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Trade Reform in Services: Structural Change and Production Networks

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Trade Reform in Services: Structural Change and Production Networks**Prepared by Adam Jakubik and Wentao Zhou***

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ABSTRACT We study the effects of services trade reforms in a multi-country multi-sector quantitative trade model with input-output linkages. We find that (i) welfare gains from substantial services trade liberalization are large, around 3 percent on average; (ii) gains are larger by 0.7 percentage points in a hypothetical scenario where EMDEs' consumption patterns have converged to AEs, and by 5.7 percentage points when their production networks have converged; (iii) both EMDEs and AEs gain from EMDEs reducing services barriers to the level of AEs. Services-intensive AEs with strong supply linkages to EMDEs benefit the most. Our results are important to illustrate the increasing gains from services trade as EMDEs continue on their development trajectory, and therefore call for injecting further ambition into multilateral negotiations on services trade reforms.

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1 Introduction

The global economy has undergone remarkable transformation and convergence between advanced economies (AEs) and emerging market and developing economies (EMDEs) over the last decades. These trends follow the secular reduction of trade barriers and opening of capital accounts beginning in the early 1970s—deeper among AEs and shallower among EMDEs.¹

Propelled by open policy stances and technological innovation, successive waves of structural transformation have resulted in industrial development in EMDEs, often starting from industrial production of basic products and upgrading to high-quality products (Brandt and Rawski, 2008; Brandt and Thun, 2010). The subsequent stages of structural transformation from a middle-income to a high-income economy are characterized by the growing share of high-value services displacing the primacy of the industrial sector. This implies greater specialization in the production and exporting of modern financial, communications, computing, legal, technical, and business services, especially in countries more open to trade (Eichengreen and Gupta, 2013). The reallocation of factors due to technological progress and trade entails adjustment costs and losses are often concentrated in some sectors and regions. Labor market, competitiveness and compensation policies can ease adjustment, and countries’ approaches differ widely (WTO, 2024). Liberalization of services generates relatively lower adjustment costs given its larger employment share and can help ease adjustment costs due to liberalization of goods trade by attenuating factor reallocation (Konan and Maskus, 2006).

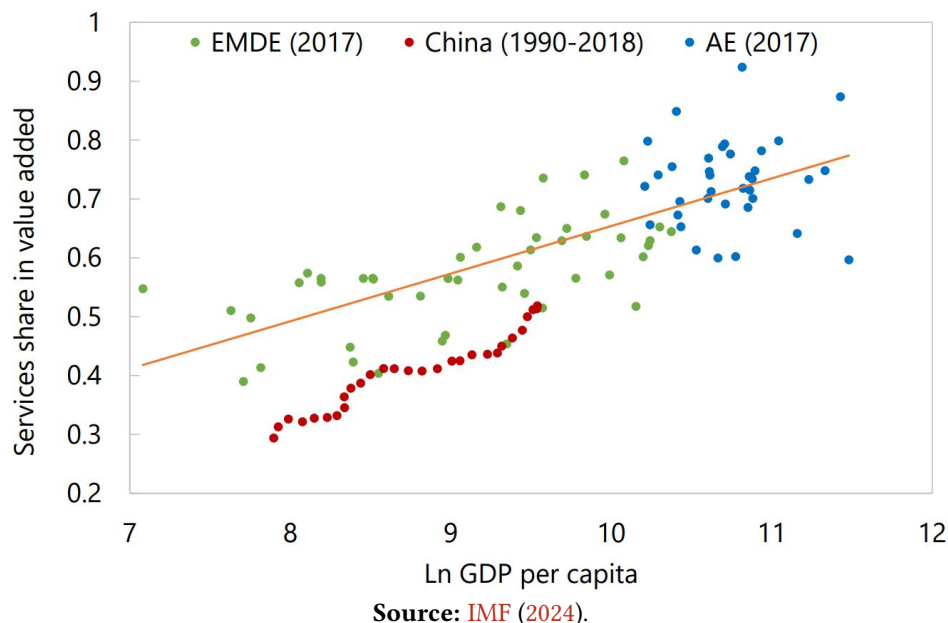
On aggregate, world expenditure on services has risen from 55% in 1970 to 75% in 2015 (Lewis et al., 2022) and digitally delivered services have been the fastest growing component of international trade, growing on average 8.1% annually over the last two decades (IMF et al., 2023; Hanappi et al., 2024).

Expansion of the services sector in EMDEs is also desirable from a macroeconomic perspective. Services inputs to production can aid in escaping the middle-income trap (Lin and Wang, 2020) and enhance the export performance and resilience of manufacturing, whether sourced domestically or imported (Bamieh et al., 2020; Liu et al., 2020). The 2024 IMF Article IV Staff Report for China shows that although services value-added in China has increased to around 50%, this is still below the AE average of about 75% (Figure 1). The IMF argues services are an under-exploited driver of growth that can boost productivity and increase employment, especially among younger people. Reforms to rebalance demand toward consumption and the opening-up

¹Such reforms were supported and encouraged by the World Bank and the International Monetary Fund (IMF)—including by persuading countries to lift their foreign exchange controls—and benefited from multiple rounds of multilateral trade negotiations under the General Agreement on Tariffs and Trade (GATT) which ultimately led to the creation of the World Trade Organization (WTO) in 1995 (Irwin, 2020, 2022)

of the service sector by lowering entry and other regulatory barriers are therefore required (IMF, 2024).

Figure 1: Service Sector Shares



Despite these potential benefits, international trade reforms in the domain of services have not kept pace. Miroudot et al. (2013) note that services trade costs have remained stubbornly high, over two to three times as large as trade costs for goods. Nearing the failure of the Doha Round in 2008, Hoekman et al. (2007) discuss key reasons why negotiations under the WTO General Agreement on Trade in Services (GATS) had been slow to make progress, including the role of technology in lowering trade costs, unilateral and regional initiatives, and resistance due to political economy forces.² Only meager progress has been made since, mostly on a plurilateral basis, including agreeing disciplines on domestic regulations affecting services and on digital trade or “e-commerce”, in the parlance of trade negotiators.³

Motivated by the above juxtaposition of the growth of the services sector domestically but high policy barriers to trade in services internationally, we study the interaction of such structural change with trade policy reforms in the services sector. Specifically we address three questions: (i) How would gains from global services trade liberalization depend on the hypothetical convergence between EMDE and AE consumption patterns? (ii) How would gains from global services

²See Marchetti and Mavroidis (2011) for a history of the GATS and Francois and Hoekman (2010) for a review of the economic literature on services trade policy.

³These commitments are yet to be fully integrated in the WTO legal framework. As of writing, most participating members have integrated domestic regulation in services commitments into their GATS schedules, and e-commerce negotiations have produced a “stabilized text”.

trade liberalization depend on the hypothetical convergence between EMDE and AE production structures? and (iii) How large would gains be in a hypothetical scenario where only EMDEs lower their services trade policy restrictiveness to match AEs?

To this end, we use a new quantitative trade model with production networks developed by [Baqae and Farhi \(2024\)](#). This multi-country multi-sector general equilibrium model with inter-country inter-sector trade linkages is well suited for studying long term structural changes because it allows for alternative production structures and expenditure shares that characterize these developments. In particular, a necessary element to study the structural transformation into a services economy, it allows for the trade in intermediate and final services. Lastly, it captures the heterogeneity between goods and services, as well as between different types of services, through their unique “fingerprint” in the I-O matrix and consumption shares. These pattern helps us clearly distinguish agricultural goods from metals, consumer electronics from vehicles, and transport services from accounting, and are crucial to understanding general equilibrium effects of changes in trader costs.⁴ Finally, changes in trade costs not only directly lower the consumer prices of imports but also generate a reallocation of trade and production across sectors and countries through substitution effects. The model allows us to decompose the welfare changes into price and reallocation effects. The model does not assess adjustment costs from labor reallocation across sectors.

We find several interesting results. Firstly, multilateral services trade liberalization can have significant potential welfare gains. We call this the baseline scenario, and compare it to three hypothetical scenarios in which AEs and EMDEs are assumed to have converged along various dimensions.

