%), rank correlation for the EU28, model with tariff revenues

| Welfare change (%) | | | | Welfare change (million USD) | | | |
|---|---|---|---|---|---|---|---|
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
| Scenario 1 | 1.0000 | - | - | Scenario 1 | 1.0000 | - | - |
| Scenario 2 | 0.9962 | 1.0000 | - | Scenario 2 | 0.9995 | 1.0000 | - |
| Scenario 3 | 0.9206 | 0.9250 | 1.0000 | Scenario 3 | 0.9858 | 0.9880 | 1.0000 |

Note: This matrix shows the Spearman's rank correlation coefficients on the welfare change in percentage terms in Tables 27 and 28 for the member states of the EU28.

Table 30: Trade in services, rank correlation for the EU28, model with tariff revenues

| Imports change (%) | | | | Exports Change (%) | | | |
|---|---|---|---|---|---|---|---|
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
| Scenario 1 | 1.0000 | - | - | Scenario 1 | 1.0000 | - | - |
| Scenario 2 | 0.9907 | 1.0000 | - | Scenario 2 | 0.9918 | 1.0000 | - |
| Scenario 3 | 0.9195 | 0.9513 | 1.0000 | Scenario 3 | 0.9217 | 0.9376 | 1.0000 |
| Imports flows (million USD) | | | | Exports flows (million USD) | | | |
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
| Scenario 1 | 1.0000 | - | - | Scenario 1 | 1.0000 | - | - |
| Scenario 2 | 1.0000 | 1.0000 | - | Scenario 2 | 1.0000 | 1.0000 | - |
| Scenario 3 | 1.0000 | 1.0000 | 1.0000 | Scenario 3 | 1.0000 | 1.0000 | 1.0000 |

Note: This matrix shows the Spearman's rank correlation coefficients for variables in Figures 27 and 28 for the member states of the EU28.

Table 31: Trade in goods, rank correlation for the EU28, model with tariff revenues

| Imports change (%) | | | | Exports Change (%) | | | |
|---|---|---|---|---|---|---|---|
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
| Scenario 1 | 1.0000 | - | - | Scenario 1 | 1.0000 | - | - |
| Scenario 2 | 0.9064 | 1.0000 | - | Scenario 2 | 0.9896 | 1.0000 | - |
| Scenario 3 | 0.8095 | 0.7499 | 1.0000 | Scenario 3 | 0.9907 | 0.9830 | 1.0000 |
| Imports flows (million USD) | | | | Exports flows (million USD) | | | |
| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
| Scenario 1 | 1.0000 | - | - | Scenario 1 | 1.0000 | - | - |
| Scenario 2 | 0.9995 | 1.0000 | - | Scenario 2 | 1.0000 | 1.0000 | - |
| Scenario 3 | 1.0000 | 0.9995 | 1.0000 | Scenario 3 | 1.0000 | 1.0000 | 1.0000 |

Note: This matrix shows the Spearman's rank correlation coefficients for variables in Figures 29 and 30 for the member states of the EU28.

Table 32: Trade in services between member states and India, model with tariff revenues, million EUR

| Scenario | Baseline | | Scenario 1 | | Scenario 2 | | Scenario 3 | |
|---|---|---|---|---|---|---|---|---|
| Country | *Imports* | *Exports* | *Imports* | *Exports* | *Imports* | *Exports* | *Imports* | *Exports* |
| AUT | 82.15 | 78.97 | 94.02 | 93.99 | 93.91 | 94.10 | 81.74 | 79.45 |
| BEL | 428.47 | 395.78 | 490.51 | 470.70 | 489.92 | 471.30 | 426.27 | 398.13 |
| BGR | 4.20 | 1.44 | 4.80 | 1.72 | 4.79 | 1.72 | 4.17 | 1.45 |
| CYP | 37.38 | 0.09 | 42.68 | 0.11 | 42.62 | 0.11 | 37.15 | 0.09 |
| CZE | 78.02 | 10.02 | 89.19 | 11.93 | 89.09 | 11.94 | 77.59 | 10.08 |
| DEU | 1,312.32 | 949.99 | 1,503.76 | 1,129.19 | 1,502.09 | 1,130.52 | 1,306.74 | 954.98 |
| DNK | 451.37 | 641.59 | 515.98 | 764.13 | 515.32 | 765.14 | 448.66 | 646.00 |
| ESP | 16.37 | 80.94 | 18.72 | 96.41 | 18.69 | 96.54 | 16.28 | 81.49 |
| EST | 3.13 | 0.24 | 3.59 | 0.29 | 3.58 | 0.29 | 3.12 | 0.25 |
| FIN | 520.86 | 25.80 | 596.05 | 30.70 | 595.32 | 30.74 | 518.58 | 25.94 |
| FRA | 1,095.22 | 1,074.34 | 1,253.75 | 1,278.26 | 1,252.40 | 1,279.73 | 1,089.72 | 1,080.82 |
| GBR | 641.31 | 886.18 | 734.99 | 1,053.30 | 734.19 | 1,054.52 | 638.37 | 891.16 |
| GRC | 11.98 | 168.97 | 13.69 | 201.32 | 13.67 | 201.63 | 11.90 | 170.22 |
| HRV | 4.74 | 0.42 | 5.41 | 0.50 | 5.41 | 0.50 | 4.71 | 0.42 |
| HUN | 24.65 | 11.67 | 28.18 | 13.91 | 28.14 | 13.93 | 24.51 | 11.75 |
| IRL | 8.33 | 151.70 | 9.52 | 180.75 | 9.51 | 180.98 | 8.28 | 152.78 |
| ITA | 166.64 | 216.29 | 190.64 | 257.51 | 190.40 | 257.85 | 165.75 | 217.66 |
| LTU | 0.89 | 0.23 | 1.02 | 0.27 | 1.02 | 0.27 | 0.89 | 0.23 |
| LUX | 4.74 | 0.69 | 5.42 | 0.82 | 5.41 | 0.82 | 4.71 | 0.69 |
| LVA | 0.34 | 0.69 | 0.39 | 0.82 | 0.39 | 0.82 | 0.34 | 0.69 |
| MLT | 0.76 | 0.10 | 0.87 | 0.12 | 0.87 | 0.12 | 0.76 | 0.10 |
| NLD | 683.39 | 357.14 | 781.44 | 425.24 | 780.52 | 425.77 | 679.53 | 359.45 |
| POL | 108.65 | 63.28 | 124.17 | 75.40 | 124.00 | 75.51 | 108.01 | 63.71 |
| PRT | 0.44 | 1.34 | 0.51 | 1.59 | 0.51 | 1.60 | 0.44 | 1.35 |
| ROU | 11.49 | 39.15 | 13.12 | 46.68 | 13.10 | 46.74 | 11.41 | 39.44 |
| SVK | 4.62 | 1.55 | 5.27 | 1.85 | 5.26 | 1.85 | 4.59 | 1.56 |
| SVN | 2.24 | 2.81 | 2.57 | 3.35 | 2.56 | 3.35 | 2.23 | 2.83 |
| SWE | 876.31 | 130.80 | 1,003.58 | 155.52 | 1,002.40 | 155.71 | 872.62 | 131.48 |

Note: For the EU28 countries the flows are with India as trade partner, while for India the partner is the EU28.

Table 33: Trade in goods between member states and India, model with tariffs revenues, million EUR

