Cultural spillovers from multinational to domestic firms: evidence on female employment in Costa Rica*

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Abstract

We study cultural spillovers from multinational corporations (MNCs) to domestic companies in the information technology (IT) sector of Costa Rica. Using firm-level panel data for 2001–2011, we explore to what extent domestic firms' female labour share increases as a result of business operations of MNCs. We find evidence of two channels for cultural spillovers from foreign direct investment (FDI) to domestic IT firms influencing higher shares of female employment: *learning* (imitation) effects through labour mobility, which allows former MNC employees working in domestic firms to apply skills and gender practices from their previous work experience, and *demonstration* effects with the presence of MNCs (through competition in the labour market), which include imitation of social norms and values of MNCs by local firms. No evidence was found for a relationship between backward linkages (purchases) of MNCs from domestic suppliers and female labour share. To promote greater participation by women in labour markets through FDI attraction, strengthening cultural spillovers would require implementing FDI promotion policies to (i) enhance the absorptive capacity of domestic IT firms, (ii) attract IT MNCs with greater potential to generate spillovers, and (iii) foster a favourable national investment climate for enhancing business interactions between IT MNCs and domestic IT firms.

Keywords: Costa Rica, cultural spillovers, foreign direct investment, labour mobility, multinational firms, gender equality

JEL Codes: F21, F23, J16, C23

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1. Introduction

Multinational corporations (MNCs), particularly those in high-technology industries, are leaders in advanced business practices and global transmitters of capital, new ideas and technologies. Thus, FDI is seen as an engine of growth and development for host countries because of its potential to increase productivity, create employment, help diversify exports and drive productive structural transformation (Harrison and Rodríguez-Clare, 2010; Alfaro, 2016). FDI can also contribute to sociocultural change and gender equality, improving labour conditions for women (Word Bank and WTO, 2020). Through increased demand for labour, technological spillovers and corporate social responsibility practices, FDI can potentially influence women's welfare (UNCTAD, 2014; Oueadraogo and Marlet, 2018).

Developed countries that are sources of the most outward FDI tend to be more gender equal than developing countries. MNCs can be international vehicles of their country of origin's gender norms in terms of female employment, the wage gap and gender equality (Kodama et al., 2018; Choi and Greaney, 2020). Moreover, MNCs can create cultural spillovers (a process of local firms updating their biased perceptions of the costs of female workers) to domestic firms when their female labour share grows with the operation of multinationals in the same industry (Tang and Zhang, 2017).

This study explores cultural spillovers from MNCs to domestic companies and their impact on female employment in the IT sector in Costa Rica. The country is an illustrative case to study the impact of FDI on gender-specific local firm practices. On one hand, Costa Rica's strategy for the attraction of FDI has targeted MNCs that operate in high value-added sectors (explicitly including foreign IT companies), whose presence has the potential to increase demand for products and services from domestic firms and create productive linkages with the national economy (Monge-González and Rivera, 2020). On the other hand, gender imbalances in the labour market of Costa Rica are persistent. According to INEC (2019), women account for 37 per cent of the national workforce. This share varies across sectors: 13 per cent in agriculture, livestock, and fishing; 18 per cent in manufacturing; and 48 per cent in services. In the IT sector, women represent 38 per cent of the labour force.

A key policy question is whether closing the gender employment gap in Costa Rica could be achieved through cultural spillovers from FDI. We aim to disentangle different channels from three forms of MNC interaction with domestic firms in the same industry: (i) *backward linkages* between MNCs and their local suppliers; (ii) *labour mobility*, which allows former employees of MNCs working in domestic firms to apply skills from their previous work experience and training; and (iii) *demonstration effects*, which include imitation of social norms and values practices of MNCs by local businesses (Saggi, 2002).

In the first case (backward linkages), we use MNCs' transactions per worker (frequency of purchases) from domestic IT firms as co-variables. In the second case (labour mobility), we use as a co-variable the number of former MNC workers working in domestic IT firms. And in the third case (demonstration effects), we use as an explanatory variable the presence and competition of MNCs in the labour market though their employment share in the IT sector. Thus, we explore to what extend domestic firms' female labour share increases with the operation of MNCs in the same industry. More specifically, we address these research questions: Do backward linkages between MNCs and local suppliers facilitate the imitation of MNCs' cultural gender practices by domestic firms? Does labour mobility from multinational companies to local companies facilitate the imitation of MNCs' cultural gender practices by local firms? Do MNCs' affiliates induce domestic firms to employ more women through higher competition in the labour market?

Our findings suggest two channels for cultural spillovers in female employment from MNCs to IT domestic firms: learning (imitation) effects through labour mobility, which allow former employees of MNCs working in domestic firms to transfer skills and gender practices from their previous work experience and training; and demonstration effects through the presence of MNCs, through competition in the labour market. No evidence was found for a relationship between backward linkages (purchases) of MNCs from domestic suppliers and the female labour share.

