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Economic Impacts of Investment Facilitation

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We quantify the impacts of a potential Investment Facilitation Agreement (IFA) given the outcomes of the structured discussions. The analysis is based on an innovative multi-region general equilibrium simulation model including bilateral representative firms. Consideration is given to Foreign Direct Investment (FDI) and monopolistic competition. The model shows empirically relevant gains associated with removal of investment barriers. The expected global welfare gains range between 0.56% and 1.74% depending on the depth of a potential IFA. The benefits are concentrated among the members with the highest welfare increase for the low and middle income countries. Notable spillovers accrue to non-participants, which can be increased by joining the agreement. Our results contribute to the relatively scarce research on investment facilitation and provide policy makers with information on the potential effects of an IFA.

JEL codes: F11, F12, F17

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1. Introduction

After the successful adoption of the Trade Facilitation Agreement (TFA) by the World Trade Organization (WTO) in 2014, investment facilitation has been gaining in popularity. Investment facilitation can be generally defined as a set of measures for improving the transparency and predictability of investment frameworks, streamlining procedures related to foreign investors, and enhancing coordination and cooperation between different stakeholders. An Investment Facilitation Agreement (IFA) was first suggested by a group of experts in 2015 (Sauvant and Hamdani, 2015). After three years of structured discussions on investment facilitation for development (2018-2020), the formal negotiations on a multilateral agreement started in September 2020 among more than 100 members of the WTO.

Quantifying the impacts of potential IFAs is, at the outset, challenging. Despite

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the dynamic debate on investment facilitation, there is still no clear definition of the concept. In general, investment facilitation covers a wide range of areas with the focus on allowing investment to flow efficiently and for the greatest benefit. Transparency, simplicity, and predictability are among its most important principles. Moreover, investment facilitation refers to actions taken by governments designed to attract foreign investment and maximize the effectiveness and efficiency of its administration through all stages of the investment cycle. It does not, however, incorporate investment liberalization and protection, or investor-state dispute settlement. These issues remain a subject of bilateral and regional investment agreements (Berger, Gsell, and Olekseyuk, 2019).

In this paper we use an economic model of global interactions to quantify the value of a potential IFA given the outcomes of the structured discussions. The model is calibrated to GTAP 10 data characterizing trade and the social accounts. We aggregate the world into 17 regions including over 60 countries participated in the structured discussions. We consider the possible IFA scenarios based on the Investment Facilitation Index (IFI) developed by Berger, Dadkhah, and Olekseyuk (2021a); Berger and Olekseyuk (2019). The IFI helps to conceptualize the scope of investment facilitation along 6 policy areas and 117 individual measures and provides an indication of the level of current practice in investment facilitation across a large number of countries. It illustrates clearly that there is significant variation across countries and considerable gaps between the current practices of many countries as well as what might be considered *best* practice. The IFI score ranges from a low of 0.23 for Benin to a high of 1.73 for the USA (with an upper bound of 2.00).[1] It is especially true that lower and middle income countries would gain from implementing investment facilitation provisions. We use the index in this paper to inform the quantitative level of the liberalization embodied in a potential IFA. While the absolute scale of the liberalization is uncertain, we leverage the IFI to establish a sound measure of the relative shocks across countries and regions. With the shocks established we use the economic model to establish plausible ranges for IFA benefits. The primary measure of the value of an IFA to different regions is reported from the model in terms of changes in economic welfare.[2] We demonstrate the model's operation as a tool for informing the policy debate, but we also warn that the model is sensitive to a number of ad hoc assumptions. A continuation of the empirical research necessary to inform these assumptions is warranted.

To the best of our knowledge, there are no empirical studies that quantify the potential effects of the specific provisions of an IFA. Thus, our work provides re-

[1] See Table A.1 for the IFI scores of included countries.

[2] Economic welfare is measured as *equivalent variation* in private consumption of the representative regional household. Equivalent variation in this context establishes the theoretically consistent *ex ante* nominal value that the representative household places on the policy change.

sults on the economic impact of a potential IFA on the most active countries during the structured discussions including Brazil, Colombia, Argentina, China, Russia, Kazakhstan, Australia, Canada, Japan, South Korea, Mexico and EU-27. Other countries involved in the structured discussions within the WTO are aggregated into high-income (HIF) and lower income (LIF) regions. Apart from members of the structured discussions we also include the USA and India, major countries that signaled their opposition to multilateral talks on investment facilitation during the German G20 presidency in 2017.[3] At this level of geographic resolution, our country sample covers around 90% of world FDI stocks with the rest of countries aggregated into the rest of the world (ROW) aggregate region. Appendix A.1 includes a table with the modeled regions and a mapping of the component GTAP regions.

This paper proceeds as follows. In Section 2 we describe the underlying data sources and the applied model of global trade. In Section 3 we outline the specific model scenarios and the implementation of the IFI based shocks. Section 4 provides a set of results for all included countries and regions. In Section 5 we enumerate a set of critical ad hoc assumptions and Section 6 illustrates the model's sensitivity to our structural and parametric assumptions. Finally, in Section 7 we provide concluding comments and highlight follow-up research needed to increase our confidence in the quantitative measures of the value of investment facilitation.

2. Data and Model Description

2.1 Nontechnical Description of the Methodology

The Computable General Equilibrium (CGE) methodology is capable of providing valuable insights from policy reforms in different areas such as taxation, migration, trade and investment, development policy, climate change, carbon trading, food prices and pro-poor economic growth policies. It is a standard tool of empirical analysis which is broadly used in economic policy consulting since it is able to capture how the entire economy responds to the policy shock. This approach allows to incorporate the complex interactions of productivity differences at the country, sector or factor level, shifts in demand as income rises, changes in comparative advantage, trade flows, market entry and industry productivity following trade and FDI liberalization. CGE models account simultaneously for interactions among producers, households and governments in multiple product markets and across several countries and regions of the world.

To quantify the impact of potential IFA frameworks, we develop an innovative multi-region general equilibrium simulation model with four sectors (agriculture,

[3] The USA represents a major player covering around 25% of the inward and outward FDI stock worldwide.

manufacturing, services and energy) and 17 regions covering over 60 countries currently participating in the official negotiations.[4] The model extends the basic GTAPINGAMS structure presented by Lanz and Rutherford (2016) calibrated to GTAP 10 data characterizing bilateral trade and the social accounts.[5] Extensions include a consideration of FDI and imperfect competition in a multi-region setting following the model developed by Balistreri, Tarr, and Yonezawa (2015). Unlike that study, our model includes the ability to consider FDI in goods in addition to business services. For this purpose we compute bilateral shares of foreign affiliate sales for model-specific sectors and regions using the data from Fukui and Lakatos (2012) and the GTAP9 data for 2007.[6] Given the shares, we distinguish between goods and services supplied either by domestic firms or by foreign firms both operating in the host country (FDI case) and abroad (cross-border supply).

Given consistency of all other model features with the standard GTAPINGAMS formulation, we only document the extensions to the trade and FDI structures in this paper.[7] In this section we briefly describe the two model structures explored: ARM the perfect-competition Armington structure; and BRF a monopolistic competition structure of bilateral representative firms.

The agricultural (AGR) and energy (ENR) sectors are always modeled as perfectly competitive sectors with constant returns to scale (ARM). This standard modeling approach applies the Armington assumption of differentiated regional products to model foreign trade.[8] In this framework firm-level products and technologies are assumed to be identical within a region, whereas product varieties from different places of production are imperfect substitutes. Thus, agents consume domestic as well as foreign varieties of the same good which are aggregated to a composite commodity using the so-called Armington elasticity of substitution. The assumption of homogeneous firm-level goods within one region is realistic for agricultural and energy products, which are usually characterized by rather low shares of intra-industry trade (i.e., below 60%) and rather high elasticities of substitution between different varieties meaning that products are closer substitutes.

