

Trading firms and the gender wage gap: evidence from South Africa*

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Abstract

Firms engaged in international trade account for a large share of South Africa's output and employment. Therefore, their behaviour has potentially large effects on national outcomes including gender inequality. In this paper, we test whether the gender wage gap (GWG) of trading firms differs from that of domestic firms based on a growing literature that has outlined how the special characteristics of trading firms could lead to such a different GWG. Using a unique employer–employee matched data panel from 2011 to 2016 for South Africa based on novel tax record data and employing various fixed effects regressions, we find that the GWG of trading firms is significantly larger than that of domestic firms. This holds even when controlling for unobserved individual and firm fixed effects that account for factors such as worker education or firm profitability. We also find that firms which both import and export (a crude proxy for foreign-owned firms) behave more equally than other trading firms. This could be driven by foreign owned firms that impose their more equal domestic pay structures on their South African affiliates and would emphasize the role of foreign investment for gender equality.

Keywords

Gender wage gap; international trade; employer–employee matched data; South Africa

JEL classification: F16; J16; J31

Introduction

There is a strong case for gender equality being a major contributor to economic development. According to World Bank (2017, 2018) estimates, the elimination of all forms of discrimination against women could raise global per capita productivity by 40%; at present earnings inequalities between men and women equate to an economic loss of \$160 trillion. A McKinsey Global Institute (2016) report suggests that adding 240 million more female workers to the global workforce could add \$28 trillion to global GDP. This would be particularly beneficial for developing countries where gender-based differences in the labour market are fairly pronounced.

A key determinant of female participation in the labour force is the gender wage gap (GWG). A smaller gap raises the opportunity costs of women staying outside the labour market and is therefore likely to boost female labour force participation (Galor & Weil, 1996). In this context, the influence of trade on gender (in)equality and the gender wage gap has recently caught the attention of academics and policymakers alike. At the World Trade Organization's Ministerial Conference in 2017, 121 member states and observers agreed to support the Buenos Aires Declaration on Women and Trade, which seeks to remove barriers to, and actively foster, women's economic empowerment through trade. New generation regional trade agreements, such as those between Chile and Uruguay or Chile and Canada, now include specific chapters devoted to gender equality.

Trade can affect gender inequality through various channels. For instance, import competition can lower the GWG by making it harder for firms to engage in wasteful discrimination (see for example Becker (1957), Artecona & Cunningham (2002), Black & Brainerd (2004) and Klein et al. (2013)). It can also lower the GWG by inducing a reallocation of resources towards female-intensive comparative advantage sectors or by incentivising technological upgrading, which reduces the demand for physical tasks that favour male labour (Aguayo-Tellez et al., 2014; Juhn et al., 2014). On the other hand, trade can widen the GWG by increasing firm profitability, which in turn exacerbates the GWG¹, or by exploiting women's weaker bargaining position leading to more part-work and lower wages (Ben Yahmed, 2017; Seguino 1997; Berik et al., 2004). Trade-induced specialization can also raise the GWG by diluting capital–labour ratios which benefit women if they are more complementary to capital than men (Sauré & Zoabi, 2014). Finally, trade can increase the GWG because it shifts resources to trading firms which have a preference for flexible workers since they deal with customers across different time zones. Women are usually perceived to be less flexible than men since they tend to be responsible for a larger share of domestic activities, such as child-rearing. As a result, trading firms might exhibit a wider GWG (Boler et al., 2018).

In this paper we contribute to the literature by examining the role of trading firms in gender inequality. As discussed above, there are counterbalancing effects between trade and the GWG and

we estimate the net effect at the firm level. As firms engaged in international trade account for 44% of total employment in the South African manufacturing sector, this net effect potentially constitutes a major driving force of the overall national GWG and can be a key tool for addressing it. Using several fixed effects regressions on a unique employer–employee dataset constructed from South African administrative data for the universe of manufacturing firms from 2011 to 2016, we find that South African firms engaged in trade have an almost 25% or 8 percentage points higher GWG than domestic firms. Once we control for unobserved firm-level differences, this difference actually turns positive. However, when we add individual-specific fixed effects that control for unobserved worker differences, the GWG of trading firms becomes higher than that of domestic firms again by a still considerable 1.5 percentage points.