In the initial (baseline) scenario, which does not assume ex-ante convergence, the cost of trading services across borders is lowered by 50% in all countries. We chose this level of liberalization for services for comparability with historic goods trade liberalization, given the similar magnitude of tariff reductions resulting from the Uruguay Round.⁵ This scenario results in a global average real income increase of 3%, with smaller services intensive economies enjoying larger gains due to reallocation effects. Goods exporters such as Brazil, Türkiye, and Mexico experience losses from reallocation, but these are more than compensated by price effects.

⁴The [Baqae and Farhi \(2024\)](#) model can incorporate different modes of supply of services. Modes 1 (cross border supply) and 2 (consumption abroad) are treated jointly in our analysis, but could also be modeled as separate sub-sectors of each service. Mode 3 (commercial presence) can also be defined in the model through the ultimate ownership of capital, and Mode 4 (presence of natural persons) can be incorporated as an additional foreign-owned factor. In practice, however, data constraints make the reliable parameterization of such a granular model challenging.

⁵See [WTO \(2007\)](#) for a description of tariff reductions resulting from the Uruguay Round and the seven preceding rounds of GATT negotiations.

Next we turn to examine two scenarios which assume hypothetical convergence between EMDEs and AEs has taken place. In Scenario 1, EMDEs have grown their consumption share of services to AE levels and we consider the same liberalization as in the baseline. Global average real income increases by 3.7%, and gains are significantly larger for economies exporting services to large EMDEs such as China—for example, Korea, Taiwan POC, and Japan, which benefit significantly through global trade reallocation compared to the baseline. The United States also reverses its negative reallocation effects from the baseline but gain only slightly more overall. Relatively less services-intensive economies such as Mexico and Brazil experience small losses due to the negative reallocation effects offsetting positive price effects.

In Scenario 2, EMDE producers have expanded their use of services inputs to AE levels. Again, considering the same liberalization as in the baseline, we show that welfare gains are significantly larger for most economies, with global average real incomes increasing by 8.7%, which derives from the profound change in production structures. The greatest benefits accrue again to Korea, Taiwan POC, and Japan, with less services intensive economies losing out. In this scenario, EMDEs that converge in their share of services inputs naturally benefit from greater price effects, but the bulk of welfare gains are again due to reallocation effects.

Finally, we turn to the question of welfare gains under a scenario where only EMDEs liberalize their services trade. Specifically, in Scenario 3 we study the impact of EMDEs lowering their services trade restrictiveness to match AEs. These reductions differ by sector and range from 29.6% (Transport) to 66.5% (Personal services), thus the magnitude of liberalization is not very far from the baseline scenario with 50% across the board reductions. However, it only applied to EMDEs and therefore a much smaller trade volume. We find that average real income in EMDEs increases by 1.2%, driven by the growth of consumer expenditure on foreign services and domestic goods in EMDEs, and a decrease in their very high share of domestic services. In terms of intermediate input shares, production in AEs changes only minimally, but in EMDEs both goods and services producers increase their share of foreign services and domestic goods. The efficiency gains from opening to trade therefore come through substitution away from inefficient domestic services, allowing for greater use of domestic goods, which in general equilibrium are produced more efficiently due to increased foreign services inputs.

These results are important for two main reasons. First, they serve to illustrate the growing opportunity cost of a stagnating reforms agenda in the area of services trade as EMDEs continue to develop and grow their services sectors. Our findings from positive scenarios for services integration show that there is a large opportunity cost incurred by foregoing integration which is of similar magnitude to estimated welfare losses from geo-economic fragmentation.⁶

⁶In related work, two recent papers use the same [Baqaee and Farhi \(2024\)](#) modeling framework to assess the

Second, the results point to the potential for mutually beneficial broad-based services trade reforms. In light of our findings, as EMDEs continue on their development trajectory it becomes increasingly valuable to seek out new approaches to overcome long-running obstacles in negotiations.

Our paper is related to several strands of the literature. Firstly, our novel approach advances the emerging literature on estimating general equilibrium effects of services liberalization. In a recent study, [Reverdy \(2023\)](#) employs a gravity model without input-output linkages and find that partial liberalization in eight sectors yields an average welfare increase of 4.8%. Our results also contribute to the literature on structural change towards services. [Lewis et al. \(2022\)](#), for example, employ a Ricardian trade model to show that in a counterfactual world where structural transformation into services since the 1970s did not take place, welfare gains from trade integration (mostly in goods) over the same period would have been 40% greater.

The rest of the paper is organized as follows. In Section 2, we present stylized facts on differences between AEs and EMDEs that motivate our scenario analysis. In Section 3 we describe our economic model, parameterization, and solution methods. In Section 4, we present the results. Section 5 concludes.

2 Stylized Facts

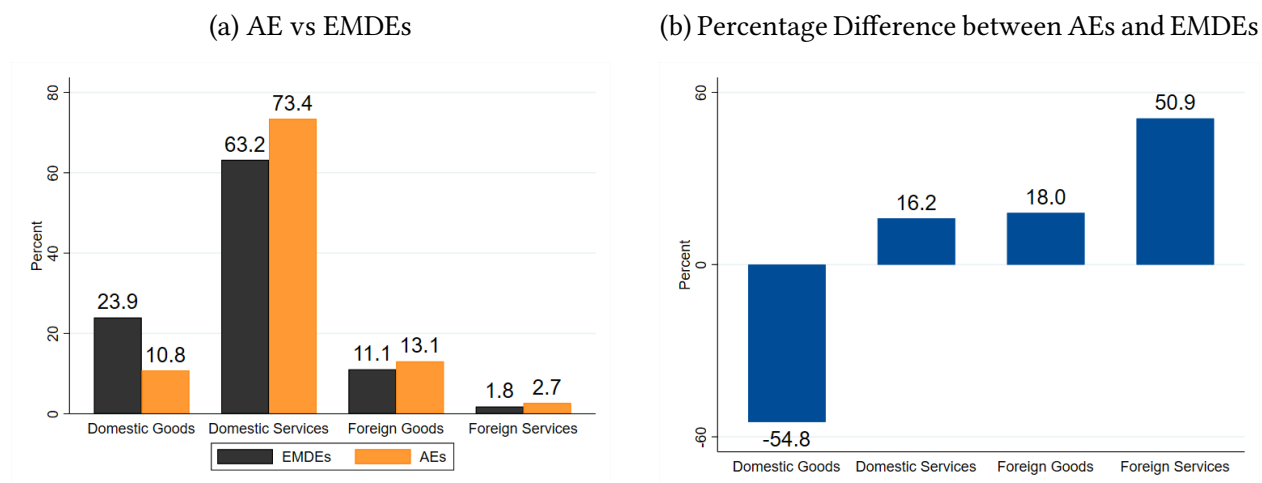
In this section, we present stylized facts on differences in expenditure shares and input shares between AEs and EMDEs that motivate our research questions and counterfactual experiments. Our definition of country groupings is detailed in Table A1. Our inter-country input-output structure is based on the World Input-Output Database (WIOD). We study 30 industries as detailed in A2 and we categorize them into two broader goods and services sectors following the structural change literature.

Figure 2(a) plots the average households' expenditure shares on goods and services across AEs and EMDEs and Figure 2(b) shows the percentage difference in average expenditure shares between AEs and EMDEs. In both income groups, services expenditure accounts for most of the households' expenditures. Households in AEs spend more on domestic services, foreign goods, and foreign services than households in EMDEs while spending less on domestic goods. In relative terms, the most striking difference lies in expenditure shares on domestic goods and foreign

direct cost of geo-economic fragmentation by splitting countries into two blocks along UN General Assembly voting patterns. [Javorcik et al. \(2024\)](#) find that friendshoring policies may lead to output losses of up to 4.6% of global GDP, and [Attinasi et al. \(2023\)](#) find welfare losses ranging from 0.7% to 15.2% depending whether decoupling is limited to strategic sectors or all sectors.

services: households in EMDEs spend 50.9% less on foreign services while spending 54.8% more on domestic goods than households in AEs. While the greater share of total services in AEs' consumption can be explained by non-homothetic preferences and higher incomes, the higher share of foreign services in particular correlates with lower services trade restrictiveness.

