

The Global Costs of Protectionism

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Abstract

This paper quantifies the wide-ranging costs of potential increases in worldwide barriers to trade in two scenarios. First, a coordinated global withdrawal of tariff commitments from all existing bilateral/regional trade agreements, as well as from unilateral preferential schemes coupled with an increase in the cost of traded services, is estimated to result in annual worldwide real income losses of 0.3 percent or US\$211 billion relative to the baseline after three years. An important share of these losses is likely to be concentrated in regions such as East Asia and Pacific and Latin America and the Caribbean which together account for close to one-third of the global decline in welfare.

Highlighting the importance of preferences, the impact on global trade is estimated to be more pronounced, with an annual decline of 2.1 percent or more than US\$606 billion relative to the baseline if these barriers stay in place for three years. Second, a worldwide increase in tariffs up to legally allowed bound rates coupled with an increase in the cost of traded services would translate into annual global real income losses of 0.8 percent or more than US\$634 billion relative to the baseline after three years. The distortion to the global trading system would be significant and result in an annual decline of global trade of 9 percent or more than US\$2.6 trillion relative to the baseline in 2020.

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1 Introduction

2016 was the fifth consecutive year with merchandise trade growth below 3 percent, much lower than the pre-crisis average of 7 percent. Despite the cyclical recovery observed in 2017, subdued trade growth in the post-crisis period reflects a number of factors. On the one hand, weak global demand is associated with post-crisis legacies in advanced economies, deteriorating terms of trade for commodity exporters and the transition to slower growth in China. On the other hand, longer-term trends have also not favoured trade growth. As a result, the long-run income elasticity of trade has been on the decline (World Bank 2015; Constantinescu et al. 2015), reflecting a shift in demand toward non-tradables and services attributable to aging populations, a slowing expansion of global value chains, and the diminishing pace of trade liberalization (IMF 2016). The post-crisis weakness in arm's length trade – trade between unaffiliated firms - has also had a negative impact of trade growth (Lakatos and Ohnsorge 2017).

Not only has stalled trade liberalization been weighing on trade growth, but the post-crisis period has seen an increase in the number of newly introduced protectionist measures. The World Trade Organization (WTO) recently warned about this worrying trend, highlighting that the rate of new trade restrictive measures introduced by G20 countries in 2016 reached the highest monthly average since 2009 (21 new measures a month), outnumbering measures aimed at facilitating trade (WTO 2016). Similarly, based on a broader definition of protectionist measures, the most recent Global Trade Alert (GTA) report reveals that despite the recent tapering off in the number of new protectionist measures, the stock of trade barriers in force has been steadily on the rise (Evenett and Fritz 2017). Among these measures, increases in import tariffs account for close to one-fifth of barriers to trade imposed since 2009.

In the current economic environment characterized by subdued potential growth and anti-globalization rhetoric, the risk of beggar-thy-neighbour trade policies has risen. This was highlighted by the recent failure of G20 economies to renew their long-standing commitment to free trade and pledge to resist all forms of protectionism at the last Finance Ministers meeting in March 2017. An increase in within-country income inequality during the period of rapid globalization has fuelled an intense debate about the benefits of trade liberalization and immigration in many advanced economies. Ongoing structural changes in the multilateral trading system and the international communities' response to them will be crucial in shaping the future dynamics of trading relations. If these changes are accompanied by an upward spiral of beggar-thy-neighbour protectionist measures, they could result in the erosion of efforts during decades of trade liberalization and the corrosion of the multilateral rules-based system that's been under construction since the mid-1940s.

While politically attractive in the short run, protectionist measures can have large negative repercussions. As a historical precedent, the implementation of retaliatory trade barriers in response to the Great Depression contributed to wiping out around two-thirds of world trade between 1929 and 1933 (Crucini and Kahn 1996; Madsen 2001). Unilateral increases in trade restrictions will most likely be met with retaliatory measures and, eventually, result in sizable increases in worldwide tariffs.

Such an increase in global protectionism is likely to have wide-ranging, economy-wide consequences not only for consumers, but also producers (firms), government, investment and trade flows. First, an increase in tariffs will translate into an effective increase in the price of imported goods for consumers, reducing their purchasing power and limiting the availability of imported goods. Tariffs have been found to disproportionately impact low-income households as these spend more on traded goods as a share of their income (Fajgelbaum and Khandelwal 2016; Furman et al. 2017). Due to their regressive nature, an increase in tariffs is likely to have adverse distributional effects and negatively impact poverty and income inequality. Second, the increase in the price of imported intermediate inputs will force firms to source their inputs from more expensive domestic markets and potentially pass on the increases in costs to the consumer. This in turn will impact firm's hiring decisions and potentially spill over to changes in wages. Furthermore, given the international fragmentation of production and complex value chains, tariffs may result in cascading trade costs as intermediate goods cross borders multiple times through the stages of production (Diakantoni et al. 2017; Rouzet and Mirodout 2013; World Bank 2017b). Third, the increase in the price of imported capital goods is likely to weigh on investment and disproportionately impact low-income countries (LICs), which rely heavily on imports of machinery and capital goods (World Bank 2017b).

These wide-ranging costs of protectionism can be summarized by a statement made in 1994 by Peter Sutherland, the Director General of the General Agreement on Tariffs and Trade (GATT): "It is high time that governments made clear to consumers just how much they pay - in the shops and as taxpayers - for decisions to protect domestic industries from import competition. Virtually all protection means higher prices. And someone has to pay; either the consumer or, in the case of intermediate goods, another producer. The result is a drop in real income and an inability to buy other products and services."¹

Against this background, the objective of this paper is to showcase the wide-ranging costs of protectionism and implicitly highlight the benefits of (close to) free trade. We quantify

¹Cited in Manzella Trade Communications (2004).

the country/region specific impacts of two scenarios reflecting an increase in barriers to trade and provide answers to the following questions:

- First, what if all WTO members were to withdraw tariff commitments from all existing bilateral/regional trade agreements as well as unilateral preferential schemes, coupled with a 3 percent increase in the cost of traded services? In the absence of tariff commitments under regional trade agreements (RTAs) and unilateral preferences such as the Generalized System of Preferences (GSP), WTO members would effectively revert to most favoured nation (MFN) tariffs which would imply a 40 percent increase in average global duties from 2.7 percent to 3.8 percent. As binding commitments from trade agreements are eliminated, the value of increase in uncertainty is captured by a cost equivalent of 3 percent. Although for now such a scenario is purely hypothetical, mounting protectionist sentiment in advanced economies such as the United States and UK highlight concerns about the benefits from free trade.
- Second, what if WTO members increase tariffs to bound rates making use of the legally allowed policy space in addition to a 3 percent increase in the cost of traded services? Under this scenario, worldwide tariffs would increase to the bound rates under WTO commitments. Average global tariffs would more than triple from the current 2.7 percent to 10.2 percent. The increase in the cost of traded services captures the value of the increase in uncertainty around barriers to services as binding commitments are eliminated.

Given the nature of the policy shocks under consideration here, it is necessary to use a framework that is powerful enough to capture interactions between producers, consumers, government, intra- and inter-industry, resource constraints and international trade. Computable general equilibrium (CGE) models are best suited for this purpose. More specifically, the simulations in this paper make use of GDyn, a multi-region and multi-sector recursive dynamic computable general equilibrium model (Ianchovichina and McDougall 2000; Ianchovichina and Walmsley 2012).