The difference between regressions with and without firm-level fixed effects suggests that the larger GWG of trading relative to domestic firms in the South African context is partly driven by variables that are correlated with trading rather than trading itself. A likely culprit could be firm profitability as it makes costly discrimination more affordable. However, since the GWG of trading firms is again larger after adding individual-level fixed effects, a sizeable part of the original difference is indeed driven by the trading status itself. This second change additionally suggests that the female workforce of trading firms differs from that of domestic firms. One likely difference that could lead to the observed results is that trading firms hire more skilled women than domestic firms. By controlling for individual fixed effects this positive effect on the differential GWG of traders coming from a more skilled female workforce is accounted for such that the GWG due to the trading status (rather than workforce characteristics) increases again. So it could then mean that because trading firms potentially employ more skilled women, the GWG that is caused by the trading status of the firm is counteracted to some degree by the more skilled female workforce.

Using information on both the exports and imports of firms, we then show that there are also important differences between different types of trading firms. Separating firms that import only or export only from two-way traders (a crude proxy for foreign ownership), we find that two-way traders exhibit a more equal pay structure than the other groups. This is consistent with a foreign ownership channel which has been put forward in recent studies. These studies have found that foreign investors introduce their own corporate culture after takeovers, which tends to benefit women in relatively unequal societies (refer for example to Tang and Zhang (2017) and Kodama et al. (2018)). As foreign-owned firms are also more likely both to import and export, our findings support such an interpretation.

Our overall results suggest that the channels which lead to a positive correlation between trade and the GWG dominate channels working in the other direction. In particular, our evidence is consistent with trading firms requiring a more flexible workforce, exploiting women's weak bargaining position to become more competitive, and with using their higher profitability to engage in costly discrimination. As a result, trade liberalization might widen the overall GWG by shifting resources from domestic to trading firms. We also provide initial evidence that allowing for foreign investment from more equal countries could partly counteract this channel. This evidence is however, in the absence of actual information on foreign ownership, very preliminary.

Data

Our employer–employee data set was constructed from South African administrative data made available by SARS. The data that we use is uniquely suited to this research because of the link that we are able to make between the employer and employee. We not only have information on individuals (that allows us to calculate the gender wage gaps), but we also have information on the firms that those individuals work for (including information about their size and trading activities). As a result this data allows us to determine the effect that the firm's trading activities could have on the gender wage gap instead of only looking at the individual's characteristics as determinants of the gender wage gap.

To construct the dataset three main sources were used: job-level tax forms (IRP5 certificates) completed by employers on behalf of their employees, customs data for all export transactions from South Africa and the income tax returns submitted by corporate firms (CIT). From the IRP5 certificates the following variables were created at the individual level: weighted monthly income per employee,² a dummy variable for gender, the employee's age and tenure in each job.³

To construct an employer–employee matched dataset, the CIT and customs (employer) data were merged with the IRP5 (employee) data. The merging was made possible by using an anonymised conjunction table (linking the firms' identifiers from each dataset) provided by SARS. The employer data provided: the main industry code; the firm's trade status (if the firm was an exporter only, an importer only or a two-way trader); the value of the firm's trade (we excluded small and sporadic exporters trading

less than R10 000 per year); the number of products exported; and the number of destinations exported to.

The final panel included employer–employee matched data from 2010 to 2016 for all manufacturing firms in South Africa that submitted both their tax returns (CIT) and IRP5 forms. This implies that only employees that are of working age (between 15 and 65) and are formally working for a manufacturing firm are included in the sample.

Empirical approach

To examine empirically whether the gender wage gap in South Africa is influenced by the trading status of firms, we follow Boler et al. (2018) by estimating so-called Mincerian (Mincer, 1974) wage equations in which the wage of an individual is regressed on various individual characteristics, such as age, and characteristics of the firm it works for, such as firm size.

We show four sets of analysis (or estimations) that become progressively more conservative through the adding of different sets of fixed effects⁴ to a baseline specification. The first set of our analysis investigates the influence that a firm's trading status has on the GWG, by showing estimates of an equation that regresses the monthly income (of a worker employed by a firm in an industry at a particular time) on a dummy variable (equal to 1) for women and a dummy variable for the trading status of a firm that, depending on the specification, is equal to 1 if a firm either imports only, exports only, or both imports and exports. The key variable is the interaction between the two dummy variables which tells us whether the GWG in trading firms is different from that of domestic firms.