| Scenario | Baseline | | Scenario 1 | | Scenario 2 | | Scenario 3 | |
|---|---|---|---|---|---|---|---|---|
| Country | *Imports* | *Exports* | *Imports* | *Exports* | *Imports* | *Exports* | *Imports* | *Exports* |
| AUT | 445.94 | 489.65 | 598.41 | 820.62 | 603.13 | 836.15 | 522.35 | 706.70 |
| BEL | 1,870.08 | 816.77 | 2,471.00 | 1,389.31 | 2,527.00 | 1,406.54 | 2,111.63 | 1,184.64 |
| BGR | 137.08 | 33.71 | 188.32 | 65.06 | 189.90 | 67.15 | 154.84 | 53.39 |
| CYP | 28.50 | 0.75 | 38.06 | 1.25 | 39.37 | 1.27 | 32.69 | 1.10 |
| CZE | 336.31 | 249.32 | 462.71 | 376.18 | 467.64 | 393.91 | 394.30 | 335.99 |
| DEU | 6,693.92 | 6,833.65 | 9,341.30 | 10,839.40 | 9,484.16 | 11,093.03 | 8,002.61 | 9,495.91 |
| DNK | 544.83 | 119.33 | 748.69 | 214.21 | 755.36 | 216.97 | 647.75 | 180.37 |
| ESP | 2,279.62 | 796.51 | 3,255.92 | 1,354.36 | 3,300.27 | 1,387.20 | 2,819.50 | 1,161.70 |
| EST | 44.81 | 33.29 | 62.69 | 89.69 | 63.61 | 89.84 | 52.67 | 69.01 |
| FIN | 322.40 | 318.39 | 438.57 | 633.74 | 441.83 | 636.74 | 373.99 | 518.64 |
| FRA | 3,912.96 | 3,029.43 | 5,404.15 | 4,341.43 | 5,462.33 | 4,505.21 | 4,653.14 | 3,907.72 |
| GBR | 6,488.28 | 3,860.84 | 8,742.49 | 6,280.76 | 8,841.57 | 6,436.82 | 7,649.74 | 5,356.32 |
| GRC | 252.76 | 72.81 | 347.30 | 138.78 | 358.99 | 139.77 | 294.78 | 111.66 |
| HRV | 99.06 | 7.10 | 134.99 | 14.56 | 137.95 | 15.21 | 113.29 | 11.82 |
| HUN | 217.60 | 103.76 | 285.20 | 168.00 | 288.49 | 175.70 | 246.36 | 146.18 |
| IRL | 345.52 | 141.62 | 478.09 | 293.88 | 484.39 | 300.79 | 412.96 | 237.40 |
| ITA | 3,926.72 | 2,121.82 | 5,367.53 | 3,404.10 | 5,457.05 | 3,463.10 | 4,606.48 | 2,975.69 |
| LTU | 54.07 | 42.44 | 74.58 | 74.15 | 78.63 | 74.35 | 64.63 | 63.68 |
| LUX | 11.44 | 11.04 | 16.13 | 18.86 | 16.22 | 18.89 | 13.34 | 16.15 |
| LVA | 39.92 | 9.58 | 54.34 | 18.73 | 55.50 | 18.84 | 46.83 | 15.51 |
| MLT | 41.63 | 2.50 | 54.85 | 3.83 | 54.99 | 3.88 | 47.28 | 3.38 |
| NLD | 2,726.02 | 1,076.73 | 3,636.48 | 1,540.48 | 3,728.66 | 1,598.32 | 3,118.41 | 1,391.37 |
| POL | 888.46 | 217.97 | 1,239.34 | 374.62 | 1,261.39 | 381.74 | 1,057.60 | 320.53 |
| PRT | 422.25 | 52.55 | 615.50 | 102.88 | 621.73 | 103.33 | 527.09 | 84.97 |
| ROU | 164.41 | 96.21 | 216.24 | 150.40 | 221.57 | 157.86 | 181.17 | 132.62 |
| SVK | 116.46 | 21.49 | 169.47 | 36.40 | 169.91 | 36.84 | 147.35 | 31.41 |
| SVN | 117.54 | 42.70 | 161.14 | 78.28 | 165.71 | 78.58 | 136.62 | 65.45 |
| SWE | 556.24 | 728.94 | 770.66 | 1,475.01 | 781.02 | 1,494.31 | 660.38 | 1,202.92 |

Note: Flows are net of tariff revenues. For the EU28 countries the flows are with India as trade partner, while for India the partner is the EU28.

Table 34: Percentage change for trade flows by sector, model with tariff revenues

| Scenario | | EU28 exports to India (%) | | | EU28 imports from India (%) | | |
|---|---|---|---|---|---|---|---|
| Sectors | Classification | *Scenario 1* | *Scenario 2* | *Scenario 3* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | A01 | 102.20 | 215.31 | 53.95 | 31.73 | 58.91 | 5.46 |
| Forestry & Logging | A02 | 268.49 | 269.17 | 181.33 | 26.26 | 26.03 | 0.80 |
| Fishing & Aquaculture | A03 | 542.87 | 967.56 | 389.26 | 85.44 | 85.13 | 48.80 |
| Mining & Quarrying | B | 52.38 | 52.42 | 30.18 | 15.44 | 15.35 | 0.03 |
| Food, Beverage & Tobacco | C10-C12 | 43.96 | 93.94 | 32.08 | 31.78 | 46.86 | 22.68 |
| Textiles, Apparel & Leather | C13-C15 | 115.86 | 116.14 | 78.13 | 65.97 | 65.76 | 43.80 |
| Wood & Cork | C16 | 272.35 | 273.25 | 162.45 | 48.20 | 47.85 | 9.01 |
| Paper | C17 | 154.38 | 154.68 | 101.56 | 46.57 | 46.36 | 8.21 |
| Recorded Media Production | C18 | 73.82 | 74.02 | 47.45 | 18.21 | 18.08 | 2.48 |
| Coke & Refined Petroleum | C19 | 59.01 | 59.14 | 34.92 | 20.29 | 20.20 | 4.40 |
| Chemicals | C20 | 71.18 | 71.27 | 48.13 | 47.82 | 47.73 | 28.29 |
| Pharmaceuticals | C21 | 170.06 | 170.61 | 102.03 | 35.38 | 35.11 | 4.99 |
| Rubber & Plastics | C22 | 31.53 | 31.59 | 24.57 | 7.43 | 7.40 | 2.36 |
| Other non-Metallic Mineral | C23 | 47.98 | 48.08 | 34.98 | 12.57 | 12.50 | 4.13 |
| Basic Metals | C24 | 96.32 | 96.48 | 55.35 | 36.44 | 36.31 | 6.64 |
| Fabricated Metal | C25 | 74.10 | 74.25 | 52.41 | 17.18 | 17.08 | 3.18 |
| Electronics & Optical Products | C26 | 157.72 | 157.90 | 90.89 | 50.54 | 50.36 | 8.06 |
| Electrical Equipment | C27 | 186.66 | 187.05 | 116.79 | 53.66 | 53.42 | 8.40 |
| Machinery & Equipment | C28 | 20.91 | 20.94 | 15.83 | 6.36 | 6.33 | 1.23 |
| Motor Vehicles | C29 | 24.21 | 45.57 | 20.17 | 8.80 | 13.83 | 5.53 |
| Other Transport Equipment | C30 | 9.90 | 18.07 | 8.87 | 3.49 | 5.19 | 2.01 |
| Furniture & Other Manufacturing | C31-C32 | 91.24 | 91.42 | 62.71 | 16.99 | 16.87 | 1.50 |
| Tradable services | serv | 18.97 | 19.12 | 0.60 | 14.48 | 14.35 | -0.49 |

Note: The change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline. The data in this table are represented in Figure 32.

Table 35: Trade flows by sector, in million of EUR, model with tariff revenues

| Scenario | EU28 exports to India | | | | EU28 imports from India | | | |
|---|---|---|---|---|---|---|---|---|
| Sectors | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | 31 | 62 | 97 | 47 | 1,474 | 1,942 | 2,343 | 1,555 |
| Forestry & Logging | 5 | 19 | 19 | 15 | 9 | 12 | 12 | 9 |
| Fishing & Aquaculture | 1 | 8 | 13 | 6 | 71 | 132 | 132 | 106 |
| Mining & Quarrying | 244 | 371 | 372 | 317 | 291 | 336 | 336 | 291 |
| Food, Beverage & Tobacco | 200 | 288 | 388 | 264 | 1,297 | 1,709 | 1,905 | 1,591 |
| Textiles, Apparel & Leather | 212 | 459 | 459 | 378 | 8,250 | 13,693 | 13,676 | 11,864 |
| Wood & Cork | 62 | 231 | 231 | 163 | 189 | 280 | 279 | 206 |
| Paper | 550 | 1,398 | 1,400 | 1,108 | 92 | 135 | 135 | 100 |
| Recorded Media Production | 67 | 117 | 117 | 99 | 31 | 36 | 36 | 32 |
| Coke & Refined Petroleum | 195 | 310 | 310 | 263 | 3,013 | 3,624 | 3,622 | 3,146 |
| Chemicals | 2,156 | 3,690 | 3,692 | 3,193 | 4,210 | 6,223 | 6,219 | 5,400 |
| Pharmaceuticals | 81 | 218 | 219 | 163 | 314 | 426 | 425 | 330 |
| Rubber & Plastics | 531 | 699 | 699 | 662 | 1,208 | 1,298 | 1,297 | 1,237 |
| Other non-Metallic Mineral | 226 | 335 | 335 | 305 | 524 | 590 | 590 | 546 |
| Basic Metals | 2,878 | 5,650 | 5,655 | 4,471 | 2,771 | 3,780 | 3,776 | 2,955 |
| Fabricated Metal | 848 | 1,476 | 1,477 | 1,292 | 1,275 | 1,495 | 1,493 | 1,316 |
| Electronics & Optical Products | 956 | 2,465 | 2,466 | 1,826 | 657 | 990 | 988 | 710 |
| Electrical Equipment | 1,028 | 2,948 | 2,952 | 2,229 | 1,309 | 2,011 | 2,008 | 1,418 |
| Machinery & Equipment | 4,179 | 5,053 | 5,054 | 4,841 | 1,476 | 1,570 | 1,570 | 1,495 |
| Motor Vehicles | 1,401 | 1,740 | 2,039 | 1,684 | 2,153 | 2,342 | 2,451 | 2,272 |
| Other Transport Equipment | 4,568 | 5,021 | 5,394 | 4,974 | 1,026 | 1,062 | 1,079 | 1,047 |
| Furniture & Other Manufacturing | 911 | 1,742 | 1,744 | 1,482 | 1,443 | 1,689 | 1,687 | 1,465 |
| Tradable services | 5,292 | 6,296 | 6,304 | 5,324 | 6,581 | 7,534 | 7,525 | 6,549 |

Note: For trade in goods the trade flows are net of tariff revenues. The data in this table are represented in Figure 31.