This paper is one of the few attempts to explicitly measure the worldwide costs of protectionism in the economic literature. Some of the few comparable papers are Bouet and Laborde (2010), Evenett and Fritz (2015) and IMF (2016). The overarching conclusion of the existing literature is that protectionism is costly and that it leads to severe distortions in international markets and has important consequences at both a macro- and microeconomic level. Similarly to this paper, Bouet and Laborde (2010) show that increasing tariffs to bound levels could result in a decrease in world trade by about 10 percent and world welfare losses of US\$353 billion. Evenett and Fritz (2015) argue that protectionist

measures implemented between 2009 and 2013 slowed least developed country (LDC) exports growth significantly, costing them an equivalent of about one-third of the total exports.

While many of these studies touch on important aspects of the impacts of protectionism, none of them provide a full and consistent picture at global and at country/regional level. The goal of this paper is to fill the gap in the literature. Compared to the existing works, the novelty of the paper is manifold. First, the paper relies on the latest available data on bound, MFN, preferential and effectively applied tariffs from the World Bank WITS database, as well as the most recent snapshot of the global economy represented in the GTAP 9.2 database.² Second, the paper focuses on the impacts of protectionism on consumers, which are likely to bear the costs of global increases in protectionism. Finally, this is among the first papers that quantify the value of existing unilateral, bilateral and regional preferences.

Results show that a coordinated global withdrawal of tariff commitments from all existing bilateral and regional trade agreements, as well as unilateral preferential schemes coupled with an increase in the cost of traded services would result in worldwide welfare (real income) losses that amount to 0.3 percent or US\$211 billion relative to the baseline by 2020. An important part of these losses is likely to be concentrated in regions such as East Asia and Pacific (EAP) and Latin America and the Caribbean (LAC) which together account for close to one-third of worldwide welfare losses. The impact on global trade³ would be much more pronounced with a decline by 2.1 percent or more than US\$606 billion relative to the baseline after three years. Second, a worldwide increase in tariffs up to legally allowed bound rates and an increase in the cost of traded services would translate into global welfare losses of 0.8 percent or US\$634 billion relative to the baseline by 2020. Regions such as South Asia (SAR), East Asia and Pacific and Latin America and the Caribbean would be among the most affected, together accounting for close to half of global welfare losses. The distortion to trade flows would be significant translating into a decline by 9 percent or more than US\$2.6 trillion relative to the baseline after 2020.

The magnitude of the results should be interpreted with caution. First, the paper does not consider the impact of reversing more in-depth commitments such as those related to investment, competition and intellectual property (Hoffman, Osnago and Ruta 2017;

²Simulations in this paper rely on GTAP database 9.2 which features as a novelty the recently updated EU-28 Input-Output tables (Rueda Cantuche et al. 2016).

³Trade as referred to in the discussion of aggregate results labels the average change between exports and imports.

Mattoo, Mulabdic and Ruta 2017) or potential increases in goods and services non-tariff barriers (NTBs). Second, the main source of international spillovers is only through trade linkages and the underlying modeling framework does not explicitly capture financial and monetary markets, the impact of nominal exchange rate movements, changes in foreign direct investment flows, innovation, the international relocation of production or global value chains. Third, in comparison with other modeling tools, taking into consideration general equilibrium linkages will likely reduce the estimated impact of changes in barriers to trade (Head and Mayer 2014). For all these reasons, results reported in the paper are likely to be lower-bound estimates.

The rest of the paper is organized as follows: Section 2 describes trends in the recent rise in global protectionism. Section 3 provides an extensive review of existing studies in the literature. Section 4 describes the modelling framework and discusses the design of the simulations. Section 5 presents and discusses the economy-wide impact of the simulated scenarios with emphasis on potential implications for consumers and finally, Section 6 concludes.

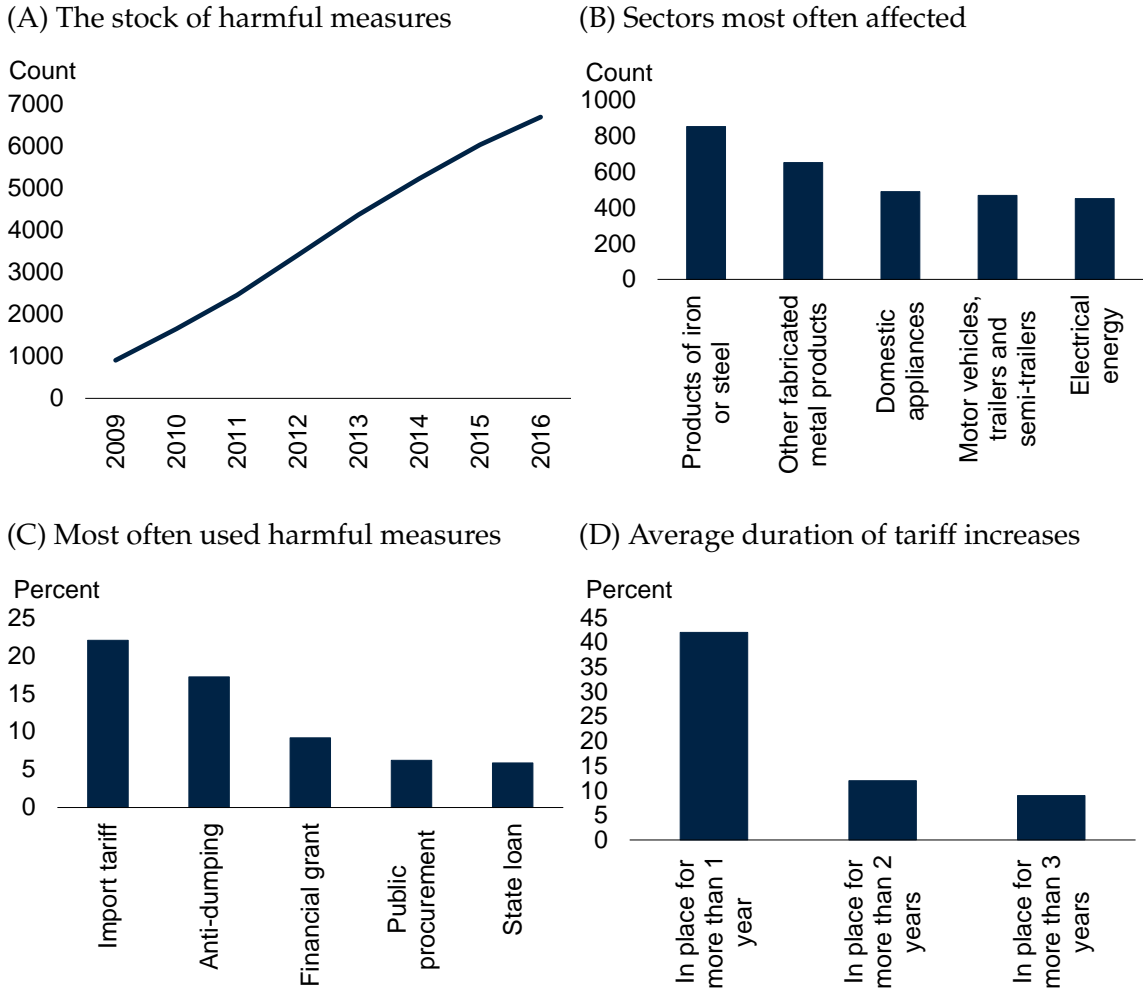
2 Global rise in trade protectionism

The 2008-09 financial crisis triggered fears of a potential worldwide protectionist spiral (Baldwin and Evenett 2009) and worries of a shift away from the use of traditional trade policy instruments such as import tariffs toward “murky” forms of protectionism.⁴ The post-crisis period has indeed seen a steady increase in the number of protectionist measures, which add up to a yearly average of more than 800 new harmful interventions (Evenett and Fritz 2017). The use of murky forms of protectionism has also been on the rise, although traditional trade barriers are still the most predominant policy instrument used. Increases in import tariffs account for close to one-fourth of new barriers to trade introduced since 2009. Other measures, such as anti-dumping duties which also translate into effective increases in applied tariffs are the second most used adding up to more than one-tenth of all new measures.