In the next section, we present the conceptual background. Then, we describe data and some stylized facts, followed by the empirical strategy. Afterwards, we discuss the results of the model estimations. In the final section we present the conclusions and policy implications.

2. Conceptual background

For the analysis of cultural spillovers, Tang and Zhang (2017) and Acemoglu and Autor (2011) use multi-sector task-based models with firm heterogeneity in productivity and biased perceptions about female labour costs. Their models focus on firms' labour demand and assumes an inelastic labour supply of both female and male workers. Cultural spillovers occur when domestic firms revise their (biased) beliefs about the cost of female workers towards the objective benchmark. Specifically, a domestic firm changes its prior belief about the cost of female workers if that belief differs from the average belief among MNCs it interacts with. These models also predict stronger cultural transfers in female-labour-intensive industries (i.e., when women have a comparative advantage in production).

Various studies have found both knowledge spillovers and cultural spillovers from MNCs to domestic firms in countries that receive FDI (Saggi, 2002; Smeets, 2008; Tang and Zhang, 2017; Monge-González and Rivera, 2021). Social scientists have analysed how MNCs influence host countries' social norms and values, contributing to cultural convergence across countries toward gender equality (Neumayer and De Soysa, 2011; Fernández, 2013; Wang, 2018).[5]

Domestic firms often react to higher FDI presence in the same sector for two reasons: competition and learning (imitation). Regarding competition, the entry of MNCs into a market may increase input costs but lower final good prices. Both effects lower profits for all firms, possibly inducing some of them to employ more women. This is particularly true for the least productive firms, which struggle for their survival (Juhn et al., 2014). In the case of learning, domestic firms will adjust their beliefs about female workers towards the "average" level in the market because of their interaction with MNCs (Tang and Zhang, 2017). This adjustment increases to the extent that MNCs come from countries with less biased perceptions of female employment. We argue that the business relationships between MNCs and local firms facilitate the process of local firms acquiring MNCs' advanced cultural practices regarding female workers. Equality-targeted gender practices at IT MNCs in Costa Rica illustrate this point (box 1).

Box 1. Gender practices at IT MNCs in Costa Rica

Advancing gender equality is not just an opportunity for countries; companies also stand to gain. Research on diversity shows that companies with higher levels of both gender and ethnic diversity perform better in economic terms, and that the relationship between diversity on executive teams and the likelihood of financial outperformance has strengthened over time. In short, these analyses find a statistically significant relationship between a more diverse leadership team and better financial performance (Hunt et al., 2018; Dixon-Fyle et al., 2020).

In the IT sector in Costa Rica, MNCs state that, because of the important results of gender diversity on their performance, they develop programs within companies and in association with educational agencies to promote equal opportunities for women for capacity-building and work engagement.

At Intel Costa Rica, through a program called WIN STEM, the company works with organizations and individuals from all industry areas to promote gender inclusion in careers in science, technology, engineering and mathematics (STEM).

.../...

[5] A special 2020 issue of *Transnational Corporations* (volume 27, number 3) presents novel and high-quality empirical evidence on the role of MNCs in promoting women's empowerment and gender equality.

Box 1. Gender practices at IT MNCs in Costa Rica (Concluded)

In addition, Intel Costa Rica works with the educational authorities of Costa Rica to motivate more women to pursue STEM careers. Company managers found that women reacted to safe environments and showed constant positive improvements. Therefore, the firm adopted as part of its organizational climate the emblem of zero tolerance for discrimination. Intel Costa Rica has the goal that by 2025, 40 per cent of its employees in technical areas will be women.

At Procter & Gamble (P&G) Costa Rica, managers point out that many efforts are made to ensure that all people can develop their capabilities and grow within the company. Thus, the company provides support and encouragement so that women can manage different stages of life without sacrificing their professional career. One of its key professional development programs for women is Inspire IT, in which female university students in Costa Rica are invited to do internships in P&G so that they can experience the gender-equal working environment of the company and thus be likely to consider P&G Costa Rica as a place to work in the future. The Reentry Task Force is a program aimed to support professional women over the age of 35 who work in STEM areas and who have been absent from work for various reasons. The Women Initiative is another program that aims to facilitate the promotion of women within the company. Finally, in partnership with other educational organizations, the Scholars program provides the opportunity for female students at technical colleges to perform professional practice at P&G Costa Rica, with the aim that they can then apply for a permanent position within the company. P&G Costa Rica also works with educational authorities of the country and non-governmental organizations to motivate more women to participate in STEM careers and MNC employment.

Both companies (Intel and P&G) stated that their gender practices are key performance drivers not only in their own companies but in the industry as well, particularly when their workers move to national companies (looking for higher positions) or new businesses (spin-offs or start-ups of former employees). These moves are regarded as a positive channel of transmitting advanced gender practices to local businesses.

