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TRANSNATIONAL CORPORATIONS

INVESTMENT AND DEVELOPMENT

Special issue on
Multinational
Enterprises
and Gender Equality

UNITED NATIONS

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EDITORIAL STATEMENT

Transnational Corporations[1] is a longstanding policy-oriented refereed research journal on issues related to investment, multinational enterprises and development. It is an official journal of the United Nations, managed by the United Nations Conference on Trade and Development (UNCTAD). As such it has a global reach, a strong development policy imprint, and high potential for impact beyond the scholarly community.

Objectives and central terrain

The journal aims to advance academically rigorous research to inform policy dialogue among and across the business, civil society and policymaking communities. Its central research question – feeding into policymaking at subnational, national and international levels – is how to make international investment and multinational enterprises contribute to sustainable development. It invites contributions that provide state-of-the-art knowledge and understanding of the activities conducted by, and the impact of multinational enterprises and other international investors, considering economic, legal, institutional, social, environmental or cultural aspects. Only contributions that draw clear policy conclusions from the research findings will be considered.

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The scale and complexities of the "grand challenges" faced by the international community, such as climate change, poverty, inequality, food security, health crises, and migration – as embodied in the United Nations' Sustainable Development Goals (SDGs) – are enormous. These challenges, combined with the impact of disruptive technologies on business, rapidly evolving trends in international production and global value chains, new emerging-market players and new types of investors and investment, make it imperative that policymakers tap a wide range of research fields. Therefore, the journal welcomes submissions from a variety of disciplines, including international business, innovation, development studies, international law, economics, political science, international finance, political economy and economic geography. However, submissions should be accessible across disciplines (as a non-specialized journal idiosyncratic research should be avoided); interdisciplinary work is especially welcomed. The journal embraces both quantitative and qualitative research methods, and multiple levels of analyses at macro, industry, firm or individual/group level.

Inclusive: multiple contributors, types of contributions and angles

Transnational Corporations aims to provide a bridge between academia and the policymaking community. It publishes academically rigorous, research-underpinned

[1] Previously: The CTC Reporter. In the past, the Programme on Transnational Corporations was carried out by the United Nations Centre on Transnational Corporations (1975–1992) and by the Transnational Corporations and Management Division of the United Nations Department of Economic and Social Development (1992–1993).

and impactful contributions for evidence-based policymaking, including lessons learned from experiences in different societies and economies, both in developed and developing-country contexts. It welcomes contributions from the academic community, policymakers, research institutes, international organizations, and others. Contributions to the advancement and revision of theories, frameworks and methods are welcomed as long as they are relevant for shedding new light on the investigation of investment for development, such as advancing UNCTAD's *Investment Policy Framework for Sustainable Development*.

The journal publishes original research articles, perspective papers, state-of-the art review articles, point-counterpoint essays, research notes and book reviews. All papers are double blind reviewed and, in line with the aims and mission of the journal, each paper is reviewed by academic experts and experts from the policymaking community to ensure high-quality impactful publications that are both academically rigorous and policy relevant. In addition, the journal features synopses of major UN reports on investment, and periodic reviews of upcoming investment-related issues of interest to the policy and research community.

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Introduction to the *Transnational Corporations* special issue on multinational enterprises and gender equality

Jennifer P. Poole[+], Amelia U. Santos-Paulino[*], and James X. Zhan[#]

1. Background

Foreign direct investment (FDI) and multinational enterprises (MNEs) are important sources of financing for developing countries. In this context, the United Nations Conference on Trade and Development (UNCTAD) has a long track-record of looking at both spillovers from FDI and gender equality. The policy study on investment by transnational corporations and gender provided a preliminary review of the academic literature on the impact of foreign investment on gender policy and practice, focusing on the wage and employment effects, and the related potential for women's empowerment (UNCTAD, 2014). In addition, the 2020 *World Investment Repor*t (UNCTAD, 2020a) describes that the world's leading multinational enterprises are increasing their gender equality reporting and policies, contributing to broader female representation and positive development impacts. Finally, several of the papers in this special issue served as background research for the UNCTAD (forthcoming) policy report on *The International Transmission of Gender Policies and Practices: The Role of Multinational Enterprises*. This original academic research was presented at an expert group meeting in May 2020, which brought together researchers, practitioners, and policymakers to discuss tangible policy recommendations and development impacts, while formally validating the quality of the research as part of the review process.[1]

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[1] Expert Group Meeting: Multinational Enterprises and Gender Equality, 27-29 May 2020 (Geneva), via WebEx.

2. Contribution of the special issue

In addition to the direct benefit of foreign capital, a long literature has demonstrated the role of MNEs in bringing a package of tangible and intangible attributes that have the potential to improve local productivity and enhance local job opportunities. Rising labour productivity and increased employment, together, contribute to stronger economic growth, significantly reducing poverty rates. Among the intangible benefits, cross-border investment can spread cultural norms and practice, in addition to know-how and technology.[2]

While there are several theoretical reasons to expect foreign firms to also transfer best-practice policies toward women, scarcely any research studies the impact of foreign direct investment and MNEs on promoting women's empowerment around the world. To fill this gap, this special issue presents high-quality empirical evidence on the role of multinational firms in promoting women's empowerment and gender equality across the world. The findings of the papers in this collection are practical considerations for governments, intergovernmental organizations, civil society organizations, and communities. Specifically, the papers in this special issue cover all major regions of the global economy and contribute to the literature on MNEs and gender equality in four major areas:

(1) firm-level differences in gender practice across domestic and foreign-owned affiliates;

(2) micro-evidence on the ability of multinationals to promote women's empowerment;

(3) empirical evidence on the mechanisms causing changes in policies toward women by MNEs; and

(4) cross-country differences in legal frameworks, including bilateral investment treaties, and policies related to women's employment and empowerment.

Though women have made progress toward equality in the last half-century, evidence on domestic policy law and practice, as described in UNCTAD (forthcoming), suggests that much work remains to be done to ensure that women receive equal opportunity and access. The first four papers in this special issue investigate firm-level differences in gender practice across domestic and foreign-owned affiliates for several regions of the world: Latin America, South Asia, the Middle East, and Sub-Saharan Africa.

[2] For example, Watson (2006) discusses the role of MNEs in spreading hand washing, business attire, queuing, and smiling.

Karol Fernandez Delgado studies the effect of foreign ownership on women's employment using micro-level data from the Chilean Manufacturing Survey. The findings provide evidence that foreign ownership increases the share of female workers within the firm. According to the empirical estimates, one year after foreign acquisition, the share of female workers is 1.6 percentage points higher in acquired firms than in non-acquired firms, and this figure increases to 3.6 percentage points two years after acquisition. Furthermore, the paper shows that the increase in the share of female workers is driven entirely by the skilled workforce. The evidence appears to be consistent with the notion that foreign-owned firms are particularly strong at employing high-skilled women. This evidence from Chile points to more progressive policies and practice toward women in foreign-owned firms.

In the Indian setting, the paper by Shruti Sharma shows that increased FDI is associated with higher employment of women. This result is confirmed by both household-level and firm-level panel data. In contrast to the Chilean context, the increase in employment of female workers is mainly driven by the increase in employment of unskilled female workers. Interestingly, and in contrast to previous research on China and South Korea, Sharma's study does not find the positive female employment effects of FDI in India to be associated with gender equality in the FDI-source country.

The paper by Alessandra Gonzalez uses a large dataset of more than 200,000 executives in the countries of the Gulf Cooperation Council, located in a region with some of the lowest female labour force participation in the world. The paper presents new evidence of a setting in which foreign firms do not capture opportunity in the local labour market. The author finds that foreign firms, on average, are less likely than local firms to hire female executives and less likely to place women into top management roles. The paper suggests that foreign firms may have fewer social networks and resources, or insider's advantage, relative to local firms for recruiting females into executive positions.

Despite the data limitations on Sub-Saharan Africa, South Africa posits an interesting case study. Like South Asia and the Middle East, in the aggregate, the countries in Sub-Saharan Africa appear to lag in terms of gender-related policies and practice. The paper by Victor Stolzenburg, Marianne Matthee, Caro Janse van Rensburg, and Carli Bezuidenhout documents that foreign-owned firms exhibit gender wage gaps approximately 2.4 percentage points larger than similar domestically-owned firms, even accounting for a variety of controls, including the employees' skill levels and the firm's trading status. More work is needed to explore the mechanisms for this disparity.

The first four papers report mixed support for multinational enterprises as strong proponents of high-quality labour policy and practice toward women. In some settings, MNE firms report lower female employment shares and higher gender

wage gaps (the Middle East and South Africa), while in other settings, foreign-owned firms appear more progressive in their female employment practices (Chile and India). At least in these countries, it appears that an expansion of foreign investment may help with women's empowerment.

The next three papers of this special issue consider possible mechanisms for the transfer of best practice toward women from multinationals to the host economy across three major regions of the world: South Asia, East Asia, and Latin America. First, Ana M. Fernandes and Hiau Looi Kee consider the role of supply chains in Bangladesh. Next, Anh Pham, Jennifer P. Poole, and Amelia U. Santos-Paulino investigate the possibility of technology and absorptive capacity in the Vietnamese setting. Finally, C. Austin Davis and Jennifer P. Poole examine the role of labour mobility in Brazil.

Fernandes and Kee analyse FDI spillovers on the gender-related labour market practice of domestic firms, based on a unique firm-to-firm data set of Bangladesh's textile and garment sectors. The paper looks at the female employment of domestic firms that are directly and indirectly related to foreign-owned firms through supply chain linkages. These domestic firms are either the local suppliers or customers of foreign-owned firms, or they share local suppliers and customers with foreign-owned firms. The estimates show that domestic firms related to foreign-owned firms have significantly more female administrative workers, but not necessarily more female non-administrative workers, owing to the former participating in more firm-to-firm interactions.

In Viet Nam, areas of the country with stronger foreign investment report higher female employment as presented in the paper by Pham, Poole, and Santos-Paulino. The paper investigates how the relationship between FDI and technology affects labour market outcomes for women. Using household surveys, the paper explores the relationship between industrial exposure to FDI and access to technology on employment and wages. The authors find that FDI is associated with a differential increase in employment and wages in high-technology areas of the country as compared to weaker technology areas. These results underscore the importance of absorptive capacity; that is, to truly benefit from foreign investment, the domestic economy needs a sound education system and established technology. The results also indicate that an equal increase in foreign investment in high-tech provinces is associated with larger increases in top wages for men than for women. In general, these results suggest that foreign investment may be associated with a rising gender wage gap at the high-end of the wage distribution.

Davis and Poole explore the role of foreign direct investment and multinational enterprises in advancing gender equality in Brazil. In that country, female employment is lower and gender earnings gaps are higher among firms receiving FDI, even controlling for industrial composition. In this setting, it is hard to imagine

how multinationals could promote more gender-equal labour market outcomes. In fact, the movement of workers from multinational to domestic enterprises has small negative effects on labour market outcomes for women. The authors present evidence suggesting that increasing the share of workers with MNE experience in domestic establishments modestly exacerbates the gender earnings gap.

MNEs have an incentive to disseminate good practice to local firms to improve labour standards and practices toward women in order to level the playing field. Pressures along the MNE supplier chain appear to be an important spillover channel. Technological capacity also continues to be a relevant determinant of cultural spillovers, just as it is for productivity spillovers. However, workforce turnover proves to be a more elusive mechanism, though this could be a function of the particular case study of Brazil, and as such, more work is needed in this area.

The paper by Renata Vargas Amaral and Lillyana Daza Jaller focuses on the role of government regulations to ensure equal opportunities for women. The paper assesses different policy and regulatory dimensions that could facilitate the positive impact of MNEs on gender equality. The authors show that over the past years, some progress has been observed in trade agreements that include gender issues in their agendas, but the same is not true for international investment treaties. The authors compare the role and effect of gender provisions in trade and investment agreements, and attempt to shed light on additional policies that may be needed to ensure that governments and multinational enterprises address gender constraints.

In addition to the papers in the special issue, which look at various dimensions of the gender impact of FDI and MNEs across developing countries, an UNCTAD Insights paper by Henri Luomaranta, Fernando Cantu, Steve MacFeely, and Anu Peltola provides further evidence on MNEs and labour market outcomes in Finland. The empirical exercise analyses novel indicators on gender equality in the business sector. The results underscore large differences in the share of women and men employed in the best paying professions and in the most profitable firms. The findings further show that foreign investment typically results in increases in the gender wage gap. The paper proposes a blueprint for linking business statistics and social statistics to enable analysis of gender inequalities in the labour market. These guidelines are potentially useful for researchers and policymakers in developing countries.

3. Final remarks and policy considerations

The papers in this special issue have important implications for policy, both at the national and global levels. A key policy recommendation for researchers, the international community, and policymakers is the need for strong local labour policies, particularly to build absorptive capacity. As the research in this

issue illustrates, the benefits from foreign direct investment on gender-equalizing employment opportunities for women (as with several other benefits from foreign investment) are enhanced and reinforced in places with strong initial conditions. Therefore, another key recommendation is to continue to build the technological capacity within countries, in order to facilitate the absorption of knowledge and best-practice policy toward women. Moreover, national education policies and training programmes should be improved and expanded, specifically for women. In many developing and emerging economies, the supply of skill remains hindered; therefore, education and training programmes should prioritize the required technological skill sets to perform in the changing work environment of a globally-integrated firm.

In the global policy context in which MNEs operate, the Sustainable Development Goals are increasingly becoming a focus of investor and company reporting for impact. Environmental, Social, and Governance (ESG) reporting is now also a mainstream expectation of markets and a rapid transition to reporting has been observed in the last ten years. Importantly, companies are increasingly expected to report on gender equality; about 70 per cent of the world's 5,000 largest MNEs now report on progress in this area, and globally about 80 per cent of companies have published a diversity policy (UNCTAD, 2020a).

Yet, overall, women's representation remains unequal. Regulation and investor pressure have led to better representation at the board level, but not at managerial levels. In addition, the implementation of gender-equalizing policies related to flexible work and services, such as childcare, remains weak. ESG reporting could contribute to and inform policy decisions regarding good practice in labour policy, including better working conditions and benefits for women. The degree to which such policies translate into concrete and positive outcomes can be approximated by the presence of flexible working arrangements, or the provision of services that might positively benefit women and facilitate their participation in labour markets.

Another policy area that demands more research and attention is the role of gender provisions in international agreements. This special issue shows that the advancement of gender as a provision in international trade and bilateral investment agreements could serve as a foundation for sustainable and equitable economic growth. Thus, policy should place a stronger emphasis on making gender provisions distinctively part of the agreements, meanwhile avoiding that gender provisions related to trade and investment be seen as increasing "behind-the-border" restrictions.

Finally, though not covered in this special issue, from the perspective of host countries, investment promotion agencies (IPAs) and female entrepreneurship policy can be instrumental in promoting and facilitating investment and female empowerment. IPAs can facilitate greater impact of foreign operations on gender

equality in the host country. According to a recent survey, IPAs are promoting gender-inclusive linkages between MNEs and the local economy (UNCTAD, 2020b), by identifying opportunities where investment projects can have a positive impact on gender equality and by facilitating women's access to capacity-building and supplier development programmes. Building capacity for female entrepreneurs can also help MNEs to advance their gender equality agendas.

The topics in this special issue cover a range of theoretical, empirical, and policy issues on gender policies and practices, and the role that foreign investment and multinational firms play in this context. We hope that the findings and conclusions will stimulate further research in the field. As a practical matter, the papers can contribute to the design and implementation of policy strategies aimed at reducing gender inequality at all levels, and to increasing transparency in gender-related policies and practice.

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Foreign acquisitions and female employment in manufacturing firms: an empirical analysis for Chile[+]

Karol Fernández Delgado*

This paper analyses the effect of foreign ownership on female employment using micro-level data from the Chilean Manufacturing Survey. Particularly, it examines whether foreign-acquired firms hire proportionately more female workers than domestic firms. To control for the possible endogeneity of the foreign acquisition decision, we use propensity score matching combined with a difference-in-differences approach. In addition, we compare firms operating in the same industry-year. Our results show that foreign ownership increases the share of female workers within the firm. One year after acquisition the share of female workers is 1.64 percentage points higher in acquired firms than in non-acquired firms, and this figure increases to 3.55 percentage points two years after acquisition. When we separate female workers into skilled and unskilled categories, we observe that the positive effect of foreign acquisition is present only for skilled women. One year after acquisition, the share of skilled women is 4.60 percentage points higher in acquired firms than in non-acquired ones, and two years after acquisition this figure increases to 6.63 percentage points. We also present evidence that foreign acquisition increases the share of skilled women only when the acquired firm was not an exporter before its acquisition, supporting Becker's (1957) theory on taste-based discrimination.

Keywords: acquisitions, foreign direct investment, gender

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1. Introduction

Are foreign-owned firms more female-friendly than domestic firms? Although a large body of empirical literature examines the impact of multinationals on several aspects of firms (skill composition, wages, productivity, among others), gender issues are generally ignored. We shed light on this neglected topic by empirically evaluating whether foreign-owned firms hire proportionally more female workers than their domestic counterparts, using plant-level data from Chilean manufacturing.[1] Namely, we investigate whether, upon being acquired, foreign plants hire more female workers than they would have done had they remained domestic.

A potential problem when estimating the causal effect of foreign acquisitions on the share of female employees is the possible endogeneity of firms being acquired. Foreign-acquired firms might exhibit characteristics that systematically differ from those of non-acquired firms, which implies that the acquired firms are not randomly selected. As a consequence, estimates that do not consider this non-randomness will be biased (because of selection bias). For this reason, we use propensity score matching combined with a difference-in-differences technique, as suggested by, for example, Blundell and Costa Dias (2000). The aim of this procedure is to find a group of non-acquired firms with similar characteristics to the group of acquired firms and then compare the share of female employees within acquired and non-acquired firms. The matched control firms are assigned only from the same year and the same sector as the foreign-acquired firm.

The underlying question of this study is why foreign firms should be expected to hire more women than domestic firms. The basic explanation is related to Becker's (1957) seminal theory on taste-based discrimination, which predicts that, under some conditions, competitive pressures will work to reduce discriminatory or other inefficient management practices, because discrimination comes at a cost to the firm owner. Thus, as explained by Heyman et al. (2013), if competition is strong, discriminating firms will be competed out of the market or may change their behaviour as competition increases the costs incurred by discriminating firms. Since foreign firms usually operate in more competitive markets, they cannot afford taste-based discrimination. Therefore, one can expect the share of female employees to increase after a foreign acquisition has taken place, and this effect should be larger when market competition was weak before the acquisition. We present evidence supporting this explanation.

[1] Although a plant is not necessarily a firm, Pavcnik (2002) points out that more than 90 per cent of Chilean manufacturing firms are single plants. For this reason, hereafter, we use the words "plant" and "firm" interchangeably.

An alternative explanation for the potential of foreign direct investment (FDI) to increase female employment is given by Lawler and Bae (1998). According to them, cultural differences in terms of gender equality between the multinationals' home countries and the host countries may explain why foreign firms are more female-friendly than domestic plants. Culture is defined as "the beliefs, attitudes, norms, role expectations, and values widely shared by the members of a particular group", which "can influence behaviour in a variety of ways", including a firm's management practices relating to the role of women in the labour market (Lawler and Bae, 1998: 129). Therefore, when the multinational's home country promotes employment, training and promotions for female workers, the parent firm may transfer its gender policies to its subsidiaries in the host country.

Chile is a suitable choice for studying the effects of FDI on female employment for two reasons. First, the country has received significant inflows of FDI since the early 1970s. Second, it exhibits a large amount of discrimination against women in the labour market. Incoming FDI has maintained an upward trend since 1973, leading to Chile gaining widespread international recognition for its success in attracting FDI. Since 1990, Chile has been one of the emerging market economies with the greatest FDI inflows relative to GDP (table A.1). Indeed, as a share of GDP, the net FDI inflows to Chile are greater than those into all the BRIC economies (Brazil, the Russian Federation, India and China) and Mexico.

Discrimination against women in the labour market is clearly reflected in the size of the wage gap between men and women – controlling for educational levels, experience, economic activity, location, work intensity and occupation – as well as in the attitude towards women doing paid work. According to data from the International Labour Organization (ILO, 2015), the unexplained gender wage gap in Chile reached 22.2 per cent in 2011, and the gap widens for the top-earning women. In addition, attitudes towards women being remunerated for work are still very negative in the country. According to the United Nations Development Programme (UNDP, 2010), survey data in Chile show that, in 2002, only 23 per cent of all survey respondents approved of women working full-time, regardless of the family situation (i.e. whether or not they have children and irrespective of the children's ages); 37 per cent took an intermediate view, with their approval depending on the age of the woman's children; and the remaining 38 per cent disapproved of women doing paid work under any (family) circumstances. A significant improvement was observed in 2009 when 38 per cent of all survey respondents approved of women doing paid work, 39 per cent expressed an intermediate view\, and 23 per cent disapproved.

When we compare Chile with other countries from the region, we observe that its performance in terms of gender equality is still insufficient. This fact is evident when we analyse the Gender

Empowerment Measure (GEM) (table A.2), which the UNDP constructs to measure female participation in economic and political decisions. The higher the GEM, the more empowered are women. The index is constructed for 109 countries worldwide, among which Chile ranked 75th in 2009, and 19th among 23 countries from Latin America and the Caribbean. When we compare Chile with other countries from the region, we observe considerable differences in terms of women's access to power. For instance, women's share of seats in Parliament is 13.9 per cent, in contrast to Argentina, with 37.7 per cent, and Mexico, with 36 per cent.

We use plant-level data from the National Annual Manufacturing Survey (Encuesta Nacional Industrial Anual, ENIA) collected by the Chilean Institute of Statistics (Instituto Nacional de Estadísticas, INE), over the period 1995–2006. The survey covers the universe of Chilean plants in manufacturing with at least 10 employees. The sample contains more than 5,000 plants per year. The ENIA contains information on different aspects of firm structure, such as ownership, sector, production inputs and outputs, and exports. More importantly for our purposes, it includes information about the total number of (full-time) employees, separated by occupation and gender.

We find a positive effect of foreign ownership on increasing the proportion of female workers. Our results show that one year after acquisition the share of female workers is 1.64 percentage points higher in foreign-acquired firms than in non-acquired firms, and this figure increases to 3.55 percentage points two years after acquisition. When we separate female workers into skilled and unskilled categories, we observe that the positive effect of foreign acquisition is present only for skilled women. One year after acquisition, the share of skilled women is 4.60 percentage points higher in foreign-acquired firms than in non-acquired ones, and it rises to 6.63 percentage points two years after acquisition. In addition, we present evidence that foreign acquisition increases the share of skilled women only when the acquired firm was not an exporter before its acquisition, supporting Becker's theory on taste-based discrimination, but only when considering skilled female workers.

As a check of the robustness of our results, we evaluate the impact on female employment of domestic takeovers; that is, a change in ownership from foreign to local investors. We find that when ownership reverts to domestic hands, the change in the share of women among workers is not statistically different from zero for either skilled or unskilled women or women overall. This result suggests that domestic owners do not affect the gender structure of the labour force when they retake control of the firm, confirming that foreign ownership does have a positive effect on increasing the share of female employees.

The contribution of our study is twofold. First, our analysis relies on foreign acquisitions, which makes our identification strategy stronger in comparison with

previous works. Second, we are also able to distinguish between skilled and unskilled workers, which allows us to confirm the existence of differences in the hiring practices by gender according to the skill level of workers.

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 outlines our empirical strategy. Section 4 presents our estimates of the propensity score. Section 5 discusses the results from the difference-in-differences analysis on the matched sample. Section 6 presents the robustness checks. Section 7 evaluates Becker's theory on taste-based discrimination, using information about exporting firms. Section 8 draws some conclusions.

2. Related literature

This paper relates to two strands of the economic literature. The first strand examines the impact of trade liberalization and FDI on gender labour outcomes, particularly the wage gap and women's share of employment. The second strand documents the relation between market competition and taste-based discrimination.

The literature analysing the impact of trade liberalization and FDI on female labour outcomes is still limited and the conclusions are mixed.[2] Juhn et al. (2014) use data from Mexico to conclude that trade liberalization improves women's labour outcomes in the blue-collar tasks but does not affect women in the white-collar tasks. Tejani and Milberg (2016) use a sample of 60 high-income developed countries and middle-income developing countries over the period 1985 to 2007 to study the effects of trade liberalization on the female share of employment in manufacturing. They find that the relative employment of women increased in developing countries but decreased in the high-income ones.

Meanwhile, other authors have found that international trade increases gender wage gaps. That is the case of Bøler et al. (2018) for Norway. They argue that exporter firms require greater commitment from their employees. If women are less flexible (or perceived as such), exporters will exhibit a larger gender wage gap than non-exporters. Using matched employer-employee data from the Norwegian manufacturing sector over 1996–2010, they find that starting to export increases the gender wage gap for highly educated women by about three percentage points. Other authors have also reported an increase in the gender wage gap due to trade liberalization (e.g. Berik et al., 2004) for Taiwan Province of China and the Republic of Korea, and Menon and van der Meulen Rodgers, 2009 for India).

[2] An extensive literature survey about the effects of trade liberalization on female discrimination appears in Aguayo-Tellez (2011).

More closely related to our paper are studies on the impact of FDI on female labour outcomes. Oostendorp (2009), using an industry-level panel of developed and developing countries and an instrumental variable approach, finds that the gender wage gap tends to decrease with increasing FDI inflows in richer countries, but not in developing economies. Heyman et al. (2013) evaluate the impact of foreign takeovers on the gender wage gap and on the gender composition of the labour force in Sweden, using linked employer-employee data. They find no change in female relative wages following a takeover, and only a small increase in the share of female workers when market competition is very weak (close to a monopoly) in the sector where the takeover takes place.

Chen et al. (2013) find that foreign firms in China, particularly those with a strong export orientation, have a greater propensity to hire women, though the gender wage gap tends to be significantly larger when compared with that of domestic firms. Siegel et al. (2018) use firm-level data from the Republic of Korea to conclude that multinationals are significantly more likely to have female managers and to implement policies that are beneficial to female employees, such as maternity leave, childcare facilities and financial support for childcare. Using anecdotal case studies for female Japanese managers, Bozkurt (2012) concludes that multinationals offer better opportunities for high-skilled Japanese women to progress in managerial careers than do domestic firms. Similar conclusions are found by Kodama et al. (2018), who examine the effect of foreign ownership on gender-related employment outcomes and work practices in Japan. Foreign firms are found to have a greater share of women among workers, managers, directors and board members, and also to offer more facilities in terms of flexibility, childcare subsidies and telecommuting. The authors conclude that the difference in gender-related outcomes is driven mostly by older foreign affiliates, where the foreign parent owns a larger share of the firm. These patterns are interpreted by the authors as a signal that transplanting corporate culture from abroad takes time and is facilitated by having greater control over operations. Tang and Zhang (2017), using data for Chinese manufacturing firms over the period 2004–2007, find that foreign firms from countries with lower gender inequality tend to hire proportionately more women and are more likely to appoint female managers.

The second strand of the literature related to this paper documents the relation between market competition and taste-based discrimination. Previous research on the relation between market competition and labour market discrimination against women finds supporting evidence for competition reducing gender discrimination. For instance, using industry-level data from the United States manufacturing sector, Black and Brainerd (2004) compare the change in the gender wage gap between 1976 and 1993 in concentrated versus competitive manufacturing industries, using a difference-in-differences approach. The authors find that the gender wage gap narrowed in concentrated industries that experienced a reduction in tariffs, but not

in competitive industries, and they interpret this result as supporting Becker's taste-based discrimination theory. Meng (2004) finds that Australian firms that are more likely to have narrower gender earnings gaps are those subject to strong market competition. Similar conclusions are reached by Hellerstein et al. (2002) for the United States and by Zweimüller et al. (2008), who use a cross-country sample. More recently, Paz and Ssozi (2020) use industry-level Brazilian census data to estimate Becker's taste-based discrimination model. More precisely, they consider changes in competitiveness induced by internal trade shocks (import penetration from China and the rest of the world) on the share of female workers and on the male-female wage gap in the manufacturing sector of Brazil. They find that the Chinese import penetration increased the female share and narrowed the male-female wage gap (except for more educated workers). Import penetration in the rest of the world raised the female share among workers with college degrees but widened the wage gap, except for those with college degrees.

Our study differs from the previous literature in two respects. First, we advance in the empirical methodology by using a difference-in-differences approach combined with propensity score kernel matching to deal with potential endogeneity.[3] Second, we also evaluate the effects of foreign ownership on the employment shares of both skilled and unskilled female workers. Data provided by the Chilean National Institute of Statistics (INE, by its Spanish acronym) suggest that the higher the level of qualifications of a Chilean woman, the greater is the discrimination she suffers in the labour market, measured by the gender wage gap (INE, 2016). The greatest gap (39.6 per cent) is observed for women with postgraduate studies. In contrast, women with only primary education have a smaller wage gap (15.5 per cent). For this reason, we consider that the effect of foreign ownership on the gender composition of labour force may differ according to the skill level of the women concerned.

3. Empirical methodology

The aim of our empirical analysis is to assess the effect of foreign ownership on the share of female workers relative to total employment.[4] We proceed as follows: First, we focus on firms that have changed their ownership status from domestic to foreign; that is, domestic firms that have been acquired by foreign investors.[5]

[3] The recently published work of Kodama et al. (2018) also applies this methodology, using nearest-neighbour matching rather than kernel matching.

[4] Note that our database does not have information about wages disaggregated by gender; thus we are unable to estimate the gender wage gaps.

[5] As a robustness check we also consider domestic acquisitions; that is, firms whose ownership has changed from foreign to domestic. Section 6.2 shows that when ownership reverts to domestic hands, the share of female workers within the firm is unchanged.

We define a foreign acquisition as a situation in which foreign participation has increased to more than 10 per cent.[6] Our core estimates are restricted to the set of manufacturing firms that switched from domestic to foreign ownership and remained in the data sufficiently long to be observed one year before acquisition, in the acquisition year and two consecutive years after the acquisition.

We then use a difference-in-differences approach to compare the average share of female workers observed in the foreign-acquired firms (the treatment group) with the share of female workers in the firms that remain under domestic control (the control group). However, this comparison may be biased due to the non-random selection of the sample.

Empirical evidence suggests that acquisition is not an exogenous decision and that, on the contrary, foreign investors "cherry pick" the best domestic firms as their targets (Arnold and Javorcik, 2009; Almeida, 2007). To address the selection issue, we combine the difference-in-differences approach with propensity score matching. As stated by Arnold and Javorcik (2009), the advantage of this approach is that "we eliminate the influence of all observable and unobservable non-random elements of the acquisition decision that are constant or strongly persistent over time". This technique has been used by researchers to analyse the effects of foreign acquisitions on other variables. For instance, Girma and Görg (2007) evaluate the effect of foreign acquisitions on wages in the United Kingdom, and Arnold and Javorcik (2009) examine plant performance outcomes for Indonesian firms.

The aim of the propensity score matching is to construct the unobserved counterfactual of how the acquired firm would have performed in the absence of ownership change. This is done by matching each foreign-acquired firm with a group of comparable non-acquired firms with similar pre-acquisition characteristics, such as productivity, size, exporter status, and the like. Since this procedure would imply comparing acquired and non-acquired firms across a large number of variables, Rosenbaum and Rubin (1983) suggest the use of the conditional probability of receiving treatment given some pre-treatment variables (named propensity score) to perform the matching. In our context, the propensity score is the predicted probability of a firm receiving FDI. This procedure reduces the dimensionality of the matching process to a single index, namely the propensity score.

In section 4 we estimate the probability of a firm being acquired by foreign investors using a probit model. As explanatory variables in the probit model we include observable firm characteristics such as total factor productivity (TFP), firm size,

[6] Empirical literature usually follows the OECD Benchmark Definition of FDI, which establishes that a firm can be considered as foreign if at least 10 per cent of its capital is owned by foreign investors (OECD, 1999). See, for example, Javorcik (2004).

share of imported inputs, exporter status and share of female workers within the firm.

Having obtained the propensity score, we employ kernel matching, in which multiple control observations (non-acquired firms) within the common support[7] are used and the weight given to each is determined by the distance in the propensity score from the acquired firm. Note that the matching is performed in the pre-acquisition year. Different from one-to-one matching estimators (such as nearest neighbour), kernel matching uses the weighted averages of all firms in the control group to construct the counterfactual outcome. Higher weight is given to controls whose propensity score is closer to that of the acquired firm, while lower weight is given to more distant controls. Thus, one major advantage of this approach is the lower variance that is achieved because more information is used. A drawback of kernel matching is that possibly observations are used that are bad matches. Hence, the proper imposition of the common support condition is of major importance (Caliendo and Kopeinig, 2008).

To identify the treatment effect, the so-called balancing property of the propensity score must be fulfilled. This implies that observations with the same propensity score must have the same distribution of characteristics, independently of treatment status. In other words, for a given propensity score, exposure to treatment is random and therefore acquired and non-acquired firms should be, on average, observationally identical (Becker and Ichino, 2002). Our estimated propensity score satisfies the balancing property.[8] Moreover, following Arnold and Javorcik (2009), we restrict the matched control observations to the same sector and year as the acquired firm.[9] This, in the authors' terms, "eliminates the possibility that differences in productivity or other aspects of plant operations observed across sector-year combinations exert influence on our estimated effects" (Arnold and Javorcik, 2009: 44).

3.1 Data description

The data used in this paper come from the Annual National Manufacturing Survey (ENIA, by its Spanish acronym) carried out by the INE. This survey is a census that includes all Chilean manufacturing plants with at least 10 workers and three

[7] The common support is bound by the lowest propensity score of a treatment observation and the highest propensity score of a control observation.

[8] Appendix B presents our balancing tests.

[9] Our matching procedure is implemented in Stata 12 using the procedure described in Arnold and Javorcik (2009), which guarantees that treated and control firms come from the same year and sector. We thank the authors for kindly sharing their code.

months of operation in the year of reference. It covers approximately 5,000 plants per year. The data constitute an unbalanced panel covering the period 1995–2006. This survey is well known in the literature and has been used by several authors.[10]

This survey captures detailed information on aspects of an establishment's characteristics, such as ownership structure, the five-digit ISIC sector, size, gross nominal output, value added, investment, intermediate inputs, capital stock and employment. It also reports the total number of (full-time) employees,[11] separated by occupation and gender. We group workers into two categories: skilled and unskilled. Skilled workers include the following occupations: owners, managers, administrative personnel and specialized workers. Unskilled workers comprise non-qualified workers directly or indirectly involved in the production process, sellers, personal service workers and home workers.

The data were subjected to the following initial cleaning process. We excluded four industries – tobacco (ISIC 314), petroleum refining (ISIC 353), wholesale trade (ISIC 610) and business services (ISIC 832) – from the sample because of a lack of representation (fewer than five firms operating in the sector). Furthermore, we kept only those firms for which information on the key variables was available.[12]

3.2 Foreign-acquired firms

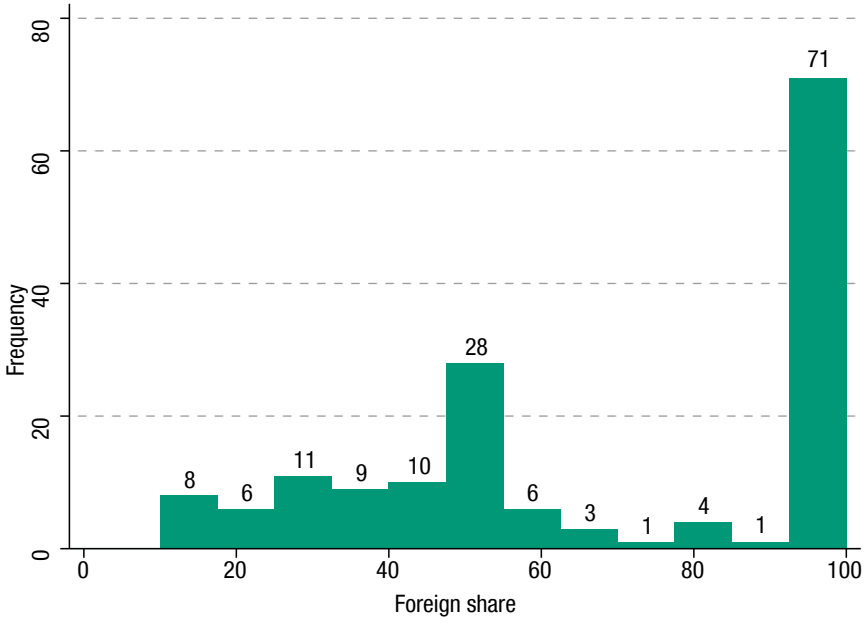
In total, 158 firms in our sample were foreign-acquired, of which 71 firms (45 per cent) were fully acquired by foreigners; that is, foreigners acquired 100 per cent of a firm's total assets. Indeed, 57 per cent (90 out of 158) of the acquisitions resulted in foreign control of the firm (i.e. foreigners owning more than 51 per cent of the property) (figure 1).

[10] See, for instance, Pavcnik (2002) and Levinsohn and Petrin (2003).

[11] Unfortunately, we do not have data about part-time workers, which could provide important information for our analysis as part-time jobs may be an important employment alternative for women.

[12] The share of firm-year observations that were dropped represents 29 per cent of the original sample. Nevertheless, the representation of dropped observations in the total output is only 2 per cent.

Figure 1: Foreign property share in acquired firms (number of firms)



Source: ENIA.

Regarding the sectors in which acquisitions took place, in table 1 we observe that the industries in which most of the acquisitions were concentrated were the manufacture of food and beverages (37 per cent of total acquisitions) and the manufacture of chemicals, coal, rubber and plastic products (22 per cent of total acquisitions). Other industries in which acquisitions also took place were the manufacture of wood and wood products (11 per cent of total acquisitions), textile, wearing apparel and leather industries (9 per cent of total acquisitions), and the manufacture of fabricated metal products, machinery and equipment (9 per cent of total acquisitions).

One alternative explanation for the disparate outcomes in labour markets between male and female workers in foreign-acquired firms could be that foreign firms target intrinsically female-friendly industries. Table 1 includes the share of female workers within each sector (column 3) and the industry rank position in terms of industry-level female share of employment in the initial period (column 4). As can be observed, there is no clear pattern indicating that foreigners target industries with higher concentrations of female workers. The two sectors where most of the acquisitions take place have 25 per cent and 15 per cent of female workers, respectively.

Table 1: Foreign-acquired firms by industry

	Number of acquired firms	Percentage	Share of female workers	Rank
Manufacture of Food, Beverages and Tobacco	58	37	25	3
Textile, Wearing Apparel and Leather Industries	15	9	37	2
Manufacture of Wood and Wood Products, Including Furniture	18	11	8	7
Manufacture of Paper and Paper Products, Printing and Publishing	7	4	21	4
Manufacture of Chemicals and Chemical, Petroleum, Coal, Rubber and Plastic Products	35	22	15	5
Manufacture of Non-Metallic Mineral Products, except Products of Petroleum and Coal	5	3	5	9
Basic Metal Industries	4	3	6	8
Manufacture of Fabricated Metal Products, Machinery and Equipment	15	9	10	6
Other Manufacturing Industries	1	1	46	1
Total	158	100		

Note: Ranking goes from 1 to 9, where 1 corresponds to the sector with the highest share of women among all workers.
Source: ENIA.

4. Estimation of the propensity score

This section describes the estimation of the propensity score, which in our case is the probability of a firm being acquired by foreign investors. As a first step in our analysis, we need to obtain the probability of a local firm being acquired by foreign investors (our propensity score). We do so by estimating a probit model. The selection of explanatory variables is based on previous studies, such as Arnold and Javorcik (2009) and Alfaro and Chen (2012). In particular, we incorporate variables related to the production structure of the firm, such as (ln) TFP,[13] size (measured by the (ln) total number of workers), capital per worker (ln), the share of women among total workers as well as among total skilled workers. We also include variables capturing the openness of the firm to foreign markets (exporter dummy and share of imported inputs). In addition, we consider that the presence of other foreign firms

[13] We estimate TFP following the generalized method of moments suggested by Wooldridge (2009). This methodology controls for both endogeneity and selection biases. It also corrects the collinearity problem outlined by Ackerberg et al. (2015) of the two-steps estimation techniques suggested in Olley and Pakes (1996) and Levinsohn and Petrin (2003).

in the sector[14] may motivate foreign investors to acquire a local establishment. The complete list of explanatory variables with their means and standard deviations appears in table 2.

Table 2: Summary statistics

	Mean	Standard deviation	Number of observations
ln(TFP)	8.892	1.395	56,598
ln(Employment)	3.466	1.114	62,473
Female labor share (%)	23.71	22.9	62,473
Skilled female labour share (%)	28.95	25.25	62,702
Share of imported inputs (%)	7.355	19.53	62,224
Exporter dummy	0.202	0.402	62,702
ln(Capital per worker)	8.333	1.691	57,259
Foreign presence in the sector	0.145	0.159	62,702

The results from the probit model are presented in table 3. As expected, more productive, larger and more capital-intensive plants are more attractive to foreign investors. Plants with a larger share of female workers are also more attractive for foreign investors (although the variable is significant only at the 10 per cent level). In addition, we find that a firm's openness to international markets (measured by the share of imported inputs and a dummy for exporter status) as well as the presence of other foreign firms in the sector are important determinants of the acquisition decision. In contrast, the share of skilled female workers within the firm seems not to be important in the identification of an acquisition target. Finally, we include a time trend, which is statistically significant.

On the basis of the predicted probability of being acquired by foreign investors (the propensity score), we perform our matching procedure. The balancing property of the propensity score is tested and satisfied.[15] In other words, there is not a statistically significant difference in the means of the variables considered between the acquired (treated) firms and the matched controls (non-acquired firms). Therefore, we can be confident that our propensity score is appropriate to perform the matching.

[14] Following Javorcik (2004), we define the extent of the foreign presence in the four-digit sector *j* at time *t* as the foreign equity participation, averaged over all firms in the sector, weighted by each firm's share in sectoral output. That is, $\frac{\sum_{i \in j} foreign_{share_{it}} x_{y_{it}}}{\sum_{i \in j} y_{it}}$.

[15] The main idea behind balancing tests is to check if at each value of the propensity score, the pre-acquisition variables used to estimate the propensity score X_{t-1} have the same distribution for the treatment and comparison groups. Balancing tests proposed in the literature mainly evaluate equality of means and variance. The balancing tests are presented in appendix B.

Table 3: Probit results. Predicting foreign acquisitions

ln(TFP) $_{t-1}$	0.0539***
	(0.0202)
ln(Employment) $_{t-1}$	0.155***
	(0.0289)
Female labor share $_{t-1}$	0.00288*
	(0.00169)
Skilled female labor share $_{t-1}$	-0.00413**
	(0.00185)
Imported inputs share $_{t-1}$	0.337***
	(0.108)
Exporter dummy $_{t-1}$	0.217***
	(0.0693)
ln(Capital per worker) $_{t-1}$	0.102***
	(0.0242)
Foreign presence in the sector $_{t-1}$	0.455***
	(0.161)
Time trend	-0.0744***
	(0.0103)
Number of observations	44 607
Pseudo R^2	0.149
Chi^2	321.6

Note: Standard errors in parentheses.
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.
The model includes an intercept that is not reported.

5. Results from the difference-in-differences propensity score matching

We now present the difference-in-differences matching estimates. These estimates give the effects of foreign ownership on the share of female employees (total, skilled and unskilled) in a firm's workforce. Table 4 reports the average treatment effect on the treated group of firms (ATT). We present bootstrapped standard errors.

Looking at the share of women among all workers (first column of table 4), we observe a positive and significant effect – at the 10 and 5 per cent significance levels, respectively – for the first and second years after acquisition. One year after acquisition, the total share of female workers within foreign-acquired firms rises by about 1.64 percentage points, and two years after acquisition this figure increases to 3.55 percentage points. These magnitudes are economically meaningful. Considering that the average share of women among total workers in our data set is 23.63 per cent, the estimates imply that foreign acquisitions raise the participation of females by nearly 7 per cent one year after acquisition and by 15 per cent two years after acquisition with respect to the average.

Table 4: Matching results for the share of female workers

	(1) All women (%) ATT	(2) Skilled women (%) ATT	(3) Unskilled women (%) ATT
Acquisition year	-0.7800	0.9933	-1.3709
	(0.642)	(1.158)	(1.347)
One year later	1.6395*	4.6016***	-0.8481
	(0.871)	(1.433)	(1.424)
One year later	3.5555***	6.6330***	0.6580
	(0.855)	(1.018)	(1.449)
Number of acquisitions	158	158	158

Note: Bootstrapped standard errors in parentheses (300 repetitions).
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

When considering the ratio of skilled female employees to total skilled workers (second column of table 4), we can observe that, in the year of acquisition, the ATT is not statistically different from zero. However, in the following two years the effect of foreign acquisition is positive and significant at the 5 per cent level. One year after acquisition the ATT is equal to 4.60 percentage points. That is, after considering the initial difference between the two groups, the share of skilled female workers in the foreign-acquired plants is 4.60 percentage points higher than it is in non-acquired plants In the following year (two years after acquisition) the figure increases to 6.63 percentage points. In terms of magnitude the observed effect is larger for the share of skilled women than when including all women. Once again, the estimates are economically meaningful. The average share of skilled female workers in our sample is 29 per cent. Therefore, foreign acquisition increases the share of women among skilled workers by 15.9 per cent one year after acquisition and 22.9 per cent two years after with respect to the average share.

Next, we evaluate the effect of foreign ownership on the share of unskilled women – the ratio of unskilled female workers to total unskilled workers – (table 4, column 3). In this case, we observe that the effect of foreign ownership is not statistically different from zero for any of the years under consideration.

These results suggest that foreign ownership increases the share of female workers within the firm. However, the effect seems to be important (and significant) only among skilled women. Our results are consistent with two possible explanations: (i) foreign firms being exposed to more competition and hence being less able to discriminate and (ii) foreign firms' attitudes towards women reflecting the culture of their home country. Unfortunately, we do not have information to test (ii), but the evidence on exporters (see section 7) points towards (i).

5.1 What about male workers?

Our baseline results show an increase in the share of female workers within foreign-acquired firms. The effect is stronger for skilled females. However, these findings may be due to the hiring of more female workers or because of the firing of male workers. To evaluate this possibility we perform our matching process using the (ln) total number of female and male workers as our variables of interest.

In the results (table 5), there is a positive and statistically significant effect for the total number of female workers. One year after acquisition, the total number of female workers increases by about 0.19 per cent, and two years later by 0.27 per cent. The skilled female workers increase by 0.17 per cent one year after acquisition and by 0.22 per cent two years later. In the case of unskilled female workers we only find a positive and significant effect after two years of foreign control, equal to 0.19 per cent. We do not find a statistically significant effect for male workers, whether skilled or unskilled.

Table 5: Matching results for the total female and male workers (ln)

	(1) All		(2) Skilled		(3) Unskilled	
	Women	Men	Women	Men	Women	Men
Acquisition year	0.0246	0.0240	0.0394	-0.0106	0.022	0.0417
	(0.0698)	(0.0311)	(0.0585)	(0.0551)	(0.0868)	(0.0822)
One year later	0.1929***	0.0594	0.1780***	0.0123	0.1169	0.0977
	(0.0532)	(0.0444)	(0.0635)	(0.0425)	(0.0936)	(0.0704)
One year later	0.2702***	0.0385	0.2217***	-0.0303	0.1891**	0.1216
	(0.0857)	(0.0626)	(0.0493)	(0.0592)	(0.0919)	(0.0753)
Number of acquisitions	158	158	158	158	158	158

Note: Bootstrapped standard errors in parentheses (300 repetitions).
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

In sum, the increase in the share of female workers within foreign-acquired firms reported in our baseline results may be explained by a greater rate of hiring female workers. After taking control of domestic firms, foreign firms seem not to alter the number of male workers.