The WTO recently warned about the global rise in trade protectionism observed in G20 countries and showed that, albeit at a moderate rate, trade restrictions in G20 economies have been rising (WTO 2017). During the review period between mid-October 2016 to

⁴Murky forms of protectionism were defined as those that do not necessarily violate WTO obligations but are legitimate abuses of discretion and hurt the commercial interests of trading partners. Examples of these are bailout and stimulus packages or “green protectionism”, see also Cernat and Madsen (2011).

Figure 1: The recent rise in protectionist measures



Source: Global Trade Alert.
A. The cumulative number of newly introduced protectionist measures.
B. C. D. Based on protectionist measures impacting import flows between 2009-2017.

mid-May 2017, G20 countries introduced 42 new trade-restrictive measures, among which new or increased tariffs, customs regulations and rules of origin restrictions were the most prevalent. Based on a broader definition of protectionist measures, the latest Global Trade Alert report shows that countries introduced 659 new trade-restrictive measures in 2016 (Evenett and Fritz 2017). The trend seems to continue in 2017 where the number of harmful measures implemented until September reached 335. Since the beginning of the financial crisis, 7,027 discriminatory interventions have been implemented (Figure 1.A).

Sectors most commonly impacted by protectionist measures are metals, machinery and chemicals which together account for 7 of the top 10 most affected sectors (Figure 1.B). Barriers that affect agricultural and food sectors have also been gaining prominence and are likely to disproportionately impact exports of the poorest countries which are highly dependent on agricultural production and exports (Evenett and Fritz 2017).

Of all protectionist measures, increases in import tariffs are the most frequently used, accounting for more than one-fifth of all measures introduced since the start of the financial crisis (Figure 1.C). The total value of imports affected by tariff increases stands at US\$684 billion for the period 2009-2017 (Evenett and Fritz 2017). Accounting for multiple tariff increases of the same tariff line, the total value of imports affected would increase to US\$864 billion.

The distortive impact of discriminatory trade instruments depends on the length of the period for which they were in force. Evidence shows that of the 1,159 import tariff measures assessed as discriminatory (red), 42 percent were put in place for more than 1 year, 12 percent for more than 2 years and 9 percent for more than 3 years (Figure 1.D).

Although the number of newly introduced barriers to trade has tapered off in 2017, the risk of protectionism continues to be a major source of concern. This was highlighted by the recent failure of G20 economies to renew their long-standing commitment to free trade and pledge to resist all forms of protectionism at the last Finance Ministers meeting in March 2017.

3 Review of the literature

Three decades of continued liberalization of barriers to trade and fast trade growth resulted in a body of empirical research with a strong focus on the effects of trade liberalization both at the macro and at the micro (firm) level. The post-crisis uptick in protectionism

and rising anti-trade and anti-globalization sentiment associated with a persistent slowdown in trade flows are, however, changing the discussion towards the potential impacts of increasing protectionism.

An important part of the existing body of literature concerns the economic impact of trade wars. The seminal work of Johnson (1954) first conceptualized the beggar-thy-neighbour motive behind increases in tariffs and showed that in a trade war a country can gain by imposing an optimal tariff even when others retaliate. Subsequent literature generalized Johnson's (1954) findings using more general assumptions such as imperfect competition (Brander and Spencer 1984; Eaton and Grossman 1986; Broda et al. 2008), specific tariffs (Horwell 1966) and quotas (Tower 1975).

Ossa (2014) was the first to empirically estimate the impact of introducing optimal tariffs and the impacts of a global trade war. Using a multi-country, multi-sector general equilibrium model with inter- and intra-industry trade and special interests, the author models tariffs that 1) manipulate terms of trade; 2) shift profits away from countries and 3) protect politically influential industries, and estimates that world trade war tariffs average 63 percent which if implemented would translate into welfare losses of 2.9 percent.

More recently, Noland et al. (2016) used a traditional, multi-equation econometrically estimated macroeconomic model developed by Moody's Analytics to analyse the impacts of different trade war scenarios between the US and China/Mexico. The authors conclude that in a full trade war scenario in which the US imposes a 45 percent tariff on nonoil imports from China and a 35 percent tariff on nonoil imports from Mexico followed by China's and Mexico's symmetric response on US exports is expected to push the US economy into recession by 2019 with an associated plunge in investment of 9.5 percent and unemployment rate of 8.4 percent. In the same vein, Bouet and Laborde (2017) use a static computable general equilibrium model called MIRAGRODEP to measure the impact of potential trade wars between the United States, on the one hand, and China and Mexico, on the other. An innovative feature of their approach is that tariffs are computed endogenously considering different objective functions such as to minimize welfare losses, minimize terms-of-trade losses, to generate the same amount of collected revenue or tariffs that replicate a Nash equilibrium. The authors conclude that out of the 18 potential scenarios considered, there is none in which the US can benefit by neither an increase in domestic welfare nor GDP. Using econometric modeling techniques and a new database on the content of trade agreements, Mattoo, Mulabdic and Ruta (2016) argue that undoing US trade agreements would result in a decline in US exports by up to 4.3 percent and real income by 3.2 percent. This in turn would lead to the decline in the exports of the US's trading partners by 0.1-7.2 percent.

The remaining body of literature focuses on the impact of more isolated or ad-hoc type increases in protectionism. Recently, the IMF (2016) explores the effects of a hypothetical 10 percent increase in import prices driven by a symmetric rise in both tariff and non-tariff barriers. The authors use Global Integrated Monetary and Fiscal Model (GIMF), a multi-region dynamic stochastic general equilibrium (DSGE) model and find that such an increase in protectionism will lead to a strong decline in trade flows by 16 percent, and on the long run translate into a fall in global output of 2 percent. Kutlina-Dimitrova (2017) assesses the impact of the Russian import ban on exports of agri-products from the European Union, the United States, Australia, Norway and Canada. The author shows that these protectionist measures weigh heavily on Russian consumers whose welfare declines by more than US\$5.8 billion.

Using an econometric framework and changes in the incidence of protectionism documented in the Global Trade Alert database, Evenett and Fritz (2015) estimate that protectionist measures implemented between 2009 and 2013 slowed LICs exports growth significantly costing them an equivalent of about one-third of the total exports.

In an empirical exercise similar to the one in this paper, Bouet and Laborde (2010) use MIRAGE, global dynamic CGE model to estimate the impact of a scenario that implies an increase in tariffs in major economies up to WTO bound rates. The model is calibrated using a 27 region and 12 sector aggregation of the GTAP 7 database with base year 2007. The authors show that such an increase in worldwide protectionism translates into a decline in world trade of 9.9 percent and world welfare by US\$353 billion – more pronounced in many developing countries.

Finally, a recent paper by Kutlina-Dimitrova and Lakatos (2014) assesses the impacts of the EU-Singapore free trade agreement (FTA) also by simulating the costs of not concluding the FTA. By doing so the authors go beyond the standard assessment of the impact of free trade agreements by introducing an alternative scenario which quantifies the economic impact of Singapore raising its tariffs to levels bound in the WTO. Along these lines, Kutlina-Dimitrova and Lakatos (2014) exemplify that there is an additional benefit from a free trade agreements namely the prevention of future tariff hikes in line with WTO commitments. Results show that considering the cost of non-insurance against protectionism is an important aspect of the likely gains from trade liberalization.