In contrast to agriculture and energy sectors, manufacturing (MAN) and services (SER) are modeled as monopolistically competitive sectors with FDI (BRF). In this model framework we differentiate all goods and services on the firm level. The first application of the bilateral representative firms structure in a multi-region

[4] See Table A.1 for aggregation details.
[5] See Aguiar et al. (2019) for documentation of GTAP 10 database.
[6] We use the older GTAP data for calculation of shares since the two datasets are more consistent in terms of time frame.
[7] The reader is referred to Lanz and Rutherford (2016) for a complete documentation of the basic model with Armington trade and no FDI.
[8] Armington (1969) was the first to propose differentiating traded goods by region of origin. His proposal is the standard formulation of contemporary quantitative trade models.

trade model is provided by Balistreri, Böhringer, and Rutherford (2018), however, the authors do not consider FDI in their model specification. Thus, this is an important model extension necessary to investigate the effects of investment facilitation.

In general, contemporary trade models with monopolistic competition usually adopt either a Krugman (1980) style homogeneous-firms structure or a Melitz (2003) style heterogeneous-firms structure. We consider a hybrid model that is computationally tractable like the relatively simple Krugman model, but includes bilateral selection of firms and rents associated with each market like the Melitz formulation. Each good or service that is modeled under monopolistic competition is assumed to be provided by a small firm selling a unique variety. We characterize supply on a given bilateral cross-border trade link or supply through bilaterally-designated FDI as provided by a bilateral representative firm (BRF). We achieve a stable equilibrium with bilateral entry (selection) by designating a portion of observed capital payments to a bilateral specific-factor earning rents.

Under investment facilitation FDI barriers are diminished and more FDI firms enter. Overall output goes up and there are additional gains through the normal variety (extensive margin) channel. Consumers obtain access to a number of new varieties unavailable before IFA implementation and producers gain from a higher number of intermediate goods and services. The entry condition of a representative firm is bilateral and therefore different from a standard Krugman formulation. In a standard Krugman formulation the fixed cost of establishing a variety (entry) would be assumed specific to a given source region and this cost would be covered by profits across all host markets. Relative to a standard Krugman model, therefore, the BRF formulation generates bilateral extensive-margin response (like the selection effect in Melitz). In addition, because there is a specific factor, changes in bilateral distortions are properly allocated to those favored firms in the markets where they operate. For a more detailed description of the BRF formulation in an application see Balistreri, Böhringer, and Rutherford (2018), and for a extended discussion of monopolistic competition in computational simulation models see Balistreri and Rutherford (2013).

2.2 A theory of Bilateral Representative Firms (BRF) and FDI

To describe the BRF model consider that supply of a good indexed by $i \in I$ (where I is the set of BRF goods included in the model) in region $r \in R$ (where R is the set of countries and aggregate regions) will include different varieties depending on the mode of supply. Denote the quantity of a given firm-level variety as q_{isrf}, where $s \in R$ is a potential source region and $f \in \{1, 3\}$ indicates the mode of supply. Under mode 1 production takes place in the source region. If the source region is the same as the destination region ($r = s$) when $f = 1$ we have domestic supply. If, however, $r \neq s$ and $f = 1$ then we have typical *cross-border*

international trade. Under mode 3 ($f = 3$ and $r \neq s$) we have FDI.[9] That is, a firm from source region s has a commercial presence in destination r where it supplies the good or service.[10]

Given the quantities of a set of symmetric varieties (q_{isrf}) the supply in region r of good i is given by the standard Dixit-Stiglitz CES aggregator:

$$A_{ir} = \left[\sum_s \sum_f N_{srf} q_{isrf}^{1-1/\sigma_i} \right]^{\sigma_i/(\sigma_i-1)}, \tag{1}$$

where σ_i is the elasticity of substitution and N_{srf} is a measure of the number of firms/varieties with source s and supplied via mode f. We generally represent the aggregation in its dual (price) form which embeds optimization. In the dual we have the minimized unit cost of good i in region r, which is given by the price index

$$P_{ir} = \left[\sum_s \sum_f N_{srf} p_{isrf}^{1-\sigma_i} \right]^{1/(1-\sigma_i)}. \tag{2}$$

Representative firm prices (p_{isrf}) are defined on a gross basis. They are gross of trade, regulatory, and tariff costs.[11]

Typical of a model of monopolistic competition we assume that the firm's fixed and variable costs are incurred in terms of a composite input. What is different here is that the cost includes a bilateral specific factor payment. Denote the price of a given representative firm's composite input c_{isrf}. This price is given by a CES cost function where the minimized production cost local to the production activity (in region s if $f = 1$; or in region r if $f = 3$) is combined with the specific-factor rental payment. This formulation allows us to control the elasticity of supply of the composite input, as shown by Balistreri, Jensen, and Tarr (2015) in their Appendix G. The unit-cost is

$$c_{isrf} = \left[\theta_{isrf} r_{isrf}^{1-\tilde{\eta}_{isrf}} + (1-\theta_{isrf}) z_{isrf}^{1-\tilde{\eta}_{isrf}} \right]^{1/(1-\tilde{\eta}_{isrf})}, \tag{3}$$

where r_{isrf} is the bilateral specific-factor rental price. We denote z_{isrf} as the standard GTAPinGAMS unit-cost function local to region s for mode 1 and local to

[9] Currently we do not include the case of $f = 3$ and $r = s$. This would only be logical in the case of an aggregated region where there is mode-3 (FDI) provision between the subaggregate countries.

[10] The model is simplified to only consider modes 1 and 3. Modes 2 and 4, which includes consumption abroad and services provided by natural persons in a foreign country, would generally be subsumed into mode 1 as represented in standard measures of imports and exports. We do not consider complex multinational supply where a foreign affiliate (FDI firm) might engage in supplying back to the source country or any other third country.

[11] We do not manipulate tariffs in this analysis, so their representation will be suppressed for exposition.

region r for mode 3 (FDI), but we maintain the full set of bilateral and mode indexes because for FDI firms there is a specialized imported (headquarters) input from the source region (as elaborated in the calibration section below).[12] The parameter θ_{isrf} is the benchmark value share of the specific factor under our convention of choosing benchmark physical units such that r_{isrf} and z_{isrf} are one at the benchmark. The substitution elasticity ($\tilde{\eta}_{isrf}$) controls the general-equilibrium supply response given an inelastic specific factor. To facilitate the exposition consider denoting x_{isrf} as the production level associate with the composite input. That is, x_{isrf} is the total composite input-supply produced under the technology embodied in equation (3), and this composite input is used by all of the firms (of type $isrf$) for their fixed and variable costs.

Firms of each type produce a unique, yet symmetric, variety priced at p_{isrf}. Applying the envelope theorem to (2) we can derive firm level demand:[13]

$$q_{isrf} = A_{ir}\left(\frac{P_{ir}}{p_{isrf}}\right)^{\sigma_i}. \tag{4}$$

Faced with this demand a firm will maximize profits by setting marginal revenue equal to marginal cost. This results in the standard markup formula:[14]

$$p_{isrf} = \frac{\tau_{isrf} c_{isrf}}{1 - 1/\sigma_i}. \tag{5}$$

We have introduced the policy instrument τ_{isrf} here as an adverse productivity cost associated with firm type $isrf$. This is a typical formulation often referred to as *iceberg* trade costs associated with cross-border (mode 1) provision. We adopt a parallel formulation of policy reform for mode 3. An IFA will reduce $\tau_{isr,'3'}$ increasing the competitiveness of FDI firms.

There is free entry, so profits are driven to zero. Under zero profits fixed cost payments will equal operating profits:

$$c_{isrf} F_{isrf} = \frac{p_{isrf} q_{isrf}}{\sigma}. \tag{6}$$

We can finalize the BRF structure by equating the real resource cost across all N_{isrf}

[12] The standard GTAPinGAMS unit-cost as a function of primary factors and intermediates is covered in Lanz and Rutherford (2016). Domestic and FDI firms located in the same market (r) have different unit costs because of the imported specialized input representing headquarter services.