The first set of analysis provides only a preliminary or, in technical terms, unconditional view of the influence that a firm's trading status has on the GWG, since it does not consider gender-specific differences in employment across industries among other things. If more men are employed in high-wage and trade-intensive industries than women, this selection effect could explain our results rather than the difference between trading and domestic-only firms. To exclude such bias, we add industry–year fixed effects in the second set of analysis.

In the third set of analysis, we consider within-firm changes to control for the gender composition not only within industries but also within firms with different international trade statuses. As a firm's trade status is correlated with a set of unobserved, firm-specific variables such as productivity and profitability, which might also correlate with their gender composition, the first two analyses might have misallocated GWG differences to firms' export statuses which were in fact driven by such unobserved covariates. By incorporating firm-fixed effects, we have eliminated this source of endogeneity such that the variation now stems from employees at firms that change their trading status within our seven-year period or from employees who have switched between employers with different trading statuses. It is important to note that the first source of variation is then based on a very specific set of firms, which might not be representative of the wider set of trading firms. The second set of variation should however make sure that our results are representative.

Unobserved differences between firms are just one source of heterogeneity that might bias the results. The second source is differences between individuals over and above the observed characteristics that we control for, namely gender and age. This is important since our dataset contains very little information about worker characteristics such as education, race or occupation. To account for this, we add individual-level fixed effects in the fourth set of analysis. Consequently, gender-specific differences in the workforce composition of domestic and trading firms, whether related to education or any other factor, could not bias our results. For example, if trading firms hire on average more educated women than domestic firms, the first three analyses could have assigned these differences to the trading status rather than education. This is no longer the case in the fourth set of analysis. The variation we use still stems from firms that have changed their trading status within our sample period and employees who have switched to firms with a different trading status.

Our various fixed effects ensure that our results are unlikely to be driven by omitted variables bias which could arise if a variable that is missing from our empirical specification is both correlated with our variable of interest, the interaction between the female and the trading dummy, and the wage of a worker. However, an important caveat that remains is reverse causality if firms become exporters exactly because they pay women less making their prices more competitive. Ultimately, this is not a main concern for us since from a policy perspective it doesn't necessarily matter in which direction causality runs. In both cases complementary policies are required to address this inequality. In addition, the extensive literature showing that trading firms pay a wage premium⁵ makes it unlikely that this channel is very strong. Nevertheless, it is necessary to keep this issue in mind when interpreting our results.

Results

What the figures say

Table 1 provides an overview of the distribution of workers between traders and non-traders, as well as between different types of traders (two-way traders, importers only and exporters only). It also shows the mean income and age of all these types of firms. What stands out is that trading firms account for a considerable share of employment (44%). As a result, the behaviour of trading firms is a major determinant of labour market outcomes. In that context it is interesting to note that when considering the distribution of workers – more specifically the share of women in the different types of firms – the data suggests that all trading firms (two-way traders, importers only and exporters only) employ only a slightly smaller percentage of women than non-trading firms.

Table 1: Trading vs. non-trading firms

	No international trade		Exporter only		Importer only		Two-way trader		All	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Mean income (Current ZAR)	28 375	19 757	13 108	9 817	14 855	10 750	32 266	17 973	27 989	18 095
Mean age	36.2	35.9	37.2	37.6	36.3	36.5	37.8	36.3	36.4	36.2
Gender share within firm type	64%	36%	67%	33%	67%	33%	66%	34%	65%	35%
Gender distribution across firm types	36%	20%	4%	2%	4%	2%	21%	11%	65%	35%
Total share in labour force	56%		6%		6%		32%		100%	

Source: SARS data (Pooled data 2011 – 2016)

When comparing the mean income of men and women, it is evident that there is a GWG in all types of firms. Figure 1 provides a visual representation of the GWG in Table 1. Two-way trading firms pay the highest wages, but these firms also have the widest GWG. In two-way trading firms the mean female income as a percentage of mean male income is 55.7%. In non-trading firms, the corresponding figure is 69.6% while for exporters only and importers only, it is 74.9% and 72.4% respectively.