4 Modeling framework and simulation design

The model underlying the simulations described in this paper is the dynamic GTAP model (GDyn). GDyn is a multi-sector and multi-region recursively dynamic computable gen-

eral equilibrium (CGE) model that extends the standard, comparative static version of the GTAP model (Hertel 1997) by including international capital mobility, endogenous capital accumulation and adaptive expectations theory of investment (Ianchovichina and McDougall 2000; Ianchovichina and Walmsley 2012). The model is ideal for simulating the impact of trade policy changes as it takes into consideration economy-wide general equilibrium linkages such as interactions between consumers, producers, government, inter- and intra-industry links, domestic and foreign markets and the interaction between supply, demand and resource constraints.

The core specification of the model broadly replicates a standard global CGE model with perfect competition and constant returns to scale. Production is specified as a series of nested constant elasticity of substitution (CES) functions using intermediate inputs and factors of production such as unskilled and skilled labor, capital, land, and natural resources. Demand by each domestic agent is defined by so-called Armington preferences, i.e. imperfect substitution possibilities between demand for goods produced domestically and imports from each sourcing country. Source substitution elasticities are based on estimates using the methodology developed by Hummels (1999) and are fully documented in Hertel and van der Mensbrugghe (2016). Savings are treated as in the comparative static GTAP model where the representative household allocates regional income that maximizes per capita utility based on a Cobb–Douglas utility function complemented with non-homothetic preferences on the private consumption side.

The model represents five factors of production: land, skilled labor, unskilled labor, capital and natural resources. Land and natural resources are assumed to be imperfectly mobile across sectors. Capital and skilled and unskilled labor are assumed to be perfectly mobile across sectors, determining a single rental price and skilled and unskilled wage that clears the market. These assumptions are consistent with a framework that captures the medium- to long-term impacts of trade policy shocks.⁵ Each period's equilibrium determines the level of global savings and implicitly the aggregate amount of investment expenditure available in that specific period. International capital mobility is modelled using a disequilibrium approach that reconciles investment theory with empirical findings. The disequilibrium approach of GDyn is described by two mechanisms: first, there is a gradual convergence of expected rates of return in the long run; and second, errors in expectations with respect to the actual rate of return are eliminated over time. When making investment decisions, investors are assumed to respond to expected rates of return allowing for errors in expectations. The dynamic nature of the model allows us to

⁵The results reported in the paper are broadly robust to reduced labor mobility assumptions.

consider the short, medium- and long-term impacts of the changes in trade policies considered here.

4.1 Regional and sectoral aggregation

The GTAP 9.2 database represents 140 different countries/regions and 57 sectors. In order to be able to focus on key results and countries/regions/sectors of interest, these were bundled into 11 sector and 10 region aggregates (Table A1). The final regional aggregation includes the following: the European Union, the United States, Other Advanced Economies, China, Rest of East Asia and Pacific, Latin America and Caribbean, Europe and Central Asia, Middle East and North Africa and Sub-Saharan Africa. Table A2 in the annex provides a detailed overview of GTAP sectors and their mapping into the aggregates used in this paper.

4.2 Simulation design

We develop two scenarios to quantify the country/regional impact of a global increase in protectionism. Each of these scenarios includes an increase in tariffs as represented in Table 1 and an increase in the cost of traded services. The latter is modelled through a symmetric, non-revenue generating increase in non-tariff barriers that result in a 3 percent increase in the ad-valorem trade cost of services⁶. This shock reflects the loss of binding services sector protection at currently applied levels achieved in trade agreements. The magnitude of the increase is conservative as it only implies a loss of services bindings but not further loss of market access which has been achieved in many FTAs. Hence, the results of these scenarios are to be considered as providing lower bound estimates of the potential losses resulting from an increase in protectionism.

- **Scenario 1 - Loss of preferences:** in this scenario, we measure the economic impact of the loss of tariff preferences from all existing bilateral/regional trade agreements, as well as unilateral preferential schemes in addition to a 3 percent increase in the cost of traded services. In the absence of tariff commitments under regional trade agreements (RTAs) and unilateral preferences, WTO members would effectively revert to MFN tariffs which in turn would translate into an increase of 40 percent in average global tariffs from the currently applied 2.7 percent to 3.8 percent. The increase in the cost of traded services captures the value of the increase in uncertainty

⁶The 3 percent ad-valorem increase is an estimate of the value of binding of applied levels of services protection and was applied in the same context in Decreux and Fontagné (2011) and Kutlina-Dimitrova and Lakatos (2014).

around barriers to services as binding commitments from trade agreements are eliminated.

- **Scenario 2 - Increase to bound tariffs:** in this scenario, we quantify the effects of an increase in tariffs up to the bound rates under WTO commitments and an increase in the cost of traded services of 3 percent. The difference between applied tariffs and bound rates, i.e. the binding overhang or the water in the tariff is the policy space that countries can use without breaching their WTO commitments. Average worldwide tariffs would more than triple increasing from the currently applied 2.7 percent to 10.2 percent. The increase in the cost of traded services captures the value of the increase in uncertainty around barriers to services as binding commitments are eliminated.

As a first step, we updated tariffs in the GTAP 9.2 database with effectively applied tariffs available from the World Bank WITS database⁷ to reflect the latest available year (2015) of worldwide protectionism. Not surprisingly, as highlighted in Table 1, average import tariffs in advanced economies such as the EU and the United States are among the lowest and range from 1.5-1.6 percent. In a contrast, in emerging market and developing economies (EMDEs) in South Asia and Sub-Saharan Africa, effectively applied duties are five times higher than that of advanced economies with average rates ranging from 7.5-7.7 percent.

As in the case of applied tariffs, average bound tariffs are also the lowest for advanced economies amounting to 2.5 percent and 2.7 percent in the European Union and the United States, respectively. On the other extreme, average bound rates are the highest in South Asia at 45 percent, followed by Sub-Saharan Africa 36 percent and Latin America and Caribbean of 33 percent driven by higher than average bound tariffs in major EMDEs in these regions such as India (41 percent), Nigeria (126 percent) and Brazil (30 percent).

In terms of the difference between currently applied and MFN rates (scenario 1), Europe and Central Asia and Latin America and the Caribbean would increase tariffs the most, by 2.2 percentage points each. On the other hand, the loss of existing preferences would only result in small tariff increases in regions with no strong RTA commitments such as South Asia and China. In terms of raising tariffs to bound levels (scenario 2), the United States and the EU would be the least affected, followed by Europe and Central Asia and China. On the other hand, South Asia, Sub-Saharan Africa and Latin America and the Caribbean would be raising tariffs significantly by 37 percentage points, 29 percentage points and 26 percentage points, respectively.