6. Robustness checks

In order to evaluate the robustness of our above results, we conduct three checks. First, we strengthen our definition of foreign acquisition. Second, we evaluate the effect of domestic acquisitions on the share of female workers. Third, we apply alternative empirical strategies.

6.1 An alternative definition of foreign acquisition

As a first way of checking the robustness of our results, we change our definition of foreign acquisition. We now define a foreign acquisition as a situation in which foreign participation in a firm's equity reaches 50 per cent and perform a new matching process. Since this definition is tighter, the number of foreign-acquired firms decreases to 131.

Table 6: Matching results under an alternative definition of foreign acquisition

	(1) All women (%) ATT	(2) Skilled women (%) ATT	(3) Unskilled women (%) ATT
Acquisition year	-0.3261	1.2154	-1.0352
	(0.7066)	(1.1937)	(1.8628)
One year later	1.7954***	3.5735***	-0.6659
	(0.7147)	(1.5730)	(1.3099)
One year later	3.8893***	5.9543***	1.0765
	(1.01518)	(1.5730)	(1.3099)
Number of acquisitions	131	131	131

Note: Bootstrapped standard errors in parentheses (300 repetitions).
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

The matching results are presented in table 6. When we consider the total share of all female workers in the firm (table 6, column 1), we observe a positive and significant effect at the 1 per cent level for the second and third years under foreign control. In both years, the magnitude of the effect is somewhat greater than when we use the benchmark definition of foreign acquisition: 1.80 versus 1.64 percentage points one year after acquisition, and 3.88 versus 3.55 percentage points for the following year. In the case of skilled female workers (table 6, column 2), we observe that, for the acquisition year, the effect of foreign ownership is not statistically different from zero. One and two years after foreign acquisition, the effect of foreign ownership is significant at the

1 per cent level, and the magnitude of the effect is very similar than our previous estimates. Finally, the effect of foreign ownership on the share of unskilled female employees is not statistically different from zero for the year of acquisition and the following years (table 6, column 3).

In sum, our main results are valid even when we use a tighter definition of foreign acquisition. Namely, foreign ownership increases the total share of women working within the acquired firms for the two first years after acquisition. The magnitude of the effect depends on the definition of foreign acquisition applied. Similarly to when we used the benchmark definition of foreign acquisition, the effect of foreign ownership is higher when we consider only skilled women. For unskilled women, the effect of foreign ownership is not statistically different from zero regardless of whether we use our benchmark definition or the tighter definition of foreign acquisition.

6.2 Just a matter of acquisition?

We are also interested in determining whether the observed effects on female employment are due to foreign ownership or just because of the change in ownership. To do so, we follow exactly the same procedure as before (for details, see section 3), but this time we consider domestic acquisitions; that is, a change in ownership from foreign to local investors. We define a domestic acquisition as a situation in which a domestic investor becomes the owner of more than 90 per cent of the firm's property. Foreign firms are now our control group. In this case we have 175 domestic takeovers.

As a first step we estimate a probit model to obtain the probability of a foreign firm being acquired by domestic investors (our propensity score). We include the same explanatory variables in the probit model as in the case of foreign acquisitions, except for the presence of foreign firms in the sector. Using our estimated propensity score, we performed the kernel matching, and then estimate the impact of domestic takeovers on the female employment share.

As shown in table 7, when ownership reverts to domestic hands, the change in the share of female workers within the firm is not statistically different from zero for either skilled or unskilled women or women overall. This result suggests that domestic owners do not affect the gender structure of the labour force when they retake control of the firm, which confirms our finding that foreign ownership does have a positive effect in increasing the share of female employees. Therefore it is not just a change in ownership that explains this positive impact.

Table 7: Matching results for domestic acquisitions

	(1) All women (%) ATT	(2) Skilled women (%) ATT	(3) Unskilled women (%) ATT
Acquisition year	0.7407	-0.1487	3.3232
	(0.8190)	(1.8796)	(2.0239)
One year later	-0.7691	-1.9678	0.6039
	(0.5824)	(1.1705)	(1.4241)
One year later	-1.2583	-1.7787	-0.4632
	(1.7258)	(1.3686)	(1.2749)
Number of acquisitions	175	175	175

Note: Bootstrapped standard errors in parentheses (300 repetitions).
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

6.3 Alternative empirical strategies: fixed effects and propensity score weighting

As alternatives to our difference-in-differences matching estimates, we apply two empirical strategies to estimate the effect of foreign ownership on the share of a firm's employees (both skilled and unskilled) who are women. First, we use the panel structure of our database and estimate a fixed effects regression. We estimate the following regression:

$$Female_{share_{it}} = \alpha + \gamma acquired_{it} + \sum_{j} \beta^{j} X^{j}_{i,t-1} + d_t + \eta_i + \varepsilon_{it} \qquad (1)$$

where *Female_Share*$_{it}$ represents the share of skilled (unskilled or all) women employed by firm *i* in time period *t*, and *acquired* is an indicator variable taking the value of one in the period in which a change in ownership from domestic to foreign investors is recorded and in subsequent periods. $X^{J}_{i,t-1}$ is a set of *j* (lagged) firm-level control variables, such as the (ln) firm size, (ln) capital intensity, the share of women among skilled workers, and (ln) TFP. Finally, dt and ηi are firm and time period fixed effects and εit is the error term.

Including a firm fixed effect helps us to control for selection based on time-invariant firm characteristics, while the inclusion of the vector $X^{J}_{i,t-1}$ controls for selection on time-varying observables.[16] This strategy ensures that the estimates of the parameter γ reflect only changes in the share of female workers associated with

[16] The variables included as controls are the following: (1) (ln) total employment; (2) (ln) TFP (to control for time varying selection on firm size and productivity, respectively); (3) exporter status; (4) share of imported inputs; (5) foreign presence in the sector (to control for time-varying selection on the

foreign acquisitions. We expect γ to be positive, that is, firms to employ a larger share of women after a foreign owner has taken control.

Second, as suggested by Guadalupe et al. (2012), we conduct a propensity score weighting regression to reflect differences in the probability of a firm being acquired based on prior characteristics. The estimated probability of being acquired, or the propensity score, $\hat{p}(X_{i,t-1})$ can be used to reweight the data. The idea of this approach is that plants that are underrepresented in the treated or control group are up-weighted and plants that are overrepresented in one of the groups are down-weighted. In order to estimate the average treatment effect of foreign ownership, i.e. the ATT, we follow Nichols (2008) and assign a weight equal to one $\hat{p}(X_{i,t-1})/(1-\hat{p}(X_{i,t-1}))$ to all acquired firms and a weight equal to to all potential controls (firms remaining under domestic control).[17]

6.4 Foreign-acquired firms hire more female workers

The results from the fixed effects and propensity score weighting estimations are presented in table 8 and confirm our difference-in-differences matching results: foreign acquisition has a positive and significant impact on the share of female workers in the firm. The first column in each panel includes only firm and year fixed effects; the second adds the set of lagged controls; the third presents the propensity score re-weighted estimates.

The fixed effects specifications in columns 1 and 2 of panel A show that the share of skilled female workers is positively and significantly associated with foreign ownership. Column 1a shows that the share of skilled female workers in foreign-acquired firms is about 2.7 per cent higher than in firms that stay under domestic control. This estimate is robust to controlling for lagged firm characteristics (column 2a). In the case of unskilled women, the fixed effects specifications (columns 1b and 2b) show that the effect of foreign ownership is not statistically significant. Similarly, the effect of foreign ownership on the share of all women is not statistically different from zero when we use the fixed effects specifications (columns 1c and 2c).

Columns 3a and 3b present the propensity score re-weighted regressions for the shares of skilled and unskilled employees, respectively. In the case of skilled female workers (column 3a), we observe that the coefficient of 1.38 is lower than in earlier columns but is still highly significant, implying that firms

international presence of these firms and potentially related productivity effects not captured by other variables); and (6) (ln) capital per worker (to control for time-varying capital intensity of the firm).

[17] A discussion of alternative weights is presented by Nichols (2008).

Table 8: Fixed effects and propensity score weighting regressions results

Panel A: Share of skilled female workers

	(1a)	(2a)	(3a)
Acquired	2.680***	2.715**	1.377***
	(0.957)	(1.208)	(0.271)
Number of observations	60,401	44,607	44,640
R^2	0.008	0.007	0.872

Panel B: Share of unskilled female workers

	(1b)	(2b)	(3b)
Acquired	-1.179	-0.947	1.042***
	(0.873)	(1.110)	(0.282)
Number of observations	60,401	44,607	44,640
R^2	0.008	0.008	0.919

Panel C: Share of all female workers

	(1c)	(2c)	(3c)
Acquired	-0.177	0.373	0.521***
	(0.503)	(0.575)	(0.174)
Number of observations	60,401	44,607	44,640
R^2	0.003	0.002	0.958
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Selection controls		Yes	
Propensity score weighting			Yes

Note: Standard errors are clustered by firms (in parentheses).
Selection controls described in footnote 17.
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

employ a higher share of skilled female workers following foreign acquisition. In the case of unskilled women (column 3b), we now observe a positive and significant effect of 1.04 per cent after foreign acquisitions. Finally, the share of women among all workers (column 3c) is 0.5 per cent higher after foreign acquisition.

These results confirm our findings from the difference-in-differences matching estimates. Foreign-acquired firms hire relatively more female workers than they would have done had they remained domestic. The impact is higher when considering only skilled women.

7. Competition and taste-based discrimination

As previously stated, theories of taste-based discrimination (Becker, 1957) suggest that market competition will reduce discriminatory practices due to the costs to firms' owners. Assuming that the differences in hiring practices for men and women occur because of discrimination, one can expect that, as competition increases, the number of female employees within firms should also increase.

Since exporting firms are exposed to greater competition, they may be less discriminatory. Hence, foreign acquisitions of exporting firms should not lead to big changes in female employment. As a way to test our hypothesis that stronger competition reduces female discrimination in the labour market, we perform a difference-in-differences estimation between foreign-acquired firms and non-acquired firms including exporter status at *t – 1*, i.e. the year before acquisition, as an explanatory variable. This variable takes a value of 1 if the firm was an exporter the year before its acquisition and 0 otherwise.[18] We also include a post-acquisition dummy (post-acquisition) taking the value of 1 for all years following acquisition, and an acquisition dummy (acquired), which is equal to 1 for foreign-acquired firms and 0 otherwise, as well as interaction terms between exporter status, the post-acquisition periods and acquired firms. We include all years available for the matched sample.

In table 9 we can observe that the share of skilled female workers within acquired firms increases in the post-acquisition years by an amount equal to 3.71 percentage points. However, when the acquisition dummy is interacted with the post-acquisition variable and the exporter status at *t – 1*, the effect is negative (–4.69 percentage points) and significant at the 5 per cent significance level. Therefore, if our hypothesis that foreign acquisition does not affect the share of female employees within exporting firms is correct, the sum of these two coefficients must be equal to zero. An F-test shows that this is true in our case (see bottom of table 9). For unskilled female workers and for the total share of female workers, this effect is not observed.

[18] The total number of foreign-acquired firms that were non-exporters at t – 1 is 55 (out of 158), which represents about 35 per cent of the total acquired firms.

Table 9: Effects of exporting status on female employment within foreign-acquired firms

	(1) Skilled women	(2) Unskilled women	(3) All women
Post-acquisition	1.242	-2.238	-0.434
	(1.552)	(1.731)	(1.095)
Post-acquisition*Acquired	3.712**	0.867	-0.174
	(1.611)	(2.217)	(0.774)
Exporter at t-1	0.408	-0.490	-0.119
	(0.469)	(0.403)	(0.278)
Exporter at t-1*Post-acquisition*Acquired	-4.693**	-0.0918	-0.0989
	(2.005)	(2.535)	(1.211)
Constant	30.41***	21.31***	25.29***
	(0.0945)	(0.0829)	(0.0562)
Observations	34,805	34,805	34,805
F-test _b[Post-acquisition*Acquisition]+_b[Exporter at t-1*Post-acquisition*Acquired]=0			
	F-stat	*p*-value	
	0.55	0.4591	

Note: Standard errors are clustered by firms (in parentheses).
*, **, *** indicate statistically significance at 1, 5, and 10 per cent level, respectively.

8. Conclusions

A large body of empirical literature underscores that multinationals have more skilled labour forces and pay higher wages than domestic firms. However, the issue of gender inequality is generally ignored. This paper aimed to shed some light on this issue by examining the causal relationship between foreign ownership and a plant's share of female workers, using a census of Chilean manufacturing plants. We identify causality by controlling for the possible endogeneity of plant ownership status, using a difference-in-differences approach in combination with propensity score matching (kernel matching).

Our results can be summarized as follows. First, the evidence on foreign acquisitions shows that foreign ownership leads to a significant increase in the share of skilled female workers at the acquired plants. The improvements become visible one year after the acquisition and continue in the subsequent period. Two years after acquisition, the share of skilled female employees is 6.63 percentage points higher in the acquired plants than in the control group. When considering the share of unskilled female workers, we observe that the effect of foreign ownership is not statistically different from zero for any of the years under consideration. These results highlight the importance of considering skills differences when evaluating the impact of foreign ownership on female employment.

Second, we present supporting evidence for the argument that competition may be the driving force behind the rise in the share of female employees after foreign acquisitions. Since exporting firms are exposed to greater competition, they may be less discriminatory. Hence, foreign acquisitions of exporting (domestic) firms should not lead to big changes in the share of female employees, which is exactly what we found; that is, exporters already act less discriminating prior to their foreign acquisition. This finding is consistent with the view that lack of discrimination may be a source of competitive advantage. In addition, exporters may be more concerned about international reputation, which may motivate them to be less discriminatory than non-exporters.

Our results suggest that FDI may be a key channel to avoid waste of talent, by offering more job opportunities to skilled women. In this sense, we present evidence of a further channel through which FDI can stimulate the economic growth of host countries. This conclusion has important policy implications. Policies encouraging FDI may contribute not only to stimulate economic growth but also to close gender gaps in host countries.

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Appendix

Complementary Tables

Table A1: Slected emerging market economies: net FDI inflows (percentage of GDP)

	1980	1990	2000	2013
Brazil	1.00	0.25	5.08	2.85
Chile	**0.72**	**1.97**	**6.46**	**7.26**
China (mainland)	0.02	0.86	3.41	1.33
India	0.04	0.07	0.77	1.47
Russian Federation	n.a.	n.a.	1.05	3.70
Developing Economies	0.29	0.89	3.77	2.84
Latin America	0.83	0.78	4.55	5.03

Source: UNCTAD (2014).
Note: n.a. Not available.

Table A2: Selected countries: gender inequality indicators 2009

	Chile	Trinidad Tobago	Argentina	Brazil	Mexico	Peru
GEM	**0.53**	0.80	0.70	0.50	0.63	0.64
Ranking in the GEM	**75**	14	24	82	39	26
Seats in parliament held by women[a,b]	**13.9**	26.0	9.6	9.6	36.0	21.5
Female senior officials and managers[a]	**23**	43	23	35	31	29
Female professional and technical workers[a]	**50**	53	54	53	42	47
Ratio of estimated female to male earned income	**0.42**	0.55	0.51	0.60	0.42	0.59

Source: UNDP (2009) and UNDP (2014).
Note: Data as of 28 February 2009, unless otherwise specified.
[a] Percentage of total.
[b] Data as of 2003.

Testing the reliability of the propensity score

Propensity score matching provides a reliable estimate of the effect of foreign ownership on the share of female workers if, conditional on the propensity score, the potential outcomes of the matched sample are independent of whether or not acquisition takes place. If this assumption is satisfied, then the pre-acquisition variables X_{t-1} used to estimate the propensity score, should have the same distribution for the acquired and non-acquired groups. As emphasized by Rosenbaum and Rubin (1983), a lack of balance usually indicates a misspecification of the model used to estimate the propensity score.

In order to assess whether our data satisfy this condition, we conduct some tests jointly, known as balancing tests. Since there is no consensus in the literature about which of the multiple versions of the balancing test is most appropriate in terms of its statistical properties, we perform a number of such tests that are suggested.

First, we employ a test suggested by Rosenbaum and Rubin (1985). It examines the standardized differences (or bias) between the treated group and the group of controls using the kernel matching process for all the variables included in the estimation of the propensity score. The difference between nearest neighbour matching and kernel matching is that in the former, unmatched control group observations are discarded and given zero weights, with some firms of the control group observations serving as the counterfactual for more than one treatment observation (so they have weights greater than one). In the latter case, no control group firms are given a zero weight, with firms from the control group who are more similar to treated firms (in terms of their propensity score) given more weight and control firms who are less similar to treated firms given less weight. The bias for a variable X is the difference between its (weighted) mean for the foreign-acquired firms and that for the matched control group sample, divided by the square root of the average of the variances of X in the treatment and comparison groups. If our balancing condition is satisfied, then the standardized difference will be low. Since there is no formal criterion for how small a standardized bias should be, we follow Rosenbaum and Rubin (1985) and consider a bias lower than 20 (in absolute value) as sufficient to satisfy the balancing condition. As shown in the first column of table B.1, all the variables satisfy this condition.

The second test we apply is also suggested by Rosenbaum and Rubin (1985). It is a simple t-test of the equality of the (weighted) means of the pre-acquisition variables between the treatment group and the control group. This test indicates that there is no statistically significant difference between the (weighted) means of any of the variables included in the matching process between the treated and comparison groups.

The results from these tests suggest that the balancing condition is satisfied overall in our matching process.

Table A3: Balancing tests

	(1) Bias	(2) Treated group mean	(3) Control group mean	(4) *t* stats	(5) *p*-value
ln(TFP) $_{t-1}$	5.1	8.86	8.78	0.1810	0.670
ln(Employment) $_{t-1}$	12.7	3.74	3.60	1.4117	0.235
Female labor share $_{t-1}$	4.2	26.10	25.13	0.0545	0.815
Skilled female labor share $_{t-1}$	-8.3	29.31	31.12	0.2179	0.641
Imported inputs share $_{t-1}$	14.7	0.12	0.08	2.5570	0.110
Exporter dummy $_{t-1}$	1.8	0.22	0.22	0.0525	0.819
ln(Capital per worker) $_{t-1}$	9.6	8.47	8.32	0.3241	0.569
Foreign presence in the sector $_{t-1}$	9.5	0.17	0.15	0.9783	0.323
Number of observations (weighted)	158	158	158		

Source: UNDP (2009) and UNDP (2014).
Note: Data as of 28 February 2009, unless otherwise specified.

The impact of foreign direct investment on gender inequality in India[+]

Shruti Sharma*

This paper examines the effect of foreign direct investment (FDI) on female employment and wages in India. Using both household-level and plant-level data, it estimates the impact of industry-level FDI inflows on employment, wages and the gender wage gap for skilled and unskilled female workers. Further, it estimates whether there are any "cultural transfers" or spillovers in terms of gender norms from more gender-equal countries through this FDI. In order to estimate this, a weighted industry-level Gender Inequality Index (GII) is created. The main findings are that although FDI leads to an increase in employment of unskilled female workers, it worsens the gender wage gap. Further, there is no strong evidence of cultural spillovers to skilled female workers. This may be explained by the fact that multinational enterprises choose to adopt local institutions in order to be successful in developing-country markets, thereby losing some of their ownership advantages.

Keywords: FDI, foreign direct investment, gender inequality, India

1. Introduction

The impact of foreign direct investment (FDI) on the employment and wages of workers has been extensively investigated in various economic studies (Aitken et al. (1996), Hijzen et al. (2013), Lipsey et al. (2013), Poole (2013)). More recently, there has an been an emphasis on examining the impact of FDI on social development in developing countries. One dimension that has been examined is the impact of FDI on gender equality, more specifically, the impact of FDI on the employment and relative wages of women participating in the labour force in developing countries.

The studies examining these effects of FDI on gender outcomes can be divided into two main categories. The first set of studies focuses on the role of increased competition experienced by globalized firms in reducing costly discriminatory practices, as highlighted by Becker (1971), Chen et al. (2013), Heyman et al.

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(2013) and Meng (2004). The other, more recent set of studies highlights the role of "cultural transfers" from more gender-equal home countries to their foreign affiliates in host countries (Kodama et al., 2018; Tang and Zhang, 2017).

This paper examines the impact of FDI on employment of female workers in India and on the gender wage gap there. It estimates both the average effects of industry-level FDI, and the differential effect of this FDI on the basis of the country of origin. Since India opened its borders to trade and investment, studies have investigated how tariff liberalization in the country has played a role in creating a demand for skilled workers (Sharma, 2018) and improved firm-level productivity (Topalova and Khandelwal, 2011) and product variety (Goldberg et al., 2010a, Goldberg et al., 2010b). Although India has experienced significant growth in its FDI inflows, it continues to rank poorly in terms of gender equality — 127 out of 200 countries, according to the United Nations Development Programme (UNDP), measured on reproductive, empowerment and labour market dimensions.[1] An important question to investigate, therefore, is how does FDI impact gender outcomes in India? This paper starts by examining the average effects of industry-level FDI on female employment, employment relative to male workers, and wages of female workers, along with the gender wage gap. Do the competitive pressures of globalization through FDI lead to less discrimination in Indian labour markets?

Further, following Tang and Zhang (2017), this paper uses the Gender Inequality Index (GII) to examine whether there are any "cultural spillovers" from more gender-equal countries to industries that receive FDI from these countries. The paper uses two main data sets — a household-level data set from the National Sample Survey (NSS), and a plant-level data set from the Annual Survey of Industries (ASI). The latter makes it possible to control for various plant-level characteristics while examining the relationship between FDI inflows and gender outcomes but does not contain information on the gender breakdown of the skilled workers at these plants.[2] Further, it mainly covers the manufacturing sector. In order to overcome these shortcomings, this paper mainly considers the employment-unemployment rounds from household-level data available from the NSS for the years 2006, 2008, 2010 and 2012. The impact of industry-level FDI on employment and wages is studied for female and male workers. Further, a weighted industry-level GII[3] is constructed so as to be able to capture the cultural transfers and spillovers of FDI.

[1] India's FDI inflows increased by 167 per cent from 2005 to 2006 and have increased by 19 per cent from 2006 to 2012, the period of analysis in this paper (author's calculations, data from UNCTAD World Investment Report 2020, Annex table 01. FDI inflows, by region and economy, 1990—2019).

[2] Additionally, there is no information on the foreign ownership or export status of the plant.

[3] Data on the GII is available from the UNDP's Human Development Report: http://hdr.undp.org/en/indicators/68606.

The main finding is that FDI does improve gender outcomes in terms of employment. There is a positive impact of FDI — in both absolute and relative terms — on the employment of female workers. This result is confirmed from both the household-level and the plant-level panel data. The increase in employment of female workers is mainly driven by the increase in employment of unskilled female workers. However, FDI has a negative impact on the absolute wages for these female unskilled workers and on the gender wage gap. There is no impact of FDI on the absolute wages or relative wages of skilled female workers.

When considering the weighted industry-level GII to measure the cultural transfers and spillovers, the analyses from the household-level data reveal that FDI from more gender-equal countries has a negative and significant impact on the absolute and relative employment of skilled female workers, while there is no absolute or relative impact on wages. Although this is counter-intuitive to our expectations based on the hypothesis of cultural transfers, it might also be because a significant percentage of the FDI in India is rerouted through Mauritius.[4] When excluding Mauritius from the data, the analysis shows that there are no significant cultural transfers in terms of gender norms for FDI. There might be possible explanations as to why these transfers do not occur in the Indian context, but it is also important to keep in mind that the unavailability of the data about the countries of origin rerouting FDI is also possibly impacting the results obtained in this study.

The fact that FDI in India causes an increase in employment of unskilled female workers can be explained by the fact that the main motivation for FDI in developing countries such as India is to obtain low-cost resources. The resource in India is low-cost unskilled labour. Female unskilled workers earn lower wages than their male counterparts (see section 2), which is why resource-seeking FDI can be expected to increase demand for and thus employment of these workers. However, perhaps because of an excess supply and the weak bargaining power of female unskilled workers, there is no positive impact of FDI on wage outcomes.

A recent study by Coniglio et al. (2017) investigates the differences between foreign-owned and domestic firms in Viet Nam and finds that although foreign firms increase employment opportunities for female unskilled workers, they also widen the gender wage gap. The study, however, considers only a cross-section of Vietnamese firms. In Mexico, in contrast, Juhn et al. (2014) find that tariff reductions in the North American Free Trade Agreement that led to the adoption of modern technologies benefited both the employment and the wages of female workers. However, they are not able to find any positive outcomes in terms of employment or

[4] For 2017, the share of FDI from Mauritius was 39 per cent. Most foreign companies route investments into India through Mauritius-based shell companies to avoid paying capital taxes as a result of the Double Taxation Avoidance Agreement that India signed with Mauritius.

wages for female white-collar workers. Studies by Kodama et al. (2018) and Tang and Zhang (2017) find evidence of cultural transfers and spillovers of FDI to foreign affiliates and firms within the domestic industry for Japan and China, respectively. In this study cultural transfers in the form of higher wages or employment for female skilled workers have not been identified, and while there are some shortcomings in the data, there may be other reasons as to why these effects have not been observed. China and Japan have been recipients of FDI for a much longer time than India (which liberalized only in 1991). A longer, more sustained period allows for better conditions to do business and establish the presence of foreign affiliates to better allow for such transfers. In fact, Kodama et al. (2018) emphasize that they mainly find effects in older affiliates with a larger foreign share, suggesting that time plays an important role in transplanting culture.

In a developing country such as India, where most of the FDI is still market and resource seeking, and it is not as easy to establish a foreign company as in other countries, Halaszovich and Lundan (2016) show that a certain level of "embeddedness" is required for multinational firms to be successful. Thus, in order to be successful initially and to perform better in developing countries, multinational firms need to adopt local institutions. This means multinational enterprises are more likely to hire more-experienced managers to better adapt to local market conditions; thus, they are more likely to hire male managers who have experience working in these countries, than to provide more opportunities to female managers. This embeddedness theory offers an explanation — aside from the shortcomings in the data — for why this study is not able to find a strong presence of cultural transfers and spillovers in terms of gender norms.

The rest of the paper is structured as follows. Section 2 describes the data sets used for this analysis. The empirical estimation models are presented in section 3. A discussion of the estimates obtained from these models is provided in section 4. Section 5 concludes.

2. Data

Four main sources of data were used in conducting this study: household-level data from the NSS of India, plant-level data from the ASI, data on FDI from the Ministry of Statistics and Planning and the Reserve Bank of India, and data on the GII from the UNDP.

The household-level data are obtained from the employment-unemployment rounds of the NSS of India. The data used in this study are from 2006, 2008, 2010 and 2012. The household-level data contain information on the state, occupation, industry, wages, education, age, gender and training of the workers in the data set. The data are mainly available as a repeated cross-section. Summary statistics

on these household-level data are presented in tables 1 and 2. Table 1 provides summary statistics for employment across various worker categories, whereas table 2 provides summary statistics for wages across various worker categories. From table 1, we gather that in the data there are more male workers than female workers, and more unskilled workers than skilled workers. Table 2 shows that skilled workers (both male and female) earn higher average weekly wages than unskilled workers, and that on average male workers earn higher average weekly wages than female workers.

For the purposes of this study, I created cohorts of workers using their age, education, gender, state, industry and occupation. I used the one-digit National Classification of Occupations (NCO) codes to create two main categories, for

Table 1: Employment summary statistics for household-level data

	Average employment	
	Employment (standard deviation)	Log (Employment) (standard deviation)
Female workers	1.94×10^8	19.0062
	(6.72×10^7)	(0.459)
Skilled female workers	1.02×10^7	16.127
	(1.35×10^6)	(0.137)
Unskilled female workers	1.84×10^8	18.940
	(7.28×10^7)	(0.539)
Male workers	5.84×10^8	20.130
	(1.77×10^8)	(0.378)
Skilled male workers	4.85×10^7	17.679
	(1.02×10^7)	(0.214)
Unskilled male workers	5.35×10^8	20.033
	(1.87×10^8)	(0.449)
All workers	7.78×10^8	20.412
	(2.35×10^8)	(0.384)
Skilled workers	5.87×10^7	17.872
	(1.06×10^7)	(0.184)
Unskilled workers	7.19×10^8	20.323
	(2.4×10^8)	(0.436)
Number of cohorts created	114, 349	

Source: Author's calculations based on data from the National Sample Survey (Employment and Unemployment rounds 2006, 2008, 2010, and 2012).

Table 2: Wage summary statistics for household-level data

	Average employment	
	Employment (standard deviation)	Log (Employment) (standard deviation)
Female workers	835.06	6.586
	(502.02)	(0.550)
Skilled female workers	2404.21	7.741
	(808.87)	(0.341)
Unskilled female workers	530.16	6.179
	(273.43)	(0.491)
Male workers	1276.01	7.045
	(662.67)	(0.476)
Skilled male workers	3516.37	8.123
	(1160.61)	(0.337)
Unskilled male workers	976.04	6.799
	(484.59)	(0.462)
All workers	1183.88	6.964
	610.56	(0.473)
Skilled workers	3226.55	8.037
	(981.08)	(0.310)
Unskilled workers	887.48	6.700
	(416.30)	(0.438)

Source: Author's calculations based on data from the National Sample Survey (Employment and Unemployment rounds 2006, 2008, 2010, and 2012).

skilled and unskilled workers. I grouped legislators, senior officials and managers (NCO 1), professionals (NCO 2), and technicians and associate professionals (NCO 3) as skilled workers, and the rest of the professional categories as unskilled workers. All the analyses were also conducted with an alternative definition of skilled workers, with only legislators, senior officials and managers, but it did not significantly change the main results of the paper. The age and education buckets used for creating the cohorts are presented in tables A.1 and A.2 of the Appendix. The occupational categories as they appear in the NSS data are presented in table A.3. There are 35 states and union territories, and 236 industries at the three-digit level. The total number of cohorts created is 114,349. An example of a cohort used for this analysis would be female workers between the ages of 25 and 34 with higher education working as professionals (NCO 2) in computer programming, consultancy and related activities (National Industrial Classification, or NIC 620) in Delhi (State code 7). Wages in the data are average weekly wages in Indian rupees.

Table 3 presents the summary statistics from the plant-level ASI data. The gender breakdown in terms of employment is available only for unskilled workers. The statistics show that on average, plants have more unskilled male workers than unskilled female workers, and those male workers make higher wages than those female workers.

Table 3: Summary statistics for plant-level data

	Mean	Standard deviation
Log (Employment)		
Total workers	5.128	(1.674)
Female unskilled workers	3.269	(1.736)
Male unskilled workers	4.401	(1.748)
Log (Average daily wage) (INR)		
Total workers	15.91	(2.168)
Female unskilled workers	13.64	(1.745)
Male unskilled workers	15.09	(2.236)
Log (Fixed capital)	18.95	(1.859)
Log (Working capital)	16.32	(2.795)
Log (Total sales)	18.52	(2.497)
Log (FDI)	16.42	(2.122)
Observations	5,425	

Source: Author's calculations based on data from the Annual Survey of Industries (plant data, 2000–2006).

For robustness checks for the impact of FDI on female workers, I consider plant-level data from the ASI. Panel data of firms in the manufacturing sector for the time period 2000—2006 were used. The data contain detailed information on various plant-level characteristics, including employment and wages of workers; however, they provide the gender decomposition only of a firm's unskilled workers, not its skilled workers. Thus, the data have been used to verify the effects for unskilled female workers that were obtained from the household-level data. Details on foreign ownership or exports are not available for the years considered in this study.

The FDI data are obtained from the Department of Industrial Policy and Promotion in the Ministry of Statistics and Planning. I mostly use the industry-level inflows of FDI provided at the three-digit NIC. The FDI measure is a flow variable, and the unit of measurement considered is millions of Indian rupees. With the relaxation of FDI policies in India, the share of majority-owned or wholly owned companies has increased significantly and was 85 per cent in 2015 (Aggarwal, 2018). Summary statistics from the FDI data are presented in tables 4 and 5. In order to obtain information on the country-level breakdown of these industrial inflows for the GII analysis, I use the company-level information provided by the Reserve Bank of India. These data provide the name of the company and the inflow of FDI, the main

product description, and the country of origin. There were 12,538 entries for 6,106 unique companies in this data. I created a convergence table to match the product description to the three-digit NIC classification. The most accurate matching was obtained for 2017, and I have used data from that year to obtain an industry-level country classification of inflows of FDI. From these data, I obtain the share of various countries' FDI for each industry.

Table 4: FDI Summary for household-level data

Year	Total FDI (INR)	Industry-level FDI (INR)	Log (Industry-level FDI)
2006	3.96×10^{10}	1.98×10^{9}	19.170
		(4.72×10^{9})	(3.428)
2008	8.20×10^{11}	4.06×10^{9}	20.438
		(1.03×10^{10})	(2.531)
2010	6.18×10^{11}	3.22×10^{9}	19.672
		(8.81×10^{9})	(2.414)
2012	8.28×10^{11}	4.16×10^{9}	19.513
		(1.40×10^{10})	(3.192)

Source: Author's calculations based on data from the Department of Industrial Policy and Promotion, Ministry of Statistics and Planning.
Note: Inward FDI presented in these data is measured as a flow.

Table 5: FDI Summary for plant-level data (manufacturing sector only)

Year	Total FDI (INR)	Industry-level FDI (INR)	Log (Industry-level FDI)
2000	2.24×10^{9}	1.51×10^{7}	15.058
		(3.30×10^{7})	(2.642)
2001	3.47×10^{9}	2.35×10^{7}	14.691
		(6.38×10^{7})	(2.924)
2002	3.34×10^{9}	2.25×10^{7}	14.787
		(6.33×10^{7})	(2.746)
2003	2.05×10^{9}	1.38×10^{7}	15.290
		(2.30×10^{7})	(1.850)
2004	3.20×10^{9}	2.16×10^{7}	15.220
		(5.47×10^{7})	(2.163)
2005	4.33×10^{9}	2.92×10^{7}	15.421
		(6.84×10^{7})	(2.178)
2006	1.11×10^{10}	7.49×10^{7}	16.402
		(1.58×10^{8})	(2.164)

Source: Author's calculations based on data from the Department of Industrial Policy and Promotion, Ministry of Statistics and Planning.
Note: Inward FDI presented in these data is measured as a flow.

These shares are used as weights to compute a weighted GII for each industry. As data on the country of origin of FDI inflows is accurately available only for 2017, the GII data has also been used from 2017 on. It was obtained from the UNDP Human Development Reports. The index considers three main dimensions to measure gender inequality: reproductive health, empowerment and the labour market. A low index (close to 0) reflects low gender inequality, whereas a high index (close to 1) indicates greater inequality in the country. The top three countries with the lowest GII in 2017 were Switzerland (0.039), Denmark (0.040) and Sweden (0.044), whereas those with the highest GII were Yemen (0.834), Papua New Guinea (0.741) and Chad (0.748). India falls in the category of countries with "medium human development" according to the UNDP, with a GII of 0.524 but a very low rank of 127. The labour force participation rate in 2017 of female workers was 27.2 per cent whereas for male workers it was 78.8 per cent.

3. Empirical Strategy

I first consider the average effects of FDI on outcomes such as female employment and wages earned by women. I start with the household-level data where I created cohorts based on age, education, gender, state, skill and industry of occupation. The following estimation measures the impact of industry-level FDI on the employment of the cohorts:

$$y_{it} = \beta_0 + \beta_1 FDI_{jt} + \theta_i + \theta_{st} + \epsilon_{it} \quad (1)$$

where *i* refers to the cohort, and *j* refers to the three-digit NIC industry. The specification controls any unobserved time-invariant cohort-level characteristics that might affect the relationship between FDI and the dependent variable by including θ_i. Further, the specification also controls for state-level time-variant effects that could affect this relationship such as state-level FDI policies, by including θ_{st}. The standard errors in this specification are robust and clustered at the industry-year level.

This estimation is carried out for various subcategories — skilled male workers, unskilled male workers, skilled female workers, and unskilled female workers. Two main dependent variables are considered: average total employment and average daily wages of the cohorts. A positive coefficient on FDI suggests that higher FDI inflows increase the total employment and the daily wages of cohorts in each of the subcategories considered.

Further, to estimate the differential effects between male and female workers, I estimate the following specification:

$$y_{it} = \beta_0 + \beta_1 FDI_{jt} + \beta_2 FDI_{jt} * Gender_{it} + \beta_3 Gender_{it} + \theta_i + \theta_{st} + \epsilon_i \quad (2)$$

where $Gender_{it}$ is a dummy variable that takes a value of 1 for female workers and a value of 0 for male workers. Again, the main dependent variables

considered are cohort-level average total employment and average daily wages of workers. In this specification, a positive and significant coefficient on the interaction term would suggest that the gains in employment and wages due to increased inflows of FDI are significantly higher for female workers than for male workers.

As a robustness check, I run the same specifications for plant-level data and control for plant-level fixed effects. These are time-invariant plant-level characteristics that may impact the relationship between FDI and the main dependent variable — the plant-level employment of workers. Since the plant-level data have the gender decomposition only for unskilled workers, we are unable to conduct this analysis for skilled workers.

To better estimate cultural spillovers from more gender-equal countries through FDI, I move on to the analysis with GII. As there is not a lot of variation in the GII across time, I consider the cross-section from the latest year that I could obtain from the NSS (2012):

$$y_i = \beta_0 + \beta_1 GII_j + \theta_{st} + \epsilon_{it} \quad (3)$$

where

$$GII_j = \sum_k shareFDI_{jk} * GII_k$$

Here *GII* is weighted by the shares of each country in the total FDI inflows of an industry. Higher values reflect higher gender inequality, and lower values reflect lower gender inequality. The specification controls for state fixed effects, to control for any state-level variation that might impact the relationship between GII and the dependent variables of interest. As mentioned in the data section, the most accurate company data providing information on the country of origin of FDI is from 2017, thus the GII can only be computed for 2017. This has been merged with our latest round of household-level data (2012), with the assumption being that while inflows of FDI might have changed, the rough composition in terms of the country of origin in each industry is more or less the same. The dependent variables are employment and wages of workers. This is estimated for the four sub-populations — skilled male workers, unskilled male workers, skilled female workers, and unskilled female workers.

A negative coefficient on GII when considering the employment and wages of female workers would indicate that FDI from more gender-equal countries leads to higher employment and wage outcomes for female workers in India. This would support the hypothesis that there are cultural spillovers from developed countries through FDI to developing countries.

4. Estimation results and discussion

This section presents the estimation results of the empirical analyses discussed in the previous section. The results of the first specification, which examines the impact of *log(FDI)* on *log(employment)* of female and male workers, appear in table 6. On average, higher flows of FDI are associated with an increase in employment, but this is mainly driven by the employment of unskilled workers. The impact on unskilled female and male workers is positive and significant; however, there is no impact on the employment of skilled female and male workers. The coefficients estimated suggest that a 100 per cent increase in FDI inflows in a particular period will lead to an increase in employment of 13.8 per cent on average, driven mainly by an increase in employment of unskilled male workers (11.8 per cent) and unskilled female workers (22.6 per cent). Although the literature does not provide comparisons of these estimates based on the estimation strategy used in this paper (the impact of industry-level inflows on cohorts of workers), these effects might be compared with those obtained by Lipsey et al. (2013). They find that in Indonesia, takeovers by foreign firms led to 10 per cent faster growth in employment than in domestically owned firms.

Table 6: FDI and employment (various populations)

	(1)	(2)	(3)	(4)	(5)
	All workers	**Male unskilled**	**Male skilled**	**Female unskilled**	**Female skilled**
Log (FDI_{ind})	0.138***	0.118***	0.0345	0.226***	0.0487
	(0.0380)	(0.0352)	(0.0270)	(0.0525)	(0.0932)
Constant	5.789***	6.259***	7.412***	4.648***	7.053***
	(0.807)	(0.742)	(0.570)	(1.087)	(1.930)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	16,515	11,533	1,843	2,092	1,047
Adjusted R^2	0.077	0.086	0.075	0.244	0.058

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

Table 7 shows the relative effects for female workers by including a gender dummy, which takes on a value of 1 if the gender is female. When we consider all workers, an increase in industry-level FDI has a significantly bigger impact on female workers than male workers. When considering unskilled workers only, increased FDI has a bigger impact on employment of unskilled female workers than on employment of unskilled male workers. There is no differential gender-based impact of FDI for skilled workers.

Table 7: FDI and employment: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
Log (FDI_{ind})	0.118***	0.117***	0.0270
	(0.0354)	(0.0353)	(0.0256)
Log (FDI_{ind}) x Gender	0.113***	0.0946**	0.0145
	(0.0319)	(0.0306)	(0.0620)
Constant	5.758***	6.045***	7.553***
	(0.772)	(0.761)	(0.604)
State-year FE	Yes	Yes	Yes
Observations	16,515	13,625	2,890
Adjusted R^2	0.081	0.103	0.059

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

As a robustness check for this result, I use plant-level data from the ASI[5]. Although these data provide detailed information on several characteristics of the plant, they do not include information about foreign ownership. Also, they include the gender breakdown of the plant-level workforce only for "production workers", or unskilled workers. The FDI data have been merged at the three-digit level NIC, and a panel was created for the years 2000 — 2006. The estimation results confirm the effects obtained from the NSS household-level data. The share of female workers at the plant level increases significantly as industry-level FDI increases. The results are presented in table 8.

Table 8: FDI and employment results using ASI plant-level data

	(1) Share of female workers	(2) Share of female workers	(3) Share of female workers
Log (FDI_{ind})	0.0252**	0.00250**	0.00244**
	(0.00101)	(0.00102)	(0.00100)
Log (Total sales)		0.000246	0.000601
	0.301***	(0.00164)	(0.00168)
Constant	(0.0166)	0.240***	0.228***
	No	(0.0319)	(0.0331)
State-year FE	Yes	No	Yes
Year FE	Yes	Yes	No
Observations	12,243	Yes	No
Adjusted R^2	0.002	0.001	0.012

Note: Plant-fixed effects are included in all regressions.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[5] This only considers the manufacturing sector.

The positive impact of industry-level FDI on the employment of unskilled female workers is indicative of the fact that most FDI to developing countries seeks low-cost, unskilled labour. Because female workers are paid less than male workers, the employment of this worker group that increases the most.

The next set of results presents the wage effects of FDI from the household-level data. The dependent variable in table 9 is the average daily wage paid to each worker group. There are no significant effects on workers overall; however, increased FDI inflows are associated with significant negative effects on wages for unskilled female workers, whereas there are somewhat significant positive wage effects for male skilled workers. Papers that study the impact of FDI on wages find varying effects, from a small 2–4 per cent increase in wages in cases of foreign takeover in a study for Portugal that controls for firm fixed effects (Almeida, 2007) to a much higher positive effect (between 8 and 23 per cent) in a cross-sectional study that considers Cameroon, Ghana, Kenya, Zambia and Zimbabwe (te Velde and Morrissey, 2003).

Table 9: FDI and wages (various populations)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
Log (FDI_{ind})	-0.00740	-0.00641	0.0273*	-0.0143*	-0.0797
	(0.00470)	(0.00482)	(0.0153)	(0.00591)	(0.0632)
Constant	6.740***	6.722***	7.602***	6.485***	9.240***
	(0.0992)	(0.101)	(0.324)	(0.113)	(1.303)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	16,515	11,533	1,843	2,092	1,047
Adjusted R^2	0.335	0.353	0.273	0.450	0.256

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

I investigate whether these effects are significant when considering the differential impact on female workers relative to male workers. The results are presented in table 10. For unskilled workers, as inflows of FDI increase, female workers make significantly lower wages than male workers. Unskilled female workers still constitute a lower share of the workforce than unskilled men, and thus have lower bargaining power. This may be why FDI is able to exploit and reinforce the lower wages paid to these workers.

When considering skilled workers, industry-level FDI significantly worsens the gender wage gap, as skilled male workers earn higher wages than skilled female workers. An explanation can be found in the embeddedness theory

Table 10: FDI and wages: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
Log (FDI_{ind})	-0.00433	-0.00581	0.0312*
	(0.00427)	(0.00454)	(0.0168)
Log (FDI_{ind}) x Gender	-0.0172***	-0.0136**	-0.0678**
	(0.00507)	(0.00484)	(0.0315)
Gender	0	0	0
	(.)	(.)	(.)
Constant	6.750***	6.600***	7.873***
	(0.0944)	(0.0997)	(0.390)
State-year FE	Yes	Yes	Yes
Observations	16,515	13,625	2,890
Adjusted R^2	0.336	0.365	0.253

Note: All regressions include cohort fixed effects.
Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

of Halaszovich and Lundan (2016) — that multinational firms in developing countries might need to integrate into local institutions in order to be successful in their markets. Thus, multinational firms might prefer experienced managers – who are likely to be male, considering the existing bias in a developing country such as India, where the GII is quite high.

The effects discussed so far are just the average effects of FDI. Yet, given the hypotheses on cultural spillovers, we can expect that the effects will vary depending on the country where these inflows originate. FDI from more gender-equal countries is more likely to have positive outcomes for both skilled and unskilled female workers. The next set of results is from the industry-weighted

Table 11: GII and total employment

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	0.964*	0.841	2.245**	0.0908	4.250**
	(0.567)	(0.784)	(0.923)	(1.177)	(1.539)
Constant	6.357***	6.553***	5.833***	6.134***	5.391***
	(0.133)	(0.160)	(0.168)	(0.268)	(0.350)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	20.266	11,625	4,025	3,091	1,525
Adjusted R^2	0.297	0.272	0.347	0.286	0.431

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

GII analysis. I first consider the employment effects; the estimation results are presented in table 11.

Since a higher value of GII represents greater gender inequality, the results present evidence contrary to our hypothesis of cultural spillovers when it comes to gender norms. I find that the impact of FDI from more gender-equal countries is associated with significantly lower employment of female skilled workers, as well as male skilled workers. Table 12 shows that these negative employment effects of FDI from more gender-equal countries are significantly bigger for female skilled workers than male skilled workers. Estimates obtained in table 13 show that there are no significant wage effects of FDI from countries with a lower GII on either female or male workers.

Table 12: GII and total employment: gender dummy

	(1) All workers	(2) Unskilled	(3) Skilled
GII_{ind}	1.024*	0.848	2.323**
	(0.604)	(0.780)	(0.966)
GII_{ind} x Gender	-0.0438	-0.802	1.694*
	(0.967)	(1.153)	(0.868)
Gender	-0.0768	0.0622	-0.0406**
	(0.205)	(0.246)	(0.183)
Constant	6.361***	6.481***	5.827***
	(0.122)	(0.150)	(0.169)
State-year FE	Yes	Yes	Yes
Observations	20,266	14,716	5,550
Adjusted R^2	0.297	0.276	0.372

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

Table 13: GII and wages

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	0.920	0.806	0.341	0.436	0.250
	(0.669)	(0.496)	(0.587)	(0.847)	(1.661)
Constant	7.365***	7.233***	8.223***	6.795***	7.746***
	(0.131)	(0.0877)	(0.159)	(0.146)	(0.419)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	20,266	11,625	4,025	3,091	1,525
Adjusted R^2	0.062	0.061	0.068	0.110	0.073

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* p < 0.10, ** p < 0.05, *** p < 0.01. Dependent variables are in logs.

One possible problem from this analysis could be that FDI that flows into India is mainly re-routed from Mauritius. Thirty-nine per cent of the FDI in the data is from Mauritius. While Mauritius is considered to have "high human development" by the UNDP (its GII was 0.373 in 2017), it might be rerouting FDI from countries with higher or lower standards of gender equality. Furthermore, my assumption that the share of FDI from each country into each industry remained relatively unchanged from 2012 to 2017 may not be entirely correct.

The relationship between the GII and the employment and wages of workers is re-examined without Mauritius in the next set of results. The estimates presented in table 14 consider the employment effects. There is no evidence of significant cultural transfers in gender norms in terms of higher employment of unskilled or skilled female workers.