[13] When taking the derivative of (2) with respect to p_{isrf} it is important to note that N_{srf} is neither an argument or a parameter in the function. N_{srf} represents the number of identical price arguments in the function, so it drops out when taking the derivative of just one of those prices.

[14] We assume that there are a large number of firms such that from the perspective of any one firm $\partial P_{ir}/\partial p_{isrf}$ is approximately zero.

firms to the supply of the composite input

$$x_{isrf} = N_{isrf}\left(F_{isrf} + \tau_{isrf} q_{isrf}\right). \tag{7}$$

2.3 Operationalizing the BRF and ARM structures

Including the BRF structure in the model used in this study takes advantage of a key simplification, apparent in the theory going back to Krugman (1980). The fact that the inputs used in fixed costs have the same price as inputs used in variable costs indicates that the real resources used by each firm is a constant (fixed firm-level output). While firms have an increasing-returns-to-scale technology they never realize any rationalization gains. It is a model of external economies. To show this notice that we can use the markup equation given by (5) and the zero profit condition given by (6) to show that the firm-level quantity (gross of policy or transport costs) is a constant:

$$\tau_{isrf} q_{isrf} = F_{isrf}(\sigma_i - 1);$$

so the only margin of adjustment in the model is in entry and exit of varieties. N_{isrf} is the only variable that moves on the right-hand side of equation (7). The insight here is that the only thing required for incorporating the implied variety impacts is a measure of the proportional changes in N_{isrf} so they can be incorporated into the price index (2), but by equation (7) we know that proportional changes in N_{isrf} must equal proportional changes in x_{isrf}. Furthermore, proportional changes in x_{isrf} are already given in a standard GTAPinGAMS formulation.

Adapting the GTAPinGAMS model (Lanz and Rutherford, 2016) to the BRF structure is thus relatively simple. Consider a typical GTAPinGAMS Armington price index as it would be modified to include all of the firm types included in our analysis:

$$P_{ir}^{\text{ARM}} = \left[\sum_s \sum_f \lambda_{isrf}\left(\tau_{isrf} c_{isrf}\right)^{1-\sigma_i}\right]^{1/(1-\sigma_i)}, \tag{8}$$

where the λ_{isrf} are typical calibration (CES weight) parameters that adjust to accommodate the benchmark accounts. Now let $\hat{x}_{isrf}$ indicate the proportional changes in x_{isrf}. The only change in the formulation is to include this variety adjustment in the price index:

$$P_{ir}^{\text{BRF}} = \left[\sum_s \sum_f \lambda_{isrf} \hat{x}_{isrf}\left(\tau_{isrf} c_{isrf}\right)^{1-\sigma_i}\right]^{1/(1-\sigma_i)}. \tag{9}$$

We do not need to incorporate the marked up price from equation (5) as it enters equation (2), because the markup is constant and it would simply show up as a compensating adjustment in the calibration of the λ_{isrf}, which are constant. Thus, the price index can instead be defined directly with the unit costs (c_{isrf}) as arguments, as we do in equation (9). Of course, $\hat{x}_{isrf}$ must be tracked as a variable

in the non-linear system as it has an external-economies effects on the price index. Increases in $\hat{x}_{isrf}$ indicate the standard extensive-margin gains associated with new varieties. Notice also that this formulation facilitates a clean structural sensitivity analysis by holding $\hat{x}_{isrf}$ at the benchmark value of one in equation (9), so the price index reverts back to equation (8).

2.4 Data Extensions and FDI-BRF Calibration

Calibrating the simulation model as outlined follows closely Lanz and Rutherford (2016), but given our extensions to include FDI some additional information is needed and a description of how it is used is warranted. For a description of the basic GTAP 10 social accounts again we refer the reader to Aguiar et al. (2019).

The GTAP base accounts do not consider FDI, and therefore need to be augmented for our purposes. As mentioned we compute bilateral shares of foreign affiliate sales for model-specific sectors and regions using the data from Fukui and Lakatos (2012). To capture features explored in the theory of multinationals we allocate a portion of bilateral cross-border (mode 1) trade directly into the cost functions of the FDI firms. The theory as outlined by Markusen, Rutherford, and Tarr (2005) includes the reliance of foreign affiliates on *headquarter* services provided by the source country. As a central assumption we assume that 40% of cross-border trade of a corresponding FDI good is supplied to the corresponding bilateral FDI firms.

The addition of the bilateral specific-factor rents and FDI also require adjustments in the in flows of income, as well as an assumption about how any changes in the rents are allocated internationally. This is a fundamental question of how FDI income is shared between value added payments in the host country and the value of the multinational firm from the perspective of the source country. Before turning to the issue of rental allocation across countries, we have to establish the rental payment. To establish the calibrated value share of the specific factor (θ_{isrf}) we simply assume that a portion of observed capital payments in the host country are specific-factor payments owned by an international mutual fund.[15] The mutual fund, in turn, is owned by each region such that income is consistent with the social accounts. In this way concentrated FDI profits on a given bilateral link are dissipated through an integrated financial market. Each region earns a common rate of return on its FDI ownership, where the rate of return is the diversified (average) return across all bilateral rents.

The final assumption needed for the calibration is the local supply elasticity. With the value share of the specific factor established, θ_{isrf} from equation (3),

[15] The portion of capital payments reallocated is the minimum of 5% of gross output (across all firms producing the FDI good in the host country) or capital's gross of tax share in gross output. This conditional ensures that the allocation is neither zero nor exceeds observed capital payments. The portion of capital payments allocated to specific-factor payments indicates the CES weights in equation (3).

Balistreri, Jensen, and Tarr (2015) show that we can calibrate $\tilde{\eta}_{isrf}$ to match the assumed supply-elasticity η using the formula

$$\tilde{\eta}_{isrf} = \eta_{isrf} \frac{\theta_{isrf}}{1 - \theta_{isrf}}.$$

For our central analysis we assume that $\eta_{isrf} = 1$, and note that the results are sensitive to this assumption.[16] In the results section we illustrate the sensitivity by showing the impact of $\eta_{isrf} = 2$. Informing the value of η is a priority for future research.

3. Investment Facilitation Scenarios

Following the detailed work on quantification of the current practice in investment facilitation as well as expected reforms due to potential IFA by Berger, Dadkhah, and Olekseyuk (2021a,b), we use the country-level improvements in the Investment Facilitation Index (IFI) induced by different frameworks of the potential IFA as an assumption for the relative reductions in ad valorem equivalents (AVEs) of non-tariff barriers (NTBs). Using this *at an assumed scale* we are able to simulate several scenarios representing different depth and country coverage of the potential multilateral investment facilitation deal. The detailed assumptions about reductions of the AVEs are illustrated in Table 1 while the mapping of scenarios to the IFI is provided in Table A.2.

1) Lower bound IFA (ifa_l): Investment facilitation measures are already to some extent included in different deep and comprehensive free trade agreements (e.g., NAFTA, ASEAN, CETA). To investigate this, (Berger, Dadkhah, and Olekseyuk, 2021b) review three recent FTAs: the Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the United States-Mexico-Canada Agreement (UMCA). In the agreements' text they identify commitments regarding investment facilitation such as, e.g., horizontal transparency provisions (dissemination of regulations affecting foreign investment), digital signature, protection of confidential information. The authors map the agreements to the IFI (see Table A.2) and provide the improvements of index scores in accordance to each agreement. The results illustrate that the highest increase in the IFI score will arise in case of a CPTPP like IFA. For our lower-bound scenario we use the percentage change in the IFI score

[16] In contrast the model is not particularly sensitive to the *ad hoc* generation of θ_{isrf} as outlined in footnote 15. This is because for a given η different value shares will imply different $\tilde{\eta}$ which generate the same local supply response. That is, higher value shares of the fixed specific factor will require a compensating higher elasticity of substitution so the supply response is the same.