⁷<http://wits.worldbank.org/>

Table 1: Tariffs by region

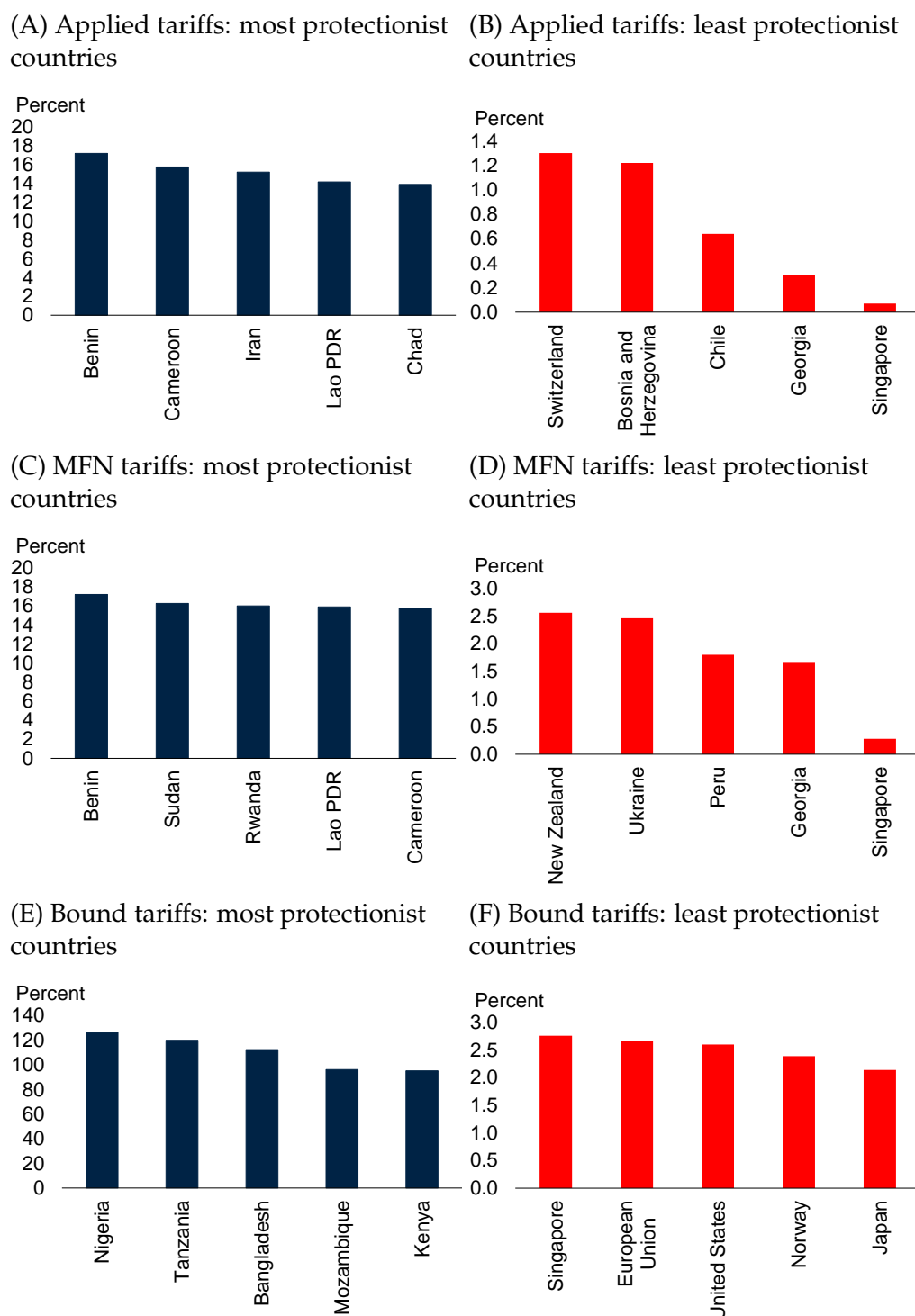
	Applied	MFN	Bound
European Union	1.5	2.5	2.6
United States	1.6	2.7	2.7
Other Advanced Economies	2.6	4.2	14.3
China	3.4	3.9	4.9
East Asia and Pacific	1.3	2.5	9.7
Europe and Central Asia	2.6	4.8	5.5
Latin America and the Caribbean	6.7	9.0	32.9
Middle East and North Africa	4.9	6.3	19.4
South Asia	7.7	8.0	44.7
Sub-Saharan Africa	7.5	9.2	36.3
World average	2.7	3.8	10.2

Source: World Bank WITS database.

Note: Trade weighted averages for 2015.

The model underlying the simulations is calibrated on the GTAP 9.2 database (Aguiar et al. 2016). The baseline scenario tracks the evolution of macroeconomic variables such as GDP, population and labour force growth in the absence of a policy change. Projections of these variables up to 2020 are based on the April 2017 update of World Economic Outlook (WEO) of the IMF. The policy shock (increase in tariffs) is implemented in 2018. All results are reported as the difference between the counterfactual and the hypothetical baseline scenario in 2020. The size of the tariff shocks is based on data from the World Bank World Integrated Trade Solution (WITS) database which in turn is based on Trade Analysis and Information System (TRAINS) data.

Figure 2: Tariffs by country



Source: World Bank WITS database.

Note: Trade weighted averages for 2015. Includes countries with population of at least 3 million.

A. B: Applied tariffs are a combination of preferential tariffs (where these exist) and MFN tariffs.

C. D. Most Favored Nation (MFN) tariffs are normal, non-preferential tariffs charged by WTO members to trading partners that are members of the WTO.

E. F. Bound tariffs are maximum MFN tariff level.

5 Results

This section presents and discusses the results of the simulations following the two scenarios described in Subsection 4.2. The discussion emphasizes the impact of protectionism on consumers with a focus on welfare impacts and household consumption. Special attention is given to the effects of protectionism on trade.

5.1 The value of preferences

Recent decades of continued trade liberalization resulted in a “spaghetti bowl” of bilateral and regional trade agreements (RTAs). As of 2017, the WTO received notifications of 464 individual RTAs of which 271 are currently in force (WTO 2017). Apart from bilateral and regional trade agreements, numerous emerging and developing economies (EMDEs) and least developed countries (LDCs) benefit from special and differential treatment in the form of non-reciprocal and non-discriminatory preferential schemes under the Generalized System of Preferences (GSP). GSP preferences aim to increase export earnings, promote industrialization and accelerate rates of economic growth of the poorest countries (UNCTAD 1968). Among these, for instance, the GSP schemes of Australia, New Zealand, and Switzerland allow for duty-free quota-free (DFQF) access for virtually all LDC exports to their respective markets. As part of the EU’s GSP preferential scheme, the Everything But Arms (EBA) arrangement grants DFQF access for all LDC exports except arms and ammunitions, similarly to the African Growth Opportunity Act (AGOA) which targets a subset Sub-Saharan African LDCs as part of the US’s GSP preferences.

In this section, we discuss the economic effects of a potential scenario in which all WTO members simultaneously withdraw their tariff commitments from both unilateral preferential schemes as well as all existing bilateral/regional trade agreements coupled with a 3 percent increase in the cost of traded services reflecting the removal of services binding commitments. Although for now such a scenario could be considered purely hypothetical, mounting anti-globalization pressures and rising protectionist sentiment in advanced economies such as the United States and UK highlight widespread concerns about the benefits from trade agreements.

In the absence of tariff commitment under RTAs and unilateral preferences, WTO members would effectively revert to MFN tariffs. Such increases in worldwide tariffs are two-faceted: on the one hand, they imply an increase in tariffs applied on imported goods and, on the other hand, to the degree that trading partners also increase tariffs, translate into a loss of market access in export markets. Additionally, the increase in the ad-valorem cost of traded services of 3 percent reflects the loss of binding services sectors protection

and implies an effective increase in the price of traded services. As highlighted in Table 1, reverting to MFN tariffs would nearly double average applied tariffs in regions such as Latin America and the Caribbean and Europe and Central Asia. With average MFN tariffs at 9 percent, LAC would become the second most protectionist region after Sub-Saharan Africa. On the other hand, although tariffs in advanced economies such as the EU and the United States would increase as well, relative to other regions these increases would be modest (average MFN tariffs ranging from 2.6-2.7 percent).

The absence of preferential market access will likely result in two opposing effects. On the one hand, the loss of preferential tariffs will increase average distortions in the global economy and translate into efficiency losses. On the other hand, the elimination of preferential market access will reduce trade diversion effects and result in a more efficient allocation of resources.

5.1.1 Impact on welfare

The loss of all existing tariff preferences and the increase in the cost of traded services is expected to translate into global welfare losses of more than 0.3 percent or US\$211 billion relative to the baseline by 2020 (Table 2). EMDEs are expected to be more affected with income losses that amount to 0.4 percent or US\$113 billion. In EMDEs, the lion's share of these losses would be concentrated in regions such as East Asia and Pacific and Latin America and the Caribbean which together account for close to one-third of worldwide declines in welfare. EAP and LAC would be among the most affected in relative terms as well, experiencing a decline in real income of 0.9 percent and 0.5 percent, respectively, relative to the baseline after three years.