Source: Based on information from interviews with company managers at Intel Costa Rica and P&G Costa Rica and sector stakeholders at the AZOFRAS (the Association of Free Zone Companies) and CINDE (the investment promotion agency).

2.1 The relevance of mediating factors for knowledge and cultural spillovers

When exploring possible cultural spillovers from FDI, factors that mediate the extent of MNC impacts in local firms become relevant, specifically *foreign firm characteristics*, *domestic firm characteristics*, and *host country factors and institutional framework* (Paus and Gallagher, 2008; Farole and Winkler, 2014). These mediating factors affect the interaction between MNCs and domestic firms and therefore influence the potential for cultural spillovers.

In this regard, Monge-González et al. (2015) construct three indices based on surveys of IT MNCs and domestic IT firms (table 1). The first measures absorptive capacity, to measure the degree to which domestic IT firms are likely to be able to absorb knowledge and technology from their interactions with IT MNCs.The average value for Costa Rican domestic IT firms is relatively low (2.51), owing to their relatively low levels of productivity, proportions of skilled labour in the workforce, levels of innovation, exports and scale. These factors prevent domestic IT firms from taking full advantage of opportunities offered by interactions with IT MNCs that operate in Costa Rica. The second index measures the degree to which the national environment favours the emergence of positive impacts from the interactions between IT MNCs and domestic IT firms. To improve its very low value (1.82) would require improvement in the business environment (access to finance, telecommunication infrastructure, promotion of innovation, human resource development, and trade, investment and industry policies), for domestic IT firms to be able to take advantage of the operations of IT MNCs. The third index measures the potential of IT MNCs to generate spillovers for local IT firms. The low value (2.01) indicates a need to target the generation of spillovers as an FDI attraction policy priority (Monge-González et al., 2015).

These indices indicate that the absorptive capacity of domestic IT firms, the potential of IT MNCs to generate spillovers and the national environment of Costa Rica are not very favourable for promoting strong interactions between IT MNCs and domestic IT firms. This evidence should be considered when evaluating cultural spillovers and their effective potential in the country.

Table 1. Costa Rica: Domestic IT's absorptive capacity, national environment and MNC spillover potential indexes

Mean	N	Median	Mean	Std. Dev.	Min.	Max.
Absorptive capacity	72	2.45	2.51	0.70	0.91	3.91
National environment	83	1.83	1.82	0.71	0.23	3.57
MNCs' spillovers potential	33	2.09	2.01	0.57	0.6	3.39

Source: Monge-González et al. (2015).
Note: Index scores range from 1 (lowest) to 5 (highest).

3. Data

This study uses a novel micro-level panel data set of both domestic firms and MNCs in the IT sector with annual observations from 2001 to 2011. Data sources include the Costa Rican Social Security System (CCSS), the Ministry of Foreign Trade (COMEX) and the Ministry of Finance (MH). Since these agencies do not register all firms in the IT sector, additional sources were used to complete the data set, namely the Chamber of Information and Communication Technologies, the Export Promotion Agency (PROCOMER), the investment promotion agency (CINDE) and the Costa Rican-American Chamber of Commerce (AmCham Costa Rica). The exports of these firms were estimated on the basis of information provided by PROCOMER.[6] In addition, the MH provided information on commercial links between MNCs and IT domestic firms.

This firm-level data set allowed us to classify businesses as mainly domestic or MNC affiliates and among different IT categories. The final panel data set includes 873 companies: 587 are domestic IT firms and 286 IT MNCs. We included in the group of domestic IT firms only those that we could confidently assign to one of four standard IT subsector categories. These categories, which are particularly closely associated with the creation and implementation of IT, are the following four:[7]

- Telecommunication: companies that own, operate and/or use voice and data networks to provide communications services between people and devices
- Hardware: businesses that carry out activities related to the design, manufacture and/or assembly of electronic devices such as computers and their peripherals, telephones, network devices (e.g., routers, switches) and various types of integrated circuits
- Software: businesses that are primarily dedicated to the creation and sales of relatively standardized applications and software tools (e.g., BIOS firmware, operating systems, application software) for horizontal or vertical market niches, or for individuals
- Solutions providers: businesses that offer consulting, assistance, training, custom software development, systems integration or any other of many services that are closely related to the creation, implementation and maintenance of information or telecommunication systems.