Table 1. Policy shock assumptions under different IFA scenarios

Model countries and regions		Assumed reduction of AVE in percent			
		Lower bound IFA (ifa_l)	Middle range IFA (ifa_m)	Ambitious IFA (ifa_h)	Extended ambitious IFA (ifa_x)
ARG	Argentina	6.63	18.35	31.68	31.68
AUS	Australia	2.64	3.91	6.87	6.87
BRA	Brazil	6.03	16.42	20.17	20.17
CAN	Canada	2.39	5.89	8.82	8.82
CHN	China (incl. Hong Kong)	4.85	6.34	9.45	9.45
COL	Colombia	6.86	16.19	24.79	24.79
IND	India				48.64
JPN	Japan	3.10	6.54	9.30	9.30
KAZ	Kazakhstan	5.71	10.11	21.45	21.45
KOR	Korea	2.15	2.46	4.39	4.39
MEX	Mexico	3.41	6.95	11.36	11.36
RUS	Russia	10.00	30.09	36.48	36.48
USA	USA				8.77
E27	EU without UK	4.38	13.12	17.98	17.98
HIF	High income countries	5.98	11.92	17.11	17.11
LIF	Low and middle income countries	16.56	37.47	56.16	56.16

Source: Berger, Dadkhah, and Olekseyuk (2021b) and own calculations. The values for aggregate regions (CHN, E27, HIF and LIF) are calculated as a GDP weighted average according to the mapping provided in Table A.1 and using GTAP 10 data for weights.

according to the CPTPP agreement. Moreover, we assume that investment facilitation commitments covered by the regional treaty are multilateralized, so we apply them to all model-specific countries and regions that participated in structural discussions. Thus, a lower bound IFA simulation covers only a limited number of measures from the detailed IFI and suggests the lowest policy shocks ranging from a reduction of FDI barriers by 2.15% in South Korea to the highest reduction by 16.56% in low and middle income countries.

2) Middle range IFA (ifa_m): We assume that commitments under the IFA follow closely Brazil's circulated proposal for a possible WTO agreement (the "Model Agreement", see WTO, 2018a), which covers over 30% of investment facilitation measures included in the IFI (e.g., single window, focal point, transparency provisions). Again, we map the Brazil's proposal from February 2018 and provide the change in IFI score, which is used in the simulation. We apply this policy shock to all included coun-

tries except for India and USA. Table 1 shows that the lowest decline of AVE occurs again in South Korea (2.46%) while the highest reduction of FDI barriers is assumed for the low and middle income countries (37.47%). According to (Berger, Dadkhah, and Olekseyuk, 2021b), South Korea, Germany and Australia will have the least changes in their investment facilitation rules since they have already adopted most of the commitments covered by this scenario.

3) Ambitious IFA (ifa_h): Given a number of submitted proposals during the structured discussions (by Brazil, Argentina, Russia, China, Kazakhstan, MIKTA, FIFD, see WTO, 2017a,b,c,d,e, 2018a,b), we assume that commitments under the IFA include all mentioned investment facilitation measures, which strongly increases the coverage of measures included in the IFI (almost 50% of all measures) and reflects a much deeper reform potential. According to (Berger, Dadkhah, and Olekseyuk, 2021b), most of the proposals have similar commitments in terms of transparency and predictability, fees and charges as well as electronic governance. However, focal point (WTO (2017a)) and outward investment provisions WTO (2017b) provide value added to the other proposals. In terms of magnitude, due to the broad coverage of measures this scenario assumes the highest reduction of FDI barriers from 4.39% in South Korea up to 56.16% for the low and middle income countries (LIF region). In general, the low income countries will gain most from implementation of investment facilitation provisions due to the low level of current practice and, consequently, the highest improvement in their IFI scores.

4) Extended IFA including USA and India (ifa_x): In this scenario we also apply the highest reduction of FDI barriers following the ambitious scenario, but extend the country coverage to India and USA. According to Mishra (2018), India is rethinking its opposition against multilateral talks on investment facilitation, thus we include this country into the group of potential members. To illustrate the potential gains of the US as a major investor worldwide, we also extend our assumptions for reductions in investment barriers to this country. For the US the shock is quite small (8.77%) since its practice in cooperation and electronic governance is even more advanced than the expected investment facilitation commitments. Only for focal point, application process and transparency provisions Berger, Dadkhah, and Olekseyuk (2021b) find some improvements in the IFI score. For India, in contrast, the ambitious IFA scenario would lead to significant improvements across all policy areas with the highest increase by almost 70% for application process provisions. India's overall shock for the ambitious scenario equals to 48.64%, the highest reduction of FDI barriers among all separately included countries (only for the aggregate LIF region the value is higher with 56.16%).

4. Results

Conditional on the key assumptions, our model suggests significant gains from investment facilitation. Figure 1 reports the aggregated welfare[17] and GDP impact as percentage change for the four scenarios. For the world as an aggregate, welfare increases range between 0.56% under the lower bound IFA and 1.74% under the ambitious scenario.[18] If India and the US join the agreement, the potential gains would be even higher with 2.46%. Consistently, the world GDP would also rise by 0.33% in case of lower bound IFA and over 1% in the ambitious scenarios (1.01% for ifa_h and 1.41% for ifa_x).

Figure 1. Aggregated regional welfare and GDP impact (%)

Note: Table A.1 provides country coverage for *EU27, HIF and LIF*, which is identical with our model-specific regions. *G20* covers all G20 countries involved in structured discussions (ARG, AUS, BRA, CAN, CHN, JPN, KOR, MEX, RUS). *Non-G20* includes Columbia and Kazakhstan as participants of structured discussions. *Non-participants* include USA, India and the rest of the world.

In general, the results illustrate that the broader the coverage of a potential IFA agreement and the higher the applied shocks, the higher are the gains. The benefits are concentrated among the regions participating in the negotiations[19] with the highest proportional increase in welfare realized by the lower income countries (LIF) across all scenarios (0.99% for ifa_l and 2.91% for ifa_h). The other participating regions show somewhat lower welfare increases: In the middle range simula-

[17] The welfare is measured as equivalent variation which indicates the value (benefits) of the policy for people. This measure shows changes in households' utility driven by the adjustment of their consumption level after an external shock, such as a reduction in FDI barriers. According to Burfisher (2011, p. 97), it compares the cost of "pre- and post-shock levels of consumer utility, both valued at base year prices."

[18] Global welfare is measured as the sum of equivalent variation across regions relative to global benchmark private consumption. This is consistent with a *Bentham* global welfare function, in which each dollar of welfare change is weighted equally across regions. Thus, no consideration of inequality aversion is considered.

[19] Those are included in G20, Non-G20, EU27, HIF and LIF regions.

tion (ifa_m) the values range between 1.26% for high income countries (HIF) and 1.84% for G20 countries participated in the structured discussions. For the ambitious IFA scenario (ifa_h), the respective values equal to 1.75% (HIF) and 2.59% (G20). There are notable spillovers from applied investment facilitation reforms that accrue to regions not involved in structured discussions. Their average welfare gains equal to 0.23% in case of ifa_l simulation and increase up to 0.73% in ifa_h scenario. However, joining the agreement is beneficial not only for outsiders, but also for all participating regions since they are able to generate higher gains (by approximately 0.6 percentage points) with the extended number of members in the ifa_x scenario.