The decomposition of results highlights that in these regions, welfare losses are driven mostly by allocative efficiency and terms of trade losses. Allocative efficiency or dead-weight losses capture the loss in economic efficiency driven by the government's intervention that forces resources to move to sectors that are protected by higher tariffs.

Results also suggest that the worldwide increase in barriers to trade lead to moderate welfare losses in certain regions such as China and South Asia. These findings can be mostly explained by the general equilibrium nature of the model underlying the simulations. The global distribution of welfare losses is determined not only by the absolute increase in trade cost applied on import and faced on exports, but also by their relative increase compared to other countries/regions. As pointed out above, regions with no strong RTA commitments such as South Asia and China would be only affected by a 0.2 and 0.5 percentage point increase in tariffs. Furthermore, the withdrawal of preferential tariffs and

Table 2: Regional welfare impact

	Percent	US\$ billions
East Asia and Pacific	-0.9	-33
Latin America and the Caribbean	-0.5	-30
Middle East and North Africa	-0.5	-20
Sub-Saharan Africa	-0.4	-9
Europe and Central Asia	-0.4	-15
European Union	-0.3	-55
Other Advanced Economies	-0.2	-33
United States	-0.1	-11
South Asia	-0.1	-2
China	-0.1	-5
Total	-0.3	-211

Source: Authors' simulations.

Note: Results are reported relative to the baseline in 2020.

the increase in the cost of traded services occurs simultaneously in all regions so these results cannot be interpreted as the marginal impact of removing certain trade agreements. Last but not least, due to the fact that the underlying modelling framework does not capture financial and monetary linkages, the impact of nominal exchange rate movements, changes in FDIs, innovation, the international reallocation of production and potential increases in NTBs in goods and services markets, these results should be considered as lower-bound estimates.

5.1.2 Impact on consumers

The increase in worldwide barriers to trade is expected to spill over to consumers through both price channels and quantity consumed. First, higher tariffs translate into the effective increase in the price of imported consumer goods putting upward pressure on the aggregate consumer price index (CPI) and *ceteris paribus*, reducing households' purchasing power. Second, the increase in the price of imported goods may limit the availability of foreign sourced products and force consumers to substitute with relatively cheaper goods sourced from domestic markets.

Results suggest that the loss of existing preferences would translate into a decline in global real household consumption by 0.3 percent or close to US\$148 billion relative to the base-

line by 2020. The aggregate decline in the consumption of imported consumer goods and services is expected to be much more pronounced at 3.7 percent or US\$196 billion relative to the baseline after three years (Table 3).

Table 3: Impact on household consumption by region

	Total		Imports	
	Percent	US\$ billion	Percent	US\$ billion
East Asia and Pacific	-0.9	-21.3	-6.7	-28.3
Latin America and the Caribbean	-0.6	-23.3	-7.9	-29.6
Middle East and North Africa	-0.5	-10.6	-2.9	-15.0
Europe and Central Asia	-0.5	-11.2	-6.1	-22.5
Sub-Saharan Africa	-0.4	-6.0	-4.5	-11.1
European Union	-0.3	-37.4	-1.9	-30.7
Other Advanced Economies	-0.3	-23.5	-4.5	-32.3
China	-0.1	-3.7	-3.0	-4.3
United States	-0.1	-9.6	-2.4	-19.4
South Asia	-0.1	-1.2	-2.5	-3.2
Total	-0.3	-147.8	-3.7	-196.3

Source: Authors' simulations.

Note: Results are reported relative to the baseline in 2020 in real consumption.

At the regional level, the distribution of losses follows that discussed in the previous section with respect to impacts on welfare. In general, regions that experience welfare losses are also negatively impacted in terms of real consumption. More specifically, consumers in EAP and LAC are hurt by an aggregate decline in real consumption by 21.3 billion and 23.3 billion, respectively, relative to the baseline by 2020. The decline in the volume of imported consumer goods is even more pronounced at 7.9 percent and 6.7 percent or US\$29.6 billion and US\$28.3 billion in LAC and EAP, respectively. The aggregate adverse impact on consumers is partly offset by the increase in the consumption of domestically sourced consumer goods.

Apart from their negative impact on aggregate consumption, tariffs have been found to disproportionately impact low-income households as these spend more on traded goods as a share of their income (Fajgelbaum and Khandelwal 2016; Furman et al. 2017). Due to their regressive nature, increases in tariffs are likely to have adverse distributional effects

and negatively impact poverty and income inequality.⁸

5.1.3 Impact on trade

Table 4 below summarizes the regional impact of increases in barriers to trade on both exports and imports. Such increases in global protectionism would translate into a decline of global imports by 2.1 percent amounting to more than US\$614 billion relative to the baseline by 2020. In relative terms, imports of regions such as LAC and ECA would decline the most, by 5.7 percent and 4.5 percent, respectively, relative to the baseline after three years. Latin America and the Caribbean and Sub-Saharan Africa which benefit from important bilateral and unilateral preferences granted by advanced economies, are expected to be the most affected by the loss in external competitiveness with a decline in exports of 3.6 percent and 3.4 percent relative to the baseline by 2020. In LAC, exporters of textiles and clothing and transport equipment are likely to be most affected by a decline in exports of 33 percent and 27 percent, respectively.

Table 4: Impact on regional trade

	Exports		Imports	
	Percent	US\$ billion	Percent	US\$ billion
Latin America and the Caribbean	-3.6	-56.8	-5.7	-97.2
Sub-Saharan Africa	-3.4	-24.6	-3.8	-32.2
Europe and Central Asia	-3.3	-46.9	-4.5	-65.0
European Union	-3.3	-103.4	-1.8	-88.2
United States	-2.6	-84.9	-1.8	-58.8
Other Advanced Economies	-2.5	-104.6	-2.3	-96.4
Middle East and North Africa	-2.4	-41.7	-2.4	-45.6
East Asia and Pacific	-2.2	-58.7	-3.8	-117.4
South Asia	-2.1	-20.2	-0.8	-11.6
China	-1.6	-72.4	-1.0	-28.7
Total	-2.1	-598.1	-2.1	-614.6

Source: Authors' simulations.

Note: Results capture changes in the volume of trade relative to the baseline in 2020.

⁸In the model underlying the simulations, there is one representative household and as a result we cannot explicitly capture the poverty and inequality impacts of the simulated increases in tariffs.

5.2 Reversal to WTO bound rates

While a Great Depression like spiral in protectionism remains unlikely given current international safeguards, countries may still resort to beggar-thy-neighbour protectionist policies within existing rules. WTO members retain ample policy space in legally more than tripling applied tariff rates up to their bound levels from the current 2.7 percent to 10.2 percent.

In terms of binding tariff commitments, heterogeneity at the country and product level is nuanced. For example, the average applied tariff rate in India is about 13 percent and could be increased up to 48 percent without any violation of WTO commitments, even higher in the case of agricultural commodities from 33 percent to 114 percent. While using some of these flexibilities would be economically prohibitive (Foletti et al. 2009), potential losses from tariff hikes would disproportionately affect the poorest EMDEs that rely on imports from the rest of the world relatively more than advanced economies.

5.2.1 Impact on welfare

Table 5 summarizes the impact on regional welfare of increases in tariffs up to bound levels as well as an increase in the ad-valorem cost of traded services. Global real income losses could amount 0.8 percent or US\$634 billion, much more pronounced in EMDEs where income losses add up to 0.8 percent relative to the baseline after three years.

The region most severely affected in terms of welfare is South Asia. The increase in tariffs to average bound rates of 44.7 percent in highly protectionist countries such as India, Bangladesh, Pakistan and Sri Lanka would translate into a decline in real income in South Asia by 4.2 percent or welfare losses of close to US\$125 billion relative to the baseline by 2020, i.e. nearly one-fifth of global welfare losses.

