

Foreign direct investment and gender inequality: evidence from South Africa⁺

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We study an often-overlooked factor behind gender inequality: globalization, in particular, foreign direct investment (FDI). Building on a growing literature that studies the impact of trade and FDI on gender inequality, we test whether foreign-owned firms exhibit a different gender wage gap (GWG) than firms with domestic ownership, using unique South African administrative matched employer-employee data. We find that the unconditional GWG is substantially smaller in foreign-owned firms than in firms with domestic ownership. We also find that for foreign-owned firms this difference is reversed once we control for a large set of fixed effects. In our preferred specification, foreign-owned firms have a larger GWG of about 2.4 percentage points. The share of women employed in foreign firms is lower than in firms with domestic ownership, in contrast to similar studies, which may indicate an underlying inequality in opportunities for women within a developing country context.

Keywords: employer-employee matched data, FDI, gender wage gap, globalization, South Africa

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1. Introduction

Inequality is at high levels in many developing countries across the world, including in South Africa. According to the International Monetary Fund (2020), the country has one of the highest and most persistent levels of inequality in the world on the basis of various measures such as the Gini coefficient. This can negatively affect social cohesion and hinder economic growth.¹

Inequality is driven by many factors. One such factor is globalization in its many different aspects, from trade to investment and capital flows. Although the impact of globalization on inequality has been widely studied, many studies focus on income inequality. Yet inequality comes in many facets, one being gender inequality.

South Africa has high levels of gender inequality and, just like income inequality, this can slow economic growth by reducing the entry of women into the workforce.² The World Trade Organization highlighted the role of globalization in gender inequality in the Buenos Aires Declaration on Women and Trade adopted during its ministerial meeting in 2017. In line with this declaration, there is a growing literature that assesses the impact of trade and investment on gender inequality. This literature has identified different channels through which trade affects gender gaps in employment and in wages.

In particular, it has shown that trade causes a resource reallocation across sectors that can benefit or harm women by raising demand for male or female labour (e.g. Sauré and Zoabi, 2014). It also affects competition and profitability, which changes the scope for discrimination (e.g. Ben Yahmed, 2017; Black and Brainerd, 2004), and it incentivizes technological upgrading that typically favours female skills (Aguayo-Tellez et al., 2014; Juhn et al., 2014). Another channel relates to the requirements of exporters and importers. As these firms typically require more flexibility with respect to work hours and business travel, they prefer male employees (Bøler et al., 2018; Bezuidenhout et al., 2019).

This last channel highlights the importance of working conditions and corporate culture for the relationship between globalization and gender inequality. Such a channel is most likely more pronounced within transnational corporations (TNCs). These firms tend to be more closely linked with foreign buyers and suppliers and, thus, require a more flexible workforce. Foreign direct investment (FDI) is also more likely to lead to a transfer of corporate culture than are simple trade linkages.

¹ For a recent review of the impact of inequality on growth, see Boushey (2019).

² For a recent review of the link between gender inequality and economic growth, see World Bank Group and World Trade Organization (2020). It also reviews the literature on trade and gender inequality.

The empirical literature on FDI and gender inequality has produced mixed results. Some studies find positive effects of FDI, whereas others find negative effects. Recent efforts highlight the importance of using employer-employee matched data sets in this context as unobserved individual and firm characteristics can cause sharp changes in the findings. However, studies using such granular data focus exclusively on developed countries.

In this paper, we contribute to the literature by examining gender wage gaps (GWGs) in firms with either domestic or foreign ownership³ in a developing country context. We exploit a unique panel of administrative matched employer-employee data from the South African manufacturing sector for the years 2010–2016. We observe first that the GWG of foreign-owned firms is about five percentage points smaller than the GWG of firms with domestic ownership. Then, a more rigorous empirical analysis controlling for a large set of fixed effects reveals that this difference in the unconditional GWGs is driven by relative differences in the abilities of women working for foreign-owned firms. Foreign-owned firms seem to employ particularly able women, which explains the lower GWG. Once we take this into account, we find that foreign-owned firms actually underpay female employees and exhibit a larger GWG than firms with domestic ownership by about 2.4 percentage points. We also observe that the share of women employed in foreign firms is lower than in firms with domestic ownership, in contrast to similar studies.

Our paper addresses an important gap in the literature by exploiting employer-employee matched data to study the impact of FDI on gender equality with a focus on a developing country. FDI tends to play a much larger role and GWGs tend to be wider in developing countries. Hence, it is important to examine whether relationships identified in the context of relatively equal developed economies are informative for countries that offer very different conditions for foreign-owned firms.

The remainder of this paper is structured as follows. Section 2 provides a brief literature overview, section 3 introduces the empirical approach and section 4 describes the data and presents some descriptive statistics. Section 5 discusses the results of the econometric analysis and section 6 concludes.