Figure 2: Households' Expenditure Shares



Turning to producers, Figure 3(a) plots the average expenditure shares on intermediate inputs and factors of goods producers across AEs and EMDEs and Figure 3(b) shows the percentage difference in average input shares of goods producers between AEs and EMDEs. Figure 3 shows that in both AEs and EMDEs goods producers spend more on intermediate inputs than factors. Similar to household spending, goods producers in AEs spend more on domestic services, foreign goods, and foreign services than goods producers in EMDEs while spending less on domestic goods. A key difference in input shares of goods producers between AEs and EMDEs is that goods producers spend 88.6% less on foreign services while spending 32.2% more on domestic goods than goods producers in AEs.

A similar pattern emerges also for services producers. Figure 4(a) plots the average expenditure shares on intermediate inputs and factors of services producers across AEs and EMDEs and Figure 4(b) shows the percentage difference in average input shares of services producers between AEs and EMDEs. Figure 4 shows that in both AEs and EMDEs services producers spend more on primary factors than on intermediate inputs, and spend more on various services inputs than do goods producers, which require raw materials and intermediate parts and components. Services producers in AEs spend more on domestic services, foreign goods, and foreign services than services producers in EMDEs while spending less on domestic goods. Importantly, services producers spend 92.9% less on foreign services while spending 40.6% more on domestic goods than services producers in AEs.

Figure 3: Input Shares of Goods Producers

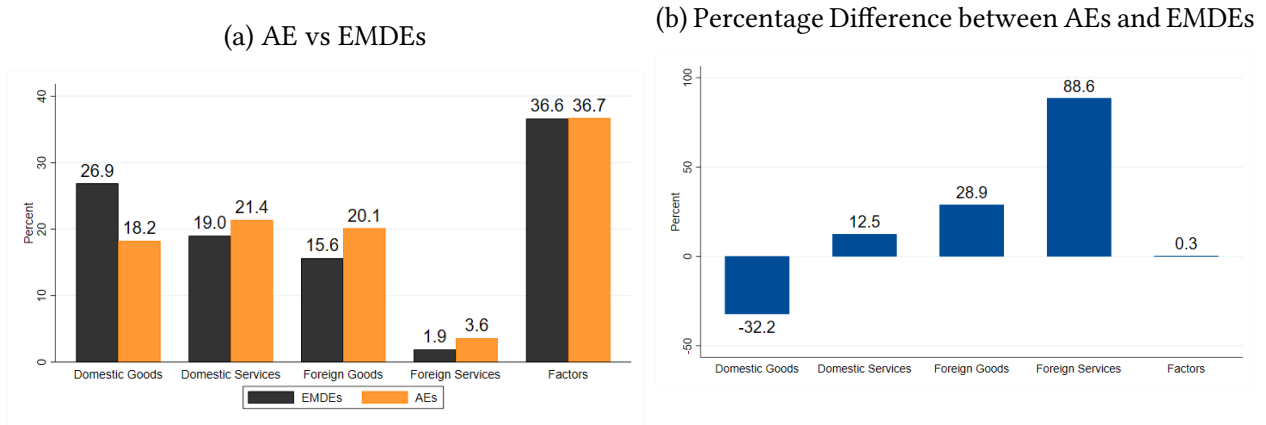
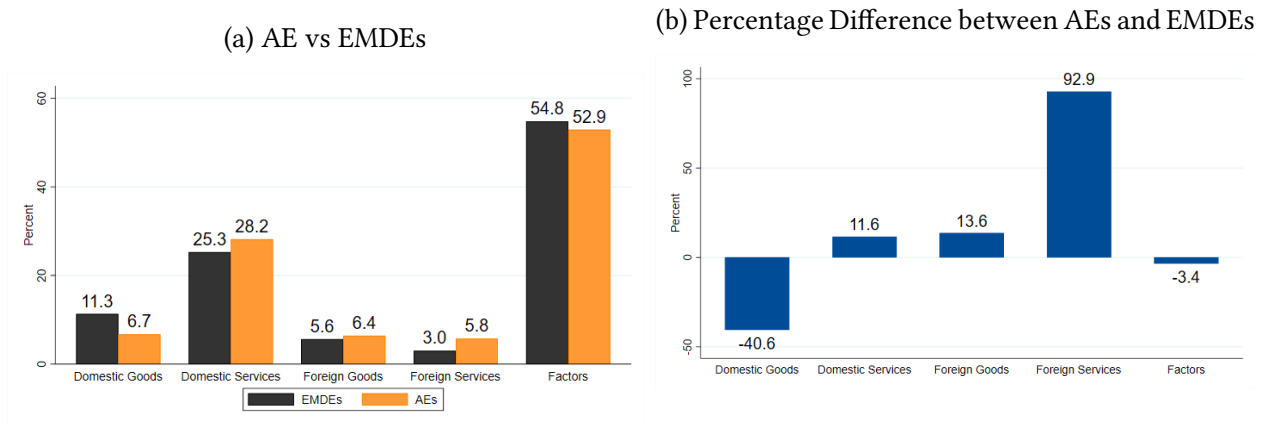


Figure 4: Input Shares of Services Producers



To summarize, based on WIOD, we find significant differences in expenditure shares of households, input shares of goods producers, and input shares of services producers between AEs and EMDEs. AE households spend 50.9% more on foreign services than EMDE households, and AE firms spend 88.6% (goods producers) and 92.9% (services producers) more on foreign services as inputs than EMDE firms. These significant differences are a hallmark of structural transformation. As EMDEs continue to develop and converge to AEs in these patterns, it raises the question about implications for potential welfare gains from services trade liberalization. In our counterfactual exercises, we study the impact of service trade liberalization under different scenarios. First when EMDEs have reached the same expenditure/input shares as AEs, and second, we also study how EMDEs' expenditure/input shares change if EMDEs experience a services trade costs reduction.

3 The Model

In this section, we present a multi-country multi-sector general equilibrium trade model with international production networks following [Baqae and Farhi \(2024\)](#) in order to study the welfare impact of trade liberalization. The embedded international production network allows the model to capture shock propagation across sectors and countries along the supply chains, which has been shown to be important in shaping the impacts of trade shocks in the literature ([Caliendo and Parro, 2015](#)).

3.1 Model Environment

There are C countries. In each country, there are N industries that produce differential goods. A representative firm in an industry combines factors and an intermediate bundle to produce a variety. A representative household in each country consumes a final consumption bundle and supply factors. All markets are perfectly competitive and factors are mobile across sectors and not mobile across countries.

Input-Output Matrices. As standard in trade literature, we assume there are iceberg trade costs that affect the consumer prices of products. We denote the producer price of variety j produced by country m as p_{jm} . In country c , the consumer price of this variety becomes:

$$p_{jm}^c = \tau_{jm}^c p_{jm} \quad (1)$$

where τ_{jm}^c is the iceberg trade cost. In input-output tables, we observe the expenditures on inputs j produced in country m as a share of total sales of variety i produced in country c , which is given by

$$\Omega_{jm}^{ic} \equiv \frac{p_{jm}^c x_{jm}^{ic}}{p_{ic} y_{ic}} \quad (2)$$

where x_{jm}^{ic} and y_{ic} denote quantities.

Households. In each country, there is a representative household that consumes a final consumption bundle $0c$ which consists of sectoral consumption bundles formed by varieties sourced from different countries. The price for sectoral consumption bundle j in country c is given by

$$p_j^{0c} = \left[\sum_{m \in C} \frac{\Omega_{jm}^{0c}}{\sum_{v \in C} \Omega_{jv}^{0c}} (p_{jm}^c)^{1-\theta_i} \right]^{\frac{1}{1-\theta_i}} \quad (3)$$

where θ_i denotes industry-specific elasticity substitution across country varieties, and p_{jm}^c denotes

the price paid by household in country c for variety j produced in country m . The weight of each country variety jm is normalized with the share of sectoral consumption bundle j in the final consumption good $\sum_{v \in C} \Omega_{jv}^{0c}$.