Table 36: Percentage change for trade flows by sector, model with tariff revenues, extra-EU28 trade, excluding India

| Scenario | | EU28 exports to extra-EU28, excluding India (%) | | | EU28 imports from extra-EU28, excluding India (%) | | |
|---|---|---|---|---|---|---|---|
| Sectors | Classification | *Scenario 1* | *Scenario 2* | *Scenario 3* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | A01 | -0.42 | -0.43 | -0.31 | 0.26 | 0.12 | 0.28 |
| Forestry & Logging | A02 | -0.45 | -0.46 | -0.29 | 0.46 | 0.47 | 0.33 |
| Fishing & Aquaculture | A03 | -0.27 | -0.28 | -0.18 | -0.19 | -0.18 | -0.07 |
| Mining & Quarrying | B | -0.31 | -0.31 | -0.20 | 0.09 | 0.09 | 0.07 |
| Food, Beverage & Tobacco | C10-C12 | -0.07 | -0.05 | -0.05 | 0.07 | 0.03 | 0.05 |
| Textiles, Apparel & Leather | C13-C15 | 1.71 | 1.70 | 1.04 | -3.07 | -3.06 | -1.92 |
| Wood & Cork | C16 | -0.42 | -0.43 | -0.34 | 0.39 | 0.40 | 0.39 |
| Paper | C17 | -0.53 | -0.55 | -0.38 | 0.47 | 0.48 | 0.35 |
| Recorded Media Production | C18 | -0.36 | -0.37 | -0.24 | 0.35 | 0.36 | 0.23 |
| Coke & Refined Petroleum | C19 | 0.14 | 0.14 | -0.03 | -0.27 | -0.27 | 0.02 |
| Chemicals | C20 | 0.35 | 0.34 | 0.16 | -0.70 | -0.69 | -0.36 |
| Pharmaceuticals | C21 | -0.28 | -0.29 | -0.20 | 0.19 | 0.19 | 0.17 |
| Rubber & Plastics | C22 | -0.06 | -0.07 | -0.06 | 0.05 | 0.06 | 0.08 |
| Other non-Metallic Mineral | C23 | -0.13 | -0.13 | -0.10 | 0.14 | 0.15 | 0.13 |
| Basic Metals | C24 | 0.19 | 0.18 | -0.18 | -0.47 | -0.46 | 0.09 |
| Fabricated Metal | C25 | -0.20 | -0.21 | -0.17 | 0.19 | 0.20 | 0.19 |
| Electronics & Optical Products | C26 | -0.28 | -0.29 | -0.22 | 0.08 | 0.08 | 0.12 |
| Electrical Equipment | C27 | -0.13 | -0.14 | -0.28 | -0.20 | -0.18 | 0.19 |
| Machinery & Equipment | C28 | -0.08 | -0.09 | -0.06 | 0.08 | 0.08 | 0.07 |
| Motor Vehicles | C29 | -0.05 | -0.04 | -0.04 | 0.04 | 0.03 | 0.04 |
| Other Transport Equipment | C30 | -0.05 | -0.07 | -0.04 | 0.03 | 0.03 | 0.03 |
| Furniture & Other Manufacturing | C31-C32 | -0.10 | -0.11 | -0.15 | -0.01 | 0.00 | 0.14 |
| Tradable services | serv | -0.32 | -0.32 | -0.21 | 0.33 | 0.34 | 0.22 |

Note: The change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline. The data in this table are represented in Figure 34.

Table 37: Trade flows by sector, in million of EUR, model with tariff revenues, extra-EU28 trade, excluding India

| Scenario | EU28 exports to extra-EU28, excluding India | | | | EU28 imports from extra-EU28, excluding India | | | |
|---|---|---|---|---|---|---|---|---|
| Sectors | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | 15,577 | 15,512 | 15,510 | 15,529 | 55,627 | 55,770 | 55,696 | 55,785 |
| Forestry & Logging | 1,125 | 1,120 | 1,119 | 1,121 | 2,371 | 2,382 | 2,382 | 2,378 |
| Fishing & Aquaculture | 1,057 | 1,054 | 1,054 | 1,055 | 4,201 | 4,193 | 4,193 | 4,198 |
| Mining & Quarrying | 25,078 | 25,002 | 24,999 | 25,029 | 235,431 | 235,647 | 235,651 | 235,597 |
| Food, Beverage & Tobacco | 76,844 | 76,788 | 76,804 | 76,804 | 64,776 | 64,819 | 64,798 | 64,811 |
| Textiles, Apparel & Leather | 54,360 | 55,288 | 55,285 | 54,925 | 112,714 | 109,250 | 109,270 | 110,551 |
| Wood & Cork | 11,180 | 11,133 | 11,132 | 11,142 | 9,216 | 9,251 | 9,253 | 9,251 |
| Paper | 17,564 | 17,470 | 17,467 | 17,497 | 14,129 | 14,195 | 14,197 | 14,179 |
| Recorded Media Production | 3,806 | 3,792 | 3,792 | 3,797 | 3,087 | 3,097 | 3,098 | 3,094 |
| Coke & Refined Petroleum | 69,518 | 69,615 | 69,614 | 69,496 | 96,324 | 96,060 | 96,062 | 96,344 |
| Chemicals | 109,265 | 109,645 | 109,635 | 109,434 | 92,643 | 91,994 | 92,000 | 92,313 |
| Pharmaceuticals | 70,630 | 70,429 | 70,424 | 70,487 | 61,823 | 61,940 | 61,944 | 61,926 |
| Rubber & Plastics | 36,042 | 36,020 | 36,019 | 36,020 | 26,467 | 26,481 | 26,482 | 26,487 |
| Other non-Metallic Mineral | 20,167 | 20,142 | 20,141 | 20,147 | 12,218 | 12,235 | 12,236 | 12,234 |
| Basic Metals | 59,821 | 59,933 | 59,927 | 59,712 | 70,717 | 70,383 | 70,389 | 70,778 |
| Fabricated Metal | 46,365 | 46,273 | 46,269 | 46,286 | 30,080 | 30,138 | 30,141 | 30,139 |
| Electronics & Optical Products | 82,810 | 82,580 | 82,571 | 82,627 | 198,907 | 199,057 | 199,067 | 199,138 |
| Electrical Equipment | 63,157 | 63,078 | 63,071 | 62,981 | 62,694 | 62,571 | 62,579 | 62,811 |
| Machinery & Equipment | 203,890 | 203,719 | 203,712 | 203,760 | 75,994 | 76,052 | 76,055 | 76,050 |
| Motor Vehicles | 195,767 | 195,677 | 195,685 | 195,698 | 65,007 | 65,035 | 65,026 | 65,036 |
| Other Transport Equipment | 90,815 | 90,768 | 90,755 | 90,783 | 61,123 | 61,144 | 61,140 | 61,141 |
| Furniture & Other Manufacturing | 44,072 | 44,027 | 44,025 | 44,007 | 51,054 | 51,051 | 51,055 | 51,126 |
| Tradable services | 801,091 | 798,564 | 798,491 | 799,434 | 680,356 | 682,575 | 682,645 | 681,879 |

Note: For trade in goods the trade flows are net of tariff revenues. The data in this table are represented in Figure 33.

Table 38: Percentage change for trade flows by sector, model with tariff revenues, intra-EU28 trade

| Scenario | | EU28 trade with intra-EU28 (%) | | |
|---|---|---|---|---|
| Sectors | Classification | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | A01 | -0.11 | -0.19 | -0.03 |
| Forestry & Logging | A02 | 0.01 | 0.01 | 0.02 |
| Fishing & Aquaculture | A03 | -0.36 | -0.36 | -0.20 |
| Mining & Quarrying | B | -0.09 | -0.09 | -0.05 |
| Food, Beverage & Tobacco | C10-C12 | 0.01 | -0.01 | 0.01 |
| Textiles, Apparel & Leather | C13-C15 | -0.86 | -0.86 | -0.54 |
| Wood & Cork | C16 | -0.06 | -0.06 | -0.01 |
| Paper | C17 | -0.02 | -0.02 | 0.00 |
| Recorded Media Production | C18 | 0.03 | 0.03 | 0.03 |
| Coke & Refined Petroleum | C19 | -0.03 | -0.03 | 0.01 |
| Chemicals | C20 | -0.24 | -0.24 | -0.13 |
| Pharmaceuticals | C21 | -0.09 | -0.09 | -0.04 |
| Rubber & Plastics | C22 | 0.01 | 0.01 | 0.02 |
| Other non-Metallic Mineral | C23 | 0.01 | 0.01 | 0.02 |
| Basic Metals | C24 | -0.16 | -0.16 | -0.03 |
| Fabricated Metal | C25 | -0.01 | -0.01 | 0.01 |
| Electronics & Optical Products | C26 | -0.17 | -0.17 | -0.09 |
| Electrical Equipment | C27 | -0.23 | -0.23 | -0.07 |
| Machinery & Equipment | C28 | 0.02 | 0.02 | 0.02 |
| Motor Vehicles | C29 | 0.03 | 0.02 | 0.02 |
| Other Transport Equipment | C30 | 0.03 | 0.03 | 0.03 |
| Furniture & Other Manufacturing | C31-C32 | -0.09 | -0.09 | -0.01 |
| Tradable services | serv | 0.02 | 0.02 | 0.02 |

Note: The change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline. The intra-EU28 includes intranational trade of the member states. The data in this table are represented in Figure 36.

