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Trade and Women's Wage Employment

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Abstract

The main goal of this paper is to address an important question that arises from the interaction between increased participation in international trade, labor markets, and gender inequality; namely, the impact of trade liberalization on women's access to wage employment in the non-agricultural sector. We empirically address this question by performing fixed-effects and GMM estimations on panel data from a large group of developing economies, and tracing the impact of trade on women's access to wage employment. Overall, the empirical results indicate that trade has different effects on women's participation in wage employment and these effects appear to be nonlinear. Notably, the results seem to be consistent with the 'MENA gender-equality paradox'. We discuss the policy implications of the findings.

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Trade and Women's Wage Employment

1. Introduction

Most developing countries have experienced a narrowing of gender gaps in literacy and primary and secondary school enrollments in the last two decades or so, and many of these countries have witnessed notable improvement in the proportion of seats held by women in national parliaments (although women's de facto political power remains limited in many parts of the world). However, worldwide the proportion of women (age 15-64) in the labor force remains significantly lower than that of men (53.9% versus 80.6% in 2017). The world average for female-to-male labor participation ratios (age 15 and older) has been relatively stable in the last two decades or so (increasing only slightly; from 67.4% in 1990 to 68.4% in 2005, and back to 67.5% inn 2017) and the ratios remain remarkably low in many African and Arab countries. In the case of the MENA region in particular, where female labor force participation reached no more than 22% (in 2017), the fact that the region achieved significant progress in reducing gender inequality in health and education which has not been accompanied by a significant increase in female participation in labor markets (and politics) has been referred to as a 'gender-equality paradox' (World Bank, 2013).

Similar to their low participation in labor markets women also have lagged their male counterparts in accessing wage employment in the non-agricultural sector. Women's share (percentage of total non-agricultural employment) of wage employment in the nonagricultural sector remains relatively low on average (approx. 36.5%, in 2005; latest available data for the world) but with large disparities across countries.

At the same time, since the mid-1990s many developing countries (including in Africa) have relaxed trade restrictions and have increasingly embraced greater openness to international trade, albeit to varying degrees. Greater participation in international trade is expected to have differentiated gender effects due to pre-existing gender discrimination in labor markets. Beneria and Lind (1995:1) note that "[g]iven the predominance of labor market segmentation and segregation in production by gender, it makes sense to assume that trade will have a differential impact by gender." Indeed, given that labor markets, as Elson (1999:611) argues, "are gendered institutions operating at the intersection of the productive and reproductive economies", women may or may not benefit from the impacts of trade on labor markets. In addition, if the composition of trade is biased towards industries that use skilled labor relatively more intensively—as is often the case when developing countries enter the export markets of more sophisticated products—women in many developing countries may experience reduced access to wage employment, given that they tend to possess lower skills relative to men, and thus would end up in lower-productivity jobs; mostly in the informal sector. In this case, greater integration in world markets may lead to higher growth but would be associated with lower gender equality (Boserup 1970; Seguino, 2000; Baliamoune-Lutz, 2007; Baliamoune-Lutz and McGillivray, 2009 and 2015). Therefore, under such conditions, and in the absence of mitigating public policies, greater participation in international trade could be associated with further 'engendering' of labor markets in developing countries.

The main goal of this paper is to address the question of whether trade liberalization exerts a positive or negative effect on women's share of wage employment in the non-agricultural sector.

We address this question by performing country-level panel-data estimations using data from a large group of emerging and developing economies and focusing on the effects of trade (openness to international trade) on women's access to wage employment in the nonagricultural sector. The empirical results obtained in this paper indicate that trade has differentiated effects on women's participation in wage employment and these effects are generally nonlinear. Interestingly, the results appear to be consistent with the 'MENA gender-equality paradox'. The findings have important implications for women's paid (and unpaid) work and underscore the critical role of gender-equitable labor market institutions and laws.

The remainder of the paper is organized as follows. Section 2 provides an overview of the relevant theoretical and empirical literature. Section 3 describes the data and methodology and presents the empirical results. In Section 4, we discuss the main policy implications and provide examples of policy actions that could address the adverse impacts of trade on women's welfare. Section 5 concludes.

2. A brief literature review

This paper relates to three strands of the literature. The first one is the literature on women in labor markets, in particular the line of research dealing with female-male wage and employment gaps. The second strand of literature is the one focusing on the impact of globalization (in particular international trade) on gender equality in employment. The third line of research this paper relates to is the study of the impact of international trade, especially exports, on the wage gap between skilled and unskilled labor and the associated intersectoral labor movements; especially research focusing on how these trade-induced movements impact female-male gaps in wages and employment (Wacziarg and Wallack, 2004; Sauré and Zoabe, 2014)—given that women generally have lower skills relative to men and thus tend to be over-represented in low-skill-labor intensive industries.

Women in labor markets: Overview of related theoretical research

The theoretical literature generally focuses on three main explanations of the observed gender gaps in labor markets, covering primarily the supply side of female labor: (i) the human capital model (Schultz, 1961; Becker 1975); (ii) the household production model (Becker, 1965; Mincer, 1962); and (iii) the labor-leisure choice theory (Mincer, 1962). On the other hand, theoretical explanations of the impact of international trade on women's participation in the labor force and male-female wage gaps come from models which are mainly based on four different, but related, mechanisms: (i) trade-induced competition and wage-discrimination models (Becker, 1971); (ii) human capital models (Zhang, 2000; Galor and Mountford, 2008); (iii) technical-change based theoretical explanations (e.g., Acemoglu, 2003); and (iv) sectoral reallocation of labor models, using the Stolper-Samuelson theorem (factor-price equalization). Nevertheless, all four theoretical explanations tend to be related to the pro-competitive effects resulting from trade liberalization.

The debate on trade-induced long-run gender wage inequalities (discrimination) is generally missing from the standard trade theory since this theory assumes wage inequalities inexistent in the presence of highly competitive markets (Busse and Spielmann, 2006). This theory posits that trade would lead to greater competition and this should make discrimination more costly and eventually cause gender gaps in employment and wages to fall (Becker, 1971), once we control for differences in educational attainments. However, female and male labor can be imperfect substitutes, as has been documented,

for example, in Acemoglu et al. (2004) in the case of the U.S., using data for 1950, where the authors find that "male and female labor inputs are imperfect substitutes, with an elasticity of substitution of around three." This suggests that trade liberalization may not necessarily lead to higher female labor participation, especially in the early years of trade reforms.

Theoretical studies of the impact of trade liberalization for the most part predict that trade causes firms, especially in concentrated industries, to face greater competition and hence would reduce gender gaps in wages and employment. In the case of developing countries, in particular, because it is often assumed that trade liberalization would cause the expansion of female labor-intensive industries, trade is expected to lead to higher female employment. However, some theoretical studies show the opposite; concluding that since trade increases demand for skills, the wage and/or employment gaps would increase because women generally have lower skill levels and thus, even when their employment increases, women would be over-represented in low-paying occupations. For example, Juhn et al. (2014) construct a theoretical model which assumes that a reduction in tariffs induces firms to modernize their technology to become exporters and obtain results suggesting that "the relative wage and employment of women improve in blue-collar tasks, but not in white-collar tasks."