Table 14: GII and total employment (without Mauritius)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	-0.0139	0.0570	0.327	0.682	0.731
	(0.654)	(0.871)	(0.755)	(1.099)	(0.973)
Constant	6.322***	6.447***	6.184***	5.696***	5.890***
	(0.115)	(0.133)	(0.199)	(0.268)	(0.344)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,510	6,115	2,213	1,410	772
Adjusted R^2	0.330	0.298	0.397	0.334	0.432

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

The estimates presented in table 15 consider the wage effects of the GII after removing Mauritius from analysis. No significant cultural transfers were found in the form of higher wages paid to female workers, whether skilled or unskilled.

Although issues with data might be impacting the results that are obtained here, it is worthwhile considering why the cultural transfers from more gender-equal countries might not be taking place in a country such as India. I would like to highlight again the theory of embeddedness as proposed by Halaszovich and Lundan (2016). For entry and success in developing countries, multinational enterprises might sacrifice some of their ownership advantages to assimilate into the local institutions in order to perform better in developing-country markets. Thus, it is likely that they do not differentially impact hiring practices in developing countries, especially for skilled workers. Furthermore, Kodama et al. (2018) find that cultural transfers are strongly present in older affiliates, indicating that time plays an important role in transplanting culture. Given that India has opened up its markets to FDI more recently than countries such as Japan and China, we find that enough time has not passed for cultural transfers (or spillovers) from the home country to take place.

Table 15: GII and wages (without Mauritius)

	(1) All workers	(2) Male unskilled	(3) Male skilled	(4) Female unskilled	(5) Female skilled
GII_{ind}	1.182	0.900	0.431	1.195	0.105
	(0.968)	(0.723)	(0.884)	(1.050)	(2.078)
Constant	7.382***	7.229***	8.375***	6.720***	7.910***
	(0.167)	(0.118)	(0.193)	(0.185)	(0.468)
State-year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,510	6,115	2,213	1,410	772
Adjusted R^2	0.058	0.060	0.071	0.109	0.051

Note: Standard errors in parentheses. Standard errors are robust and clustered at the industry-year level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variables are in logs.

5. Conclusion

This paper examines the impact of FDI on gender outcomes in India, more specifically, the employment and wages of female workers in India. I find that an increase in industry-level FDI inflows increases the employment of unskilled female workers Ð both absolute and relative to unskilled male workers. Yet, it has a negative impact on both wages and the gender wage gap of female unskilled workers. These results are confirmed by both the household-level data and the plant-level panel data used for this study. They can be explained by the fact that in addition to being market seeking, most of the FDI to developing countries is resource seeking, mainly for low-cost unskilled labour. The paper also tries to identify if there any cultural transfers of FDI in terms of the gender norms of the home countries. Given that India is more gender unequal than most countries it receives FDI from, it is likely that FDI from these more gender-equal countries brings with it a higher demand for female employees, better wages for women and a reduction in the gender wage gap. Using an industry-weighted GII, this paper examines whether countries with lower indices (more gender equality) contribute to better employment and wage opportunities for women through FDI. It finds that there is a negative impact of FDI from countries with better gender norms on both the employment and wages of skilled female workers. This result might be misleading because much of the FDI in India has been rerouted through Mauritius (rank 84 in the list of GII countries), which that might explain the counter-intuitive effects. Removing Mauritius from the analysis changes the result: there is no impact of FDI from more gender-equal countries on the employment and wages of skilled or unskilled workers in India. Again, this result needs to be interpreted with caution, because removing Mauritius from the analysis also removes almost 40 per cent of the FDI in the data, which may actually flow from more gender-equal countries.

Despite the problems posed by the data, there might be some factors explaining why we do not observe any cultural transfers or spillovers. Compared with other countries, such as Japan and China, where evidence of such transfers has been found, the time period for which India has been a recipient of inflows is shorter. Kodama et Al. (2018) find that the effects of the transfers are stronger for older affiliates, suggesting that it takes time before a country can enjoy such transfers. Furthermore, Halaszovich and Lundan (2016) show that most multinational enterprises in developing countries need to embed themselves initially in local institutions in order to be successful, especially if they seek to sell in developing-country markets. This means that it is likely that multinational firms hire corporate leaders and managers who have experience in domestic companies and, given the gender norms in developing countries, are more likely to be men. In doing this, multinational enterprises might lose their ownership advantages, making it less likely for cultural transfers to take place.

This paper provides interesting insights from a policy perspective. First, FDI does lead to positive gender outcomes in terms of employment for unskilled female workers. However, in order to allow for cultural transfers that might translate into more employment and higher wages to skilled female employees, the government needs to provide MNEs with easier access to suppliers and the market for multinational firms so MNEs do not lose their ownership advantages that might spill over as benefits to local firms.

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Appendix

Table A.1: Age buckets

Age bucket	Age range (in years)
1	< 18
2	18 — 24
3	25 — 34
4	35 — 44
5	45 — 54
6	55 — 64
7	65+

Table A.2: Education buckets

Education bucket	Label	Years of education
1	Below middle school	Up to grade 8
2	Secondary / senior secondary	Grade 9 to grade 12
3	Higher education	College or more

Table A.3: One-digit National classification of Occupations (NCO) codes

Division Code (NCO)	Division name	Skilled / unskilled
1	Legislators, senior officials, and managers	Skilled
2	Professionals	Skilled
3	Technicians and associate professionals	Skilled
4	Clerks	Unskilled
5	Service workers, and shop & market sales workers	Unskilled
6	Skilled agricultural and fishery workers	Unskilled
7	Craft and trade related workers	Unskilled
8	Plant and machine operators and assemblers	Unskilled
9	Elementary occupations	Unskilled

Insider's advantage: when foreign firms do not capture opportunity in the local labour market[+]

Alessandra L. González*

Previous studies have argued that, relative to local firms, multinational firms may have an "outsider's advantage" in hiring women. Using a large data set of executives in the countries of the Gulf Cooperation Council, in a region with some of the lowest rates of female labour force participation in the world, I present new evidence of a setting in which foreign firms do not capture opportunity in the local labour market. I find that foreign firms, on average, are not more likely than local firms to hire female executives and are *less* likely to place women into top management roles. I propose that foreign firms may have fewer social networks and resources, or lack "insider's advantage", relative to local firms for recruiting women into executive positions.

Keywords: executives, diversity, gender, global strategy, labour markets, management, multinationals, organizational behaviour

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1. Introduction

Multinational firms play an increasing role in the global economy. Global foreign direct investment (FDI) outflows amounted to $1.39 trillion in 2019, up from $244 billion in 1990 (UNCTAD, 2020). Today, multinational enterprises (MNEs) account for about 23 per cent of global employment, providing attractive jobs for workers in host countries that often pay higher wages than domestic firms in the same industry (Aitken *et al.,* 1996; Setzler and Tintelnot, 2019). In 2017, women held 22 per cent of board seats in the top 100 MNEs, which is slightly above the S&P 500 average and higher than the national averages in almost all countries in the world (UNCTAD, 2018).

Whereas a growing body of literature has documented an "outsider's advantage" (Siegel *et al.,* 2018) for foreign firms when capturing opportunity in the local labour market, I present new evidence of a setting in which foreign firms are not more likely than local firms to hire female executives in a set of countries with very low shares of women in management and some of the lowest rates of female labour force participation in the world. In addition, I find that multinational firms are actually *less* likely to place female executives in top management roles in these countries. These findings are robust for differences in the share of female executives across industries and are not driven by the fact that MNEs specialize in industries with a low share of women in executive roles. An alternative hypothesis about the influence of local firm advantage in recruiting is that foreign female executives may be more reluctant to travel from their home country to a subsidiary country. Yet when considering only local female executives, I find that foreign firms are still not more likely than local firms to hire a female executive. To explain these results, I suggest that local firms have an *insider's advantage* because of greater access to relevant social networks and resources– what I term *firm social capital*– relative to foreign firms.

1.2 "Outsider's advantage"

We might expect that firms originating in societies with social norms[1] that feature a greater presence of women in management and the labour force may internalize and export their organizational practices to their countries of operation, even if local customs differ. The idea that a national culture can influence organizations within it is not new (Hofstede, 1980; Schneider, 1989; Weber *et al.,* 1996; Gerhart and Fang, 2005; Gerhart, 2008). But what happens when an organization with one set of social norms and practices related to women and work enters a national culture with very

[1] Following Scott and Marshall (2009), I think of social norms as "a shared expectation of behaviour that connotes what is considered culturally desirable and appropriate." I examine descriptive but not injunctive norms.

different gender norms and practices? An analysis of the promotion of women to managerial positions poses a stricter measure of female employment. A separate but relevant literature on workplace inequality has sought to address the mechanisms by which women remain a low proportion of business executives.[2] Even among countries with high rates of female labour force participation, women constitute a minority of business executives. A test of the transmission of national culture in female executive hiring outcomes presents a rich case in which to understand whether source or host-country business practices dominate, and when and where foreign firms are able to capture opportunity in the local labour market.

One way to contrast organizational culture with national culture is to study how multinational organizations diverge from or maintain their economic practices when operating abroad. A number of papers have investigated whether foreign-owned firms are more likely than local firms to hire female workers and even create new perceived demand for female labour (see Kodama *et al.,* 2016 and Mun and Jung, 2017 for Japan and Korea; Villareal and Yu, 2007 for Mexico; Tang and Zhang, 2016 for China; Siegel *et al.,* 2018 for South Korea; and Jensen, 2010 for India).[3] Overall, these papers find that foreign-owned firms are more likely than local firms to hire more women and in some cases also influence local firms to increase the participation of the local female labour force. But these studies are largely limited to analysis of multinational firms within one or two countries, within limited industries, and with smaller sample sizes. An exception to outsider's advantage is Salzinger (2003)'s ethnographic case study of Mexican manufacturing firms, which found that foreign firms had greater gender inequality than local firms and suggested that this inequality is due to misperceptions about the local female labour market by foreign firms. In contrast to these studies, I find an advantage for local firms on the outcome of hiring female executives[4] across all industries in six countries with particularly low rates of female labour force participation.[5] This new evidence suggests that further

[2] Baron and Bielby, 1980; Baron, 1984; Bielby and Baron, 1986; Acker, 1990; Reskin, 1993; Tomaskovic-Devey, 1993; Ridgeway, 2001; Castilla, 2008; Carter *et al*., 2014; Charness and Gneezy, 2012; Fernandez-Mateo and Fernandez, 2016; Niederle and Vesterlund, 2007; Mas and Pallais, 2017; Correll *et al*., 2017.

[3] Some scholars use the term "outsider's advantage" at an organizational level to characterize individuals outside a group; see Yenkey (2018).

[4] My analysis focuses on executives because demographic data on employees were not available.

[5] Some readers may consider the vast difference in norms of female labor force participation in the Gulf Cooperation Council (GCC) region to limit the generalizability of the findings. I argue that it is precisely because of the great difference in the norms of women in management that a test of foreign firm culture should be most rigorous. In fact, one would expect an "outsider's advantage" to be most salient when business norms on hiring women are so different. My study is the first to test foreign firm influence across six countries and all industries with such a large number of firms and executives in precisely the right analytic environment.

exploration is necessary to understand the conditions by which "outsider" firms are advantaged, as well as if and when they are not at an advantage, to capture opportunity in the local labour market.

2. Hypotheses

I draw on three concepts from the organizations literature to identify potential hypotheses for hiring outcomes: firm taste for discrimination (Becker, 1957)[6], competitive and institutional isomorphism (Meyer and Rowan, 1977; DiMaggio and Powell, 1983)[7] and social capital within firms (Bourdieu, 1986; Coleman, 1988; Portes, 1998; Reagans and Zuckerman, 2001; Burt, 2005; Fernandez *et al.,* 2000; Fernandez and Sosa, 2005; Lin 2017). In addition, we can refer to the literature on localization, referral networks and hiring as pathways by which the social capital of local firms may advantage local firms. First, the literature on firm taste for discrimination would predict that foreign firms from countries with higher rates of female labour force participation or higher shares of women in management would have a lesser taste for discrimination against hiring women, and we would expect a greater presence of female executives relative to firms from countries with lower participation rates. A view of organizational behaviour competing for top talent in the labour market would also predict that foreign firms would take the lead on the hiring of female executives. This prediction would also be consistent with literature supporting an "outsider's advantage" that exploits local social gender divisions for competitive advantage (Siegel *et al.,* 2018). We could empirically test this as follows:

> Hypothesis 1a (H1a), pp. *Foreign firms from countries with higher shares of women in management should have a greater presence of female executives and be more likely than local firms to place women in top management supervisory roles when operating in countries with lower shares of women in management.*

A second possible outcome could be that foreign and local firms would show no difference on the outcome of hiring female executives. An argument drawn from the literature on firm isomorphism is that competing firms, despite their differing endogenous preferences, would eventually converge on the outcome of hiring

[6] In Becker's conceptualization, taste for discrimination is the price an employer is willing to pay not to hire a person from a certain group. In his case, he studied the price at which employers were willing to not hire African-Americans, but in my study, I look at the price at which employers are willing to not hire females.

[7] Isomorphism refers to the degree to which institutions start to look alike.

women if hiring female executives were the more profitable strategy.[8] A related perspective from neo-institutionalist theory would be to predict that firms would adapt to host-country business norms if institutional pressures incentivized foreign firms to conform (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). Foreign and local firm convergence on the business practice of hiring female executives could occur through coercive, mimetic or normative isomorphism. All mechanisms are plausible in a setting in which foreign firms are beholden to the regulatory political and legal environments of host countries; local and foreign firms would want to imitate whichever organizational strategy was most successful in the host culture, and the standardization of human resource departments through global professionalization networks may in fact cross national boundaries. Indeed, recent work (Smith and Rand, 2018) suggests that behaviours of non-discriminating firms – specifically, in hiring practices and wages paid – will come to mirror the behaviours of discriminators in equilibrium. From this argument, we would expect no difference between foreign firms and local firms on the outcome of female executive employment. We could empirically test this as follows:

> Hypothesis 1b (H1b), pp. *Foreign firms from countries with higher shares of women in management should not have a significantly different presence of female executives, nor should they differentially place them in supervisory roles, relative to local firms when operating in countries with lower shares of women in management.*

A third possible outcome is that the social capital of the firm would determine its ability to compete for top managerial talent among the available labour supply. This line of argument supposes that local firms would have a greater presence of female executives than foreign firms simply because of their market access and power. A standard definition of social capital remains contested (for various definitions, see Bourdieu, 1986; Coleman, 1988; Portes, 1998; Burt, 2005; and Lin, 2017; and for various applications, see Fernandez *et al.,* 2000; Fernandez *et al.,* 2005; Mehra *et al.,* 2006; Dokko and Rosenkopf, 2010; Laursen *et al.,* 2012). By social capital I

[8] Some may wonder if these firms have any real competitive advantage of profitability from hiring women. Although some of the data on net income are missing, for the subset of firms in the data set that include all the relevant variables, I find no significant association between a higher share of female executives and net income (reported profits/reported losses) in the last reported period. In fact, the coefficient of the proportion of female executives is negative to net income (though not statistically significant). However, as panel data on executives are not available, one cannot draw a conclusion about the relationship between the proportion of female executives and net income. Instead of an argument about profitability, in this paper I make the assumption that firms seeking a competitive advantage for recruiting human capital in the local labor market for executive positions, of which the majority are female college graduates, would seek to increase their share of female executives relative to their competitors despite the absence of solid evidence that the share of female executives is causally related to firm profitability for this set of global firms.

mean the firm's access to resources and networks to exercise agency in the local labour market.[9] In this study, I use a term traditionally applied to persons within organizations and apply it to the firm, as called for in previous research (Sorenson and Rogan, 2014). By *firm social capital*, I mean a firm's ability to draw on its social resources and social network to exercise its will and preferences in the country in which it operates. Firms exercise this will and agency to establish themselves or remain economically competitive and profitable. Social resources can include firms' relationships with local stakeholders who facilitate the legal, political and economic transactions necessary for firms to conduct their business in the country and make a profit. We could expect firm social capital to encompass not only existing social networks but also endogenous cultural capital (Bourdieu, 1986) and knowledge, which can be operationalized into both proactive hiring strategies as well as knowledge about when to selectively adapt certain practices and even how to comply with regulations without deterring potential applicants.

Last, the literature underscores the fact that organizations have embedded structural hierarchies whose power structures are influenced by pressures outside of the organization (Acker, 1990; Baron and Bielby, 1980; Bertrand and Hallock, 2001). If we assume that national culture can influence organizational hierarchy, we might expect that the same mechanisms by which foreign and local companies differ in terms of the presence of female executives, as well as the kinds of roles they occupy in the organization – whether advisory roles or top management supervisory roles where they would be expected to supervise men, for example[10] – may differ as well (Cohen *et al.,* 1998; Phillips, 2005). In addition, we may expect returns to tenure at multinational firms to maintain an embedded gender disadvantage that results in unequal returns to male and female employees, as has been found in other organizational settings (Fernandez-Mateo, 2009).

Drawing on the literature mentioned here, we might expect that foreign firms with less firm social capital may have fewer networks and resources with which to recruit women into supervisory roles. We could empirically test this as follows:

> Hypothesis 1c (H1c), pp. *Foreign firms from countries with higher shares of women in management should have a lesser presence of*

[9] My definition comes closest to Lin's discussion of a "network theory" of social capital as "assets in networks" (2017: 3).

[10] In this setting, I define a role as top management, or *supervisory*, when the executive job title includes the words chairman, chief executive, CEO, owner, founder, proprietor, head, chief, director, deputy, vice, partner or manager. A role is *advisory* when the job title includes the words senior, adviser, signatory and other categories. These broad categories were drawn from the most frequently mentioned categories in the data set. The inclusion criterion was whether the job title's inclusive words would separate those higher in rank with likely supervisory roles, from subordinate employees, lower-level managers or both.

female executives and be less likely than local firms to place them in top supervisory roles when operating in countries with lower shares of women in management.

There is a debate in the literature on whether the mere presence of female executives influences within-firm organizational development for other women in the organization. For example, Mun and Brinton (2015) found that the presence of female executives influenced a positive take-up of work-family policies in firms in Japan, but Bertrand *et al.* (2014) found that board quotas for women in Norway did not improve wages for women in the organization. Sociologists of gender have highlighted the additional cultural significance that gender has as a performative framework (Ridgeway, 2001), where gender roles in leadership are played out as a status-based performance. In other words, while the presence of female managers may positively influence an organization's development, the influence of a female executive may be attenuated by the difficulty of fitting the expectations of her colleagues because she is both female and in a position of executive leadership (Eagly, 2007; Eagly and Karau, 2002). This study inquires whether source- and host-country practices intersect with the status-based gender roles required of female executives. This investigation is carried out by distinguishing supervisory executive roles, in which women would be expected to have male subordinates, from advisory executive roles, which may more easily maintain gender segregation in the workplace.

Finally, to be effective, firm social capital must be utilized; simply having it is not sufficient to make a firm competitive. To further disentangle possible mechanisms by which foreign and local firms may differ on the outcome of hiring female executives, I observed foreign and local firms in Saudi Arabia over several visits to local and multinational firms of various sizes and industries in Riyadh, Jeddah and the Eastern Province from August 2016 through March 2019. In October 2017, I asked a Saudi human resources manager at a large local company how he convinced top management to begin hiring women. He described an elaborate process of persuading his board of directors of the untapped market potential that hiring women would bring to the company. It entailed patiently moving high-potential women from lower levels within his company into leadership positions through visible projects with important clients, starting with the campus of a female university and then moving to clients in more male-dominated environments. This manager described a skillful career development strategy for high-potential female employees in his company that indicates a level of cultural knowledge and access that may not be found in comparable managers at foreign firms. First of all, the client network with large local markets at the company, such as a large local campus of a female university, was already established; therefore, it may not have been as difficult a transition to hire a woman for an executive position, whether from within the company or recruited from outside it. Second, the manager followed a patient

strategy of persuading his majority-Saudi board of directors of the potential to expand the company from within. One can imagine that male managers at foreign companies may not have the knowledge, access or confidence to persuade their all-male board of directors to hire females for executive positions, especially if they do not have a base of female executives in low-level managerial roles whom they can move into more senior roles. This example illustrates the institutional divide between foreign and local firms and their ability to activate their social network and resources, allowing them to recruit and retain female employees effectively in management positions.

2.1 Localization, referral networks and hiring

To explore the pathways by which local firms access insider's advantage through their firm social capital, we can look briefly at the literature on localization, referral networks and hiring. A vast literature on localization supports the idea that global firms must integrate themselves into a host culture in order to succeed. The definition, application, and interpretation of the concept of localization vary – whether as an ideological "manifesto" (Hines, 2000) or "ethical response" (Hailey,1999) to a human resource policy that cuts costs for the firm. I use the term to refer to the business practice of hiring locals, in the context of international firms. Hiring locals may be challenging but can ultimately benefit a firm by building support within the local community, rather than by imposing norms and practices from without. Research on knowledge transfer within organizations has suggested that "knowledge embedded in the interactions of people, tools, and tasks provides a basis for competitive advantage in firms" (Argote and Ingram, 2000); however, processes of localization may require a site-specific "constellation of logics" to guide recontextualization of the meaning as well as actual business practices (Värlander *et al.,* 2015).

Some challenges of recruitment and selection of potential employees from within the local population include lack of information about the culture and an inability to properly contextualize the compensation and incentives of employment (Waxin *et al.* 2018; Bhanugopan and Fish, 2007). Others have found it crucial to retain local managers through the duration of a recruitment and training process for hiring locals (Fryxell *et al.,* 2004). Overall, these studies of multinational companies moving to hire locals and replace expatriate workers recommend "culture-sensitive" approaches to hiring (Kühlmann *et al.,* 2010); others have called for a "holistic" and "comprehensive" human resource development framework (Al-Asfour and Khan, 2014).

Previous work has documented gender disparities in hiring, but recent scholarship suggests that organizational mechanisms such as tokenism among screeners, rather than gender-typing or blanket discrimination across job types, are more

effective in explaining gender discrimination in hiring (Campero and Fernandez, 2018; Forstenlechner, 2009). This literature might suggest that foreign firms would not necessarily have an advantage in hiring practices when they hire a token local to recruit and hire and that this practice may even disadvantage the future hiring of locals. However, this literature has not tested these mechanisms across countries or in cases in which local regulations privilege the hiring of locals, as in the Gulf Cooperation Council (GCC) countries.

The literature on referrals in hiring also suggests that networks are important for maintaining homophily, or hiring people similar to those already in the organization. Homophilous hiring might limit the ability of foreign firms to penetrate local hiring networks, but also might limit the agency of organizations in shaping referral and hiring practices to overcome the segregation that occurs in homophilous hiring. Rubineau and Fernandez (2013) find that referrer behaviours can segregate jobs beyond the effects of homophilous network recruitment, but if designed thoughtfully, referrals can become opportunities for organizations to influence the effects of network recruitment. Rubineau and Fernandez (2015) find that network recruitment need not necessarily lead to gender segregation in United States organizations and propose that network recruitment segregates primarily through interactions with other biasing mechanisms. These studies do not account for insider advantages to network recruiting when competing with foreign firms for local talent. Last, some scholars suggest that gender disparities in hiring are driven by the applicants themselves, who self-select into certain jobs based on their expectations of success in those fields and occupations (Barbalescu and Bidwell, 2013). Unfortunately, one would need the universe of applications data for both foreign and local firms in order to further test supply-side mechanisms.

Surprisingly little scholarship has proposed that insiders may actually advantage firms in a competitive global environment. Eden and Molot (2002) used data from the Canadian auto industry to test a theoretical model showing foreign status as a liability to first-mover firms and latecomers in their ability to bargain with a host government; however, they did not consider the insider's advantage of local firms but rather assumed that foreign firms were advantaged over local firms.

2.2 Insider's advantage

I propose a theoretical mechanism of insider's advantage that foreign firms must wrestle with when testing their social capital and networks in a host environment, particularly when it comes to local resources, such as recruiting talent in hiring for executive positions. I define insider's advantage as a locally owned firm's competitive advantage in access to local social resources, including cultural knowledge and social networks, with which to capture opportunity in the local labour market. Local

firms by their nature are embedded in and comprise local knowledge, networks and social resources within the communities where they must extract the kinds of human talent that would enable them to respond to cultural change in hiring women. In principle, smaller local organizations could also be more flexible and less encumbered by regulations, which could make them adaptable if the regulations are expedient and could make them more competitive in changing particular technologies or human resource practices, such as hiring women for managerial positions. This study presents new evidence for how insider's advantage can explain the failure of foreign firms to capture opportunity in the local labour market.

3. Research setting

Inward FDI stocks in the GCC have grown from $24 billion to $430 billion in the last two decades (UNCTAD, 2016). This growth is evidence that foreign firms, through the sheer magnitude of business they conduct in the GCC, might be expected to change norms. In this paper, I do not try to measure or quantify spillovers of norm change to local firms. Rather, I analyse whether foreign firms transmit their national culture to the host-country culture. GCC countries as host countries have very different social norms when it comes to female labour force participation and women in management, as shown in table 1.

From table 1, we can see that GCC host countries and the source countries of foreign multinationals operating in the GCC differ on the business norm of female employment, including the more stringent measure of women in management. Contrary to expectations, we note that in general, foreign firms from source countries with higher percentages of women in management have fewer women in management in their GCC affiliates (table 1, columns 4–9) than at their headquarters (table 1, column 3). This finding is evidence that foreign firms may not be taking the lead over local firms when it comes to hiring female executives, despite having source-country social norms of a greater percentage of women in management.

Hiring is a process of matching people and jobs (Kalleberg and Sorensen, 1979). A match requires agreement from two parties – the firms that hire and the job candidate, or the demand side and the supply side. From the demand side, we might expect that foreign firms and local firms could differ in their preferences and abilities to hire women. We must also consider that to hire women into executive positions, there must be an available labour supply of women with the skills that firms demand. A complex combination of historical dependence on foreign labour and extraction of natural resources has burdened GCC labour markets in their current approaches to incentivizing firms to hire locally and optimizing local labour supply by incorporating female labour (Willoughby, 2004; Lepeska, 2010; Randeree, 2012). To establish that appropriate human capital is available among local women to

Table 1. Female executives by firm source country and firm location (% female of total executives)

Global ultimate owner (GUO)	Firm location									Total GCC firm foreign affiliates (N)	Total Executives (N)
	1	2	3	4	5	6	7	8	9	10	11
	Source-country FLFP[a]	Source-country percentage of WIM[b]	GUO headquarters[c]	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates		
GCC											
Kuwait	28.2	13.9	4.1	8.9	-	10.3	10.5	0	12.7	156	481
Bahrain	21.0	10.0	14.9	-	6.5	0	-	3.1	12.4	109	208
United Arab Emirates	12.4	10.0	1.9	8.5	12.8	5.1	5.7	0	-	65	216
Oman	12.9	9.3	1.7	-	10.7	-	-	-	11.2	166	247
Saudi Arabia	16.2	7.1	0.3	2.0	14.3	0	5.9	-	12.4	402	645
Qatar	14.1	6.8	1.4	-	11.5	6.7	-	-	11.8	77	191
Foreign (high number of women in management)											
Panama	39.6	47.4	16.2	-	-	-	-	-	18.2	7	24
United States	45.8	42.7	21.7	3.3	33.3	-	0	0	7.8	98	247
Cayman Islands	-	42.4	14.1	-	-	-	-	-	21.2	13	49
France	47.0	39.4	24.6	6.3	-	3.6	33.3	0	6.7	55	165
Canada	47.2	36.2	16.4	-	-	-	-	-	10.3	22	45
Sweden	47.7	35.5	23.3	-	-	-	-	-	11.8	9	21

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Global ultimate owner (GUO)	Firm location									Total GCC firm foreign affiliates (N)	Total Executives (N)
	1	2	3	4	5	6	7	8	9	10	11
	Source-country FLFP[a]	Source-country percentage of WIM[b]	GUO headquarters[c]	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates		
United Kingdom	46.5	34.2	21.0	5.9	-	6.7	25.0	5.9	8.6	107	293
Switzerland	46.6	33.2	13.7	-	-	-	-	8.7	15.2	30	74
Ireland	44.9	32.6	21.1	-	-	-	-	-	21.4	9	20
Belgium	45.9	32.4	10.9	-	-	-	-	15.4	-	11	29
Norway	47.1	32.2	25.1	-	-	-	-	-	-	3	15
Singapore	45.0	31.4	14.8						5.3	12	26
South Africa	45.0	31.3	21.0	-	-	-	-	-	14.3	5	14
Germany	46.5	31.1	16.2	0	-	-	-	3.3	4.2	32	79
Spain	46.4	30.0	14.9	-	-	-	-	0	-	13	30
Netherlands	46.1	29.0	17.8	-	-	-	-	0	0	27	63
Denmark	47.4	28.4	20.1	-	-	-	-	-	4.8	12	32
Italy	42.0	25.8	14.0	-	0	10.0	-	0	0	21	98
Malaysia	38.1	21.5	18.2	-	-	-	-	-	8.3	11	21
Luxembourg	45.2	18.0	11.2	-	-	-	-	-	25.9	15	43
China	43.6	16.8	13.6	-	-	-	-	0	9.1	17	32
Cyprus	46.5	15.8	14.6	-	-	-	-	-	6.3	6	17
Iran, Islamic Republic of	19.0	14.6	0	-	-	-	-	-	9.4	40	64

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Global ultimate owner (GUO)	Firm location									Total GCC firm foreign affiliates (N)	Total Executives (N)
	1	2	3	4	5	6	7	8	9	10	11
	Source-country FLFP[a]	Source-country percentage of WIM[b]	GUO headquarters[c]	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates		
Foreign (low number of women in management)											
Turkey	32.2	12.2	17.0	-	-	-	7.7	-	27.8	14	32
Japan	43.2	11.1	2.6	-	-	-	-	-	11.1	29	53
Syrian Arab Rep.	14.4	10.2	-	-	-	-	-	-	9.6	91	119
Egypt	23.1	9.7	9.2	-	-	-	-	-	16.4	58	92
Lebanon	24.5	8.4	22.3	-	17.9	-	0	10.0	15.7	68	158
Jordan	17.7	5.1	4.1	-	-	-	-	7.7	7.3	49	110
British Virgin Islands	-	-	6.3	-	-	-	-	0	13.2	36	94
India	24.5	-	9.5	0	-	8.5	29.4	0	8.9	207	438
Iraq	20.1	-	-	-	-	-	-	-	10.5	16	19
Kenya	48.5	-	15.0	-	-	-	-	-	25.0	5	12
Libya	24.6	-	-	6.1	-	-	-	-	-	7	70
Pakistan	22.4	-	3.2	-	-	-	-	-	10.9	109	132
Sudan	29.4	-	0	-	-	-	-	-	21.4	50	57

FLFP = female labour force participation, GUO = global ultimate owner, - = no data available or no executives in this category.

Source: GUO headquarters and firm location from BvD Orbis 2016. Source-country FLFP from World Bank 2017 (includes non-citizen labour force). WIM data from ILO Statistical Database, Employment by occupation: managers, June 2014, reported in ILO 2015. Data for the United States from the United States Bureau of Labour Statistics, Management Occupations from Household Survey Data, 2012, in ILO (2015:9). Data for Bahrain listed as "female legislator managers" from Metcalf (2008:88).

Note: Data include the set of firms that have an establishment in a GCC country and at least 10 executives. Countries are listed by source-country percentage of women in management.

[a] As a percentage of the total labour force. [b]. Does not include women at establishments in the GUO country. [c]. Firms present in multiple GCC countries are counted multiple times.

meet the demand for executive positions, we can point to the fact that throughout the GCC today, women outnumber men in attaining a college education, coinciding with local hiring quotas set up in the 1990s.[11] This fact provides evidence against gender-based differences in individuals' educational investments as an alternative explanation for the dearth of female executive labour supply. Although gender-segregated social norms and business regulations in the GCC may hinder firms in hiring women, hiring quotas for locals greatly incentivize businesses to overcome these structural barriers (Miller *et al*., 2019). Hiring quotas are business regulations that require firms to have a certain number of employees sourced from the local population. For example, in some sectors Saudi Arabia requires that firms with more than 10 employees have at least 30 per cent of their employees be local nationals.[12] Although it is difficult to disentangle causality from these data, we can see that hiring quotas were implemented at similar junctions as when women overtook men in college attendance. Although these quotas are not gender quotas, women with college education would be expected to be as competitive as men for demand in the labour market. Relevant to this study, women with college degrees would be expected not to fill just any role, but to be competitive for managerial positions.[13] Despite prevailing cultural norms of fewer women in the labour force for historical reasons, both local and foreign firms are incentivized under current GCC labour market policies to hire locals, and a preponderance of female college graduates has flooded the market with an abundant supply of female human capital.[14] A college degree today appears almost universally as a prerequisite for eligibility for executive positions.

From the supply side, we might also expect that men and women could differ in their preferences to work for local or foreign firms, which for foreign expatriate employees may involve a process of relocation either within their home country or abroad. In a subset of the data for which executive nationality is available, about 49 per cent of women in foreign firms are foreign nationals and about 20 per cent are local women. The data for male executives are surprisingly similar: 50 per cent of male executives

[11] Using data retrieved from Barro *et al.,* (2013), the author's calculations show that women's tertiary education rates surpassed those of men around the time of the introduction of local hiring quotas in the 1990s. See also González (2019).

[12] Recent regulations mandate that some industries, such as retail, localize completely regardless of the number of employees (see Miller *et al.,* 2019).

[13] Although in the GCC women have surpassed men in terms of education attainment, women's labor force participation as a percentage of management still remains significantly lower than the labor force participation of men (see column 2 of table 1). This may be related to the fact that throughout the GCC, women are educated in women's colleges, segregated from men, and historically there has been variation in the kinds of college majors available to men and women, which may not correspond to the demands of the labor market.

[14] See footnote 11.

at foreign firms are foreign nationals and about 22 per cent are local men. Among local firms, 25 per cent of female executives are foreign nationals and about 46 per cent are local. Among local firms, about 28 per cent of male executives are foreign and about 51 per cent are local men.[15] Studies of local women's employment in this region dispel the myth that foreign oil companies are the largest employers; instead, many paths to women's employment are connected through kinship ties to family businesses in smaller, family-owned retail firms (Charrad, 2009). The data in this sample support this view of the trend of many local women being executives in small retail firms. For simplification, I focus on which firms are more likely to hire a female executive and place her into a supervisory role, regardless of nationality.[16]

Whereas both supply- and demand-side factors may play a part in executive hiring, this study focuses on firm-level outcomes in order to provide empirical evidence to disentangle equally plausible outcomes theorized in the literature. This study also serves to motivate future research to investigate causal mechanisms for the findings here.

4. Data and methods

To test the concept of insider's advantage through the mechanism of firm social capital, I analyse a large data set of firms in the GCC from the 2016 Orbis database of Bureau van Dijk Electronic Publishing (BvD), with a set of firm data from the GCC countries Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. The GCC firm data include 139,550 firms and 227,402 executives. This is the most comprehensive list of all firms in these countries I have found with the relevant executive demographic data.[17] These data allow me to pick up nuance in the structural factors that characterize organizations with more female executives. Instead of eliminating sole proprietorships, as has been done in previous analyses

[15] The high number of foreigners working in the GCC, including at the management level, stems from a legacy of hiring foreigners in the private sector, whereas much of the local population is employed in the public sector (Willoughby, 2004; Lepeska, 2010; Randeree, 2012). There is evidence that local versus foreign nationality (Al Dabbagh *et al.* 2016) as well as gender (Heilman, 2001; Eagly and Karau, 2002; Heilman *et al.,* 2004; Eagly, 2007; Barbulescu and Bidwell, 2013; Chattopadhyay and Choudhury, 2017) can influence preferences for working in foreign or local companies in managerial positions.

[16] To ensure that my findings are robust to local labour supply, I rerun the main analysis but limiting it to executives with local nationality; the findings are unchanged.

[17] The data were downloaded directly from one online database source. The total number of executives in the original data set is 788,330; however, because of the large amount of missing data on the gender of executives at small firms, the data set for analysis, which includes the gender of the executive, is reduced to 227,402. By including only firms with an executive whose gender is pre-populated, the number of firms in the analysis is reduced to 139,738 from an original 692,165. Appendix table 1 provides descriptive statistics comparing the complete downloaded sample with the analysis sample.

of women executives in European Orbis data (Christiansen *et al.,* 2016), I include all firms in the database.[18] Similar to Kemp *et al.* (2015), who used Thomson Reuters Zawya data, I provide descriptive analysis of particular job titles of female executives in GCC countries but look at female executives in all firms in the data set with at least one female executive – not only the firms with more than 300 employees, as they did.[19] In addition, Kemp *et al.* made no hypothesis related to the propensity of foreign firms to hire women. This study improves their analysis, not only through regression analysis but also by counting the many female sole proprietors with small- to medium-sized firms.

Firm-level data come from administrative data collected by local chambers of commerce and provided to BvD. The representation of the broader population of firms is difficult to gauge because no better comprehensive list of firms is available. However, the fact that so many small firms are represented allows this analysis to be the most comprehensive data available for understanding executive outcomes throughout a broad sample of firms. Executives are identified and included in the data set by using data provided to BvD by chambers of commerce, by scraping company websites and by calling companies for verification. Executives include all available listed managers, including mid-level managers, top executives, owners, and board members. Some limitations to the data set are that it is cross-sectional; no panel data on individual executives are available in Orbis, limiting the ability to conduct longitudinal analysis of executives; and no employee demographic data are available. Analysis of female executives in Orbis, as in Christiansen *et al*. (2016), has been done primarily on countries of the Organization for Economic Cooperation and Development.[20] It must be noted that the criterion for being designated an "executive" in the BvD Orbis data set is more broad than that used elsewhere in scholarship focused on executives; it includes mid-level managers as well as top management.

[18] I still report findings after removing small firms to test the robustness of the findings for larger firms as this is the size category more salient to foreign multinational firms.

[19] Kemp *et al*. analysed 124 female executives in Bahrain, 558 in Saudi Arabia, 323 in Kuwait, 125 in Oman, 144 in Qatar and 926 in the United Arab Emirates, with a total of 2,200 female executives (the number of male executives in their data is unclear), whereas my analysis lists 10,355 female executives in Bahrain, 603 in Saudi Arabia, 12,578 in Kuwait, 133 in Oman, 2,163 in Qatar and 15,984 in the United Arab Emirates out of a total of 41,816 female executives and 227,402 executives overall (male and female). As a robustness check, I reran the main analysis, limiting the sample to only firms with at least 300 employees, and the results were unchanged.

[20] I could not test firm growth and productivity because of the amount of missing data for GCC firms. In addition, management data (my dependent variable of interest) are available only for the current year, which limited my ability to test for change in female hiring outcomes across a panel of years. Additional controls including export status and log revenue were either not available for this sample or there were too many missing values to include them in regressions.

4.1 Measures of firm social capital

Firm social capital is operationalized by including measures of foreign or local status, size and age. Whether the firm is *foreign* or *local* is included as a measure of status because by definition this measure defines its peer group – who it seeks as role models, sees as competition and seeks for cooperation. Firm ownership is easily observable in many ways, as it is advertised on websites where applicants must submit job applications, in job postings, and in firm marketing and branding. Foreign firms are also understood socially by the public to constitute a different kind of culture than local firms – where English may be the dominant language in the workplace, where greater efforts are made to integrate male and female coworkers on projects, and where work may involve significant international travel. All of these characteristics are signals to local firms of quality and experience and make working at foreign firms particularly attractive for ambitious employees with managerial aspirations, whether for a local or a foreign firm. A second important component of firm social capital is firm size. *Firm size* operationalizes the firm's own resources, heft and influence in the economy. Firm size is another important characteristic of a firm's peer network and access to resources. The third component included in the operationalization of firm social capital is firm age or number of years operating in the country. Previous studies have pointed to the impact of age on a firm's chances of success in new markets (Dowell and Killaly, 2009) and establishing a peer network (Reagans, 2011). The age of the firm in the country would be expected to correlate with the firm's network and resources, simply by the firm having had the time in the host country to accumulate them.

4.2 Outcome variables

I approximate the relationship of the variables of interest by linear regression functions. The main outcome variable of interest is a count of the number of female executives.[21] Since the distribution of the dependent variable is a count variable skewed left, I fit the model with a negative binomial regression[22] and include only

[21] Executive gender came pre-populated in the data set, and according to correspondence with the data provider, this information came from open sources ("through websites, press releases, etc."—personal correspondence with Orbis, 14 November 2017). Gender was available for 227,402 executives and was perfectly pre-populated in the data. Results are similar using ordinary least squares regression on female share, as seen in appendix table 2.

[22] I also ran the analysis as an ordinary least squares regression on the share of women in total executives and as a binary logistic regression on the likelihood of the executive being a woman, and the results are similar.

firms with a total executive gender count greater than zero.[23] This model jointly considers the supply of available executives and firms that hire them:

$$H_j = \alpha_0 + \alpha_1 \cdot ForeignHighWIM_j + \alpha_2 \cdot ForeignLowWIM_j + \alpha_3 \cdot FirmAge_j + \alpha_4 \cdot FirmAgeMissing_j + \alpha_5 \cdot FirmAge_j^2 + \alpha_6 \cdot Size_j + \alpha_7 \cdot Public_j + \alpha_8 \cdot TotalExecutives_j + \alpha_9 \cdot Country_j + \alpha_{10} \cdot Industry_j + u_j, \quad (1)$$

where H_j is the count of female executives at firm j.

Second, I run a binary logistic regression at the executive level on the probability that a female executive at a firm is in a top management supervisory or advisory role. Supervisory role is coded 1 when the job title includes the words chairman or chief executive, owner, founder, proprietor, head, chief, director, deputy, vice, partner or manager. Supervisory role is coded 0 when the job title includes the words senior, advisor, signatory, and other categories.[24]

$$S_i = b_0 + b_1 \cdot ForeignHighWIM_{j(i)} + b_2 \cdot ForeignLowWIM_{j(i)} + b_3 \cdot FirmAge_{j(i)} + b_4 \cdot FirmAgeMissing_{j(i)} + b_5 \cdot FirmAge_{j(i)}^2 + b_6 \cdot Size_{j(i)} + b_7 \cdot Public_{j(i)} + b_8 \cdot TotalExecutives_{j(i)} + b_9 \cdot Country_{j(i)} + b_{10} \cdot Industry_{j(i)} + u_i \quad (2)$$

where S_i is the binary outcome that a female executive i is in a supervisory role. In total, the data include 33,931 women with supervisory roles.

4.3 Explanatory and control variables

A firm is defined as foreign when the firm's global ultimate owner (GUO) country code was different from the firm's country code and the GUO country had a greater share of women in management than the GCC country with the highest share (Kuwait at 13.9 per cent). For the foreign dummy, a firm had a 0 if the GUO country code was the same as the country of operation or the GUO

[23] See footnote 21.

[24] I draw from firm-level data in order to understand the firm-level predictors of female executive leadership and employment. My analysis of women executives at the firm level does not directly address the labor demand for female employees at lower levels in the company; indeed, results may not correlate for female employees and executives, as was found for female board members in Norway (Bertrand *et al*., 2014). It is difficult to obtain employee demographic data without the participation of firms because many firms do not report, let alone track, this kind of information. Because of the lack of data on the gender composition of firm employees, here I focus on executives across a range of countries with low rates of female labour force participation as an integral part of the firm's organizational culture rather than aggregated along with total firm employment.

country had the same or a lower percentage of women in management as the country of operation. Foreign firms were coded in this way to account for some foreign firms having lower percentages of women in management than the GCC country with the highest share of women in management.[25] To distinguish among foreign firms, those from countries with more than 13.9 per cent women in management are labeled as "foreign high WIM," and those from countries with less than 13.9 per cent women in management are coded as "foreign low WIM." In the sample, the former amount to 575 and the latter to 739 firms.

Additional controls include firm age, which is calculated as 2016 (the year the data were downloaded) minus the year of incorporation. Because of the large number of missing age variables, a dummy variable for those firms with missing age variables was created in order to include them in the regression. Firm age squared was also included in order to test for non-linearity of age effects. The total number of executives was compiled by adding those executives for whom gender (male or female) was specified. Firm size was calculated from Orbis's pre-populated Category of the Firm variable, which defines firms as small (15 or fewer employees or the default category when otherwise not mentioned), medium (15–149 employees), large (150–999 employees) and very large (1,000 or more employees). In total, the data include 78,186 small, 53,875 medium, 5,454 large, and 2,223 very large firms; country and industry fixed effects were included. Industry fixed effects were constructed as dummy variables based on the pre-populated BvD Major Sector variable.[26] Last, because scholars have found the role of public sector firms to be significant in income inequality and democracy (Lee 2005), and relevant in this setting as the largest employer of local population, public sector status (GUO is the government or a ministry) was included.

[25] See table 1 for the data sources for the percentage of women in management and for a breakdown of the countries included in the foreign category.

[26] The BvD Major Sector variable is derived from the detailed cross-reference system in BvD Orbis "linking multiple national and international industry classification systems from around the world" (Orbis Internet User Guide 2007, page 85: https://www.bib.uni-mannheim.de/fileadmin/ub/pdf/Fachref/BWL/OrbisInternetUserGuide.pdf).

5. Results

To answer the first question of whether multinational foreign firms or local firms are more likely to have female executives, we look at the results in table 2.[27] From these results, we conclude that foreign firms from countries with either high or low shares of women in management tend to hire fewer or not significantly different shares of female executives than do domestic firms. These results are robust to adding controls for firm age, firm size, and industry. Small firms and younger firms are more likely to have more female executives. For older firms, the negative effect of age increases. Therefore, we find that in foreign firms, even those from countries with higher shares of women in management, the presence of female executives does not significantly differ from that of local firms, when operating in countries with lower shares of women in management. This evidence is consistent with the first part of hypothesis 1b, based on theory from institutional isomorphism: *Foreign firms from countries with higher shares of women in management should not have a significantly different presence of female executives, nor should they differentially place them in supervisory roles, relative to local firms when operating in countries with lower shares of women in management.*

Theory from the literature on firm isomorphism would suggest that firms may simply adjust to the gender-segregated social norms of the host culture and disregard strategies of hiring women into executive positions. This could be one way to interpret the result that foreign firms are not more likely than local firms to hire women into executive positions. However, another possibility is that firms do not have the means (firm social capital) with which to recruit and hire women into executive positions. To further test the mechanism by which firms do act within their means, once they hire women in executive positions, we can observe what kinds of roles they are assigned within the organization. To answer this question, we look at the results of the executive-level analysis.

I use binary logistic regression to test whether a female executive is a supervisor by GCC firm characteristics (table 3). Here we see that foreign firms are significantly less likely to place women in supervisory roles, and this finding is robust to size category and firm age controls. The findings at the executive level are consistent with the second half of hypothesis 1c: *Foreign firms from countries with higher shares of women in management should have a lesser presence of female executives and be less likely than local firms to place them in top supervisory roles when operating in countries with lower shares of women in management.*

[27] A negative binomial regression was the best fit count model for a dependent variable with a large number of zeroes.