The EU and the USA are expected to be also severely affected by the trade shock: welfare of the EU would decline by an annual estimated US\$76 and of the US by US\$74 billion relative to the baseline by 2020. Other regions which are also significantly affected are East Asia and Pacific (2 percent decline in real income amounting to US\$77 billion) and Latin America (1.1 percent decline in real income amounting to US\$70 billion). The decomposition of aggregate welfare effects highlights that allocative efficiency losses contribute disproportionately to the decline in global welfare. The increase in barriers to trade forces the reallocation of resources away from a relatively high social marginal value to a lower one and in turn increases the excess burden on the global economy and dead-weight losses such that the surface of the Harberger triangle grows.

Table 5: Regional welfare impact

	Percent	US\$ billions
South Asia	-4.2	-125
East Asia and Pacific	-2.0	-77
Latin America and the Caribbean	-1.1	-70
Middle East and North Africa	-1.0	-42
China	-0.8	-91
Sub-Saharan Africa	-0.7	-14
Other Advanced Economies	-0.5	-65
United States	-0.4	-74
European Union	-0.4	-76
Europe and Central Asia	-0.1	-2
Total	-0.8	-634

Source: Authors' simulations.

Note: Results are reported relative to the baseline in 2020.

Europe and Central Asia experience relatively modest welfare losses. The decomposition of the aggregate effects indicates that this is due to considerable terms of trade gains which close to outweigh allocative efficiency losses. ECA benefits from terms of trade gains as the level of bound tariffs is relatively close to applied ones and thus, relative to other regions, the increase in the price of their imports is smaller than the increase in the price of exports.

5.2.2 Impact on consumers

The worldwide increase in barriers to trade translates into a strong decline in the imports of goods and services for household consumption in all regions. Regions most affected are South Asia and Latin America and the Caribbean which experience a decline 47 percent and 35 percent, respectively, relative to the baseline after three years (Table 6).

Total household consumption also is expected to decline in all regions, as the increase in the consumption of domestically produced goods and services is not strong enough to compensate for the pronounced decline in the consumption of imported goods and services. In the case of the United States, the imports of goods and services for household consumption would decline by 5 percent or US\$43 billion and as in the European

Table 6: Impact on household consumption by region

	Total		Imports	
	Percent	US\$ billion	Percent	US\$ billion
South Asia	-4.4	-95	-47	-59
East Asia and Pacific	-2.2	-54	-22	-91
Middle East and North Africa	-1.6	-35	-16	-81
Sub-Saharan Africa	-1.4	-20	-27	-66
Latin America and the Caribbean	-1.3	-56	-35	-133
China	-0.7	-29	-6	-9
Other Advanced Economies	-0.6	-44	-10	-69
European Union	-0.4	-50	-2	-38
United States	-0.4	-57	-5	-43
Europe and Central Asia	-0.2	-6	-11	-42
Total	-0.9	-445	-12	-631

Source: Authors' simulations.

Note: Results are reported relative to the baseline in 2020 in real consumption.

Union, where this decline is partially offset by the boost in the consumption of domestically produced products. These countries' pronounced reliance on domestic markets have an important role in reducing the negative impact of the increase in barriers to trade. Nonetheless, household consumption declines markedly by US\$57 billion in the United States and by US\$50 billion in the European Union relative to the baseline by 2020.

The increase in barriers to trade translate into higher prices for consumers. CPI is estimated to increase by 8 percent in Sub-Saharan Africa and by close to 5 percent in MENA and ECA. Food prices are found to increase even more, by 15 percent in SSA and close to 10 percent in MENA. Consumers in low income countries in Sub-Saharan Africa that rely heavily on imports of machinery and capital goods are also significantly impacted by the close to 10 percent increase in the price of transport equipment and electronics and machinery.

5.2.3 Impact on trade

All regions are expected to experience a pronounced decline in both exports and imports (Table 7). The strongest decline in imports is estimated in LAC, where the volume of

imports of goods and services would fall by 35 percent or US\$604 billion relative to the baseline after three years. Among the other regions, most affected are South Asia and Sub-Saharan Africa where imports decline by 33 percent and 19 percent, amounting to a decline in real imports by US\$459 billion and US\$161 billion relative to the baseline by 2020, respectively. These results are not surprising, as these are the regions for which the increase in tariffs is the most pronounced. Imports of goods and services decline the least in the European Union and China by 2.4 percent and 3.5 percent relative to the baseline after three years. At the sectoral level, imports of food and agricultural commodities are disproportionately affected. For instance, imports of food decline by 82 percent in South Asia and by 52 percent in Sub-Saharan Africa. For countries that have limited possibilities to substitute more expensive imports with domestic production of food and agricultural commodities, the increase in tariffs will lead to significant negative spillovers in terms of nutrition, poverty and inequality.

Table 7: Impact on regional trade

	Exports		Imports	
	Percent	US\$ billion	Percent	US\$ billion
Latin America and the Caribbean	-26.4	-415.7	-35.2	-604.4
Sub-Saharan Africa	-21.9	-158.6	-19.1	-161.0
South Asia	-15.9	-151.5	-32.6	-458.7
Middle East and North Africa	-13.7	-242.0	-13.9	-261.9
Europe and Central Asia	-12.8	-179.3	-9.3	-133.8
East Asia and Pacific	-12.0	-322.5	-17.6	-540.6
European Union	-11.9	-369.8	-2.4	-113.7
Other Advanced Economies	-8.3	-340.2	-5.6	-231.1
United States	-7.9	-258.0	-4.4	-143.1
China	-3.9	-179.8	-3.5	-97.8
Total	-9.0	-2,570	-9.0	-2,657

Source: Authors' simulations.

Note: Results capture changes in the volume of trade relative to the baseline in 2020.

Changes in the value of trade amount to a global decline by 9.4 percent or US\$2.7 trillion.

Regarding external competitiveness, the regions most affected by a decline in exports are Latin America and the Caribbean by a decline of 26 percent, Sub-Saharan Africa by 22 percent and South Asia by 16 percent relative to the baseline by 2020. In LAC, for instance,

an important commodity exporter, exports of energy and minerals would decline by more than 23 percent. Similarly, South Asia is expected to lose competitiveness in textiles and clothing with a decline in exports of 7 percent. Exports of China and the United States decline less strongly in relative terms, on average by 3.9 percent and 7.9 percent relative to the baseline by 2020 but there are sectors which are more affected such agricultural exports which decline by 17 percent in China and 20 percent in the United States.

Results of Scenario 2 are consistent with those reported by Bouet and Laborde (2010) who estimate a similar decline in world trade of 9.9 percent and welfare loss of US\$353 billion. Their simulations, however, do not include an increase in the cost of traded services. Furthermore, results in Bouet and Laborde (2010) are based on global production and trade data from the year 2007 which reflects the structure of the world economy before the financial crises.⁹

5.3 The costs of protectionism: global impact

The summary of the global impact of the simulations is presented in Table 8. Results show that a coordinated global withdrawal of tariff commitments from existing unilateral preferential schemes, as well as bilateral and regional trade agreements coupled with a 3 percent increase in the cost of traded services would translate in worldwide welfare losses that amount to 0.3 percent or US\$211 billion relative to the baseline by 2020. Similarly, consumers would be hurt by a decline in real consumption by close to US\$148 billion. The impact on global trade would be much more pronounced with a decline of close to 2.1 percent or more than US\$606 billion relative to the baseline after three years.