Sauré and Zoabe (2014) develop a theoretical model that incorporates endogenous choice of fertility (following Galor and Weil, 1996) and assume that women have less physical labor endowments relative to men and, in particular, they assume that the complementarities between capital and labor are higher for women than they are for men. The authors derive a counterintuitive result indicating that trade integration of a capital-intensive country results in the expansion of the sector using female labor more intensively and a contraction of the male intensive sector. This would induce male workers to move to the expanding sector which would lead to a dilution of the capital-labor ratio in the expanding (female intensive) sector. The greater capital-female labor complementarity "causes the marginal productivity of women to drop more than that of men. Thus, the gender wage gap widens and female labor force participation falls" (Sauré and Zoabe, 2014:31). This implies that increased trade with developing countries (capital poor) would result in lower female employment in the capital rich country. Sauré and Zoabe tested the predictions of their theoretical model using what they call 'the NAFTA episode' (U.S.–Mexican trade integration) for the period 1990–2007 and find that the employment patterns in the U.S. following NAFTA are generally consistent with the theoretical predictions. This, however, does not imply that the model would predict the opposite effects taking place in a developing or emerging economy like Brazil, for example, which are the type of economies this paper focuses on.

Empirical literature

The empirical research on the effects of trade on gender gaps in wage and employment contains mostly country-specific studies, using micro-level data. Cross-country studies using macro-level data are rather limited. Findings in the empirical literature are generally mixed, although micro-data based evidence from a large number of studies tends to support either negative impacts of increased openness to trade on women's participation in the labor force and in wage employment, or a positive impact that is associated with women being over-represented in low-wage occupations. This latter means that even when greater openness to trade (especially through exporting) results in women having greater access to employment in general and wage employment in particular, women may not always benefit from trade as their relative (to men) welfare may worsen. Women may end up in low-wage employment either in expanding export sectors or in the non-traded sectors of the economy where the male labor force is declining due to reallocation to skill-intensive export sectors. Additionally, the evidence on the effects of trade on gender gaps in employment and wages in developed countries is

in stark difference to that uncovered in the case of developing countries. In fact, the empirical results can be different even for countries at similar stages of economic and human development, and even across studies of the same country.[1]

Some studies that examined these issues in developed economies have found that trade can make women worse off by decreasing their participation in the labor force or increasing the gender wage gap vis-à-vis their male counterparts, or by doing both. For example, Kucera (2001) uses data from Germany and Japan for the period 1970-1996 and finds that expanding trade had a negative impact on women´s manufacturing employment in Japan but not in Germany. The author explains the difference by the fact that Germany traded more, relative to Japan, with non-OECD countries. In contrast, Sauré and Zoabe (2014) use US-Mexico trade data (see discussion above) for the period 1990–2007 and find that the employment patterns in the U.S. following NAFTA are broadly consistent with increased trade integration with Mexico (which they view as a poor country) being associated with a decline in the female labor force and a widening of the gender wage gap in the United States. On the other hand, using pre-NAFTA (1976-1993) U.S. data, Black and Brainerd (2004) find that "while trade increases wage inequality by modestly reducing the relative wages of less-skilled worker, at the same time it appears to benefit women by reducing the ability of firms to discriminate" (p. 540).

Country-specific studies focusing on developing countries also tend to find mixed evidence on the impact of trade expansion on women. Four developing/emerging economies that have been researched by many scholars are Brazil, China, South Korea, and Mexico. For Mexico, Aguayo-Tellez et al. (2014) find that trade liberalization policies increased the relative demand for female workers within industries and skilled groups. On the other hand, Ghiara (1999) did not find any effect from the adoption of export-led strategies on women's wages in 1987-93, while Fleck (2001) finds a negative impact using 1997-98 data. Juhn et al. (2014) find that the tariff reductions associated with NAFTA caused new firms to modernize their technologies to be able to enter export markets and replace male blue-collar workers with female blue-collar workers. Dominguez-Villalobos and Brown-Grossman (2010) obtain consistent evidence on the negative impact of trade liberalization on both women's and men's wages but find that women lose "in both absolute and relative terms".

For South Korea, Berik et al. (2004) report a negative impact from exports (share in output per industry) on women's wages (an increase in female-male wage gap). Guicheney (2015) analyzes the gender impacts of South Korea's export-led industrialization policy and concludes that "labor policies enacted by the government to promote the growth of the private sector negatively impacted the opportunities women had for upward mobility, leaving them in a position of permanent inferiority relative to men" (p. 14).

China has witnessed increasing gender wage inequality in the last three decades or so. Still, the empirical evidence on whether trade is a main contributor remains mixed. Shu et al. (2007) report that while there are increasing gender inequalities, they find no variation in the gender gap in income among cities of varying levels of FDI, growth rates of FDI, or whether they were among the earliest to open up to international investment. However, the authors find that women are more likely to work in export-oriented manufacturing industries that pay lower wages and less likely to work in high-paying foreign firms and joint ventures. The authors conclude that "globalization profoundly influences gender inequalities by changing the nature of job queues, and men and women are sorted and matched into

1. For recent literature surveys see Aguayo-Téllez (2011) and Papyrakis et al. (2012).

jobs accordingly". Chi and Li (2014) note that China has experienced a widening gender pay gap in the past two decades but argue that the female-male gender pay gap can be biased if employment selectivity is not taken into account. On the other hand, Chen et al. (2013) find a positive impact from foreign participation and export orientation within the same region and industry on female employment and on gender wage equality (a narrowing gap), with the existing large gender wage gap in foreign and exporting firms being explained primarily by differences in gender productivity. The authors also find gender pay discrimination among private non-exporting firms and conclude that globalization plays an important role in encouraging female employment and reducing gender discrimination.

Gaddis and Pieters (2012) study the effects of Brazil's 1987-1994 trade liberalization on women's participation in the labor force. They find that "tariff reductions were associated with an increase in female labor force participation and employment after a period of around two years." On the other hand, Gaddis and Pieters (2017) find that trade liberalization in Brazil decreased both male and female labor force participation rates and tradable sector employment rates, especially among the low-skilled labor. The authors also find that trade reduced the percentage point gender gap in employment and participation rates but did not find any evidence that women's employment and participation (relative to men's) increased, or that the pro-competitive effects of free trade. Benefited women. Finally, in a recent paper, Benguria and Ederington (2017) focus on increased exposure to Chinese imports in Brazil and examine the impact of trade on wage inequality.[2] They find a negative impact from rising imports but the wage decline was entirely borne out by male workers. Using Oaxaca-Blinder decompositions, the authors explain the difference in the wage reduction by differences in the female and male occupational employment. Interestingly, they find that trade increased women's share of higher-paying occupations and increased the returns to primarily-female occupations.

Cross-sectional research focusing on large number of countries is relatively scant. One of the early studies is Wood (1991), which uses data from 35 countries and finds that trade liberalization is associated with greater relative demand for women in labor markets in developing countries but not in developed countries. Oostendorp (2009) examines the effects of globalization on gender wage gaps in over 80 economies for the 1983-1999 period and obtains the opposite evidence. The author finds that trade and FDI reduce gender wage gaps in rich countries but fail to find evidence of any impact in the case of poor countries. Focusing on Southeast Asia and Latin America, Tejani and Milberg (2016) find that the capital intensity of production, reflected in shifts in labor productivity, has a significant negative association with the shifts in women's share of employment in manufacturing, whereas exports are statistically insignificant. Thus, the existing cross-country evidence also seems mixed.