Table 2. GCC firm negative binomial regression on female executive count

	Model 1	Model 2	Model 3	Model 4	Model 4 (without small firms)
	B (SE)	B(SE)	B(SE)	B(SE)	B(SE)
Firm social capital					
Foreign high WIM	-0.25*	-0.24*	-0.15	-0.17	0.10
	(0.10)	(0.10)	(0.10)	(0.11)	(0.11)
Foreign low WIM	-0.19*	-0.16	-0.09	-0.06	0.03
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Firm age	-	-0.03***	-0.03***	-0.03***	-0.03***
		(0.003)	(0.003)	(0.004)	(0.004)
(Firm age missing)	-	-0.10***	-0.24***	-0.13**	-0.27**
		(0.03)	(0.03)	(0.04)	(0.08)
(Firm age squared)	-	0.0002**	0.0003***	0.0003**	0.0005***
		(0.00007)	(0.00007)	(0.0001)	(0.0001)
Size					
Small	-	-	1.37***	1.44***	
			(0.11)	(0.12)	
Medium	-	-	1.17***	1.24***	0.49***
			(0.11)	(0.12)	(0.11)
Large	-	-	1.04***	1.02***	0.37***
			(0.11)	(0.12)	(0.11)
Very Large	-	-	-	-	-
Public sector	-	-	-	*-0.99***	*-0.33*
				(0.34)	(0.24)
Total executives	0.11***	0.13***	0.16***	0.18***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Country fixed effects	✓	✓	✓	✓	✓
Industry fixed effects	-	-	-	✓	✓
N	139,549	139,549	139,549	94,365	52,837
Log pseudolikelihood	-89,278.33	-88,949.06	-88,542.83	-58,344.60	-27,019.14
Pseudo R^2	0.08	0.08	0.09	0.10	0.04

Source: BvD Orbis 2016.
Note: Significance is reported at the ***p < .001, **p < .01, *p < .05 levels. Robust standard errors are reported. Foreign high WIM = from a GUO country with a share of WIM higher than 13.9 per cent. A checkmark indicates that fixed effects were included.

Executive-level evidence supports the theory that foreign firms, despite coming from cultures with a higher share of women in management, are less likely to hire women into upper-level management and supervisory roles. The findings provide evidence that foreign firms may lack, or that local firms may have greater, firm social capital with which to source, recruit and attract local women into supervisory positions.

Table 3. Female executive is a supervisor by GCC firm characteristics (binary logistic regression)

	Model 1		Model 2		Model 3		Model 4		Model 4 (without small firms)	
	B	OR	B	OR	B	OR	B	OR	B	OR
Firm social capital										
Foreign high WIM	-2.42	0.09***	-2.27	0.11***	-2.24	0.11***	-1.97	0.14***	-2.10	0.12***
	(0.35)		(0.34)		(0.36)		(0.34)		(0.34)	
Foreign low WIM	-1.67	0.19***	-1.60	0.19***	-1.64	0.19***	-1.54	0.21***	-1.26	0.28***
	(0.42)		(0.39)		(0.40)		(0.33)		(0.32)	
Firm age	-		-0.09	0.92***	-0.09	0.92***	-0.08	0.92**	-0.08	0.92***
			(0.02)		(0.02)		(0.02)		(0.02)	
(Firm age missing)	-		-1.26	0.35***	-1.05	0.35**	-1.46	0.23***	-1.25	0.28***
			(0.22)		(0.24)		(0.26)		(0.35)	
(Firm age squared)	-		0.001	1.00***	0.001	1.00***	0.001	1.00***	0.001	1.00***
			(0.0003)		(0.0003)		(0.0003)		(0.0003)	
Size										
Small	-		-		0.08		0.59	1.80***	-	
					(0.23)		(0.20)			
Medium	-		-		0.72	2.05***	0.66	1.93***	0.18	1.20
					(0.23)		(0.19)		(0.21)	
Large	-		-		-0.16		-0.23	0.80	-0.65***	0.52***
					(0.24)		(0.20)		(0.21)	
Very Large	-		-		-		-		-	
Public sector	-		-		-		-1.20	0.30**	-0.88	
							(0.46)		(0.49)	
Total executives	0.04	1.04***	0.04	1.04***	0.04	1.04***	0.07	1.07***	-0.002	
	(0.007)		(0.008)		(0.008)		(0.007)		(0.006)	
Country fixed effects	✓		✓		✓		✓		✓	
Industry fixed effects	-		-		-		✓		✓	
N	41,742		41,742		41,742		27,322		10,397	
Log pseudo-likelihood	-10,400.99		-10,370.97		-10,343.65		-9,469.01		-1,318.08	
Pseudo R^2	0.48		0.49		0.49		0.32		0.30	

Source: BvD Orbis 2016.

Note: Significance is reported at the *** p < .001, **p < .01, *p < .05 levels. Supervisor includes any job title with the words chairman or chief executive, owner, founder, proprietor, head, chief, director, deputy, vice, partner or manager, and the excluded categories are any job title with the words senior, advisor, signatory and any other title not listed. Names can be repeated (i.e. the same name can be listed in more than one job title). Robust standard errors are reported. Foreign high WIM = from a GUO country with a share of women in management higher than 13.9 per cent.

5.1 Robustness checks

Additional robustness checks – not shown in published tables – included rerunning the firm-level analysis at the executive level on the likelihood that the executive is female; limiting the analysis to firms with at least 300 employees, as is more standard in previous studies using Orbis data (but with the sample reduced to 9,829 executives from 227,402); and clustering standard errors at the firm level. The main results were unchanged. Foreign firms were not significantly more likely to have a female executive, but the coefficient on foreign firms was negative. I controlled for an interaction between the oil industry and foreign status in order to test propositions in Ross (2008) that oil production is negatively correlated to female labour force participation, but these controls were not significantly associated with the hiring of female executives.

For the small sample of female executives with data on nationality, I replicated the analysis to see whether the results are robust to executive nationality. The findings are robust to female nationality: foreign women are extremely unlikely to be placed in a supervisory role at a foreign firm, whereas local women in the sample foreign firms are not more or less likely to be placed into supervisory roles. These findings indicate that foreign firms are not more likely to place women, not even foreign women, into supervisory roles.

6. Conclusion

In this paper, I propose a theoretical mechanism, insider's advantage, measured by firm social capital, as one way to explain why foreign firms do not always capture opportunity in the local labour market. A large data set of executives across six countries in a region with some of the lowest rates of female labour force participation in the world provides a setting in which multinational production does not necessarily lead to greater numbers of women in management. Relative to foreign firms, local firms may have greater firm social capital, or access to networks and resources, with which to recruit local women into executive positions.

These findings add nuance to previous work that has documented an outsider's advantage for foreign firms (Siegel *et al.,* 2018) and home-country network advantage for United States firms (Guler and Guillén, 2010) by seeing whether network advantage transfers to foreign markets with divergent cultural business norms. Whereas other researchers find positive effects from multinational firms operating in China (Tang and Zhang, 2016) and Japan (Kodama *et al.,* 2016), I find the opposite result when looking at a large sample of executive data across six countries and all industries in the GCC. This paper shows that in the case of executive hiring outcomes in countries with patriarchal norms multinational firms

may even overcompensate for local customs by hiring female executives at much lower rates than in their home countries (see table 1).[28] The findings show that outsider's advantage may not be uniformly used but rather may be activated only under certain conditions – subject to access to relevant local social networks and resources – that enable firms to exercise their advantage. From my findings, foreign networks do not appear to cross into these new markets with respect to the outcomes of hiring female executives.

These findings have natural policy implications, including for human resource practitioners and policymakers. Human resource managers at foreign firms may seek to build their local employee networks from which to increase their firm's insider advantage. This could mean investing more in recruitment of locals and learning from the recruitment strategies and practices of local firms in countries of operation. Labour market policies that regulate localization quotas for foreign firms could be accompanied by training of foreign firms by local labour officials on the best practices for hiring and recruiting local workers. Policymakers who aim to increase demand for female labour force participation in GCC countries may be tempted to attract investment from firms whose home countries have greater rates of female labour force participation. Yet, the findings from this paper suggest that in GCC countries foreign firms are not more likely than local firms to hire women for managerial positions and are less likely to place them into supervisory roles. A better understanding of firm social capital and networks in host versus source countries, as begun in this paper, can help inform future studies of the mechanisms by which global gender inequality in management persists.

[28] In a separate project, the author conducted five in-depth, semi-structured interviews with United States diversity managers across a range of industries; four interviews were with diversity managers in multinational firms. These preliminary interviews provide examples to support the idea that executives at foreign firms pursue diversity policies in context with their country of operation and may hesitate to pursue uniform diversity policies by Western standards in non-Western contexts. Further research should investigate the consequences of heterogeneous application of diversity policies on gender inequality in executive employment.

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Appendix

Appendix Table 1. Descriptive statistics comparing full sample and analysis sample

	Full sample	Analysis sample
Number of executives	788,330	227,402
Number of firms	692,165	139,738
(by firm size)		
Small	593,715	78,186
Medium	88,579	53,875
Large	7,260	5,454
Very large	2,610	2,223

Source: BvD Orbis 2016.

Appendix Table 2. GCC firm ordinary least squares regression on female executive share

	Model 1 B(SE)	Model 2 B(SE)	Model 3 B(SE)	Model 4 B(SE)	Model 4 (without small firms) B(SE)
Firm social capital					
Foreign high WIM	-0.07***	-0.06***	-0.04***	-0.04***	-0.01
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Foreign low WIM	-0.06***	-0.05***	-0.03***	-0.02**	-0.01
	(0.009)	(0.009)	(0.009)	(0.01)	(0.01)
Firm age	-	-0.00***	-0.005***	-0.006***	-0.005***
		(0.0003)	(0.0003)	(0.0004)	(0.0004)
(Firm age missing)	-	-0.06***	-0.08***	-0.05***	-0.08***
		(0.004)	(0.004)	(0.005)	(0.006)
(Firm age squared)	-	0.00004***	0.00005***	0.00007***	0.00007***
		(0.000006)	(0.000006)	(0.000007)	(0.000007)
Size					
Small	-	-	0.10***	0.08***	
			(0.004)	(0.004)	
Medium	-	-	0.05***	0.04***	0.05***
			(0.004)	(0.004)	(0.004)
Large	-	-	0.01***	0.008*	0.01**
			(0.004)	(0.004)	(0.004)
Very Large	-	-	-	-	-
Public sector	-	-	-	-0.02*	-0.01
				(0.01)	(0.01)
Total executives	-0.005***	-0.002***	0.0009*	0.002***	0.001***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Country fixed effects	✓	✓	✓	✓	✓
Industry fixed effects	-	-	-	✓	✓
N	182,723	182,723	182,723	128,263	69,087
R^2	0.04	0.05	0.05	0.03	0.03

Source: BvD Orbis 2016.

Note: Significance is reported at the ***p < .001, **p < .01, *p < .05 levels. Robust standard errors are reported. Foreign high WIM = from a GUO country with a share of women in management higher than 13.9 per cent. A check mark indicates that fixed effects were included.

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 ownership[3] 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. Ouedraogo 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 Tanakla, 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 company[5] 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 () 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:

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

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 IRP5[10] 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.

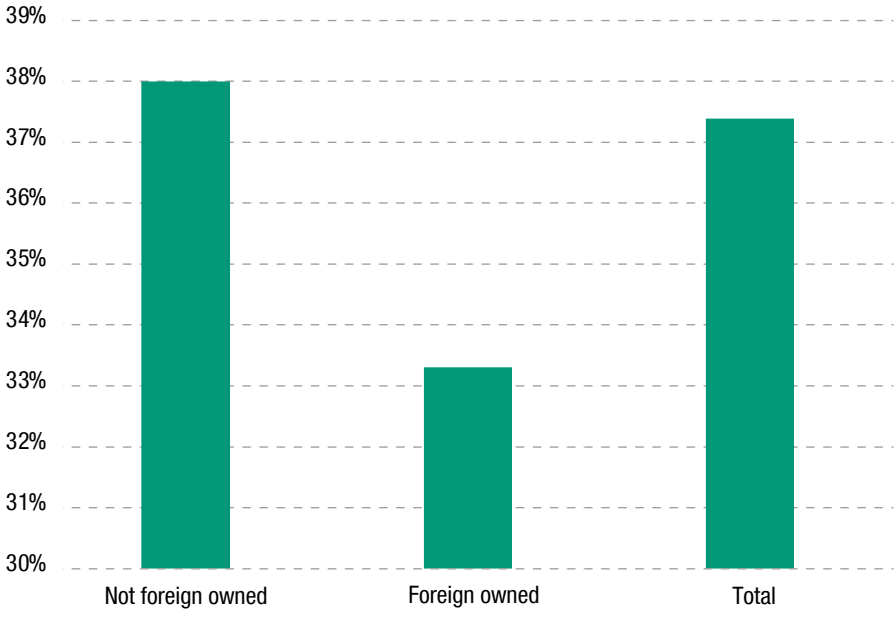
Table 1: Employment share by ownership status (pooled data, 2010-2016)

	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
R^2	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^{β} -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 with 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.

Women empowerment, supply chain linkages and FDI: evidence from Bangladesh[+]

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This paper studies foreign direct investment spillovers on the gender-related labour market practice of domestic firms, based on a unique firm-to-firm data set of Bangladesh's textiles and garment sectors. The paper looks at the female employment of domestic firms that are directly and indirectly related to foreign-owned firms through supply chain linkages. These domestic firms are either the local suppliers or customers of foreign-owned firms, or they share local suppliers and customers with foreign-owned firms. The estimates show that domestic firms related to foreign-owned firms have significantly more female administrative workers, but not necessarily more female non-administrative workers, owing to the former participating in more firm-to-firm interactions.

Keywords: Bangladesh, female labour force participation, foreign direct investment, supply chain linkages, women

JEL: F1, F2, F6, J2.

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1. Introduction

Foreign direct investment (FDI) may affect gender parity objectives and gender inequality through increased economic growth and new employment opportunities. Jobs in foreign-owned firms (which we term "FDI firms") are shown to be "good" jobs associated with higher wages, more stability and training than jobs in domestic firms, especially in developing countries (Javorcik, 2015). In addition to direct effects, FDI can have indirect spillover effects through supply chain linkages. Technological spillovers from foreign affiliates to their suppliers or customers may improve their productivity and allow them to increase the wage premiums they pay to workers.[1] If the technology diffused is more complementary to the female workforce, it can lead to relative increases in female labour demand. Additionally, FDI may improve female labour outcomes via corporate social responsibility efforts to improve working conditions, and health and safety in the workplace. Foreign investors (especially those from advanced economies) may push for more gender-equal norms and less discrimination against females in the workplace, and these practices may spill over to their suppliers or customers in the host country (as well as to other domestic firms) (UNCTAD, 2014).

But FDI can worsen gender inequality depending on the type of technology it brings, the predominant occupations of women, firms' export activities, the competitive environment, and the origin of the investment. Foreign affiliates operating with sophisticated, skill-biased production processes may not improve female labour outcomes in countries with a large gender gap in education. If foreign affiliates transfer technologies to their supplier or customer firms that automate production, those firms' female workers who are engaged in manual occupations, will see a reduction in employment and wages.[2] Foreign affiliates engaged in exports require greater time commitment and flexibility from their employees (e.g. to interact with foreign buyers in different time zones or to travel at short notice). If females are less flexible in their work hours (due to family responsibilities), such FDI may worsen the gender wage gap.[3] The increase in competition driven by FDI weakens the bargaining power of workers, especially of female workers, when they are disproportionately employed in sectors such as ready-made garments that compete on the basis of

[1] See Havránek and Iršová (2011) for a review and meta-analysis of the evidence on spillovers from FDI through supply chain linkages on firm productivity.

[2] Juhn et al. (2014) have shown evidence of such effects in Mexico as a result of trade liberalization: females, engaged in white-collar manual occupations, experienced a decrease in employment and wages as firms invested in production automation, replaced those occupations. However, women employment and wage inequality were reduced for females engaged in blue-collar occupations, which were complemented by automation technologies.

[3] Boler et al. (2014) show that firms beginning to export in Norway see an increase in the gender wage gap for high-skilled workers due to women's reduced ability to work flexibly.

low labour costs with highly mobile capital. Finally, female labour market outcomes may be harmed if FDI originates in countries with a prejudice against female labour (Tang and Zhang, 2017).

This paper examines how FDI affects gender-related labour outcomes directly, but especially via supply chain linkages, focusing on firms in Bangladesh's apparel and textiles sectors. The ready-made garments sector in Bangladesh has been a key contributor to the country's robust economic growth, poverty reduction, and women's empowerment over the last three decades. Bangladesh is the world's second largest exporter of ready-made garments after China, with the sector accounting for more than 80 percent of the country's exports as of 2015, and providing jobs to over four million low and semi-skilled workers (Farole et al., 2017). We exploit a unique firm-level survey collected by the World Bank covering representative samples of firms in the apparel and textiles sectors. It includes information on each firm's suppliers and customers, which allows the construction of novel measures of supply chain linkages to FDI firms in the country. We follow and extend the approach proposed by Kee (2015) by relating FDI firms with domestic firms that share local input suppliers. She designates as FDI siblings those domestic firms that share local input suppliers with an FDI firm in the same sector.[4]

In this paper, we first examine whether there are significant differences in terms of the gender labour practices of FDI firms compared to domestic firms in Bangladesh. We show that FDI firms hire significantly more female administrative workers and non-administrative (production) workers than domestic firms. This is true even after controlling for firm size, location and industry fixed effects. We then exploit the unique firm-to-firm relationships present in our dataset. We study whether domestic firms that are related to FDI firms as their suppliers or customers are different from other domestic firms in terms of gender labour market practices. The estimates show that customers of FDI firms employ significantly more female administrative workers. Finally, we explore the gender labour practices of domestic firms that share local suppliers or local customers with FDI firms. We show that apparel firms that are FDI siblings employ significantly more female administrative workers than other domestic firms. Overall, these results suggest that domestic firms that are associated with FDI firms through backward and forward linkages in the supply chain have similar gender practices as the FDI firms.

Three caveats should be made regarding our study. Although our analysis is able to exploit novel and unique data rarely available, which captures firms' suppliers and customers, the information is available for only a cross-section of firms in one

[4] Using a natural experiment generated by the Everything-But-Arms Initiative of the European Union that increased market access for Bangladeshi exporters, Kee (2015) shows that one-quarter of the product scope expansion and one-third of the productivity gains of domestic firms in Bangladesh that were FDI siblings can be attributed to the presence of the related FDI firms.

year. Thus, our results are robust cross-sectional correlations but cannot be given a causal interpretation. The fact that the data covers the year 2005 implies that our evidence provides a historic perspective on the development of the apparel and textiles sectors in Bangladesh before many changes to working conditions had been made following the Rana Plaza accident in 2013. Unfortunately, our survey does not include information on wages by gender, hence, we consider the gender labour market outcomes in terms of female employment across different types of occupations.

The paper relates to two strands of literature. The first strand of literature examines the role of FDI in gender labour outcomes and work practices. From a macro perspective, stronger FDI inflows are shown to be linked to better welfare for women and lower gender inequality across countries, through decreases in informal employment and the gender wage gap, and improved life expectancy and school enrollment (Ouedraogo and Marlet, 2018). The within-occupation gender wage gap tends to decrease with FDI but only in richer countries, with no clear link identified for poorer countries (Oostendorp, 2004).[5] The expansion of light manufacturing activities led by FDI, such as ready-made garments, is associated with an increase in female labour force participation around the world (Heath and Jayachandran, 2017). From a micro perspective, evidence on how foreign affiliates affect gender inequalities in the labour market is just emerging. Evidence based on large cross-sections of firms in China, Japan, Viet Nam, and a sample of 64 developing countries shows that foreign affiliates hire relatively more female workers than comparable domestic firms in the same sector (Chen et al., 2013; Coniglio et al., 2017; Kodama et al., 2018; Rocha and Winkler, 2019).[6] The female labour share premium in the sample of 64 developing countries is much higher for production than non-production workers, indicating a specialization of women in low-skill production activities. Along the same lines, the lower wages offered to females in China reflect their assignment to low-tech and low-training jobs and their lower productivity, but this is not indicative of gender discrimination. The job opportunities for females in Viet Nam are also in low-skilled occupations due to the country's comparative advantage in labour-intensive, low-tech manufacturing. Across all countries the findings point to foreign affiliates' wage premia being lower when they

[5] UNCTAD (2014) argues that the impact of FDI on the gender wage gap is not one-sided but rather that it varies over time and is country- and context-specific, depending on the level of education and work experience of women and their bargaining power, but also the nature of the industry where they work, the degree of international competition, and the technological spillovers.

[6] While for China, Viet Nam and the sample of 64 developing countries the evidence is based only on large cross-sections of firms, for Japan the evidence provided by Kodama et al. (2018) also relies on a panel of firms. Specifically, following a rigorous causal approach (propensity score matching difference-in-differences) they show that foreign acquisitions are associated with a 9-10 percentage point increase in the share of female workers, although this effect takes place with a delay.

employ a higher share of female workers. Foreign affiliates in Japan are also shown to create more female-friendly workplace conditions than domestic firms, including flexible working hours, telecommuting, childcare facilities, or subsidies.[7] Foreign affiliates can also transmit gender norms from their countries of origin to the host country. Tang and Zhang (2017) show that foreign affiliates in China with parent companies from countries with a more gender-equal culture, employ relatively more women and appoint more female managers. Additionally, those affiliates generate cultural spillovers, increasing female labour shares and the likelihood of hiring a female manager in the domestic firms in the same industry or city.[8]

The second literature strand focuses on Bangladesh's ready-made garment sector's gender outcomes and working conditions. Heath and Mobarak (2015) show that the new employment opportunities brought by the ready-made garment sector had sizeable effects on female welfare in Bangladesh: delayed marriage, decreased fertility, and a rapid increase in girls' educational attainment over the last 30 years. Ready-made garment jobs were the first large-scale employment opportunities for women in a country with very traditional social values, where women generally did not have paid jobs outside the home. Garment jobs provide women with steady incomes but working conditions in the sector are far from perfect. Concerns about worker safety were amplified by the Rana Plaza accident, a factory disaster that killed more than 1,000 garment workers in Bangladesh in 2013. Foreign buyers implemented reforms in response to this accident, including a minimum wage increase, voluntary audits, and an increased reluctance to sub-contract to smaller factories. Bossavie et al. (2019) show that such reforms led to an improvement in overall working conditions in the garment sector, although at the expense of hourly wages for female workers, possibly due to the sector's globally competitive nature. Foreign multinationals in Bangladesh are also shown to play a growing role in improving working conditions in compliance with labour law upstream in their supply chains (Boudreau, 2020).

The contribution of our paper is two-fold. First, we document differences in gender-related labour market outcomes for firms in Bangladesh depending on their links to foreign affiliates in the country through supplier or customer relationships. Studies of supply chain linkages and gender impact are not available in the literature due to the difficulties in measuring such linkages, which our unique dataset allows us to circumvent. Second, we contribute to the broader debate on the link between globalization and gender inequality in developing countries.

[7] The study shows that these differences are more pronounced in affiliates with a higher foreign ownership share, suggesting that control is essential for the ability of the foreign parent to affect the corporate culture in the overseas affiliate.

[8] Tang and Zhang (2020) show theoretically and empirically that these relationships are quantitatively stronger in industries that make more intensive use of female labour.

This paper is organized as follows. In Section 2, we describe the data and provide summary statistics. Our empirical approach is described in Section 3, while regression results are shown in Section 4. Section 5 concludes the paper.

2. Data

Our analysis uses data from a firm-level survey conducted by the World Bank in Bangladesh during November 2004 and September 2005, covering the apparel and textiles sectors.[9] For each sector, the sample was drawn from a different data source. For the apparel sector, a stratified random sample was drawn based on the rich Bangladesh Garment Manufacturers and Exporters Association directory covering 350 firms, which corresponded to about 10 percent of the total population of the domestic firms and 100 percent of FDI firms operating in the sector as of 2004. The sample of apparel firms was stratified to reflect the population distribution of firms by size, industry (woven garments versus non-woven garments), and location (Chittagong, Chittagong-Export Processing Zone, Dhaka, and Dhaka-Export Processing Zone). For the textiles sector, the random sample was drawn based on the most recent list of firms from the corresponding business association, also stratified by size. Strict quality control criteria were applied during the data collection and data processing phases. The survey collected a wealth of information on firm characteristics, in particular related to foreign ownership and exports, as well as several labour market-related variables. Most importantly, the apparel firms were asked to list the names and addresses of their top three local suppliers and the textiles firms were asked to list the names and addresses of their top three local customers. Based on this and on information pertaining to firms' foreign ownership, we were able to identify which firms are suppliers or customers of FDI firms, as well as link domestic firms to FDI firms through common local suppliers or customers.

In our analysis we use the following women employment practice variables as outcome variables: the total number of female workers, the number of female administrative workers, and the number of female non-administrative workers (which includes in particular female production workers).[10] Our main regressors of interest are variables related to FDI. An FDI dummy variable is defined as being

[9] See Fernandes (2009) and Kee (2015) for studies on firm productivity based on the Bangladesh survey data.

[10] Another potential outcome variable would be the gender of the manager of each firm. The survey collected information on the name of the manager and we manually categorized each name as female or male. But we do not use this outcome variable in our analysis given the lack of variability across firms. Among all 350 apparel firms, only three have a female manager, and of all 144 textiles firms, only two have a female manager.

equal to one for firms with any degree of foreign ownership and zero otherwise. An FDI supplier dummy variable equals one for textiles firms that sell to an FDI apparel firm and zero otherwise. An FDI customer dummy variable equals one for apparel firms that buy from a textiles FDI firm and zero otherwise. An FDI sibling dummy variable equals one if the firm shares a local input supplier with an FDI firm and zero otherwise and it is defined for apparel firms only. An FDI partner dummy variable equals one if the firm shares a local customer with an FDI firm and zero otherwise and it is defined for textiles firms only. We use several firm controls including firm size defined as the log of total sales, a dummy for being an exporter, and a dummy for being located in an Export Processing Zone (EPZ).

After data cleaning to exclude firms with incomplete information, the samples used in the econometric estimation include 350 firms in apparel and 144 firms in textiles, as shown in Table 1. Within apparel, 65 percent of firms belong to the woven sub-sector, 34 percent belong to the knitwear/sweater sub-sector, and 1 percent belong to other apparel sub-sectors (e.g. linens).

Table 1: Sectoral distribution of firms

		Number of firms
Apparel	Knitwear	119
	Woven	226
	Other	5
Textiles		144

Table 2 shows summary statistics for our sample. Firms in our sample are large, averaging more than 700 workers, of which 384 are women. About 77 percent of the firms are exporters and 12 percent are located in an EPZ. Within our sample, 11 percent of firms are FDI firms, 5 percent are suppliers to FDI firms, and 15 percent are customers of FDI firms. Moreover, 37 percent of firms are FDI siblings (which share local suppliers with FDI firms), while 4 percent of firms are FDI partners (which share local customers with FDI firms).

Table 2: Summary statistics

	Number of observations	Mean	Standard deviation	Minimum	25th percentile	Median	75th percentile	Maximum
Panel A. Total employment and female labour-market outcomes								
Total number of workers	493	700	815	1	291	450	780	8,200
Total number of female workers	456	384	541	0	128	252	443	7,259
Number of female administrative workers	409	3	7	0	0	2	4	102
Number of female non-administrative workers	388	399	571	-3	127	250	480	7,253
Panel B. FDI variables								
FDI dummy	494	11%	31%	0%	0%	0%	0%	100%
Supplier to FDI firm dummy	494	5%	21%	0%	0%	0%	0%	100%
Customer of FDI firm dummy	494	15%	35%	0%	0%	0%	0%	100%
FDI sibling dummy	494	37%	48%	0%	0%	0%	100%	100%
FDI partner dummy	494	4%	20%	0%	0%	0%	0%	100%
Panel C. Firm controls								
Firm size (log of total sales)	489	18.6	1.3	12.6	17.9	18.6	19.5	22.0
Exporter dummy	494	77%	42%	0%	100%	100%	100%	100%
EPZ dummy	494	12%	33%	0%	0%	0%	0%	100%

3. Empirical specifications

3.1. Impact of FDI

To examine the impact of foreign ownership *per se* on firm-level gender labour market outcomes, the following regression is estimated on the full sample of apparel and textiles firms:

$$Y_{ij} = \beta_{FDI} FDI_i + \beta_X X_i + \mu_j + \varepsilon_{ij} \quad (1)$$

where Y_{ij} is one of the outcome variables for firm *i* in sector *j*, FDI_i is the dummy variable for FDI firms, X_i is the vector of firm controls (size, exporter status, and EPZ location), μ_i is an industry fixed effect, and ε_{ij} is an independent and identically distributed error term. Standard errors are clustered by industry and location.[11]

3.2. Impact of being suppliers or customers of FDI firms

To examine the impact of directly buying from an FDI textiles firm or the impact from directly selling to an FDI apparel firm on firm-level gender labour market outcomes, we estimate the specification below on the sample of domestic apparel and textiles firms:

$$Y_{ij} = \beta_{FDI} FDI\_supplier_i + \beta_X X_i + \mu_j + \varepsilon_{ij} \quad (2a)$$

$$Y_{ij} = \beta_{FDI} FDI\_customer_i + \beta_X X_i + \mu_j + \varepsilon_{ij} \quad (2b)$$

where all variables are defined as above, $FDI\_supplier_i$ is the dummy variable for domestic firms that sell to FDI apparel firms, and $FDI\_customer_i$ is the dummy variable for domestic firms that buy from FDI textile firms.

3.3. Impact of being FDI siblings or partners

To examine the impact of sharing a local input supplier with an FDI apparel firm or the impact of sharing a local customer with an FDI textiles firm on firm-level gender labour market outcomes, we estimate the following two specifications, respectively, on the sample of domestic apparel or textiles firms:

[11] The industries considered are woven, knitwear/sweater, other apparel and textiles.

$$Y_{ij} = \beta_{FDI} FDI\_sibling_i + \beta_X X_i + \mu_j + \varepsilon_{ij} \quad (3a)$$

$$Y_{ij} = \beta_{FDI} FDI\_partner_i + \beta_X X_i + \mu_j + \varepsilon_{ij} \quad (3b)$$

where all variables are defined as above, $FDI\_sibling_i$ is the dummy variable for domestic apparel firms which share a local input supplier with an FDI firm, and $FDI\_partner_i$ is the dummy variable for domestic textiles firms which share a local customer with an FDI firm.

4. Results

Table 3 presents the regression results examining whether FDI firms are different from domestic firms in terms of their gender labour practices. The estimates of Equation (1) show that FDI firms in Bangladesh consistently employ more female workers across all worker categories. However, some of these results are driven by other covariates. Once we control for firm size, exporter status, location and industry fixed effects, the results show that FDI firms only hire significantly more female administrative workers relative to domestic firms.

Tables 4 and 5 present the results from estimating Equations (2a) and (2b) to examine whether domestic firms that are the suppliers and customers of FDI firms have different gender labour practices, respectively. The estimates show that customers of FDI firms have significantly more female administrative workers, once we control for firm size, exporter status, location and industry fixed effects. For suppliers to FDI firms we find no significant differences in gender labour practices relative to other domestic firms.

Tables 6 and 7 present the results from assessing whether FDI siblings and partners have different gender labour practices than other domestic firms by estimating, respectively, Equations (3a) and (3b). These are the domestic firms that share local suppliers or local customers with the FDI firms. The estimates in Table 6 show that, all else being equal, FDI siblings employ significantly more female administrative workers than other domestic firms. In contrast, the estimates in Table 7 show that FDI partners are no different from other domestic firms in terms of their female hiring practices.

As a robustness check, we use as dependent variables in Equations (1), (2a), (2b), (3a), and (3b) shares (rather than levels) of female administrative and non-administrative workers. The results are very similar to those in Tables 4-7. Domestic firms that are either FDI siblings or FDI customers are found to hire significantly larger shares of female administrative workers, controlling for firm size, exporter status, location and industry. No significant differences across FDI siblings or customers and other domestic firms are found for the share of female non-administrative workers. These results are available upon request.

Table 3: Do FDI firms exhibit different gender labour practices?

	Dependent variable is firm-level:					
	Number of female workers	Number of female workers	Number of female administrative workers	Number of female administrative workers	Number of female non-administrative workers	Number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI dummy	556.0**	95.22	5.706**	3.095*	608.2***	115.1
	(199.5)	(134.7)	(2.617)	(1.562)	(185.0)	(166.5)
Firm size (log of total sales)		162.7***		1.836***		163.3**
		(55.44)		(0.318)		(59.77)
Exporter dummy		-74.43		-0.537		-65.86
		(85.81)		(0.663)		(83.92)
EPZ dummy		354.0*		0.547		357.2
		(202.7)		(1.353)		(217.8)
Mean of dependent variable	383.24	385.32	3.31	3.32	398.45	401.09
Observations	455	451	408	404	387	383
R-squared	0.102	0.340	0.056	0.163	0.110	0.339
Industry fixed effects	No	Yes	No	Yes	No	Yes

Notes: robust standard errors in parentheses clustered by industry and location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 4: Are gender labour practices of suppliers of FDI firms different from those of other domestic firms?

	Dependent variable is firm-level:					
	Number of female workers	Number of female workers	Number of female administrative workers	Number of female administrative workers	Number of female non-administrative workers	Number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI suppliers dummy	-46.66	-46.17	0.761	1.099	-47.12	-46.07
	(58.37)	(67.79)	(1.515)	(1.292)	(60.45)	(69.90)
Firm size (log of total sales)		44.61***		1.534***		42.26**
		(7.005)		(0.0812)		(7.239)
Exporter dummy		21.94		0.648**		13.16
		(15.71)		(0.177)		(17.90)
EPZ dummy		-63.91		-3.216		-58.25
		(67.77)		(2.094)		(67.45)
Mean of dependent variable	161.44	162.38	2.8	2.78	157.95	158.96
Observations	113	112	117	116	106	105
R-squared	0.002	0.043	0.004	0.286	0.003	0.039
Industry fixed effects	No	Yes	No	Yes	No	Yes

Notes: robust standard errors in parentheses clustered by industry and location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 5: Are gender labour practices of customers of FDI firms different from those of other domestic firms?

	Dependent variable is firm-level:					
	Number of female workers	Number of female workers	Number of female administrative workers	Number of female administrative workers	Number of female non-administrative workers	Number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI customers dummy	253.7*	154.7	2.584*	2.054*	276.3*	161.7
	(127.3)	(107.3)	(1.345)	(1.071)	(145.1)	(116.3)
Firm size (log of total sales)		194.6**		1.466***		205.0**
		(67.07)		(0.249)		(81.25)
Exporter dummy		-250.5		-1.311**		-244.5
		(141.1)		(0.566)		(176.7)
EPZ dummy		484.7		-0.532		509.1
		(292.3)		(0.696)		(332.2)
Mean of dependent variable	385.81	387.95	2.67	2.67	409.83	412.8
Observations	293	290	248	245	239	236
R-squared	0.041	0.259	0.036	0.120	0.044	0.255
Industry fixed effects	No	Yes	No	Yes	No	Yes

Notes: robust standard errors in parentheses clustered by industry and location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 6: Are gender labour practices of FDI siblings different from those of other domestic firms?

	Dependent variable is firm-level:					
	Number of female workers	Number of female workers	Number of female administrative workers	Number of female administrative workers	Number of female non-administrative workers	Number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI siblings dummy	101.9	43.00	1.919***	1.405**	102.4	38.49
	(70.83)	(51.57)	(0.471)	(0.468)	(88.10)	(62.75)
Firm size (log of total sales)		200.0**		1.505***		212.0**
		(69.35)		(0.331)		(84.16)
Exporter dummy		-245.5		-1.380**		-237.3
		(139.3)		(0.480)		(173.1)
EPZ dummy		503.0		-0.322		529.2
		(295.1)		(1.054)		(336.5)
Mean of dependent variable	385.81	387.95	2.67	2.67	409.83	412.8
Observations	293	290	248	245	239	236
R-squared	0.011	0.246	0.030	0.114	0.009	0.242
Industry fixed effects	No	Yes	No	Yes	No	Yes

Notes: robust standard errors in parentheses clustered by industry and location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Table 7: Are gender labour practices of FDI partners different from those of other domestic firms?

	Dependent variable is firm-level:					
	Number of female workers	Number of female workers	Number of female administrative workers	Number of female administrative workers	Number of female non-administrative workers	Number of female non-administrative workers
	(1)	(2)	(3)	(4)	(5)	(6)
FDI partners dummy	-17.54	-67.89	1.602*	0.332	-18.80	-65.77
	(35.14)	(29.29)	(0.600)	(0.280)	(34.48)	(29.09)
Firm size (log of total sales)		48.98**		1.527***		46.65**
		(8.949)		(0.101)		(9.216)
Exporter dummy		19.79		0.651*		10.85
		(13.16)		(0.242)		(15.68)
EPZ dummy		-87.57		-2.470		-82.13
		(101.2)		(1.228)		(101.2)
Mean of dependent variable	161.44	162.38	2.8	2.78	157.95	158.96
Observations	113	112	117	116	106	105
R-squared	0.000	0.045	0.017	0.280	0.000	0.041
Industry fixed effects	No	Yes	No	Yes	No	Yes

Notes: robust standard errors in parentheses clustered by industry and location. ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

In summary, the regression analysis above shows that FDI firms hire relatively more female administrative workers than domestic firms. Domestic firms that are related to FDI firms directly as their customers or indirectly as their siblings also employ more female administrative workers, but not necessarily more female non-administrative workers. This could be because administrative workers are involved in the intense firm-to-firm interactions between FDI firms and their related domestic firms, but other workers are not. By hiring more female administrative workers, the presence of FDI firms created a more gender-conducive environment that encouraged the related domestic firms to also hire more female administrative workers. It is possible that female administrative workers are more comfortable dealing with female administrative workers of other related firms.

One concern about our results above is that they might be driven by selection bias. Some domestic firms self-select to be FDI customers. If these domestic firms happen to have better gender practices, the estimated impact of the FDI customer dummy variable would be driven by selection, not by spillovers of the gender practices from FDI firms. Likewise, some domestic firms may self-select to be FDI siblings that share local suppliers with FDI firms. If these domestic firms hire more female administrative workers, the positive coefficient on the FDI sibling dummy variable would be driven by selection and not by spillovers from FDI firms.

In the absence of a valid instrumental variable correlated with FDI-related variables but not with the number of female administrative workers in our cross-sectional sample, we conduct a placebo exercise to address potential selection bias. First, we randomly assign FDI supplier, customer, sibling, and partner status to the domestic firms in our sample, categorized into the apparel and textiles sectors, in a way that results in new versions of the indicator variables $FDI\_supplier$, $FDI\_customer$, $FDI\_sibling$, and $FDI\_partner$, with similar averages as those shown in Table 2 for the original variables. Second, we re-estimate Equations (2a), (2b), (3a), and (3b) including these new versions of the variables. Finally, we repeat this process 100 times. We compute the average of the estimated coefficients and their standard deviations and present them in Table 8. The results of this placebo exercise show that when the linkages between FDI and domestic firms are randomly assigned, there are no statistically meaningful differences in gender labour practices of linked firms relative to other domestic firms. The coefficients are either insignificant or have counter-intuitive signs. This finding gives us some confidence that selection effects are not the driving force behind our previous findings.

Table 8: Placebo exercise

	Dependent variable is firm-level:					
	Number of female workers		Number of female administrative workers		Number of female non-administrative workers	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
FDI suppliers	3.057	91.833	-0.110	0.931	5.839	95.029
FDI customers	-3.456	58.424	0.087	0.964	-5.583	73.038
FDI siblings	3.821	58.657	0.070	0.784	4.464	70.837
FDI partners	6.417	96.211	-0.142	0.945	7.169	98.871

Notes: this table reports the mean and standard deviation of the bootstrap coefficients on the new indicators for FDI suppliers, FDI customers, FDI siblings and FDI partners from 100 regressions, where domestic firms are randomly assigned to FDI supplier/customer/sibling/partner status according to industry proportions.

5. Conclusion

This paper studies whether the presence of FDI firms has positive spillover effects on the gender labour practices of domestic firms in developing countries. Based on a unique linked firm-to-firm data set of the apparel and textiles sectors in Bangladesh, the paper first shows that FDI firms hire more female workers, particularly administrative and production workers. Domestic firms that are directly related to FDI firms as their local customers, also hire more female administrative workers, but not necessarily more female non-administrative workers. Moreover, domestic firms that share local suppliers with FDI firms, which are the FDI sibling firms, also employ more female administrative workers. But the same is not verified for female production workers. This could be due to the fact that, unlike production workers, administrative workers participate more in firm-to-firm interactions. Thus, with FDI firms hiring more female administrative workers, they create a more conducive environment for domestic firms that interact with them to hire female administrative workers.

Traditionally, in the study of FDI spillovers, the focus is on the impact of FDI presence on the productivity of domestic firms. However, FDI presence may provide more jobs for women and lead to women empowerment, which, through supply chain linkages, may encourage domestic firms to hire more women.

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Foreign investment and female employment in Viet Nam[+]

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This paper investigates how the interplay between foreign direct investment (FDI) and the availability of technology affects labour market outcomes for women in Viet Nam. Using household surveys, we explore the relationship between industrial exposure to FDI, access to technology, and employment and wages. We find that FDI is associated with increases in employment and wages *by more* in high-technology areas of the country. In areas of the country with weak technology, foreign investment is associated with lower employment and lower wages, particularly for men. Together, these results highlight the importance of absorptive capacity; that is, to truly benefit from foreign investment, the domestic economy needs a sound education system and established technology. We also find that an equal increase in foreign investment in high-tech provinces is associated with larger increases in top wages for men than for women. In general, these results suggest that foreign investment may be associated with a rising gender wage gap at the high end of the wage distribution.

Keywords: FDI, gender wage gap, information technology, skills, Viet Nam

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1. Introduction

Attracting foreign direct investment (FDI) is at the forefront of economic policies in many developing countries, supported by the academic literature, which shows that FDI increases productivity and economic growth, among other outcomes.[1] In addition, many developing countries have experienced increases in the availability of computing technologies in the past few decades. The technology available in a host country can facilitate the development and contribution of FDI to the local economy. Meanwhile, there is widespread concern that technological progress and foreign investment in some sectors or industries may displace lower-skilled workers.[2] Furthermore, as women constitute the bulk of the world's poor and tend to work in lower-skilled and more vulnerable jobs, economic policy must address the differential impact of FDI and technology on women relative to men.

This paper investigates how industry-specific FDI is associated with labour market outcomes for women in Viet Nam. We further inquire about how the association between FDI and the labour market may vary across provinces that have different degrees of access to computing technology. As multinational enterprises may benefit from pre-existing technologies in the host country, we hypothesize that these two economic forces have an interactive effect on the labour market, and particularly on outcomes specific to women.

The paper relies on household surveys from Viet Nam and annual greenfield foreign investment data from the United Nations Conference on Trade and Development (UNCTAD) to explore local (industry-province-time) variation in labour market outcomes, such as employment, wages, and the wage gap between the 90th and 10th percentiles of the wage distribution. To alleviate concerns that local labour market outcomes could drive foreign investment, we lag the key FDI variable by two years. Furthermore, our main estimations progressively control for industry, province, and year fixed effects to capture time-invariant factors, such as the industry's unobserved underlying productivity, the province's unobserved level of development and the average effect of Viet Nam's many policy reforms over this time period. In addition, our analysis controls for several time-varying variables at the province and industry levels. In the most stringent specification, we also control for province-by-year fixed effects to capture all provincial time-varying factors. Our results are robust when we use alternative measures for computing technology and FDI.

[1] For example, see Djankov and Hoekman (2000), Conyon, et al. (2002), Girma and Gorg (2007), and Arnold and Javorcik (2009).

[2] See, for example, Acemoglu and Autor (2011) for the United States, and Almeida, Corseuil, and Poole (2019) for a developing country context.

Our results suggest that in provinces with low access to computers, FDI is associated with a decrease in employment and average wages. The decreases in average wages appear to be driven by decreases in wages at the top of the wage distribution (90th percentile). By contrast, in high-tech provinces, FDI is associated with a differential increase in employment, average wages, and the 90th percentile of wages.

Importantly, these results differ somewhat between men and women. While both women and men see large relative increases in employment and average wages in high-tech provinces following investment liberalization, the increases in wages for women are driven by relative increases in the 10th percentile of the distribution, while for men the increases in average wages are driven by increases at the 90th percentile of the wage distribution. Together, these results provide suggestive evidence that the employment expansion for women (relative to men) with increased foreign investment is in lower-wage, low-skilled jobs.

The rest of this paper is organized as follows. Section 2 presents brief background information on Viet Nam's main economic reforms leading to significant FDI attraction and changes in the labour market, particularly for women. In section 3, we review the literature on FDI and technology. In section 4, we present our main data and descriptive statistics. Section 5 presents our preferred reduced-form empirical model. Section 6 describes and discusses our main results, and we offer conclusions and policy implications in section 7.

2. Background

Viet Nam launched important reforms under the Doi Moi renovation plan in 1986. The plan formally shifted the economy toward a new economic strategy, based on integration in global markets, export diversification, and the attraction of FDI. The open economy approach evolved jointly with national development strategies centred on agricultural development, light industrialization, and a continued role for State-owned enterprises, meanwhile encouraging growth of the private sector (Thoburn, 2013).

Before 2007, FDI was prohibited in a number of sectors mostly related to national security and the financial sector, such as national defence, insurance, banking, and other services. The reforms led to a significant increase in FDI inflows and greenfield projects. Moreover, in preparation for its accession to the World Trade Organization (WTO) in 2007, Viet Nam significantly reduced restrictions on FDI and allowed merger and acquisition activity (UNCTAD, 2008). Viet Nam continues to be a major host economy for FDI, driving the growth of foreign investment inflows in South-East Asia, alongside Singapore, Indonesia, and Thailand. Processing and manufacturing still represent the lion's share of FDI into the country, although FDI

into tourism, heavy industry, and real estate has been increasing in recent years. Strong investment within the Association of Southeast Asian Nations (ASEAN), as well as investment from other Asian economies, contributed to this performance (UNCTAD, 2019). FDI in Viet Nam has supported the rapid development of the export-oriented manufacturing sector, created more than one million jobs, offered higher-than-average wages, generated high levels of exports, transferred knowledge and skills, and accounted for a significant portion of tax revenue (UNCTAD, 2008).

Employment of women in Viet Nam was fostered by economic reforms and education policies targeting gender equality (IMF, 2018). The reforms were accompanied by the overhaul of the education system – Education for All – that has been sustained over time. Viet Nam stands out in terms of female participation in the labour force and is one of the few Asian countries that has thrived in reaching gender parity in educational attainment and equal participation in the labour force (see Goldin and Olivetti (2012) and UN Women (2016)). Moreover, Viet Nam's national development plan, and the ASEAN comprehensive economic integration agreement, emphasize skills development for modern industry. Despite impressive basic literacy and numeracy achievements, there is still a skill shortage in the job market. For instance, numerous firms report a shortage of workers with the necessary technical skills. Also, firms are increasingly demanding cognitive skills, such as problem-solving and critical thinking, as well as behavioural skills in non-manual tasks (World Bank, 2014).

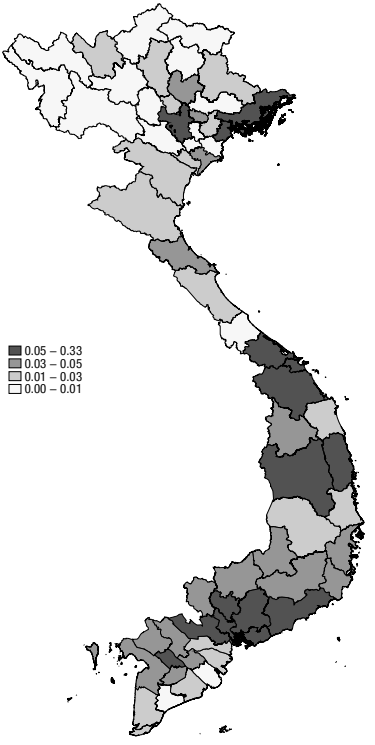
Foreign investment has been an important source of job creation, including for women, and has allowed the insertion of women into the formal labour force. Foreign firms employ a higher percentage of women than national companies and State-owned enterprises, partly as a result of the high level of employment in trade-oriented industries such as apparel and footwear. For instance, the 2016 policy report of the UN Women Viet Nam Country Office states that wage employment offers comparatively more favourable conditions to women workers, in particular, if they are employed in the public sector or foreign-owned enterprises. The main export-oriented manufacturing industries are female-intensive. Either they were female-intensive to start with (garments) or are increasingly becoming so (electronics and vehicle parts).