³ A foreign-owned firm is defined as a firm over which a foreign holding company has ultimate control either through a majority of shares or through alternative arrangements transferring control.

2. Literature overview

2.1 FDI and gender inequality

In the globalized world, countries have become increasingly integrated through trade and investment. Although trade and portfolio investment offer opportunities for developing countries through arms-length integration, FDI represents long-term, deeper economic integration and is considered an important element of these countries' growth strategies (Blanton and Blanton, 2015). The opportunities that arise from deeper economic integration through FDI have been well documented. Benefits range from financing savings gaps to increasing human capital and enabling domestic firms to benefit from technological spillovers created by foreign-owned firms (OECD, 2002; Kinda, 2012). Girma et al. (2019), in their study of Chinese firms, specifically take note of wage differentials between foreign-owned and domestic firms, whereby they argue that FDI is a channel for emerging economies to raise their living standards.

Although FDI brings opportunities to host countries, these may not be shared equally (Doh, 2018). A recent survey of empirical literature by Hale and Xu (2016) confirms that foreign ownership creates a skills premium through an increase in demand for skilled labour in both developed and developing host countries. The skills premium contributes also to an increase in average productivity and wages, which adds to wage inequality. Nonetheless, in the literature on developing countries, the authors find consensus that foreign ownership has a positive effect on employment.

The literature on the unequal distribution of opportunities in terms of wages and employment has evolved to increasingly emphasize an added layer of complexity by considering these through a gender lens. Evidence on the outcomes of foreign ownership on gender inequality vary. In some cases, they are positive towards the reduction in gender inequality whereas in others, the outcomes are negative (Bui et al., 2018). We consider these outcomes of foreign ownership on gender inequality through two strands of literature, namely the share of women employed by foreign-owned firms and through the GWG between men and women.

Generally, foreign ownership is associated with larger shares of female employment. A few empirical studies in this regard highlight this association. Foreign ownership is studied by both Kodama et al. (2018, using employer-employee data for Japan) and by Tang and Zhang (2016, using manufacturing firm-level data for China). The authors find that foreign affiliates are more likely than domestically-owned firms not only to employ women, but also to provide them with more career-enhancing opportunities (e.g. promotion to managerial or CEO positions). Moreover, Siegel et al. (2019) point out that in South Korea, foreign affiliates that hired women locally improved both their productivity and their profitability.

The impact of foreign ownership on the GWG is, nonetheless, ambiguous (Magda and Salach 2019). Concurrent efforts showcase empirical evidence on both a reduction and an increase in the GWG through FDI, in cross-country and within-country contexts. Oostendorp (2009) provides a cross-country study of the impact of trade and FDI on the occupational GWG. He discovers that, controlling for occupation, the GWG decreases with FDI in high-income countries but finds no conclusive evidence for an effect in low- and medium-income countries. Quedraogo and Marlet (2018) conduct an analysis on 94 developing countries and conclude that FDI is negatively associated with the GWG. Within-country case studies show similar positive effects of FDI's influence on the GWG. For example, Glick and Roubaund (2006) consider FDI in export processing zones through the use of Madagascan labour force surveys, finding that these zones pay women higher wages relative to their skills, and that payment for men and women is on par. Similar findings are produced by Davin (2004) for Chinese export processing zones and by Aguayo-Tellez et al. (2014) for Mexican maquiladoras. Decomposing household survey data on Cambodia's manufacturing sector, Helble and Takeda (2020) conclude that the GWG in formal manufacturing is reduced through FDI (but not in the garment industry, which is the foundation of the economy and employs most women).

Evidence to the contrary is illustrated by Friedman et al. (2009) in a study utilizing microdata from Chile's Supplementary Income Survey. They find that men in sectors with a higher degree of FDI intensity (such as manufacturing) receive on average 27 per cent higher wages than women. Men also receive higher wages within sectors with low degrees of FDI openness (such as services), albeit slightly lower (on average 20–22 per cent higher than those of women). Through the analysis of household income and expenditure surveys, Braunstein and Brenner (2007) concur that the GWG between men and women in China has increased because of industrial upgrading that requires more male workers.

Recently, the evidence on the effect of FDI on the GWG has shifted towards the utilization of matched employer-employee data, as can be seen for Japan (Greaney and Tanaka, 2020), Estonia (Vahter and Masso, 2019), Norway (Boler et al., 2018), Poland (Magda and Salach, 2019) and Finland (Loumaranta et al., 2020). All find larger GWGs in foreign-owned firms, with the exception of the study on Japan. This work highlights the importance of using granular data, as the inclusion of employee fixed effects leads to significant changes to the coefficients; however, this work so far focuses exclusively on developed countries. Most of these countries are considered to have low levels of gender inequality (as illustrated through their position among the top 30 countries in the 2019 Gender Inequality Index of the United Nations Development Programme) and depend less on FDI. This underscores the contribution that our study makes in exploiting the availability of matched employer-employee data in a developing country context.