Additionally, a recent study by Wamboye and Seguino (2015) provides evidence from Sub-Saharan Africa (SSA) that gendered employment effects of trade liberalization depend on the structure of the economy but a country's infrastructure has played a key role in gendered labor market outcomes in SSA since the early 1990s. An earlier study by Baliamoune-Lutz (2007) found significant evidence of a negative effect of greater integration in world markets on gender equality (in literacy) in SSA but not in other regions. The author did not examine gender inequality in employment directly, but the assumption of a positive association between education and skills suggests that trade may be associated with reduced access to skills for women (relative to men) in SSA and thus while women may increase their participation in labor market they may end up in low-skill occupations which would

2. While the discussion of the literature focuses on the impact of export expansion, increased integration in world markets (international trade) is also a matter of expanding import (e.g., Black and Brainerd, 2004).

increase the gender wage gap. Finally, we should point out that the impacts of trade may also be different when the focus is on youth employment. Anyanwu (2016) examines the key drivers of gender equality in Africa's youth employment in 1991-2011 and finds that in Africa (including North Africa) "gender equality in primary education, trade openness, FDI inflows, political globalization, economic growth, urbanization, female population, and being a net oil-exporting country are significantly positively associated with gender equality in youth employment". On the other hand, the author finds that equality in secondary education, gross domestic investment, and government consumption expenditure are associated with lower gender equality in youth employment in SSA, while in North Africa these factors have a positive link with gender equality in youth employment.

3. Empirical Analysis

3.1 Variables, data and methodology

The variable of primary focus in the empirical analysis is international trade (measured by the share of exports and imports in GDP). We draw on existing empirical studies for the selection of the other major variables that could potentially influence women's participation in the labor force in general and in the non-agricultural wage employment in particular. However, we should take into account the high correlations among some of these determinants which significantly reduces the number of variables we can meaningfully include. The main control variables we consider are fertility, female enrollment ratios in secondary schools, the share of FDI in GDP and income per capita.

We include FDI, as well as its interplay with openness to trade, on the right hand-side (RHS) for two main reasons. First, many developing economies that have increased their integration in world markets tend to also receive significant amounts of FDI, often targeting industries that produce for export or re-export (the case of international outsourcing). Hence, FDI may complement trade. Second, if FDI is linked to export industries it may target products where there is high international competition which would make discrimination costly and may reduce the gender gap and increase women's participation in wage employment (Becker, 1971). On the other hand, if FDI targets industries which are high-skilled-labor intensive or capital intensive (mining industries, for example), then women may end up with reduced access to wage employment or end up in lower-wage occupations; increasing the female-male wage gap, which in turn could lower female participation in the labor force. Thus, the effects cannot be determined a priori. Furthermore, we include the interplay of trade variables with region dummy variables (for North Africa, SSA, and Latin America and the Caribbean).

Descriptive statistics for the main variables are displayed in Table 1. These statistics indicate that the female share of non-agricultural wage employment ranges from a very low level of 7.7% (in Pakistan in 1990) to a high level of 52.3% (in Mongolia in 2013), with a relatively low sample mean (35.4%). Openness to trade ranges from 13.75% (Argentina in 1991) to 220.4% (Malaysia in 1993), with a sample mean of 73%.

Figure 1 also shows that the shares of women in non-agricultural wage employment vary significantly across countries. These shares tend to be above 40% in many countries in Latin America and the Caribbean while they are low (below 30%) in the MENA region and some countries in Sub-Saharan Africa and South Asia; registering in 2010, for example, as low as 15.1% (17.6% in 2013) in Algeria

and 18% (18.6% in 2013) in Egypt. In general, countries with low female participation in the labor force also have a low female share in the non-agricultural wage employment. The case of the MENA region in particular is puzzling since the region (at least in most countries) has achieved significant progress in female health and education but still has remarkably low female participation in the labor force (World Bank, 2013).

One of the key factors that have been shown to exert a significant influence on women's participation in paid work is fertility. Figure 2 shows that in the group of countries with women's share in wage employment of at least 40% (from Barbados to Mexico in Figure 2) in 2013, only one country (the Philippines with 3.01%) had a fertility rate significantly higher than 2.5 percent. On the other hand, five of the countries to the right of Mexico show fertility rates close to or higher than 3 percent, with rates in Ethiopia and Kenya exceeding 4 percent. However, Figure 2 does not show a clear linear relationship between the two variables, as countries such as Tunisia and Turkey (both in the MENA region) have low fertility rates and low female participation in wage employment.

3.2 Results

3.2.1 Linear correlations

The share of women in wage employment in the non-agricultural sector has a negative correlation with fertility (-0.48) and a positive association with the other variables (albeit weak in most cases); ranging from 0.24 with FDI to 0.48 with female secondary-school enrolments. As expected, the correlation of fertility with all other variables is negative and relatively high in the cases of per-capita income (-0.8) and female enrollments in secondary education (-0.74). Openness to international trade does not seem to have strong correlation with any of the variables. Interestingly, the correlation between FDI and openness to international trade is markedly low, perhaps suggesting that these variables may be influenced by different factors and policies or may have a nonlinear association.

3.2.2 Openness to trade and women's share of wage employment

We first use a fixed-effects estimator and report the results in Table 3. These results indicate that openness to trade generally has a positive impact on women's share of wage employment but there are diminishing returns from further trade openness. Indeed the relationship between the two variables appears to have an inverted-U form (also see Figure 3) with the critical value, for countries other than the ones in SSA and North Africa, occurring at a level of openness ranging from 92.5% to 98.75%, depending on whether we control for fertility and female enrolments in secondary schools (columns 7 through 9) or exclude the variable 'fertility'. These critical values (turning point) are higher than the median and the mean in 2013 (the latest year in the sample) which are 65.76% and 75.34%, respectively. In 2013, there were 8 countries (excluding those in Africa) with openness to trade as a share of GDP greater than 100% and 5 countries with the value of openness to trade between 80% and 95% (Bolivia, Jamaica, Barbados, Dominica, and Paraguay). The results suggest that in countries where openness to trade is above the critical values (turning point), women may not be benefiting from greater openness to trade, while in countries where openness to trade is close to these critical values, the effects will start to diminish with increased openness to trade. In both types of economies, there is need for policy interventions to mitigate the diminishing returns and negative effects and promote women's access to paid work in the non-agricultural sector (see discussion below).

In the case of SSA countries, the critical values are much higher and range from 131% to 207%, indicating that women benefit from increased trade openness and the negative effects are not present for the most part. In fact, only in Mauritius is the share of openness in GDP close to 130% in several years. On the other hand, women in North Africa seem to experience adverse effects from openness to trade as the critical values are 21.25% or lower.

However, an important issue that might arise in fixed-effects estimates is the potential endogeneity of some of the RHS variables. For example, women's participation in paid employment might lead to lower fertility and higher school enrollment ratios, and also might result in more trade, as women gain more education and greater access to wage employment. Thus, we also perform dynamic panel-data GMM (GMM-DIFF) estimations[3] and report the results in Table 4. In these equations, we treat trade openness as well as (the control variables) fertility, female enrollments in secondary education, FDI and income as endogenous.