Table 39: Trade flows by sector, in million of EUR, model with tariff revenues, intra-EU28 trade

| Scenario | EU28 trade with intra-EU28 | | | |
|---|---|---|---|---|
| Sectors | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | 399,498 | 399,052 | 398,755 | 399,395 |
| Forestry & Logging | 39,317 | 393,23 | 39,323 | 39,324 |
| Fishing & Aquaculture | 12,219 | 12,176 | 12,176 | 12,195 |
| Mining & Quarrying | 122,635 | 122,526 | 122,523 | 122,576 |
| Food, Beverage & Tobacco | 1,007,431 | 1,007,495 | 1,007,371 | 1,007,493 |
| Textiles, Apparel & Leather | 147,220 | 145,961 | 145,960 | 146,420 |
| Wood & Cork | 110,208 | 110,139 | 110,139 | 110,197 |
| Paper | 149,940 | 149,909 | 149,908 | 149,939 |
| Recorded Media Production | 88,230 | 88,258 | 88,258 | 88,253 |
| Coke & Refined Petroleum | 383,478 | 383,377 | 383,380 | 383,504 |
| Chemicals | 398,951 | 398,013 | 398,013 | 398,443 |
| Pharmaceuticals | 142,161 | 142,032 | 142,030 | 142,111 |
| Rubber & Plastics | 245,305 | 245,337 | 245,338 | 245,356 |
| Other non-Metallic Mineral | 185,549 | 185,564 | 185,564 | 185,582 |
| Basic Metals | 302,719 | 302,235 | 302,234 | 302,614 |
| Fabricated Metal | 427,010 | 426,959 | 426,960 | 427,074 |
| Electronics & Optical Products | 181,145 | 180,847 | 180,840 | 180,991 |
| Electrical Equipment | 195,106 | 194,658 | 194,655 | 194,970 |
| Machinery & Equipment | 403,069 | 403,155 | 403,156 | 403,166 |
| Motor Vehicles | 556,598 | 556,748 | 556,702 | 556,729 |
| Other Transport Equipment | 106,699 | 106,736 | 106,733 | 106,728 |
| Furniture & Other Manufacturing | 160,185 | 160,047 | 160,047 | 160,166 |
| Tradable services | 11,246,961 | 11,249,594 | 11,249,630 | 11,249,508 |

Note: For trade in goods the trade flows are net of tariff revenues. The intra-EU28 includes intranational trade of the member states. The data in this table are represented in Figure 35.

Table 40: Tariff revenues on imports between EU28 and India by sector, million EUR

| Scenario | EU28 tariff revenues | | | | India tariff revenues | | | |
|---|---|---|---|---|---|---|---|---|
| Sectors | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* | *Baseline* | *Scenario 1* | *Scenario 2* | *Scenario 3* |
| Crops & Animals | 108.90 | 129.11 | 103.83 | 103.36 | 9.00 | 14.56 | 17.03 | 11.09 |
| Forestry & Logging | 0.02 | 0.00 | 0.00 | 0.00 | 0.70 | 0.26 | 0.26 | 0.20 |
| Fishing & Aquaculture | 3.68 | 0.68 | 0.68 | 0.55 | 0.36 | 0.70 | 0.39 | 0.54 |
| Mining & Quarrying | 0.21 | 0.02 | 0.02 | 0.02 | 12.17 | 1.85 | 1.86 | 1.58 |
| Food, Beverage & Tobacco | 213.33 | 168.68 | 125.32 | 157.03 | 66.44 | 66.96 | 51.54 | 61.43 |
| Textiles, Apparel & Leather | 564.54 | 93.70 | 93.58 | 81.18 | 21.26 | 4.59 | 4.60 | 3.79 |
| Wood & Cork | 1.53 | 0.23 | 0.23 | 0.17 | 5.94 | 2.21 | 2.22 | 1.56 |
| Paper | 0.05 | 0.01 | 0.01 | 0.01 | 51.20 | 13.02 | 13.04 | 10.32 |
| Recorded Media Production | 0.14 | 0.02 | 0.02 | 0.01 | 5.00 | 0.87 | 0.87 | 0.74 |
| Coke & Refined Petroleum | 25.31 | 3.04 | 3.04 | 2.64 | 11.02 | 1.75 | 1.75 | 1.49 |
| Chemicals | 201.25 | 29.75 | 29.73 | 25.82 | 177.40 | 30.37 | 30.38 | 26.28 |
| Pharmaceuticals | 1.77 | 0.24 | 0.24 | 0.19 | 6.65 | 1.80 | 1.80 | 1.34 |
| Rubber & Plastics | 9.59 | 1.03 | 1.03 | 0.98 | 52.65 | 6.92 | 6.93 | 6.56 |
| Other non-Metallic Mineral | 6.20 | 0.70 | 0.70 | 0.65 | 21.16 | 3.13 | 3.13 | 2.86 |
| Basic Metals | 14.71 | 2.01 | 2.00 | 1.57 | 172.18 | 33.80 | 33.83 | 26.75 |
| Fabricated Metal | 5.29 | 0.62 | 0.62 | 0.55 | 82.15 | 14.30 | 14.31 | 12.52 |
| Electronics & Optical Products | 3.39 | 0.51 | 0.51 | 0.37 | 65.16 | 16.79 | 16.80 | 12.44 |
| Electrical Equipment | 1.11 | 0.17 | 0.17 | 0.12 | 89.85 | 25.76 | 25.79 | 19.48 |
| Machinery & Equipment | 0.68 | 0.07 | 0.07 | 0.07 | 311.20 | 37.63 | 37.64 | 36.05 |
| Motor Vehicles | 107.03 | 58.22 | 12.18 | 56.47 | 308.94 | 191.86 | 44.97 | 185.62 |
| Other Transport Equipment | 17.84 | 9.23 | 1.88 | 9.10 | 709.83 | 390.05 | 83.81 | 386.41 |
| Furniture & Other Manufacturing | 3.26 | 0.38 | 0.38 | 0.33 | 87.27 | 16.69 | 16.71 | 14.20 |

Note: For the EU28 countries the tariff revenues are from trade flows with India as trade partner, while for India the partner is the EU28.

Table 41: Sectoral weights in country-level production for the EU28 and India, model with tariff revenues

| Scenario | | EU28 (%) | | India (%) | |
|---|---|---|---|---|---|
| Sectors | Classification | *Baseline sectoral weights in total production* | *Change between baseline and counterfactual* | *Baseline sectoral weights in total production* | *Change between baseline and counterfactual* |
| Crops & Animals | A01 | 1.57 | -0.17 | 9.28 | -0.03 |
| Forestry & Logging | A02 | 0.15 | -0.02 | 0.71 | -0.34 |
| Fishing & Aquaculture | A03 | 0.05 | -0.35 | 0.44 | 0.04 |
| Mining & Quarrying | B | 0.56 | -0.09 | 1.24 | -1.17 |
| Food, Beverage & Tobacco | C10-C12 | 4.11 | -0.04 | 4.94 | 0.09 |
| Textiles, Apparel & Leather | C13-C15 | 0.76 | -0.09 | 3.90 | 4.16 |
| Wood & Cork | C16 | 0.46 | -0.01 | 0.69 | -0.58 |
| Paper | C17 | 0.64 | 0.38 | 0.43 | -3.80 |
| Recorded Media Production | C18 | 0.35 | 0.02 | 0.37 | -0.50 |
| Coke & Refined Petroleum | C19 | 1.72 | -0.03 | 3.80 | -0.03 |
| Chemicals | C20 | 1.93 | 0.14 | 3.33 | 1.30 |
| Pharmaceuticals | C21 | 0.81 | -0.14 | 0.50 | -0.41 |
| Rubber & Plastics | C22 | 1.07 | 0.01 | 1.29 | -0.13 |
| Other non-Metallic Mineral | C23 | 0.78 | 0.00 | 1.38 | -0.18 |
| Basic Metals | C24 | 1.38 | 0.60 | 4.24 | -0.17 |
| Fabricated Metal | C25 | 1.80 | 0.05 | 1.67 | -0.59 |
| Electronics & Optical Products | C26 | 1.00 | 0.32 | 0.73 | -0.92 |
| Electrical Equipment | C27 | 0.98 | 0.49 | 1.20 | -0.80 |
| Machinery & Equipment | C28 | 2.32 | 0.08 | 1.73 | -0.51 |
| Motor Vehicles | C29 | 2.86 | 0.00 | 2.59 | -0.04 |
| Other Transport Equipment | C30 | 0.77 | 0.17 | 0.52 | 0.30 |
| Furniture & Other Manufacturing | C31-C32 | 0.78 | 0.26 | 3.10 | -0.71 |
| Tradable services | serv | 45.68 | -0.04 | 31.42 | -0.05 |
| Non-tradable services | other | 27.47 | 0.00 | 20.49 | -0.27 |

Note: The sectoral weights in total production are computed as the production of the sector considered over the total production (computed as the sum across sectors of sector-level production). The values of the baseline sectoral weights in total production might not sum up to exactly 100 due to rounding. The change refers to the sectoral weights in total production, and it is computed between a counterfactual scenario 1, where the EU and India share a trade agreement, and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline.