South Africa is a particularly interesting context in which to focus on inequality for three reasons. First, it has been marred by a legacy of exclusion. When apartheid ended, the country experienced its first democratic election in 1994, a first step towards inclusion. Yet, due to the deep-rooted nature of exclusion, it still struggles with one of the highest levels of income inequality in the world. Second, great strides have been made in restructuring South Africa's labour laws to encourage women's participation in the labour market, which contributed to improved participation by women (Lepelle et al., 2017). Unfortunately, South Africa remains among the lower end of the 2019 Gender Inequality Index (in the 97th position). Third, when South Africa became reintegrated into the global economy in the early 1990s, FDI was touted as a measure to enhance growth; however, income inequality is exacerbated by those who are able to partake in the opportunities that FDI provides. In this sense, as we see from the discussion above, high levels of gender inequality arising from FDI can be a significant factor behind South Africa's aggregate levels of income inequality.

2.2 Transmission channels

Before concluding the literature review, it is useful to briefly summarize the channels through which FDI influences the GWG, namely economic discrimination, technology transfer, human resource practices and flexibility (Vahter and Masso, 2019). The first channel, economic discrimination, is formed around the seminal work of Becker (1957). In his research on the economics of discrimination he foresaw that the scope for discrimination can be limited by increasing competition. This implies that foreign-owned firms, because of exposure to competition from abroad, are limited in their ability to discriminate in a costly manner, thus allowing for a more effective allocation of resources within the firm. Likewise, domestically-owned firms are exposed to greater competition from the foreign affiliates, also lowering their ability to discriminate. Ultimately, the GWG would be lower in both foreign affiliates and domestically-owned firms (Vahter and Masso, 2019). Furthermore, the GWG may decrease if FDI is invested in specific sectors that are export oriented and female labour intensive. Such investment will lead to resources being reallocated towards female-labour-intensive comparative advantages, which will ultimately result in inter-industry reallocation and women earning higher wages (Aguayo-Tellez et al., 2014; Vahter and Masso, 2019).

In the second channel – technology transfer – foreign ownership stimulates upgrading as well as technological transfer. This lowers the demand for physical tasks usually performed by men (Juhn et al., 2014), and female workers have an advantage in cognitive skills relative to physical skills. As technologies are therefore complementary to female workers, both the relative demand for and the wages of women will rise (Aguayo-Tellez, 2012; Vahter and Masso, 2019).

Influencing the GWG through the third channel – human resource practices – implies that the foreign affiliate transposes its home country's culture and norms to the host country. In a study of Japan, which is an unequal society in terms of gender equality, Kodama et al. (2018) show that foreign affiliates transferred their gender norms to their human resource practices (which included the share of female employees, the flexibility of working hours and childcare services at the workplace), thus narrowing the GWG. In an African context, Hoxhaj and Miti (2020) show through an analysis of 1,700 firms in 19 sub-Saharan countries (controlling for firm-specific characteristics) that foreign firms originating from more gender-equal societies tend to employ a higher share of female workers. The contribution of Fernandes and Kee (2020) on Bangladeshi firms extends this idea by investigating the gender labour practices of Bangladeshi firms that have the same local suppliers or customers as foreign-owned firms. They find that these firms employ a larger share of female administrative workers.

The fourth and final channel – flexibility – can widen the GWG when higher-skilled employees in foreign affiliates need to work longer hours and travel more than employees in domestically-owned firms. Boler et al. (2018) find that the degree of flexibility may increase when working with affiliates in other countries in different time zones. As the authors stated, women are usually less flexible in their working hours because most household responsibilities, for example childcare, are usually theirs. As having young children is regarded as a penalty on flexibility, the GWG for foreign-owned firms is larger than for domestically-owned firms (Vahter and Masso, 2019).

In summary, we build on a growing literature that studies the impact of trade and FDI on gender inequality by examining a small, open economy that encourages FDI but has high levels of both income and gender inequality.

3. Empirical approach

We want to estimate the impact of a firm's ownership status on the GWG in order to establish how transnational corporation (TNC) activity affects wage-based gender inequality in South Africa. To do this, we follow a standard empirical approach used in the literature on trade and gender equality.⁴ That is, we estimate a Mincerian (Mincer, 1974) wage equation at the individual level that controls for an individual's gender, whether he or she works for a firm with foreign ownership and an interaction between these two variables. Foreign ownership is determined by the company

⁴ See, for instance, Boler et al. (2018) and Bezuidenhout et al. (2019).

