Assessing the potential of trade policy reform for closing gender wage gaps

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Abstract

On average, female workers receive a lower wage than male workers. In this chapter, we analyse the potential contribution of trade policy reform to a reduction in this gender wage gap. We first establish four stylized facts: (i) tariffs are on average higher in more female labour-intensive sectors; (ii) trade costs are on average larger in female labour-intensive services than in goods; (iii) services trade restrictiveness is higher in more female labour-intensive services; (iv) trade costs associated with the need for face-to-face interaction are larger in female labour-intensive sectors.

Based on these stylized facts, we conduct counterfactual trade policy experiments with four key findings. First, equalizing tariffs to eliminate the bias against female labour will not help to reduce the wage gap according to the simulations. Second, more sophisticated tariff liberalization would reduce the female wage gap, but the contribution would be marginal. Third, reducing services trade restrictiveness can deliver a modest contribution to closing the female wage gap. Fourth, accelerating the digitalization of the economy to reduce trade costs related to the need for face-to-face interaction, is projected to reduce the male wage premium substantially (by almost 1 per cent).

Introduction

Achieving gender equality and empowering all women and girls is the United Nations Sustainable Development Goal 5 as part of its 2030 agenda (United Nations, 2015). Yet, countries globally at all levels of development are far away from reaching this goal, let alone by 2030. The World Economic Forum (2022) estimates that at current rates it will take 132 years to completely close gender gaps, up from 99.5 years in 2019 due to the harmful effects of the pandemic. This shows that countries need to significantly improve their efforts to address gender equality in order to make meaningful progress in the foreseeable future. One area that has received little attention in this regard, despite accounting for more than 50 per cent of global GDP, is international trade.

International trade has long been linked to inequality. Factor endowment theories such as the Heckscher–Ohlin model predict that a country's relatively scarce factors incur welfare losses from trade liberalization. Since then, an extensive empirical literature has examined the impact of trade liberalization on inequality.[1] However, most of this literature approaches inequality from a skill perspective, focusing on the diverging effects on high versus low-skilled workers or on occupations with different skill intensities.

In contrast, the literature on trade and gender is relatively small. Recent work has exploited firm-level data to show that exporting firms have larger gender wage gaps (Boler *et al.*, 2018; Janse van Rensburg *et al.*, 2020). Other work has found that in the context of North American

Free Trade Agreement (NAFTA), trade agreements seem to have benefited gender equality in Mexico but harmed it in the United States (Hakobyan and McLaren, 2018; Juhn *et al*., 2014; Saure and Zoabi, 2014). Earlier work has examined how increased competition from imports leads to a narrowing of the gender wage differences in concentrated (i.e. non-competitive) industries relative to industries that were competitive before trade liberalization (Black and Brainerd, 2004).

There is no work to our knowledge assessing the potential contribution of trade policy reform to tackling gender inequality in the labour market.[2] This is surprising as various recent studies have demonstrated that sectors with higher female employment intensities face larger tariffs on their inputs and output.[3] We address this gap in the literature by simulating the effects of trade policy reform scenarios in two ways.

First, we analyse to what extent tariff reform can contribute to closing the gender wage gap. Intuitively, removing the differential treatment in market access should facilitate women's opportunities in the labour market. This is similar in spirit to work by Shapiro (2021) who shows that addressing the pro-pollution bias in tariff policy can lower CO_2 emissions. However, as we show in this chapter, the situation with gender equality is not that simple due to the presence of countervailing factors.

Second, we evaluate the potential of services trade liberalization to limit the gender wage gap. When analysing trade liberalization with a gender lens, it is important to put special emphasis on services trade. Globally, services account for 59 per cent of female employment as of 2019.[4] At the same time trade in services faces high trade costs in the form of regulations and other non-tariff barriers. Benz and Jaax (2022) measure *ad valorem* equivalents of barriers in services trade using the Organisation for Economic Co-operation and Development (OECD) Services Trade Restrictiveness Index (STRI) and find that these costs are around "57% for communication services and 54% for business services, around 60% for transport services, around 103% for insurance services, and around 255% for financial services" – demonstrating the high potential for cost reduction in these sectors.

To conduct the analysis, we use the WTO Global Trade Model, a recursive dynamic computable general equilibrium (CGE) model, expanded with labour supply differentiated by gender based on the World Bank's Gender Disaggregated Labor Database (GDLD).[5] The analysis reveals that tariff policy reform can deliver only a very marginal contribution to closing the female wage gap. Equalizing tariffs between sectors to correct for the tariff bias against women would not make any contribution. The reason is that although it would raise export opportunities of female labour-intensive sectors and reduce its intermediate input costs, it would also raise import competition in those sectors. A more sophisticated tariff reform considering the impact of the export opportunities channel, intermediate input channel and import competition channel would reduce the male wage premium, but only marginally, by about 0.001 per cent.

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Evidence suggests that tariff reform in merchandise trade does not deliver a meaningful contribution to closing the gender gap in the model. There also exist non-tariff barriers in merchandise trade that may contribute to this gap, we refrain from exploring them for the scope of this analysis. Instead, we analyse the contribution of removal of barriers in services trade. Three stylized facts inspire the work. First, inferred trade costs are larger for services than for goods. Second, services trade restrictiveness is larger in sectors which are more female labour intensive. Both these facts suggest that services trade liberalization can help to reduce the female wage gap. Third, international trade is limited by the need for face-to-face interaction in many economic transactions, especially in services. Digitalization can reduce this need for physical face-to-face interaction, as seen during the COVID-19 pandemic, making it possible to deliver more goods and services digitally. Our analysis shows that the higher trade costs in services are to a large extent explained by the higher trade costs in face-to-face intensive sectors. At the same time, sectors with a larger face-to-face task intensity are more female labour intensive, for example, the sector called "osg" which includes public administration, defense, education and other such services have one of the highest female and face-to-face intensities. Digitalization could reduce face-to-face interaction requisite for these sectors and hence, improve trade prospects. This implies that there is potential for digitalization to contribute to a reduction in the female wage gap in such face-to-face intensive sectors.

Our results suggest that a reduction in services trade restrictiveness can deliver a modest contribution to the reduction in the female wage gap of around 0.03 per cent. A reduction in trade costs associated with the need for face-to-face interaction could deliver an even more significant contribution to the reduction in the female wage gap. Our projections indicate that the male wage premium could fall by almost 0.4 per cent.