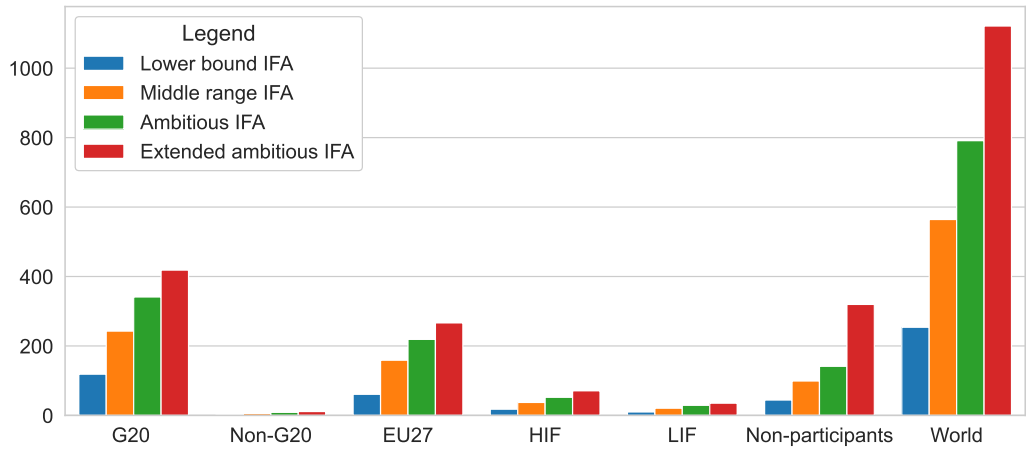
Table 2. Regional welfare impact (% equivalent variation)

Countries and regions		Lower bound IFA (ifa_l)	Middle range IFA (ifa_m)	Ambitious IFA (ifa_h)	Extended amb. IFA (ifa_x)
ARG	Argentina	0.59	1.51	2.35	2.84
AUS	Australia	0.53	1.00	1.55	1.97
BRA	Brazil	0.70	1.77	2.27	2.69
CAN	Canada	0.38	0.87	1.27	1.76
CHN	China (incl. Hong Kong)	1.51	2.66	3.85	4.78
COL	Colombia	0.74	1.70	2.53	2.96
IND	India	0.26	0.57	0.82	4.52
JPN	Japan	0.57	1.25	1.78	2.18
KAZ	Kazakhstan	0.76	1.49	2.57	3.67
KOR	Korea	0.68	1.41	2.06	2.75
MEX	Mexico	0.35	0.72	1.08	1.50
RUS	Russia	1.16	3.23	4.00	4.31
USA	USA	0.20	0.47	0.66	1.60
E27	EU without UK	0.69	1.80	2.48	3.01
HIF	High income countries	0.60	1.26	1.75	2.39
LIF	Low and middle income countries	0.99	2.07	2.91	3.53
ROW	Rest of the world	0.28	0.60	0.86	1.17

Table 2 reports the decomposition of the regional impacts for the individually modeled countries. We can see that China and Russia are the two countries gaining the most across all IFA scenarios. In particular, China's welfare gains range between 1.51% in the lower bound simulation and 3.85% in case of ambitious IFA. Russia's benefits might be even higher with 4% for the ambitious scenario since this country starts with rather poor current practice given the IFI score of 1.09. For the rest of individually included countries the gains lie between 0.35% in Mexico (ifa_l) and 2.57% in Kazakhstan (ifa_h).

Of particular interest is the fact that India has a lot to gain from investment facilitation reforms. Solely spillover gains reach 0.26% or even 0.82% under the ifa_l and ifa_h scenarios which is comparable to some participating countries like

Figure 2. Aggregated regional welfare impact ($B)



Note: Table A.1 provides country coverage for *EU27, HIF and LIF*, which is identical with our model-specific regions. *G20* covers all G20 countries involved in structured discussions (ARG, AUS, BRA, CAN, CHN, JPN, KOR, MEX, RUS). *Non-G20* includes Columbia and Kazakhstan as participants of structured discussions. *Non-participants* include USA, India and the rest of the world.

Mexico or Canada in case of ifa_m scenario. If India joins the agreement, welfare gains would rise strongly with 4.52% under the ifa_x scenario. The USA, in contrast, does not show such a dramatic increase from participation: it is only moving from a spillover gain of 0.20% or 0.66% under the ifa_l and ifa_h scenarios to a 1.60% gain under the ifa_x simulation.

The reports of the percentage welfare changes are somewhat lower for larger developed regions (like the EU). This masks the value of an IFA in terms of dollars of benefits that accrue to these higher income regions. Figure 2 reports the welfare increases in billions of dollars. We see that global welfare increases by more than $250 billion under the lower bound scenario (ifa_l) and reaches more than $1120 billion in case of the extended ambitious IFA simulation. Hereby, substantial benefits accrue to the EU and other participating G20 countries. In particular, other participating G20 countries accrue 43-46% of the total global benefits across different IFA scenarios, for the EU this share ranges between 24% (ifa_l) and 28% (ifa_m and ifa_h).

The model does report changes in Gross Domestic Product (GDP) or regional incomes. These are not our primary measures of policy impact because relative to the reported welfare measures, GDP changes can be problematic; although they are more familiar to policy makers. GDP measures can be problematic because they are dependent on the particular price convention used to bring them into real units (the numeraire in economic terms). We report GDP changes in Table 3 using

each regions unit-expenditure-function index as the nominal unit. That is we use a different nominal unit of measure for each regional report. This is a pricing convention that generally gives results that are consistent with welfare. Proportional changes in GDP, however, tend to be somewhat smaller than welfare impacts because the basis is total income (including government spending and investment), where as the basis is only private consumption. Table 3 and Figure 1 reflect this. We emphasize that the previously reported welfare impacts are not numeraire dependent and are consistent with a rigorous theory of policy evaluation. GDP changes do not report a theory consistent welfare impact.

5. Critical Ad Hoc Assumptions

Computation of innovative models exploring new research questions like the impact of an investment facilitation requires a substantial collection of data inputs. As this is a first attempt at quantification, we make ad hoc assumptions that will need to be addressed in future research. In the following we present a set of critical assumptions made for the BRF calibration. Model results are conditional on (and sensitive to) these assumptions, and as of yet they are not well informed by any data.

1) Elasticity of substitution ($\sigma = 3$): the elasticity of substitution across BRF varieties indicates the marginal value of a new variety. The lower is the

Table 3. Regional GDP impact (%)

Countries and regions		Lower bound IFA (ifa_l)	Middle range IFA (ifa_m)	Ambitious IFA (ifa_h)	Extended amb. IFA (ifa_x)
ARG	Argentina	0.38	0.97	1.50	1.82
AUS	Australia	0.29	0.55	0.85	1.08
BRA	Brazil	0.42	1.05	1.35	1.63
CAN	Canada	0.22	0.50	0.72	1.03
CHN	China (incl. Hong Kong)	0.58	1.01	1.47	1.80
COL	Colombia	0.41	0.93	1.38	1.64
IND	India	0.17	0.39	0.55	2.27
JPN	Japan	0.33	0.73	1.04	1.29
KAZ	Kazakhstan	0.41	0.80	1.39	1.96
KOR	Korea	0.35	0.72	1.04	1.38
MEX	Mexico	0.23	0.48	0.72	1.01
RUS	Russia	0.60	1.68	2.07	2.21
USA	USA	0.16	0.38	0.53	1.14
E27	EU without UK	0.38	0.99	1.37	1.68
HIF	High income countries	0.36	0.79	1.11	1.52
LIF	Low and middle income countries	0.60	1.24	1.72	2.11
ROW	Rest of the world	0.17	0.36	0.51	0.69

elasticity the more valuable is a new variety. Using the value adopted by Balistreri, Tarr, and Yonezawa (2015) for their FDI sectors we assume an elasticity of three. This is generally on the lower end of many estimates, and so the expectation is that welfare impacts might be mitigated as the estimate is refined.