report in tax forms on whether their ultimate holding company⁵ is a resident of another country. We also control for the individual characteristics that are observed in the data, namely age and age squared, and whether a firm trades, given that the large majority of foreign-owned firms export and import which could cause us to assign a trade effect to the TNC variable. As the data do not provide sufficient individual or firm-level characteristics to exclude the possibility that our estimates suffer from omitted variable bias, we add sequentially several multi-dimensional fixed effects to account for this issue. To obtain a baseline estimate for the GWG and the role of foreign-owned firms that is only conditional on the observables included in the regression, we start by estimating the following equation without fixed effects:

$$\ln w_{ijst} = \beta_1 fem_i + \beta_2 fem_i * foreign_{jt} + \beta_3 foreign_{jt} + \beta_4 fem_i * trade_{jt} + \beta_5 trade_{jt} + \beta_6 age_{it} + \beta_7 age_{it}^2 + \varepsilon_{ijst} \quad (1)$$

where w_{ijst} is the monthly income of worker i employed by firm j in industry s at time t , fem_i is a dummy variable equal to one for women, $foreign_{jt}$ is a dummy variable equal to one if the firm is foreign owned and $trade_{jt}$ is a dummy variable equal to one if the firm imports, exports or does both.

Coefficient β_2 in equation (1) indicates how and if foreign ownership of a firm affects the GWG. This coefficient can be biased if a sectoral selection bias is present. The GWG between foreign-owned and domestically-owned firms can thus appear larger or smaller than it is, if it is driven by variables related to the type of industry firms are in, rather than their ownership status. If, for example, women are mainly employed in high-paying industries that also have a higher share of foreign-owned firms, then the differential GWG of foreign-owned firms will be underestimated because of this gender-based clustering of workers in certain industries. We account for this potential source of bias by adding industry-year fixed effects (α) to equation (1). Accordingly, equation (2) is then specified as follows (for conciseness, we summarize age and age squared in the vector X):

$$\ln w_{ijst} = \beta_1 fem_i + \beta_2 fem_i * foreign_{jt} + \beta_3 foreign_{jt} + \beta_4 fem_i * trade_{jt} + \beta_5 trade_{jt} + \beta' X_{it} + \alpha_{st} + \varepsilon_{ijst} \quad (2)$$

Equation (2) controls for sectoral selection bias over time. Yet, this might not be sufficient for an unbiased estimation of β_2 as another type of selection bias can occur within industries if certain types of workers select into certain types of firms. In this case, the GWG can be driven by individual characteristics that are not captured by the control variables in equations (1) and (2). For example, if male or

⁵ A holding company is defined as a company that controls enough voting stock in a subsidiary company to elect the board of directors and thereby control management of the subsidiary (Legwaila, 2010).

female workers with higher education and better skills are more prone to work for foreign-owned firms, the GWG will be driven by the worker's level of education or skills rather than the firm's ownership status. To account for this, we add individual, or employee, fixed effects (α_i) to equation (2) in order to arrive at equation (3), which now controls for unobservable individual characteristics:⁶

$$\ln w_{ijst} = \beta_1 fem_i + \beta_2 fem_i * foreign_{jt} + \beta_3 foreign_{jt} + \beta_4 fem_i * trade_{jt} + \beta_5 trade_{jt} + \beta' X_{it} + \alpha_{st} + \alpha_i + \varepsilon_{ijst} \quad (3)$$

In addition to controlling for unobserved industry-specific (equation (2)) and individual-specific (equation (3)) characteristics that can bias the GWG between firms that are foreign owned and those that are not, it is also necessary to control for firm-specific characteristics that can influence both the GWG and a firm's ownership status. The literature on wage differences shows, for instance, that there is a strong relation between a firm's wages and its productivity and size.⁷ As an example, if larger firms are more likely to be foreign owned, have higher wages and employ either more women or men, the coefficient of interest β_2 will be biased. To control for this, we add employer-employee, or job, fixed effects. By using a job fixed effect, the coefficient is identified only from firms that switch their ownership status while holding the workforce composition in these firms constant. This restriction provides us with a very conservative estimate for the effect of foreign ownership on the GWG and, thus, serves as our preferred specification:

$$\ln w_{ijst} = \beta_1 fem_i + \beta_2 fem_i * foreign_{jt} + \beta_3 foreign_{jt} + \beta_4 fem_i * trade_{jt} + \beta_5 trade_{jt} + \beta' X_{it} + \alpha_{st} + \alpha_j + \varepsilon_{ijst} \quad (4)$$

We consider that the fixed effects, in particular in our preferred specification given by equation (4), effectively control for omitted variables bias and thus allow us to identify the causal effect of foreign ownership on the GWG.⁸ This, in turn, allows us to discuss the role of foreign ownership (i.e. FDI) in gender inequality and broader inequality in a developing-country context.

⁶ The new fixed effect absorbs the female dummy such that from equation (4) on, we cannot identify the degree of the GWG anymore.