The aggregate price index for the final consumption good in country c , P^{0c} , can be written as

$$P^{0c} = \left[\sum_{j \in N} \left(\sum_{m \in C} \Omega_{jm}^{0c} \right) (P_j^{0c})^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (4)$$

where σ is the elasticity of substitution across industry bundles in the final consumption.

Besides consumption, the representative household also supplies primary factors to producers in each country and therefore their budget constraint is given by:

$$P^{0c} C^{0c} = \sum_{f \in F} W_f L_f \quad (5)$$

where W_f and L_f is the price and quantity of factor f , and $P^{0c} C^{0c}$ is the aggregate expenditure in country c .

Producers. A representative producer in an industry combines a value-added bundle and an intermediate input bundle to produce an industry variety. Producers choose inputs to minimize costs and set prices equal to the marginal costs. The marginal cost of variety i produced by country c is therefore:

$$p_{ic} = \left(\alpha_{ic} P_{F_{ic}}^{1-\phi} + (1 - \alpha_{ic}) P_{M_{ic}}^{1-\phi} \right)^{\frac{1}{1-\phi}} \quad (6)$$

where ϕ denotes the elasticity of substitution between the value-added bundle and the intermediate input bundle. α_{ic} is the total expenditures on factor inputs as a share of total sales of a country variety ic . $P_{F_{ic}}$ denotes the price of the value-added bundle used by producer i in country c , which is given by

$$P_F^{ic} = \left[\sum_{f \in F_c} \left(\frac{\Omega_{fc}^{ic}}{\sum_{d \in F_c} \Omega_{dc}^{ic}} \right) W_{fc}^{1-\gamma} \right]^{\frac{1}{1-\gamma}} \quad (7)$$

where γ denotes the elasticity of substitution across primary factors, and W_{fc} denotes the price paid by household in country c for factor f . The weight of each factor f is normalized with the share of total expenditures on factor inputs in total sales of a country variety $\alpha_{ic} = \sum_{d \in F_c} \Omega_{dc}^{ic}$.

P_M^{ic} denotes the price index for the intermediate input bundle used by producer i in country c ,

which aggregates over different industry bundles:

$$P_M^{ic} = \left[\sum_{j \in N} \frac{\sum_{m \in C} \Omega_{jm}^{ic}}{1 - \alpha_{ic}} (P_j^{ic})^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} \quad (8)$$

where ε is the elasticity of substitution across intermediate inputs. The weight of each sector is normalized with the total share of intermediate inputs in the sales of a country variety $1 - \alpha_{ic}$. Finally, the price of the industry bundle j used by producer i in country c aggregates over varieties of j sourced from different countries:

$$P_j^{ic} = \left[\sum_{m \in C} \frac{\Omega_{jm}^{ic}}{\sum_{v \in C} \Omega_{jv}^{ic}} (p_{jm}^c)^{1-\theta_i} \right]^{\frac{1}{1-\theta_i}} \quad (9)$$

where θ_i denotes industry-specific elasticity substitution, and p_{jm}^c denotes the price paid by producer i in country c for variety j produced in country m . The weight of each country variety jm is normalized with the share of industry bundle j in the total expenditures on intermediate inputs $\sum_{v \in C} \Omega_{jv}^{ic}$.

Equilibrium. In the equilibrium, given the factor endowments, production functions, consumption preferences, and iceberg trade costs, the prices of the factor and product adjust, and factors are allocated to different sectors such that the markets for all goods and factors clear.

3.2 The Effects of Trade Shocks on Real Income

In our general equilibrium setting, changes in iceberg trade costs will not only directly lower the consumer prices of imports but also generate a reallocation of trade and production across sectors and countries through substitution effects. This reallocation effects of trade shocks lead to factor income changes across sectors and countries. Following [Baqae and Farhi \(2024\)](#), we can decompose the welfare effects of changes in iceberg costs into a direct technology effect of the shocks, holding fixed the allocation of resources, and a pure reallocation component. To a first-order approximation, the changes in real income for each country in response to changes in trade costs can be characterized as follows:

$$d \log W_c = \underbrace{- \sum_{i \in N} \lambda_i^{W_c} d \log \tau_i}_{\text{Price Effects}} + \underbrace{\sum_{f \in F} (\Lambda_f^c - \Lambda_f^{W_c}) d \log \Lambda_f}_{\text{Reallocation Effects}} \quad (10)$$

where $d \log \tau_i$ denotes changes in trade costs for a variety i , and $d \log \Lambda_f$ denotes the changes in factor prices. The first term captures the direct effect of trade shocks on consumer prices: $\lambda_i^{W_c}$ captures how country c 's consumption basket is exposed to variety i . A reduction in trade cost $d \log \tau_i$ will directly lower the price of the consumption basket by $\lambda_i^{W_c} d \log \tau_i$, holding fixed factor prices. This will lead to a direct increase in the real income of a country. The second term captures the general equilibrium effects of trade shocks on factor income: Λ_f^c is the share of the country c 's income from factor f , and $\Lambda_f^{W_c}$ is the share of the country c 's consumption costs that depend on factor f . $(\Lambda_f^c - \Lambda_f^{W_c})$ therefore captures country c 's net exposure to factor prices. The reallocation effects of trade shocks therefore depend on how trade shocks affect factor prices across countries and countries' net exposures to the factor prices. Throughout our quantitative analysis, we report the effects of trade reforms on real income and the two components: the price effects and the reallocation effects.

3.3 Solution Methods and Calibration

Instead of solving for two different equilibrium with different levels of trade costs, we only solve for equilibrium prices and factor allocations in response to changes in trade costs, as standard in the trade literature (see [Costinot and Rodríguez-Clare, 2014](#)). Following [Baqaee and Farhi \(2024\)](#), we log-linearize the model and solve for perturbations to the equilibrium induced by an iceberg trade cost change.

We assume production and consumption have a nested-CES structure. As shown in Table 1, we calibrate the elasticity of substitution in our model to standard values in the literature. We calibrate initial expenditure shares and input-output structures to match the WIOD. Our model contains 40 countries plus the Rest of the World and 30 industries, as shown in Table A1 and A2.

Table 1: **Parameters: Elasticities of Substitution**

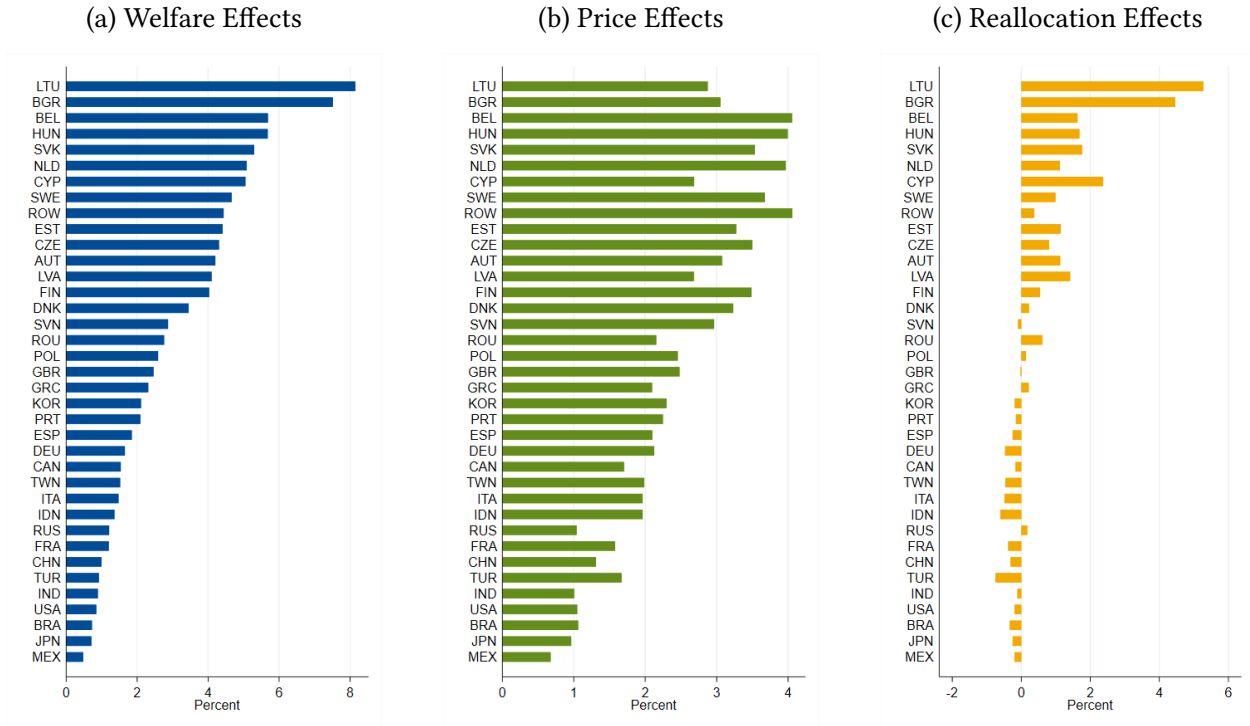
Parameter	Description	Value	Source/Targets
ϕ	ES between factors and intermediate	0.20	Atalay (2017)
γ	ES across factors	1.0	Atalay (2017)
ϵ	ES across intermediate inputs	0.5	Atalay (2017)
θ_i	ES across country varieties within industry	see Table A2	Caliendo and Parro (2015)
σ	ES of household consumption across industry	0.9	Atalay (2017)