Viet Nam has also strengthened its legal framework to guarantee equality and non-discriminatory practices in the labour market, which explains the relative success in bringing high-skilled women into the workforce. The country has also propelled generous family-friendly laws regarding childcare and maternity. However, gaps and regional imbalances persist in terms of more secure economic alternatives for women with low levels of formal education and from disadvantaged rural regions and for women from ethnic minority groups (UN Women, 2016).

Despite high growth rates and poverty reduction resulting from the major reforms and institutional developments, gains have not spread homogenously. Consequently, income inequality has increased between and within regions of the country. Structural transformation from agriculture to manufacturing is heterogeneous by region, and this likely contributes to unequal growth (Sarma et al., 2017). Moreover, the observed increases in inequality in incomes and opportunities may be explained by changing patterns of employment, for both men and women – specifically, employment shifting away from agriculture and away from lower-skill jobs to higher-skill and higher-productivity non-farm jobs (IMF, 2016).

Concerning technology adoption, Viet Nam has only limited technological infrastructure, including access to computers, and faces other impediments to productivity, such as the high cost of internet access. Recently, however, the share of the population that has a personal computer has been rising, albeit with significant variation across provinces, with northern provinces still lagging behind (figure 2.1). In terms of access to computers in Asia, the country ranks just behind Malaysia and China (WDI, 2016). Technology adoption, skills and access to finance have been noted as key impediments to firm performance in the country (World Bank, 2014).

Figure 2.1: Computer coverage in Viet Nam, 2004 (percentage of households)



Source: VHLSS.

3. Literature review

This section reviews the literature on the impact of technology and FDI on female labour market outcomes in Viet Nam. To the best of our knowledge, not many papers address the interaction between FDI and technological capability, and even fewer take the perspective of women. Thus, evidence-based research on this topic will help inform policy in local governments and international organizations to prioritize the expansion of socially responsible foreign investment.

The impact of FDI on labour outcomes in Viet Nam has been analysed from different angles, mostly focusing on the effects on wages and productivity. Fukase (2013) shows that foreign firms pay higher wages than domestic firms. These foreign wage premia are larger for highly educated workers and are partially explained by longer working hours. Looking at gender outcomes, Fukase (2013) shows that unskilled women experience a larger foreign wage premium than unskilled men.

Newman et al. (2015) study the relationship between FDI and the productivity of Viet Nam's domestic firms, although the paper does not assess gender-related specific outcomes. The paper relies on a unique survey of over 4,000 manufacturing firms in Viet Nam, and distinguishes between productivity gains along the supply chain (i.e., direct transfers of knowledge and technology among linked firms) and productivity effects through indirect FDI productivity spillovers. The paper provides evidence of productivity gains through forward linkages for domestic firms which receive inputs from foreign-owned firms.

Coniglio et al. (2017) show that, compared with domestic firms, foreign firms create more employment opportunities for unskilled female workers, pay lower average wages (for both male and female workers) and widen the gender wage gap. Coniglio and Hoxhaj (2018) report similar findings on employment and wages. They also find that foreign firms significantly reduced the gender wage gap among unskilled workers but had only limited effects on gender wage gaps in employment for skilled workers.

As far as technology and the labour market is concerned, the demand for educated, skilled labour is associated with recent technological developments, which contribute to the rising skill premium. Sakellariou and Patrinos (2003) study the impact of computer use on wages in Viet Nam, as well as the determinants of computer use. Higher-educated workers experience larger average annual wage increases with computer use than do lower-skilled workers, leading to growing wage inequality. Konstadakopulous (2005) studies the characteristics of firms adopting technology and assesses whether adoption leads to greater regional cooperation. The study finds that significant penetration of information and communications technology are limited to export-oriented sectors based in more urban areas, where the share of people with an internet connection is higher.

The information technology industry has received high levels of foreign investment in Viet Nam. The country is an attractive destination because of the relatively low wages and operating costs (Shillabeer, 2013), combined with a young workforce that has growing technological and scientific skills, as well as a high percentage of English speakers (Thangvelu, 2013). The impact of increased investment in information technology has relatively benefited Viet Nam's younger population who see the opportunity for higher wages and the heightened social status of working for a foreign company (Shillabeer, 2013).

4. Data

We build panel data for province-industry observations from several main data sources. Data on employment and access to computing technology come from household surveys. To measure levels of FDI, we use greenfield investment information from UNCTAD.

4.1. Household data

We use five waves of the Viet Nam Household Living Standards Surveys (VHLSS) – every two years from 2006 to 2014. Survey samples are representative at the national level and are stratified geographically. The survey is conducted for households from the 63 provinces, which constitute eight geographical regions of the country. Every survey wave consists of questions asked about the household in general, and about individual members of the household.

Labour market outcomes. Our main dependent variables of interest are employment, wages, and the wage gap between the 90th and the 10th percentiles of the wage distribution. We use individual member survey information on the industry of employed people.[3] An individual's industry is defined by the main product and industry code of his or her salaried employment. The industrial classification in the VHLSS follows the International Standard Industrial Classification (ISIC), with increasing disaggregation over time. For a time-consistent classification of industries, we use the aggregate two-digit ISIC, Revision 3, as the benchmark classification, similar to the approach in McCaig (2011).

[3] A limitation of our data and analysis is that we cannot distinguish between individuals working at foreign firms and individuals working in domestic firms. Although the VHLSS does ask a question about what kind of firm a worker is employed in, only a very small percentage of workers respond to this question, so the data are more flawed than helpful in this respect. We view this as an avenue for future research.

Table 4.1: Summary statistics

	Mean	Standard Deviation	Minimum	Maximum
Total Employment	14	37	1	416
Average Wage	26,260	23,050	440	328,404
10th percentile Wage	18,534	20,472	0	328,404
90th percentile Wage	35,940	34,932	440	541,800
Wage Gap	3.8	8.4	1.0	245.5
Computer Share (2004)	0.100	0.061	0.000	0.300
FDI Value (USD Millions)	306	847	0	7 673

Sources: VHLSS (2004-2014); UNCTAD.
Notes: Wage variables are in thousands of VND.

We aggregate across all workers employed in a province and an industry in each survey year. Table 4.1 offers simple descriptive statistics on the main variables of interest during our study period, from 2006 to 2014. The average number of employees per industry and province is about 14. Average annual earnings are about VND 26 million (approximately $1,300), with a standard deviation of about VND 23 million. The ratio between the 90th and the 10th percentiles in wages is 3.8.

Technology. The VHLSS asks households about whether they have a computer at home, information that we rely on to create a province-specific share of households that own a computer. To alleviate concerns about the endogeneity of the computing technology variable, we rely on a time-invariant, pre-period (or 2004) measure of access to computers around the country. Figure 2.1 plots the distribution of the main technology variable across the country's provinces. Table 4.1 shows that, on average, only 10 per cent of households had a computer at home in 2004. Yet access to computers varies greatly across provinces, with some provinces having no households that own a computer and others provinces having about one-third of households reporting owning a computer.

Controls. We also rely on the VHLSS to generate important province-by-time and industry-by-time control variables. Specifically, we create measures related to the share of households in the province that are among the ethnic minority, the share of households in the province that are in urban areas, and the age composition of the population of the province. We also characterize the educational composition of employment in the industry.

4.2. FDI data

To measure levels of FDI, we use annual greenfield investment data at the two-digit industry level from UNCTAD. Greenfield investment is a type of FDI through which

foreign parent companies create a new subsidiary in a host country from the ground up, rather than merging with or buying existing businesses in the host country. The greenfield data report the number of announced greenfield projects and the value in millions of dollars for each industry in each year. As is reported in table 4.1, the average value of greenfield FDI in Viet Nam during our time period was $306 million, though the maximum value for a single project reached $7.7 billion.

Figure 4.1 shows that greenfield investment in Viet Nam has fluctuated over the years, with the highest average amount of $731 million and an average of six projects per industry received in 2008 after Viet Nam joined the WTO.[4] Construction receives the highest value of greenfield investment (figure 4.2), while finance receives the highest number of projects (figure 4.3).

Figure 4.1: Foreign direct investment announced greenfield projects, by value and number, 2006–2014

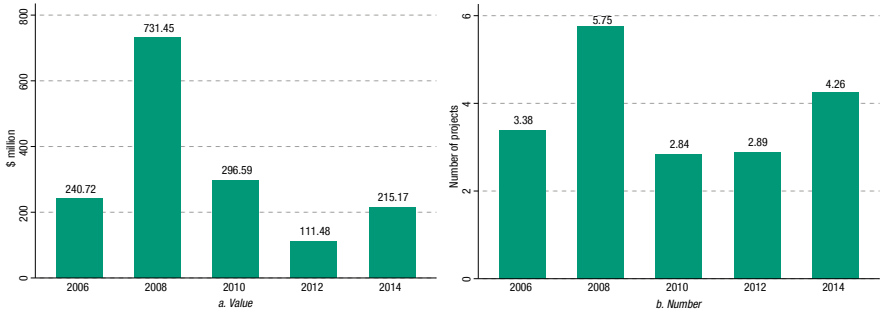
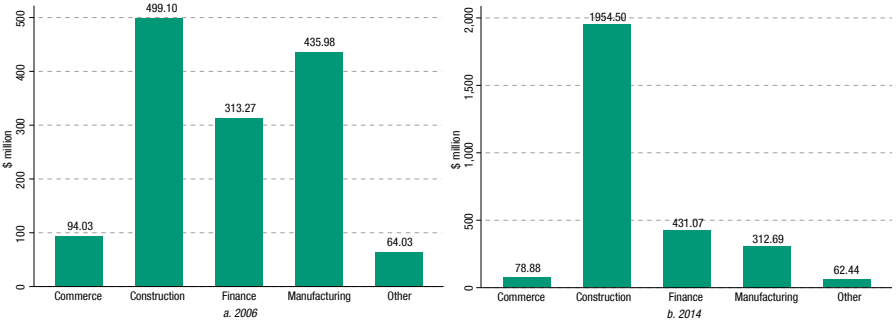
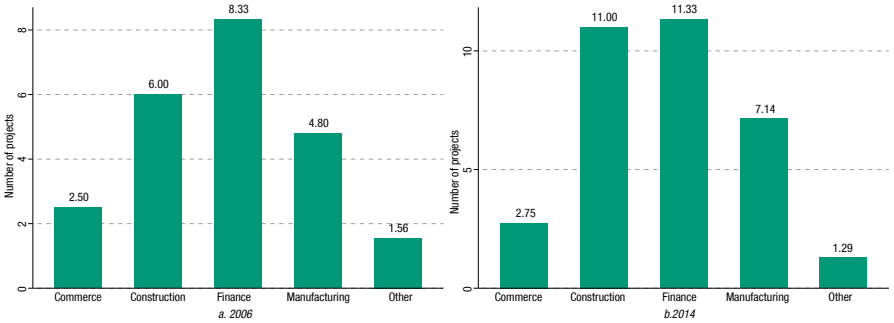


Figure 4.2: Foreign direct investment values, by industry, 2006 and 2014



[4] In 2008, Viet Nam received record foreign investment, as it became an increasingly attractive location for FDI in labour-intensive manufacturing and other industrial activities. The increase in investment reflects increases in investor confidence in the country's long-term growth prospects (UNCTAD 2011). Finally, several incentive programmes to encourage foreign investment may have played a role in attracting foreign investment projects. We re-estimated the model, and the results were robust to the exclusion of 2008.

Figure 4.3: Foreign direct investment projects, by industry, 2006 and 2014



5. Empirical methodology

Our goal in this paper is to uncover how FDI and technology are associated with labour market outcomes for women. As noted, we rely on pre-reform, province-specific information on computing technology and industry-specific information on exposure to FDI and begin with the following framework:

$$y_{kpt}=\gamma_1 (FDI_{k(t-2)} * TECH_{p,\,2004})+\beta_1 FDI_{k(t-2)}+ \varphi_k+ \varphi_p+ \delta_t+ X_{pt}+X_{kt}+ \varepsilon_{kpt} \quad (1)$$

where *k* indexes the industry, *p* indexes the provincial location, and *t* indexes time from 2006 to 2014.

We relate the industry-by-province labour market outcomes (y_{kpt}), defined as the logarithm of employment, average wages, and the wage gap between the 90th percentile and 10th percentile of the wage distribution to the industry, provincial-, and time-varying variables of interest. In this setting, $FDI_{k(t-2)}$ represents the logarithm of the value of FDI projects plus 1 in industry *k* and lagged survey wave. We lag the variable FDI to alleviate simultaneity concerns that the local labour market outcomes may drive FDI investment. The variable $TECH_{p\ (2004)}$ denotes the share of households in province *p* and in a pre-reform time period (2004) that own a computer. We examine the technology variable in 2004, two years before the main data analysis in order to alleviate concerns about the endogeneity of the computing technology variable. This pre-period level of technology across provinces is our proxy for the baseline level of development, technology, and absorptive capacity of the province.[5]

[5] Other sources of heterogeneity across provinces may be picked up by the computer access variable. However, given that we rely on the pre-reform differences across provinces in access to technology and include province-by-year fixed effects, we believe most of the cross-province differences are well accounted for.

Our baseline estimation also includes industry fixed effects (φ_k) to capture time-invariant factors, such as the industry's unobserved underlying productivity, and province fixed effects (φ_p) to capture the province's unobserved level of development, which may influence both the labour market outcomes and the likelihood of access to information technology. By controlling for province fixed effects, we absorb the coefficient on the pre-existing level of computing technology. We also include year-specific dummies (δ_t) to control for the average effect of Viet Nam's many policy reforms over this time period. X_{pt} are time-varying provincial control variables related to the share of households in the province that are among the ethnic minority, the share of households in the province in urban areas, and the age composition of the population in the province. X_{kt} characterizes the educational composition of employment in the industry. In the most stringent specification, we also control for province-by-year fixed effects to capture all time-varying differences across provinces.

6. Results

Table 6.1 reports results from the ordinary least squares estimation of a variation of equation (1) in section 5, in which we include industry-by-year controls, industry fixed effects and province-by-year fixed effects as the most robust specification for all workers. We perform the analysis for five main dependent variables: log employment, log of average wages, log of the 10th percentile of the wage distribution, log of the 90th percentile of the wage distribution, and log of the wage gap between the 90th and the 10th percentile of the wage distribution. Table 6.2 reports the results for labour market outcomes for women, while table 6.3 reports results for labour market outcomes for men. Figures 6.1 to 6.5 plot the marginal effects of foreign investment on the five outcomes at different pre-existing levels of computing technology.[6] In what follows, we first consider the implications of foreign investment and technology on employment, then wages and finally the wage gap. The analysis considers all workers and then the differential effects on women and men.

[6] The 1st, 10th, 50th, 90th, and 99th percentiles of access to computing technology correspond to 0 per cent, 0.9 per cent, 3 per cent, 13 per cent, and 30 per cent, respectively.

Table 6.1: Foreign investment and labour market outcomes

Dep. Variable:	Log (Employment) $_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.022**	-0.016**	-0.014	-0.021***	-0.008
	(0.009)	(0.007)	(0.010)	(0.008)	(0.010)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.282***	0.127***	0.068	0.167***	0.100
	(0.082)	(0.038)	(0.054)	(0.047)	(0.061)
Observations	6,594	5,619	5,618	5,619	5,618
R-squared	0.727	0.600	0.484	0.563	0.307
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.

Note: This table reports coefficients from a variation on equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

Figure 6.1: Effects of FDI on employment at different levels of computer access

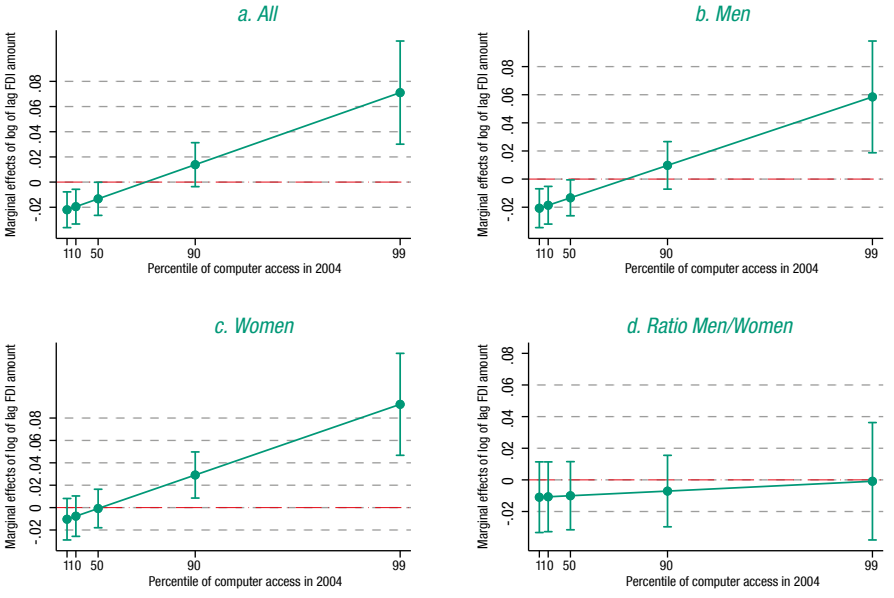


Figure 6.2: Effects of FDI on average wages at different levels of computer access

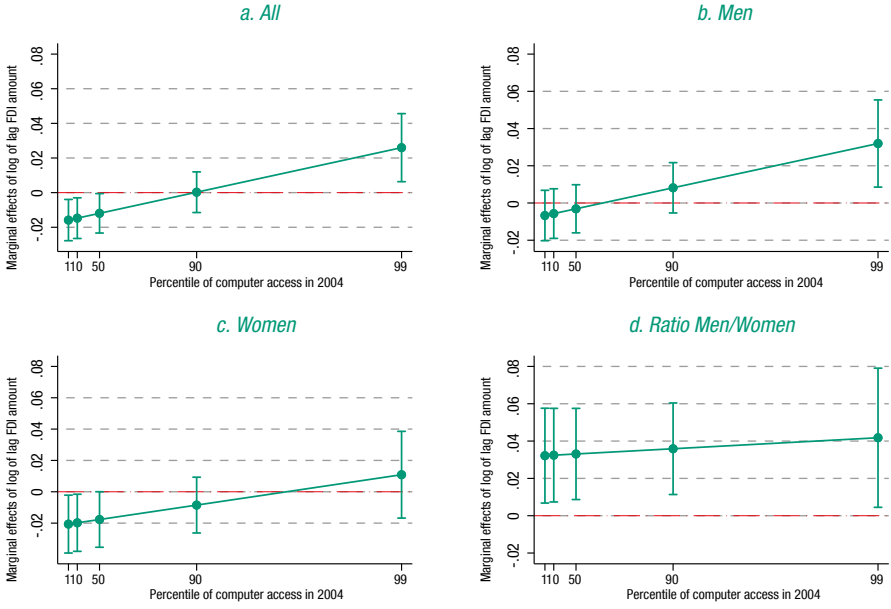


Figure 6.3: Effects of FDI on the 10th percentile of wages at different levels of computer access

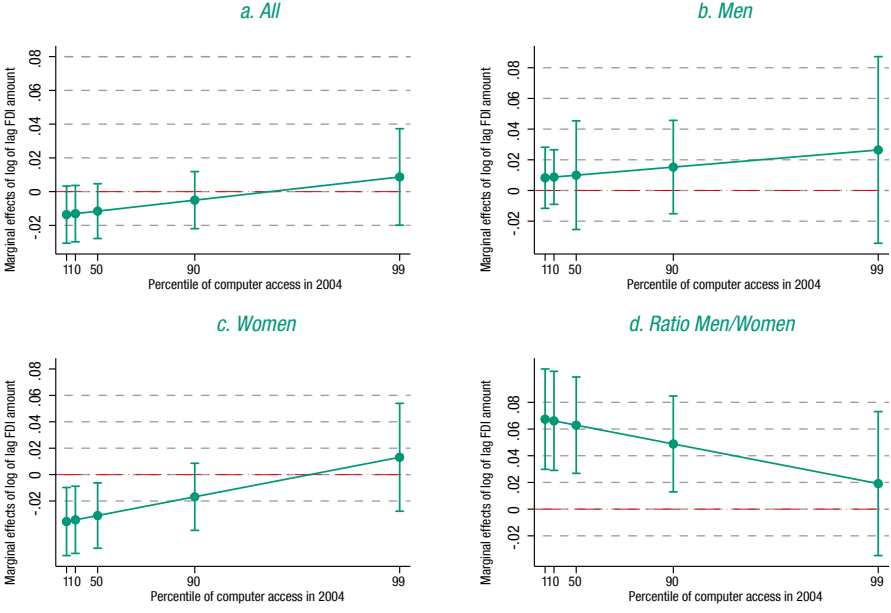


Figure 6.4: Effects of FDI on the 90th percentile of wages at different levels of computer access

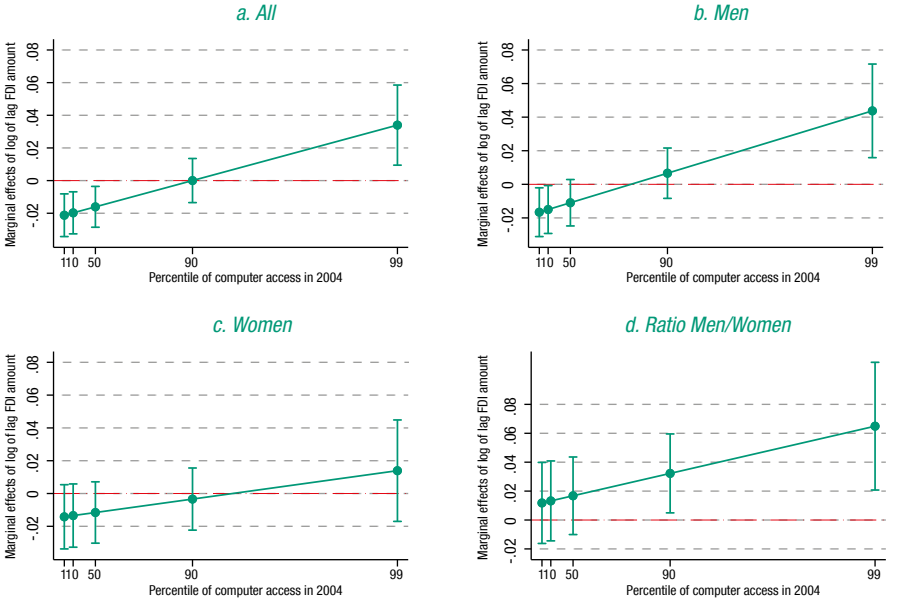
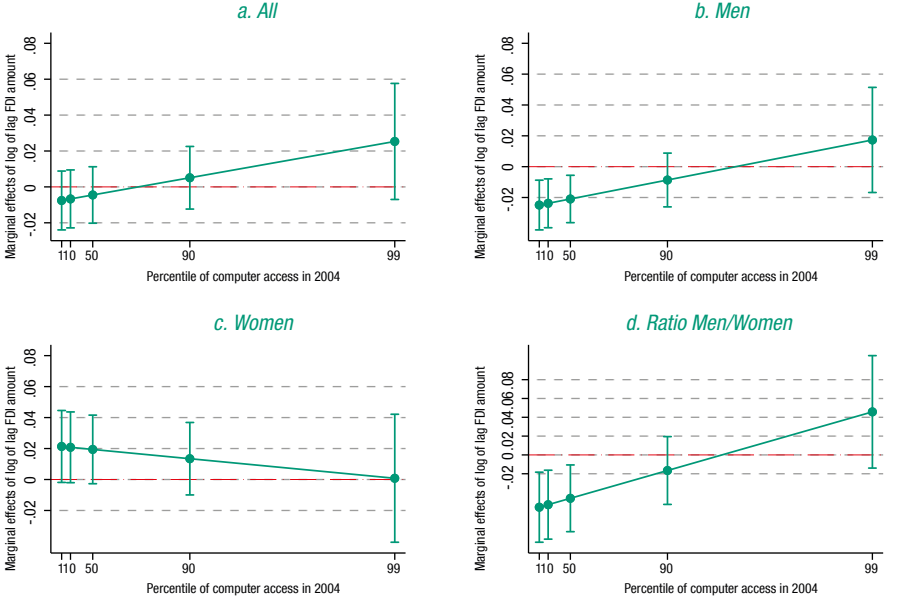


Figure 6.5: Effects of FDI on the wage gap at different levels of computer access



The coefficient of log*(FDI)*$_{kt-2}$ in table 6.1 (and the corresponding panel A of figure 6.1) shows that FDI is associated with small decreases in employment in provinces with weak access to technology (10th percentile and lower). This effect is wholly driven by the employment of men (table 6.3) – that is, female workers face no decrease in employment opportunities in weak technology areas of the country in response to foreign investment liberalization (table 6.2). Thus, in provinces with weak initial access to computers, a 1 per cent increase in foreign investment is associated with a 2 per cent decline in the employment of men.

Table 6.2: Foreign investment and female labour market outcomes

Dep. Variable:	Log (Employment)$_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.010	-0.021*	-0.036**	-0.014	0.021
	(0.011)	(0.011)	(0.016)	(0.012)	(0.014)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.311***	0.096*	0.147*	0.085	-0.062
	(0.092)	(0.052)	(0.076)	(0.059)	(0.080)
Observations	4,486	3,425	3,425	3,425	3,425
R-squared	0.772	0.609	0.501	0.584	0.297
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

Tables 6.1 to 6.3 also point to changes in average earnings with increased foreign investment. Across all workers, average wages fall with advances in FDI in weak-technology provinces. These effects appear to be driven by female wages at the low-end of the wage distribution, though there are also some declines in the 90th percentile of wages for men in weak-technology provinces in the aftermath of increased foreign investment. Because of this effect, increased FDI reduces wage inequality among working men in such areas.

Taken together, these results offer suggestive evidence of foreign investment replacing skilled opportunities for men in low-technology areas of the country, as would be hypothesized in a brains versus brawn story. For example, prior to foreign investment, the male labour force performed the many routine, manual (and relatively

Table 6.3: Foreign investment and male labour market outcomes

Dep. Variable:	Log (Employment)$_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.021**	-0.007	0.008	-0.017*	-0.025**
	(0.008)	(0.008)	(0.011)	(0.009)	(0.010)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.240***	0.117***	0.055	0.183***	0.128*
	(0.079)	(0.045)	(0.060)	(0.054)	(0.066)
Observations	5,634	4,566	4,565	4,566	4,565
R-squared	0.687	0.569	0.486	0.538	0.316
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

brute force) tasks. If foreign firms bring advanced labour-saving technologies to automate the production process, this differentially harms the male workers.

Interestingly, the story is very different in areas with more advanced technologies and high absorptive capacity. When FDI flows to areas with strong technological capabilities, employment and wages differentially improve. That is, the interaction coefficient between log*(FDI)*$_{kt-2}$ and the pre-existing technology variable in table 6.1 is positive, implying that an increase in FDI is associated with a differential increase in employment in provinces with greater technological capacity. Specifically, in a province where about a third of households own a computer, a 1 per cent increase in FDI is associated with about a 6.5 per cent increase in employment (see figure 6.1).

This differential increase in employment in strong technology areas holds for both men and women. In fact, average wages also differentially increase in response to an equal foreign investment shock in strong relative to weak technology provinces. However, the relative increase in average wages for women arises from increases at the low end of the wage distribution (10th percentile), whereas the relative increase in average wages for men arises from increases at the top of the wage distribution (90th percentile).

Therefore, the absorptive capacity of an area in this setting tends to benefit men relatively more. Though women find more opportunities for employment, they are relatively low-wage opportunities. The increased employment opportunities for men

associated with increased foreign investment in high-tech areas tend to be skilled and pay higher average wages. Altogether, these results point to a widening of the gender wage gap, especially at the top of the wage distribution.

Robustness. Table 6.4 estimates a variation of equation (1) in which the main dependent variable is the ratio of labour market outcomes for men relative to those for women (i.e. log male employment over log female employment). Because men and women are not both employed in all province-industry pairs over time, the number of observations in table 6.4 is smaller than the number of observations in tables 6.2 and 6.3, and thus we should keep this in mind in our interpretation. Yet, the analysis of the relative labour market outcomes offers a more definitive picture of how foreign investment and technology affect women relative to men.

Table 6.4: Robustness check, male/female relative labour market outcomes

Dep. Variable:	Log (Employment)$_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.011	0.032**	0.067***	0.012	-0.056**
	(0.014)	(0.015)	(0.023)	(0.017)	(0.023)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.031	0.029	-0.146	0.161*	0.307***
	(0.068)	(0.069)	(0.100)	(0.084)	(0.116)
Observations	3,526	2,372	2,372	2,372	2,372
R-squared	0.522	0.191	0.223	0.217	0.274
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

Though both men and women see strong relative increases in employment and wages in strong technology areas in the aftermath of foreign investment liberalization, table 6.4 reports a statistically insignificant interaction coefficient – suggesting there is no difference across genders in this effect. Both men and women report better employment and average wage opportunities with foreign investment in areas with high absorptive capacity. However, there is a positive relative impact on wages at the 90th percentile of the distribution, suggesting that men benefit from even larger wage gains at the top of the wage distribution in such circumstances. Once

again, this evidence points to a widening gender wage gap, particularly at the top of the wage distribution, as foreign investment in high-tech areas increases the demand for a skilled workforce, complementing the existing technology. These skilled workers largely appear to be men.

As our main analyses include province-industry-time variables as the main dependent variables and regressor of interest, our main analyses use only robust standard errors. Because employment and wages may be serially correlated over time in industries and provinces, in table 6.5, we present two-way clusters of the standard errors by industry and by province. The main findings are largely the same as in table 6.1. Foreign investment in high-tech provinces differentially increases average wages in Viet Nam.

Table 6.5: Robustness check, two-way clustered standard errors

Dep. Variable:	Log $(Employment)_{kpt}$	Log $(Wage)_{kpt}$	Log $(10^{th}$ percentile $Wage)_{kpt}$	Log $(90^{th}$ percentile $Wage)_{kpt}$	Log $(Wage\ Gap)_{kpt}$
$Log\ (FDI)_{kt-2}$	-0.022	-0.016**	-0.014	-0.021***	-0.008
	(0.014)	(0.006)	(0.010)	(0.006)	(0.010)
$TECH_{p2004}$*$Log\ (FDI)_{kt-2}$	0.282	0.127***	0.068	0.167	0.100***
	(16.129)	(0.006)	(9.888)	(0.992)	(0.006)
Observations	6,594	5,619	5,618	5,619	5,618
R-squared	0.727	0.600	0.484	0.563	0.307
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.

Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

The main analyses in this section use the logarithm of the value of greenfield projects to measure FDI and the share of households in a province that have computers at home to measure pre-existing computing technology. In table 6.6, we consider the logarithm of the number of announced greenfield projects as the main measure of foreign investment, while in table 6.7, we rely on the share of firms in the province that use a computer from the World Bank's Enterprise Survey database. Both of these checks yield similar results as the baseline estimation in table 6.1.

Table 6.6: Robustness check, number of projects

Dep. Variable:	Log (Employment)$_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.086***	-0.028	-0.024	-0.041*	-0.017
	(0.024)	(0.019)	(0.029)	(0.022)	(0.028)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.791***	0.238**	-0.003	0.390***	0.393**
	(0.207)	(0.104)	(0.156)	(0.130)	(0.174)
Observations	6,594	5,619	5,618	5,619	5,618
R-squared	0.728	0.600	0.484	0.562	0.307
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

Table 6.7: Robustness check, alternative technology

Dep. Variable:	Log (Employment)$_{kpt}$	Log (Wage)$_{kpt}$	Log (10th percentile Wage)$_{kpt}$	Log (90th percentile Wage)$_{kpt}$	Log (Wage Gap)$_{kpt}$
Log (FDI)$_{kt-2}$	-0.101***	-0.050***	-0.029	-0.065***	-0.037*
	(0.021)	(0.016)	(0.023)	(0.018)	(0.022)
TECH$_{p2004}$*Log (FDI)$_{kt-2}$	0.050***	0.021***	0.009	0.028***	0.019**
	(0.009)	(0.007)	(0.009)	(0.007)	(0.008)
Observations	3,741	3,183	3,183	3,183	3,183
R-squared	0.745	0.448	0.389	0.429	0.339
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

Finally, as we note in section 4, in 2008 Viet Nam attracted record foreign investment, as investor confidence in the country's long-term growth prospects grew (UNCTAD, 2011). In table 6.8, therefore, we re-estimate our baseline model, excluding 2008 as a possible outlier in the foreign investment data. Once again, the main results are robust to this exclusion.

Table 6.8: Robustness check, excluding 2008

Dep. Variable:	Log $(Employment)_{kpt}$	Log $(Wage)_{kpt}$	Log $(10^{th}$ percentile $Wage)_{kpt}$	Log $(90^{th}$ percentile $Wage)_{kpt}$	Log $(Wage\ Gap)_{kpt}$
Log $(FDI)_{kt-2}$	-0.012	-0.013*	-0.014	-0.017**	-0.004
	(0.009)	(0.008)	(0.011)	(0.009)	(0.011)
$TECH_{p2004}$*Log $(FDI)_{kt-2}$	0.304***	0.120***	0.061	0.156***	0.095
	(0.093)	(0.041)	(0.060)	(0.052)	(0.069)
Observations	5,376	4,598	4,598	4,598	4,598
R-squared	0.726	0.615	0.498	0.576	0.307
Industry-Year Controls	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES
Province-Year Fixed Effects	YES	YES	YES	YES	YES

Sources: VHLSS (2004-2014); UNCTAD.
Note: This table reports coefficients from a variation of equation (1) in the paper, where the dependent variables are as in the column headers. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors are reported in parentheses.

7. Concluding remarks and policy implications

In this paper, we investigate how the interplay between FDI and technology affects labour market outcomes for women in Viet Nam. We explore household survey data combined with industry-specific exposure to FDI and province-specific access to technology. We find that increases in foreign investment differentially increase employment and average wages in high-technology areas of the country. We also investigate these impacts across gender and find that an equal increase in foreign investment in high-tech provinces increases male wages at the top of the wage distribution. Although foreign investment in areas with absorptive capacity brings new employment opportunities for all workers, increases in the employment of women tend to be concentrated at the low end of the wage distribution, while increases in the employment of men are concentrated in higher-wage, skilled jobs. Together, these results imply that foreign investment in Viet Nam contributes to a widening of the gender wage gap, particularly at the top of the earnings distribution.

From a policy standpoint, our work contributes to an understanding of job requirements and job security in the increasingly technology-driven and integrated world economy. It also offers insights for other less developed countries that face similar challenges as they move up the development ladder. Exposure to foreign investment and access to computing technology raises the demand for different types of skills, and although they have positive effects for the economy as a whole, some workers may be left behind.

The importance of absorptive capacity is highlighted in our results. Increases in foreign investment in areas of the country with weak technology actually reduce employment and wages, notably for men. We hypothesize that foreign firms in low-tech provinces bring advanced, labour-saving automation technologies that disproportionately displace brute force, manual labour performed by men. In the more technologically-advanced areas of the country, investment improves employment and wages, but mostly for skilled men. This provides further evidence for the notion that to truly benefit from foreign investment a domestic economy needs a sound education system that supports all workers—male and female.

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Can multinational firms promote gender equality? The role of labour mobility[+]

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A long and well-established literature exists on the role of multinational enterprises (MNEs) in transferring technology around the globe, enhancing local productivity. However, we know very little about the impact of foreign direct investment (FDI) and multinational enterprises on gender policy and practice. In this research, we focus on the role of MNEs in potentially promoting female empowerment and gender equality in Brazil. First, the research performs a descriptive exercise on the gender composition and gender earnings gaps at MNEs versus domestic firms. Then, we ask whether workers moving from multinational to domestic firms can transfer information about gender practice, by exploring the relationship across domestic firms with various proportions of workers with previous experience in a multinational. Unfortunately, despite the many theoretical reasons to expect MNEs to support and transfer best practice in gender policy, these ideas are not borne out in the data. Multinational firms employ fewer women and exhibit higher gender earnings gaps than their domestic firm counterparts. For this reason, it is no surprise that domestic firms with high shares of former MNE workers are not different from domestic firms with fewer former MNE workers in terms of gender policy and practice. Our work emphasizes the need for domestic policy to enhance the status of women in the economy and the international community to support best practice in gender policy across all types of firms.

Keywords: Brazil, gender equality, labour mobility, multinational firms

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1. Introduction

A long and well-established literature exists on the role of multinational enterprises (MNEs) in transferring technology around the globe, enhancing local productivity.[1] Alongside the pure economic implications of foreign investment, MNEs are increasingly expected to maintain social and environmental responsibility and standards.[2] Even when supply chains are not entirely vertically integrated within the multinational firm, MNEs are increasingly held responsible for the labour and environmental practices of their suppliers by the international community. In fact, the idea that cross-border investment spreads cultural norms and practice has received widespread attention among anthropologists (Watson 2006).[3] However, we know very little about the impact of foreign direct investment (FDI) and multinational enterprises on gender-specific policy and practice.

This paper seeks to fill this gap by investigating the role of foreign direct investment and multinational enterprises in spreading gender equality in Brazil. The Brazilian context is rich for such a study, given that the country underwent a substantive and unilateral liberalization of its economic policies in the 1990s, including, importantly, a relaxation of restrictions on foreign investment. According to aggregate statistics from the World Bank, foreign direct investment inflows to Brazil more than quintupled in the three years between 1996 and 1999 immediately after liberalization (World Bank 2020). Previous research on the implications of this sharp increase in foreign ownership suggests that Brazilian workers benefited through higher wages (Poole 2013); however, this work did not distinguish the effects for women differently from men.

In theory, there are several reasons to hypothesize an improvement in gender equality with increases in foreign investment. For example, FDI, like international trade, brings increased income levels—as gender equality tends to be positively associated with income levels across countries, this would predict an improvement in gender policy and practice. Similarly, as in Becker's (1957)

[1] For example, industries with high levels of foreign participation are more productive (Aitken and Harrison 1999) and more likely to export (Aitken, Hanson, and Harrison 1997). Bloom and van Reenen (2010) also offer evidence of high-quality management practice being transplanted by multinational firms. In addition to these direct productivity effects on subsidiaries, indirect spillovers may exist as domestic firms supply foreign firms or use their goods as intermediate inputs (e.g., Javorcik (2004) and Kee (2015)). A growing literature also posits that workers learn while employed at multinationals and then transfer this knowledge as they transition to domestic firms (Poole 2013).

[2] For instance, the United Nations Conference on Trade and Development's "Linkages" programme trains multinational executives on how to engage with domestic firms in the countries in which they invest.

[3] For example, there is strong anecdotal evidence of multinationals spreading high-quality health standards (e.g., washing hands), customer service (e.g., queuing and smiling), and cultural norms (e.g., business attire).

seminal work, (gender) discrimination is expected to diminish as firms face heightened competition. Therefore, if MNEs increase local competition, firms have less capacity to discriminate against women. Finally, multinationals may also be subject to higher international (or FDI-source country) standards. Backlash from consumers may result if MNEs attempt to circumvent these standards. As such, reputational pressures may force multinationals to bring higher-quality policies and practices to their host countries.

The analysis in this paper largely tracks a long and well-established literature on productivity spillovers from multinationals to establish micro-evidence on the ability of foreign firms to promote female empowerment, to close gender wage and employment gaps, and, therefore, to enhance economic growth in developing countries (Diebolt and Perrin 2013). First, we investigate the *direct* spillovers to foreign-owned subsidiaries in Brazil, with a descriptive exercise on the differences between MNEs and domestic firms in their gender composition and gender earnings gaps.

In addition to our analysis of the potential for spillovers in the aggregate, we then further inquire about the mechanism underlying the international transfer of gender-equalizing policies and practice. Specifically, we examine whether labour mobility from multinational to domestic firms can transfer information about gender practice, as in the well-identified work of Poole (2013) for multinational wage spillovers. That is, when workers leave multinational firms and are rehired at domestic establishments, do they bring about equitable gender policy?

Our findings suggest that domestic firms that hire former multinational workers have similar female employment shares and higher gender earnings gaps when compared to domestic firms that do not hire former multinational workers. Unfortunately, despite the numerous theoretical possibilities that multinational enterprises may help to promote gender equality around the globe, this is not borne out in the data from Brazil. Part of the explanation may be that the MNEs in our sample, if anything, exhibit less gender-equal policies than their domestic counterparts—multinational firms employ fewer women and report higher gender earnings gaps. It is no surprise, then, that domestic firms with higher shares of former MNE workers are not very different from otherwise identical domestic firms with lower shares of former MNE workers in terms of their gender practice.

Our work emphasizes the need for domestic policies to promote the education and employment of women, through high-quality working conditions and employment protection (i.e., health and safety benefits), and to reduce the barriers for women to access employment in certain occupations and industries. In addition, our findings support a goal of more flexible labour markets to facilitate the transition of workers across firms. Finally, the international community should continue to promote positive female employment practice across all types of firms.

The rest of this paper is organized as follows. Section 2 offers a detailed overview of the main economic literature associated with our research question linking multinational firms and gender-related outcomes. Section 3 offers some theoretical predictions, based on the background literature, relating changes in exposure to foreign firms to women's empowerment. In Section 4, we present the main data sets and provide some descriptive statistics on women in the workplace, on FDI in Brazil, and on the diffusion of MNE experience. Section 5 describes the main empirical strategy and Section 6 reports the main results for the effects of MNE spillovers of gender-equalizing policies. We offer conclusions and implications for policy in the final section.

2. Background literature

While there are substantial bodies of research on the gender wage gap and on multinational spillovers, to our knowledge, there are very few papers at the intersection of these literatures – the impact of multinational firms on gender-specific outcomes. In this section, we briefly review the background literature on this topic. We are among the first to explore the role of multinational firms in spreading gender equality to the domestic economy. That is, many of the papers we cite explore the differences between MNEs and domestic firms in gender policy and practice, while our paper investigates whether and how multinationals may transmit policies towards women empowerment to the host economy.

MNEs and the gender wage gap. The takeover of domestic firms by foreign enterprises, or the entry of MNEs, is typically associated with a rise in the wages of local workers. The most direct effect of MNEs comes from their effects on productivity and the labour market. Multinationals compete with domestic firms in both the factor market and in the product market; as such, increased labour demand can result in an increased overall wage. Within foreign-owned firms, this increase is concentrated in higher-skilled and managerial positions. Managerial positions and positions with highly educated workers also tend to have higher gender wage gaps (e.g., Vahter and Masso (2018), Yahmed (2018), and Bertrand, et al. (2010)), which suggests MNEs may increase the gender wage gap.

This is not just a theoretical postulation: several studies from around the world have argued that the entry of MNEs exacerbate the gender wage gap. Seguino (2000) argues that Taiwan's reliance on FDI as a means of advancing its technological base contributed to a rising gender wage gap as compared to Korea. After 2002, Taiwan's Gender Equal Employment Act helped narrow the gap for some time, but the gap in FDI-intensive industries persisted (Lai and

Sarkar, 2017). Stolzenburg, et al., (2020) examine employer-employee linked data from South Africa, and find that firms receiving FDI exhibit a 2.4 percent higher gender wage gap than those that do not. Sharma (2020) also finds that greater FDI among Indian firms increased gender wage gaps, particularly for unskilled workers. Interestingly, in Estonia, Vahter and Masso (2019) find that foreign-owned firms display a much larger gender wage gap than domestic firms, and especially so for workers in managerial positions.

In Brazil, the unconditional gender wage gap declined over the 1990s and early 2000s (Arabsheibani, et al., 2003), a period marked by rapid increase in FDI inflows (Poole, 2013). As calculated by Arabsheibani, et al., (2003), men were paid on average 300 percent more than women in 1988, and only 33 percent more in 1998. The period between 1988 and 1998 was marked by an increase in education for both men and women, along with a movement out of agriculture into services for men, and out of both agriculture and production into services for women (Arabsheibani, et al., 2003). Along with structural changes, Arabsheibani, et al. (2003) attribute the declining gender wage ratio to increased economic liberalization. Likewise, Rendall (2013) emphasizes the role of structural change over the same time period in reducing gender inequality—with the shift from "brawn-intensive" to "brain-intensive" jobs playing a major role, as in Aguayo-Tellez, et al. (2014) for Mexico.[4]

MNEs and female employment. A recent body of research has shown that foreign investment leads to increased female employment in local MNE affiliates, especially in managerial positions. For example, Olcott and Oliver (2014) found that the number of female managers rose more sharply at acquired companies than at traditional companies over a five-year period in Japan, and Kodama, et al. (2016) found that foreign affiliates are more gender-equal than otherwise identical Japanese firms. Fernandes and Kee (2020) examine a cross section of Bangladeshi firms in 2005, and find that firms with FDI hire more women in managerial positions. For Chile, Delgado (2020) shows that foreign acquisition increased the share of female workers by 3.6 percent in the following two years; among managerial positions the increase was 6.6 percent.

The importance of the FDI-source country is clear in the work by Tang and Zhang (2017). The authors find that foreign firms, especially those from more gender-equal cultures, generate cultural spillovers to domestic firms within their study of Chinese manufacturing firm data over the period 2004 to 2007. The authors show

[4] The distinction in job types can also work against women, however. A recent study on the Brazilian tourism industry finds that women are concentrated in perceived feminine activities such as being cooks and maids, which limits their mobility and earnings despite being slightly more educated and otherwise equally qualified as men in the same industry (Ferreira Freire Guimarães and Silva 2016).

that foreign affiliates whose home country culture is more gender equal tend to hire proportionately more women and appoint more female managers, and that there is a positive correlation between domestic firms' female labour shares and the prevalence of FDI across industries and cities. Similarly, Choi and Greaney (2020) find strong evidence that MNEs from more gender-equal countries tend to employ proportionately more women and female CEOs within their firm-level study of South Korea. One exception to this idea is Sharma (2020), who does not find the female employment composition effects of FDI in India to be positively related to the gender equality of the FDI-source country.

3. Conceptual framework

It is well documented that multinational firms are different from domestic firms, in terms of size, productivity, average wages, and skill composition (Helpman, Melitz, and Yeaple 2004). We also know from a substantive literature that multinational firms can transfer many of these differences to the local host economy – as productivity spillovers and increased education and training. There is also a small, and growing, literature suggesting that multinational firms are different from domestic firms in terms of their female workforce composition and gender wage gaps (see the discussion in the previous section). Whether these gender-equalizing practices can "spill over" into the domestic economy is the main topic of this paper. Therefore, we ask whether multinational firms transfer gender policies and practices to firms in their host countries, as they transfer productivity improvements.

As Brazil is a middle-income, emerging economy, increased foreign investment is also associated with increased income levels for the country. As income is associated with better working conditions and higher standards, we can expect female empowerment to improve via the income effect. In fact, according to the International Monetary Fund's Gender Inequality Index, advanced economies are more gender equal than lower-income developing countries. Furthermore, following Becker's (1957) model of labour market discrimination, if increased foreign presence increases local competition, MNEs may help to promote gender equality by forcing domestic firms to hire equally qualified and productive women.

Implicitly, we question whether MNEs may alter the legal frameworks and practices in the host countries in which they operate. On the one hand, there have long been concerns by opponents of corporate globalization of a race to the bottom; that is, countries compete via their tax levels, or labour and environmental regulations, to attract foreign investment. The theory suggests, then, that as multinationals seek places to operate around the globe, they

look for weak standards and low tax rates.[5] In this context, it is theoretically possible that foreign firms contribute to poorer standards for women in Brazil. On the other hand, as is carefully documented for the case of Indonesia by Harrison and Scorse (2010), multinationals may also be subject to higher international standards. If, and when, they circumvent and diminish labour practices, they potentially face backlash from consumers. These reputational pressures force multinationals to bring higher-quality policies and practices to their host countries. In this case, we may expect multinational firms to have higher quality labour practices toward women.