Second, a worldwide increase in tariffs up to the legally allowed bound rates coupled with a 3 percent increase in the cost of traded services would translate into global welfare losses of 0.8 percent or US\$634 billion relative to the baseline by 2020. Global household consumption would decrease by 0.9 percent corresponding to a loss of nearly US\$445 billion. The distortion to trade flows would be significant with decline by 9 percent or more than US\$2.6 trillion relative to the baseline after three years.

If these protectionist measures were to stay in place for longer than the assumed three years, real income effects are likely to further deteriorate before negligibly rebounding after 2025 (Figure 3). Reversal to bound tariffs is expected to translate into strong negative

⁹Bouet and Laborde (2010) also use a different modelling framework than the one used in the current paper namely the MIRAGE model. For more information on the MIRAGE model see Decreux and Valin (2007).

Table 8: Global impact of protectionism

	Scen 1: Loss of preferences		Scen 2: Increase to bound	
	Percent	US\$ billion	Percent	US\$ billion
Welfare	-0.3	-211	-0.8	-634
Household consumption	-0.3	-148	-0.9	-445
Trade	-2.1	-606	-9.0	-2,613

Source: Authors' simulations.

Note: Results are reported relative to the baseline in 2020.

dynamic trade effects as the annual decline in trade flows will likely continue to worsen beyond 2020. Also, these strong negative trade impacts will likely result in important employment losses. As shown by Rueda-Cantuche and Sousa (2016), on average, each €1 billion of exports supported 14,000 jobs in the EU.

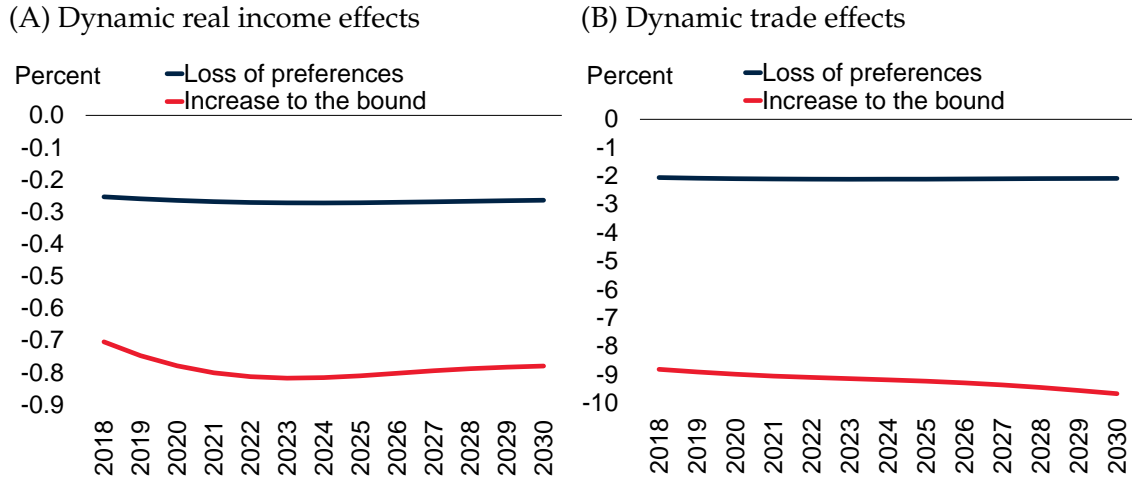
6 Conclusions

At their meeting in March 2017, G20 Finance Ministers failed to renew their long-standing commitment to free trade and pledge to resist all forms of protectionism. If mounting anti-globalization pressures and rising protectionist sentiment culminate in an upward spiral in beggar-thy-neighbour trade policies, they could result in the erosion of efforts during decades of trade liberalization and the corrosion of the multilateral rules-based system that has been under construction since the mid-1940s.

While in some cases protectionist measures are politically attractive in the short run, these can have large negative repercussions over the medium and long run. This paper aims to highlight the wide-ranging costs of protectionism and implicitly the benefits of free trade in two scenarios.

First, what if all WTO members withdrew their tariff commitments from existing unilateral preferential schemes as well as bilateral/regional trade agreements coupled with an increase in the cost of traded services? Although for now such a scenario is purely hypothetical, mounting anti-globalization pressures and rising protectionist sentiment in advanced economies come as a result of widespread doubts about the benefits from free trade. We estimate that such an increase in worldwide protectionism would result

Figure 3: The dynamic path of global impacts



Source: Authors' simulations.

Note: Cumulative percent change relative to the baseline.

in worldwide welfare losses that amount to 0.3 percent or US\$211 billion relative to the baseline after three years. An important share of these losses is likely to be concentrated in regions that benefit from important preferential tariffs in their export markets such as East Asia and Pacific and Latin America and the Caribbean and which together account for close to three-quarters of the global decline in welfare. Highlighting the importance of preferences and the value of decades of trade liberalization, the impact on global trade is estimated to be much more pronounced with a decline by 2.1 percent or more than US\$606 billion relative to the baseline by 2020.

Second, what if WTO members increased tariffs up to the legally allowed bound rates coupled with an increase in the cost of traded services? This would translate into global welfare losses of 0.8 percent or US\$634 billion relative to the baseline after three years. Similarly, global household consumption is found to decrease by 0.9 percent corresponding to a loss of US\$445 billion. The distortion to trade flows would be significant with decline by 9 percent or more than US\$2.6 trillion relative to the baseline after three years.

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Appendix A Sectoral and regional aggregation

Table A1: Sectoral and regional aggregation

Sectors	Countries/Regions
Agriculture	EU28
Energy and minerals	United States
Processed foods	Other advanced economies
Textiles and clothing	China
Chemicals	Rest of East Asia and Pacific
Electronics and machinery	South Asia
Transport equipment	Latin America and Caribbean
Other manufactures	Europe and Central Asia
Transport and energy	Middle East and North Africa
Business services	Sub-Saharan Africa
Other services	

Table A2: Sectoral mapping: GTAP sectors to model aggregation

GTAP sectors		Aggregation
Code	Description	Description
pdr	Paddy rice	Agriculture
wht	Wheat	
gro	Cereal grains nec	
v_f	Vegetables, fruit, nuts	
osd	Oil seeds	
c_b	Sugar cane, sugar beet	
pfb	Plant-based fibers	
ocr	Crops nec	
ctl	Cattle: sheep, goats, horses	
oap	Animal products nec	
rmk	Raw milk	
wol	Wool, silk-worm cocoons	
frs	Forestry	
fsh	Fishing	
coa	Coal	
oil	Oil	
gas	Gas	
p_c	Petroleum, coal products	
omn	Minerals nec	
cmt	Meat: cattle, sheep, goats, horse	Processed foods
omt	Meat products nec	
vol	Vegetable oils and fats	
mil	Dairy products	
pcr	Processed rice	
sgr	Sugar	
ofd	Food products nec	
tex	Textiles	Textiles and clothing
wap	Wearing apparel	
lea	Leather products	
crp	Chemical, rubber, plastics	Chemicals
lum	Wood products	Other manufactures
ppp	Paper products, publishing	
omf	Manufactures nec	
nmm	Mineral products nec	
i_s	Ferrous metals	
nfm	Metals nec	
fmp	Metal products	
b_t	Beverages and tobacco	

mvh	Motor vehicles and parts	Transport equipment
otn	Transport equipment nec	
ele	Electronic equipment	Electronics and machinery
ome	Machinery and equipment nec	
ely	Electricity	Transport and energy
gdt	Gas manufacture, distribution	
otp	Transport nec	
wtp	Sea transport	
atp	Air transport	
cmn	Communication	Business services
ofi	Financial services nec	
isr	Insurance	
obs	Business services nec	
ros	Recreation and other services	Other services
dwe	Dwellings	
cns	Construction	
trd	Trade	
wtr	Water	
osg	Public administration/	
	fence/Health/Education	