⁷ For a review, see Bhorat et al. (2017).

⁸ We do not consider it likely that foreign firms invest on the basis of the targeted firm's GWG. Hence, reverse causality is not a probable source of bias.

4. Data and descriptive statistics

4.1. Data

Most of the empirical studies examining the GWG between types of firms in terms of ownership and trade status review firm data. Recently, more emphasis has been placed on studies using employer-employee matched data sets. These aggregated data sets enable researchers to follow employees over time – which gives a better understanding of a country's employers as well as employees since it makes it possible to control for unobservable characteristics of both employees and employers. However, most of these studies are conducted for developed countries.⁹ Evidence from developing countries on individual or worker characteristics has been based mostly on survey data such as Fafchamps' (2009) study of Moroccan firms and Rankin and Schöer's (2013) use of the World Bank's 2004 Investment Climate Assessment Survey for South Africa.

In South Africa great strides have been made through a project in which the United Nations University – World Institute for Development Economics Research, South Africa's National Treasury and the South African Revenue Services (SARS) joined hands to make administrative tax data available for research purposes. This rich data set enables researchers to link employer and employee data and combine it with customs data. The employer data is gathered from the corporate income tax forms, which can be linked to the personal income tax data (captured in what is called IRP5¹⁰ certificates) providing information on the employee. The customs data can then also be linked through firm identifiers such that a rich employer-employee data set is created, which contains the universe of formal South African manufacturing firms and their employees. This unique data set makes it possible to research the individual and firm characteristics that contribute to the GWG. As Ebrahim and Lilenstein (2019, p. 16) stated: "The addition of the gender variable to the tax data allows for an analysis of the determinants of female employment by firms." The details of how we utilize this rich data set to consider the GWG are discussed below (for a detailed description of the variables used in the regressions, see table A1 in the appendix).

From the corporate income tax returns that firms complete, data are provided on firm characteristics including whether a firm is foreign or domestically-owned (through a binary foreign ownership variable, $foreign_{jt}$) which allows us to define our

⁹ See, for example, Boler et al. (2018).

¹⁰ An IRP5 document is the employee's tax certificate outlining the employer/employee's related incomes, taxes as well as all kinds of related deductions each year as it ends. The IRP5 is used by employees to complete their income tax return for each year).

variable of interest. The foreign ownership variable is set to 1 if the ultimate holding company is a foreign firm. Only firms that indicated that they belong to a foreign holding company are shown as foreign-owned firms in this variable. The question that firms responded to was, "Is the ultimate holding company resident outside South Africa?". Foreign firms in this data set include subsidiaries, associates and branches of foreign firms (Kilumelume et al., forthcoming). This question does not address how much of the firm is foreign owned, but it does show whether the firm is ultimately controlled by a foreign entity. As only foreign-owned firms needed to respond to this question, all missing variables were set to zero. This generates a share of foreign-owned firms that is very close to the share indicated in the only other South African data set providing information on foreign ownership, namely the 2007 World Bank Enterprise Survey data set for South Africa.

On an employee level, the IRP5 certificates enable us to create a weighted monthly income per employee ($\ln w_{ijst}$),¹¹ establish a dummy variable for gender (fem_i), and calculate the employee's age (age_{it}/age_{it}^2).¹² Unfortunately, the data are limited in terms of individual characteristics such as education and skill levels. In terms of identification, this does not cause a problem because we can use employee fixed effects (see equations (3) and (4)), but it limits our ability to interpret as we cannot observe which specific individual characteristics affect the results. From the customs data, we can determine information on a firm's trading status ($trade_{jt}$), i.e. whether the firm trades internationally (exports and/or imports) or not.¹³ A summary of all the variables used in the equations, with a description of each, appears in the Appendix (table A1).

Our final panel data set consists of more than 6.5 million observations for all manufacturing firms in South Africa, matched with their employees, from 2010 to 2016.

4.2. Descriptive statistics

Before turning to the results of our econometric analysis, it is helpful to look at some descriptive statistics to see the unconditional relationship between foreign ownership of firms and gender inequality. The descriptive statistics discussed here highlight the need to analyse gender wage disparities between foreign-owned and domestic firms in the manufacturing sector of South Africa. Table 1 provides an overview of the gender employment distribution across and within ownership

¹¹ The monthly income per employee was calculated by dividing the income by the number of days worked to get the daily wage equivalent. The daily wage equivalent was then multiplied by 30 to get the monthly wage equivalent.

¹² The data set included only working-age adults between the ages of 15 and 65.

¹³ Firms that traded less than ZAR 10,000 per year were not defined as trading firms.

status in South Africa. There is a considerable employment disparity between genders within both foreign-owned and domestic firms, but this disparity seems to be larger in foreign-owned firms: 29 per cent of employees in foreign-owned firms are women, compared with 33 per cent in firms that are not owned by a foreign holding company. Note also that foreign-owned firms make up only 13 per cent of all manufacturing firms.