The analysis has three policy implications. First, despite the gender bias in tariffs, tariff reform appears to have little potential to reduce the female wage gap. Second, services trade liberalization can help to make a more meaningful contribution to the reduction in the female wage gap. Third, policies supporting the digitalization of the economy can make a significant contribution to closing the female wage gap.

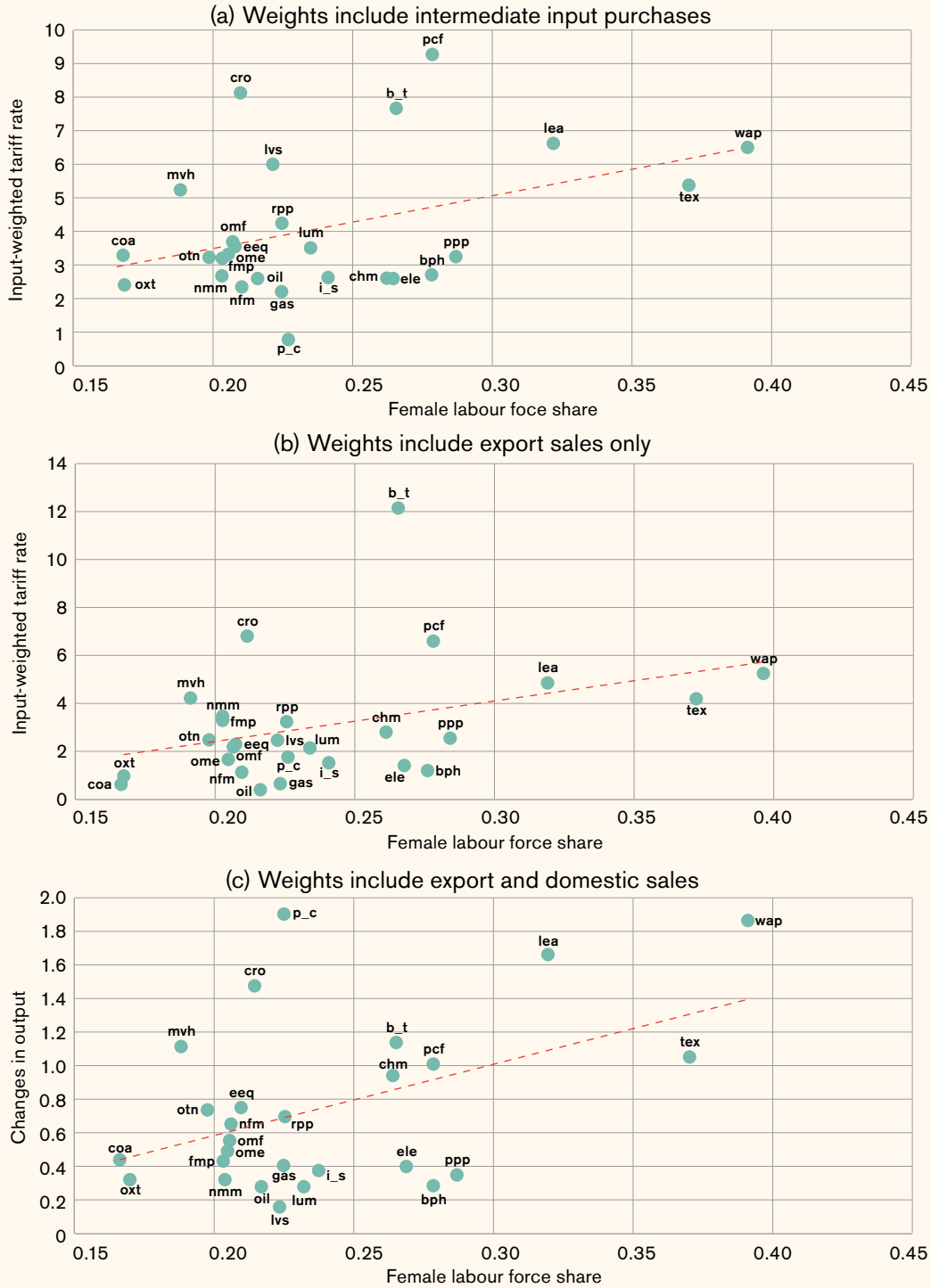
The gender bias in manufacturing tariffs

Stylized facts

Before conducting counterfactual analyses, we explore the relation between the female labour intensity of sectors and their tariff rates in two ways. First, we examine the relation between the average tariffs on intermediate inputs used by a sector and its female labour intensity. Second, we study the relation between the average tariffs faced by an exporting sector and the female labour intensity of the sector. For both relations we combine tariff data and production data from the multiregional input–output tables in the Center for Global Trade Analysis (GTAP) Data Base with data on female labour intensity (in number of workers) from the GDLD.

Starting with the first relation, Figure 1(a) shows a positive relationship between the average tariffs on intermediate inputs and female labour shares. Sectors that have a high female labour share such as wearing apparel (wap) and textiles (tex) face a higher input tariff than sectors with lower female shares such as petroleum and coal products (pc) and minerals (oxt). This finding is in line with the analysis in World Bank Group and WTO (2020).

Figure 1: Relationship between tariff and female labour share



Source: WTO Secretariat calculations based on GTAP multiregional input–output tables and World Bank Household Surveys for the most recent available years.

Note: See Table 1 for sector descriptions. Weighted input tariffs are calculated as a weighted average of sectoral tariffs with the weights being the import volume shares. Final averages across all regions for each sector are unweighted. An additional change is that the domestic sales do not include domestic sale and purchase of fossil fuel sectors

Table 1: Sectoral aggregation

Sector	Sector description
b_t	Beverages and tobacco products
bph	Manufacture of pharmaceuticals, medicinal chemical and botanical products
chm	Manufacture of chemicals and chemical products
coa	Coal
cro	Crops
eeq	Electrical equipment
ele	Manufacture of electrical equipment
fmp	Manufacture of fabricated metal products, except machinery and equipment
gas	Gas
i_s	Iron and steel: basic production and casting
lea	Manufacture of leather and related products
lum	Lumber: manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
lvs	Livestock
mvh	Manufacture of motor vehicles, trailers and semi-trailers
nfm	Non-ferrous metals: production and casting of copper, aluminium, zinc, lead, gold and silver
nmm	Manufacture of other non-metallic mineral products
oi	Oil
ome	Manufacture of machinery and equipment n.e.c.
omf	Other manufacturing: includes furniture
otn	Manufacture of other transport equipment
oxt	Other mining extraction (formerly omn): mining of metal ores; other mining and quarrying
p_c	Petroleum and coke: manufacture of coke and refined petroleum products
pcf	Processed food
ppp	Paper and paper products: includes printing and reproduction of recorded media
rpp	Manufacture of rubber and plastics products
ser	Services
tex	Manufacture of textiles
wap	Manufacture of wearing apparel

A similar picture arises for the second relation. Figure 1(b) and (c) show that tariffs faced are higher in exporting sectors which are more female labour-intensive. Figure 1(b) shows the relationship with only export sales included and Figure 1(c) includes also domestic sales when calculating the average tariffs faced with tariffs on domestic sales set at zero. Considering only export sales (b), textile (tex), wearing apparel (wap) and leather (lea) all face high tariffs and have a high female labour intensity. With both export and domestic sales included (c), the distribution of tariffs faced by exporters changes slightly: tariffs for female labour-intensive sectors such as wearing apparel, textile and leather are now clearly higher than average tariffs.