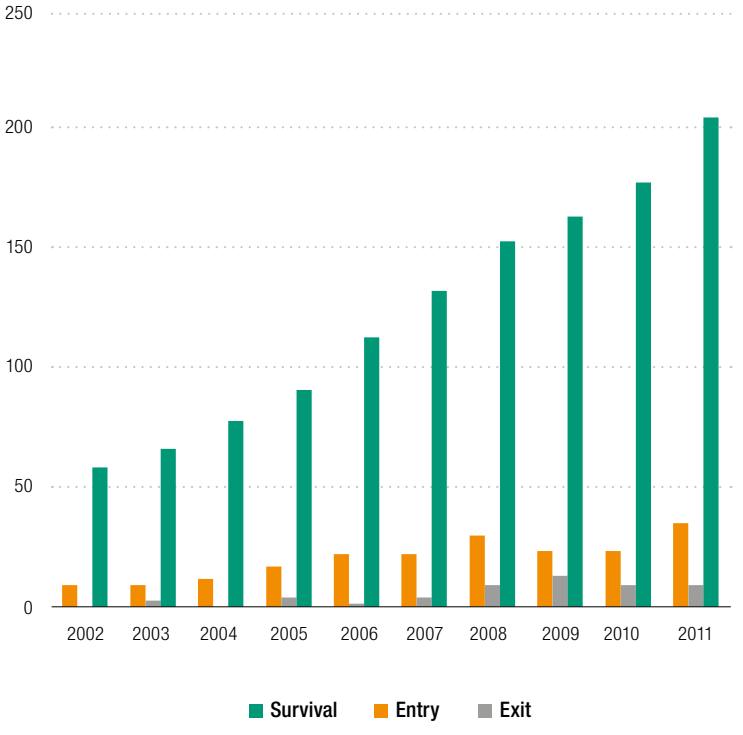
[6] An exporter is a company selling products abroad worth more than US$10,000 per year.

[7] Almost no domestic firms were involved in the design and/or manufacture of hardware. This is to be expected as such manufacturing typically requires substantial investments in infrastructure (which very few local firms are capable of). The analysis therefore does not include domestic hardware companies, but only IT MNCs.

3.1 The dynamics of MNCs and domestic firms in the IT Sector

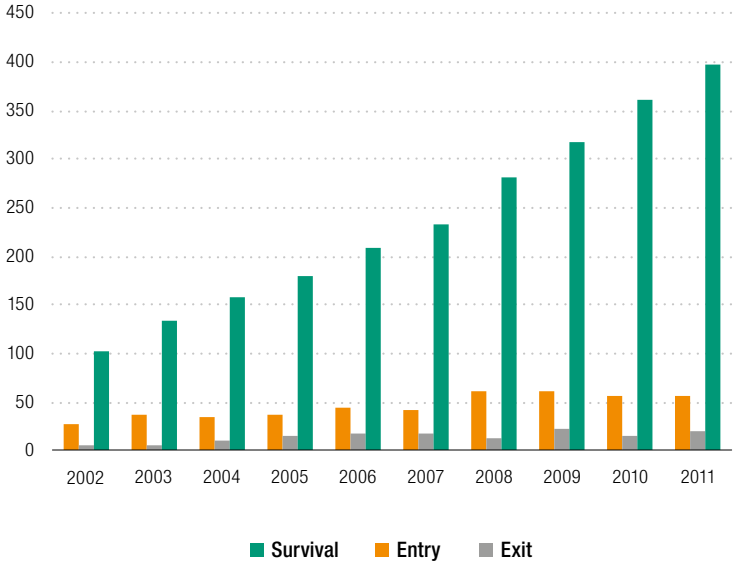
Figure 1 depicts the pattern of entry and exit of IT MNCs in Costa Rica between 2002 and 2011. It seems that the efforts of Costa Rica to attract FDI in IT industries have been successful, as the number of MNCs exiting is much lower than that of MNCs entering the country, resulting in a sustained increased in the number of MNCs operating in the country over time. Figure 2 shows the pattern of entry, exit and survival of domestic IT firms in Costa Rica from 2002 to 2011. As in the case for IT MNCs, the number of domestic firms has increased over time, because of more domestic firms entering the market than leaving it during the period analysed. These results can be interpreted as a preliminary indication that the presence of IT MNCs did not hinder the survival of domestic IT firms but contributed the creation of a national cluster with local and foreign firms.

Figure 1. Costa Rica: Entry, exit and survival of IT MNCs, 2002–2011 (Number of firms)



Source: Authors' calculations based on data from CCSS.

Figure 2. Costa Rica: Entry, exit and survival of domestic IT firms, 2002–2011 (Number of firms)



Source: Based on data from CCSS.

3.2 Female employment in MNCs and domestic IT firms

When analysing female employment in both MNCs and domestic firms in the IT sector, differences between the types of firms are not evident. Indeed, in both, women represent more than 30 per cent of the total payroll during the whole period under analysis (table 2).

This result changes when we compare the proportion of women in the total workforce in MNCs and in domestic companies that have hired former employees of MNCs, as shown in table 3. Indeed, whereas in MNCs the share of women moved from 30 per cent in 2001 to 36 per cent in 2011, in domestic firms that hired former MNC employees the share moved from 25 per cent in 2001 to 36 per cent in 2011. Thus, it is possible that such an increase in the share of women may occur because of cultural spillovers from MNC firms.