Figure 1: Gender wage gap by type of (trading) firm (Current ZAR)

Source: SARS data (Pooled data 2011 – 2016)

Does a firm's trading status affect the GWG?

Table 2 presents the results for the four sets of analysis using a random 30% sample of firms (each column represents a set of analysis as explained in section 3).⁶ We define firms as trading irrespective of whether they import, export or do both, since many of the channels linking trade to the GWG, such as the flexibility gap channel, should be independent of the type of trade a firm conducts. In line with the channels that predict a larger wage gap among trading firms, we find that traders exhibit a wider GWG than domestic firms both when unobserved firm and employee characteristics are taken into account and when not.

Column 1 shows that the average GWG conditional only on age and age squared of an employee in non-trading South African manufacturing firms is 34%, which is close to the 37% global GWG average for 2018, according to the World Economic Forum (2017). For trading firms it is 8% wider resulting in a substantial 42%. As the wage premium for men is fairly high at 46%, this nevertheless implies that women in trading firms earn on average 38% more than women in domestic firms but only 4% more than men in domestic firms.

Table 2: Gender wage gap: Domestic vs. trading firms

	(1)	(2)	(3)	(4)
Female	-0.343*** (0.003)	-0.246*** (0.003)	-0.183*** (0.004)	
Trading firms	0.463*** (0.002)	0.407*** (0.0019)	-0.016*** (0.004)	0.007*** (0.003)
Female* trading firms	-0.080*** (0.002)	-0.051*** (0.0023)	0.014*** (0.004)	-0.015*** (0.004)
Industry-year fixed effects	No	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes
Individual fixed effects	No	No	No	Yes
Observations	1 998 970	1 998 970	1 994 623	1 831 269
R-squared	0.136	0.218	0.526	0.887

Source: SARS data (Pooled data 2011 – 2016)

Standard errors in parentheses. Additional controls include age and age squared.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Once we control for industry-time fixed effects in column 2, the GWG in domestic firms narrows considerably to around 25%, suggesting that women tend to work in manufacturing industries that pay on average lower wages such as textiles. Both the trading wage premium for men and the differential GWG of trading firms decrease slightly, which suggests that South African firms in high-wage industries are more likely to trade than firms in low-wage industries. As women are overrepresented in low-wage industries, not controlling for industry-fixed effects overstates the GWG of traders.

The addition of firm-fixed effects in column 3, and thus the focus on firms that switched their trading status in our seven-year period or workers that newly joined trading firms, changes the coefficients significantly. The GWG shrinks in domestic firms but only to about 18%, suggesting that a substantial proportion of gender wage inequality, over half of the total, exists within firms. This is possibly due to differences in occupations of men and women with men occupying more senior positions. Interestingly, the trading wage premium for men contracts considerably and turns negative, which seems to indicate that a large share of the premium is due to firm-specific differences such as higher productivity of trading firms rather than their trading status.

The key change in the results, however, is that the difference in the GWG between traders and non-traders becomes small and turns positive – that is, firms engaged in international trade exhibit a smaller GWG than firms that do not trade once unobserved firm characteristics are taken into account. For instance, trading firms are on average more profitable than domestic firms which would allow them to engage in costly discrimination. In such a case, not controlling for firm-fixed effects would wrongly assign gender wage discrimination to the trading status as opposed to profitability. It is important to note though that profitability is only one possible, and likely, alternative explanation but in the absence of actual observations of firm profitability we cannot say which variable is behind our results.

In column 4 we finally add individual-level fixed effects. Given the paucity of data on the characteristics of employees, this is crucial for capturing differences in skills, experience and other

factors in which the workforce of traders and non-traders might differ by gender. This obviously does not allow us to observe the GWG anymore but we can still observe wage premia of trading firms for men and women. First we find that the trading wage premium for men turns positive again but remains very small, suggesting that the results in column 3 were biased against trading firms. Similarly, the coefficient capturing differences in the GWG between traders and non-traders switches sign again and becomes negative with a magnitude of 1.5 percentage points, which is quite large given the different fixed effects.