2) The local supply elasticity of monopolistically competitive inputs ($\eta = 1$): the supply elasticity indicates the degree to which firms can substitute away from the bilateral specific factor. The higher the elasticity the more responsive output is, but the less revenues are allocated to the specific-factor rents. The model is sensitive to this elasticity with larger welfare gains for liberalizing regions under higher elasticities.
3) For the SER sector we assume that 40% of observed cross-border provision is a specialized input for the associated multinational. That is, for example an EU financial firm operating in Kenya will have specialized cross-border imports of financial services from the EU that are used to facilitate FDI supply. The specialized-input formulation is developed by Markusen, Rutherford, and Tarr (2005). While this parameter is necessary for an operational model, its measurement is difficult. Some limited information may be available from proprietary firm-level data.
4) Since not all measures covered by the IFI induce costs to FDI firms, we make a scalar adjustment to the IFI of 0.05 to arrive at an actionable ad valorem model shock related to the IFA. Thus, we assume that 5% of the suggested reductions in investment barriers by the IFI (illustrated in Table 1) would lead to actual cost reductions for FDI firms. This scalar adjustment, by design, preserves the relative variation in the IFI across countries, but its level is uncertain. Conservatively, we consider at least 5% of the IFI as actionable under the adoption of an IFA. After applying the 5% adjustment, the FDI weighted average ad valorem shock across those participating countries under our middle range simulation (ifa_m) is 0.5%.

We consider other studies that have looked at FDI barriers to give some context to our conservative assumption that the actionable ad valorem model shock is derived by taking a fraction, 5%, of the reported IFI. As a point of comparison, after applying the 5% adjustment, the FDI weighted average ad valorem shock across participating countries under our middle range simulation (ifa_m) is 0.5%. This is a small ad valorem shock in comparison to other quantitative studies of FDI liberalization. This gives us confidence that we are not exaggerating the economic impacts of the IFA. In the following section we include a set of sensitivity runs that adopt a less conservative assumption by applying a scalar adjustment of 10%, effectively doubling the ad valorem shocks.

Other studies that have looked at FDI barriers find much larger AVEs and often apply 25-50% of those as an actionable model shock. For example, based on infor-

mation about regulatory regimes, Jafari and Tarr (2015) develop a database on the barriers faced by foreign suppliers (discriminatory barriers) for 103 countries and 11 services sectors. They find that professional services (e.g., accounting, legal services) are among the sectors with the highest AVEs in high income countries (around 30%), but high income countries have uniformly lower estimated AVEs than transition, developing or least developed countries. For instance, least developed countries (LDCs) exhibit the highest AVE in fixed line telephone services with an average of 764% (for 13 countries in sub-Saharan Africa and South Asia the estimated AVE equals to 915%). For the rest of services sectors, the average AVEs for LDCs range between 3% for retail trade and 56% for rail transport.

There are also a number of studies estimating the FDI barriers for single countries. For instance, Balistreri, Jensen, and Tarr (2015) estimate and apply the AVEs of discriminatory and non-discriminatory (apply equally to domestic and foreign firms) FDI barriers in services for Kenya. The values for non-discriminatory barriers range between 2% for air transport and 57% for maritime transport. For discriminatory barriers the upper bound is somewhat lower with the highest AVE of 40% in maritime transport. For Belarus, Balistreri, Olekseyuk, and Tarr (2017) use non-discriminatory barriers between 5.3% in communications and 47.5% for water, rail and other transport, while discriminatory barriers for the same sectors equal to 2.3% and 42.5%, respectively. Similar studies also exist for, e.g., Armenia, Georgia, Kazakhstan, Malaysia, Tanzania and suggest a broad range for FDI barriers reaching over 90% (in Georgia and Kazakhstan) or even 100% (in Armenia).[20] Thus, assuming 25-50% of the described AVEs as an actionable model shock, our assumption seems to be quite conservative.

6. Sensitivity analysis

We proceed with a couple of exercises that illustrate the model's sensitivity to our structural and parametric assumptions. Table 4 shows the comparison of welfare results under different assumptions of the scalar adjustment to the IFI, namely 5% (our central assumption) and 10%. Since we prefer to be conservative in our central simulations, we would like to illustrate the magnitude of gains when we double the actionable ad valorem model shock related to the IFA. The results illustrate that a double scalar adjustment leads to welfare gains approximately twice as high as in our central simulations. The global welfare increases by 1.11% under the ifa_l and by 4.92% under the ifa_x scenarios (compared to 0.56% and 2.46% in the central simulations, respectively). This corresponds to $506 billion under the lower bound scenario and $2243 billion under the extended ambitious IFA.

In Table 5 we consider the percentage welfare impact of the middle range sce-

[20] See, e.g., Jafari and Tarr (2015), Jensen and Tarr (2012), Jensen, Rutherford, and Tarr (2010), Jensen and Tarr (2008).

Table 4. Sensitivity to different scalar adjustments to the IFI (% equivalent variation)

	ifa_l		ifa_m		ifa_h		ifa_x	
	5%	10%	5%	10%	5%	10%	5%	10%
ARG	0.59	1.18	1.51	2.91	2.35	4.10	2.84	5.12
AUS	0.53	1.06	1.00	2.06	1.55	3.19	1.97	4.07
BRA	0.70	1.39	1.77	3.46	2.27	4.44	2.69	5.35
CAN	0.38	0.75	0.87	1.77	1.27	2.60	1.76	3.64
CHN	1.51	3.03	2.66	5.42	3.85	7.92	4.78	9.84
COL	0.74	1.48	1.70	3.36	2.53	4.93	2.96	5.84
IND	0.26	0.52	0.57	1.20	0.82	1.74	4.52	7.34
JPN	0.57	1.15	1.25	2.55	1.78	3.65	2.18	4.52
KAZ	0.76	1.52	1.49	2.97	2.57	5.04	3.67	7.22
KOR	0.68	1.38	1.41	2.88	2.06	4.23	2.75	5.56
MEX	0.35	0.70	0.72	1.45	1.08	2.20	1.50	3.08
RUS	1.16	2.30	3.23	6.19	4.00	7.56	4.31	8.28
USA	0.20	0.41	0.47	0.97	0.66	1.41	1.60	3.31
E27	0.69	1.37	1.80	3.54	2.48	4.85	3.01	6.04
HIF	0.60	1.14	1.26	2.46	1.75	3.47	2.39	4.78
LIF	0.99	1.91	2.07	3.68	2.91	4.63	3.53	5.81
ROW	0.28	0.56	0.60	1.23	0.86	1.78	1.17	2.44

nario (ifa_m) under the central BRF monopolistic competition structure and under the full Armington treatment (under Armington the MAN and SER sectors are treated as perfectly competitive).[21] The BRF structure does indicate substantially larger gains from the IFA. Across all regions there are larger gains under the BRF structure, and even larger spillovers for those non-participating countries. On average the gains are about 40% higher under BRF monopolistic competition. Our experience is that most of the added gains can be attributed to new variety gains. These extensive-margin gains are not available under the Armington formulation.

Calculating an exact attribution of the *welfare* gains from new varieties is challenging, because in general equilibrium the relative prices of varieties are in flux.

[21] To facilitate a fair comparison of our central BRF structure with a model with all goods modeled as Armington with perfect competition we include an identical benchmark calibration with FDI in the manufacturing and services sectors. Compared to a standard GTAPinGAMS structure, we consider that the composite commodity might include additional varieties provided by multinationals from different source countries with a physical presence in the host country (foreign affiliate sales). Thus, we expand the Armington aggregation to include these FDI varieties, but in the spirit of Armington under perfect competition these firms are assumed to face a constant returns technology and there is no extensive margin expansion.

The complex computation of variety gains as suggested by Feenstra (2010), for example, applies in the context of a one sector model without intermediate inputs. We can illustrate qualitative impacts, however, by reporting the weighted average change in entry of FDI varieties. In our central middle-range scenario (ifa_m) the weighted average (across participating countries) increase in FDI manufacturing varieties is 0.3%, and the weighted average increase in FDI service varieties is 0.4%. This compares to no variety gains under the Armington treatment. New varieties in our central treatment translate direct into productivity and welfare gains by better fulfilling the needs of firms buying intermediates and consumption by households.[22]

Table 5. Sensitivity across structural and parametric assumptions for the middle range IFA scenario (% equivalent variation)

	$\eta = 1$		$\eta = 2$	
	ARM	BRF	ARM	BRF
G20	1.34	1.84	1.36	1.88
Non-G20	1.15	1.63	1.29	1.88
EU27	1.24	1.80	1.45	2.12
HIF	0.94	1.26	0.92	1.26
LIF	1.60	2.07	1.93	2.72
Non-participants	0.38	0.51	0.25	0.32
World	0.89	1.24	0.89	1.24

We emphasize that parametric sensitivity is also important. In the same Table 5 we provide one example for the middle range scenario. Doubling the local supply elasticity ($\eta = 2$) increases the gains from the IFA for participants, but mitigates the spillovers to non-participants (comparison of the BRF structure for $\eta = 1$ and $\eta = 2$). This is logically consistent. With a higher elasticity the participants can take advantage of the liberalization, but also with a higher elasticity it is easier for non-participants to be squeezed out of the market. Thus, competitive effects are exacerbated under higher elasticities.