If MNEs display more progressive gender policies and practices, and MNE workers learn about these high-quality labour practices toward women—either through explicit labour training or casual observation—then it is possible that these workers spread best practice by imposing or demanding better treatment when they leave MNEs for employment elsewhere. The expectation is that these transfers are likely to be stronger for female employees, for whom the policies are more pertinent, and for managers and human resources personnel, for whom applying these policies is part of their job. These workers then help to introduce these more progressive labour policies into their new establishments.

4. Data

The Brazilian context is suitable to the question at hand in part due to the wealth and depth of available data sources. In addition, the country experienced a dramatic and unilateral trade liberalization, accompanied by a relaxation of foreign investment restrictions in the mid-1990s, and an abrupt real exchange rate devaluation of the currency in 1999. Our research relies on several different data sources collected by Brazilian government agencies. We are able to match these different databases based on common and unique identifiers, such as worker registration numbers, establishment tax identification codes, and municipal location.

Matched employer-employee data. We exploit administrative data, collected by the Brazilian Labour Ministry and reported in the *Relação Anual de Informações Sociais* (RAIS), to observe the formal labour market. RAIS captures all formal job spells in Brazil, as classified by individual and establishment identifiers. The benefits of a linked employer-employee database are numerous. First, we observe the

[5] Olney (2013) finds evidence of such a race to the bottom for foreign investment using data from the Organization of Economic Cooperation and Development. In his work, he demonstrates that larger volumes of foreign investment flows to countries with weaker employment protections.

complete formal employment history of all workers, including all job transitions both within and between firms, and across sectors and regions of the economy. Second, earnings reflect the average earnings for a particular job spell of a particular worker. Household surveys, by contrast, often report an individual's average wage for the year, which may confound a number of jobs throughout the year. Similarly, firm-level data sources often characterize average wages across the company's workforce, obscuring the composition of the workforce within the firm. Third, because firms are required by the Ministry of Labour to report on their workforce in order to comply with labour legislation, the data suffer far less from attrition and measurement error than would data based on individual-level recall survey questionnaires.

The main benefit of this data is the ability to trace workers over time across establishment-types, with detailed demographic and labour market information for each worker. These worker transitions will be our main measure of labour mobility. RAIS provides rich information about workers, firms, and job spells that we use to study female labour market participation in the context of a growing, low-to-middle-income country. The data include worker characteristics like (importantly) gender, age, and education. Information about companies includes detailed industry codes, the municipal location of each establishment, and establishment-level workforce composition.

We use data for the years 1996 through 2004, a period of dramatic trade and investment liberalization across the country. In 1996, the RAIS data includes over 29 million workers, employed in approximately 1.7 million establishments. By 2004, the formal labour force had grown significantly in our sample to cover over 37 million workers, employed in 2.6 million establishments.

Multinational establishments. The establishment identifier in RAIS is a public registration number, allowing us to merge external information about establishments. For example, we rely on firm-level information to discern foreign-owned from domestically-owned establishments using data from the Brazilian Central Bank. By law, all foreign investments must be registered with the Central Bank of Brazil (*Banco Central do Brasil*, BCB) in the *Registro Declaratório Eletrônico–Investimentos Externos Diretos* (RDE-IED). This is the same data previously used in Poole (2013) to estimate the wage spillovers of workers with experience at multinational firms.

The data include a list of all establishment tax numbers with a positive inflow of FDI for the years 1996 through 2003 and a list of all establishments with a positive stock of foreign capital in the years 2001 to 2004. Lacking direct information on an establishment's FDI stock by year, these data allow a procedure to infer with considerable confidence which establishments are at least partially foreign-owned in

a given year between 1996 and 2004.[6] Specifically, following Poole (2013), we define an establishment to be at least partly foreign-owned in year *t* if the establishment received an inflow of foreign capital in year *t*. We note that establishments receiving inflows of foreign capital in year *t* may maintain a stock of foreign capital in later years. Therefore, establishments with a positive stock of foreign capital in later years are classified as foreign owned in all years $\tau \geq t$ after the initially observed inflow at year t, even if no inflow is observed in the intervening years.[7]

By this method, around 12,000 multinational establishments were operating in Brazil in 2004. This accounts for roughly 0.5 percent of all establishments in the country. However, as multinational firms tend to be larger, these firms account for around 2.2 percent of all formal-sector employment.

4.1 Descriptive statistics

We next offer some descriptive statistics as background for the empirical estimations ahead. First, we present evidence on the low participation of women in the workplace and the relatively high and steady earnings gap that exists between formally working women and men. Then we present figures on the presence of multinational establishments in the Brazilian economy, the workers employed in those establishments, and the diffusion of workers with experience at MNEs. Together, these statistics may help to explain some of the empirical findings reported in the next section.

Women in the workplace. While the level of participation was relatively low, the period we study saw large increases in both the number and proportion of women in the formal workforce. Figure 1 shows that the proportion of women in the formal workforce increased from about 37.9 percent to 40.0 percent during our sample period.[8] These levels are relatively low; for example, the United States exceeded 37.4 percent in 1970 and 40.0 percent in 1976, and had reached 46.5 percent by

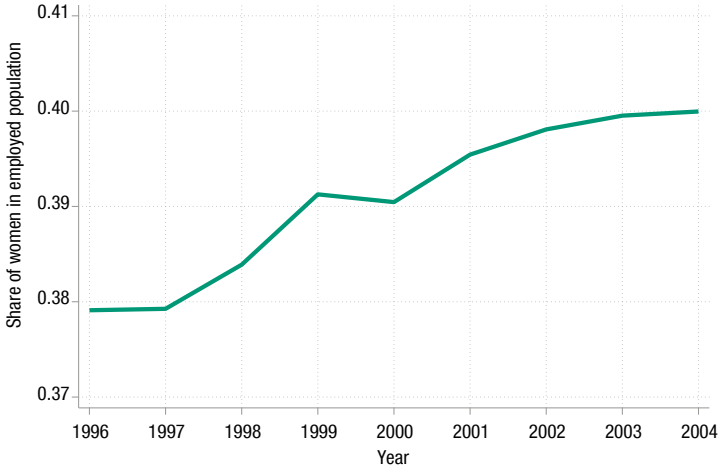
[6] Unfortunately, the data we currently have available regarding establishment-level foreign ownership is limited. In future work, we intend to collect more detailed data from the BCB, which will allow us to identify the source country of the foreign investment. As the country of origin has been found as a strong determinant of the likelihood of positive gender policy spillovers in other countries (see, for example, Tang and Zhang (2017)), we see this as a fruitful avenue for future research.

[7] The main concerns are establishments without any recorded inflows of foreign investment and no stock of foreign capital in 2001. By our definition, these would be considered domestically-owned enterprises. Therefore, if there was an initial inflow of foreign capital before the sample period and a full divestiture at some point during the sample period, we miss those foreign-owned establishments. If anything, this would reduce the likelihood of finding statistical differences between foreign and domestic firms.

[8] Authors' calculations from RAIS data.

2004.[9] However, although two percentage points sounds modest, combined with the growth in the total formal labour force, this represents a major increase in formal employment for women: almost 4 million more women were formally employed in 2004 compared to 1996.

Figure 1: Share of women in employed population



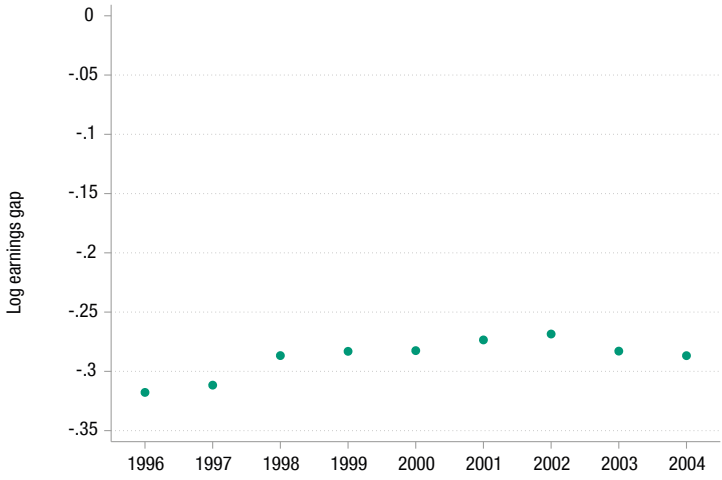
This remarkable increase in participation occurred despite a large and persistent gap in earnings. We find that, controlling for education, age, tenure, year, state, occupation, and industry, women earn around 25 percent less than men in Brazil.[10] As shown in Figure 2, this gap remains relatively stable throughout the study period, in contrast to the unconditional gender gap we discuss in Section 2, as reported by Arabsheibani, et al. (2003). Whatever forces were drawing women into the formal workforce during this time, it does not appear to be improvements in relative

[9] Authors' calculations from series i) U.S. Bureau of Labor Statistics, Employment Level [CE16OV], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CE16OV, July 23, 2020 and ii) U.S. Bureau of Labor Statistics, Employment Level - Women [LNS12000002], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/LNS12000002, July 22, 2020.

[10] Formally, in a sample of RAIS data, we regress the natural logarithm of earnings on age, age squared, tenure, year indicators, state indicators, education indicators, and a fully interacted set of indicators for occupation and industry. Figure 2 shows the coefficients on the interaction between female and year indicators. Changes in log units are roughly equivalent to percentage point changes. A difference of -0.25 log points corresponds an earnings gap of 22 percent. A difference of -0.3 log points corresponds to an earnings gap of 26 percent.

wages.[11] The level and trend of the earnings gap during this period in Brazil is similar to findings from the same period in the United States (Goldin et al., 2017), although those authors find a clear downward trend in relative earnings among highly-educated women.

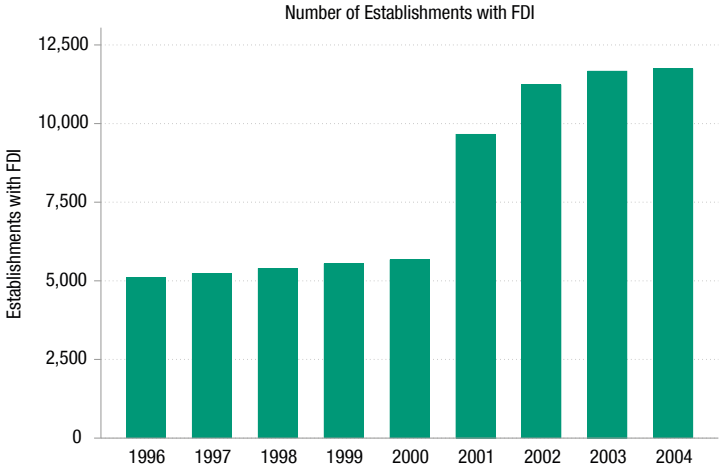
Figure 2: Gap in log earnings between men and women



The growth of foreign investment in Brazil. The late 1990s and early 2000s witnessed significant increases in foreign investment in Brazil. Prior to 1996, foreign investment in Brazil was essentially prohibited, but restrictions were relaxed as a part of a broader package of economic liberalization (see Rodrigues (2000) and Goldfajn and Minella (2005)). The results were immediate: by the end of 1996, about 5,000 establishments across the country had received at least some foreign capital (Figure 3). Restrictions were further loosened in 2001 and, by 2004, almost 12,000 establishments reported foreign investment.

[11] At the same time, the strong increase in the supply of women may have contributed to downward pressure on female wages, suggesting that, all else being equal, the gender wage gap may have narrowed some over the time period.

Figure 3: Number of establishments with foreign direct investment



The nature of MNE experience. Until now, we have been working under the assumption, backed by some existing literature, as discussed in our conceptual framework, that multinational firms employ high-quality gender policy and practice around the world—either because they have reputational concerns, or they are monitored by international standards agencies, or they face heightened competition. In this section, we test this assumption with an investigation into the Brazilian data and report statistics on the differences between foreign-owned and domestically-owned establishments regarding employment composition and earnings.

In stark contrast to the theory, during the study period, our data report that multinational establishments do not offer systematically better employment outcomes for women as compared to domestic establishments. Multinational employment is concentrated in large, male-dominated industries. Even controlling for industrial composition, multinational establishments employ fewer women and, on average, show greater earnings gaps. This suggests that MNEs may not be an engine of gender equality in the Brazilian labour market.

Establishments receiving FDI are large, concentrated in male-dominated industries, and almost entirely absent from industries that tend to employ women. In 2000, the median (mean) domestic establishment employed only three (13) people, compared to 24 (150) for multinational establishments (Figure 4). Almost two thirds of employment in MNEs is in manufacturing, and over 70 percent of manufacturing workers are men (Figure 5). Perhaps not surprisingly, there is almost no MNE employment in the sector which accounts for almost half of all working women: public administration, health, and education.

Figure 4: Size of domestic and multinational establishments (2000)

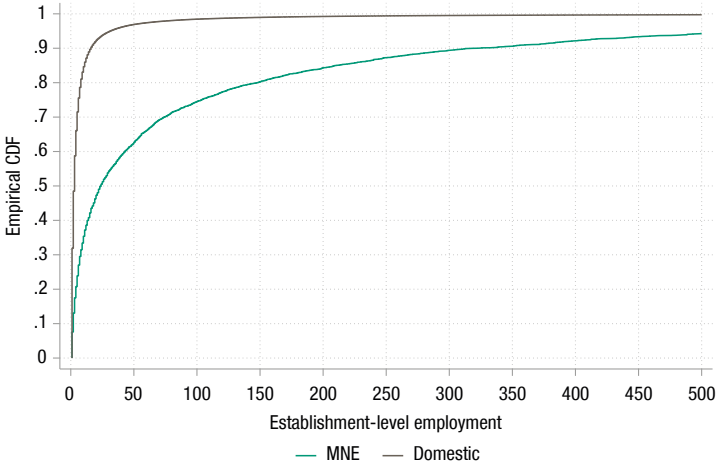
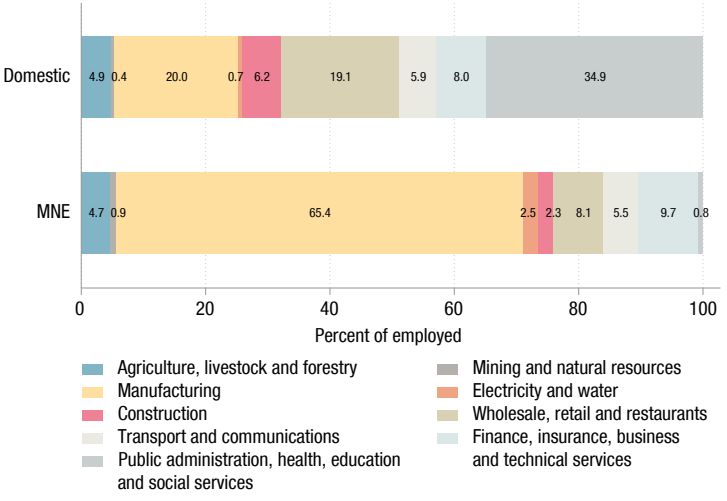
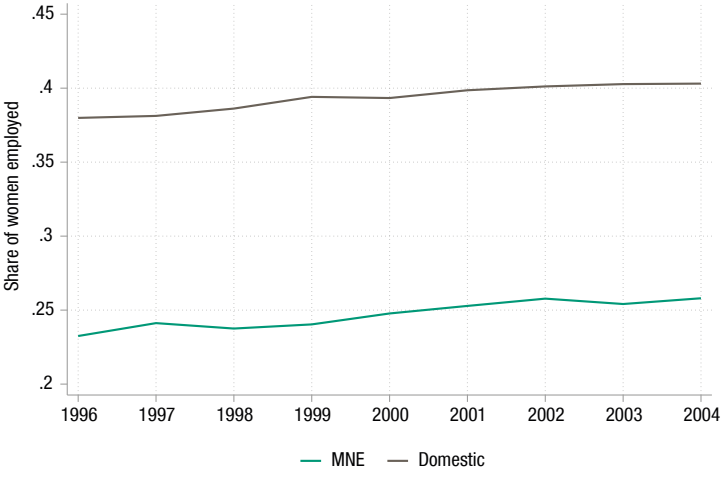


Figure 5: Employment by industry across establishment type



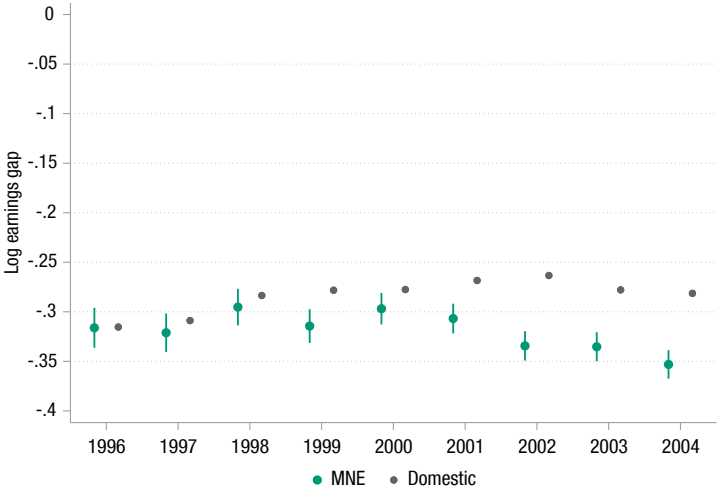
Female employment is lower among firms receiving FDI, even controlling for industrial composition. Throughout the period, the share of women employed in MNEs is about 15 percentage points lower than the share of women in domestic establishments (Figure 6), and this gap is consistent over time. The differences in industrial composition largely explain this gap, but not all of it; even controlling for industry, the share of women in MNEs is 3.3 percentage points lower than domestic establishments.

Figure 6: Female employment by establishment type



If anything, gender earnings gaps are more severe in MNEs. We repeat our analysis from Figure 2 separately for MNEs and domestic enterprises, estimating the earnings gap after controlling for basic individual, job, and establishment characteristics. Women in multinational establishments earn 25 to 30 percent less than their male counterparts (Figure 7). While this is similar in magnitude to the earnings gap in domestic establishments, it increases slightly during our study period.

Figure 7: Gap in log earnings by establishment type



Across several dimensions, these statistics show that multinational establishments are different from domestic establishments in terms of gender practices in an unexpected way – that is, that MNE establishments employ fewer women and report higher gender earnings gaps. We next wonder whether the types of establishments receiving foreign investment exhibited poor gender practice even before they received investment from abroad. Table 1 explores this exact idea. We report sample statistics from 1995 across two types of establishments – those that would receive foreign investment inflows at some point in the future (1996 through 2004) and those that would never receive foreign investment. Note that as of 1995 none of these establishments, to our knowledge, are yet foreign owned. Future MNEs are larger in terms of employment, more likely to be in the manufacturing industry, and pay higher average wages. Interestingly, even prior to foreign ownership, the future MNE firms employed fewer women (28 percent female labour force composition, on average, compared to 36 percent female in establishments that would not become MNEs) and paid lower total female earnings (on average, 24 percent compared to 35 percent of the total wage bill went to female workers). This suggests, at least, that foreign ownership is not worsening practices toward women, but that the types of establishments with the potential for future foreign investment pursue different practices toward women.

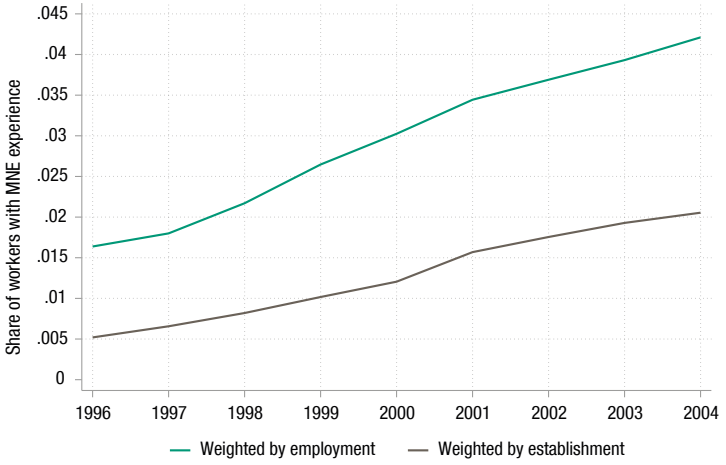
Table 1: Summary statistics, by establishment type

	Future recipient of FDI	Not future recipient of FDI
No. of establishments	1,145	1,058,777
Total employment	231,528	15,759,200
Est. employment (25th pctile)	7	1
Est. employment (50th pctile)	33	3
Est. employment (75th pctile)	155	6
Pct. of est. by industry:		
Agriculture	0.108	0.133
Extractive	0.034	0.004
Manufacturing	0.473	0.169
Utilities	0.006	0.003
Construction	0.034	0.049
Wholesale, retail, restaurant	0.203	0.348
Transport and communication	0.042	0.050
Finance, insurance, business	0.084	0.112
Public sector	0.016	0.133
Mean wages per employee (reais per month)	1,123	247
Female employment (pct)	0.280	0.359
Female earnings (pct)	0.239	0.351

Source: RAIS, BCB.

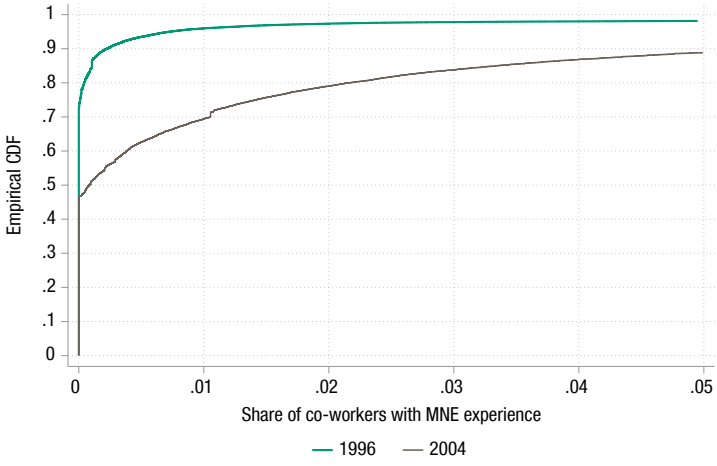
The diffusion of MNE experience. One of our primary interests is whether MNEs transmit gender norms through labour mobility; that is, as workers move in and out of MNEs, they bring gender policies acquired from MNE experience to domestic employers. Given the statistics in the previous section, the expectation that workers moving from MNEs to domestic firms could help to promote gender equality is significantly diminished. In fact, there is even a risk that workers moving from MNEs might spread poor gender practices to new firms. Nevertheless, Figure 8 shows that MNE experience, while starting at a low baseline, was diffusing rapidly throughout Brazil during this time. In 1996, about 0.5 percent of workers at a typical establishment had previous MNE experience. By 2004, about 2 percent of the workforce at a typical establishment had had MNE experience. Larger establishments tend to have a larger proportion of workers with prior MNE experience; therefore, in 1996, about 1.5 percent of a typical worker's colleagues had MNE experience. By 2004, that number had almost tripled.

Figure 8: Diffusion of MNE experience



Workers were much more exposed to MNE experience in 2004 compared to 1996. In 1996, around three quarters of workers were in an establishment in which no one had MNE experience and almost nobody worked in an establishment where 5 percent of employees had MNE experience (Figure 9). By 2004, more than half the workforce had at least some co-workers with MNE experience. More than one in ten worked in an establishment in which 5 percent of employees had MNE experience.

Figure 9: Empirical CDF of share of co-workers with MNE experience



5. Empirical strategy

This research investigates the role of foreign direct investment and multinational enterprises in affecting gender-related employment outcomes in Brazil. We explore whether workers moving between foreign-owned and Brazilian-owned firms are a means of transferring female-friendly labour practices. That is, when workers leave multinational firms and are rehired at domestic firms, do they bring about equitable gender policy? Our empirical strategy follows the work in Poole (2013). Specifically, we allow a worker's wage to depend on the characteristics of the worker's economic environment – the establishment in which they are employed, as follows:

$$\ln earn_{ijt} = \gamma_M SM_{jt} + \mu_M SM_{jt} \times 1(Female_i) + \beta_1 X_{it} + \beta_2 Z_{jt} + \varphi_i + \theta_{j(i)} + \delta_t + \varepsilon_{ijt} \quad (1)$$

where i indexes the individual, j indexes the establishment, and t indexes time. The main outcome of interest we explore in this estimation are individual-level log earnings. SM_{jt} refers to the share of the establishment's workforce with previous experience in a multinational establishment. We also include time-varying individual characteristics (X_{it}), time-varying establishment characteristics (Z_{jt}), individual fixed effects (φ_i), establishment fixed effects ($\theta_{j(i)}$), and year dummies (δ_t). Because the sample is restricted to domestically-owned establishments and their employees, it is not subject to the estimation bias in previous research on productivity spillovers – that is, that foreign investment flows to already more productive firms. Finally, in order to explore the impact of these multinational earn spillovers on women

differentially from men, we interact the main variable of interest with a dummy signaling the worker's gender. The main coefficient of interest, μ_M, is identified by within-establishment variation in the fraction of workers with prior MNE experience.[12]

We restrict the estimation sample for both substantive and computational reasons. Importantly, we present results estimated from a 5 percent sample.[13] Each year of RAIS data has tens of millions of observations; in conjunction with the large number of fixed effects, our estimation strategy is computationally expensive.

In addition to this individual-level analysis, we consider the possibility that establishments that have more MNE experience also hire more women. In particular, we estimate the following establishment-level regression:

$$PctFemale_{jt} = \gamma_M SM_{jt} + \beta_2 Z_{jt} + \theta_j + \varepsilon_{ijt} \quad (2)$$

where all notation is as in equation (1). The main outcome of interest we explore in this estimation is the establishment-level share of female employment. As above, identification arises from within-establishment differential changes in the diffusion of multinational experience.[14]

6. Results

The movement of workers from multinational to domestic enterprises has relatively small effects on labour market outcomes for women. As shown in Table 2, increasing the share of workers with MNE experience modestly exacerbates the gender earnings gap (although the point estimate is statistically insignificant). Table 3 furthers this evidence with an establishment-level analysis. Across all domestic establishments, those with higher shares of former MNE workers report lower female employment shares. The coefficient estimates themselves are not small, but, scaled by the variation in the fraction of workers with MNE experience, the implied changes in female labour market outcomes are limited. As shown in

[12] The regression attributes differential trends in female earnings to changes in the share of workers with MNE experience. Thus, the estimate of μ_M may capture factors other than a causal relationship between labour mobility and female employment outcomes. For example, imagine the density of urban areas leads MNE experience to diffuse relatively quickly. Imagine further that, during our sample period, the burden of childcare falls faster for women in urban areas, leading to greater entry in labour markets, leading female earnings to decline relative to men. We would observe a negative estimate for μ_M due to increases in FDI, urban labour mobility, and changes in the availability of childcare.

[13] Specifically, we first create a list of all individuals who ever appear in RAIS between 1996 and 2004. We randomly select one percent of those individuals. The final estimation sample includes the complete work histories for all sampled individuals.

[14] This analysis cannot exclude the possibility that some third factor, e.g. a change in management practices, drives changes in both female and former multinational worker hiring.

Figure 9, roughly 90 percent of workers are employed in a workplace where at most 5 percent of their colleagues have MNE experience (SM_{jt} = 0.05). Between 1996 and 2004, the average worker saw their share of colleagues with MNE experience increase by 1 percentage point. This would represent minor changes in female earnings gaps and employment. Nevertheless, this result cannot be explained by the simplest version of our conceptual framework.

Table 2: Individual-level regression analysis

Dep. Variable: Log (December Earnings)	
Share of Employees with MNE Experience	-0.180***
	(0.030)
Female*Share of Employees with MNE Experience	-0.013
	(0.057)
Observations	4,620,945

Sources: RAIS, BCB.
Notes: This table reports coefficients of individual-level log earnings on listed variables plus tenure, age, age-squared, education indicators, private-ownership indicator, and fixed effects for establishment, individual, and year. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors, clustered at the establishment level, are reported in parentheses.

Table 3: Establishment-level regression analysis

Dep. Variable: Share of Female Workers	
Share of Employees with MNE Experience	-0.052***
	(0.003)
Observations	16,211,575

Sources: RAIS, BCB.
Notes: This table reports coefficients of establishment-level share of female workers on listed variables plus fixed effects for establishment and year. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors, clustered at the establishment level, are reported in parentheses.

This unexpected and intriguing result opens more questions than it answers. In what follows, we next consider the possibility that the economy-wide effect may vary across broad sectors of the economy. Some sectors of the economy are more female-labour instensive, while others are more skilled-labour or capital intensive. In Table 4, we re-estimate our main individual-level specification (as in equation (1)) across the nine 1-digit ISIC industries in our analysis. By and large, the gender disequalizing effects of former-MNE workers in domestic establishments is wholly driven by the result in the public sector. Given that there is virtually no foreign direct investment in the public sector, all of the former MNE workers are moving from outside the public sector. As policies and practices in the private sector are very different, perhaps this is an explanation for the weak transmission of positive employment practices toward women. Moreover, the public sector is known to be quite rigid in labour regulations and likely does not react to incentives in the same way that the private sector does.

Table 4: Individual-level regression analysis, by broad sector

Dep. Variable: Log (December Earnings)	Agriculture	Mining	Manufact.	Utilities	Construction	Wholesale / Retail	Trans. / Comm.	Finance / Bus.	Public
Share of Employees with MNE Experience	0.064	0.122	-0.035	-0.191*	0.205**	-0.039	-0.154***	0.058	-1.442***
	(0.049)	(0.408)	(0.035)	(0.088)	(0.068)	(0.038)	(0.030)	(0.054)	(0.333)
Female*Share of Employees with MNE Experience	0.046	-0.405	-0.086	0.315	-0.095	-0.080	0.213**	0.044	-0.168
	(0.116)	(0.642)	(0.051)	(0.610)	(0.156)	(0.069)	(0.069)	(0.056)	(0.516)
Observations	202,196	18,489	841,067	41,275	166,930	672,404	229,359	276,702	2,125,748

Sources: RAIS, BCB.

Notes: This table reports coefficients of individual-level log earnings on listed variables plus tenure, age, age-squared, education indicators, private-ownership indicator, and fixed effects for establishment, individual, and year. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors, clustered at the establishment level, are reported in parentheses.

Interestingly, across domestic establishments in the transportation and communication sector, those with larger shares of former MNE workers tend to exhibit lower gender earnings gaps. While our data do not allow us to investigate the exact mechanism, one plausible explanation is the relative advantage that women have in communication-intensive tasks. Perhaps employees at multinational enterprises learn about best practice in sales and customer service, strongly communication-intensive tasks, and bring that knowledge with them to their domestic employment. Given that these tasks are female-oriented, the increase in productivity differentially benefits women.

In fact, just as it is unlikely that policies affect men and women equally, it is also unlikely that the spread of good policy occurs through all workers in the same fashion. Therefore, we next explore the possible heterogeneity in the transfer of policy by the worker's demographic characteristics—female versus male, and managers versus production workers. We hypothesize that women and managers, workers who have the power and motivation to affect change, will be more likely to spread good gender policy and practice. Table 5 reports the main individual-level estimation (as in Table 2), in which the treatment variable is now the share of workers in the establishment who are female and have experience in a multinational enterprise. While the coefficient on the main interaction is still statistically insignificant, it is now positive – offering some potential for the idea that women may be better able to transfer good employment practices for women's empowerment. In fact, though unreported (but available by request), the transportation and communications sector again reports a large, positive, and statistically significant interaction coefficient, suggesting that establishments with larger shares of former MNE workers exhibit lower gender earnings gaps. This effect is also notably larger in magnitude (an even lower gender earnings gap) when we consider only female former MNE workers. Table 6 reports coefficients for a similar analysis for former MNE workers in management positions and the results are qualitatively similar, again pointing to the notion that those workers who may know about good policy are better able to transfer it.

Table 5: Individual-level regression analysis, female switchers

	Dependent Variable: Log (December Earnings)
Share of Employees who are Female and with MNE Experience	-0.258***
	(0.072)
Female*Share of Employees who are Female and with MNE Experience	0.051
	(0.090)
Observations	4,620,945

Sources: RAIS, BCB.

Notes: This table reports coefficients of individual-level log earnings on listed variables plus tenure, age, age-squared, education indicators, private-ownership indicator, and fixed effects for establishment, individual, and year. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors, clustered at the establishment level, are reported in parentheses.

Table 6: Individual-level regression analysis, manager switchers

Dependent Variable: Log (December Earnings)	
Share of Employees who are Managers and with MNE Experience	-0.280**
	(0.101)
Female*Share of Employees who are Managers and with MNE Experience	0.156
	(0.092)
Observations	4,620,945

Sources: RAIS, BCB.

Notes: This table reports coefficients of individual-level log earnings on listed variables plus tenure, age, age-squared, education indicators, private-ownership indicator, and fixed effects for establishment, individual, and year. *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level. Robust standard errors, clustered at the establishment level, are reported in parentheses.

7. Conclusions and policy implications

Foreign investment is an important conduit of external financing for many developing countries and has been shown to significantly reduce poverty by raising average wages (Klein, Aaron, and Hadjimichael, 2001). Given that women comprise the bulk of the world's poor, a natural extension is whether foreign direct investment can promote more gender equal labour market outcomes and female empowerment around the world. This paper investigates the role of foreign direct investment and multinational enterprises in spreading gender equality in Brazil. Specifically, we examine whether labour mobility from multinational to domestic firms can transfer information about gender practices. That is, when workers leave multinational establishments and are rehired at domestic establishments, do they change gender employment outcomes?

Despite the strong theoretical reasoning for female empowerment via multinational activity, the Brazilian data do not support these ideas. A leading explanation may be that multinational firms in Brazil (as in Japan) do not appear particularly progressive in terms of policies and practices toward women. Multinational establishments exhibit larger gender earnings gaps and smaller female employment shares than do otherwise identical domestic establishments. It is then no real surprise to learn that labour mobility from multinational to domestic establishments is not the engine for gender equality proposed at the outset.

High-quality, evidence-based research on this topic will help inform policy in local governments and international organizations to potentially prioritize the expansion of socially-responsible multinational enterprises to contribute and reinforce the advances of women over the last century. Our work emphasizes the need for domestic policies to promote the education and employment of women, through high-quality working conditions and employment protections (i.e., health and safety benefits), and to reduce the barriers for women to access employment in certain occupations and industries. In addition, our findings support a goal of more flexible labour markets to facilitate the transition of workers across firms.

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The role of regulation and MNEs in ensuring equal opportunities for women[+]

Renata Vargas Amaral[#] and Lillyana Daza Jaller[*]

Government policy and private sector practice have the ability to spread gender equality, which can have an impact on growth and development. Over the past years, an upsurge has been observed in trade agreements that carve out space for gender issues in their agendas. The same is not true for international investment treaties. Foreign direct investment inflows can lead to more opportunities for women in the job market but may also exacerbate disparities. This paper aims to address and compare the role and effect of gender provisions in trade and investment agreements, and to shed light on additional policies that may be needed to ensure that governments and multinational enterprises address gender constraints.

Keywords: bilateral investment treaty, foreign direct investment, gender, inclusion, investment, multinational enterprises, trade, trade agreement, women

1. Introduction

This paper provides an overview, from a legal perspective, of gender provisions and chapters in trade agreements and investment treaties and the role of domestic policies and multinational enterprises' (MNEs') policies in contributing to women's empowerment and gender equality. Although it would be natural to believe that a rise of trade and investment in the economy would lead to more opportunities for women, studies consistently show that trade and investment policies are not gender neutral. That means that although the current trade and investment paradigms are supposed to increase growth, decrease inequalities and promote employment, evidence shows (especially in developing countries) that a more globalized economy and a boost of foreign direct investment by MNEs may increase inequalities, "especially across sectors, income, gender and social groups" (Sengupta, 2013, p. 2).

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As a result of the negative impact that may come with economic growth, sustainable development objectives are increasingly being considered in domestic and international trade as well as in international investment policymaking. This paper aims to provide a legal and gender perspective on trade and investment provisions, with a focus on Sustainable Development Goal 5 as defined by the United Nations: achieving gender equality and empowering women and girls by 2030.[1]

1.1 Trade and investment as sustainable development drivers

Trade and investment are key drivers of economic development. They can be instrumental for sustainable economic growth and job creation. However, are opportunities equally created for men and for women? Are trade and investment policies gender sensitive? Enhancing women's equality and economic empowerment is not only a UN human right and a Sustainable Development Goal, but the removal of explicit and implicit barriers to women's economic inclusion has a multiplier effect on the economy. According to a McKinsey Global Institute report (2015), $12 trillion could be added to global GDP by 2025 by advancing women's equality. To that end, the public, private and social sectors need to act to close the gender gap in work and society.

Gender equality – herein meaning women's inclusion – is a critical determinant of development. Achieving gender equality is complex: it requires levelling the playing field as well as working with community leaders and those with power and influence in the economic, political and social spheres. Although other forms of classification exist, gender policies are commonly categorized as gender sensitive, gender neutral and gender blind (table 1). Gender-sensitive policies indicate gender awareness, and account for the different social roles of men and women as well as for their different needs (WHO, 2010). Gender-neutral policies are not aimed specifically at men or women and are assumed to affect both equally. Gender-blind policies refer to policies that do not perceive the existence of different roles, needs, or responsibilities between men and women, and as a result fail to realize that policies, programmes and projects can have different impacts on men, women, boys and girls.[2]

Table 1: Categorization of gender policies

Gender-sensitive	Gender-neutral	Gender-blind
Indicate gender awareness	Do not explicitly target men or women	Ignore different roles or needs
Account for different social roles that lead to different needs	Assumed to affect both men and women equally	Fail to recognize different impacts on men and women

Source: United Nations, Gender Terms Explained. https://www.un.org/esa/sustdev/csd/csd15/lc/gender_terms.pdf.

[1] https://www.un.org/sustainabledevelopment/gender-equality.

[2] https://www.un.org/esa/sustdev/csd/csd15/lc/gender_terms.pdf.

The Glossary of Terms for Sustainable Development Goal 5 clarifies that gender equality does not mean that women and men are the same, but that rights, responsibilities and opportunities should not depend on birth as male or female. Gender equality therefore means equal rights, responsibilities and opportunities for all. It is a question of human rights and a condition for people-centred sustainable development.[3]

Trade and investment policies do not exist in isolation. They interact with each other and with other policy areas, such as environmental, labour, industrial and social policies. However, the link among these policies is not necessarily clear. Unlike the multilateral trading system (where correlations to other policy areas are more evident), the current international investment regime has no evident link to other policy areas.

In fact, although international investment law and international trade law are related in the sense that they are both branches of international economic law, the way they are structured is very different. International trade law is largely regulated by an international organization – the World Trade Organization (WTO) – and its covered agreements, with horizontal norms for its members (currently a total of 164). By contrast, international investment law is fractional and broadly defined within bilateral investment treaties (BITs) between developed and developing countries – currently totalling almost 3,000, according to the United Nations Conference for Trade and Development (UNCTAD) Investment Policy Hub.[4]

Despite the divergent legal structure of the two international systems, gender is a crucial consideration when designing trade and investment policies and agreements with a focus of inclusive growth, as policies and treaties affect people differently. Globally, often because of discriminatory regulations and conditions, women entrepreneurs and employees face inequality of job opportunities, lack of social support and, in some cases, violence and harassment.

In the international investment arena, the private sector can play an active role in promoting gender equality, and investment by MNEs can be conducive to creating more employment opportunities for women. As previously reported by UNCTAD, MNEs have enabled more women in more countries to enter the formal sector, through their companies or affiliates, which has resulted in higher standards of living and better social outcomes (Sengupta, 2013). However, a rise in investments by MNEs risks increasing gender inequality when, for instance, “the jobs created for women remain confined to low-paid activities or occur in the informal sector, if adequate employment and working conditions are lacking, or when upgrading of skills is insufficient for women to remain employed” (UNCTAD, 2014, p. vii).

[3] https://nacoesunidas.org/wp-content/uploads/2017/06/Glossario-ODS-5.pdf.

[4] https://investmentpolicy.unctad.org/international-investment-agreements/model-agreements.

One of the premises of this paper is that gender-responsive domestic and international policies and agreements combined with gender-sensitive investment policies by MNEs may contribute to a better reality for women in the economic force.

1.2 Mainstreaming gender in trade and investment negotiations

There has been an upsurge in discussions on gender mainstreaming lately, but what does that mean? In July 1997, the United Nations Economic and Social Council (ECOSOC) defined the concept of gender mainstreaming as follows:

> Mainstreaming a gender perspective is the process of assessing the implications for women and men of any planned action, including legislation, policies, or programs, in any area and at all levels. It is a strategy for making **women's as well as of men's** (*emphasis added*) concerns and experiences an integral part of the design, implementation, monitoring, and evaluation of policies and programs in all political, economic, and societal spheres, so that women and men benefit equally, and inequality is not perpetuated. The ultimate goal of mainstreaming is to achieve gender equality (ECOSOC, 1997).

The UN identifies gender equality as the overarching and long-term development goal, "while gender mainstreaming is a set of specific, strategic approaches as well as technical and institutional processes adopted to achieve that goal".[5] Gender mainstreaming means integrating the gender equality goal in domestic and international public and private organizations, in both central and local bodies.

Gender mainstreaming, therefore, requires that gender perspectives be embedded in the development of public policy, in the legal and economic research, in the allocation of resources and planning, and in the implementation and monitoring of social programmes and projects. The implementation of a gender-mainstreaming approach to trade and investment agreements also requires transparency about women's accountability and participation in decision-making processes.

2. The role and effect of gender provisions in trade agreements and bilateral investment treaties

The future of the international economic order is contingent on the ability of governments and the private sector to distribute the benefits of economic growth equally to all (Ala'i and Amaral, 2019). Until now, this has not been the case.

[5] https://www.unwomen.org/en/how-we-work/un-system-coordination/gender-mainstreaming.

Historically, women and men have faced different challenges and have been given different opportunities in the business environment. The path to achieving gender equity is complex and requires the acknowledgement of the role that decision makers in the public and private sectors can play in overcoming long-standing practices that set women and girls back.

This section explores whether and how gender provisions are being included in international trade and investment agreements, and the different ways gender concerns are being addressed (or not) by policymakers.

2.1 Gender provisions in trade agreements

The discussion on the inclusion of gender-related provisions in trade agreements is not recent. The first gender-related provision appeared in 1957 in the treaty establishing the European Economic Community (Treaty of Rome), which defined under Article 119 that "each Member State shall during the first stage ensure and subsequently maintain the application of the principle that men and women should receive equal pay for equal work".[6] Since then, and notably in recent years, gender-related provisions have appeared in many regional trade agreements (RTAs) (Monteiro, 2018).

Over the past four decades, as many countries around the world have adopted a more aggressive approach towards trade liberalization with market-opening policies aimed at accelerating economic growth, accessing new markets and further developing the domestic industry, there was very little concern (or no concern at all) for gender matters. Due to this lack of concern or awareness, presumably, the common perception was that the effects of macroeconomic policies towards economic liberalization, including trade policies, provided equal opportunities for men and women. That perception was not correct.

Research and reports from the International Trade Centre (ITC),[7] the WTO,[8] the World Bank[9] and UNCTAD,[10] for example, have shown that trade policy and its instruments, such as negotiations and agreements, have affected women and men differently. Indeed, according to the World Trade Organization and the World Bank's Women and Trade joint report issued in 2020, even though no country imposes tariff or non-tariff measures based on gender, a closer look at trade policies reveals their disproportionate effects on women in terms of wages, consumption, welfare,

6 https://ec.europa.eu/romania/sites/romania/files/tratatul_de_la_roma.pdf.

7 http://www.intracen.org/itc/women-and-trade.

8 https://www.wto.org/english/tratop_e/womenandtrade_e/womenandtrade_e.htm.

9 https://www.worldbank.org/en/topic/trade/brief/trade-and-gender.

10 https://unctad.org/en/Pages/DITC/Gender-and-Trade.aspx.

and the quality and quantity of jobs available to them (World Bank and World Trade Organization 2020). The notion that trade policies and trade agreements were gender neutral was a common belief, and very little space was dedicated to that discussion in the international arena. That has changed.

The debate on whether existing provisions in international trade agreements are gender sensitive, gender neutral or gender blind was largely developed over the past years. Along with that discussion, the debate on whether countries need to focus on a whole agreement approach towards gender mainstreaming (and whether it is possible to accomplish this) is also being increasingly explored.

According to a recent study, the number of regional trade agreements (RTAs) with gender-related provisions has grown significantly since 2016 (Monteiro, 2018). Increasingly, trade agreements include a chapter dedicated to trade and gender, which mostly covers issues ranging from cooperation activities to institutional arrangements, including the establishment of a trade and gender committee and consultations procedures. Other gender-related provisions can be found spread throughout the text of an RTA – in the preamble, in chapters on labour, on investment, on cooperation, on sustainable development, or on small and medium enterprises (SMEs). For example, the 2019 United States–Mexico–Canada Agreement (USMCA) includes explicit provisions on gender in its labour chapter when referring to cooperation and discrimination in the workplace.[11]

Furthermore, in spite of the increasing number of gender provisions and specific chapters on trade and gender in RTAs and free trade agreements (FTAs), the commitments made to address gender through those instruments are not bold enough since they are mostly aspirational provisions. Chile and Uruguay stand out, as they have been negotiating gender chapters in trade agreements that recognize the importance of gender mainstreaming for achieving inclusive economic growth. Yet, although the trade agreements negotiated by these countries generally advance the objective of gender equality and are gender responsive, some provisions are particularly detrimental to this goal. For example, although the chapter on trade and gender in the recent trade agreement between Chile and Canada[12] includes some exemplary provisions on awareness promotion and cooperation, the chapter is excluded from the scope of the agreement's dispute settlement chapter (table 2).

[11] https://ustr.gov/sites/default/files/files/agreements/FTA/USMCA/Text/23-Labor.pdf.

[12] https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/chile-chili/fta-ale/2017_Amend_Modif-App2-Chap-N.aspx?lang=eng&_ga=2.144598006.2146702353.1568666812-2050347739.1568666812.

Table 2: Relevant provisions in Canada-Chile FTA's Trade and Gender Chapter	
General provisions (Article N bis-01)	Obligation to promote awareness of gender equality legislation, policies and practices.
Cooperation activities (Article N bis-03)	Obligation to implement cooperation activities to improve the capacity and conditions for women in the workplace; activities should be designed in collaboration with the private and public sectors as well as labour unions, academic institutions and NGOs.
Trade and Gender Committee (Article N bis-04)	Establishment of Committee with representatives from each Party's agency responsible for trade and gender tasked with ensuring the implementation of the Chapter's provisions; obligation to review implementation of the Chapter within two years of the Committees first meeting; obligation to develop a transparency mechanism for activities implemented under the Chapter.
Agreement on Labour Cooperation (Article N bis-07)	Where there are inconsistencies with the Agreement on Labour Cooperation and this chapter, the Agreement prevails.
Consultations and dispute resolution (Article N bis-06)	Recommendation to resort to dialogue, consultations and cooperation to resolve issues that arise under the Chapter Disputes arising under this chapter are excluded from the scope of the chapter on Institutional Arrangements and Dispute Settlement Procedures in the Agreement.

Source: Canada-Chile Free Trade Agreement, Appendix II – Chapter N bis–Trade and Gender.