These results help establish empirically a gender bias that may exist in tariff impositions. However, these correlations do not imply automatically that equalizing tariffs across sectors will reduce the gender wage gap. This depends on how such changes would work out in the economy characterized by complex interlinkages between countries, sectors and production factors. Therefore, we employ a general equilibrium model to evaluate if removal of the bias would lead to a reduction in gender disparity.

Simulating the effect of tariff liberalization on gender wage gaps

Discussion of simulation design

Given the gender bias in tariffs established in the previous section, we design tariff reforms that aim to reduce tariffs in female labour-intensive sectors for all 26 regions considered. We use the WTO Global Trade Model (GTM)[6] and extend it with a gender disaggregated labour supply, to analyse the impacts of trade reforms on output and gender inequality in the labour market. For this section, we restrict our focus to the merchandise sectors facing tariffs and hence, aggregate all services sectors into one. We also change the other sector aggregations to ensure each sector accounts for at least 1 per cent of total trade volumes. As a result, our final database comprises 28 sectors and 26 regions (see Table 2).

Table 2: Regional aggregation

Region	Region description
ANZ	Australia and New Zealand
ASL	Asian least-developed country
BRA	Brazil
CAN	Canada
CHN	China
E27	European Union 27
EFT	European Free Trade Association
GBR	United Kingdom
HNT	Hong Kong, China and Chinese Taipei
IDN	Indonesia
IND	India
JPN	Japan
KOR	Republic of Korea
LAC	Latin America
MEX	Mexico
MIN	Middle East and North Africa
OAS	Other Asian countries
ROW	Rest of the world
RUS	Russian Federation
SAU	Saudi Arabia, Kingdom of
SEA	Southeast Asia
SSL	Sub-Saharan African least-developed country
SSO	Sub-Saharan Africa other
TUR	Türkiye
USA	United States
ZAF	South Africa

We conduct four different experiments. First, we look at a scenario where we equalize tariffs across all sectors. This serves as our counterfactual. Given the positive relation between tariff rates and female labour intensity identified in the previous section, such a change would reduce tariffs in female labour-intensive sectors while raising them in male labour-intensive sectors and is hence expected to raise female wages relative to male wages. However, the outcome of this experiment presents unexpected results, as it leads to a widening of the gender wage gap.

Upon further analysis of the counterfactual scenario's results, we identify three key transmission channels for the effects of tariff liberalization upon output in female labour-intensive sectors: an export opportunities channel; a cost of intermediate inputs channel; and an import competition channel. The three channels operate in different directions and can lead to a reduction in output in female labour-intensive sectors in regions where the import competition channel dominates the export opportunities channel.

Bearing in mind these effects, we then attempt to design three more experiments that employ more sophisticated shocks than a simple equalization of tariffs. Scenario 1 includes only a shock to increase export opportunities in female labour-intensive sectors. Scenario 2 adds the reduction of intermediate input costs to the previous scenario and finally Scenario 3 brings all three channels together.

In all three scenarios the change in the *ad valorem* tariff rate in region j in sector s, Δt_{js}, is proportional to its initial tariff rate, t_{js}, with the factor of proportion a function of a coefficient varying by sector, $coef_{js}$:

$$\Delta t_{js} = -coef_{js} * t_{js}$$

This coefficient varies for each scenario, capturing the different effects described above.

In the first scenario, the coefficient determining the size of the tariff reduction is designed to generate more export opportunities in exporting sectors with a high female labour share. Hence, the coefficient governing the tariff reduction in importing region j in region s is determined by the share of imports from exporting region i and the female labour intensity in exporter i in sector s.

$$coef_{js} = \sum_{i} imp.share_{ijs} * f_{is}$$

In the second scenario, the intermediate input cost channel is added such that tariffs are reduced not only to promote export opportunities in female labour-intensive sectors but also to reduce the costs of intermediate inputs used in female labour-intensive sectors. A reduced cost of intermediate inputs is expected to raise production and thus demand for labour-force inputs because of the complementarity in production between intermediate inputs and factor inputs such as labour and capital.

We combine the two channels as follows with the coefficient:

$$coef_{js} = \left[\left(\sum_{i} imp.share_{ijs} * f_{is} \right) * \left(\sum_{j} \sum_{t} int.input\ imp.share_{ijst} * f_{jt} \right) \right]^{\frac{1}{2}}$$

In the third scenario, the import competition channel is added. The analysis of the results of the tariff equalization experiment will show that in many regions output is not promoted in the female labour-intensive sectors, because of fiercer import competition. Therefore, we add a third element to the coefficient to prevent that output will fall in female labour-intensive sectors where import competition is fiercer.

Combining the three channels leads to the following expression for the coefficient, $coef_{js}$

$$coef_{js} = \left[\frac{(\Sigma_i \, imp.share_{ijs} * f_{is}) * (\Sigma_j \Sigma_t \, int.input \, imp.share_{ijst} * f_{jt})}{imp.share_{js}} \right]^{\frac{1}{3}}$$

Using the above-described shocks in the recursive dynamic GTM with a gender disaggregated labour supply, we simulate the impact of such sophisticated reforms on output and female wage shares. We maintain revenue neutrality by keeping the ratio of total tariff revenue to income neutral. Additionally, our model contains an upward sloping labour supply with a supply elasticity of 0.5, which is in line with the empirical literature on labour supply elasticities. We fix the substitution elasticity between male and female labour at 1.6. In the next section, we discuss the impact on output and the gender wage gap emerging from simulating these scenarios.