4 Quantitative Results

4.1 Welfare Impact of Trade Reform in Services

In this section, we study the effects of a hypothetical 50% reduction in services trade costs across all countries. This reduction is of comparable magnitude to tariff reductions agreed during the Uruguay Round of trade negotiations.⁷ Figure 5 plots the welfare gains from service trade reform by country. As shown in Figure 5, we find large welfare gains across countries, and average real income across countries increases by 3%. Decomposing the welfare effects into price effects and reallocation effects, we find that all countries benefit from lower consumer prices due to lower trade costs in services and the average real income across countries increases by 2.5% through the price effects. These price effects are especially strong among countries relying on foreign services as final consumption and intermediate inputs.

Figure 5: Impacts of Services Trade Reform by Country: Benchmark Case



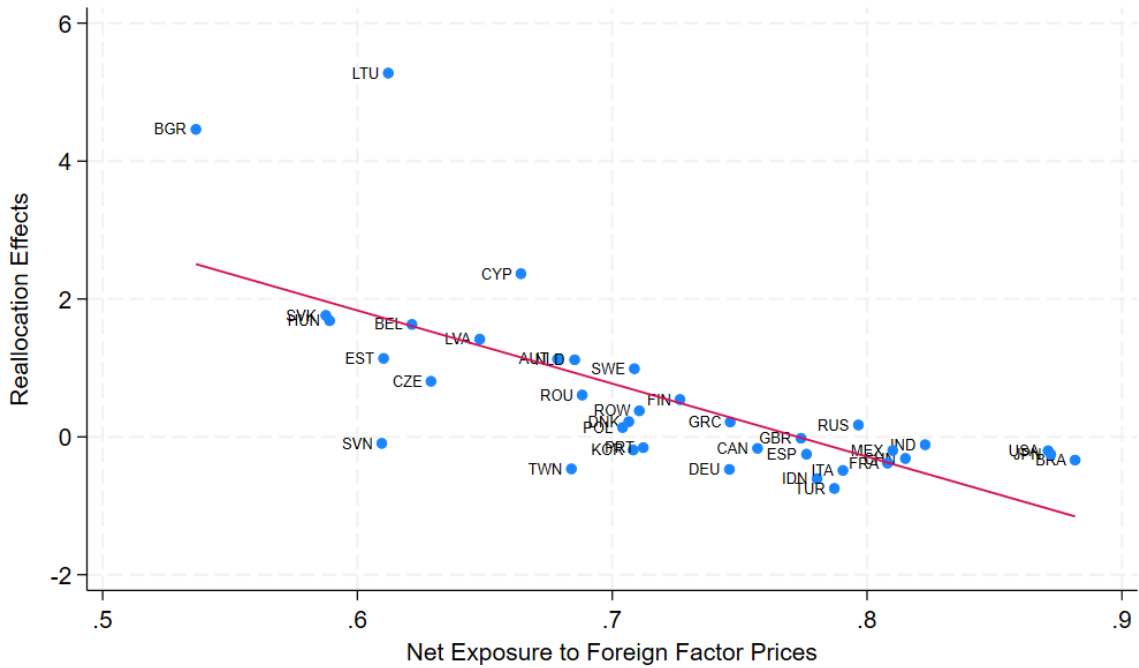
Notes: This figure plots the estimated welfare effects of a 50% reduction in services trade costs across countries using our calibrated model. We decompose the welfare effects into the price effects and reallocation effects, which are defined in Section 3.2.

⁷See [WTO \(2007\)](#) for a brief history of the GATT rounds of trade negotiations and multilateral tariff reductions. Import-weighted tariff reductions in the Uruguay Round amounted to around 38% in AEs. Meanwhile, the prevalence of non-tariff measures, which cover both goods and services, declined by around 21% in AEs ([Estefania-Flores et al., 2022](#)).

The changes in relative prices between services and goods also generate a significant reallocation of trade and production across countries which leads to changes in factor prices across countries. The reduction in trade costs acts as positive productivity shocks to each country, leading to higher factor prices on average across countries. Therefore, countries who have large exposure to foreign factor prices might lose welfare due to the increased foreign factor prices. Figure 6 presents the negative relationship between countries' net exposure to foreign factor prices and the reallocation effects across countries.

Small services-intensive economies enjoy large income gains through the reallocation effects. Goods exporters such as Brazil, Türkiye, and Mexico experience negative but small income losses from the shift from goods to services while these losses in factor income are compensated by lower consumer prices, leading to overall welfare gains.

Figure 6: Net Exposure to Foreign Factor Incomes and Reallocation Effects



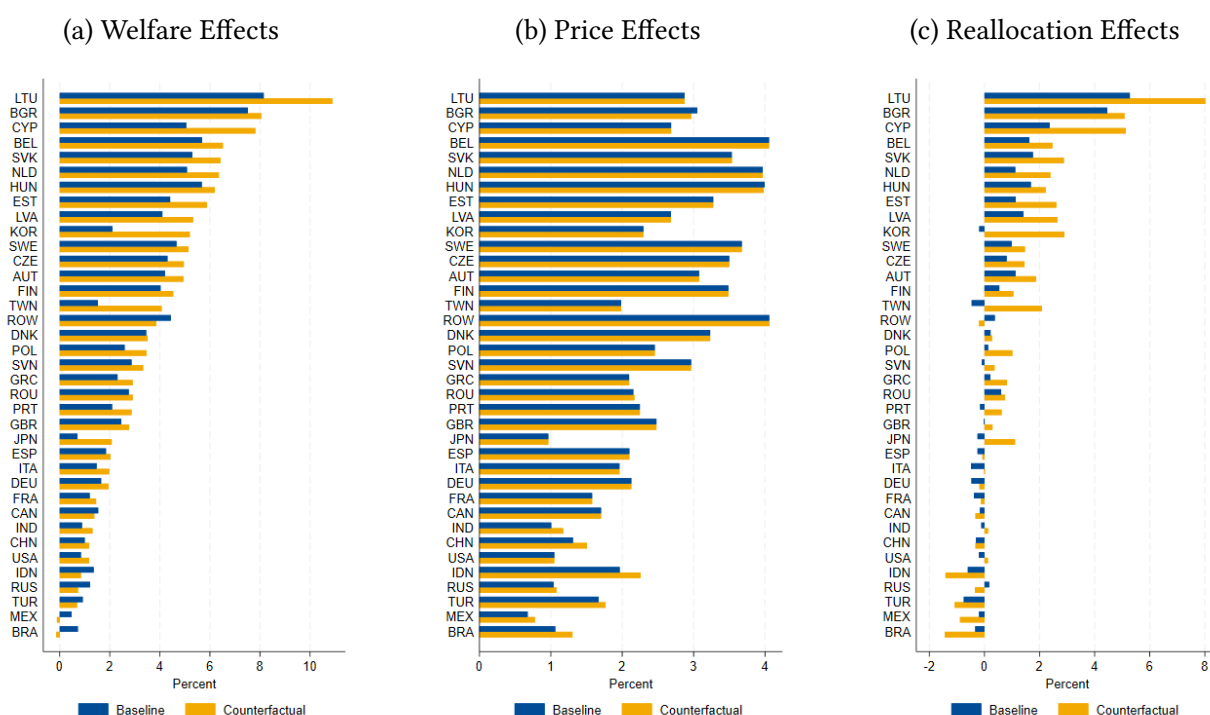
4.2 Households' Expenditure Shares Convergence