When there is no specific chapter on women and trade, gender-related provisions are often tied to other cross-cutting (and also aspirational) issues such as environment and labour (as in the case of the USMCA[13]). Many, if not all gender-related provisions, are couched in the language of best endeavours and cooperation language, are spread in different parts of an agreement – e.g. in the preamble, in a side letter, in annexes, in chapters – and more importantly, they are not enforceable. In fact, there is no common template for gender provisions in a trade agreement and gender provisions have never been challenged before the WTO dispute settlement body.

In December 2017, 121 WTO members gave their support to the Declaration on Trade and Women's Economic Empowerment, which seeks to foster women's economic empowerment and eliminate barriers for women in trade. The declaration is not binding, but there is value in the large number of countries that joined forces to recognize the importance of the issue. Pursuant to the 2017 declaration, supporting WTO members have committed to a series of seminars covering gender-based analysis of trade policy, women's participation in public procurement and international value chains, gender in trade agreements, and bridging the gender-based digital divide. Moreover, at least six[14] WTO members have used the Trade Policy Review

[13] https://ustr.gov/sites/default/files/files/agreements/FTA/USMCA/Text/23-Labor.pdf.

[14] The six WTO members are: the European Union (WT/TPR/G/357), Iceland (WT/TPR/G/361), Gambia (WT/TPR/G/365), Montenegro (WT/TPR/G/369), Philippines (WT/TPR/G/368) and Colombia (WT/TPR/G/372).

Mechanism to highlight progress on trade and gender issues, which seems to indicate that the topic is gaining traction and attention among WTO members.

Institutionally speaking, the WTO is well equipped to assist in this matter. As a multilateral institution, the WTO currently has a central role to play not only in the revival of global trade negotiations but also in the protection and enhancement of women empowerment. It recently nominated a Trade and Gender Focal Point, with the mandate to identify and plan the WTO's role in matters relating to trade and gender. Undoubtedly, trade negotiations and trade agreements are effective tools for raising awareness of gender-related concerns and the need for enforceable rules that can help remove barriers to women's economic participation.

The ultimate goal should be mainstreaming gender in trade agreements through a comprehensive agreement. Greater thoughtful engagement is needed from national governments and global institutions charged with global governance on this issue, most notably the WTO. That said, a gender-mainstreaming approach in trade agreements can succeed only if policymakers comprehend the distinct realities women face globally and how these realities vary from nation to nation.

2.2 Gender provisions in bilateral investments treaties

There are clear linkages through which trade and investment policies and agreements can affect gender dynamics. Sengupta (2013, p. 2) categorizes the linkages as the following: "(i) work sphere affecting employment and incomes, terms of employment, work conditions; (ii) access to resources (land, water, credit, technology); access to basic services (e.g., health, education); (iii) home situation affecting care work, unpaid work, within household inequality/empowerment; (iv) migration, including both domestic and international, and of both men and women; (v) women as consumers; and (vi) affecting the policy space for gender-friendly policies and social policies".

Unlike trade agreements, very few BITs currently include gender provisions. Out of almost 80 model agreements published online by UNCTAD's Investment Policy Hub,[15] only six explicitly address gender, albeit through broad provisions that refer o "fair and equitable treatment" between men and women.[16] All of the agreements that mention gender were adopted in the last six years, showing a positive trend in this regard. Nonetheless, others from the same time period did not include such protections, which shows that there is still room for growth.[17] A few others make

[15] https://investmentpolicy.unctad.org/international-investment-agreements/model-agreements.

[16] The Model BITs that mention gender were signed by Morocco, Belgium-Luxemburg, Netherlands, Slovakia, India, and Serbia.

[17] https://investmentpolicy.unctad.org/international-investment-agreements/treaty-files/4786/download.

reference to international agreements, such as the Organisation for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises and the United Nations Guiding Principles on Business and Human Rights,[18] suggesting that companies abide by certain standards of responsible business, by implementing policies that address various issues, including gender.

Among the few examples of countries that have submitted model BITs containing gender provisions is the Netherlands, with the most recent version of the Government's model BIT recently published by UNCTAD's Investment Policy Hub platform.[19] Amid the interesting changes introduced, the 2019 model includes a commitment to promote equal opportunities and participation for women and men in the economy. The preamble recognizes the importance of gender equality in international trade and investment policies and Article 6, paragraph 3 of the Netherlands Model Investment Agreement states the following (emphasis added):

> The Contracting Parties emphasize the important contribution by women to economic growth through their participation in economic activity, including in international investment. They acknowledge **the importance of incorporating a gender perspective into the promotion of inclusive economic growth**. This includes removing barriers to women's participation in the economy and the key role that gender-responsive policies play in achieving sustainable development. **The Contracting Parties commit to promote equal opportunities and participation for women and men in the economy**. Where beneficial, the Contracting Parties shall carry out cooperation activities to improve the participation of women in the economy, including in international investment.

The model also addresses gender issues in Article 9 (Treatment of investors and of covered investments) and Article 20 (Constitution and functioning of the Tribunal) of the Agreement.

The Dutch model BIT is relevant because it sets the scene for a new generation of international investment agreements and it highlights the importance of incorporating a gender perspective in the promotion of inclusive growth and equal opportunities between men and women. Previously, when investment agreements mentioned gender equality, they mostly focused on gender equality in arbitral dispute resolution and the gender division among arbitrators. This seems to be changing, but the impact of investment treaties and foreign direct investment on gender equality are notions that need to have more concrete ground in international investment treaties.

[18] http://www.oecd.org/daf/inv/mne/ResourceDocumentWeb.pdf.

[19] https://investmentpolicy.unctad.org/international-investment-agreements/treaty-files/5832/download.

A similar trend is observed with regard to BITs. Of the 2,899 BITs signed to date, only six mention gender in the text of the agreement.[20] Interestingly, there is little correlation between the countries that addressed gender in their model BITs and the countries that signed BITs that addressed gender. Whereas Brazil stood out as one of the few countries whose recent model investment agreement did not address gender, the government addresses the issue in most of its recently signed investment cooperation and facilitation treaties. Conversely, whereas Morocco's 2019 model BIT addressed gender, its most recent BIT – signed with Japan in August 2020 – does not.

3. The impact of MNEs' investment policies on gender issues: a legal perspective

The private sector can have a very active role in promoting gender equality, and investment polices by MNEs can be conducive to creating more employment opportunities for women. Whereas in section 2 this paper discussed the role of international trade and international investment agreements accorded by nations in promoting gender equality through gender chapters or provisions, the present section looks at the perspective of private sector gender policies, and more specifically the role of MNEs. Indeed, one of the assumptions of this paper is that women-responsive international policies (and agreements/provisions) combined with gender-sensitive private sector investment policies can positively affect the opportunities of women in the economic force.

In this sense, maximizing the benefits for women in terms of investment by MNEs requires action from both the public and private sectors, at the national and the international levels. Domestically, legal reform and enforcement of gender policies by local governments in the countries where an MNE operates is crucial. That is discussed in section 3.1. For its turn, and with a focus on the private sector role, section 3.2 provides concrete examples of how multinationals address g ender issues at the international level, and specific MNEs' local gender policies that have had positive outcomes for the past few years.

3.1 The role of domestic policies

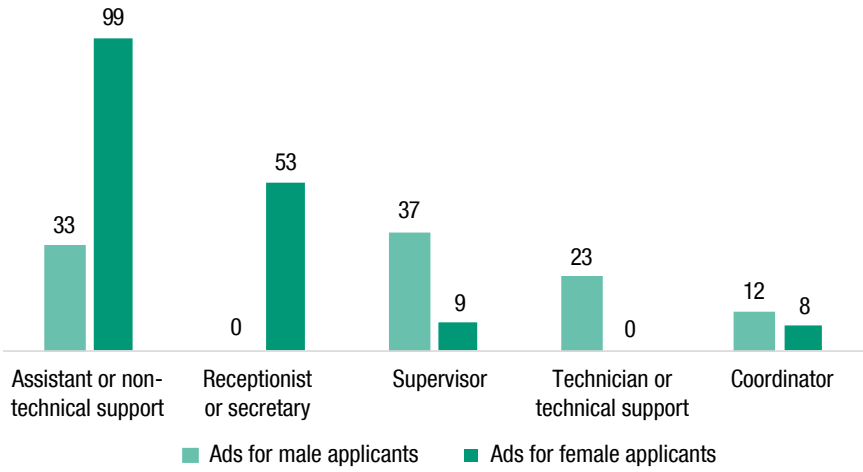
Legal frameworks around the world have vastly improved in terms of the rights afforded to women, but there is still much room for growth. Research shows that legal reform leads to smaller gender gaps and higher investments, among other

[20] The BITs that mention gender were signed between Moldova and the United Arab Emirates, Rwanda and the United Arab Emirates, India and the Kyrgyz Republic, India and Belarus, Belarus and Hungary, and Hungary and Cabo Verde.

societal and economic benefits (Hyland; Djankov; Goldberg, 2019). Yet, 45 per cent of countries have legislation in place that limits women's decisions in the workplace (World Bank, 2020). By removing regulatory barriers, governments can grant women legal rights in the workplace, and, in turn, domestic economies can fully reap the benefits of globalization.

In recent years, countries have introduced legislation to address gender disparity, including laws addressing sexual harassment in the workplace, banning discrimination by creditors on the basis of sex and prohibiting gender-based discrimination in employment (World Bank, 2020). Neverthel ess, to see a positive impact in society, enforcement of these laws is crucial. Although Mexican law prohibits employment discrimination on the basis of sex, for example, many online job postings specify a gender preference, based on the job responsibilities (Hyland; Djankov; Goldberg, 2019). Most gendered roles called for male applicants, reserving supporting roles for women. For example, while advertisements for Home Depot Inc. target men to be sales associates, VF Outdoor Services' executive assistant advertisements target women with "excellent presentation" and "emotional intelligence". In some cases, companies offered women lower salaries than men for the same role. Following an analysis carried out by Bloomberg, the companies made it clear that the postings were not in line with their policies and the issues related to discrimi natory hiring practices had been addressed internally. This is indicative of a disconnect between domestic policies and corporate policies and the realities faced by women in the workplace.

Figure 1: Companies target men for leadership roles and women for administrative work



Source: Green, J. and Stillman, A. (2019). Multinational Companies Reveal Gender Bias in Job Ads. Bloomberg, September 3. *https://www.bloomberg.com/news/articles/2019-09-03/multinational-companies-reveal-gender-bias-in-job-ads.*

Gender needs to be mainstreamed in the design and implementation of national trade policies. G ender-based analysis helps governments analyse policies and regulations, assess their impact on inclusion and make proper adjustments prior to their adoption (Steger, 2019). Gender-based policymaking and monitoring will require greater resource allocation to the agencies charged with gender affairs. In response to the global crisis caused by the COVID-19 pandemic, a joint statement[21] signed by Business 20, Labour 20, and Women 20 urged the G20 to address the disparate impact of the pandemic on women's health and employment. One of the measures suggested in the statement was to include women in decision-making processes. To ensure that the concerns of women are appropriately addressed, it is crucial to have inputs from women who are active in bo th the public and the private sectors. Another joint statement,[22] signed by UN Women and Women 20, highlighted the need to carry out gender-responsive impact reviews, in order to establish investment priorities that address the pandemic's disproportionate effects on women.

Governments should implement sensitivity training of key technocrats charged with formulating, implementing and monitoring trade and economic policies and their gendered impact. Stakeholders from civil society and the private sector can help design trade policies and measure their impact. As shown by the experience in Mexico, governments must follow through and ensure that these policies are enforced. Finally, governments should promote greater inclusion of gender provisions in FTAs and BITs.

3.2 How multinationals address gender issues

The actions of MNEs have a significant impact on global practices and norms (Koveshnikov, Tienari and Piekkari, 2019). Investing in women and gender issues can benefit companies as well as the communities where they have operations. The examples in the previous section high light one of the issues that MNEs face. Although on paper they may be taking part in the global movement to address gender issues companies must ensure that this participation is engrained in the company-wide culture, not just at the headquarters or among senior leadership.

A recent study showed that although MNEs are taking steps towards eliminating the gender gap at their headquarters, when compared with domestic firms in developing countries, multinationals display a larger gender wage gap (van der Straaten, Pisani and Kolk, 2019). This further highlights the need for MNEs to ensure that their initiatives have a positive impact on the host economies where they carry out their operations.

[21] https://www.b20saudiarabia.org.sa/wp-content/uploads/2020/04/B20-L20-W20-final-statement-v1.pdf.

[22] https://www.unwomen.org/en/news/stories/2020/7/press-release-un-women-and-w20-call-to-recognize-women-as-drivers-of-recovery-and-resilience.

As an example of corporate best practice, ExxonMobil, one of the world's largest oil and gas companies, claims to pay women and men equally for equal work, reporting a 3.9 per cent gender pay gap for its companies in the United Kingdom, where the national average was 17.9 per cent (ExxonMobil, 2018). According to the company's Gender Pay Gap Report, some of the main challenges faced by the company are posed by the traditionally male-dominated industry and the limited talent pool for female graduates in science, technology, engineering and mathematics (STEM). In the United States, women account for only 21 per cent of graduates in engineering and engineering technologies and 15 per cent of employees in engineering and architecture occupations (Catalyst, 2020). Moreover, women working in STEM are more likely to occupy lower-paying jobs than men. ExxonMobil's action plan includes investing in STEM education, with a particular focus on girls and young women.

Invest ing about $500 million per year in women-owned businesses has resulted in benefits for the local communities as well as profit for the MNE. Linda DuCharme, president of Exxon's Global Services Company, explained that from a business perspective it makes sense: the initiative lowers costs and improves competition (Welsh, 2018). However, the impacts on the community – mainly more stability – is also in the interest of the company, as its presence is usually long term. The company partners with WEConnect, an organization that helps women entrepreneurs around the world with funding, training and support. Through meetings with community leaders and government officials, ExxonMobil identifies women-owned businesses in the region hat participate in its supply chain to help them become economically empowered.[23] For example, in Mexico, the company that transports the fuels and lubricants for the company is women-owned (Welsh, 2018).

In 2012, ExxonMobil and the UN Foundation published *A Roadmap for Promoting Women's Economic Empowerment*. The report analysed interventions aimed at economically empowering women, to identify those that were most successful. Nine actions were identified as proven to increase the productivity and earnings of women in developing countries, depending on their particular situations (ExxonMobil and United Nations Foundation, 2013). On the basis of the evidence, the report concluded that when assessing the effectiveness of an intervention, one of the main determinants was the categories of women likely to be affected. For example, whereas "poor entrepreneurs" may benefit from micro savings, business training and credits are more beneficial to "non-poor entrepreneurs".24 Certain design adjustments also proved effective, such as the ability to use mobile phones

[23] https://logichem.wbresearch.com/exxonmobil-address-gender-imbalance-supply-chains-weconnect-strategy-ty-u.

[24] The Report categorized women into four groups based on different factors, including revenue: very poor (<$100/month)); poor (>$100/month); non-poor (>$5000/month); young women (15-24 year-old women who are typically poor or very poor).

to conduct financial transactions, apply for jobs and access information. Eliminating the need to conduct these activities in person gives the women more autonomy, as it helps them overcome mobility constraints that hinder their ability to become economically empowered.

Another MNE whose policies on gender equality is worth highlighting is Unilever, which achieved gender balance across management globally in 2020. With this achievement, Unilever's workforce is closing the gender gap, with women accounting for 50 per cent of management positions globally, up from 38 per cent in 2010; and a non-executive board that is 45 per cent women (Unilever, 2020).

Among the company policies towards gender equality is an initiative challenging harmful social norms and gender stereotypes "to unlock women's potential" (Unilever, 2017). According to Unilever's statements, the company aims to drive change in four main ways: (i) by using its influence as one of the world's biggest advertisers – and changing the way it markets products, advocates and partners with others for change across the industry; (ii) by building a diverse business and value chain, in which women are empowered and visible as role models for change; (iii) by developing sustainable-living brands that advance gender equality and women's empowerment; and (iv) by ensuring that everyone, including men, is part of the movement to build positive cultural change (Unilever, 2017).

The top management of Unilever believes that when women are empowered, society and the economy benefit, grow and thrive. That seems to have made a great difference with regard to gender policies within the company over the past years. Throughout its documents, Unilever (2017) highlights priority areas for accelerating gender equality and women's empowerment in the private sector:

> (i) be gender aware, by ensuring they have the right information and data in place to inform policies
>
> (ii) be gender active, by having the right policies and practices in place that respect women's rights and empower professional and personal development
>
> (iii) be the new norm, by ensuring that harmful norms are not perpetuated through outdated business practices, while actively promoting more positive portrayals of women along the value chain to challenge stereotypes.

These advances helped the company move from sixth place in 2019 to second place in 2020 under Forbes' annual ranking of Best Employers for Women. Based on surveys distributed among American men and women working for businesses with more than 1,000 employees, the ranking aims to highlight companies that have made progress in their quest for gender equality. This year, the surveys were conducted as COVID-19 began to spread in the United States, and the responses captured employees' feelings at the time. Among the initiatives highlighted were

Table 3: Proven interventions for women's economic empowerment

High-Fertility Agrarian Economies	Declining-Fertility Urbanizing Economies
Very poor entrepreneurs • Micro savings • Bundles services • Rural electrification	Poor entrepreneurs • Micro savings • Bundled services
Poor farmers • Micro savings • Land rights/land titling • Rural electrification	Non-poor entrepreneurs • Savings • Credit • Business training
Poor entrepreneurs • Micro savings • Bundled services • Rural electrification	Wage workers • Savings • Childcare
Non-poor farmers • Savings • Land rights/land titling • Credit	Young • Micro savings • Demand-driven job services • Conditional cash transfers
Young • Micro savings • Rural electrification • Demand-driven job services • Conditional cash transfers	

Source: ExxonMobil; United Nations Foundation, 2013.
https://corporate.exxonmobil.com/-/media/Global/Files/womens-opportunity/weoi-roadmap-for-economic-empowerment.pdf.

flexible work arrangements available to employees at Unilever. The company's head of diversity and cross-cultural marketing pointed out that although the benefit was in place prior to the pandemic, the situation accelerated its adoption (Forbes 2020). Studies have shown that women were disproportionately affected by the global pandemic (Madgavkar et al 2020). Not only are women more l ikely to have been laid off as a result of this year's economic crisis, but they are more likely to decide to leave their jobs to be able to tend to household needs, such as helping their children navigate remote learning (LeanIn.org and McKinsey & Company 2020). By providing flexible work schedules and paid leave companies can help their women employees address their personal and professional needs without having to sacrifice one or the other. Finally, ensuring that women remain in the workplace is not only beneficial for them but also for their employers and their colleagues. Senior-level women can increase company profits by almost 50 per cent and they are more likely to promote inclusion in the workplace (Dixon-Fyle et al. 2020).

Other MNEs have introduced policies towards increasing gender equality that are worth highlighting, including Visa, Nestlé, Natura, Caterpillar UK, Bank of America and Prudential, among others. Visa was named Best Employer for Women by Forbes

magazine in 2018 mainly owing to initiatives like equal opportunities and equal pay, and programmes such as the Return to Work initiative to encourage and support women re-entering the workforce after taking time off to have a family.[25] After conducting surveys among farmers in countries like Brazil and India to assess supply c hain equality, in 2019 Nestlé launched its Gender Balance Acceleration Plan to put further emphasis on increasing the proportion of women in the group's top 200 senior executive positions from around 20 per cent currently to 30 per cent by 2022. The company's plan focuses on bold leadership, empowering culture and enabling practices.[26] In 2018, Natura signed its adherence to the UN Women's Empowerment Principles (WEPs). As part of this initiative, Natura assumed a corporate strategy towards women's empowerment and established the public goal of having 50 per cent of leadership positions (management and positions above) held by women by 2020. The rate in 2018 was 32 per cent in Brazil and 27 per cent of Natura's global operations.[27] Caterpillar UK, excluding Northern Ireland, compiles data yearly for the United Kingdom (UK) Gender Pay Gap Report, which includes the data of three Caterpillar UK legal entities: Caterpillar UK Ltd., Perkins Engines Company Ltd. and rogress Rail Services UK Ltd. According to the 2019 report[28], Caterpillar UK overall figures reflect a 2.9 per cent pay gap (men being paid more than women).[29] Finally, Bank of America deserves some attention as they were the 2019 Catalyst Award winner[30] because of the Investing in Women initiative.[31] The Bank has mandatory diverse hiring guidelines to recruit a wider range of job candidates and continuing conversations and employee surveys to make sure careers are on track.

Of course, a deeper dive into an MNE's specific actions – such as these – may open room to discuss the eventual need for improvement. The intent in this short section was to showcase MNEs whose policies already have a significant impact on global private sector practice and norms, and whose communities, and especially women, already benefit from the cultural and regulatory chan ge within the MNEs.

[25] https://usa.visa.com/about-visa/diversity-inclusion.html.

[26] https://www.nestle.com/csv/global-initiatives/global-youth-initiative/gender-balance-women-empowerment.

[27] https://www.natura.com.br/blog/mais-natura/natura-adere-aos-principios-de-empoderamento-feminino-da-onu.

[28] http://s7d2.scene7.com/is/content/Caterpillar/CM20200616-cfde9-769aa.

[29] https://www.caterpillar.com/en/careers/apply-now/gender-pay-gap-reporting.html.

[30] https://www.catalyst.org/research/bank-of-america-investing-in-women/.

[31] https://about.bankofamerica.com/en-us/partnering-locally/reaffirming-our-investment-in-women.html#fbid=x4DbGllEu7o.

4. Concluding remarks and policy recommendations

Gender inequalities continue to deprive women and girls in their ability to exercise their educational and professional choices to their full potential. The existence of gender-blind laws, social practices, traditions and stereotypes that reproduce unequal relationships between women and men reinforces the need to discuss the role of gender in society and to integrate it into all political and economic debates.

Following the path in progress for international trade agreements, the incorporation of gender provisions in BITs furthers engagement in the promotion of women's empowerment in the private and public sectors. These provisions should address issues such as equal opportunities for men and women in supply chains and closing gender pay gaps. Governments should ensure their enforceability.

The issue is not just about ensuring that women can exercise their basic human rights; systematic integration and mainstreaming of the gender perspective are crucial for the implementation of the entire 2030 United Nations Agenda for Sustainable Development, offering a solid path to achieve the inclusive, sustainable and lasting economic growth.

Public and private trade and investment policies and regulations are of fundamental importance to further women's economic empowerment, creating opportunities for employment, entrepreneurship and inclusive growth. To balance the effects of improving international investment flows and economic liberalization, governments and private stakeholders (i.e. MNEs) should incorporate a mandatory gender perspective in their trade and investment policies, as well as in their international and domestic commitments.

Gender-based analysis may help governments prevent the adverse effects of new trade and investment measures, including through the adoption of compensatory social policies. Ensuring the inclusion of international gender standards in trade and investment negotiations among public and private stakeholders is also extremely important to secure a positive outcome for women and girls.

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The role of multinational and trading enterprises in employment and the gender pay gap: evidence from Finland[+]

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This paper constructs and analyses a set of novel indicators on gender equality in the business sector, which focus on multinational enterprises and foreign traders in Finland. The descriptive analysis reveals large differences in the share of women and men employed in the best paying professions, especially in multinationals. Dynamic analysis shows that foreign investment typically results in pay increases for males, while this is not true for women. These disparities are strongest among managers and professionals working in the most profitable firms. A blueprint is provided for linking business statistics and social statistics to enable analyses of gender inequalities in the labour market.

Keywords: FDI, gender equality, international trade, MNE, official statistics

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1. Introduction

How is gender equality achieved in the business sector? Answering this question is perhaps one of the most fundamental tasks in the effort of moving towards women's economic empowerment and the global development agenda, including the Addis Ababa Action Agenda and the 2030 Agenda for Sustainable Development. Studies have shown that economic empowerment is one of the most important explanatory drivers of gender equality more broadly (Barnat et al., 2019).

A key challenge to confront in trying to answer this question is overcoming a paucity of data. Despite growing availability of gender disaggregated data, the link between gender outcomes and the wealth generating apparatus of global economies, i.e. multinational enterprises and international trade, has not been addressed to date.

Multinational enterprises (MNEs), and business groups in general, are important actors in modern economies. From a welfare point of view, and depending on circumstances, they can be seen as either "parasites", or "paragons" (see Khanna and Yafeh, 2007). Carney et al. (2017) in their meta-analysis of business group literature highlight that further research is needed to settle this question. They note that addressing this issue is not straightforward and will depend on context and circumstance. In a similar fashion, expansion of international trade can bring mixed effects from a welfare point of view (e.g. Bourguignon, 2015); very little data exist to facilitate a systematic analysis of labour market outcomes from a gender perspective.

This paper provides a blueprint, showing how business statistics and social statistics can be linked to enable an analysis of gender inequalities in the labour market using data provided by the business sector. In doing so, a number of implications for developing countries, aiming to modernize their statistical systems to improve the availability of data for Sustainable Development Goal (SDG) indicators are highlighted. First, the paper puts emphasis on linking data across existing data sources, better use of government data for statistics, and the development of data architecture that can respond to the challenges of measuring the SDG agenda. As highlighted in MacFeely and Barnat (2017), investments in similar national statistical systems should be a priority to reap long-term benefits in developing regions. Second, the analyses underline the fact that business economies and policies promoting growth cannot be analysed in isolation but, rather, a holistic view is needed to assess their impact on society as a whole. Third, the process of globalization cannot be well understood without properly identifying its most important drivers – multinational and trading enterprises – and without considering its social and human effects.

Analysis of Finnish data reveals that, while a sizeable gender pay[1] gap in the business sector is identified, and in MNEs in particular, the gap is relatively small in domestically-owned businesses. The gender pay gap tends to be larger in high-paying jobs in foreign multinationals. There are exceptions of course; for example, professions requiring deep digital skills generally award more equal pay. In general, however, the analysis suggests that economic globalization tends to magnify gender inequalities in the Finnish labour market. This is further illustrated by focusing on worker level outcomes following foreign investment, which seem to boost men's salaries especially, resulting in wider pay gaps within MNEs.

Section 2 outlines the theoretical basis of gender inequality in the business sector. Section 3 discusses the data sources, definitions and methodologies used, including indicators to measure gender equality in business and trade. Section 4 presents some descriptive statistics and analysis of gender inequalities in MNEs, and Section 5 discusses the robustness of the interpretation and presents tests to assess the evolution of the gender pay gap that results from foreign investment. Section 6 concludes and reflects on possible steps forward.

2. What do we know already?

Economic growth, propelled forward by internationalization, affects gender equality in many ways through labour markets and investment, but the reverse may also be true, as existing gender biases can affect economic growth (e.g. Fontana, 2014). Cross-country comparisons typically find that economic growth benefits from greater gender equality (Dollar and Gatti, 1999; Klasen and Lamanna, 2009), although businesses sometimes extract a comparative advantage from paying women lower wages (Busse and Spielmann, 2005). The picture is further complicated by international trade that reflects the different roles and comparative advantages of countries in the global economy. Regardless, it is commonly accepted that international trade has an important impact on development (see Monterrey Consensus (United Nations, 2012)). However, depending on a variety of circumstances, trade creates winners and losers (e.g. Stiglitz, 2002; Sachs, 2005; Piketty, 2014; Bourguignon, 2015).

Most of the known gender-related outcomes of trade are the difference in how women and men participate in the labour force, which is heterogeneous across countries. In Organisation for Economic Co-operation and Development (OECD) countries, men work more often in exporting firms and women in suppliers of those firms (OECD, 2018), whereas a recent study shows that in developing countries

[1] In this article, pay is measured as the sum of wages and salaries.

women make up a higher share of the workforce in trading firms than in non-trading firms (World Bank, 2020).[2]

Occupational choices of women and men play a key role also in the Finnish gender pay gap, as highlighted in Korkeamäki and Kyyrä (2006) and Ilmakunnas and Maliranta (2005). Foreign trade seems to have lower representation of women than men. Lindroos, Luomaranta and Nurmi (2019) find that 18 per cent of entrepreneurs in exporting firms in Finland were women, and on a full-time equivalent basis, women accounted for 27 per cent of the labour input to exporting firms.

Using data from the United States, Goldin (2014) provides a tentative explanation as to why gender pay gaps still exist in developed countries, arguing that it is because organizations place a high value on worker flexibility in occupations with high-skill requirements. Bøler et al. (2018) show that this reasoning also applies to trading enterprises in Norway, and Vahter and Masso (2018) shows that it applies to Estonian-based MNEs. These findings add to an accumulating literature that suggests that firm heterogeneity plays an important role in the gender pay gap (Card et al., 2016; Cardoso et al., 2016; Jewell et al., 2019; Gallen et al., 2019).

This paper addresses some of the measurement challenges of gender-in-trade by providing a methodology for compiling statistics that builds on statistical registers and other data typically available from national statistical offices. These data allow for systematic inspection of labour participation and pay of both women and men in heterogeneous firms. Moreover, this paper provides additional evidence of the existing gender pay gaps and mechanisms analysed in Vahter and Masso (2018) and Bøler et al., (2018). Data for Finland is of particular interest due to the exceptional coverage offered by registers, and the emphasis the country places on gender equality, allowing for a focus on business and labour market dynamics. Thus, unobserved legal or cultural gender biases are less likely to impede the analysis.

MNE spillovers and measurement issues in developing countries

Anticipating that the methodology used in this paper may serve as a useful blueprint for developing countries, this section considers foreign investment and measurement issues relevant to developing economies. The role of MNEs in development has been much debated, as they may benefit host countries in terms of productivity or by filling institutional voids, yet they may exploit host country resources or exercise monopolistic power. These possibilities seem more consequential for developing

[2] In this text, trading firms refer to those firms that are engaged in cross border (international) trade. For the analysis that follows, an exact definition is provided in Section 3.2.

countries with vulnerable business sectors and weaker institutions. Caves (1999) finds that while productivity spillovers from foreign subsidiaries to local firms are widespread, the impact is conditional on the country's state of development, the firms' market structure and the industry.

An empirical analysis for a sample of developing and developed countries from 1987 to 2007 suggests that stronger economic and social rights for women can spill over into a country with weaker rights when the two countries are connected via trade or foreign direct investment (FDI) (Neumayer and De Soysa, 2011). Similarly, Wang (2018) shows that between 1999 and 2009 governments tended to promote gender parity by employing policy choices similar to those of their economic competitors. As noted by UNCTAD (2020), there are multiple, often country and location-specific interactions between gender and trade requiring case-by-case evaluation: Differences in the labour market structure, economic conditions, degrees of trade liberalization and gender inequality, legal frameworks and commitments as well as the level of women's participation in the economy mean that a successful policy in one country does not necessarily work in another. And this is exactly why the more systematic availability of data is important.

Currently, statistical authorities lack the data and tools to measure gender dynamics in trade, which hampers informed policymaking. The development of registers and the use of government administrative data for statistics can play an important role in the statistical development of developing countries. Without good data infrastructure for national statistics, solid legislation and institutional foundations, countries will not be able to meet existing and future demands for information (MacFeely and Dunne, 2014). The importance of data infrastructure, for the development of national statistical systems and for addressing statistical analyses required by development economics has been highlighted by MacFeely and Barnat (2017); UNCTAD (2016); and UNESCAP (2019). This applies to the SDG monitoring framework in general, but also to gender-in-trade statistics and other emerging data needs.

Even if data gaps exist, extant labour statistics offer a useful point of departure for gender-in-trade analysis in both developed and developing countries, by either focusing on tradable industries or by identifying the firms behind international trade, an approach promoted in this paper. In addition, surveys carried out by international organizations, such as the World Bank Enterprise Surveys[3], provide a valuable complementary data source. Additional country-level surveys may address the most pressing data gaps, such as those relating to the informal economy. To this end, the statistical offices of Rwanda and Uganda, for example,

[3] https://www.enterprisesurveys.org/

record small-scale cross-border trade by sending enumerators to the border areas. The African Trade Policy Centre (ATPC) of the United Nations Economic Commission for Africa has developed a methodology for measuring informal cross-border trade and is piloting it with several African countries. The country-level survey designs may benefit from the insights and definitions outlined in the following sections.

In the vein of leveraging scarce resources, many developing countries will require capacity-building support to achieve data infrastructure that facilitates microdata linking, in which existing data are combined and reused for other data needs. New statistics are needed, especially to gain insights into inequalities in the context of the 2030 Agenda, as well as to inform policymakers in a timely fashion of emerging topics, such as the impact of COVID-19. The following section details the necessary ingredients for the compilation of gender-in-trade statistics.

3. From data sources to indicators

The analysis presented in this paper draws on the register-based statistical infrastructure at Statistics Finland to analyse gender equality in the Finnish business sector. The key element for linking data is the *unique business identifier* that allows consistent identification of an enterprise across different data sources and through time. The business identifier is given by the tax administration and can be used by the enterprise for all administrative purposes.

In Finland, the total known business population and all the ownership links are covered, facilitating comparisons between MNEs and domestic enterprises without requiring any imputation or complex weighting strategies.

The approach used in this paper builds on related initiatives by Eurostat (2019) as well as the OECD work on trade in goods statistics by enterprise characteristics (TEC). Both of these initiatives bridge business statistics and international trade statistics, which serve as a foundation for adding information on business ownership dependencies and gender composition.

3.1 Statistical data sources

The following official statistical surveys and registers provide useful data for the analysis of gender-in-trade:

- The statistical business register (SBR) contains a limited number of key variables for the full population of enterprises, including size and ownership links.

- Structural business statistics (SBS) describe the structure, activity and competitiveness of businesses[4] and includes variables pertaining to the economic performance and productivity of businesses, their inputs and outputs.
- Foreign affiliate statistics (FATS), contain both inward FATS and outward FATS. Inward FATS describe the ownership of an enterprise, i.e. whether an enterprise is foreign-owned or not; the ultimate controlling institutional unit (UCI) defines the country of ownership. Outward FATS detail the geographic distribution of domestically-controlled affiliates abroad. In Finland, these statistics are based on full enumeration of all known legal units with foreign affiliates.
- International trade in goods statistics (ITGS) record physical movement of goods between countries. The administrative records may be collected by the customs including information on foreign trade for amounts above certain thresholds. For Finland, all extra-EU trade is covered, while for trade within the European Union (EU) the limit is €600,000 for both imports and exports in 2020[5]. For this reason, additional information is obtained from the value-added tax (VAT) data to identify traders. These data are available from the tax administration containing total sales from enterprises that can be allocated to trade in goods or services if the trading partner is located within EU.
- International trade in services (ITS) statistics are based on a survey of around 2,000 enterprises, and thus do not provide full coverage of the business sector. However, since the concentration of business activities is very high in Finland, Statistics Finland is able to capture around 80 per cent of turnover from trade in services from the survey. In addition, the VAT data can again be used to identify intra-EU service trade, thus capturing some, if not all, of the small firms that are engaged in services trade.
- Combined employer-employee data (FOLK) link employees and employers, similarly as the increasingly available linked employer-employee data (LEED) (e.g. Hammermesh, 2007). The data include information on individual characteristics, such as family, living arrangements, employment relationships, income and educational attainment.

[4] Covering sectors from B to J and L to N and Division 95 of the Statistical Classification of Economic Activities in the European Community, referred to as NACE (nomenclature statistique des activités économiques dans la Communauté européenne). It is the industry classification system used in the European Union, equivalent to the UN International Standard Industrial Classification of All Economic Activities (ISIC).

[5] https://tulli.fi/en/intrastat/who-provides-intrastat-information.

3.2 Definitions and analytical groupings

The following analytical groupings are useful for measuring and understanding the different roles enterprises may have in creating gender-related outcomes in the labour market. The firm-type definitions proposed below, follow broadly the guidelines published by Eurostat (2019) for microdata linking.

Domestic enterprises	
Independent	Does not control any other enterprise or is not controlled[6] by another enterprise.
Domestic group	Controlled by a domestic group, or a domestic parent without affiliates abroad.
Multinational enterprises[7]	
Domestic MNE	Controlled by a domestic group, or is a domestic parent with foreign affiliates in OFATS.
Foreign MNE	Controlled by a foreign group, and therefore found in IFATS.
Trading status	
Exports only	Exports exceeding €5,000 and export intensity above 5 per cent.
Imports only	Imports exceeding €5,000 and import intensity above 5 per cent.
Two-way traders	Enterprise satisfies thresholds for both exporter and importer.
Non traders	Enterprise does not belong to the above categories.
Skills and occupations	
STEM	Science, technology, engineering, and mathematics.[8]
DDC	Subset of STEM, fields requiring deep digital competencies.[9]
ISCO-major groups	The International Standard Classification of Occupations (ISCO) major groups (1-digit level).
Activity distribution	
KIS	Eurostat definition, knowledge-intensive services.[10]
Manufacturing	NACE 2-digit categories 10-33.
Other	

[6] Based on direct or indirect share of votes, exceeding 50 per cent.

[7] Analysis of MNEs is partial, as only domestic activities are observed. However, the problem is circumvented by focusing on comparable analytical units, i.e. enterprises and their dependencies.

[8] These span the International Standard Classification of Education Fields of education and training (ISCED-F) codes: 511, 512, 531, 532, 533, 541, 542, 612, 613, 711, 712, 713, 714, 715, 716, 721, 722, 723, 724, 731, 732.

[9] ISCED-F codes: 533, 541, 542, 612, 613, 711, 713, 714.

[10] https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Knowledge-intensive_services_(KIS).

High-skill categories are relevant for studying differential gender-based outcomes. In addition, employees with science, technology, engineering and mathematics (STEM) education are expected to benefit from globalization and international trade, owing to an increased skills premium (e.g. Burstein et al., 2011). It is in these categories that the gender pay gap is found to be large (see Kahn and Kinther, 2017, for a review of this literature).

In addition, the new wave of globalization is driven by digitalization and computer competences. Hence, the relevance of deep digital competences (DDC), a category that delineates those equipped with "deeper" digital skills from standard STEM-equipped employees. Michaels, Natraj and Van Reenen (2014) find indeed that job polarization is related to information and communication technology (ICT) development. The knowledge-intensive services (KIS) category is similarly of relevance.

Other analytical possibilities include splitting manufacturing industries by technological requirements (e.g. high-technology and low-technology), or one could examine even more disaggregated statistics. The categories selected for this analysis are based on an ex ante understanding of gender inequality in the context of globalization.

Based on the analytical groupings presented above, *participation rates* and *average pay* of women and men are contrasted. In this way, the role of firm types in both occupational choices of women and men and gender pay gap is assessed.

4. Gender equality in the Finnish business sector

4.1 The Finnish business sector in numbers. Where are the "best" jobs?

The Finnish economy is characterized as industrialized and open. The business sector employs around 74 per cent of the workforce, according to the latest employment statistics (Statistics Finland, 2019). Due to the small size of the domestic economy, export markets are an important driver of growth and development. However, the adverse effects of international competition in the largest multinational enterprises (Fornaro & Luomaranta, 2018) have also been felt. Job losses in the aftermath of difficulties in the mobile phone industry serve as a reminder of the risks arising from depending on a few multinationals.[11]

[11] MacFeely (2012) in the context of Ireland's economy has also highlighted the risks of depending on large MNEs, highlighting that although MNEs only account for 2 per cent of enterprises, they account for 22 per cent of persons engaged and half of all gross value added generated by enterprises. The largest 50 MNEs present an even greater risk, accounting for 30 per cent of total enterprise turnover, 37 per cent of GVA and 59 per cent of gross operating surplus.

Table 1 presents an overview of the Finnish business population providing a backdrop for the subsequent analysis. This section focuses on cross sectional differences where the statistics presented are aggregated averages for the years 2008 to 2016. Enterprises with only one employee (often the entrepreneur) are excluded. Exclusion of one-person companies is driven by data quality considerations, as it is much harder to determine the level of what the wages and salaries in those enterprises is (the entrepreneur may for instance pay dividends or accrue retained earnings). Furthermore, only full-time employees are included, since the inclusion of part-time workers hampers the comparison between women and men as women are more likely to be employed on a part-time basis.

Table 1. The Finnish business sector by firm type, 2008-2016, average

	(1)	(2)
Firm type	**Observations[1]**	**Per cent**
Multinational enterprises		
MNEs	22,870	4
Others	521,667	96
Trading status		
Exports only	14,684	3
Imports only	86,039	16
Two-way traders	32,834	6
Non traders	410,980	75
Size distribution[2]		
Large (>250 FTE)	4,864	1
Medium (50-250 FTE)	19,785	4
Small (10-50 FTE)	10,9397	20
Micro (<10 FTE)	410,491	75
Activity distribution		
Manufacturing	85,622	16
Construction	88,836	16
Trade	131,727	24
Services	238,352	44

Source: Authors› calculations based on data extracted from Statistics Finland.
Notes:
[1] Observations refer to firms observed over 2008–2016.
[2] FTE refers to Full Time Equivalent.

Columns 1 and 2 of table 1 present the composition of the Finnish business sector. Multinationals account for a tiny fraction of enterprises (4 per cent). Trade participation is rare, as 76 per cent of enterprises are non-traders. Large firms represent less than one per cent of the enterprise population. Also, a large portion of firms are located in the services sectors (almost 44 per cent).

Table 2 highlights the types of enterprises by dependency and ownership and considers their productivity.

Table 2: An overview of the business sector broken down by the enterprise relation 2008-2016, average

	(1)	(2)	(3)	(4)
Size, productivity and salaries	**Size by employees**	**Labour productivity (Value Added/ worker)**	**Female salary (€)**	**Male salary, (€)**
Independent	8	60,188	25,732	31,219
Domestic group	67	93,269	33,275	43,365
Domestic MNE	**234**	96,071	**41,526**	**59,079**
Foreign MNE	89	**115,130**	41,499	58,292
NACE category	**Manufacturing**	**Construction**	**Trade**	**Services**
Independent	14%	**18%**	24%	**44%**
Domestic group	28%	9%	19%	45%
Domestic MNE	**45%**	4%	19%	31%
Foreign MNE	21%	3%	**42%**	34%
Trading status	**Exports**	**Imports**	**Two-way trader**	**Non-trader**
Independent	2%	15%	4%	**79%**
Domestic group	5%	17%	14%	64%
Domestic MNE	**8%**	15%	**45%**	32%
Foreign MNE	5%	**39%**	32%	24%
Skills	**% of professionals**	**% STEM**	**% DDC**	
Independent	11%	33%	7%	
Domestic group	14%	34%	9%	
Domestic MNE	18%	34%	8%	
Foreign MNE	**20%**	**39%**	**12%**	
Gender differences	**Female participation rate**	**Premia**	**Women/Male salary**	
Independent	33%	-2.7 %	**82%**	
Domestic group	**39%**	1.5 %	77%	
Domestic MNE	37%	1.4 %	70%	
Foreign MNE	36%	**0.0 %**	71%	
Average	36%			

Source: Authors' calculations based on data extracted from Statistics Finland.
Note: Premia are computed as deviation from the business sector participation rate, share of professionals refers to ISCO-2 category of workers. Percentages under the NACE category and trading status sections are computed from the number of firms, while percentages in skills and gender differences sections are computed from workers.

In the first section of table 2, column 2 shows that foreign-owned multinational enterprises are almost twice as productive as independent enterprises; productivity of domestically-owned MNEs are not far behind foreign MNEs. In columns 3 and 4, average annual salaries reflect this productivity gap. Foreign MNEs pay on average €58,292 to male workers (column 3), while female employees receive €41,499 (column 4). These salaries are broadly similar to those paid by domestic MNEs. Thus, MNEs pay a premium in excess of 30 per cent compared with average salaries in the non-MNE business sector. Foreign-owned multinationals are most often situated in trade[12] (42 per cent), and services (34 per cent) while domestic MNEs are mostly found in manufacturing (45 per cent).

The section on skills presented in table 2 shows that higher pay is associated with higher-skilled workforce, as on average, 20 per cent of MNE employees are defined as *professionals* by the ISCO classification. In addition, almost 40 per cent of their workforce have received a STEM education and 12 per cent have received a DDC education. This contrasts with independent enterprises, where only 11 per cent of employees are professionals, 33 per cent have a STEM degree, and 7 per cent have a DDC degree.

4.2 Multinationals and gender inequality

Female participation in the business sector averages around 36 per cent (gender section of table 2), as women are more often employed in the public sector. Women represented 72 per cent of public sector workers in 2018 (Statistics Finland, 2020a). In addition, women's unemployment rate (6.2 per cent) is lower than men's (7.5 per cent) (Statistics Finland, 2020b).

The simple descriptive statistics 3a and 3c in the final section of table 2 reveal firm heterogeneities from a gender perspective. While independent enterprises have a slightly lower female participation rate than the average of 36 per cent (-2.7 percentage points lower), domestic groups and domestic MNEs have a higher female participation rate than the average (about 1.5 percentage points higher).

MNEs, as seen in table 2, provide highly productive employment[13] and tend to pay the highest salaries. Table 3 provides further insights into gender roles in the Finnish labour market.

[12] Including wholesale and retail trade.

[13] MacFeely and O'Brien (2008) warn that care should be exercised when drawing conclusions from productivity estimates, as differences between MNEs and independent enterprises may in some cases be an accounting one, as the financial accounts for foreign owned enterprises can be distorted by the impact of outsourcing, transfer pricing, merchanting, licensing or royalty arrangements etc.

Table 3a. Pay and participation rates of women in manufacturing by enterprise relation and job category, 2008–2016, average

	(1)	(2)	(3)	(4)
	Manufacturing			
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
TOTAL				
Labour productivity (VA/worker)	**58,122**	74,593	**93,021**	90,096
Women's salary (€)	**26,237**	32,679	**40,395**	39,040
Men's salary (€)	**31,438**	40,528	**56,936**	50,466
Women's/Men's salary	**83.5%**	80.6 %	**70.9%**	77.4%
% of female	**24%**	26%	**31%**	25%
STEM				
Women's salary (€)	**26,439**	32,890	**45,313**	39,554
Men's salary (€)	**32,441**	40,773	**61,826**	53,554
Women's/Men's salary	**82%**	80.7%	**73.3%**	73.9%
% of female	**10%**	11%	**16%**	11%
DDC				
Women's salary (€)	**31,470**	35,736	41,960	**44,024**
Men's salary (€)	**34,633**	40,017	**53,806**	50,155
Women's/Men's salary	**90.9%**	89.3%	**78.0%**	87.8%
% of female	**4%**	5%	**7%**	6%
ISCO-1				
Women's salary (€)	**42,489**	73,613	**104,909**	86,094
Men's salary (€)	**52,019**	86,159	**131,408**	109,291
Women's/Men's salary	**81.7%**	85.4%	79.8%	78.8%
% of female	16%	**15%**	**22%**	17%
ISCO-2				
Women's salary (€)	**37,175**	44,965	51,810	**51,906**
Men's salary (€)	**42,571**	51,548	**61,770**	60,820
Women's/Men's salary	87%	**87.2%**	**83.9%**	85.3%
% of female	**20%**	21%	**32%**	23%
ISCO-3				
Women's salary (€)	**31,532**	35,729	38,480	**38,674**
Men's salary (€)	**37,412**	43,387	47,417	**49,294**
Women's/Men's salary	**84.3%**	82.3%	81.2%	**78.5%**
% of female	**32%**	34%	**42%**	33%

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Table 3a. Pay and participation rates of women in manufacturing by enterprise relation and job category, 2008–2016, average *(concluded)*

	(1)	(2)	(3)	(4)
	Manufacturing			
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
ISCO-4				
Women's salary, €	**27,808**	30,941	32,938	**33,609**
Men's salary, €	**32,251**	36,232	**40,655**	39,993
Women's/Men's salary	**86.2%**	85.4%	**81.0%**	84.0%
% of female	**80%**	77%	**74%**	75%
ISCO-5				
Women's salary, €	**22,126**	27,971	28,373	**30,577**
Men's salary, €	**29,786**	35,393	37,529	**38,409**
Women's/Men's salary	**74.3%**	79.0%	75.6%	**79.6%**
% of female	**68%**	66%	64%	**51%**
ISCO-6				
Women's salary, €	**17,644**	22,524	**24,164**	20,305
Men's salary, €	**22,642**	26,562	**35,711**	32,708
Women's/Men's salary	77.9%	**84.8%**	67.7%	**62.1%**
% of female	26%	**43%**	**9%**	16%
ISCO-7				
Women's salary, €	**23,244**	27,374	28,440	**30,047**
Men's salary, €	**28,830**	33,648	35,162	**36,688**
Women's/Men's salary	**80.6%**	81.4%	80.9%	**81.9%**
% of female	11%	**12%**	11%	**10%**
ISCO-8				
Women's salary, €	**22,456**	27,401	29,007	**31,186**
Men's salary, €	**27,583**	32,405	34,196	**37,222**
Women's/Men's salary	**81.4%**	84.6%	**84.8%**	83.8%
% of female	29%	**31%**	26%	**26%**
ISCO-9				
Women's salary, €	**19,241**	24,911	26,629	**28,194**
Men's salary, €	**25,635**	30,294	31,760	**33,541**
Women's/Men's salary	**75.1%**	82.2%	83.8%	**84.1%**
% of female	**38%**	33%	31%	**24%**

Source: Authors' calculations based on data extracted from Statistics Finland.
Note: The smallest and largest values of each row are in bold.
ISCO-1 categories - 1 Managers - 2 Professionals - 3 Technicians and associate professionals 4 Clerical support workers - 5 Service and sales workers - 6 Skilled agricultural, forestry and fishery workers - 7 Craft and related trades workers - 8 Plant and machine operators, and assemblers - 9 Elementary occupations.