The negligible impact of tariff reform on the gender wage gap

To analyse the impact on the gender wage gap, we look at the per cent change in the wage premium (WP) of male relative to female workers, such that a negative value of WP implies that female wages increase relative to male wages. To measure the effects on trade, we look at variations in imports and exports by region and sector. We also look at changes in output by sector and region and correlate it with the sectors' female wage shares to identify whether or not the reform succeeds in expanding the sectors that are female labour intensive.

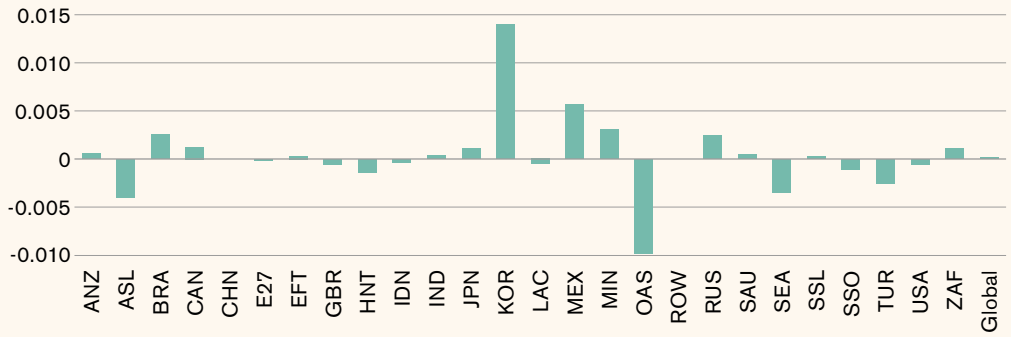
The percentage change in WP is defined as follows:

$$WP = \left(\frac{1 + \frac{pe_m}{100}}{1 + \frac{pe_f}{100}} - 1 \right) * 100$$

where pe_m and pe_f represent the changes in factor prices (i.e. wages) for males and females respectively.

Figure 2 shows the per cent changes in wage premia for the counterfactual scenario. We find that the effects are small in magnitude. The highest change is lower than 0.08 per cent which is marginal compared to the initial level of the wage premium of 27 per cent for skilled workers and 20 per cent for unskilled workers in the GDLD.[7] Only in a few regions, in particular a set of Asian economies and Türkiye, female wages rise relative to male wages. For most other regions, males gain relative to females and the global weighted average is slightly positive at 0.0001 per cent for the scenario with equalized tariffs. The positive global average implies that globally male wages rise relative to female wages. Given the stylized facts in Section 2.1, this posits a puzzle.

Figure 2: Changes in wage premia for counterfactual scenario where we equalize tariff across all sectors



Source: Authors' calculations based on simulations.

Note: See Table 2 for regional descriptions. Global weighted average calculated using total factor prices for labour as weights.

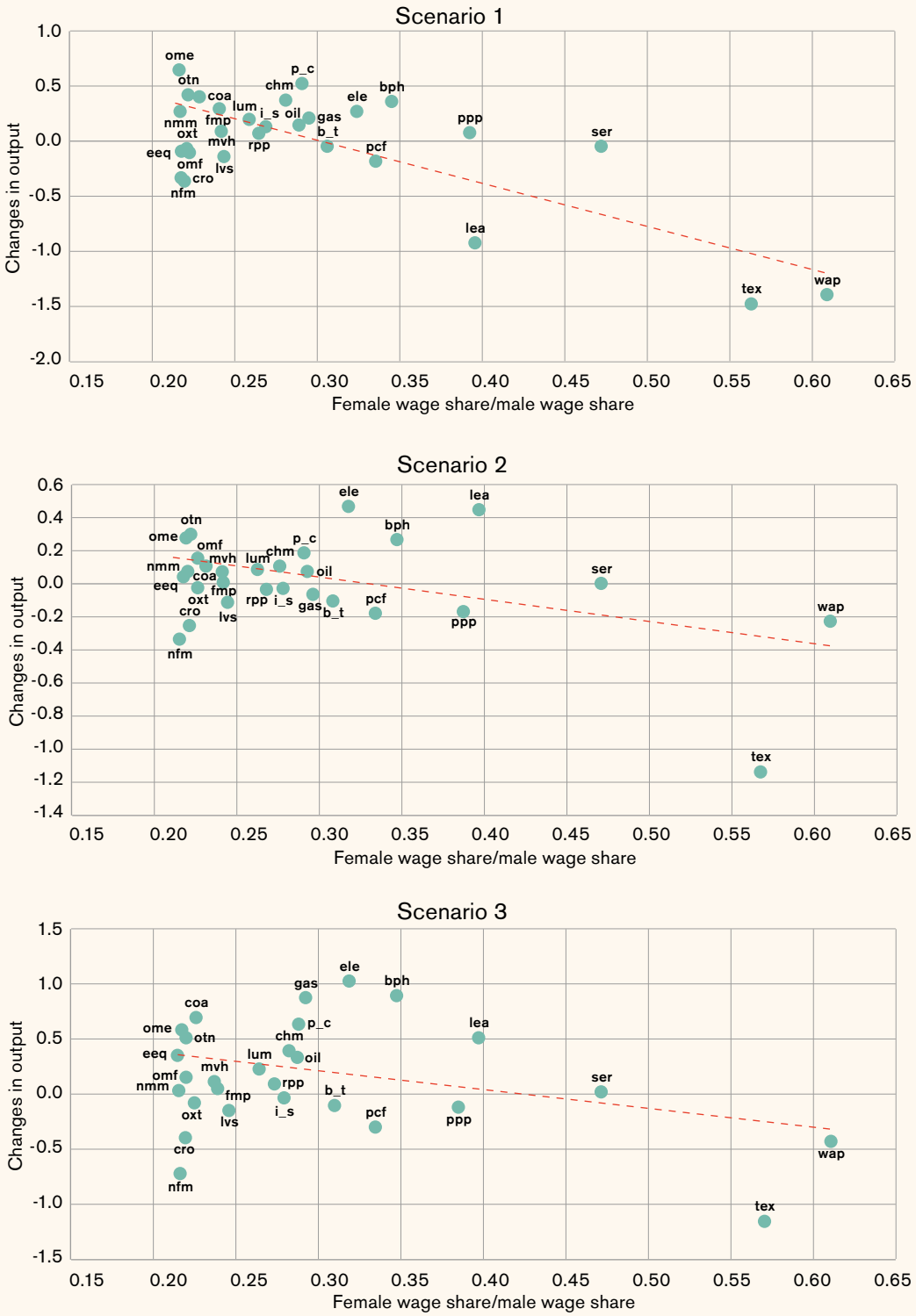
To solve this puzzle, we need to focus on the general equilibrium relations in the global economy between output, trade and production factors. We designed our shock such that sectors which produce intermediate inputs used by female labour-intensive sectors benefit from tariff reductions. This tariff cut should decrease input costs for female labour-intensive sectors and, hence, lead to their expansion.