Table 42: Openness for the EU28 and India, model with tariff revenues

| Scenario | | EU28 (%) | | India (%) | |
|---|---|---|---|---|---|
| Sectors | Classification | *Baseline openness* | *Change openness* | *Baseline openness* | *Change openness* |
| Crops & Animals | A01 | 3.76 | -0.10 | 3.13 | 2.57 |
| Forestry & Logging | A02 | 2.79 | 0.75 | 1.18 | -2.39 |
| Fishing & Aquaculture | A03 | 7.97 | 0.67 | 8.49 | 1.87 |
| Mining & Quarrying | B | 17.11 | 0.24 | 15.93 | 0.16 |
| Food, Beverage & Tobacco | C10-C12 | 7.10 | 0.03 | 7.70 | 2.96 |
| Textiles, Apparel & Leather | C13-C15 | 27.04 | 2.19 | 22.40 | 15.01 |
| Wood & Cork | C16 | 9.26 | 1.04 | 5.79 | 5.95 |
| Paper | C17 | 10.78 | 3.72 | 4.70 | 19.68 |
| Recorded Media Production | C18 | 4.21 | 0.86 | 2.11 | 1.19 |
| Coke & Refined Petroleum | C19 | 15.38 | 0.28 | 28.76 | 0.57 |
| Chemicals | C20 | 21.83 | 1.52 | 19.49 | 9.82 |
| Pharmaceuticals | C21 | 33.22 | 0.00 | 8.56 | 6.98 |
| Rubber & Plastics | C22 | 12.97 | 0.34 | 11.94 | 1.83 |
| Other non-Metallic Mineral | C23 | 9.90 | 0.36 | 6.52 | 1.75 |
| Basic Metals | C24 | 17.16 | 3.92 | 12.76 | 9.03 |
| Fabricated Metal | C25 | 9.96 | 1.03 | 11.65 | 4.44 |
| Electronics & Optical Products | C26 | 31.62 | 1.15 | 12.20 | 15.82 |
| Electrical Equipment | C27 | 24.75 | 2.32 | 13.25 | 22.97 |
| Machinery & Equipment | C28 | 34.05 | 0.21 | 13.23 | 2.51 |
| Motor Vehicles | C29 | 26.16 | 0.07 | 13.67 | 1.87 |
| Other Transport Equipment | C30 | 47.20 | 0.21 | 59.44 | 0.58 |
| Furniture & Other Manufacturing | C31-C32 | 21.93 | 1.43 | 12.84 | 1.76 |
| Tradable services | serv | 6.69 | -0.20 | 7.83 | -0.79 |
| Country-level | | 8.10 | 0.49 | 9.00 | 4.37 |

Note: The sectoral openness is computed as sectoral exports over the sector-level production for the country considered. The country-level openness (last row) is obtained using country-level exports and production. The values are net of tariffs. For the EU28 we consider extra-EU28 exports, including exports to India. For the variable reported the change is computed between a counterfactual scenario 1, where the EU and India share a trade agreement, and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline.

Table 43: Welfare change (%) , model without tariff revenues

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | 0.0019 | 0.0003 | 0.0003 | KOR | -0.0008 | 0.0000 | 0.0000 |
| BRA | 0.0001 | 0.0003 | 0.0003 | MEX | 0.0045 | 0.0009 | 0.0009 |
| CAN | 0.0035 | 0.0005 | 0.0006 | NOR | 0.0086 | 0.0007 | 0.0007 |
| CHE | 0.0039 | 0.0001 | 0.0001 | ROW | 0.0067 | 0.0004 | 0.0004 |
| CHN | 0.0009 | 0.0003 | 0.0003 | TUR | -0.0043 | -0.0003 | -0.0003 |
| IDN | 0.0014 | 0.0004 | 0.0004 | TWN | -0.0010 | 0.0001 | 0.0001 |
| IND | 0.4380 | 0.0817 | 0.0810 | USA | 0.0019 | 0.0003 | 0.0003 |
| JPN | 0.0008 | 0.0002 | 0.0002 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0436 | 0.0071 | 0.0070 | HUN | 0.0367 | 0.0093 | 0.0091 |
| BEL | 0.0836 | 0.0163 | 0.0162 | IRL | 0.0251 | 0.0060 | 0.0060 |
| BGR | 0.0228 | 0.0100 | 0.0099 | ITA | 0.0421 | 0.0088 | 0.0088 |
| CYP | 0.0310 | 0.0071 | 0.0070 | LTU | 0.0149 | 0.0074 | 0.0074 |
| CZE | 0.0332 | 0.0094 | 0.0092 | LUX | 0.0294 | 0.0026 | 0.0026 |
| DEU | 0.0419 | 0.0109 | 0.0108 | LVA | 0.0213 | 0.0062 | 0.0061 |
| DNK | 0.0420 | 0.0074 | 0.0074 | MLT | 0.0726 | 0.0101 | 0.0101 |
| ESP | 0.0311 | 0.0084 | 0.0083 | NLD | 0.0826 | 0.0130 | 0.0129 |
| EST | 0.0266 | 0.0076 | 0.0075 | POL | 0.0290 | 0.0072 | 0.0072 |
| FIN | 0.0364 | 0.0067 | 0.0068 | PRT | 0.0292 | 0.0072 | 0.0071 |
| FRA | 0.0409 | 0.0074 | 0.0073 | ROU | 0.0233 | 0.0060 | 0.0059 |
| GBR | 0.0656 | 0.0122 | 0.0121 | SVK | 0.0242 | 0.0055 | 0.0054 |
| GRC | 0.0219 | 0.0041 | 0.0041 | SVN | 0.0420 | 0.0104 | 0.0103 |
| HRV | 0.0238 | 0.0078 | 0.0078 | SWE | 0.0312 | 0.0083 | 0.0082 |
| EU weigh. | 0.0457 | 0.0096 | 0.0095 | | | | |
| EU mean | 0.0374 | 0.0082 | 0.0082 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014. The EU weighted results is obtained using the share of consumption by each member state over the total consumption in the EU28. Scenario 1: Using the OLS coeff. from the EU-KOR variable. Scenario 2: Using the OLS coeff. from the RTA variable. Scenario 3: Using the OLS coeff. from the RTA variable and baseline data from simulations with EU-KOR coeff. for EU-Canada and EU-Japan.

Table 44: Welfare change (million EUR), model without tariff revenues

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | 40 | 7 | 7 | KOR | -18 | 1 | 1 |
| BRA | 4 | 8 | 8 | MEX | 72 | 14 | 14 |
| CAN | 86 | 12 | 14 | NOR | 50 | 4 | 4 |
| CHE | 39 | 1 | 1 | ROW | 1,525 | 96 | 90 |
| CHN | 204 | 73 | 73 | TUR | -47 | -4 | -4 |
| IDN | 18 | 5 | 5 | TWN | -9 | 1 | 1 |
| IND | 13,142 | 2,452 | 2,428 | USA | 450 | 76 | 76 |
| JPN | 50 | 12 | 13 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 260 | 43 | 42 | HUN | 76 | 19 | 19 |
| BEL | 682 | 133 | 132 | IRL | 86 | 21 | 21 |
| BGR | 22 | 9 | 9 | ITA | 1,269 | 266 | 264 |
| CYP | 10 | 2 | 2 | LTU | 9 | 5 | 5 |
| CZE | 118 | 33 | 33 | LUX | 43 | 4 | 4 |
| DEU | 2,108 | 548 | 543 | LVA | 11 | 3 | 3 |
| DNK | 186 | 33 | 33 | MLT | 16 | 2 | 2 |
| ESP | 600 | 162 | 160 | NLD | 962 | 151 | 151 |
| EST | 11 | 3 | 3 | POL | 237 | 59 | 58 |
| FIN | 140 | 26 | 26 | PRT | 92 | 23 | 23 |
| FRA | 1,549 | 280 | 278 | ROU | 70 | 18 | 18 |
| GBR | 2,616 | 486 | 482 | SVK | 40 | 9 | 9 |
| GRC | 65 | 12 | 12 | SVN | 29 | 7 | 7 |
| HRV | 17 | 6 | 6 | SWE | 231 | 62 | 61 |
| EU total | 11,556 | 2,425 | 2,404 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014. Scenario 1: Using the OLS coeff. from the EU-KOR variable. Scenario 2: Using the OLS coeff. from the RTA variable. Scenario 3: Using the OLS coeff. from the RTA variable and baseline data from simulations with EU-KOR coeff. for EU-Canada and EU-Japan.