7. Conclusion

In this paper we develop an innovative quantitative model for assessing the economic impacts of a multilateral Investment Facilitation Agreement (IFA). We utilize the newly developed Investment Facilitation Index (Berger, Dadkhah, and Olekseyuk, 2021a, IFI) to inform model shocks and run scenarios consistent with the WTO structured discussions on investment facilitation concluded in 2020. The

[22] The model includes a standard Dixit-Stiglitz aggregation which indicates a *love-of-variety* effect. Producers and consumers of goods provided by multinationals rank two of a given good below one each of different goods (conditional on fixed prices).

model includes an innovative monopolistic competition structure and is calibrated to the GTAP 10 accounts. Our objective of including FDI in manufacturing and service sectors means that the data requirements exceed those available from GTAP. In particular, we need data that establish FDI stocks and the relationships between FDI firms and their home-country (specialized) inputs. A careful collection of these data is beyond the current scope of this paper. Thus, our results rely on a set of key assumptions that will need to be addressed in future research.

Our model results generally illustrate that the deeper a potential IFA agreement and the higher the applied shocks, the higher are the gains. For the world as an aggregate, welfare gains range between 0.56% under the lower bound IFA and 1.74% under the ambitious scenario. The benefits are concentrated among the countries participated in structured discussions with the highest increase in welfare realized by the lower income countries. Given their low level of current practice in investment facilitation and the highest policy shocks among all regions, these countries will be the biggest winners of a deep and comprehensive multilateral deal. In monetary terms, the expected gains of the lower income countries range between $10 and $30 billion depending on the depth of a potential IFA. Global gains may exceed $790 billion with substantial benefits for the EU (24-28%) and other participating G20 countries (43-46%).

Interestingly, there are notable spillover gains from applied investment facilitation reforms to countries taking no action (between 0.20% and 0.82%). Joining a potential agreement is still very attractive to those countries with a low level of current practice in the field. Our extended ambitious IFA scenario with India and the USA among the members indicates significant benefits for India with a welfare gain of 4.52%. The USA, in contrast, does not show such a dramatic increase from participation with a welfare gain of 1.60%.

The presented results illustrate a potential impact of an IFA which is closer to the lower bound for several reasons. First, even our ambitious scenario is still quite limited, since it covers around a half of measures of IFI, which provides an in-depth concept of investment facilitation. If negotiated IFA goes beyond measures covered in our policy shocks, the impact would increase. Second, a broader country coverage would also increase the global welfare gains. In this analysis we focus on the list of countries engaged in the structured discussions in the beginning of the process, while there are now over 100 countries taking part in the negotiations. Third, we prefer to be conservative in our central simulations assuming a rather low ad valorem model shock. Our less conservative sensitivity runs (doubling the ad valorem shock) indicate much higher global welfare gains: 1.11% under the lower bound and 3.47% under the ambitious scenarios. This corresponds to $506 billion under the lower bound scenario and almost $1580 billion under the ambitious IFA. Overall, our empirical results and, in general, the class of models employed suggest that the potential gains from an IFA significantly exceed those available from traditional tariff liberalization.

This analysis contributes to the very scarce research on investment facilitation and has the potential to provide policy makers with important information on the effects of the multilateral agreement. Applying the demonstrated model gives useful information on what instruments and the degree of investment facilitation commitments are needed to substantially enhance economic performance. It also provides a framework for considering the impacts and incentives for those countries that have chosen not to participate in the structured discussions.

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Appendix A.

Table A.1. GTAP Regional Aggregation

Model countries and regions		Included countries		IFI score - current practice
1	EU27	1	Austria	1.50
		2	Belgium	1.38
		3	Bulgaria	1.14
		4	Croatia	1.09
		5	Cyprus	1.24
		6	Czech Republic	1.15
		7	Denmark	1.52
		8	Estonia	1.32
		9	Finland	1.39
		10	France	1.40
		11	Germany	1.66
		12	Greece	1.17
		13	Hungary	0.92
		14	Ireland	1.34
		15	Italy	1.30
		16	Latvia	0.93
		17	Lithuania	1.07
		18	Luxembourg	1.40
		19	Malta	0.79
		20	Netherlands	1.57
		21	Poland	1.34
		22	Portugal	1.23
		23	Romania	0.90
		24	Slovak Republic	1.26
		25	Slovenia	1.31
		26	Spain	1.31
		27	Sweden	1.41
Individual G20 countries participating in the structured discussions				
2	ARG	28	Argentina	1.18
3	AUS	29	Australia	1.72
4	BRA	30	Brazil	1.30
5	CAN	31	Canada	1.55
6	CHN	32	China	1.60
		33	Hong Kong SAR	1.45
7	JPN	34	Japan	1.51
8	KOR	35	Korea, Rep.	1.70
9	MEX	36	Mexico	1.48
10	RUS	37	Russian Federation	1.09
Non-G20 participants of structured discussions				
11	COL	38	Colombia	1.17
12	KAZ	39	Kazakhstan	1.27
Other aggregated non-G20 participants of structured discussions				
13	HIF (High income countries in structured discussions)[a]	40	Chile	1.34
		41	Kuwait	0.71
		42	New Zealand	1.42
		43	Panama	0.90
		44	Qatar	0.84
		45	Singapore	1.37
		46	Switzerland	1.41
		47	Uruguay	1.05
14	LIF (Lower income countries countries in structured discussions)[b]	48	Benin	0.22
		49	Guinea	0.88
		50	Togo	0.52
		51	Cambodia	1.01
		52	Costa Rica	1.46
		53	El Salvador	1.05
		54	Guatemala	0.95
		55	Honduras	0.61
		56	Kyrgyz Republic	0.74
		57	Lao PDR	0.65
		58	Malaysia	0.97
		59	Moldova	0.78
		60	Nicaragua	0.88
		61	Nigeria	0.85
		62	Pakistan	0.88
		63	Paraguay	NA
Non-participants of structured discussions				
15	USA	64	USA	1.73
16	IND	65	India	0.96
17	ROW		Rest of the world	

Notes:This aggregation is based on the list of around 70 countries participated in structured discussions. The values for the IFI score are based on Berger, Dadkhah, and Olekseyuk (2021a).

[a] Macao SAR is a non-G20 high income country that took part in the structured discussions, however, it is not included in this region as it is not separately available in the GTAP database. This country is represented in the ROW region.

[b] This region does not include the following participants of the structured discussions: Liberia, Tajikistan, Montenegro, Myanmar. These countries are not separately available in the GTAP database and constitute a part of the ROW region.