World Bank Group and WTO (2020) point out that sectors producing inputs used by female labour-intensive sectors tend to be female labour-intensive themselves. As a result, there should be an expansion of female labour-intensive sectors through two channels, as the region exporting the intermediate good would benefit from higher export opportunities. However, a reduced tariff would also increase import competition in the importing region for that particular sector. This channel would then lead to a contraction of a female labour-intensive sector in the importing region. If the effect of this last channel dominates the other two channels on net the tariff reform could benefit male workers instead of female workers. To account for these three effects, we turn to our more sophisticated scenarios.

These more complex shocks move the effects in the right direction. Moreover, we observe that the effects on output help to explain our findings in the counterfactual scenario. Figure 3 shows the relationship between the changes in output and relative female wage shares by sector, for all three scenarios. We find that sectors with high female labour intensity face a reduction in output which presents a puzzle, but explains why the effects on wage premia are marginal and not always in favour of females.

Understanding these output effects requires us to disaggregate them into their different components and examine which regions are driving the result for which sectors. But we can already see that in moving from Scenario 1 to 2 and then 3, the effects get attenuated such that the slope of the trendline falls and the negative relationship between the change in output and female labour intensity of sector is weakened.

Figure 3: Relationship between changes in output and relative female wage shares



Source: Authors' calculations based on simulation results.

Note: See Table 1 for sector descriptions. Relative female wage shares calculated as total female wage to male wage in that sector.

Table 3: Changes in the wage premium for total, skilled and unskilled labour (in per cent, cumulative 2022-2026)

	Total labour	Skilled labour	Unskilled labour
Scenario 1	0.0010	0.0027	-0.0030
Scenario 2	0.0010	0.0013	-0.0001
Scenario 3	-0.0012	-0.0007	-0.0019

Source: Authors' calculations.

Note: Average across regions, weighted by total value shares of factors.

Table 3 displays the projected per cent change in the male wage premium for skilled and unskilled workers combined (WP) and for skilled and unskilled workers separately (WP SK and WP UN, respectively). The table reports a value weighted global average of the projected change in the wage premiums.

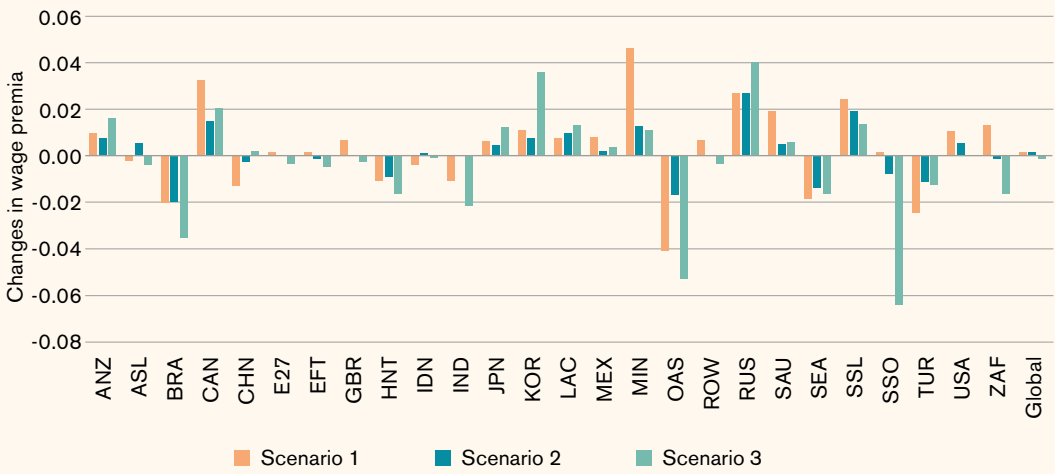
In the first scenario, male wages are projected to rise relative to female wages. The effects are opposite for skilled and unskilled workers with the wage premia changing in favour of females for unskilled labour and in favour of males for skilled labour. This result suggests that reducing tariffs to foster export opportunities of female labour-intensive sectors is not effective, proving that in this scenario the import competition channel dominates globally.

Moving to Scenario 2, tariff reductions are now also focused at reducing the costs of intermediate inputs used by female labour-intensive sectors. We expect this to promote female wages, as the sectors employing more women can expand owing to a lower cost of intermediate inputs. However, Table 3 shows that for Scenario 2 the male wage premia are still increasing for skilled workers, whereas the reduction in the male wage premium becomes smaller compared to Scenario 1.

As explained above, this can be because sectors selling intermediates to more female labour-intensive sectors are themselves also female labour intensive. For example, textile and wearing apparel are female labour-intensive sectors. They use intermediate inputs from the agriculture sector, which is itself female labour intensive. According to the intermediate cost channel, tariffs have to be reduced on agricultural products. However, since agriculture is itself a female labour-intensive sector a reduction in import tariffs in this sector generates more import competition and can thus lead to a reduction in output in the female labour-intensive sector of agriculture in the importing region.

In Scenario 3, we take into account the import competition channel as well. Table 3 shows that for all workers together (skilled and unskilled) female wages increase relative to male wages. Hence, a trade reform that takes all three channels into consideration would reduce the female wage gap. However, the effects of the reform are very small. In Scenario 3, for example, the male wage premium is projected to fall only by 0.0019 per cent, which is very marginal compared to the initial level of the wage premium of 1.27 for skilled workers and 1.2 for unskilled workers.[8] Looking at the percentage change of the male wage premium by region, we find that it falls in the majority of the regions (see Figure 4). For skilled and unskilled workers, female wages rise relative to male wages in India, other Asian countries, Southeast Asia, Sub-Saharan Africa and Türkiye. On the other hand, for countries like Canada, United Kingdom, Republic of Korea, the Middle East and North Africa, the Russian Federation and

Figure 4: Wage premia by region



Source: Authors' calculations based on simulation results

Note: See Table 2 for regional descriptions. Weighted average across sectors with total value shares for factors as weights.

the United States, male wages rise more than female wages. However, for all regions these effects are negligible in magnitude.