Again, the results show that trade openness generally has a positive effect on women's share of wage employment. However, the evidence on the diminishing returns to trade is much weaker. Openness to trade also has an additional effect through its interplay with FDI. This effect is nonlinear, as the impact from this interplay is only positive at high levels of FDI. Interestingly, the direct (independent) effect of FDI is consistently positive and statistically significant in most estimations at the 5-percent level or better. The empirical evidence also suggests that openness to trade exerts a negative effect on women's participation in wage employment in North Africa and Latin America.

4. Summary and implications of the findings

The findings in this paper suggest that trade liberalization (measured by openness to trade) generally benefits women (except in North Africa), in that it increases the female share of wage employment, but there are diminishing returns and the gains can turn into losses at high levels of openness (at least based on the fixed effects estimates). In North Africa, however, trade openness is associated with a reduction in the female share of paid employment. Moreover, we find a relatively robust positive effect from the interplay of openness to trade with FDI at high levels of FDI. These findings have at least four policy implications.

First, in North Africa trade policy reforms and labor market policies should take into consideration that women may be forced out of paid labor as the share of trade in GDP increases, and address this through interventions that enhance women's skills and eliminate discriminatory practices on the part of firms, especially in in the private sector. Examples of policy instruments include laws against gender discrimination in hiring and promoting employees, wage equality legislation, paid family leave (for both men and women), and greater access to affordable child care. It is also imperative to try to address cultural factors that make society in these countries treat women as inferior to men and girls as a liability while boys are considered a valuable asset. Cultural factors are difficult to change via government policies. Hence, there is a crucial role for education, both in its content and delivery mode. Mixed-gender education, for example, can go a long way toward teaching young individuals respect for the other sex and showing that girls are as good as boys in terms of abilities and skills.

Second, the fact that some countries have high levels of trade openness means they may be past or close to the level beyond which the impact on women's participation in wage employment would be

3. A better approach would be IV estimation but suitable instruments could not be identified.

negative. These countries should implement labor policies that would strengthen women's participation in paid work (such as the ones discussed above in the case of North Africa). In some countries, trade adjustment assistance that is offered to workers in industries harmed by a surge in imports can, in principle, help those employed in such industries. However, women are often working at low wages in industries that are competitive and are not likely to be recipient of trade adjustment assistance so that when they are displaced by men in these jobs, they do not benefit from any adjustment assistance. Rather, because of their competitiveness, firms in these industries will minimize costs, especially labor cost (by hiring workers for a lower wage), to maintain competitiveness. In this case, legislation mandating minimum wages, wage equality, and labor standards can benefit women.

Third, in countries that have very low levels of openness to trade, trade reforms that would expand exports and imports need to be accompanied by measures aimed at ensuring labor markets are not biased against women, so that both men and women have equal opportunities to access the expanding (trade-induced) paid employment. Besides the legislative measures and policy intervention in labor markets mentioned above, policymakers should mainstream the gender dimensions into trade policies and trade (and FDI) agreements, for example through implementation of quotas for employment of women in export industries, fully or partially subsidized training of female workers to facilitate their promotion to higher-level administrative and production (for technicians and engineers for example) positions.[4] Fair trade and other trade agreements should take gender aspects into account (Grosse, 2016; Barrientos et al., 2003; and Barrientos, 2010) and include elements that promote more gender equality, such as provisions to have access to women-friendly infrastructure and transportation means, child care, health care, maternity and paternity leaves, and social protection for women and men.

Finally, the findings also have important implications for women's unpaid work as the decrease in women's share of paid employment in the formal sector causes women to either shift to the informal sector or to more unpaid work or both. This requires policy interventions to prevent the reduction in female participation in wage employment or else take into account female unpaid work in national accounts and in macroeconomic policy formulation and implementation with the view to determine how women could be compensated for their unpaid work, for example through subsidies or by setting up pension funds for unpaid female workers.

The implications of these potential consequences of adjusting to trade liberalization could influence not just the status of today's female workers themselves but also have impacts on the next generation of workers (today's children) and the country's (working) population in general. As has been documented in many studies, higher wages lead to more women joining the labor force and increased female work participation is, in turn, associated with lower birth rates and higher investment in the quality of children. One could also argue the opposite would happen when women are pushed out of the formal labor force. Indeed, some of the countries where women work predominantly in the informal sector, sometimes due to more flexibility in this sector, and in unpaid work (see Lumberg et al., 2010) tend to exhibit high fertility rates. In addition, the empirical results derived in this paper also show that there is a consistent negative effect from fertility to women's share of paid work. This suggests that lower shares of female paid employment are correlated with greater shares of unpaid work for women. This is consistent with existing studies documenting that the presence of children and gender are major determinants of time allocated to unpaid work (Roncolato and Radchenko, 2016).

4. See Frohmann (2017) for more elaborate recommendations.

Figure 4 seems to be consistent with this relationship. It shows that the MENA and South Asia regions have both the highest levels of female unpaid work in the world and the largest female-male gaps; with women's share of unpaid work (time spent on unpaid care) being about six times that of men (see also OECD-GID database). These two regions have some of the highest levels of gender inequality. Interestingly, SSA on average has relatively low levels (second lowest level of female unpaid work after North America) of both male and female unpaid work, possibly because this region has very large informal economic activities and women are over-represented in the informal sector. Still, the gender gap in unpaid work is significant also in SSA and most other regions.

5. Concluding remarks

In this paper we aimed to address an important question that arises from the interactions between increased participation in international trade, labor markets, and gender inequality: What is the impact oOf trade liberalization on women's access to wage employment in the non-agricultural sector?

The empirical results indicate that trade has significant effects on women's participation in wage employment and these effects are not necessarily linear. Trade enhances women's participation in wage employment in all regions except in North Africa where the overall effect appears to be negative. While there seem to be diminishing returns to trade, many countries have trade shares in GDP that are significantly below the turning point, suggesting that women in these countries can benefit from trade expansion. We uncover fairly robust evidence (based on fixed-effects and GMM estimates) that could contribute to the explanation of the 'MENA gender-equality paradox'[5], with trade exerting a negative impact on women's share of wage employment in this region. The main implications of these findings were discussed in the previous section.

Although we did not test for short-run versus long-run impacts, we do acknowledge that there could also be important differences between short-run, medium-run and long-run effects of trade on women (relative to men). For example, when trade (exporting) is skill biased and wage increases favor skilled labor, disadvantaged groups may lose in the short run but it is possible that in the long run they would gain either through acquiring skills or as wages rise due to higher wages in the skill-biased sectors which could significantly raise demand for nontradables—income effect—which, in turn, could benefit the previously disadvantage groups, in particular women, working in the nontradable sector. It is worth noting that in the long-run, and with targeted policies, this could lead to a virtuous circle as the increase in low-skilled labor income would, in turn, allow low-skilled workers (women) to acquire skills and improve productivity and incomes in the country even further.[6] This process may ultimately (in the very long run) lead to scarcity in low-skilled labor market, as can be observed in today's developed economies. Nonetheless, the presence of such effects has important policy implications and taking it into account can help reconcile the disconnect between economists and policymakers. Indeed, it has been argued that there may be a ~~–d~~isconnect between economists who stress long-run benefits of openness and policymakers who are concerned with short-run effects on employment and income distribution (Cosar, 2013). Therefore, the fact that adjustments resulting from trade liberalization can take a long time to fully materialize should be emphasized by policymakers and economists alike.