In this section, we study the impact of the same 50% liberalization scenario as in the previous (baseline) section but under a different set of assumptions about the initial conditions. Specifically, we assume that expenditure shares of households in EMDEs have converged to AE levels. In this scenario, we find that when trade in services is liberalized, the average real income across

countries increases by 3.7%, or 0.7 percentage points more than under the baseline assumptions. As EMDE households spend more on foreign services than in the baseline, they benefit more from the lower consumer prices generated by trade cost reduction in services. However, this increase in price effects among EMDEs is quite small, as shown in Figure 7 (b). Importantly, we find that the larger demand for foreign services among EMDEs significantly amplifies the reallocation of trade and production across countries as shown in Figure 7 (c). In this case, average real income across countries increase by 1.2% through the reallocation effects, significantly larger than that in the baseline case, which contributes to the extra income gains from trade reform relative to our benchmark case.

The income gains through reallocation effects are significantly larger for economies exporting services to large EMDEs such as China—for example, Korea, Taiwan POC, and Japan, when EMDEs spend more on foreign services than in the baseline. The United States also reverses its negative reallocation effects from the baseline but gains only slightly more overall. The stronger reallocation also leads less services-intensive economies such as Mexico and Brazil to experience minor income losses due to the negative reallocation effects offsetting the positive price effects.

Figure 7: Impacts of Services Trade Reform by Country: Household Convergence



Notes: This figure plots the estimated welfare effects of a 50% reduction in services trade costs across countries using our calibrated model. The baseline case uses expenditure shares of households as in WIOD. The counterfactual case adjusts households' expenditure shares in EMDEs to the AEs levels. We decompose the welfare effects into the price effects and reallocation effects, which are defined in Section 3.2.

4.3 Producers' Input Shares Convergence

In this section, we again study the same 50% liberalization scenario as in the first (baseline) section but under a different set of assumptions about the initial conditions. Specifically, we assume that producers' input shares of services in EMDEs have converged to AE levels. In this scenario, we find that when trade in services is liberalized, the average real income across countries increases by 8.7%, which is 5.7 percentage points more than under the baseline assumptions. These significantly higher in welfare gains mirror the profound changes in production structures in this experiment. As producers in EMDEs use more foreign services as inputs, service trade liberalization generates a much stronger reduction in marginal costs of goods and services produced in EMDEs. This stronger reduction in producer prices lowers consumer prices of households across countries. As shown in Figure 8, all countries experience larger price effects in this scenario than in the baseline. The average real income across countries increases by 3.2% through the price effects. Reallocation effects are also significantly stronger in this case than in the baseline. The average real income across countries increases by 5.5% through the reallocation effects. The greatest income gains accrue again to Korea, Taiwan POC, and Japan, with manufacturing-intensive economies, such as Brazil, Türkiye and Mexico losing out.

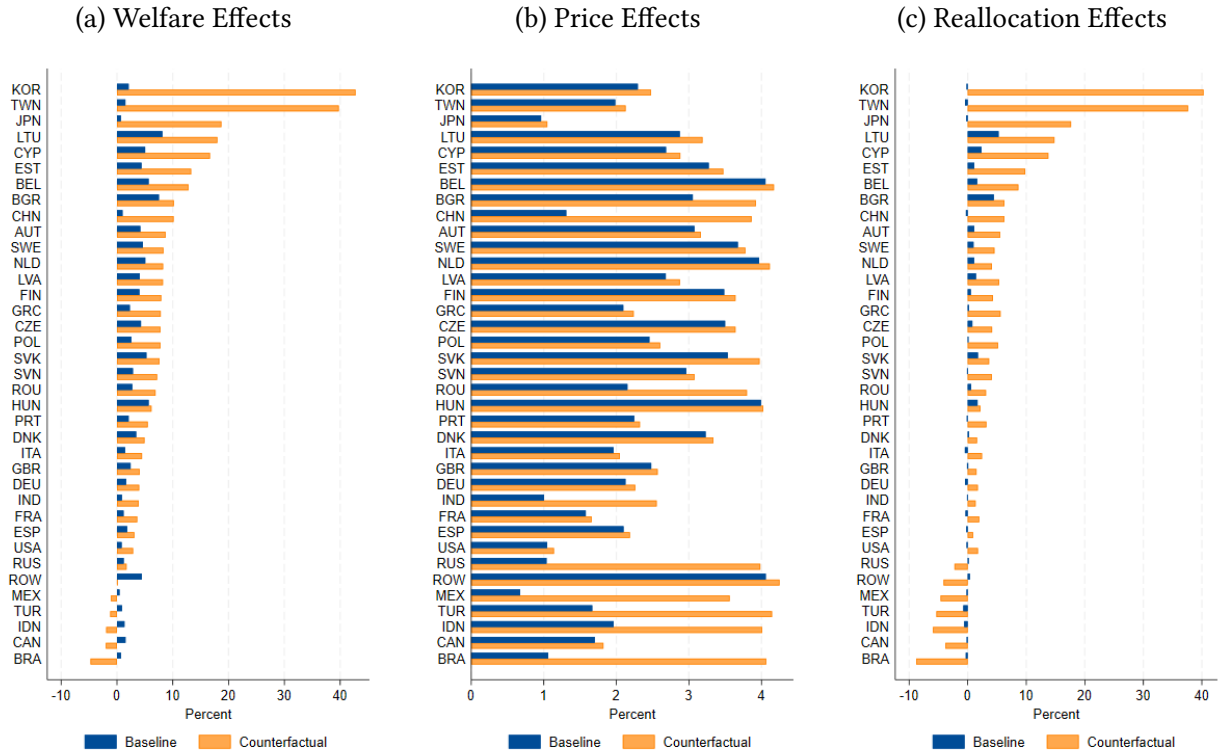
4.4 Policy Convergence: Services Trade Reforms in EMDEs

In this section we study a scenario with reductions in trade costs facing services implemented only by EMDEs. These reductions are calibrated to match the average difference between EMDEs and AEs in the ad-valorem tariff equivalent of the OECD services trade restrictiveness index (STRI) for each sector. These reductions are similar in magnitude to the reduction studied in the previous sections but vary by sector, ranging from 29.6% (Transport) to 66.5% (Personal services).

As a first step, we use a structural gravity model with both international and domestic trade flows to estimate the ad-valorem tariff equivalents (AVEs) of services trade restrictiveness indices (STRIs) sourced from OECD. In Table B1 the estimated elasticities of trade to STRIs are given by the coefficients on the interaction term between STRI and an indicator for international flows. This methodology allows us to identify the impact of STRI even though it is not a bilateral variable and would otherwise be subsumed in the country-sector fixed effects. We then calculate AVEs according to the formula $\widehat{AVE}_{ijst} = \exp\left(-\frac{STRI_{jst}\hat{\sigma}_s}{\hat{\sigma}_s-1}\right) - 1$, where $\hat{\sigma}_s$ is the elasticity of substitution between varieties, taken from Egger et al. (2021). We then calculate the percentage difference between EMDEs and AEs of the average AVE by sector.⁸

⁸We create a concordance between the WIOD sectors in the model and the EBOPS 2010 sectors used to estimate the ad-valorem equivalents by choosing the most similar sector where no exact match is available. See Appendix B.