Table A.2. Mapping of scenarios to the IFI measures

	IFI Measures	IFA_l	IFA_m	IFA_h
Cooperation				
A.1	Cooperation and coordination of the activities with a view to improving and facilitating investment	Chapter 21 – Cooperation and Capacity Building	WTO SD Article 7	WTO SD Article 7
A.2	Accession to multilateral and/or regional investment promotion and facilitation conventions			WTO China
A.3	Exchange of staff and training programs at the international level (Technical Assistance)	Chapter 16 – Competition Policy		
A.8	Organization of business-government networking events			WTO China
A.9	Regular consultation and effective dialogue with investors	Chapter 16 – Competition Policy		
A.12	Public consultations between investors and other interested parties and government	Chapter 16 – Competition Policy	WTO SD Article 12	WTO SD Article 12
Electronic Governance				
B.16	Availability of online platforms or portals in administrative procedures for the submission and processing of applications online	Chapter 14 – Electronic Commerce		
B.19	Laws or regulations provide electronic signature with the equivalent legal validity with hand-written signature	Chapter 14 – Electronic Commerce	WTO SD Article 4	WTO SD Article 4
B.23	Applicable legislation published on internet	Chapter 14 – Electronic Commerce		
B.24	Regulations or administrative measures in place for the protection of personal information (Confidential Information)	Chapter 14 – Electronic Commerce		WTO Russia
B.30	Single Window and information technology		WTO SD Article 6	WTO SD Article 6
B.31	Single Window: Is it possible to request all mandatory registrations simultaneously (e.g. business registry, national and/or state/municipal tax identification number, social security, pension schemes)?		WTO SD Article 6	WTO SD Article 6
B.32	Single Window: Is it possible to pay all fees corresponding to the mandatory registrations?		WTO SD Article 9	WTO SD Article 9
B.34	Single Window: Does the site give phones or online contacts for complaints, for each mandatory registration?		WTO SD Article 6	WTO SD Article 6
Application Process				
C.35	Periodic review of documentation requirements	Chapter 25 – Regulatory Coherence		WTO Argentina and Brazil
C.38	Range of visa processing time for investors (days)			WTO MIKTA
C.39	Multiple entry visa for business visitors			WTO MIKTA
C.40	Number of documents needed to obtain a business visa			WTO MIKTA
C.43	Publication of time frames to process an application		WTO SD Article 9	WTO SD Article 9
C.44	Inform the applicant of the decision concerning an application		WTO SD Article 10	WTO SD Article 10
C.45	Availability of information concerning the status of the application		WTO SD Article 10	WTO SD Article 10
C.46	Inform the applicant that the application is incomplete		WTO SD Article 10	WTO SD Article 10
C.47	Provide the applicant with an explanation of why the application is considered incomplete		WTO SD Article 10	WTO SD Article 10
C.48	Provide the applicant with the opportunity to submit the information required to complete the application		WTO SD Article 10	WTO SD Article 10
C.49	Provide the applicant with the opportunity to to resubmit an application that was previously rejected		WTO SD Article 10	WTO SD Article 10
C.50	Adopting a silent 'yes' approach for administrative approvals			
C.51	Evaluation of fees and charges		WTO SD Article 10	WTO SD Article 10
C.52	Cost to obtain a business visa (USD)			WTO MIKTA
C.56	Fees and charges periodically reviewed to ensure they are still appropriate and relevant			WTO Argentina and Brazil
Focal Point and Review				
D.59	Independent or higher level administrative and/or judicial appeal procedures available	Chapter 26 – Transparency and Anticorruption	WTO SD Article 11	WTO SD Article 11
D.64	Establishment of a mechanism for coordination and handling of foreign investment complaints (Focal Point/Ombudsman)		WTO SD Article 6	WTO SD Article 6
D.65	Focal Point provides guidance concerning related legislation, institutions, process, and responsible agencies		WTO SD Article 6	WTO SD Article 6
D.66	Focal Point accepts and/or forwards foreign investment complaints		WTO SD Article 6	WTO SD Article 6
D.67	Focal Point responses to inquiries of governments, investors and other interested parties		WTO SD Article 6	WTO SD Article 6
D.68	Focal Point assists investors in obtaining information from government agencies relevant to their investments		WTO SD Article 6	WTO SD Article 6
D.69	Possibility to provide feedback to Focal Point			WTO Russia

Table A.2. Mapping of scenarios to the IFI measures, continued

	IFI Measures	IFA_l	IFA_m	IFA_h
D.72	Dispute prevention mechanism in place			WTO Russia
D.73	Mechanisms to improve relations or facilitate contacts between host governments and relevant stakeholders			
D.77	Focal Point assist investors by seeking to resolve investment-related difficulties, in collaboration with government agencies		WTO SD Article 6	WTO SD Article 6
D.78	Focal Point recommends to the competent authorities measures to improve the investment environment (Policy Advocacy)		WTO SD Article 6	WTO SD Article 6
Outward Investment				
F.83	Promotion Services – Foreign offices: Home country uses foreign offices (Embassies) to facilitate outward FDI (OFDI)			WTO China
F.84	Promotion Services – Foreign offices: Home country uses foreign offices (consulates and foreign offices that are staffed by investment professionals) to facilitate OFDI			WTO China
F.85	Promotion Services – Information: Home country provides information on investment opportunities abroad, investment climates and home-country measures			WTO China
F.86	Promotion Services – Missions and matchmaking: Home country provides or organizes business missions for OFDI and matchmaking for OFDI			WTO China
F.87	Insurance and guarantees: Home country provides investment insurance and guarantees			WTO China
Regulatory Transparency and Predictability				
G.91	Establishment of inquiry points		WTO SD Article 9	WTO SD Article 9
G.92	Adjustment of inquiry points' operating hours to commercial needs			
G.94	Average time between publication end entry into force	Chapter 26 – Transparency and Anticorruption		
G.95	Publication of information on procedural rules for appeal and review	Chapter 26 – Transparency and Anticorruption	WTO SD Article 13	WTO SD Article 13
G.96	Publication of information and procedures on laws, regulations and procedures affecting investment	Chapter 26 – Transparency and Anticorruption	WTO SD Article 13	WTO SD Article 13
G.97	Publication of information on investment incentives subsidies or tax breaks		WTO SD Article 13	WTO SD Article 13
G.98	Laws and regulations are available in one of the WTO official languages		WTO SD Article 9	WTO SD Article 9
G.99	Publication of judicial decision on investment matters	Chapter 16 – Competition Policy	WTO SD Article 13	WTO SD Article 13
G.102	Information published on fees and charges		WTO SD Article 13	WTO SD Article 13
G.103	Make available screening guidelines and clear definitions of criteria for assessing investment proposals		WTO SD Article 13	WTO SD Article 13
G.105	Publication of the information on competent authorities including contact details	Chapter 26 – Transparency and Anticorruption	WTO SD Article 13	WTO SD Article 13
G.106	Penalty provisions for breaches of investment procedures and regulations published			WTO Russia
G.107	Publication of time frame required to process an application associated to any specific investment decision		WTO SD Article 13	WTO SD Article 13
G.108	Time limit for for processing of applications for investment screening, admission and licensing		WTO SD Article 10	WTO SD Article 10
G.109	An adequate time period granted between the publication of new or amended fees and charges and their entry into force	Chapter 26 – Transparency and Anticorruption		
G.110	Information available on the motives of the administration's decisions	Chapter 16 – Competition Policy	WTO SD Article 13	WTO SD Article 13
G.112	Drafts of investment regulations and acts are published prior to entry into force	Chapter 26 – Transparency and Anticorruption		WTO China
G.113	Public comments taken into account	Chapter 26 – Transparency and Anticorruption	WTO SD Article 12	WTO SD Article 12
G.115	Notification to the WTO of places and (URL) of websites where relevant information concerning investment is made publicly available		WTO SD Article 8	WTO SD Article 8
G.116	Notification to the WTO of inquiry/focal/contact points		WTO SD Article 8	WTO SD Article 8

Note: Only binding measures according to the sources are included in the table, for the full list of measures covered by the index see Berger, Dadkhah, and Olekseyuk (2021a).
Sources: For IFA_l the source is the consolidated text of the CPTPP Agreement (available at https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/cptpp-ptpgp/index.aspx?lang=eng), for IFA_m it is WTO (2018a), for IFA_h we use 6 different proposals to the WTO (WTO, 2017a,b,c,d,e, 2018a,b). The FIFD proposal (WTO, 2017d) is not explicitly mentioned in the table since the measures are already covered in other proposals.