This supports the conclusion that channels which lead to a larger GWG in trading firms relative to domestic firms dominate channels that lead to a smaller gap in a developing country context. Based on the literature discussed in the introduction, these channels could in particular be that trading firms require more flexibility from their workforce, that trading firms exploit women's weak bargaining position and underpay them in order to become more competitive, and that trading firms are more profitable than domestic firms allowing them to engage in costly discrimination by relatively overpaying men.

The change in the sign of the coefficient between the regressions using firm-fixed effects and those using both firm and individual-level fixed effects further indicates that individual characteristics of female workers in trading firms differ from those in domestic firms. Since the absence of individual fixed effects makes trading firms appear less discriminatory (the coefficient was positive), this must be a characteristic that leads to higher wages. We consider trading firms employing on average more skilled women as the most likely explanation but unfortunately we cannot test this explicitly in the absence of actual information on workers' education levels.

Evidence on a new channel: Importers, exporters, two-way traders and the GWG

We look next at possible differences between South African trading firms by differentiating between firms that import only, export only, and engage in two-way trade. This is a novelty in the literature. We see in Table 3 that the wage premia of two-way traders are significantly larger than the premia of exporters only or importers only. More importantly for our purposes is that the wage premia of two-way traders for men and women are more equal than the premia of exporters only and importers only. In our conservative estimations with either firm-fixed effects in column 3 or with firm and individual fixed effects in column 4, women employed by two-way traders experience either a larger trading premium or an equivalent one when compared to men.

Table 3: Gender wage gap: Domestic vs. trading (in terms of trading status)

	(1)	(2)	(3)	(4)
Female	-0.343*** (0.003)	-0.246*** (0.003)	-0.183*** (0.004)	
Exporters	0.084*** (0.004)	0.109*** (0.004)	-0.044*** (0.005)	0.008** (0.003)
Female* exporters	-0.027*** (0.006)	-0.064*** (0.006)	-0.007 (0.006)	-0.021*** (0.005)
Importers	0.184*** (0.004)	0.186*** (0.004)	0.020*** (0.006)	0.009** (0.004)
Female* importers	-0.114*** (0.005)	-0.098*** (0.005)	-0.038*** (0.007)	-0.031*** (0.005)
Two-way traders	0.557*** (0.002)	0.488*** (0.002)	0.025*** (0.005)	0.016*** (0.003)
Female* two-way traders	-0.086*** (0.003)	-0.045*** (0.003)	0.024*** (0.006)	-0.002 (0.004)
Industry-year fixed effects	No	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes
Individual fixed effects	No	No	No	Yes
Observations	1 577 813	1 577 813	1 577 813	1 577 813
R-squared	0.107	0.098	0.099	0.107

Source: SARS data (Pooled data 2011 – 2016)

Standard errors in parentheses. Additional controls include age and age squared.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

This could suggest that the flexibility, bargaining or profitability channels are not at work in two-way traders or that another channel counteracts them. Assuming that the former hypothesis is unlikely given that two-way traders are more, and not less, profitable and likely to work across more time zones, we suspect that the latter is the case. In particular, we suspect that the two-way trader dummy works as an, admittedly very crude, proxy for foreign ownership. From our own calculations using the World Bank's Enterprise survey of South Africa 44.6% of two-way traders are foreign owned, as opposed to only 34.2% of exporting firms being foreign owned and 28% of importing firms being foreign owned.⁷ If this is the case, our evidence would suggest that FDI could support gender inequality in developing countries and make trade more equal. The hypothesis is based on two recent studies discussed in the introduction that have shown that investors from relatively gender-equal countries implement their domestic corporate culture in their foreign affiliates leading to a more beneficial working environment for women. We have to emphasize however that in the absence of actual information on foreign ownership this is only preliminary evidence for the presence of such a channel in South Africa.

Conclusions

The impact of trade on gender (in)equality has been on the agenda of trade policy makers since the adoption of the UN Sustainable Development Goals and the WTO Buenos Aires Declaration on Women and Trade. Trade theory proposes that trade liberalization leads to a reallocation of resources from domestic firms to traders. Moreover, trading firms employ close to half of all employees in formal South African manufacturing. Therefore, it is crucial to determine whether there are systematic differences between labour market outcomes for women in firms engaged in trade and other, domestically focused firms.