5. Although we focus on North Africa, the region includes a large share of the population in the MENA and thus can adequately represent the region.

6. While this may have been difficult in the past, the 21st century's significant reliance on ICTs can provide tremendous opportunities for accessing education and acquiring skills.

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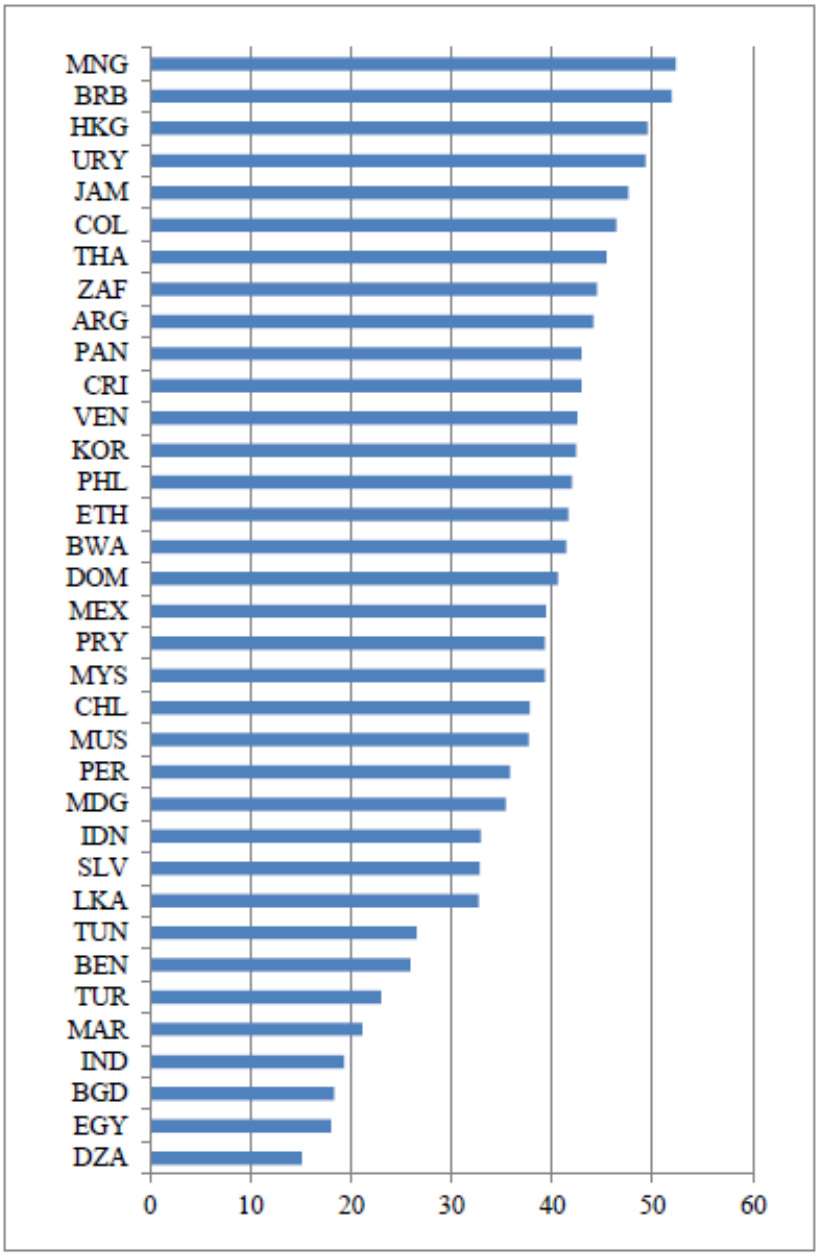
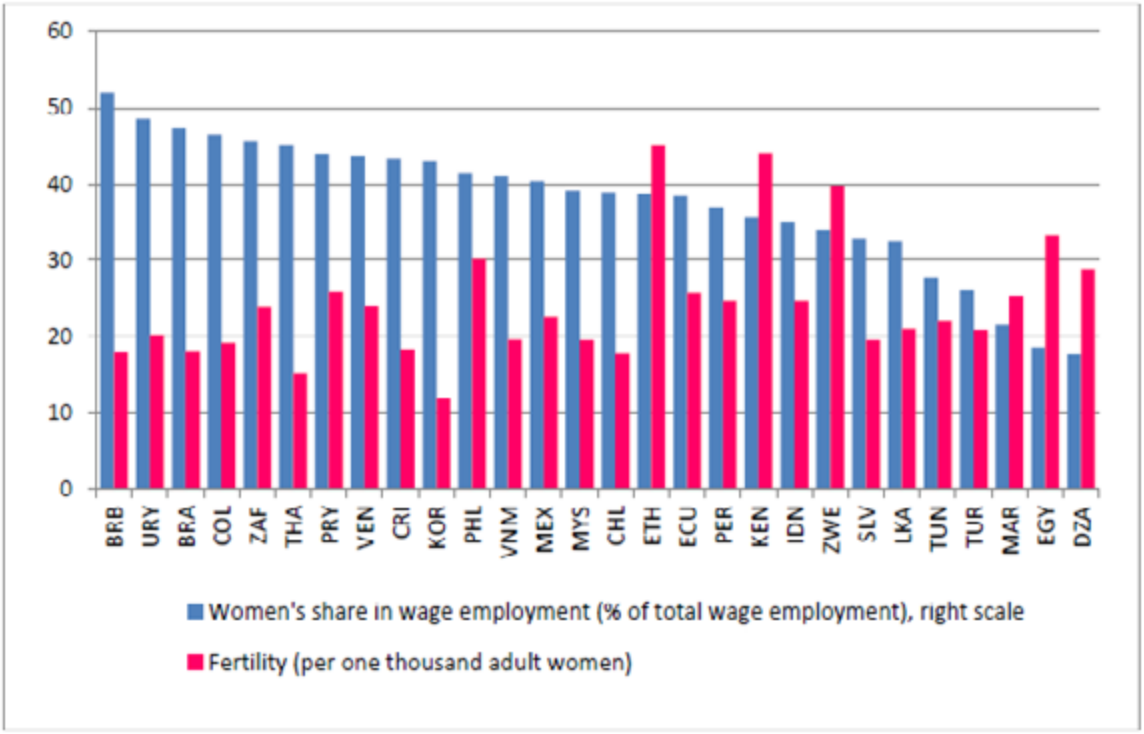
Figure 1: Share of women in wage employment in the nonagricultural sector (% of total nonagricultural employment), 2010



Note: For Tunisia (TUN), the wage employment share is from 2011.
See Appendix A for data source and variable description

Figure 2:
Fertility and women's share of wage employment (2013)



See Appendix A for data source and variable description

Figure 3:
Openness and share of women in wage employment in the non-agricultural sector