Table 3b. Pay and participation rates of women in knowledge intensive services (KIS) by enterprise relation and job category, 2008–2016, average

	(1)	(2)	(3)	(4)
	KIS			
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
TOTAL				
Labour productivity (VA/worker)	66,735	71,837	**51,921**	107,083
Women's salary, €	31,288	38,273	44,542	**44,839**
Men's salary, €	40,753	52,148	63,386	**64,145**
Women's/Men's salary	76.8%	73.4%	70.3%	69.9%
% of female	39%	37%	35%	32%
STEM				
Women's salary, €	**36,050**	41,351	47,356	**51,167**
Men's salary, €	**44,211**	55,036	70,811	**73,721**
Women's/Men's salary	**81.5**%	75.1%	**66.9**%	69.4%
% of female	19%	18%	**19%**	**17%**
DDC				
Women's salary, €	**42,381**	44,356	53,192	**58,147**
Men's salary, €	**46,114**	54,156	64,643	**75,921**
Women's/Men's salary	**91.9%**	81.9%	82.3%	**76.6%**
% of female	**8%**	10%	8%	**10%**
ISCO-1				
Women's salary, €	**54,172**	74,894	96,149	**96,643**
Men's salary, €	63,230	87,906	126,472	121,552
Women's/Men's salary	**85.7%**	85.2%	**76.0%**	79.5%
% of female	**21%**	23%	**25%**	22%
ISCO-2				
Women's salary, €	36,832	43,405	48,129	51,958
Men's salary, €	43,670	53,107	65,530	**67,560**
Women's/Men's salary	84.3%	81.7%	**73.4%**	76.9%
% of female	29%	**30%**	28%	**28%**
ISCO-3				
Women's salary, €	**29,891**	35,248	38,795	**40,883**
Men's salary, €	**35,144**	43,039	45,961	**53,187**
Women's/Men's salary	**85.1%**	81.9%	84.4%	**76.9%**
% of female	**55%**	**42%**	41%	33%

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Table 3b. Pay and participation rates of women in knowledge intensive services (KIS) by enterprise relation and job category, 2008–2016, average *(concluded)*

	(1)	(2)	(3)	(4)
			KIS	
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
ISCO-4				
Women's salary, €	**25,152**	29,655	32,196	**32,644**
Men's salary, €	**26,510**	32,465	33,364	**38,701**
Women's/Men's salary	**94.9%**	91.3%	**96.5%**	84.3%
% of female	**71%**	**81%**	76%	77%
ISCO-5				
Women's salary, €	**20,831**	25,309	25,564	**26,328**
Men's salary, €	**26,073**	29,195	33,173	**33,227**
Women's/Men's salary	79.9%	**86.7%**	**77.1%**	79.2%
% of female	**60%**	69%	**73%**	66%
ISCO-6				
Women's salary, €	22,537	**30,928**	**10,165**	17,006
Men's salary, €	21,500	**27,905**	**19,971**	22,325
Women's/Men's salary	104.8%	**110.8%**	**50.9%**	76.2%
% of female	58%	36%	**25%**	**71%**
ISCO-7				
Women's salary, €	**25,248**	31,013	30,335	**31,589**
Men's salary, €	**29,892**	36,290	37,577	38,205
Women's/Men's salary	84.5%	**85.5%**	**80.7%**	82.7%
% of female	**10%**	10%	**21%**	14%
ISCO-8				
Women's salary, €	**21,405**	26,767	**31,507**	29,983
Men's salary, €	27,616	30,253	30,432	**32,784**
Women's/Men's salary	**77.5%**	88.5%	**103.5%**	91.5%
% of female	**25%**	40%	**55%**	47%
ISCO-9				
Women's salary, €	**15,790**	**19,416**	17,849	17,983
Men's salary, €	22,297	24,888	**21,876**	**26,755**
Women's/Men's salary	70.8%	78.0%	**81.6%**	**67.2%**
% of female	46%	**36%**	**48%**	**38%**

Source: Authors' calculations based on data extracted from Statistics Finland.
Note: The smallest and largest values of each row are in bold.
ISCO-1 categories - 1 Managers - 2 Professionals - 3 Technicians and associate professionals
4 Clerical support workers - 5 Service and sales workers - 6 Skilled agricultural, forestry and fishery workers - 7 Craft and related trades workers - 8 Plant and machine operators, and assemblers - 9 Elementary occupations.

Table 3c. Pay and participation rates of women in other activities by enterprise relation and job category, 2008–2016, average

	(1)	(2)	(3)	(4)
		Other activities		
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
TOTAL				
Labour productivity (VA/worker)	**59,300**	105,806	121,377	**125,255**
Women's salary, €	**24,328**	32,138	41,401	**41,428**
Men's salary, €	**29,386**	42,208	**59,493**	59,229
Women's/Men's salary	**82.8%**	76.1%	70%	**69.9 %**
% of female	**35%**	**45%**	44.8%	44%
STEM				
Women's salary, €	**24,568**	32,264	**44,439**	42,137
Men's salary, €	**30,894**	42,802	**67,461**	61,158
Women's/Men's salary	79.5%	**75.4%**	**66%**	68.9%
% of female	**8%**	12%	**14%**	12%
DDC				
Women's salary, €	**27,233**	35,144	**50,760**	42,657
Men's salary, €	**32,846**	42,682	56,368	**57,369**
Women's/Men's salary	82.9%	82.3%	**90%**	**74.4%**
% of female	**2%**	4%	**6.4%**	4%
ISCO-1				
Women's salary, €	**34,366**	70,151	**94,159**	87,842
Men's salary, €	**44,387**	86,652	**135,350**	113,107
Women's/Men's salary	77.4%	81.0%	**70%**	77.7%
% of female	**24%**	25%	**25.4%**	24%
ISCO-2				
Women's salary, €	**35,807**	43,057	52,490	**53,834**
Men's salary, €	**40,205**	51,529	62,100	**64,257**
Women's/Men's salary	**89.1%**	**83.6%**	85%	83.8%
% of female	39%	38%	**43.0%**	**38%**
ISCO-3				
Women's salary, €	**30,352**	35,911	40,282	**43,643**
Men's salary, €	**36,786**	46,513	53,938	**58,455**
Women's/Men's salary	**82.5%**	77.2%	75%	**74.7%**
% of female	43%	40%	**43.7%**	**39%**

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Table 3c. Pay and participation rates of women in other activities by enterprise relation and job category, 2008–2016, average *(concluded)*

	(1)	(2)	(3)	(4)
	Other activities			
Enterprise relation	Independent	Domestic group	Domestic MNE	Foreign MNE
ISCO-4				
Women's salary, €	**26,530**	29,882	33,360	**34,281**
Men's salary, €	30,605	34,966	**40,792**	40,165
Women's/Men's salary	**86.7**%	85.5%	**82**%	85.3%
% of female	**71%**	60%	**57%**	70%
ISCO-5				
Women's salary, €	**20,502**	25,628	**30,857**	30,835
Men's salary, €	**25,096**	32,630	40,041	**41,737**
Women's/Men's salary	**81.7**%	78.5%	77%	**73.9**%
% of female	61%	**72%**	64.9%	**60%**
ISCO-6				
Women's salary, €	**18,278**	18,516	**23,448**	20,128
Men's salary, €	**23,627**	25,548	**26,660**	24,072
Women's/Men's salary	77.4%	**72.5**%	**88**%	83.6%
% of female	50%	46%	**40%**	**61%**
ISCO-7				
Women's salary, €	**22,534**	26,521	29,445	**30,089**
Men's salary, €	**28,850**	34,273	36,908	**38,587**
Women's/Men's salary	78.1%	**77.4**%	**80**%	78.0%
% of female	5%	5%	**6.7%**	**5%**
ISCO-8				
Women's salary, €	**21,964**	27,177	**30,512**	29,447
Men's salary, €	**27,172**	33,920	35,794	**36,103**
Women's/Men's salary	80.8%	**80.1**%	**85**%	81.6%
% of female	7%	8%	**5%**	**9%**
ISCO-9				
Women's salary, €	17,558	20,938	24,430	23,155
Men's salary, €	24,120	27,804	30,051	30,155
Women's/Men's salary	72.8%	75.3%	81%	76.8%
% of female	45%	43%	51%	**51%**

Source: Authors' calculations based on data extracted from Statistics Finland.
Note: The smallest and largest values of each row are in bold.
ISCO-1 categories - 1 Managers - 2 Professionals - 3 Technicians and associate professionals
4 Clerical support workers - 5 Service and sales workers - 6 Skilled agricultural, forestry and fishery workers - 7 Craft and related trades workers - 8 Plant and machine operators, and assemblers - 9 Elementary occupations.

Column 1 of the first section of Table 3 shows that in the manufacturing sector, women's salaries are only 84 per cent of men's salaries in independent firms, 71 per cent in domestically-owned MNEs (column 2), 77 per cent in foreign-owned MNEs (column 4) active in Finland and 81 per cent in domestic enterprise groups (column 3). The data on KIS in table 3b shows that in that sector women's salaries are 77 per cent of men's salaries in independent firms (column 1), 73 per cent in domestic groups (column 2) and 70 per cent in domestic and foreign MNEs (columns 3 and 14).

The gender pay gap is larger in MNEs than in other businesses (columns 3 and 4 of tables 3a to 3c). However, both genders receive a significant boost in salaries when employed by MNEs. Women working in foreign-owned multinationals earn on average salaries that are almost 50 per cent higher, while men's salaries are 60 per cent higher, compared with independent enterprises in the manufacturing sector. The largest gender pay gap is found in foreign-owned businesses in the KIS sector, the group of businesses that pays the highest salaries.

Focusing more closely on MNEs, the share of women workers is higher in other activities (table 3c) than KIS (table 3b) and manufacturing (table 3c). In KIS, only 32 per cent of the employees in foreign MNEs are women (column 4 of table 3b), and slightly higher, 35 per cent, in domestic MNEs (column 3 of table 3b). Interestingly, in column 2 of table 3b, the share of women in KIS increases to 37 per cent in domestic enterprise groups (non-MNEs) and to 39 per cent in independent enterprises (column 1 of table 3b). This observation is consistent with the pattern where men account for the bulk of higher paying jobs, and the share of women increases as average pay decreases.

The section on STEM in tables 3a to 3c, reveals that women are underrepresented across the board in these jobs, although slightly less so in MNEs. The gender pay differences in STEM jobs are larger in multinationals.

Professions requiring deep digital competence are clearly dominated by men as seen in tables 3a to 3c. Women represent only around 10 per cent of workers in all DDC jobs in the KIS sector (table 3b) and even less in other industries. This is noteworthy, as these professions are expected to benefit the most from digitalization. Perhaps surprisingly, the gender pay gap is quite small for those who have the DDC education in manufacturing jobs (table 3a) and the KIS sector (table 3b) in independent firms. In these occupations, women earn around 90 per cent of their male counterparts' salaries in independent businesses, on the other hand, in the best paying firm category – foreign MNEs – women's salaries comprise 88 per cent of their male counterparts in manufacturing, and 77 per cent in KIS (column 4 of tables 3a and 3b).

In the section on ISCO-1, tables 3a to 3c show that women are poorly represented in managerial level occupations (ISCO-1) across the board. This category includes workers who command the highest pay. In MNEs, some 20 per cent of managers are women. Women are slightly more likely to be managers in domestic MNEs (column 3) than in foreign MNEs (columns 4). In foreign MNEs active in KIS, 22 per

cent of managers are women, compared with 25 per cent in domestic MNEs in the same sector (columns 3 and 4 of table 3b). In manufacturing (table 3a), women managers are rarer: between 15 and 16 per cent of managers in non-MNEs (columns 1 and 2), 22 per cent in domestic MNEs (column 3) and 17 per cent in foreign MNEs (column 4). The gender pay gap is still very large for business managers overall and tends to be larger in multinationals.

Another interesting category from a "quality-job" perspective, is the ISCO-2 category in tables 3a to 3c, which includes professionals with relatively complex job descriptions. There too, women have low participation as professionals in manufacturing (table 3a) and KIS (table 3b). On the other hand, the other activities category (table 3c) has a high representation of women. Looking at MNEs in the KIS sector, in both for eign and domestic firms, the share of women professionals is 28 per cent (table 3b). The gender pay gap is relatively small in this category overall, but wider for MNEs. For example, in foreign MNEs that are active in KIS, women's salaries are around 77 per cent of men's salaries (column 4 of table 3b), while for independent KIS enterprises the relative salary is about 84 per cent (column 1 of table 3a). Out of the ISCO-2 categories, women tend to have the highest salaries in MNEs active in other sectors than KIS or manufacturing (in columns 3 and 4 of table 3c).

The gender pay gap is noticeable among clerical support workers (ISCO-4) too, where women form the majority of the workforce and salary levels are relatively low. In these occupations, the gender pay gap tends to be lowest in KIS, where women earn 95 per cent of men's salaries in independent businesses (column 1 of table 3a), 91 per cent in domestic enterprise groups (column 2 of table 3b), 97 per cent in domestic MNEs (column 3 of table 3b) and 84 per cent in foreign MNEs (column 4 of table 3b).

Men dominate the best paying jobs in the business sector, while women account for the majority of support functions. MNEs provide jobs that pay well but widen the gender pay gap. While smaller independent businesses are more gender equal in terms of pay in white-collar occupations (ISCO-1 to ISCO-5), they generally pay lower salaries. However, this observation is not universal across occupations, as those working in jobs requiring deep digital skills enjoy more equal pay. This highlights the importance of high-level education and the importance of encouraging women to enter these fields.

4.3 Traders and gender equality

Trade participation is a significant driver of economic development and welfare. The statistics presented in table 4 provide evidence that indeed both female and male workers employed in trading enterprises enjoy higher salaries. Below, unless otherwise specified, the text refers to columns 3 and 4 that present statistics on two-way traders and non-traders, respectively.

Table 4. Pay and participation rates of women by trading status, 2008–2016, average

	(1) Exports only	(2) Imports only	(3) Two-way trader	(4) Non-trader
TOTAL				
Labour productivity (VA/worker)	68,842	69,255	**80,516**	**62,830**
Women's salary, €	32,838	29,318	**35,078**	**25,931**
Men's salary, €	40,588	37,407	**45,416**	**31,370**
Women's/Men's salary	81%	78%	**77%**	**83%**
% of female	**25%**	38%	30%	**39%**
STEM				
Women's salary, €	35,306	31,080	**37,099**	**27,881**
Men's salary, €	41,115	39,146	**47,392**	**32,944**
Women's/Men's salary	**86%**	79%	**78%**	85%
% of female	**8%**	13%	13%	10%
DDC				
Women's salary, €	41,242	39,474	**42,825**	**33,862**
Men's salary, €	44,131	41,736	**47,763**	**35,515**
Women's/Men's salary	93%	95%	**90%**	**95%**
% of female	**4%**	5%	**6%**	4%
ISCO-1				
Women's salary, €	64,648	58,061	**77,161**	**41,481**
Men's salary, €	71,506	68,355	**88,744**	**51,329**
Women's/Men's salary	**90%**	85%	87%	**81%**
% of female	**16%**	21%	19%	**24%**
ISCO-2				
Women's salary, €	42,798	42,850	**46,951**	**37,849**
Men's salary, €	49,497	48,942	**53,558**	**43,841**
Women's/Men's salary	86%	88%	**88%**	**86%**
% of female	27%	33%	**26%**	**33%**
ISCO-3				
Women's salary, €	34,989	34,460	**37,326**	**30,965**
Men's salary, €	42,670	42,606	**46,877**	**37,234**
Women's/Men's salary	82%	81%	**80%**	**83%**
% of female	**36%**	37%	36%	**46%**

/...

Table 4. Pay and participation rates of women by trading status, 2008–2016, average *(concluded)*

	(1) Exports only	(2) Imports only	(3) Two-way trader	(4) Non-trader
ISCO-4				
Women's salary, €	29,430	29,598	**31,837**	**26,597**
Men's salary, €	34,899	34,660	**37,414**	**30,019**
Women's/Men's salary	**84%**	85%	85%	**89%**
% of female	**55%**	**71%**	66%	67%
ISCO-5				
Women's salary, €	26,861	22,824	**28,479**	**20,680**
Men's salary, €	33,829	30,183	**36,358**	**25,116**
Women's/Men's salary	79%	**76%**	78%	**82%**
% of female	**53%**	63%	**66%**	65%
ISCO-6				
Women's salary, €	20,461	20,650	**21,178**	**18,116**
Men's salary, €	25,221	26,379	**27,570**	**23,181**
Women's/Men's salary	**81%**	78%	**77%**	78%
% of female	29%	**52%**	**24%**	47%
ISCO-7				
Women's salary, €	25,312	24,490	**27,323**	**23,230**
Men's salary, €	30,710	31,092	**33,555**	**29,047**
Women's/Men's salary	**82%**	**79%**	81%	80%
% of female	7%	10%	**10%**	**7%**
ISCO-8				
Women's salary, €	24,961	24,419	**27,544**	**22,239**
Men's salary, €	30,246	29,613	**32,466**	**27,406**
Women's/Men's salary	83%	82%	**85%**	**81%**
% of female	16%	22%	**28%**	**11%**
ISCO-9				
Women's salary, €	21,361	20,255	**25,130**	**17,705**
Men's salary, €	28,696	27,071	**30,103**	**24,123**
Women's/Men's salary	74%	75%	**83%**	**73%**
% of female	**26%**	35%	29%	**52%**

Source: Authors' calculations based on data extracted from Statistics Finland.
Note: The smallest and largest values of each row are in bold.
ISCO-1 categories - 1 Managers - 2 Professionals - 3 Technicians and associate professionals
4 Clerical support workers - 5 Service and sales workers - 6 Skilled agricultural, forestry and fishery workers - 7 Craft and related trades workers - 8 Plant and machine operators, and assemblers - 9 Elementary occupations

In traders, labour productivity is higher, for instance in two-way trader enterprises – approximately 28 per cent higher (the first section of table 4) than in non-trading enterprises. In two-way traders, women's salary is 35 per cent higher than in non-traders, and men's salary 40 per cent higher. The pay ratio is 6 percentage points wider for employees in two-way traders than in non-traders; Female salaries are 77 per cent of men's salaries in two-way traders and 83 per cent in non-traders. STEM and DDC workers receive sizeable trade premiums in salaries which are larger for men.

However, the share of women is very low in these professions. In managerial positions, trading firms seem to provide more equal pay than non-traders, but women's participation rates are lower among traders. Among professionals, the gender pay gap is lowest overall, and slightly lower still in two-way traders compared with other firms. Thus, drawing conclusions about the gender pay gap is not straightforward. The main channel by which gendered outcomes are generated by trade stems from the number of positions held by women among the highly paid and thus, their participation in trade. Overall, the share of women employed by two-way traders is lower than the share of men. In non-traders, women workers make up 39 per cent of the workforce, compared with 30 per cent in two-way traders.

In summary, the highest-paying occupations are usually occupied by men and this is even more so in the case of trade, but the conclusions on the gender pay gap are mixed. Highly-skilled professions, for instance, have smaller pay gaps in two-way traders than in non-traders. Still, on balance, the gender pay gap is larger in two-way traders compared with non-traders, stemming from the distribution of high-paying jobs within those firms.

5. Robustness and statistical inference

This section confirms the robustness of our conclusions when confronted with alternative definitions and classic statistical inference.

First, multivariate regression analyses were performed at the firm-level to test statistical significance of the differences in women's and men's pay between independent and domestic groups and multinational enterprises broken down by country of origin of the enterprise.

In particular, the following regression is estimated:

$$y_{i,t}=\alpha + \beta T_{i,t}+X_{i,t}\,\gamma+ \mu_t+\varepsilon_{i,t} \quad (1)$$

In (1), $y_{i,t}$ represents women's / men's salaries in firm *i,* in year *t.* $T_{i,t}$ represents a set of indicator variables for each of the enterprise relationship grouping of interest (independent, domestic group, domestically-owned MNE; Nordic, EU26, Asian,

Table 5. MNEs and salary differences between women and men in occupations, regression coefficients

	women's/men's salary										
	STEM	DDC	ISCO-1	ISCO-2	ISCO-3	ISCO-4	ISCO-5	ISCO-6	ISCO-7	ISCO-8	ISCO-9
Domestic group	-0.0710***	-0.0556***	-0.112***	-0.0617***	-0.134***	-0.146***	-0.200***	-0.0408	**-0.0544*** **	-0.0916***	-0.125***
	(-8.951)	(-3.387)	(-9.660)	(-9.619)	(-18.71)	(-7.345)	(-8.546)	(-0.341)	(-6.889)	(-7.398)	(-7.116)
Domestic MNE	-0.0805***	-0.0436	-0.152***	-0.0534***	**-0.112*** **	-0.178***	-0.130**	-0.0182	-0.0306	-0.0970***	-0.118***
	(-4.050)	(-1.514)	(-7.766)	(-4.711)	(-9.832)	(-6.850)	(-2.186)	(-0.0818)	(-1.282)	(-4.271)	(-4.474)
Nordic	-0.0894***	-0.0793***	-0.129***	-0.0477***	-0.159***	**-0.144*** **	**-0.162** **	0.393	**-0.0594*** **	-0.0998***	-0.113***
	(-6.181)	(-3.264)	(-7.370)	(-4.307)	(-14.72)	(-4.864)	(-2.230)	(1.275)	(-3.394)	(-6.024)	(-3.817)
EU26	-0.0899***	-0.0128	-0.127***	**-0.0397*** **	-0.146***	-0.151***	-0.262***	0.452	-0.0119	-0.0828***	-0.108***
	(-6.883)	(-0.418)	(-7.476)	(-3.408)	(-13.88)	(-5.386)	(-4.038)	(0.420)	(-0.588)	(-4.759)	(-4.165)
Asia	-0.0735***	-0.00760	-0.125***	**-0.0767*** **	**-0.168*** **	**-0.207*** **	**-0.272*** **	…	-0.0301	-0.0799*	-0.139***
	(-2.780)	(-0.165)	(-4.260)	(-4.030)	(-9.089)	(-5.234)	(-3.488)	…	(-1.230)	(-1.742)	(-2.938)
Latin America-Africa	**-0.177** **	**-0.109** **	**-0.169*** **	0.0425	-0.153***	1.133	…	…	0.0133	**-0.0735* **	**-0.309*** **
	(-2.161)	(-2.483)	(-2.646)	(0.715)	(-2.952)	(1.381)	…	…	(0.169)	(-1.840)	(-4.497)
North America	**-0.0548*** **	-0.0387	-0.127***	-0.0678***	-0.163***	-0.146***	-0.201***	…	-0.0582***	**-0.117*** **	**-0.107*** **
	(-2.785)	(-1.303)	(-5.982)	(-4.722)	(-12.40)	(-3.595)	(-2.696)	…	(-2.876)	(-4.253)	(-3.327)
Observations	60,886	11,089	41,621	53,788	70,434	26,390	62,673	543	33,682	35,456	21,712
R-squared	0.023	0.045	0.021	0.017	0.038	0.066	0.008	0.258	0.015	0.013	0.035
Clusters	14,580	2,653	13,094	19,121	8,110	17,695	234	234	10,838	10,425	7,409

Source: Authors' estimations based on data extracted from Statistics Finland.

Note: β coefficients from (1). The regressions include full specifications as explained in (1) and the error terms are clustered around firm identity. The coefficients are interpreted as differences from the independent category. The negative coefficient values indicate smaller salaries for women with respect to men. Clusters refer to the number of firms in the regression. The smallest and largest values of each column are shown in bold. The t-statistics are presented in brackets.

Robust t-statistic in parenthesis;***, ** and * denotes significance at 1%, 5% and 10% level, respectively.

Latin American or African and North American MNEs). $T_{i,t}$ is 1 if a firm belongs to the group of interest, and 0 otherwise. Therefore, β allows inference on the effect on the salary ratio by firm type.

$X_{i,t}$ is a set of firm controls, which include 2-digit NACE indicators, number of employees, labour productivity, trade openness (exports+imports)/(turnover+purchases), and indicators for each trade participation category (exporter, importer, and two-way trader). μ_t is year fixed effects, and $\varepsilon_{i,t}$ is clustered errors around firm identifier.

Table 5 provides the β coefficients which represent the relative differences to independent firms. (1) is estimated for each job category.

The coefficients in STEM and ISCO-1 populations indicate that the gender pay gap is largest in Latin-American/African enterprises active in Finland. In the ISCO-2 to ISCO-5 jobs, the largest gender pay gap appears in Asian MNEs. Altogether, the results in table 5 establish that the differences between the independent category and the rest of the enterprise types are statistically significant across job categories in terms of pay inequality while controlling for firm observables.

Second, a more convincing interpretation of MNEs' effect on the gender pay gap can be obtained by inspecting worker level outcomes, made possible by the linked employer-employee data set. The Blinder-Oaxaca (BO) decomposition (Blinder, 1973; Oaxaca, 1973), divides the pay gap into "explained" and "unexplained" parts and is a popular method for studying labour market outcomes as it assesses how much of the outcome variable differential stems from different characteristics of the group members. The reliability of the decomposition method hinges on the ability to model the determinants of pay. For this reason, a rich set of both firm and worker characteristics is fed into the model to minimize the problem of omitted variables.

The BO equations incorporate determinants of pay relating to a worker to model expected salaries. This will form the basis for the "explained" part indicating how much the two groups differ. The remainder is the part which the model cannot explain with the observables.

The employed decomposition can be summarized a:

$$R=Q+U \tag{2}$$

$$R=[\mathrm{E}(\mathrm{x_A})-\mathrm{E}(\mathrm{x_B})]'\ \beta^*+[\mathrm{E}(\mathrm{x_A})'\ (\beta_A-\beta^*)+\mathrm{E}(\mathrm{x_B})'(\beta^*-\beta_B)] \tag{3}$$

where the explained part Q is $\mathrm{E}(\mathrm{x_A})-\mathrm{E}(\mathrm{x_B})]'\ \beta^*$, amounting to the fraction of the differences explained by the group differences in the predictors. The remainder of (2) is the unexplained part, i.e. $U= |\mathrm{E}(\mathrm{x_A})'\ (\beta_A-\beta^*)+\mathrm{E}(\mathrm{x_B})'(\beta^*-\beta_B)|$. This amounts to the observed difference from the expected outcomes. As explanatory variables, a set of human resource characteristics is included (education by 2-digit International

Standard Classification of Education, age, age squared, experience, occupation categories by 2-digit ISCO classification), firm characteristics (productivity, average wages[14]) and year dummies. As in Neumark (1988), the coefficients are obtained from a pooled regression over both groups. Table 6 provides the decomposition of pay gap in non-MNE and MNE populations.

Table 6. Blinder-Oaxaca decomposition of pay differential in non-MNEs and MNEs

	(1) non-MNE	(2) MNE
Explained	0.179***	0.132***
	(361.2)	(189.3)
Men	10.46***	10.73***
	(31.6)	(23.1)
Women	10.10***	10.34***
	(21.7)	(14.0)
Difference	0.360***	0.397***
	(630.8)	(454.7)
Unexplained	0.181***	0.265***
	(327.0)	(333.2)
Observations	6,548,888	2,437,545

Source: Authors' estimations based on data extracted from Statistics Finland.
Note: Explanatory variables include age, age^2, tenure, education, occupation, firm employees, firm labour productivity, firm average wage, firm NACE class, years.
Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6 shows that the unexplained component of MNEs is 0.26 log points (67 per cent of the raw gap) and the unexplained component of non-MNEs is 0.18 log points (50 per cent of the raw gap). These results indicate that the observables included in the model are not able to account for a large share of the pay differential, although a rich set of variables is included. Another important conclusion is that in MNEs this is even less true. This implies that in MNEs, the pay difference that cannot be justified based on the observed worker characteristics is larger, but it is also likely that there are many unobserved factors at play, related to unobservable worker characteristics or to the exact responsibilities within firms, which the registers may not fully capture. The following section presents a tighter identification of MNEs' impact on pay by focusing on worker level outcomes during ownership changes.

[14] Including average pay of the firm may seem odd, but its inclusion accomplishes a higher explained component and a tighter identification of the differences generated by the MNE status. Its exclusion does not alter any conclusions. The purpose here is to demonstrate that whatever the model, MNE population has higher unexplained component and not necessarily interpret the amounts.

Third, we find dynamic analysis useful for understanding the drivers of the observed differences. Similar to Vahter and Masso (2018), a set of worker level pay equations are estimated, controlling for various characteristics of both workers and firms to test whether changes in ownership have measurable and different impacts on women and men. As opposed to Vahter and Masso (2018), a tighter identification is preferred by fixing the worker-firm pairs instead of the firm or worker alone. In this way, one can bypass the endogenous matching issue, a key advantage of using matched employee-employer panel data sets. This specification focuses on incumbents where no entries and exits are allowed. The presented conclusions are not influenced by this choice, however.

The insightful analysis in Bøler et al. (2018) concludes that the number of time zones a firm is engaged in may affect the pay disparity between women and men, supporting the idea that firms have more incentive to disproportionately reward flexibility if firm operations require activity during unusual hours. The following specifications use the number of time zones separating the UCI (ultimate controlling institutional unit) headquarters and Eastern European Time (the Finnish time zone). For Finnish-owned multinationals, the number of time zones separating the furthest affiliate is defined. For domestic firms, the measure is zero.

The specifications rely on within firm-worker deviations from the mean plausibly caused by a change in ownership (a *treatment*). Thus, a causal interpretation is supported if pre-treatment trends do not deviate from 0 *before* the firm is acquired. A typical argument going against causality is the non-random assignment of treated firms. For instance, the firms may be selected precisely because they have some hidden potential affecting future pay. This concern is addressed by estimating the pre-treatment effects, and by propensity score matching, selecting similar firms by the probability of being acquired, to act as a placebo group.

The regressions can be expressed as follows and they are estimated in various subsets of data.

$$y_{i,t} = \alpha_{i,t} + \beta(Treat * Gender) + \delta Treat + \vartheta Gender + \gamma X_{t,i} + \delta W_{t,i} + \mu_t + \epsilon_{i,t} \quad (4)$$

$$y_{i,t} = \alpha_{i,t} + \beta\,(TimeZones * Gender) + \vartheta Gender + \rho TimeZones + \theta UCI_{i,t} + \gamma X_{i,t} + \delta W_{i,t} + \mu_t + \epsilon_{i,t} \quad (5)$$

$$y_{i,t} = \alpha_{i,t} + \sum_{s=1}^{3} \beta_{-s} \mu_{t-s} T_{j,t} + \sum_{s=1}^{3} \beta_{+s}\, \mu_{t+s}\, T + X'_{j,t}\, \gamma + \mu_t + \epsilon_{i,t} \quad (6)$$

Where $y_{i,t}$ denotes annual average pay, *Treat* stands for treatment equalling 1 when a firm is acquired by a multinational (and it remains 1 in the subsequent periods), *UCI* stands for the location of the ultimate controlling unit grouped by geographic area, $y_{i,t}$ collects the firm specific time varying variables, $W_{t,i}$ denotes the worker level variables, μ_t are year dummies and $\alpha_{i,t}$ captures the fixed effects specified as firm-worker pairs. *Gender* is a dummy (males=0), and in (4) *TimeZones* is as

explained above. In both (4) and (5) the variance of interest comes from changes in ownership. Particularly for the latter regression, the variance of interest comes from changes in the number of time zones as a result of ownership changes, i.e. if the headquarters changes location, or the firm acquires affiliates. Thus, β measures the relative impact on women compared to men.

Addressing the concern that the observed pay differentials would have appeared regardless, firm being acquired or not, a counterfactual set of 3 nearest neighbour firms is selected by propensity score matching (measured from pre-treatment data). The placebo group receives a treatment by regressing pay against the pre-treatment and post-treatment dummies exactly as in (6), using the same set of controls. The dummies capture the timing of treatment of the treated firm which would ideally have no effect on the *similar* counterfactual firms. The algorithm uses NACE class, age, labour productivity and size as predictors for being treated. Table 7 below reports the results from (4) and (5).

Across the regressions, MNEs have a different impact on women's pay. In column 1, the MNE status has a negative effect on women's pay when compared to men's pay. Column 2 focuses on the high-skill category, showing a stronger effect than what is found in column 3 for the rest of the occupations. A possible explanation follows from Becker's (1957) theory, which states that more profitable firms can afford to engage in costly taste-based discrimination. Columns 4 to 6 provide some evidence of this point, where labour productivity interacts with gender. Indeed, increased productivity is associated with higher gender pay differential as a result from ownership change. In column 5, this seems to hold especially among skilled workers.

Columns 7 to 9 consider geographical areas of ownership and allow interesting observations to be made. Asian multinationals would seem to be responsible for the highest gender pay disparity, while the gender interactions are smallest for domestic groups. The regressions with time-zone interactions in columns 12 and 13 reveal that overall as an MNE's scope across time zones grows (while controlling for the geographic area too), women benefit more with respect to men in lower-skill positions. This is not the case for the high-skilled (column 12), where women's earnings decline with respect to men's. This finding is similar to Bøler et al. (2018) and supports the insights by Goldin (2014) who notes that it is the high-skilled workers who are expected to be more flexible, and here women seem to be at a larger disadvantage when measured by the gender pay gap.

Fourth, when discussing specifications where the treatment induced difference to some previous state is interpreted, an ideal scenario for causal inference would be to observe non-existing pre-treatment trends. The following plots provide the coefficients from estimating (6) in selected subsets of workers for both women and men.

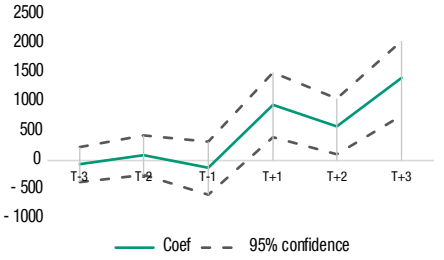
Table 7. Pay equations and interactions with gender

	(1) All	(2) High skill	(3) Lower skill	(4) All	(5) High skill	(6) Lower skill	(7) All	(8) High skill	(9) Lower skill	(11) All	(12) High skill	(13) Lower skill
Dep variable							Salary					
MNE*female	-1,384***	-3,916***	-266.6***									
	(-8.469)	(-6.264)	(-4.622)									
Prod*female				-0.0108***	-0.00429	-0.00540***						
				(-3.219)	(-0.846)	(-4.924)						
MNE*Prod*female				-0.0463***	-0.0745***	0.00179						
				(-3.713)	(-3.900)	(0.967)						
Dom group*female							-183.6**	-413.4	-97.47**			
							(-2.420)	(-1.489)	(-2.206)			
Dom MNE*female							-323.7*	-1,860***	152.1*			
							(-1.816)	(-2.859)	(1.691)			
Nordic*female							-1,378***	-3,164***	-412.8***			
							(-6.392)	(-3.750)	(-4.003)			
EU26*female							-3,295***	-8,030***	-1,047***			
							(-9.625)	(-6.079)	(-10.38)			
Asia*female							-6,531***	-17,029***	149.6			
							(-4.617)	(-4.046)	(0.526)			
Latin Am.-Africa*female							-4,216***	-9,387***	-2,806**			
							(-2.796)	(-2.758)	(-2.329)			
North-America*female							-4,513***	-7,789***	-794.6***			
							(-8.029)	(-5.678)	(-3.790)			
Female*timezones										-106.8***	-404.9***	69.25***
										(-2.924)	(-3.475)	(5.596)
Mean pay	440.88	678.87	369.92	440.88	678.87	369.92	440.88	678.87	369.92	440.88	678.87	369.92
Observations	1,622,321	408,799	1,213,522	1,622,321	408,799	1,213,522	1,622,321	408,799	1,213,522	1,621,073	408,271	1,212,802
R-squared	0.056	0.061	0.140	0.078	0.084	0.142	0.057	0.064	0.141	0.057	0.064	0.141
# Firm-workers	281,710	93,164	230,982	281,710	93,164	230,982	281,710	93,164	230,982	281,703	93,125	230,957

Source: Authors' estimations based on data extracted from Statistics Finland.

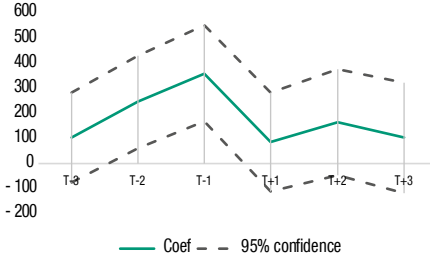
Note: High skills refer to ISCO 1- 2, medium skills to ISCO 3-5, and low skills to ISCO 6-9. The table collects ? coefficients from equations (4) and (5). Controls include age, age2, tenure, education by 3-digits ISCED, occupation by 2-digits ISCO, firm employees, firm labour productivity, firm NACE class by 2-digits, geographical location of UCI, and years. Notice that the sample is restricted to firms which change ownership status during the sample, allowing within firm estimates to be computed.

Figure 1: Parallel trends, men



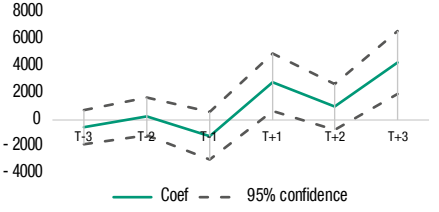
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 2: Parallel trends, women



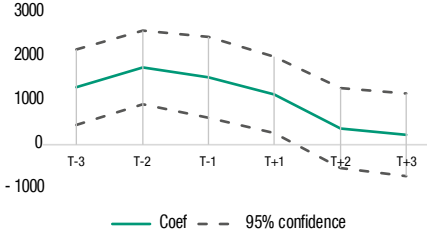
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 3: High-skill, men



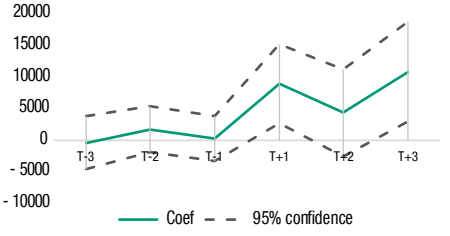
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 4, High-skill, women



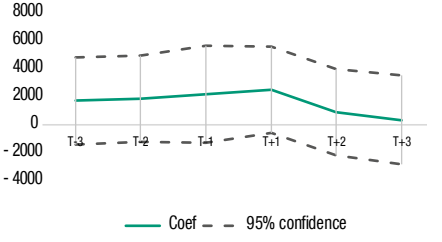
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 5: Managers, men



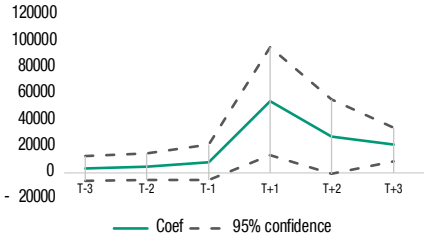
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 6: Managers, women



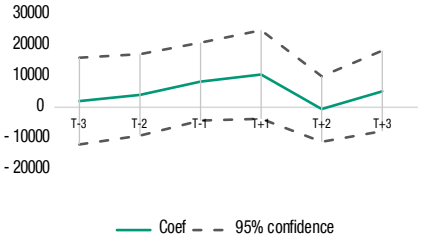
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 7: Top managers, men



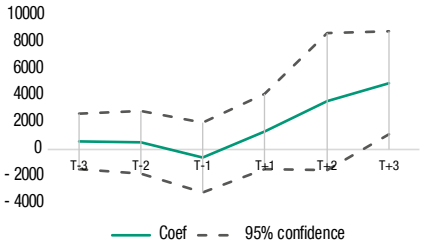
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition. Top firms belong to upper quartile of productivity distribution during the period following the acquisition.

Figure 8: Top managers, women



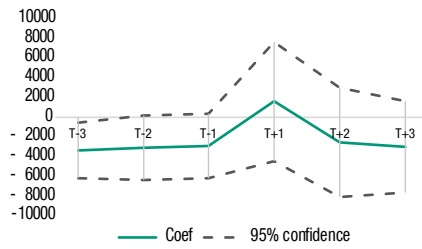
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition. Top firms belong to upper quartile of productivity distribution during the period following the acquisition.

Figure 9: Other managers, men



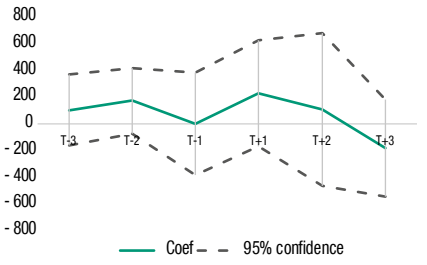
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition. Managers in firms that do not belong to the upper quartile of productivity following the acquisition

Figure 10: Other managers, women



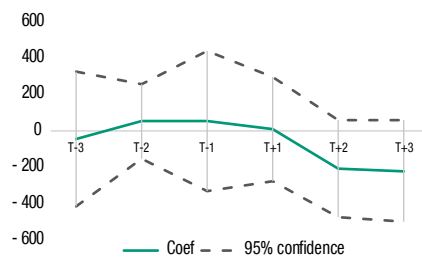
Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition. Managers in firms that do not belong to the upper quartile of productivity following the acquisition

Figure 11: Placebo 3-nn, men



Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figure 12: Placebo 3-nn, women



Source: Author's estimations from Statistics Finland database.
Note: T-3/T-1 refer to periods before, and T+1/T+3 refer to periods following the acquisition.

Figures 1 and 2 provide evidence that men receive a boost in pay as a consequence of their employer firm being acquired by an MNE, while women display no significant differences during T+1 to T+3. If anything, women's pay seems to suffer from significant pre-treatment effects, hampering causal interpretation for women. This points towards a possibility that only men's pay is affected by MNE acquisition. Similar patterns are found for high-skill workers (figures 3 and 4) and for managers (figures 5 and 6).

As a further test for what kind of firms are driving the effects, the sample is divided into four categories based on productivity at T+1. Figures 7 and 8 present results for men and women managers, respectively, showing a significant increase in men's pay and no impact on women's pay. Figures 9 and 10 consider firms that are less productive at T+1, showing no impact on salaries. It appears that among high-skill workers and managers, men reap higher pay as a consequence of success of the firm. Figures 10 and 11 show no significant effects on the control group, addressing the concern that men's pay might be affected by omitted variables.

As a fifth and final set of robustness checks we first note that the decision to exclude part-time workers (14 per cent of workers) leads to smaller gender pay gap estimates. The percentage of women's salaries of men's salaries computed including part-time workers would be 81 per cent in independent enterprises (82 per cent if part-time workers are excluded) and 68 per cent in foreign-owned multinationals (71 per cent if part-time workers are excluded). We also excluded one-person companies. If they were included, the percentage would be 81 in independent enterprises. As mentioned before, these choices were driven by data quality issues to facilitate comparisons. Using medians instead of averages does not alter any of the main conclusions, even if the gender pay gaps would appear smaller that way. Lastly, the group differences between jobs situated in MNEs and in non-MNEs are statistically significant in all occupation groups based on simple t-statistics[15], except for ISCO-6.

6. Conclusions

Using high-quality Finnish registers, covering in principle the entire business sector and linking employees to employers, we build statistics which find large differences in the share of women and men employed in the best paying professions, such as in managerial jobs, and in professions requiring science, technology, engineering or mathematics degrees, or deep digital competencies. In multinationals and foreign traders, women are much less likely to occupy these professions, indicating that

[15] Available upon request.

economic globalization tends to strengthen gender-related labour market outcomes in Finland.

While the share of women professionals working in enterprises engaged in foreign trade is lower, women in these professions experience a smaller gender pay gap compared to businesses that are not involved in foreign trade. For professionals, the gender pay gap is noticeably larger in foreign and domestic MNEs operating in knowledge-intensive services, who pay high salaries.

The country of ownership may play a role. Notably, Latin American, African and Asian-owned MNEs provide the most unequal pay between women and men in high-paying jobs. The regressions exploiting MNE acquisitions provide evidence that a change in MNE ownership increases male salaries but has no effect on women's pay in Finland. Supporting indirect evidence is found for time-use disparity as a possible mechanism, in line with the conclusions from Estonia (Vahter and Masso, 2018) and Norway (Bøler et al.,2018).

Moreover, the disparity in pay seems to be stronger as a function of the profitability of the firm, supporting Becker's (1957) theory of taste-based discrimination. As the analysis pointed out, gender pay gaps widen precisely among the workers most important to any firm, the managers and high-skill workers, suggestions offered in Goldin (2014) seem highly relevant also in Finland. That is, policies and workplace practices aimed at reducing imbalances arising from reproductive roles would help women in high-end careers. Besides addressing the time-use disparities themselves, this may be achieved by developing a business culture that encourages healthy and balanced work and private life. There may be a contrast in this respect between Finnish-owned and foreign-owned firms, as the Finnish culture is one of the most conditioned to the ideas of equality and good work-life balance. This may explain some of the ownership effects found herein, but further research, possibly qualitative, would be necessary to confirm this point.

The primary aim of this paper is to illustrate the types of analyses that can be conducted when datasets can be linked at microdata level. In doing so, encouraging official statisticians to consider the data architecture and infrastructure needed to reuse and link existing microdata, so that they can respond to the need for better information on gender equality in trade and multinationals, not to mention the complex challenges of measuring equality and inclusion posed by the 2030 Agenda. The paper, therefore, demonstrates how a well-rounded statistical infrastructure may be used to create new statistics from existing data so that links between trade, investment and social outcomes can be drawn and gender equality policies better informed.

The challenges are manifold for developing countries where women are most vulnerable and statistical capacities less developed. The analyses in this study rely on being able to link data. A multitude of discrete survey data is no substitute for an efficient national data infrastructure, where public service administrative data

are properly organized, digitized, and use standard classifications and unique identifiers. Developing economies would benefit from investment in statistical and data infrastructure, building on their national capacity and priorities, to measure the impact of multinationals and international trade on inclusive economic development and gender equality.

An interesting line of future research would be to try to disentangle cultural spillovers as an explanation for pay disparity. This would be particularly interesting in the developing country context.

An important future effort should focus on providing similar statistics on gender-in-trade from the data held by statistical offices, and where needed with special surveys addressing national data gaps and challenges, such as informal trade. In that vein, the European Commission is undertaking work with UNCTAD to advance the development and use of data and statistics for gender-responsive trade policy, and similar methodologies and data are being piloted by interested African and Eastern European countries in a programme launched by UNCTAD in 2020 with the Economic Commissions for Africa and Europe.

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