In this paper, we have shown that, in line with evidence from high-income countries, such differences exist in South Africa for most trading firms and that they are large. In particular, trading firms exhibit a 25% or 8 percentage point larger GWG than domestic firms. Even after controlling for a wide variety of alternative explanations for such a result by using fixed effect regressions, the difference is still equal to a considerable 1.5 percentage points. This suggests that at least by shifting resources from domestic to trading firms, trade liberalization might increase the overall GWG and contribute to gender inequality⁸.

We have also found, though, that other channels can counterbalance such an effect. We have shown that firms that both export and import behave more equally than firms that only import or only export. We take this as very preliminary evidence that foreign ownership might be relevant in this regard in so far as foreign ownership is more prevalent among two-way traders. The mechanism behind it would be that foreign firms from relatively more gender-equal societies introduce their domestic pay structures in acquired companies.

In summary, our paper is most closely related to recent research on Norway by Boler et al. (2018) which is the only other study that uses matched employer-employee data to study the link between trade and the GWG. Similar to this paper, it finds that exporters exhibit a higher GWG. Due to the richness of its data, the study can pin down the higher flexibility requirements of exporters as the driving force behind this result using differences in time zones across trading partners as identification. While in our paper we can only identify net effects but not the driving mechanisms. We can, however, add to the evidence from a very specific high-income country with results from a developing country where the issue of gender equality tends to be more pressing. In addition, we provide evidence that there is additional variation within trading firms which could point to the positive role of foreign investment for gender equality. Finally, we are only the second study that uses very detailed administrative matched employer-employee data to study the link between trade and gender inequality. This allows for a much cleaner identification than sector- or country-level data used in previous studies.

Going forward, we plan to complement our gathered evidence with alternative definitions of a firm's trading status, using the share of exports and imports in sales and inputs, the number of destinations and the number of products exported or imported, to get a better idea of which channels are more relevant than others for the trade-GWG link. Furthermore, we foresee using information on export and import partners to test whether gender (in)equality in the trade partner affects the results. We also plan to use a complementary dataset with explicit information on foreign ownership to see if our results are indeed driven by foreign-owned firms.