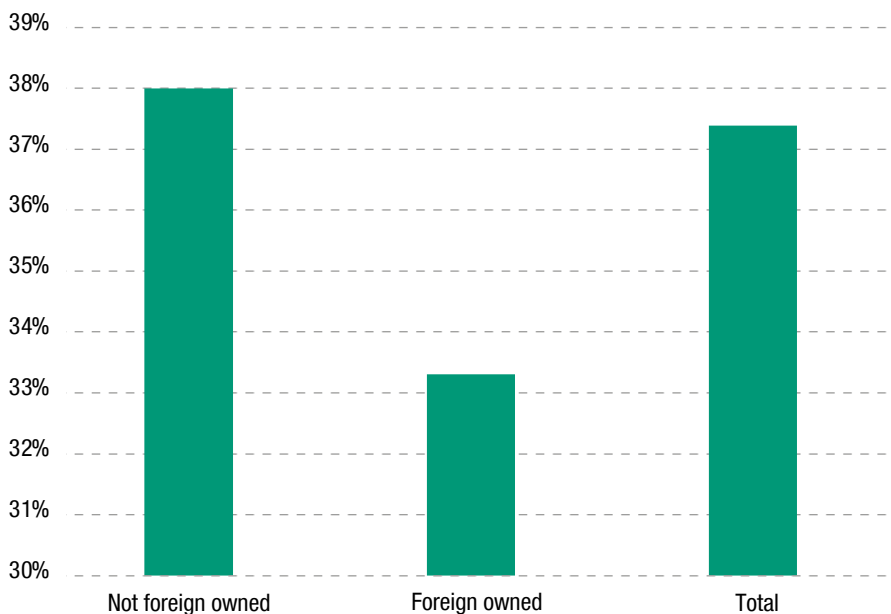
Table 1: Employment share by ownership status (pooled data, 2010-2016)

	Foreign-owned		Not foreign-owned		Total	
	Male	Female	Male	Female	Male	Female
Gender share within ownership status (%)	71	29	67	33	68	32
Gender distribution across ownership status (%)	9	4	58	29	68	32
Total share in labour force (%)	13		87		100	
No. of observations	612,649	248,272	3,844,294	1,891,497	4,456,943	2,139,769

Source: Authors' construction based on SARS data.

Figure 1 shows the unconditional GWG as a percentage of the mean male income by ownership status of manufacturing firms. There is an inverse difference in the GWG between foreign-owned and domestic firms compared with the difference in employment share. The GWG of foreign-owned firms is 33 per cent, which is much lower than the 38 per cent GWG of domestic firms. On average foreign-owned firms employ more men but have a more equal wage distribution than locally-owned firms.

Figure 1: GWG as a percentage of male income by ownership status (pooled data, 2010-2016)



5. Results

The descriptive statistics suggest that foreign TNCs might reduce the GWG in the manufacturing sector of South Africa. Therefore, we turn next to the results of the econometric analysis to see whether this relationship is robust and statistically significant. To give a preview of our findings, we show that foreign-owned firms widen the conditional GWG in the South African manufacturing sector considerably. Although foreign ownership leads to a wage premium for employees, this premium is smaller for women, such that foreign TNCs exhibit a larger GWG than firms with domestic ownership. This becomes visible only when we control for employee fixed effects, which suggests that foreign TNCs hire women with more abilities.

The results for our baseline regression (equation (1)) are shown in column 1 of table 2. Since we control only for the trading status of the firm and the age of the employees, the estimates are relatively close to the unconditional GWG statistics discussed in the previous section. They confirm the well-established facts that there is a large wage premium for employees of foreign TNCs as well as that there is a large GWG. The TNC wage premium for men amounts to a staggering 94.0 per cent, which indicates that male TNC employees earn on average almost twice as

much as male employees in firms with domestic ownership. This wage premium is much more pronounced than the 56 per cent wage premium of trading firms.

Moving to gender inequality, we find that the coefficient for the GWG in domestically-owned firms stands at a considerable 0.404, which corresponds to a wage gap of 33.2 per cent.¹⁴ More importantly for the purposes of this study, we find that foreign TNCs exhibit a considerably smaller GWG than firms with domestic ownership. The TNC wage premium for women is 129.5 per cent larger than the corresponding premium for men and, hence, the GWG in TNCs is a more moderate 21.2 per cent. This implies that foreign TNCs lower the unconditional GWG of South Africa by about one percentage point and, on first sight, seem to promote gender equality in terms of wage inequality. Controlling additionally for industry-year fixed effects to account for potential time trends or selection effects at the level of industries does not affect these conclusions, as can be seen from column 2. Although the differential GWG of foreign TNCs approximately halves in size, it remains large and statistically significant. That is, even when we compare only firms within the same industry in a given year, we find that foreign-owned firms exhibit a smaller GWG than firms with domestic ownership.