In this regard, figure 3 plots the kernel density of female labour shares for domestic firms and MNCs, showing a larger density of MNCs in terms of the ratio of female to total labour. Notwithstanding, results by subindustry show that the share of female workers does not differ significantly between MNCs and domestic firms.

Table 2. Costa Rica: Employment in MNCs and domestic firms from the IT sector, by gender

	Multinational firms			Domestic firms		
	Annual average (number)		Share of women (%)	Annual average (number)		Share of women (%)
Year	Women	Total		Women	Total	
2001	1,834	6,154	30	530	1,518	35
2002	2,191	6,967	31	624	1,796	35
2003	2,732	8,470	32	746	2,047	36
2004	3,628	11,181	32	747	2,128	35
2005	4,464	13,376	33	834	2,346	36
2006	6,178	17,948	34	954	2,612	37
2007	7,631	21,997	35	1,105	3,137	35
2008	9,155	25,866	35	1,376	3,919	35
2009	9,739	27,280	36	1,549	4,475	35
2010	10,676	29,901	36	1,808	5,294	34
2011	12,551	35,244	36	1,961	5,828	34

Source: Based on data from CCSS.

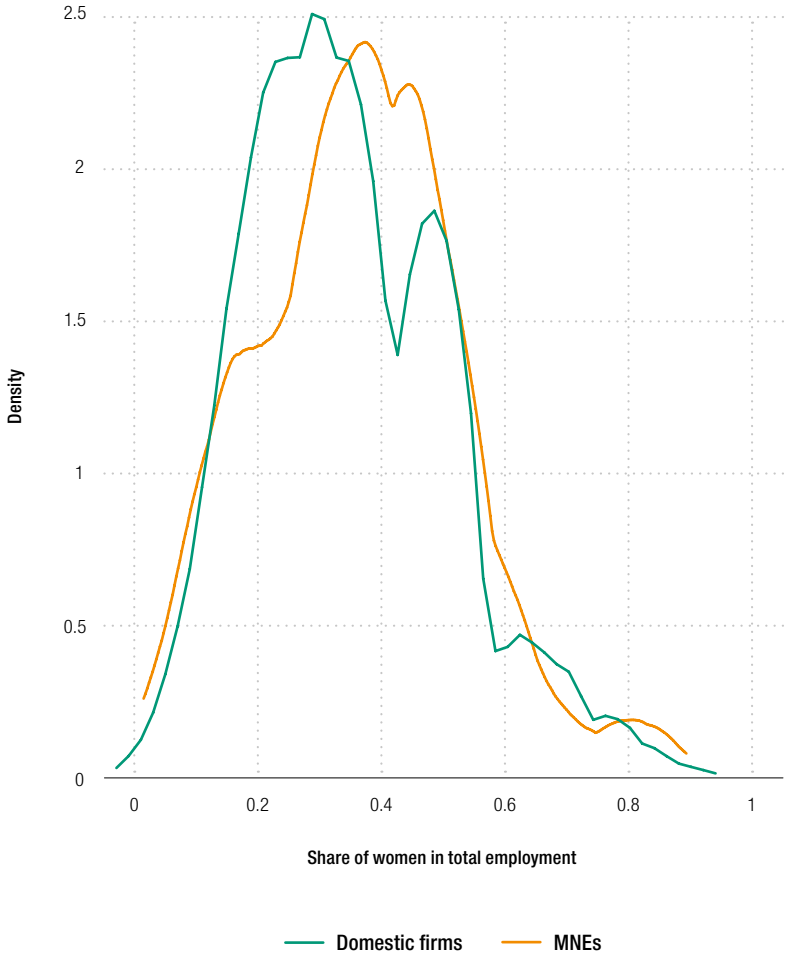
Table 3. Costa Rica: Employment in MNCs and domestic firms that hired former MNC employees from the IT sector, by gender

	Multinational firms			Domestic firms with former MNC em-ployees		
	Annual average (number)		Share of women (%)	Annual average (number)		Share of women (%)
Year	Women	Total		Women	Total	
2001	1,834	6,154	30	49	194	25
2002	2,191	6,967	31	79	305	26
2003	2,732	8,470	32	164	499	33
2004	3,628	11,181	32	165	480	34
2005	4,464	13,376	33	158	463	34
2006	6,178	17,948	34	186	560	33
2007	7,631	21,997	35	241	656	37
2008	9,155	25,866	35	368	1,016	36
2009	9,739	27,280	36	366	1,010	36
2010	10,676	29,901	36	509	1,429	36
2011	12,551	35,244	36	599	1,678	36

Source: Based on data from CCSS.