REFERENCES

- Aguayo-Tellez, E., Airola, J., Juhn, C., and Villegas-Sanchez, C., 2014, "Did Trade Liberalization Help Women? The Case of Mexico in the 1990s", in Solomon W. Polachek, Konstantinos Tatsiramos (eds.), *New Analyses of Worker Well-Being (Research in Labor Economics, Volume 38)*, Emerald Group Publishing Limited, 1–35.
- Artecona, R., and Cunningham, W., 2002, "Effects of trade liberalization on the gender wage gap in Mexico", *World Bank Working Paper No. 34144*.
- Becker, G.S., 1957, *The Economics of Discrimination*, Chicago, IL: The University of Chicago Press.
- Ben Yahmed, S., 2017, "Gender wage discrimination and trade openness. Prejudiced employers in an open industry", *ZEW Discussion Paper No. 17-047*.
- Berik, G., van der Meulen Rodgers, Y., and Zveglic, J.E., 2003, International Trade and Gender Wage Discrimination: Evidence from East Asia, *Review of Development Economics* 8(2): 237–254.
- Bernard, A.B., Jensen, J.B., and Lawrence, R.Z., 1995, "Exporters, Jobs, and Wages in US Manufacturing: 1976–1987", *Brookings Papers on Economic Activity Microeconomics* 1995: 67–119.
- Bezuidenhout, C., Matthee, M., and Rankin, N., 2018, Employment and wage premiums in South African manufacturing exporters: Firm-level evidence, *Development Southern Africa* 36(5): 632–650.
- Black, S.E., and Brainerd, E., 2004, Importing Equality? The Impact of Globalization on Gender Discrimination, *Industrial and Labor Relations Review* 57(4): 540–559.
- Boler, E., Javorcik, B., and Ulltveit-Moe, K.H., 2018, Working across time zones: Exporters and the gender wage gap, *Journal of International Economics* 111(C): 122–133.
- Fantom, N. and Serajuddin, U., 2016, "The World Bank's classification of countries by income", *The World Bank Policy Research Working Paper No. 7528*: 1-50.
- Galor, O., and Weil, D. N., 1996. The Gender Gap, Fertility, and Growth, *American Economic Review* 86(3): 374-387.
- Irrarrazabal, A., Moxnes, A., and Ulltveit-Moe, K.H., 2013, Heterogeneous firms or heterogeneous workers? Implications for the exporter premium and the impact of labor reallocation on productivity, *Review of Economics and Statistics* 95(3): 839–849.
- Juhn, C., Ujhelyi, G., and Villegas-Sanchez, C., 2014, Men, Women, and Machines: How Trade Impacts Gender Inequality, *Journal of Development Economics* 106: 179–193.
- Klein, M.W., Moser, C., and Urban, D.M., 2013, Exporting, skills and wage inequality, *Labour Economics* 25: 76-85.
- Kodama, N., Javorcik B., and Abe, Y., 2018, Transplanting corporate culture across international borders: Foreign direct investment and female employment in Japan, *The World Economy* 41(5): 1148–1165.
- Martins, P., and Opromolla, L.D., 2011, "Why Ex(Im)porters Pay More: Evidence from Matched Firm-Worker Panels", *IZA Discussion Papers No. 6013*.
- McKinsey Global Institute, 2015, "The Power of Parity: How Advancing Women's Equality Can Add \$12 Trillion To Global Growth", *McKinsey & Company*.
- Sauré, P., and Zoabi, H., 2014, International trade, the gender wage gap and female labor force participation, *Journal of Development Economics* 111 (C): 17–33.
- Seguino, S., 1997, Gender wage inequality and export-led growth in South Korea, *Journal of Development Studies* 34(2): 102–132.
- Tang, H., and Zhang, Y., 2017, "Do Multinationals Transfer Culture? Evidence on Female Employment in China", *CESifo Working Paper Series No. 6295*.
- World Bank. (2007). *South Africa Enterprise Survey - 2007*. Available from <https://www.enterprisesurveys.org/en/data/exploreconomies/2007/south-africa>.
- World Bank Group, 2017, "Doing Business Report", Washington, DC: World Bank.
- World Bank Group, 2018, "Unrealized Potential", Washington, DC: World Bank.

World Economic Forum, 2017, “The Global Gender Gap Report 2017”, Geneva: World Economic Forum.

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¹ Increasing profitability of firms could increase the GWG because firms with greater profitability could afford to discriminate despite the potential costs of discrimination (See Becker (1957)).

² As the number of days worked differs between jobs, the monthly wages variable was calculated by dividing the income by the number of days worked to get the daily wage equivalent. This was then multiplied by 30 to get the monthly wage equivalent.

³ The available data on individual characteristics was limited. The IRP5 only shows an employee's age and job tenure; there is no data on skills level or education.

⁴ If there are any industry/ firm / individual specific characteristics which are not captured by the explanatory variables in the analyses, then we add industry/ firm / individual fixed effects to account for this.

⁵ This line of inquiry has established that exporters pay a significant wage premium, which shrinks but remains significant when both observed and unobserved firm and worker characteristics are accounted for (Bernard et al., 1995; Irarrazabal et al., 2013). Bezuidenhout et al. (2018) found that this pattern also emerges among South African manufacturers. In this regard, Martins and Opromolla (2011) highlight that it is important to also account for the importing activity of firms to avoid attributing effects solely to exporting.

⁶ Limiting the sample size was necessary because of the limited server capacity at the South African Treasury which hosts the data.

⁷ Importers are defined as any firm that imports some of their inputs. Exporters are defined as any firm that exports 10% or more of their sales. Foreign owned firms are any firm of which 10% or more is owned by a foreign entity.

⁸ It is important to note that our results cannot conclusively say that trade liberalization widens the GWG as there might be indirect, so called general equilibrium, channels which counteract the effect we observe. If these channels do not operate at the level of the firm or individual, we do not capture them. An example is that trade can shift resources from male-intensive sectors like machinery to female intensive sectors like textiles. This would reduce the GWG but is not part of our study due to industry-level fixed effects.



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