Table 45: Sectoral weights in country-level production for the EU28 and India, model without tariff revenues

| Scenario | | EU28 (%) | | India (%) | |
|---|---|---|---|---|---|
| Sectors | Classification | *Baseline sectoral weights in total production* | *Change between baseline and counterfactual* | *Baseline sectoral weights in total production* | *Change between baseline and counterfactual* |
| Crops & Animals | A01 | 1.62 | -0.11 | 9.27 | 0.27 |
| Forestry & Logging | A02 | 0.15 | 0.06 | 0.71 | -0.24 |
| Fishing & Aquaculture | A03 | 0.05 | -0.06 | 0.44 | -0.20 |
| Mining & Quarrying | B | 0.59 | 0.15 | 1.28 | -0.06 |
| Food, Beverage & Tobacco | C10-C12 | 4.14 | 0.03 | 4.99 | -0.05 |
| Textiles, Apparel & Leather | C13-C15 | 0.79 | -0.20 | 3.88 | 0.91 |
| Wood & Cork | C16 | 0.47 | 0.05 | 0.69 | -0.18 |
| Paper | C17 | 0.66 | 0.04 | 0.43 | -0.90 |
| Recorded Media Production | C18 | 0.35 | 0.06 | 0.36 | -0.35 |
| Coke & Refined Petroleum | C19 | 1.73 | -2.04 | 3.85 | -0.40 |
| Chemicals | C20 | 1.98 | 0.06 | 3.32 | -0.12 |
| Pharmaceuticals | C21 | 0.87 | -0.07 | 0.50 | 0.26 |
| Rubber & Plastics | C22 | 1.06 | -0.21 | 1.29 | 3.75 |
| Other non-Metallic Mineral | C23 | 0.78 | 0.00 | 1.38 | 0.42 |
| Basic Metals | C24 | 1.41 | 0.09 | 4.21 | -0.12 |
| Fabricated Metal | C25 | 1.79 | 0.05 | 1.66 | 0.06 |
| Electronics & Optical Products | C26 | 1.06 | 0.05 | 0.70 | -0.23 |
| Electrical Equipment | C27 | 1.03 | 0.06 | 1.16 | -0.21 |
| Machinery & Equipment | C28 | 2.34 | 0.03 | 1.72 | -0.33 |
| Motor Vehicles | C29 | 2.87 | -0.09 | 2.61 | 1.03 |
| Other Transport Equipment | C30 | 0.79 | -0.34 | 0.54 | 5.19 |
| Furniture & Other Manufacturing | C31-C32 | 0.81 | 0.09 | 3.09 | -0.08 |
| Tradable services | serv | 45.72 | 0.05 | 31.46 | -0.24 |
| Non-tradable services | other | 26.94 | 0.05 | 20.46 | -0.24 |

Note: The sectoral weights in total production are computed as the production of the sector considered over the total production (computed as the sum across sectors of sector-level production). The values of the baseline sectoral weights in total production might not sum up to exactly 100 due to rounding. The change refers to the sectoral weights in total production, and it is computed between a counterfactual scenario 1, where the EU and India share a trade agreement, and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline.

Table 46: Openness for the EU28 and India, model without tariff revenues

| Scenario | | EU28 (%) | | India (%) | |
|---|---|---|---|---|---|
| Sectors | Classification | *Baseline openness* | *Change openness* | *Baseline openness* | *Change openness* |
| Crops & Animals | A01 | 5.18 | 0.96 | 3.34 | 1.92 |
| Forestry & Logging | A02 | 3.51 | 0.20 | 1.39 | 0.95 |
| Fishing & Aquaculture | A03 | 9.95 | 0.31 | 9.85 | 0.07 |
| Mining & Quarrying | B | 19.55 | 0.28 | 16.11 | 1.76 |
| Food, Beverage & Tobacco | C10-C12 | 9.05 | 0.08 | 8.86 | 0.37 |
| Textiles, Apparel & Leather | C13-C15 | 29.61 | 0.88 | 22.59 | 1.31 |
| Wood & Cork | C16 | 11.54 | 0.13 | 6.18 | 1.38 |
| Paper | C17 | 13.80 | 0.36 | 5.22 | 13.42 |
| Recorded Media Production | C18 | 5.45 | 0.08 | 2.25 | 1.80 |
| Coke & Refined Petroleum | C19 | 17.08 | 1.53 | 29.87 | 1.89 |
| Chemicals | C20 | 24.55 | 0.09 | 19.90 | 0.53 |
| Pharmaceuticals | C21 | 36.91 | 0.12 | 8.37 | 7.69 |
| Rubber & Plastics | C22 | 14.49 | 1.69 | 12.52 | 11.45 |
| Other non-Metallic Mineral | C23 | 11.53 | 0.62 | 7.01 | 4.17 |
| Basic Metals | C24 | 19.67 | 0.36 | 12.71 | 1.66 |
| Fabricated Metal | C25 | 11.95 | 0.45 | 12.19 | 4.08 |
| Electronics & Optical Products | C26 | 34.46 | 0.00 | 12.04 | 0.04 |
| Electrical Equipment | C27 | 29.28 | 0.04 | 12.99 | 0.72 |
| Machinery & Equipment | C28 | 36.89 | 0.14 | 13.58 | 7.34 |
| Motor Vehicles | C29 | 29.10 | 0.16 | 14.98 | 3.08 |
| Other Transport Equipment | C30 | 49.75 | 0.17 | 61.45 | 2.09 |
| Furniture & Other Manufacturing | C31-C32 | 25.18 | 0.55 | 13.15 | 2.73 |
| Tradable services | serv | 7.99 | 0.06 | 8.28 | 0.84 |
| Country-level | | 9.44 | 0.17 | 9.01 | 2.09 |

Note: The sectoral openness is computed as sectoral exports over the sector-level production for the country considered. The country-level openness (last row) is obtained using country-level exports and production. For the EU28 we consider extra-EU28 exports, including exports to India. For the variable reported the change is computed between a counterfactual scenario 1, where the EU and India share a trade agreement, and a baseline scenario in which the agreement is not in place, using data from 2014 with balanced trade at the country-level as baseline.

Table 47: Welfare change (%), robustness check with import-weighted tariffs

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | -0.0001 | 0.0002 | -0.0003 | KOR | -0.0033 | -0.0032 | -0.0021 |
| BRA | 0.0008 | 0.0010 | 0.0007 | MEX | 0.0027 | 0.0036 | 0.0018 |
| CAN | 0.0011 | 0.0014 | 0.0007 | NOR | 0.0012 | 0.0016 | 0.0000 |
| CHE | 0.0016 | 0.0019 | 0.0003 | ROW | -0.0003 | 0.0009 | 0.0000 |
| CHN | -0.0017 | -0.0015 | -0.0011 | TUR | -0.0035 | 0.0001 | 0.0017 |
| IDN | -0.0013 | -0.0011 | -0.0008 | TWN | -0.0007 | -0.0004 | -0.0001 |
| IND | 0.2708 | 0.2952 | 0.1232 | USA | 0.0018 | 0.0021 | 0.0011 |
| JPN | -0.0006 | -0.0004 | -0.0002 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0249 | 0.0261 | 0.0123 | HUN | 0.0232 | 0.0250 | 0.0107 |
| BEL | 0.0444 | 0.0459 | 0.0181 | IRL | 0.0213 | 0.0222 | 0.0092 |
| BGR | 0.0294 | 0.0307 | 0.0099 | ITA | 0.0277 | 0.0288 | 0.0127 |
| CYP | 0.0171 | 0.0179 | 0.0050 | LTU | 0.0243 | 0.0252 | 0.0138 |
| CZE | 0.0227 | 0.0251 | 0.0112 | LUX | 0.0009 | 0.0011 | 0.0001 |
| DEU | 0.0371 | 0.0390 | 0.0181 | LVA | 0.0157 | 0.0162 | 0.0074 |
| DNK | 0.0223 | 0.0229 | 0.0048 | MLT | 0.0205 | 0.0213 | 0.0065 |
| ESP | 0.0231 | 0.0245 | 0.0103 | NLD | 0.0340 | 0.0356 | 0.0135 |
| EST | 0.0479 | 0.0487 | 0.0263 | POL | 0.0212 | 0.0223 | 0.0094 |
| FIN | 0.0306 | 0.0311 | 0.0138 | PRT | 0.0250 | 0.0257 | 0.0100 |
| FRA | 0.0226 | 0.0238 | 0.0091 | ROU | 0.0149 | 0.0163 | 0.0066 |
| GBR | 0.0306 | 0.0324 | 0.0126 | SVK | 0.0148 | 0.0162 | 0.0078 |
| GRC | 0.0211 | 0.0213 | 0.0076 | SVN | 0.0323 | 0.0333 | 0.0150 |
| HRV | 0.0176 | 0.0185 | 0.0055 | SWE | 0.0322 | 0.0335 | 0.0150 |
| EU weigh. | 0.0290 | 0.0304 | 0.0128 | | | | |
| EU mean | 0.0250 | 0.0261 | 0.0108 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28. This simulation uses import-weighted tariffs as input.