The above analysis reveals that even with carefully constructed shocks, we fail to project substantial reductions in the female wage gap in tariff liberalization scenarios in merchandise sectors. Hence, in the next section we explore the potential of services trade and services trade policy reform to contribute to closing the female wage gap.

The gender bias in services trade costs

Stylized facts

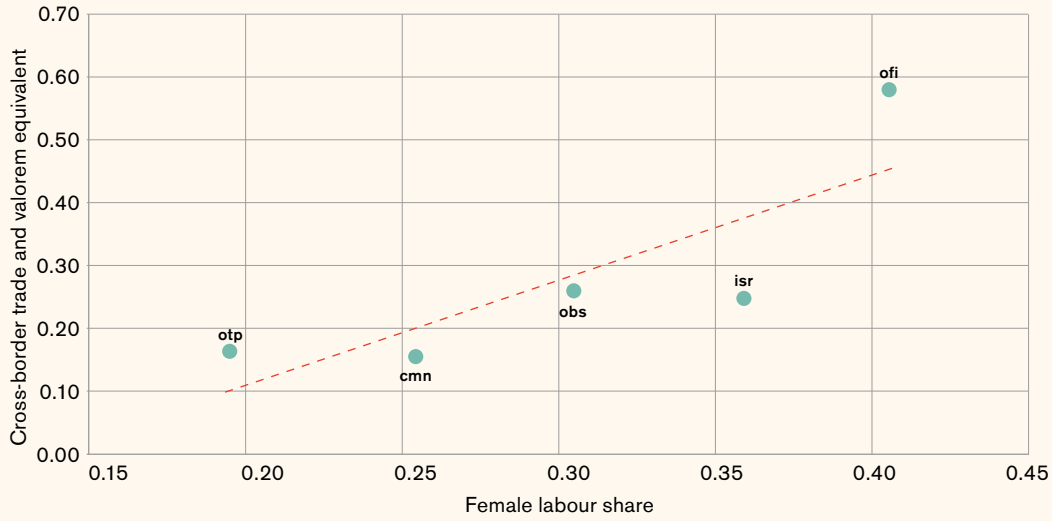
Three stylized facts motivate our work on services trade. First, trade costs are on average larger in female labour-intensive services than in goods. Table 4 shows that inferred trade costs are higher for services than for goods while at the same time services are also more female labour-intensive.[9] This suggests that reducing services trade costs could contribute to reducing the gender wage gap.

Table 4: Trade costs and female labour shares for the four key sectors

	Female labour share	Trade costs
Agriculture	0.21	2.52
Fossil fuel dependent sectors	0.20	2.39
Manufacturing	0.24	1.84
Services	0.28	2.51

Source: Authors' calculations.

Figure 5: Relationship between female shares and *ad valorem* equivalents of non-tariff measures on services trade

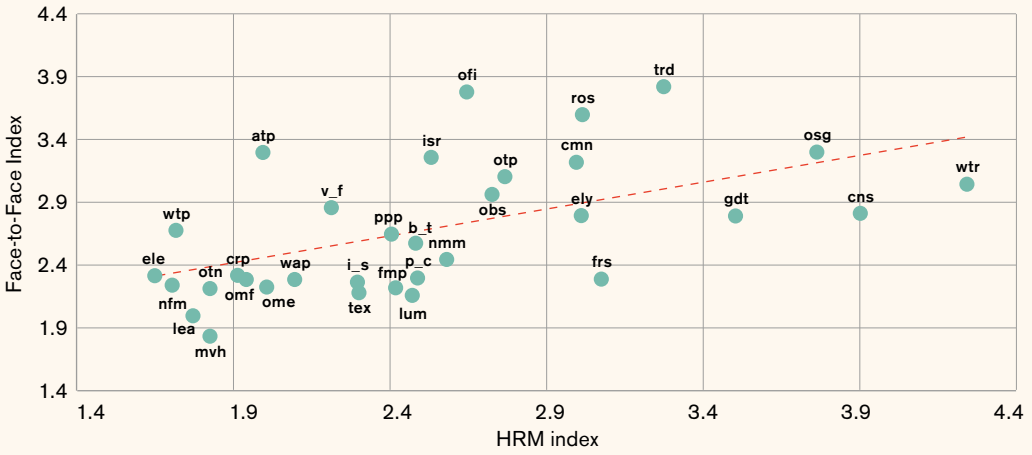


Source: Authors' calculations based on Benz and Jaax's coefficients and STRI data from 2014.

Second, not only are trade costs higher in more female labour-intensive services sectors, but also their policy-related components. Figure 5 displays the correlation between *ad valorem* equivalent trade costs based on Benz and Jaax (2022) estimates using the OECD STRI and female labour intensity. The figure makes clear that policy-related trade costs, as captured by the OECD index, are larger in more female labour-intensive sectors, especially in non-insurance financial services (ofi). This implies that services trade liberalization also has potential within services sectors to reduce the female wage gap.

Third, trade costs associated with the need for face-to-face interaction are larger in female labour-intensive sectors. Figure 6 displays the relation between a task-based face-to-face index and the index of inferred trade costs, showing that trade costs are larger in sectors requiring more face-to-face interaction. Figure 7 displays the relation between the face-to-face index and the female labour intensity, showing that female labour-intensive sectors require on average more face-to-face interaction. This implies that further digitalization of the economy leading to lower trade costs associated with the need for face-to-face interaction has the potential to raise the demand for female workers and thus reduce the female wage gap. This stylized fact is related to services trade because the face-to-face index is larger in services sectors. Controlling for the face-to-face index, there is no longer a significant difference in inferred trade cost between services and goods.