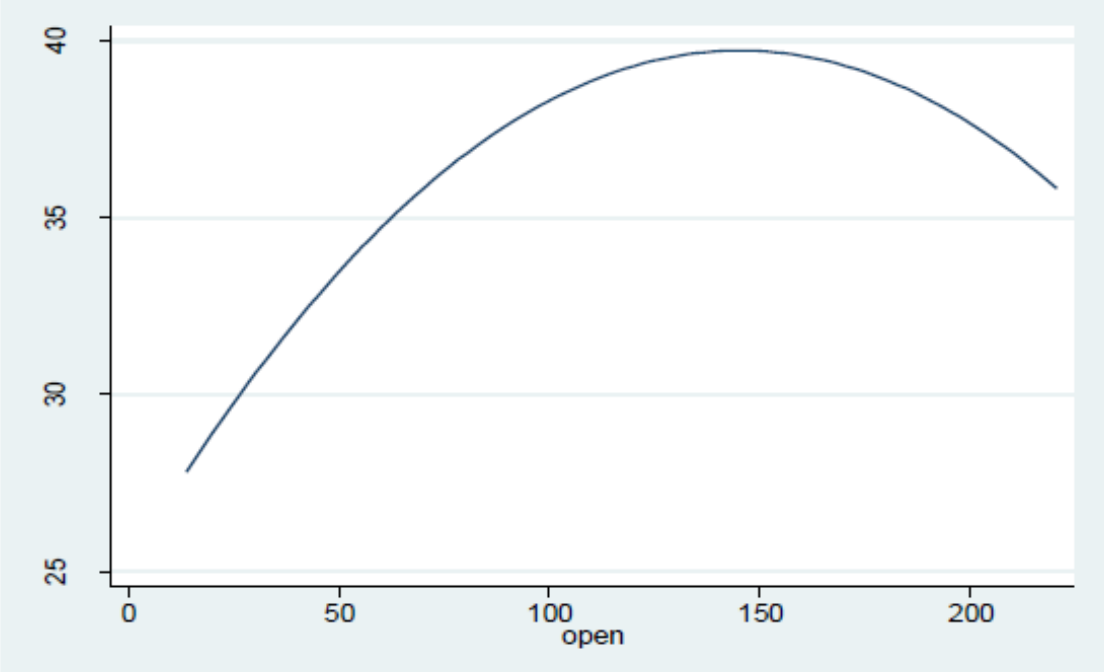
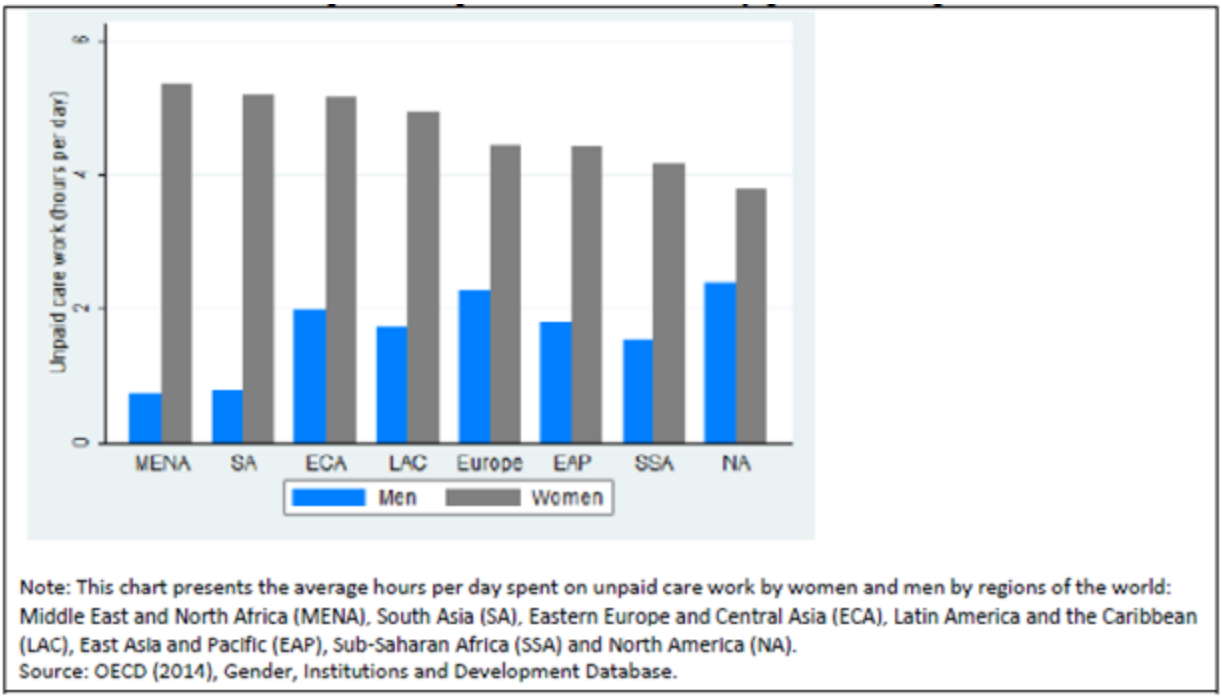


Figure 4:
Time spent on unpaid care work varies by gender and region



Note: This chart presents the average hours per day spent on unpaid care work by women and men by regions of the world: Middle East and North Africa (MENA), South Asia (SA), Eastern Europe and Central Asia (ECA), Latin America and the Caribbean (LAC), East Asia and Pacific (EAP), Sub-Saharan Africa (SSA) and North America (NA).
Source: OECD (2014), Gender, Institutions and Development Database.

Source of the graph: Ferrant et al. (2014)

Table 1: Summary statistics

Variable	Obs	Median	Mean	Std. Dev.	Min	Max
sharewemp	772	38.3	35.39	10.417	7.7	52.3
fertility	1060	2.80	3.15	1.248	1.076	7.246
Secfem	720	74.69	70.33	25.554	5.906	121.380
fdi	1074	1.86	2.82	3.389	-6.898	43.912
income	1080	7884.05	8373.87	5300.97	515.24	32684.32
open	1054	63.86	73.34	35.665	13.753	220.41

Details on source of data and variable description are in Appendix A.

Table 2: Pairwise correlation *

	sharewemp	Secfem	fdi	open	income (log)
Secfem	0.4837				
fdi	0.2409	0.319			
open	0.2547	0.216	0.355		
income (log)	0.3115	0.770	0.217	0.2469	
fertility	-0.4847	-0.743	-0.196	-0.219	-0.8015

Details on source of data and variable description are in Appendix A.

* All P values are less than 0.01 except the correlations of export sophistication (EXPY) with the share of women in wage employment and with FDI, where the P value is 0.029 and 0.063, respectively.