Figure 8: Impacts of Services Trade Reform by Country: Producer Convergence



Notes: This figure plots the estimated welfare effects of a 50% reduction in services trade costs across countries using our calibrated model. The baseline case uses expenditure shares of households as in WIOD. The counterfactual case adjusts producers' expenditure shares in EMDEs to the AEs levels. We decompose the welfare effects into the price effects and reallocation effects, which are defined in Section 3.2.

We find that average real income across EMDEs increases by 1.2% in this case. All countries benefit from the reduced trade costs facing services in EMDEs, as shown in Figure 9. Welfare gains accrue to EMDEs through greater relative price effects compared to AEs. But the reallocation effects are highly heterogeneous and reflect existing trade links among the liberalizing economies, with Eastern Europe gaining the most, and some medium sized EMDEs and Taiwan POC losing. Overall the biggest beneficiaries of policy convergence (without household and firm expenditure convergence), would be Eastern European EMs, followed by China, Brazil and Türkiye (Figure 9).

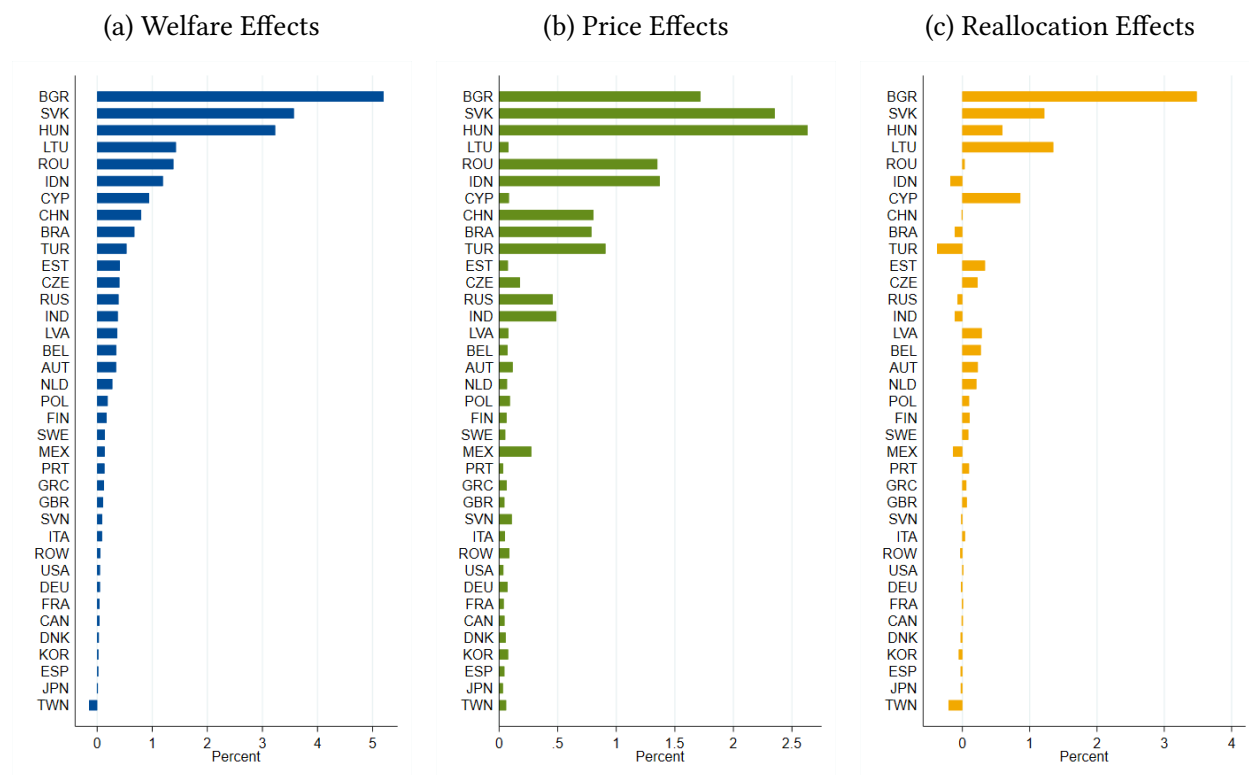
It is noteworthy that, while expenditure on imported final and intermediate services rises, so does expenditure on domestic goods, as a result of combined wealth and substitution effects due to lower services input costs.⁹

These results highlight that although partial liberalization can be beneficial, in particular where existing barriers are high, multilateral efforts to reduce trade costs in both AEs and EMDEs

⁹See Appendix C, Figures 10–12.

are needed to achieve broadly distributed welfare gains.

Figure 9: Impacts of Services Trade Reform by Country: Policy Convergence



Notes: This figure plots the estimated welfare effects of a calibrated reduction in services trade costs across EMDEs using our calibrated model. We calibrate the changes in trade costs to match the average difference between EMDEs and AEs of the ad-valorem tariff equivalent of the OECD services trade restrictiveness index (STRI) of each industry. We decompose the welfare effects into the price effects and reallocation effects, which are defined in Section 3.2.

5 Conclusion

In this paper we show, using scenario analysis, how services trade reforms can have substantial welfare implications through prices and the reconfiguration of global production networks. These gains become significantly larger when household expenditures and firms' production networks in EMDEs and AEs have converged.

This is important because services account for the largest share of global economic activity—increasing in the level of economic development—and a growing share of global trade. Nevertheless, services trade faces tighter restrictions than goods trade. We show that the opportunity cost of a stalled reform agenda only increases as EMDEs continue along their development path.

We believe that while the estimated welfare gains already provide a compelling reason to liberalize trade in services, they are likely to be underestimated for several reasons. Firstly, long-run gains from trade are generally larger in dynamic models with endogenous capital accumulation, including that of human capital, which is of particular importance for services (Baldwin, 1992). Secondly, as countries become wealthier, the share of services in consumption rises, and in future work, we plan to extend the model to take into account non-homothetic preference as a potential amplifier of welfare gains.

Finally, future research could fruitfully explore the causal impact of openness in services on the pace of structural transformation in a dynamic setting, as well as the impact of long-run demographic trends, given how population aging has been linked to increased services consumption (Cravino et al., 2022).

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A Countries and Industries

Table A1: Country Groups

Emerging Markets and Developing Economies										
BGR	BRA	CHN	HUN	IDN	IND	MEX	POL	ROU	RUS	ROW
TUR										
Advanced Economies										
AUS	AUT	BEL	CAN	CYP	CZE	DEU	DNK	ESP	EST	FIN
FRA	GBR	GRC	IRL	ITA	JPN	KOR	LTU	LUX	LVA	MLT
NLD	PRT	USA	SVK	SVN	SWE	TWN				

Table A2: List of Industries

	WIOD Sector	Aggregated sector	Trade Elasticity
1	Agriculture, Hunting, Forestry and Fishing	1	8.11
2	Mining and Quarrying	2	15.72
3	Food, Beverages and Tobacco	3	2.55
4	Textiles and Textile Products	4	5.56
5	Leather, Leather and Footwear	4	5.56
6	Wood and Products of Wood and Cork	5	10.83
7	Pulp, Paper, Paper , Printing and Publishing	6	9.07
8	Coke, Refined Petroleum and Nuclear Fuel	7	51.08
9	Chemicals and Chemical Products	8	4.75
10	Rubber and Plastics	8	4.75
11	Other Non-Metallic Mineral	9	2.76
12	Basic Metals and Fabricated Metal	10	7.99
13	Machinery, Enc	11	1.52
14	Electrical and Optical Equipment	12	10.6
15	Transport Equipment	13	0.37
16	Manufacturing, Enc; Recycling	14	5
17	Electricity, Gas and Water Supply	15	5
18	Construction	16	5
19	Sale, Maintenance and Repair of Motor Vehicles...	17	5
20	Wholesale Trade and Commission Trade, ...	17	5
21	Retail Trade, Except of Motor Vehicles and...	18	5
22	Hotels and Restaurants	19	5
23	Inland Transport	20	5
24	Water Transport	21	5
25	Air Transport	22	5
26	Other Supporting and Auxiliary Transport....	23	5
27	Post and Telecommunications	24	5
28	Financial Intermediation	25	5
29	Real Estate Activities	26	5
30	Renting of M&Req and Other Business Activities	27	5
31	Public Admin/Defence; Compulsory Social Security	28	5
32	Education	29	5
33	Health and Social Work	30	5
34	Other Community, Social and Personal Services	30	5
35	Private Households with Employed Persons	30	5