Accordingly, the panel data used for this study shows variability in terms of the share of female employment by subindustry and by firm type (domestic or MNCs). National averages described before are like sample results, while shares by domestic firms are slightly larger than MNCs (table 4). This variability should be recalled when analysing the model results described later.

Figure 3. Costa Rica: Distribution of firms' female labour share in IT sector, 2001–2012



Source: Based on data from CCSS.
Note: Kernel = Epanechnikov, bandwidth = 0.0318.

Table 4. Costa Rica: Share of women in total Employment in the IT sector, by sub-industry and firm type, 2001–2012 (Average percentage)

Subindustry		MNCs	Domestic Firms	Total
Hardware	Mean	0.4124	..	0.4124
	Standard deviation	0.1962	..	0.1962
	Frequency	221	..	221
Software	Mean	0.3136	0.3247	0.3231
	Standard deviation	0.147	0.141	0.1419
	Frequency	91	537	628
Solutions providers	Mean	0.2692	0.368	0.355
	Standard deviation	0.1657	0.1657	0.169
	Frequency	180	1,183	1,363
Telecom	Mean	0.3026	0.3146	0.3111
	Standard deviation	0.1774	0.1706	0.1724
	Frequency	125	311	436
Total	Mean	0.3654	0.3484	0.355
	Standard deviation	0.1674	0.1619	0.1643
	Frequency	1,282	2,031	3,313

Source: Based on panel data.
(..) = not available.

4. Empirical strategy

Using a balanced panel data for the 2001–11 period, we estimate the impact of MNCs on female employment in domestic firms according to the following fixed effects model:[8]

$$\left(\frac{f}{f+m}\right)_{it} = X'_{k,it}\beta_k + v_i + \gamma_t + \epsilon_{it} \quad (1)$$

[8] The challenge of equation (1) lies in estimating the coefficients associated with the impact of the presence and activities of IT MNCs, while controlling for any factor that may affect the gender practices of firm i in year t. We therefore estimate equation (1) by ordinary least squares using both fixed-effects and cluster-robust standard errors. With the fixed-effects estimation, we explore the relationship between the independent and outcome variables within firms by removing the effect of the time-invariant unobserved characteristics. The error-robust option is used to consider heteroskedasticity and within-panel serial correlation in the idiosyncratic error term (Greene, 2008; Das, 2019). We also computed a generalized least squares model using random effects. Results are available upon request.

Where $\left(\frac{f}{f+m}\right)_{it}$ is the female labour share of IT domestic firm i at time t; X' is a k x 1 vector of firm-specific independent variables at time t that may affect gender practices at the firm level; and β_k is the k x 1 vector of regression coefficients to be estimated. We include firm-specific (v_i) and year-specific (γ_t) intercepts (fixed effects), and ϵ_{it} is the "usual" residual.

The X' vector includes two sets of variables. The first set of explanatory variables refers to the presence and activities of IT MNCs in Costa Rica and their interaction with domestic firms through three channels of cultural spillovers: linkages (measured as the total number of MNCs' purchases per worker (frequency of purchases) from domestic IT firms (local suppliers) in year t); labour mobility (measured as the total number of former MNCs' employees working in domestic IT firms in year t), and presence of MNCs in labour markets (quotient of the total number of employees working in IT MNCs from subsector j by the total number of employees across the subsector [IT multinationals plus domestic IT firms] in year t, accumulated for each year of the sample). The coefficients of this first set of explanatory variables estimate the impact of MNCs on gender employment practices by domestic firms in the IT sector.

The second set of control variables relates to characteristics of domestic IT firms and the IT sector. First, a dummy variable for firm size following Haltiwanger, Jarmin and Miranda, 2010): we estimate firm size by the average number of employees in year t-1 and year t (1 for micro: fewer than 9 employees, 2 for small: 10–49 employees, 3 for medium: 50–249 employees and 4 for large: 250+ employees).[9] Second, a Herfindahl index (the sum at the level of subsector j of the squares of the quotients of the division of the number of employees of firm i by the number of employees in subsector j, for the period under study). Finally, Years exporting (number of years domestic IT companies exported during the period under study for, to account for export experience).[10]

In table 5 we present the descriptive statistics of the variables used in the estimation of equation (1). There is a large variability in the female labour share, with a mean of 0.35. We have a sample of IT domestic firms of different sizes, from microenterprises to large firms. The concentration of firms is relatively low, with a maximum value for the Herfindahl index of 0.33. The minimum scale is a firm with fewer than two workers. For the case of independent variables to measure cultural spillovers, we see that the number of linkages per worker averages 0.27, with a maximum of 3.

[9] We tested a continuous variable (number of employees) as well and found no statistical significance. Results are available upon request.

[10] In an alternative model we included a dummy variable to control for exporter status, which was not statistically significant. Results are available upon request.

In addition, the number of linkages looks small. Regarding the presence of MNCs in the market, we found that this variable is important as 35 per cent of all workers are employed by MNCs. Finally, regarding labour mobility, as an average during the period under analysis, 65 per cent of domestic firms' workers come from MNCs.