Table 3
Openness to trade and women's share in wage employment: Fixed-effects estimates Dependent variable: Share of women in wage employment)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
lagged dep. Var.	0.337*** (0.06)	0.369*** (0.08)	0.371*** (0.09)	0.369*** (0.09)	0.369*** (0.96)	0.368*** (0.09)	0.368*** (0.08)	0.370*** (0.096)	0.579*** (0.08)
Fdi	0.043** (0.032)	0.071** (0.034)	0.097*** (0.025)	0.028 (0.101)	0.028 (0.103)	0.085 (0.114)	0.072** (0.34)	0.097*** (0.025)	0.051 (0.03)
Open	0.016*** (0.005)	0.072** (0.028)	0.095*** (0.032)	0.107*** (0.037)	0.107*** (0.036)	0.078** (0.029)	0.079*** (0.028)	0.095*** (0.32)	0.037* (0.02)
NA x open	-0.045* (0.025)	-0.058** (0.021)	-0.095*** (0.016)	-0.101*** (0.017)	-0.101*** (0.018)	-0.061*** (0.020)	-0.062*** (0.02)	-0.095*** (0.016)	-0.062*** (0.011)
SSA x open	0.024 (0.03)	0.091** (0.036)	0.103** (0.048)	0.102** (0.046)	0.103*** (0.046)	0.086** (0.035)	0.087** (0.034)	0.036*** (0.011)	0.046** (0.019)
LAC x open	-0.026 (0.022)			-0.014 (0.018)	-0.014 (0.019)	-0.0088 (0.016)	-0.009 (0.015)		
Fertility	-2.386*** (0.517)	-1.506** (0.58)				-1.526** (0.59)	-1.501** (0.58)		
Secfem		0.021 (0.013)	0.049*** (0.013)	0.048* (0.025)	0.048*** (0.013)	0.021 (0.012)	0.021 (0.013)	0.049*** (0.013)	0.011 (0.008)
open_ squared		-0.0003** (0.0001)	-0.0005*** (0.0001)	-0.0005*** (0.0001)	-0.0005*** (0.0001)	-0.0004** (0.0001)	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0002* (0.00001)
open x fdi				0.0001 (0.0001)	0.001 (0.001)	-0.0004 (0.001)			
open x fdi_ squared				-0.00002 (0.00002)	-0.00002 (0.00002)	-0.00001 (0.00001)			
open x secfem				-0.00004 (0.0002)					
income (log)									1.485*** (0.52)
Obs	672	470	470	470	470	470	470	470	415
R-sq:									
Within	0.55	0.58	0.56	0.56	0.56	0.59	0.59	0.56	0.64
Between	0.79	0.79	0.72	0.68	068	078	0.77	0.72	0.94
Overall	0.77	0.73	0.66	0.63	0.63	0.72	0.71	0.66	0.92

Details on source of data and variable description are in Appendix A.
Standard errors (in parentheses) are clustered at the country level.
* indicates significance at 0.10 ** indicates significance at 0.05 and *** indicates significance at 0.01.

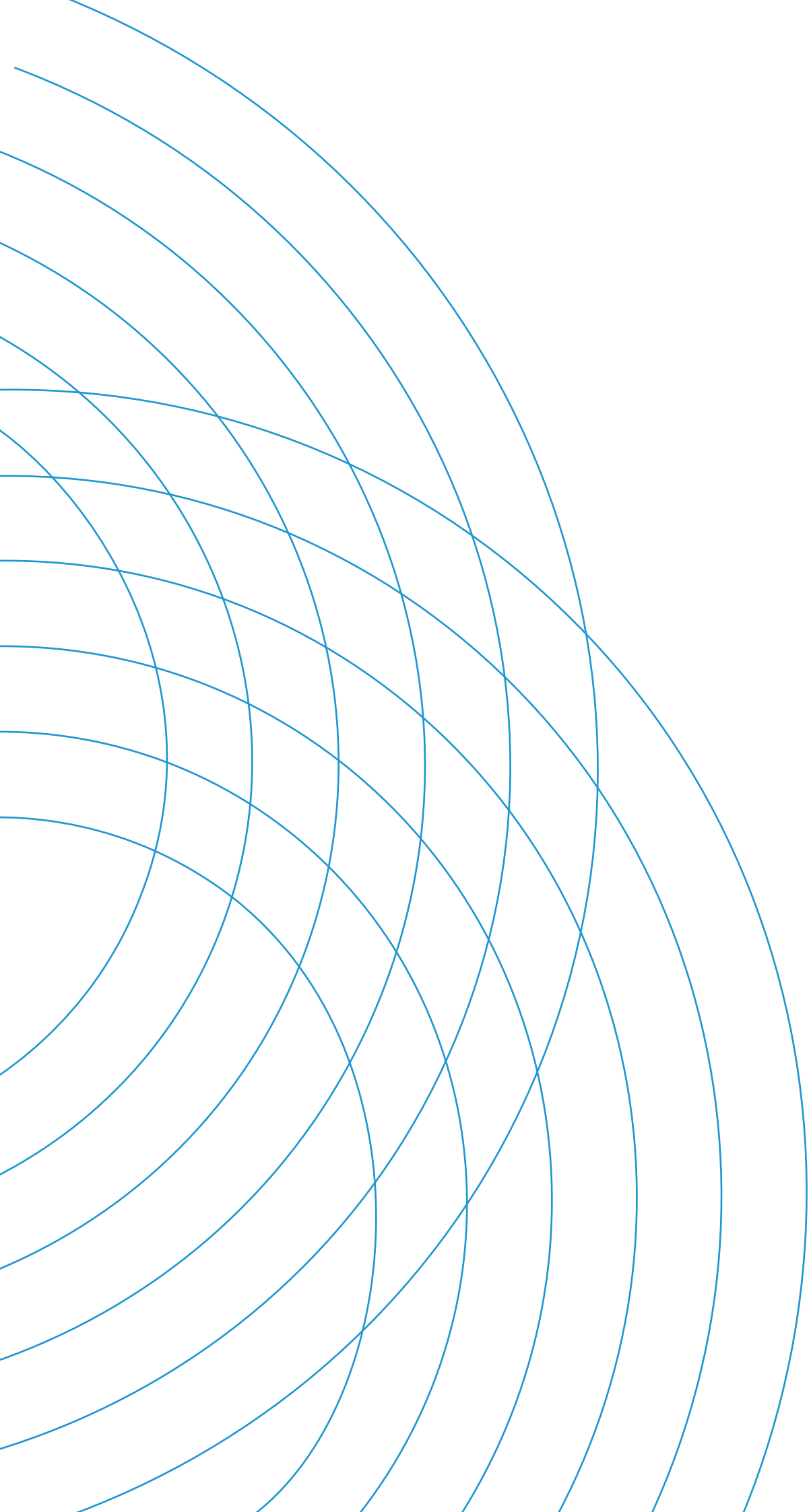
Table 4:
Trade and women's wage employment: A-B GMM estimates
Dependent variable: Share of women in wage employment)