B Trade cost reductions by sector

Table B1: Structural Gravity Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Transport	Construction	Insurance	Finance	Telecom-Comp	Business	Trade-Logistics	Personal
$Intl_{ij}$	-2.686*** (0.669)	-5.087*** (0.600)	-2.992*** (0.657)	-1.499* (0.629)	-1.899*** (0.419)	-2.698*** (0.304)	-6.090*** (0.583)	-6.922*** (0.563)
Importer $STRI_{jst} \times Intl_{ij}$	-4.890* (2.034)	-14.694*** (3.375)	-9.874*** (1.344)	-9.496*** (2.592)	-10.432*** (2.348)	-5.270*** (1.133)	-9.488*** (2.267)	-8.948* (3.865)
$\text{Log}(\text{Distance})_{ij}$	-0.454*** (0.085)	-0.138 (0.122)	-0.595*** (0.144)	-0.693*** (0.133)	-0.531*** (0.096)	-0.449*** (0.126)	-0.264 (0.173)	-0.276 (0.200)
Contiguous_{ij}	0.326* (0.134)	0.340 (0.179)	-0.469 (0.365)	-0.743** (0.230)	-0.281* (0.121)	-0.095 (0.151)	0.294 (0.189)	0.235 (0.287)
$\text{Common Language}_{ij}$	0.293* (0.137)	0.605** (0.212)	0.942** (0.294)	0.889*** (0.253)	0.754*** (0.141)	0.547*** (0.165)	0.772*** (0.166)	0.934** (0.356)
$\text{Time Difference}_{ij}$	-0.000 (0.019)	-0.132*** (0.029)	0.007 (0.033)	0.017 (0.025)	-0.038 (0.021)	-0.012 (0.018)	-0.188*** (0.047)	-0.014 (0.057)
Colony_{ij}	0.251** (0.092)	0.533* (0.236)	-0.122 (0.351)	-0.025 (0.320)	-0.128 (0.088)	0.035 (0.185)	-0.105 (0.417)	1.640*** (0.256)
$\text{Common Legal System}_{ij}$	0.090 (0.099)	-0.003 (0.114)	0.307 (0.166)	0.150** (0.057)	0.089 (0.099)	0.305*** (0.065)	0.133 (0.114)	0.344* (0.144)
$\text{Services RTA}_{ijt}$	-0.025 (0.141)	0.351* (0.166)	-0.564 (0.323)	-0.366 (0.272)	-0.419* (0.166)	-0.129 (0.153)	0.352 (0.253)	-0.018 (0.321)
Intra-EEA_{ijt}	0.589** (0.202)	1.317** (0.493)	0.762 (0.393)	0.025 (0.490)	0.947* (0.390)	0.171 (0.144)	-0.721 (0.529)	-1.269 (1.327)
Constant	14.803*** (0.527)	13.155*** (0.817)	16.042*** (0.950)	16.527*** (0.966)	15.892*** (0.659)	15.890*** (0.828)	15.312*** (1.255)	13.630*** (1.271)
Observations	13,254	9,444	10,386	11,264	12,955	13,277	9,341	3,896
Pseudo R-squared	0.987	0.998	0.997	0.986	0.995	0.992	0.999	1.000
Exporter-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Importer-Year FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors are in parenthesis, clustered at three levels: exporter, importer, and year.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B2: Trade cost reductions in EMDEs by services sector

WIOD Sector	ITPD-E Sector	Percentage decrease (EMDE to AE)
Electricity, Gas and Water Supply	none	none
Construction	158	33.5
Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel & Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	169	49.9
Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	169	49.9
Hotels and Restaurants	170	66.6
Inland Transport	156	29.6
Water Transport	156	29.6
Air Transport	156	29.6
Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	169	49.9
Post and Telecommunications	162	48.2
Financial Intermediation	160	51.0
Real Estate Activities	160	51.0
Renting of Machinery and Equipment and Other Business Activities	163	33.2
Public Admin and Defence; Compulsory Social Security	170	66.6
Education	170	66.6
Health and Social Work & Other Community, Social and Personal Services & Private Households with Employed Persons	170	66.6

C Expenditure shares with policy convergence

Figure 10: Households' Expenditure Shares before and after EMDEs Reforms

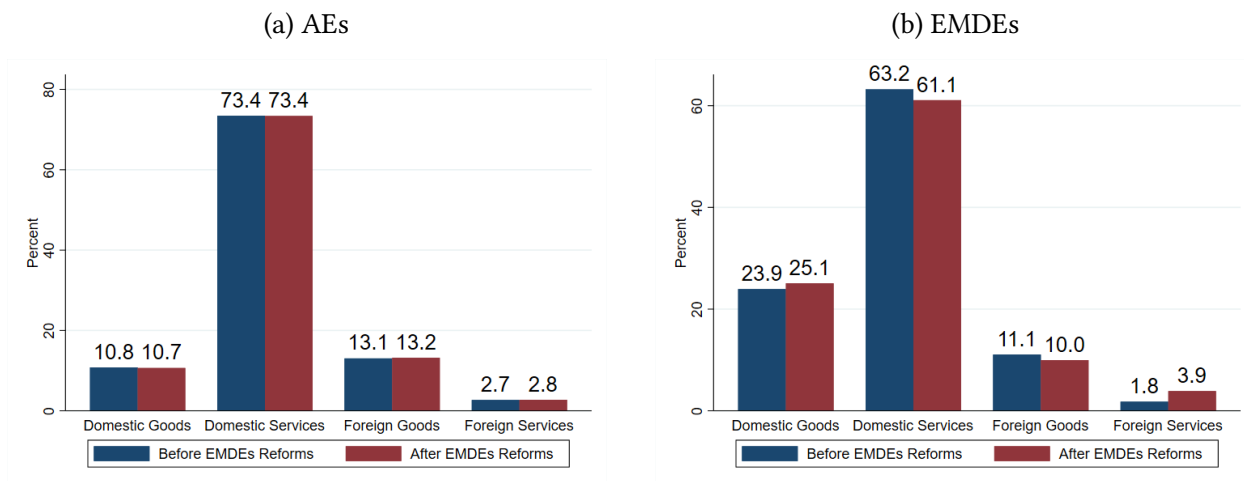


Figure 11: Producers' Input Shares in AEs before and after EMDEs Reforms

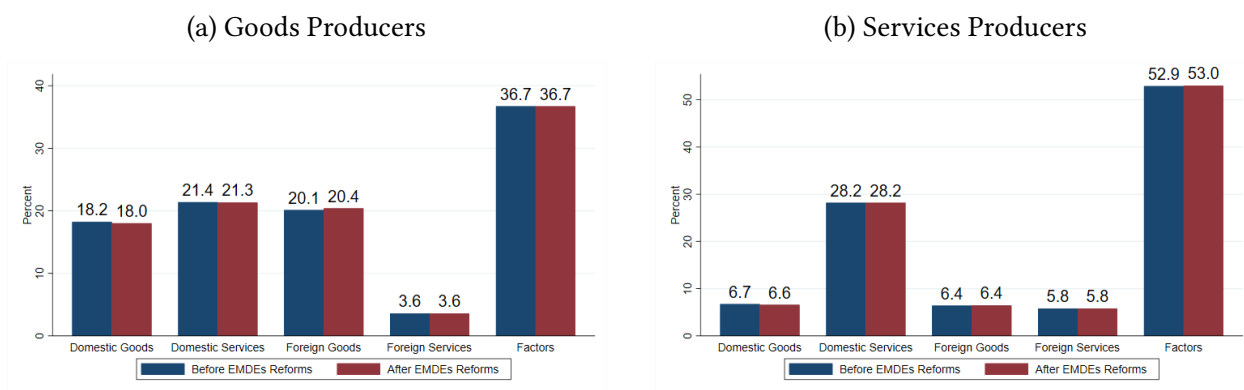


Figure 12: Producers' Input Shares in EMDEs before and after EMDEs Reforms