Table 5. Descriptive statistics of the model variables

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Female labour share	3,313	0.354968	0.164259	0.002933	0.909091
Linkages	498	0.196678	0.276171	0.000389	3
Labour mobility	10,452	0.644661	4.467279	0	176
Presence of MNCs	10,452	0.350728	0.319748	0.051881	1
Herfindahl index	10,452	0.101523	0.078896	0.023599	0.327416
Firm size	4,472	1.679562	0.914826	1	4
Years exporting	10,452	0.214217	1.131882	0	12

Source: Based on panel data.

5. Results

Table 6 shows the results for equation (1) with the female labour share as dependent variable. We included the explanatory variables one by one (Columns 1 to 3) and added the control variables afterwards (Columns 4 to 6). Column 6 depicts the results of the full model. Female labour share relates positively with labour mobility and the presence of MNCs (competition in the labour market), with statistical significance. In the first case, the mobility of former MNC employees to domestic firms has a positive relationship with the share of female employees in domestic firms. This result is consistent with the evidence of gender practices in the MNCs operating in the country and the number of former MNC employees working in domestic IT firms. In the second case, the presence of MNCs in the labour market is positively related to the share of women in total employment in domestic firms.[11]

[11] According to interviews with companies in the IT sector, the existence of an inelastic supply of qualified labor implies that domestic companies compete more strongly for the labor factor. As a response, one of their strategies is to improve employment conditions for women and imitate the gender practices of MNCs.

Yet, the linkage effect is not statistically significant, which could be attributed to a low record of transactions between domestic firms and MNCs. This outcome could be related to a low, economy-wide absorptive capacity of local IT companies that limits potential spillovers from FDI.

These results are robust for the inclusion of the three control variables. As a general conclusion, the estimations give support for cultural spillovers in terms of higher female employment in domestic firms, through two channels: labour mobility and the presence of MNCs in the labour market.

Table 6. Cultural spillovers from IT MNCs to domestic firms reflected in female labour share

	Dependent variable: Female labour share					
	1	2	3	4	5	6
Linkages	0.0398 (0.072)	0.0514 (0.073)	0.053 (0.074)	0.0311 (0.073)	0.0392 (0.074)	0.0471 (0.077)
Labour mobility		0.0006** 0.000	0.0006*** 0.000		0.0005* 0.000	0.0007** 0.000
Presence of MNC			0.0252 (0.148)			0.2529* (0.145)
Herfindahl index				0.4292* (0.246)	0.4793* (0.247)	0.6867*** (0.248)
Size_2 (small)				0.0084 (0.023)	0.0106 (0.023)	0.0084 (0.022)
Size_3 (medium)				-0.0213 (0.029)	-0.0182 (0.029)	-0.0244 (0.028)
Size_4 (large)				0.0318 (0.055)	-0.005 (0.054)	-0.0277 (0.048)
Years exporting				0.0142** (0.005)	0.0151*** (0.006)	0.0153*** (0.005)
Constant	0.3005*** (0.065)	0.3145*** (0.058)	0.3117*** (0.063)	0.2457*** (0.058)	0.2379*** (0.060)	0.1754** (0.067)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	255	255	255	255	255	255
r2 (within)	0.0517	0.0607	0.0609	0.0958	0.1008	0.1119
F	1.5266	23.069	21.8763	3.672	31.97	36.191
p value	0.1436	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Based on panel data.
Note: Standard errors in parentheses. Robust z-statistics: * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$.

6. Conclusion and policy implications

We find evidence of two channels for cultural spillovers from FDI to domestic IT firms influencing higher shares of female employment: learning (imitation) effects through labour mobility, which allows former employees of MNCs working in domestic firms to transfer skills and gender practices from their previous work experience and training, and demonstration effects through the presence of MNCs (through competition in the labour market), which include imitation of social norms and values practices of MNCs by local suppliers. No evidence for a relationship between backward linkages (purchases) of MNCs from domestic suppliers and female labour share was found.

These results coexist with observed similar shares of women in total employment by subindustry in the panel data analysed. They also indicate a business environment with low potential for interaction (linkages) between MNCs and domestic firms caused by country conditions. Therefore, to promote greater participation by women in labour markets through FDI attraction, strengthening of cultural spillovers would require FDI spillover growth policies to (i) enhance the absorptive capacity of domestic IT firms, (ii) attract IT MNCs with higher potential to generate stronger spillovers, and (iii) foster a favourable national investment climate for enhancing business interactions between IT MNCs and domestic IT firms.