Table 48: Welfare change (million EUR), robustness check with import-weighted tariffs

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | -2 | 5 | -6 | KOR | -87 | -85 | -56 |
| BRA | 25 | 31 | 22 | MEX | 42 | 57 | 29 |
| CAN | 26 | 34 | 16 | NOR | 8 | 11 | 0 |
| CHE | 17 | 21 | 3 | ROW | -57 | 191 | 0 |
| CHN | -423 | -380 | -267 | TUR | -39 | 1 | 19 |
| IDN | -16 | -14 | -10 | TWN | -7 | -4 | -1 |
| IND | 8,062 | 8,789 | 3,667 | USA | 406 | 472 | 256 |
| JPN | -37 | -25 | -11 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 156 | 164 | 77 | HUN | 51 | 55 | 24 |
| BEL | 386 | 399 | 158 | IRL | 83 | 87 | 36 |
| BGR | 27 | 28 | 9 | ITA | 876 | 912 | 401 |
| CYP | 5 | 5 | 1 | LTU | 16 | 16 | 9 |
| CZE | 88 | 97 | 43 | LUX | 2 | 2 | 0 |
| DEU | 2,076 | 2,188 | 1,012 | LVA | 8 | 8 | 4 |
| DNK | 106 | 108 | 23 | MLT | 4 | 4 | 1 |
| ESP | 449 | 476 | 201 | NLD | 436 | 456 | 173 |
| EST | 20 | 20 | 11 | POL | 179 | 189 | 80 |
| FIN | 121 | 122 | 54 | PRT | 76 | 79 | 31 |
| FRA | 858 | 904 | 345 | ROU | 45 | 49 | 20 |
| GBR | 1,217 | 1,288 | 503 | SVK | 26 | 29 | 14 |
| GRC | 57 | 58 | 21 | SVN | 23 | 24 | 11 |
| HRV | 13 | 13 | 4 | SWE | 255 | 265 | 119 |
| EU total | 7,658 | 8,044 | 3,384 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The values are in million EUR. This simulation uses import-weighted tariffs as input.

Table 49: Welfare change (%), robustness check with standard trade elasticity

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | 0.0004 | 0.0008 | 0.0000 | KOR | -0.0059 | -0.0090 | -0.0041 |
| BRA | 0.0008 | 0.0007 | 0.0004 | MEX | 0.0032 | 0.0050 | 0.0022 |
| CAN | 0.0004 | 0.0003 | 0.0001 | NOR | 0.0018 | 0.0024 | 0.0002 |
| CHE | 0.0020 | 0.0021 | 0.0004 | ROW | 0.0012 | 0.0034 | 0.0009 |
| CHN | -0.0021 | -0.0022 | -0.0015 | TUR | 0.0051 | 0.0135 | 0.0097 |
| IDN | -0.0006 | -0.0005 | -0.0006 | TWN | -0.0012 | -0.0010 | -0.0006 |
| IND | 0.2939 | 0.3430 | 0.1401 | USA | 0.0012 | 0.0012 | 0.0008 |
| JPN | -0.0012 | -0.0020 | -0.0006 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0273 | 0.0314 | 0.0139 | HUN | 0.0269 | 0.0327 | 0.0131 |
| BEL | 0.0452 | 0.0495 | 0.0192 | IRL | 0.0225 | 0.0247 | 0.0104 |
| BGR | 0.0274 | 0.0296 | 0.0104 | ITA | 0.0301 | 0.0328 | 0.0142 |
| CYP | 0.0183 | 0.0199 | 0.0057 | LTU | 0.0287 | 0.0315 | 0.0169 |
| CZE | 0.0267 | 0.0332 | 0.0142 | LUX | 0.0034 | 0.0039 | 0.0012 |
| DEU | 0.0395 | 0.0456 | 0.0203 | LVA | 0.0162 | 0.0173 | 0.0074 |
| DNK | 0.0226 | 0.0235 | 0.0051 | MLT | 0.0207 | 0.0227 | 0.0072 |
| ESP | 0.0245 | 0.0274 | 0.0112 | NLD | 0.0388 | 0.0448 | 0.0168 |
| EST | 0.0343 | 0.0357 | 0.0189 | POL | 0.0217 | 0.0239 | 0.0099 |
| FIN | 0.0277 | 0.0286 | 0.0129 | PRT | 0.0248 | 0.0259 | 0.0102 |
| FRA | 0.0253 | 0.0297 | 0.0115 | ROU | 0.0180 | 0.0218 | 0.0087 |
| GBR | 0.0312 | 0.0368 | 0.0135 | SVK | 0.0140 | 0.0148 | 0.0071 |
| GRC | 0.0203 | 0.0215 | 0.0069 | SVN | 0.0330 | 0.0353 | 0.0157 |
| HRV | 0.0193 | 0.0213 | 0.0070 | SWE | 0.0281 | 0.0316 | 0.0135 |
| EU weigh. | 0.0307 | 0.0350 | 0.0143 | | | | |
| EU mean | 0.0256 | 0.0285 | 0.0115 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28. This simulation uses the standard elasticity of $\epsilon_k = 5.03$ for all sectors. The model used includes tariff revenues.

Table 50: Welfare change (million EUR), robustness check with standard trade elasticity

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | 9 | 16 | 0 | KOR | -157 | -238 | -109 |
| BRA | 23 | 20 | 13 | MEX | 50 | 79 | 35 |
| CAN | 10 | 7 | 3 | NOR | 12 | 16 | 1 |
| CHE | 22 | 23 | 4 | ROW | 262 | 725 | 192 |
| CHN | -515 | -541 | -380 | TUR | 58 | 153 | 110 |
| IDN | -8 | -6 | -8 | TWN | -11 | -9 | -5 |
| IND | 8,751 | 10,213 | 4,171 | USA | 267 | 270 | 188 |
| JPN | -77 | -128 | -41 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 171 | 197 | 87 | HUN | 60 | 72 | 29 |
| BEL | 393 | 430 | 167 | IRL | 88 | 97 | 41 |
| BGR | 25 | 27 | 9 | ITA | 949 | 1,035 | 447 |
| CYP | 5 | 6 | 2 | LTU | 19 | 20 | 11 |
| CZE | 102 | 128 | 55 | LUX | 6 | 7 | 2 |
| DEU | 2,207 | 2,544 | 1,131 | LVA | 8 | 8 | 4 |
| DNK | 107 | 111 | 24 | MLT | 4 | 4 | 1 |
| ESP | 475 | 533 | 217 | NLD | 497 | 575 | 216 |
| EST | 14 | 15 | 8 | POL | 184 | 202 | 84 |
| FIN | 109 | 113 | 51 | PRT | 76 | 79 | 31 |
| FRA | 958 | 1,127 | 435 | ROU | 54 | 65 | 26 |
| GBR | 1,242 | 1,464 | 538 | SVK | 25 | 26 | 13 |
| GRC | 55 | 58 | 19 | SVN | 24 | 26 | 11 |
| HRV | 14 | 15 | 5 | SWE | 222 | 250 | 106 |
| EU total | 8,092 | 9,234 | 3,771 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The values are in million EUR. This simulation uses the standard elasticity of $\epsilon_k = 5.03$ for all sectors. The model used includes tariff revenues.

Table 51: Welfare change (%), robustness check with lower trade elasticity for tradable services

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | -0.0007 | -0.0003 | -0.0006 | KOR | -0.0044 | -0.0043 | -0.0028 |
| BRA | 0.0001 | 0.0002 | 0.0004 | MEX | 0.0021 | 0.0032 | 0.0015 |
| CAN | 0.0004 | 0.0008 | 0.0004 | NOR | -0.0003 | 0.0004 | -0.0007 |
| CHE | -0.0005 | 0.0001 | -0.0008 | ROW | -0.0019 | -0.0002 | -0.0006 |
| CHN | -0.0024 | -0.0022 | -0.0015 | TUR | -0.0020 | 0.0015 | 0.0045 |
| IDN | -0.0017 | -0.0013 | -0.0010 | TWN | -0.0022 | -0.0018 | -0.0009 |
| IND | 0.2822 | 0.3107 | 0.1295 | USA | 0.0012 | 0.0015 | 0.0009 |
| JPN | -0.0011 | -0.0009 | -0.0005 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0268 | 0.0286 | 0.0141 | HUN | 0.0248 | 0.0266 | 0.0122 |
| BEL | 0.0492 | 0.0513 | 0.0209 | IRL | 0.0255 | 0.0264 | 0.0124 |
| BGR | 0.0318 | 0.0328 | 0.0111 | ITA | 0.0286 | 0.0298 | 0.0134 |
| CYP | 0.0172 | 0.0181 | 0.0051 | LTU | 0.0291 | 0.0306 | 0.0178 |
| CZE | 0.0244 | 0.0272 | 0.0128 | LUX | -0.0019 | -0.0016 | -0.0015 |
| DEU | 0.0418 | 0.0445 | 0.0216 | LVA | 0.0166 | 0.0173 | 0.0081 |
| DNK | 0.0221 | 0.0225 | 0.0053 | MLT | 0.0218 | 0.0229 | 0.0071 |
| ESP | 0.0243 | 0.0257 | 0.0114 | NLD | 0.0375 | 0.0399 | 0.0159 |
| EST | 0.0559 | 0.0569 | 0.0316 | POL | 0.0220 | 0.0230 | 0.0102 |
| FIN | 0.0345 | 0.0351 | 0.0160 | PRT | 0.0248 | 0.0260 | 0.0100 |
| FRA | 0.0258 | 0.0280 | 0.0117 | ROU | 0.0144 | 0.0159 | 0.0066 |
| GBR | 0.0354 | 0.0381 | 0.0158 | SVK | 0.0145 | 0.0159 | 0.0083 |
| GRC | 0.0210 | 0.0214 | 0.0079 | SVN | 0.0343 | 0.0354 | 0.0165 |
| HRV | 0.0186 | 0.0201 | 0.0063 | SWE | 0.0382 | 0.0399 | 0.0189 |
| EU weigh. | 0.0321 | 0.0341 | 0.0151 | | | | |
| EU mean | 0.0271 | 0.0285 | 0.0124 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28. This simulation uses the elasticity of $\epsilon_k = 3.00$ for the tradable services, while we apply the same trade elasticity used in our benchmark results to the remaining sectors. The model used includes tariff revenues.