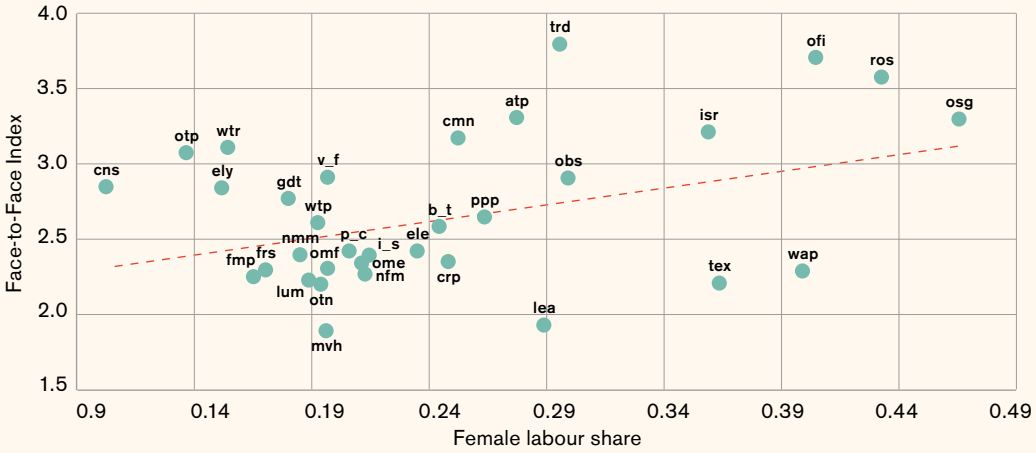
Figure 6: Relationship between inferred trade costs and the Face-to-Face Index



Source: Authors' calculations based on ONET Tasks data v17 and the GTAP v11 database.

Note: See Table 1 for sector descriptions.

Figure 7: Relationship between the Face-to-Face Index and female labour share



Source: Authors' calculations based on ONET Tasks data v17 and GTAP v11 database.

Note: See Table 1 for sector descriptions.

Simulating the effect of lower barriers to services trade

Discussion of simulation design

As we shift our focus to the services sector, we change the sector aggregation in our data by expanding the services sector and reducing the other sectors to "agr", representing key agriculture sectors; "ffl", representing key fossil fuel sectors and other manufacturing sector groups. Our dataset now has a total of 23 sectors (see Table 5).

In the previous subsection on stylized facts, we showed that trade costs inferred from trade flows are higher in services sectors compared to merchandise sectors while at the same time female labour intensity is also higher in services. Additionally, we found that among services subsectors, policy-related trade costs are larger in female labour-intensive subsectors. Finally, we also established that sectors requiring more face-to-face interactions are more female labour intensive.

Table 5: Sectoral aggregation

Sector	Sector description
agr	Agriculture
ffl	Fossil fuel dependent sectors
pcf	Processed food and beverages
otg	Other goods such as textile, apparel, leather, wood products and paper products
pc	Petroleum and coal products
che	Chemical, pharmaceutical, rubber and plastic products
met	Ferrous and other metal products
teq	Manufacture of transport equipment such as motor vehicles, trailers and semi-trailers
ome	Manufacture of machinery and equipment n.e.c.
eeq	Electrical equipment
ele	Manufacture of computer, electronic and optic equipment
utl	Provision of utility services such as electricity, water and gas
cns	Construction services
trd	Trade-related services
ars	Accommodation, food and recreational services
trp	All transport services
whs	Warehousing and related services
cmn	Communication and related services
ofi	Other financial services
ins	Insurance and related services
rsa	Real estate services
bus	Other business-related services
osg	Other services including education, health, dwellings, public administration and defence

This gives rise to two kinds of counterfactual experiments which could contribute to a reduction in the female wage gap. First, a reduction in trade costs over time associated with a reduced need for face-to-face interaction because of accelerated digitalization. This shock is operationalized as a reduction by 50 per cent in trade costs related to the need for face-to-face interaction.[10]

Second, a reduction in non-tariff barriers to services trade. For the latter, we shock trade costs in five specific sectors in which restrictions to services trade are most prominent – ofi (financial services), ins (insurance), trp (transport), bus (business) and cmn (communication).[11] These five sectors were also used by Benz and Jaax (2022) in their analysis of non-tariff measures (NTMs) and services trade. They represent sectors for which the reduction of NTMs appears feasible.

With both scenarios, we expect to see a rise in female wages relative to male wages. Given that the female labour intensity is higher in these sectors than the manufacturing sectors, we also expect the results to be larger in magnitude than those obtained for the manufacturing sectors.

Reducing services trade barriers can lower gender wage gaps

Figure 8 shows the changes in male wage premia for skilled and unskilled workers for the two different scenarios. Globally, the male wage premium is projected to fall by about 0.4 per cent in the digitalization scenario and by about 0.03 per cent in the services trade liberalization scenario. This is much higher in magnitude than for the tariff reform experiments. Between the two scenarios, digitalization has a much larger impact than a reduction in services NTMs. The main reason is that the changes in projected trade costs are much larger.

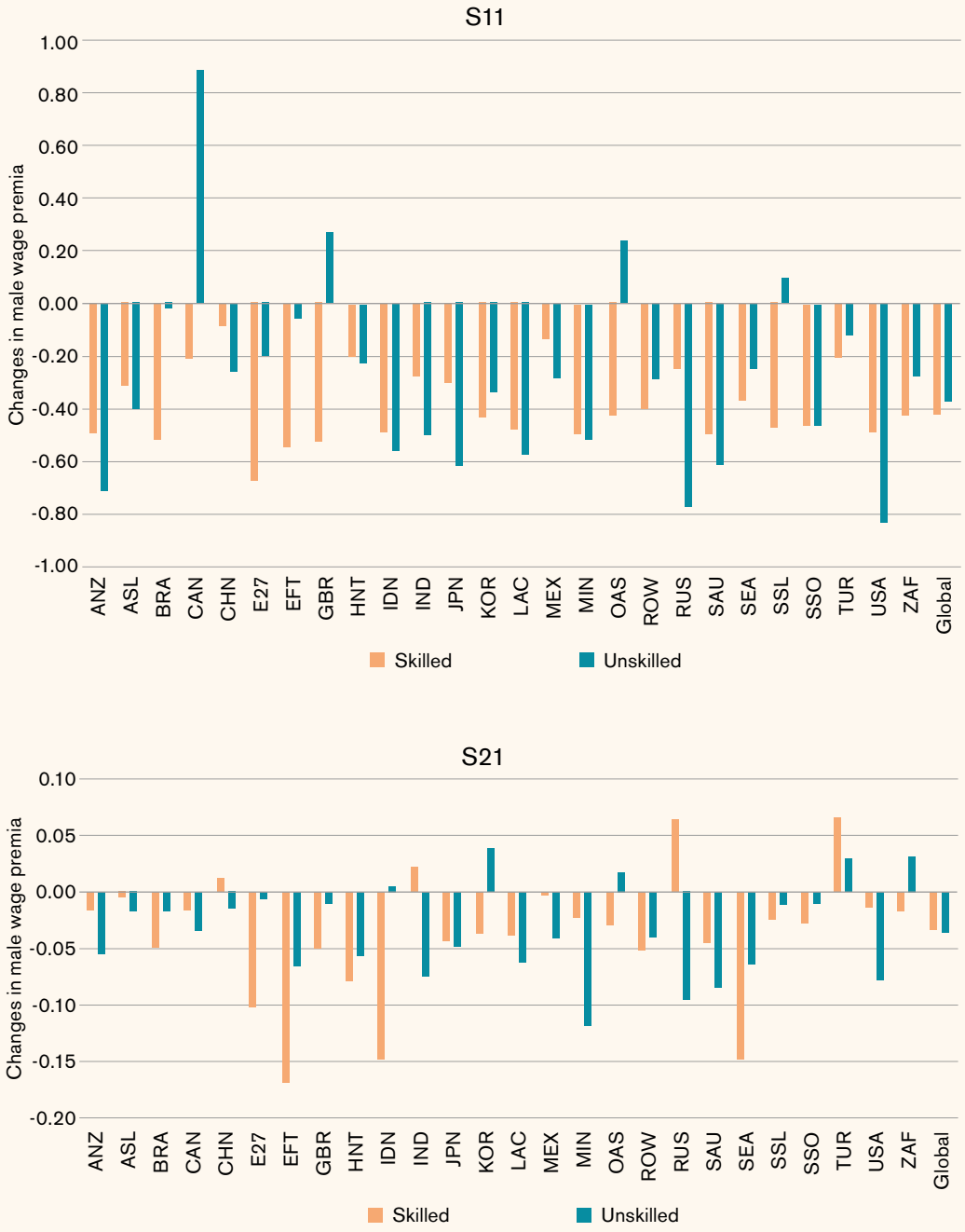
That said, there are some regions where the change is still positive and the male wage premium would go up. For skilled workers, female wages rise relative to male wages in all regions in the first scenario. However, this is not true for unskilled workers. For example, Canada, the United Kingdom and a set of Asian economies display positive changes in unskilled, male wage premia in the first scenario, indicating that unskilled female workers lose in these regions relative to male workers. For the second scenario, we find that skilled female workers lose in terms of relative wages to males in regions like China, India, the Russian Federation and Türkiye, while unskilled female workers lose in the Republic of Korea, South Africa and Türkiye.