Table 2: Differences in GWG between firms with domestic and foreign ownership (2010-2016)

Dependent variable: monthly income	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Female	-0.404*** (0.002)	-0.302*** (0.002)	-	-
TNCs	0.663*** (0.002)	0.559*** (0.002)	0.090*** (0.001)	0.063*** (0.001)
Female * TNCs	0.168*** (0.003)	0.097*** (0.003)	-0.033*** (0.002)	-0.024*** (0.002)
Trade	0.348*** (0.001)	0.293*** (0.001)	0.057*** (0.001)	0.023*** (0.001)
Female * Trade	-0.071*** (0.002)	-0.052*** (0.002)	-0.023*** (0.002)	-0.018*** (0.002)
Industry-year fixed effects	No	Yes	Yes	Yes
Employee fixed effects	No	No	Yes	No
Employee-employer fixed effects	No	No	No	Yes
Observations	6,596,175	6,596,175	5,995,848	5,751,561
R²	0.1886	0.275	0.890	0.909

Source: Authors' construction based on SARS data. Standard errors in parentheses clustered at the level of the firm. Additional controls include age and age squared. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

¹⁴ As wages are logged, the percentage differences for any coefficient β are given by $e^\beta - 1$.

The findings change sharply once we also control for employee fixed effects, such that identification now stems from workers who switch between firms with foreign and domestic ownership or from workers at firms that switch ownership status. These fixed effects account for any unobserved worker characteristic such as education, family status or occupation, which can contribute both to the GWG and to the probability of working for a foreign TNC. If skills or education gaps between men and women were smaller in TNCs than in firms with domestic ownership, our coefficient would wrongly assign this skills effect to the ownership status unless we control for it. This is particularly important for this study because our data do not provide many such characteristics, and this importance is visible in our results. With these fixed effects, the differential GWG of foreign TNCs turns negative. Conditional on worker characteristics, TNCs exhibit a larger GWG than firms with domestic ownership by about 3.2 percentage points. In addition, and as established by previous literature, the wage premia of TNCs and trading firms become considerably smaller.

This highlights the importance of controlling for unobserved characteristics of employees and, thus, the benefits of employer-employee matched data over more aggregated data sets at the firm or industry level. Previous studies have shown that TNCs tend to employ more qualified employees.¹⁵ Our results suggest that this selection bias is particularly strong for women. Since in the absence of employee fixed effects the differential GWG of foreign TNCs is positive, it appears that foreign TNCs hire women with particularly pronounced skills, relative to both women in domestically-owned firms and to men in TNCs, which more than justifies the higher wages that they receive at foreign TNCs. In fact, our results show that foreign TNCs underpay women, given their abilities.

The coefficients in column 4 of table 2 correspond to our preferred specification (equation (4)), in which we combine the employee fixed effects with firm fixed effects into a job fixed effect. We now identify the effect only on the basis of firms that change their ownership status by being either acquired or sold by a foreign firm while holding their workforce composition constant. This avoids a bias stemming from changes in the workforce composition of the firm at the time of ownership change as well as from any other firm characteristic that correlates with the GWG and ownership. The differential GWG of foreign TNCs is hardly affected compared with column 3. It decreases slightly, to 2.4 percentage points, but remains large and statistically significant at the 1 per cent level. This suggests that the coefficient is driven by the employee fixed effects rather than the additional firm fixed effects.

We thus find on the basis of descriptive statistics and simple econometric analyses that foreign TNCs in the South African manufacturing sector appear to promote

¹⁵ See, for instance, Griffith and Simpson (2003).

gender equality. A more rigorous approach reveals that this relationship is driven by employee characteristics, with foreign TNCs hiring women who have relatively more abilities compared with women hired by domestic firms. Interestingly, our controls for domestically-owned trading firms show that this is not the case for these firms. Trading firms exhibit a larger GWG than non-trading firms, both conditionally on employee fixed effects and unconditionally. In fact, the conditional gap is smaller suggesting that the employment structure at trading firms is reversed with these firms hiring women with relatively less abilities.¹⁶

The difference between trading firms with domestic ownership and foreign TNCs underscores that foreign TNCs might not only negatively affect gender equality in South Africa through the wider GWG. Instead, they might also contribute positively to gender equality by offering well-remunerated employment opportunities for high-skilled women. The fact that foreign TNCs appear to employ particularly skilled women raises incentives for women to obtain skills which, in turn, helps close gender gaps at the top of firms' hierarchies. The fact that these women are relatively underpaid can of course not be overlooked and points to an important opportunity for TNCs to further support gender equality.