Table 52: Welfare change (million EUR), robustness check with lower trade elasticity for tradable services

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | -14 | -5 | -13 | KOR | -117 | -114 | -74 |
| BRA | 3 | 7 | 11 | MEX | 33 | 50 | 24 |
| CAN | 10 | 20 | 8 | NOR | -2 | 3 | -5 |
| CHE | -5 | 1 | -9 | ROW | -411 | -38 | -121 |
| CHN | -586 | -538 | -377 | TUR | -23 | 18 | 51 |
| IDN | -21 | -17 | -14 | TWN | -21 | -17 | -8 |
| IND | 8,405 | 9,252 | 3,855 | USA | 271 | 345 | 194 |
| JPN | -73 | -59 | -30 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 170 | 181 | 89 | HUN | 55 | 59 | 27 |
| BEL | 432 | 451 | 184 | IRL | 101 | 105 | 49 |
| BGR | 29 | 30 | 10 | ITA | 908 | 946 | 425 |
| CYP | 5 | 5 | 1 | LTU | 19 | 20 | 12 |
| CZE | 95 | 106 | 50 | LUX | -3 | -3 | -3 |
| DEU | 2,368 | 2,522 | 1,222 | LVA | 8 | 8 | 4 |
| DNK | 105 | 107 | 25 | MLT | 4 | 4 | 1 |
| ESP | 473 | 500 | 222 | NLD | 487 | 518 | 207 |
| EST | 23 | 23 | 13 | POL | 187 | 196 | 87 |
| FIN | 136 | 139 | 63 | PRT | 76 | 79 | 31 |
| FRA | 980 | 1,065 | 443 | ROU | 43 | 48 | 20 |
| GBR | 1,408 | 1,517 | 628 | SVK | 26 | 29 | 15 |
| GRC | 56 | 57 | 21 | SVN | 25 | 26 | 12 |
| HRV | 13 | 14 | 5 | SWE | 305 | 318 | 151 |
| EU total | 8,534 | 9,071 | 4,014 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The values are in million EUR. This simulation uses the elasticity of $\epsilon_k = 3.00$ for the tradable services, while we apply the same trade elasticity used in our benchmark results to the remaining sectors. The model used includes tariff revenues.

Table 53: Welfare change (%), robustness check with higher trade elasticity for tradable services

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Scenario | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (%)* | | | Country | *Welfare change (%)* | | |
| AUS | 0.0005 | 0.0009 | 0.0001 | KOR | -0.0026 | -0.0025 | -0.0018 |
| BRA | 0.0013 | 0.0016 | 0.0010 | MEX | 0.0032 | 0.0043 | 0.0022 |
| CAN | 0.0016 | 0.0021 | 0.0010 | NOR | 0.0020 | 0.0028 | 0.0005 |
| CHE | 0.0028 | 0.0034 | 0.0010 | ROW | 0.0022 | 0.0041 | 0.0018 |
| CHN | -0.0017 | -0.0015 | -0.0012 | TUR | 0.0029 | 0.0075 | 0.0073 |
| IDN | -0.0010 | -0.0006 | -0.0007 | TWN | -0.0002 | 0.0002 | 0.0002 |
| IND | 0.2672 | 0.2945 | 0.1232 | USA | 0.0023 | 0.0027 | 0.0015 |
| JPN | -0.0003 | 0.0000 | 0.0000 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 0.0254 | 0.0270 | 0.0127 | HUN | 0.0245 | 0.0263 | 0.0117 |
| BEL | 0.0423 | 0.0443 | 0.0168 | IRL | 0.0219 | 0.0229 | 0.0098 |
| BGR | 0.0305 | 0.0317 | 0.0112 | ITA | 0.0279 | 0.0292 | 0.0127 |
| CYP | 0.0185 | 0.0198 | 0.0059 | LTU | 0.0263 | 0.0281 | 0.0152 |
| CZE | 0.0236 | 0.0263 | 0.0119 | LUX | 0.0025 | 0.0029 | 0.0011 |
| DEU | 0.0373 | 0.0398 | 0.0185 | LVA | 0.0159 | 0.0168 | 0.0074 |
| DNK | 0.0230 | 0.0236 | 0.0049 | MLT | 0.0201 | 0.0211 | 0.0067 |
| ESP | 0.0238 | 0.0253 | 0.0107 | NLD | 0.0337 | 0.0360 | 0.0134 |
| EST | 0.0458 | 0.0470 | 0.0254 | POL | 0.0222 | 0.0235 | 0.0101 |
| FIN | 0.0301 | 0.0308 | 0.0141 | PRT | 0.0265 | 0.0278 | 0.0112 |
| FRA | 0.0232 | 0.0252 | 0.0098 | ROU | 0.0166 | 0.0183 | 0.0076 |
| GBR | 0.0297 | 0.0322 | 0.0124 | SVK | 0.0157 | 0.0174 | 0.0083 |
| GRC | 0.0214 | 0.0223 | 0.0074 | SVN | 0.0323 | 0.0337 | 0.0149 |
| HRV | 0.0200 | 0.0217 | 0.0073 | SWE | 0.0316 | 0.0331 | 0.0151 |
| EU weigh. | 0.0291 | 0.0310 | 0.0130 | | | | |
| EU mean | 0.0254 | 0.0269 | 0.0112 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The EU weighted result is obtained using the share of consumption by each member state over the total consumption in the EU28. This simulation uses the elasticity of $\epsilon_k = 7.00$ for the tradable services, while we apply the same trade elasticity used in our benchmark results to the remaining sectors. The model used includes tariff revenues.

Table 54: Welfare change (million EUR), robustness check with higher trade elasticity for tradable services

| Scenario | Scenario 1 | Scenario 2 | Scenario 3 | Sceniaro | Scenario 1 | Scenario 2 | Scenario 3 |
|---|---|---|---|---|---|---|---|
| Country | *Welfare change (million EUR)* | | | Country | *Welfare change (million EUR)* | | |
| AUS | 10 | 18 | 2 | KOR | -69 | -65 | -47 |
| BRA | 41 | 48 | 30 | MEX | 51 | 69 | 34 |
| CAN | 39 | 51 | 23 | NOR | 13 | 19 | 3 |
| CHE | 30 | 37 | 11 | ROW | 476 | 887 | 385 |
| CHN | -414 | -356 | -282 | TUR | 33 | 85 | 83 |
| IDN | -13 | -8 | -8 | TWN | -2 | 2 | 2 |
| IND | 7,963 | 8,776 | 3,672 | USA | 525 | 621 | 329 |
| JPN | -19 | -1 | -2 | | | | |
| Member states of the EU28 | | | | | | | |
| AUT | 159 | 169 | 79 | HUN | 54 | 58 | 26 |
| BEL | 366 | 383 | 145 | IRL | 85 | 89 | 38 |
| BGR | 28 | 29 | 10 | ITA | 879 | 919 | 400 |
| CYP | 5 | 6 | 2 | LTU | 17 | 18 | 10 |
| CZE | 90 | 101 | 46 | LUX | 4 | 5 | 2 |
| DEU | 2,073 | 2,216 | 1,026 | LVA | 8 | 8 | 4 |
| DNK | 108 | 111 | 23 | MLT | 4 | 4 | 1 |
| ESP | 461 | 490 | 208 | NLD | 430 | 459 | 171 |
| EST | 19 | 19 | 10 | POL | 188 | 198 | 85 |
| FIN | 118 | 121 | 55 | PRT | 81 | 85 | 34 |
| FRA | 879 | 955 | 370 | ROU | 50 | 55 | 23 |
| GBR | 1,181 | 1,279 | 493 | SVK | 28 | 31 | 15 |
| GRC | 58 | 61 | 20 | SVN | 23 | 24 | 11 |
| HRV | 14 | 16 | 5 | SWE | 249 | 261 | 118 |
| EU total | 7,658 | 8,169 | 3,432 | | | | |

Note: The welfare change is computed between a counterfactual scenario where the EU and India share a trade agreement and a baseline scenario in which the agreement is not in place, using data from 2014 for balanced trade at the country-level. The values are in million EUR. This simulation uses the elasticity of $\epsilon_k = 7.00$ for the tradable services, while we apply the same trade elasticity used in our benchmark results to the remaining sectors. The model used includes tariff revenues.

Economic cooperation and trade between the EU and India are central issues, since the two partners are major players in the international economic and political arena. This study presents the results of a quantitative simulation of a potential FTA between the EU and India in goods and services. Under the most relevant scenarios, gains from increased trade for both sides are between €8 billion and €8.5 billion (0.03 % increase with respect to the baseline for the EU and about 0.3 % for India). Furthermore, a qualitative analysis suggests that potential gains may appear from coordinated EU action in addressing possible side effects of changes in trade, distributive impacts and externalities (such as inequalities, labour market effects, poverty and development implications, and environmental issues). This indicates that the Cost of Non-Europe in this field may be larger.

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