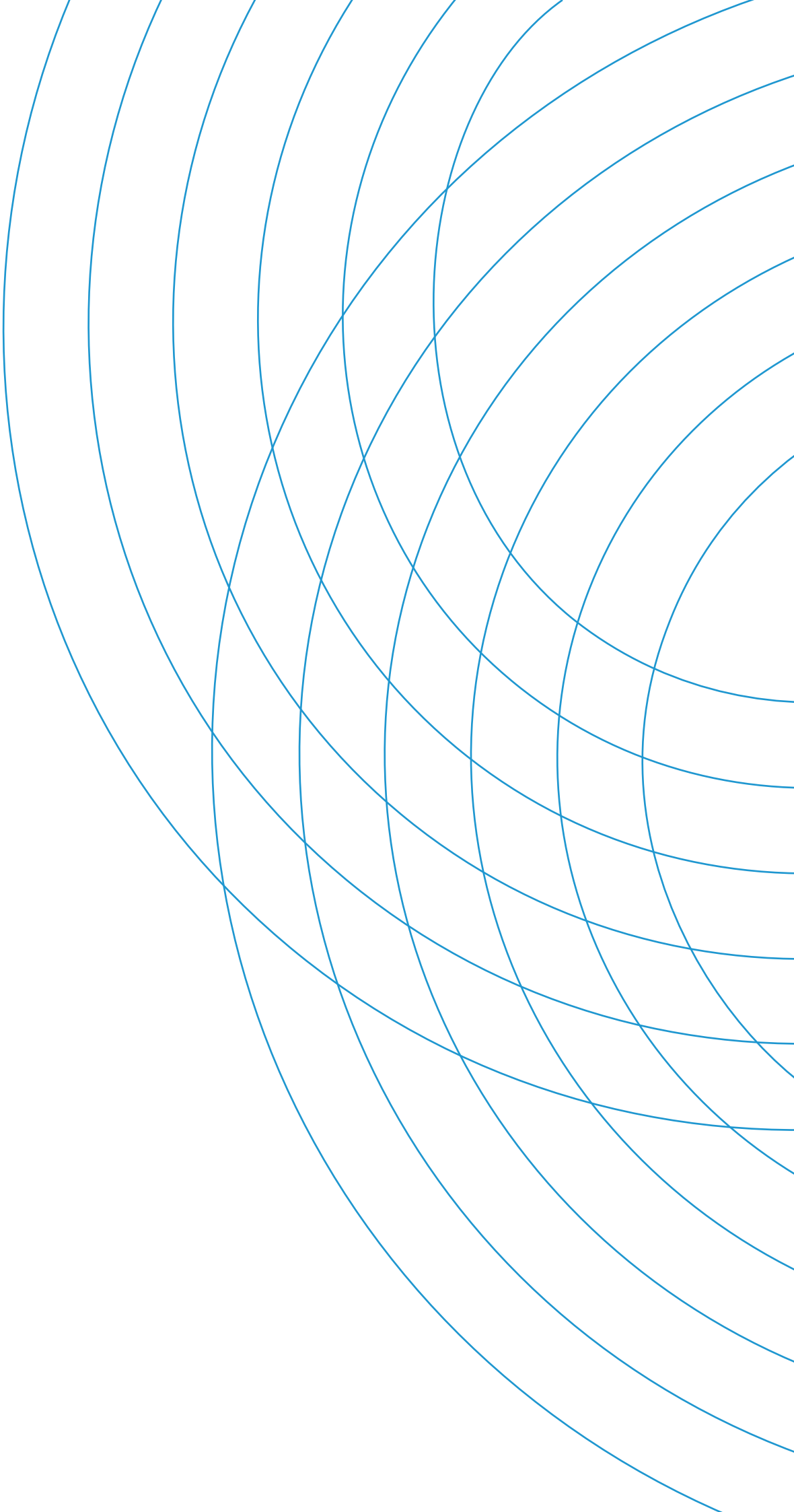
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
lagged dep var	0.635***	0.682***	0.506***	0.515***	0.478***	0.471***	0.419***
	(0.011)	(0.052)	(0.072)	(0.036)	(0.035)	(0.046)	(0.063)
Fdi	0.105***	-0.079	0.121*	0.360***	0.248***	0.259***	0.251***
	(0.034)	(0.055)	(0.069)	(0.034)	(0.081)	(0.072)	(0.042)
Open	0.011***	0.054***	0.070***	0.021***	0.052***	0.027***	0.053***
	(0.003)	(0.017)	(0.02)	(0.004)	(0.014)	(0.005)	(0.014)
Fertility	-1.095	-0.632**	-0.908***	-0.184	-2.042***	-0.900*	-1.002
	(0.281)	(0.315)	(0.246)	(0.222)	(0.620)	(0.504)	(0.653)
open x fdi	-0.001***	-0.0007*	-0.0006	-0.004***	-0.003***	-0.003***	-0.003***
	(0.000)	(0.0003)	(0.0005)	(0.00))	(0.000)	(0.000)	(0.000)
Open x fdi_ squared	0.0002***			0.0001***	0.0001***	0.0001***	0.0001***
	(0.000)			(0.000)	(0.000)	(0.000)	(0.000)
income (log)	0.696***	0.821***	1.673***	1.774***	4.153***	2.953***	1.199
	(0.09)	(0.268)	(0.575)	(0.63)	(1.162)	(0.988)	(1.162)
NA x open	-0.066***	-0.104***	-0.214***	-0.063***	-0.129**	-0.141***	-0.107***
	(0.016)	(0.033)	(0.054)	(0.019)	(0.053)	(0.052)	(0.032)
SSA x open	0.039***	0.013	-0.002		0.013		
	(0.011)	(0.017)	(0.026)		(0.013)		
LAC x open		-0.039***	-0.046***		-0.047**	-0.019*	-0.022***
		(0.01)	(0.012)		(0.018)	(0.011)	(0.018)
open_squared		-0.0001***	-0.0002**				
		(0.000)	(0.000)				
fdi_sq		0.003					
		(0.002)					
Secfem				0.0161***	-0.012	0.003	-0.008
				(0.008)	(0.016)	(0.011)	(0.010)
Time							0.108***
							(0.037)
Open* fertility							0.009
							(0.009)
Obs	490	490	490	330	330	330	330
A-B test (z)	-0.0307	-0.107	-0.324	-0.816	-0.817	-0.864	-0.988
Sargan test (chi2)	30.77	26.45	23.99	30.33	19.05	27.88	27.66

Details on source of data and variable description are in Appendix A.
* indicates significance at 0.10 ** indicates significance at 0.05 and *** indicates significance at 0.01.
a All RHS variables except 'time' are treated as endogenous.
We test for second-order autocorrelation and overidentifying restrictions (Sargan test) to assess the validity of the instruments and all reported estimates pass both tests. The results from the Arellano-Bond test indicate that there is no statistical evidence of second-order autocorrelation.

Appendix A
Description of the main variables and data sources

- sharewemp: Share of women in wage employment in the nonagricultural sector is the share of female workers in wage employment in the nonagricultural sector (industry and services), expressed as a percentage of total employment in the nonagricultural sector. Source: International Labor Organization Labor Statistics online database and World Bank's World Development Indicators online database.
- open: Openness to international trade (in log) measured as the sum of exports and imports of goods and services, measured as a share (%) of gross domestic product (net of exports to developed countries). Source: World Bank World Development Indicators online database.
- Soph: Export sophistication represented by the log of EXPY (The country's expected GDP per capita) which is calculated by summing all the PRODY values for the products exported by the country, each weighted by the product's share in total exports. PRODY is an outcome-based measure of sophistication: if a product is mostly produced by rich countries, then it is revealed to be a "rich," or sophisticated, product. PRODY is calculated as a weighted average of per capita GDP of countries producing that product, with weights derived from revealed comparative advantage. Source: World Integrated Trade Solutions online database.
- fdi: Net foreign direct investment. It represents the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is presented as a share (%) of gross domestic product. Source: World Bank World Development Indicators online database.
- fertility: Total fertility rate (births per woman) represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year. Source: World Bank World Development Indicators online database.
- secfem: Female school enrollment, secondary (% gross). This is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of secondary education level. Source: World Bank World Development Indicators online database.
- Income: GDP per capita (in log) based on purchasing power parity (PPP). Source: World Bank World Development Indicators online database.
- SSA: Dummy variable for sub-Saharan Africa.
- LAC: Dummy variable for Latin America.
- NA: North Africa





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