Overall, simulating reform in the services sector has a greater impact on reducing gender disparity in wages than reforming tariffs in merchandise trade. The wage premia effects show a reduction in the gap, or an increase in female relative to male wages by about 0.4 per cent for the digitalization scenario and about 0.03 per cent for the services NTM reductions scenario. Hence, when introducing trade policy reforms with an objective of reducing gender disparity in wages, policies promoting digitalization seem to be most promising, followed by policies reducing non-tariff barriers on services trade.

Conclusion

We began our analysis by first validating stylized facts from the literature which speak of a gender bias in tariff imposition. Our analysis shows that both in the manufacturing and services sectors, female labour-intensive sectors have more barriers to trade in terms of higher tariffs, more face-to-face interaction required and higher NTMs.

Figure 8: Changes in wage premia for skilled and unskilled labour in the digitalization (S11) and services non-tariff measures (S21) scenarios



Source: Authors' calculations based on simulation results

Note: See Table 2 for regional descriptions. Weighted average across sectors with total value shares for factors as weights

With this result in mind, we simulated different tariff shocks for the manufacturing sector and services sector. Additionally, we looked at a scenario where digitalization reduces the requirement of face-to-face interaction over time. We identified four key results. Firstly, simple tariff reform in the manufacturing sector fails to reduce the gender wage gap. Secondly, sophisticated trade reform, taking into account all channels of transmission affecting the wage premia, reduces the gender wage gap, but by an insignificant amount. Thirdly, services trade liberalization in the form of digitalization or reduced face-to-face interaction requirements, reduces the gender wage gap by an amount much higher than other scenarios. Fourthly, a reduction in NTMs in the services trade sector can also reduce the wage gap but by a lesser magnitude than digitalization.

Our results highlight that trade can play an important role in lowering gender gaps. Trade policymakers who aim to reduce gender wage gaps should focus primarily on barriers to services trade when implementing reforms. This is especially relevant, as services trade has been growing faster than goods trade and structural change in favour of services has been a dominant trend globally. This presents a major opportunity to address gender inequality. Countries adopting a services-led development strategy can succeed in reducing gender disparities if they ensure that services can flow freely, and virtually, across borders.

Our results have important implications for ongoing discussions at the WTO on services domestic regulations (SDR) and e-commerce. While the importance of services trade for gender equality has long been known, we present the first results that quantify this relationship and underline the key role of services. These findings can hopefully provide a new impetus to finding solutions in the SDR and e-commerce discussions.

As to tariff reform, our results have been less promising. However, this does not imply that tariffs play no role in gender equality. The current analysis is focused on sectoral differences in trade costs (tariffs and other restrictions) and their relation with sectoral female labour intensity and so the potential of trade policy reform to reduce the female wage gap. However, trade policy reform could also help in general or within sectors along various channels. For example, by promoting exporting by female-owned small and medium-sized enterprises or by fostering demand for female workers through technological change. This should be the focus of future work. Additionally, one can design more complex experiments of liberalizing services trade, especially ones where the process of digitalization interacts with NTM reductions and also extend the model to shock non-tariff barriers in merchandise trade.

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Endnotes

1. See Helpman (2018) for a review.
2. Some studies relying on computable general equilibrium (CGE) models simulate the effects of liberalizing trade with gender disaggregated labour supply but these studies have a regional focus and do not assess tariff reforms based on the female labour intensity of sectors (see e.g. Sinha and Sangeeta, 2001).
3. See, for example, World Bank and WTO (2020) for a selection of countries and Gailes *et al.* (2018) for the United States.
4. ILOSTAT database, January 2021.
5. See https://datatopics.worldbank.org/gdld.
6. A detailed description of the model is provided in Aguiar *et al.* (2019).
7. Global total calculated as weighted average of male to female wage premia for each region and sector
8. Global total calculated as weighted average of male to female wage premia for each region and sector.
9. Inferred trade costs are calculated based on the amount of international trade relative to intranational trade based on the methodology in Head and Ries (2001). Female labour share estimates are based on wage shares.
10. Technically, inferred trade costs are regressed on a measure of face-to-face task intensity and a set of control variables. The fitted value of face-to-face intensity from this regression is reduced by 50 per cent.
11. Technically, the STRI in each country is reduced by 50 per cent towards the level of the region with the lowest services trade restrictiveness, following experiments in Benz and Jaax (2022).