6. Conclusion

Addressing high levels of inequality is a key goal for policymakers and features prominently in the Sustainable Development Goals (SDGs). An important aspect of aggregate inequality is gender inequality, whose reduction is also listed as a separate goal in the SDGs. In effectively all countries across the world important gaps remain between men and women both in and outside of the labour market. South Africa is no exception as it exhibits both high levels of aggregate and gender inequality.

Economic growth is important to address inequality as it raises the available distributive resources of the State. In many developing countries, FDI features prominently in growth strategies but the impact of FDI on different aspects of inequality is less clear. In particular, the interaction between FDI and gender inequality is poorly understood. The literature assessing this relationship is limited and based to a large extent on data from developed economies. Hence, it is important to understand how gender inequality is affected by FDI especially in developing countries.

In this paper, we study the impact foreign ownership and acquisitions on the GWG in the South African manufacturing sector to shed light on this area. When simply comparing GWGs across firms with different ownership statuses, we find that

¹⁶ We analyse the role of trading firms for gender equality in South African manufacturing in two complementary studies (Bezuidenhout et al., 2019 and Janse van Rensburg et al., 2020).

foreign-owned firms exhibit a significantly lower GWG than firms with domestic ownership. This positive role of FDI for gender equality is, however, reversed when we successively add fixed effects that control for unobserved characteristics of firms and workers. In particular, employee fixed effects are central as they turn the positive differential GWG of foreign-owned firms negative.

This suggests that the *prima facie* smaller GWG of foreign-owned firms can be explained by the abilities that the women working for these firms have, rather than by the ownership status. That is, the difference in characteristics between men and women in foreign-owned firms is smaller than in firms with domestic ownership and, as a consequence, the GWG is smaller in foreign-owned firms. Our results indicate that foreign-owned firms in fact underpay female employees relative to domestically-owned firms in light of these differences in abilities. Yet our findings also point to a positive role of foreign-owned firms. As they appear to hire particularly skilled women, they raise the incentives for women to obtain more skills, even if they are relatively underpaid. This can promote gender equality in the long run.

Our study shows that foreign ownership is an important determinant of gender inequality. Hence, policymakers who want to reduce gender inequality must pay attention to TNCs and their gender pay structures. While the positive effect of TNCs on the unconditional GWG suggests that attracting FDI can benefit not only growth but also gender equality, it is important to ensure that these firms remunerate their female employees adequately, given their skills and other characteristics. Only if the positive effect of TNCs on unconditional GWGs expands to conditional GWGs can it be concluded that FDI is a tool for gender equality.

An important avenue for future research is to understand the channels that drive our results. Although we have established how foreign-owned firms and FDI affect wage inequality between genders, our results do not speak to the underlying channels that can explain these findings. Research that sheds light on such channels would thus complement our work and allow for more targeted policy advice on how to address these established inequalities.

Further research could also examine the heterogeneity of our results across industries or age groups.¹⁷ One could imagine, for instance, that GWGs are driven by women with younger children or by sectors with less flexible working arrangements. Future research could also use this detailed data set to study the spillover effects of FDI to domestic firms. In particular, the data would make it possible to study labour-mobility spillover effects by looking at workers who switch from foreign-owned to domestically-owned firms and vice versa. Similarly, horizontal spillovers could be examined by looking at firms in industries with a high presence of foreign-owned firms.

¹⁷ Suggestions from the authors to this effect could unfortunately not be carried out as the authors could not access the data owing to COVID regulations.

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Appendix

Table A1: Regression variable description

Variable	Definition	Calculation
$\ln w_{ijst}$	The log of the monthly wage of worker i of firm j in industry s at time t	The monthly income per employee was calculated by dividing the income by the number of days worked to get the daily wage equivalent. The daily wage equivalent was then multiplied by 30 to get the monthly wage equivalent.
fem_i	A dummy variable equal to one for females	0 or 1
$foreign_{jt}$	A dummy variable that captures whether a firm j is foreign owned or not at time t	The variable is set to 1 if the ultimate holding company is a foreign firm. All other observations, including missing observations, were set to 0.
$trade_{jt}$	A dummy variable equal to one if the firm imports, exports, or does both (in the case of non-exporting firms this variable is simply a zero)	0 or 1. Firms that traded less than ZAR 10,000 per year were not defined as trading.
age_{it}/age_{it}^2	The age (and age squared) of worker i at time t	The IRP5 certificates include information on a worker's birthdate from which the worker's age could be calculated. Age was limited to those between 15 and 65.
$profit_{jt}$	The inverse of the profitability of firm j at time t	The profitability variable is calculated as a ratio of the firm's cost of sales over its sales. The cost of sales is as per the accounting income statement. It is calculated by taking the finished goods in its beginning inventory plus the cost of goods manufactured during the accounting period minus the cost of finished goods in ending inventory.

Source: SARS data.