This is a first effort to understand cultural spillovers from FDI in Costa Rica. One limitation is the number of transactions recorded between MNCs and domestic firms during the study period. Thus, the potential impact of business linkages for cultural spillovers is not fully addressed. The dynamics of labour mobility (long-term effects) and cultural spillovers is not incorporated in the analysis. These limitations open new avenues for future research, incorporating longer and recent periods of time and distinctive employee and firm characteristics. Another issue to explore is the role of mediating factors in the investment climate for FDI attraction and gender equality. In-depth case studies of MNCs and local suppliers could contribute to a better understanding of business practices and women's empowerment at the firm level. The study of MNCs and cultural spillovers in leading FDI-driven sectors of Costa Rica that are growing (e.g., medical devices) should be considered for future research as well.

References

Acemoglu, D., and Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. *Handbook of Labour Economics*, 4, pp. 1043–1171. Oxford: North Holland.

Alfaro, L. (2017). Gains from foreign direct investment: Macro and micro approaches. *The World Bank Economic Review*, 30 (Supplement 1, March), pp. S2–S15.

Choi, J., and Greaney, T. (2020). Global influences on gender inequality: Evidence from female employment in Korea. Working Paper No. 20-3R. Department of Economics. University of Hawaii.

Das, P. (2019). *Econometrics in Theory and Practice. Analysis of Cross Section, Time Series and Panel Data with Stata 15.1*. Springer.

Dixon-Fyle, S., Dolan, K., Hunt, V., and Prince, S. (2020). *Diversity Wins: How Inclusion Matters*. McKinsey and Company, May.

Farole, T. and Winkler, D. (2014). *Making Foreign Direct Investment Work for Sub-Saharan Africa: Local Spillovers and Competitiveness in Global Value Chains.* Directions in Development: Trade. Washington, DC: World Bank.

Fernández, R. (2013). Cultural change as learning: The evolution of female labour force participation over a century. *American Economic Review*, 103(1), pp. 472–500.

Greene, W. (2008). *Econometric Analysis*, 6th ed. Upper Saddle River, NJ: Prentice Hall.

Haltiwanger., J., Jarmin, R., and Miranda, J. (2010). Who creates jobs? Small vs. large vs. young. NBER Working Paper. Cambridge, MA: National Bureau of Economic Research.

Harrison, A., and Rodríguez-Clare, A. (2010). Trade, foreign investment, and industrial policy for developing countries. *Handbook of Development Economics*, 5: 4039–4214. Oxford: North Holland.

Hunt, V., Prince, S., Dixon-Fyle, S., and Yee, L. (2018). *Delivering through Diversity*. McKinsey and Company, January.

INEC (2019). *Encuesta Continua de Empleo (ECE), 2019*. San José: Instituto Nacional de Estadística y Censos.

Javorcik, B. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *American Economic Review*, 94(3), pp. 605–627.

Juhn, C., Ujhelyi, G., and Villegas-Sanchez, C. (2014). Men, women, and machines: How trade impacts gender inequality. *Journal of Development Economics*, 106: 179–193.

Kodama, N., Javorcik, B., and Abe, Y. (2018). Transplanting corporate culture across international borders: Foreign direct investment and female employment in Japan. *The World Economy*, 4 (5), pp. 1148–1165.

Monge-González, R., Hewitt, J., and Torres-Carballo, F. (2015). Do multinationals help or hinder domestic firms? Evidence from the Costa Rican ICT Sector. International Development Research Centre of Canada (IDRC), Ottawa. Unpublished manuscript.

Monge-González, R., and Rivera, L. (2021). Exploring knowledge spillover through labour mobility from multinationals to domestic firms in the information technology sector in Costa Rica. Project Documents (LC/TS.2021/3). Santiago: Economic Commission for Latin America and the Caribbean.

Monge-González, R., and Rivera, L. (2020). *Costa Rica: un proceso de apertura inconcluso. Análisis de economía política de la apertura comercial y episodios reveladores*. San José: Editorial ULEAD.

Neumayer, E., and Soysa, I. (2011). Globalization and the empowerment of women: An analysis of spatial dependence via trade and foreign direct investment. *World Development* 39(7), pp. 1065–75.

Ouedraogo, R., and Marlet, E. (2018). *Foreign Direct Investment and Women Empowerment: New Evidence on Developing Countries*. IMF Working Paper WP/18/25. Washington, DC: International Monetary Fund.

Paus, E., and Gallagher, K. (2008). Missing links: Foreign investment and industrial development in Costa Rica and Mexico. *Studies in Comparative International Development* 42(4), pp. 53–80.

Saggi, K. (2002). Trade, foreign direct investment and international technology transfer: A survey. *World Bank Research Observer*, 17(2), pp. 191–235.

Smeets, R. (2008). Collecting the pieces of the FDI knowledge spillovers puzzle. *The World Bank Research Observer* 19(3), pp. 1–32.

Tang, H., and Zhang, Y. (2017). *Do Multinationals Transfer Culture? Evidence on Female Employment in China*. Technical Report, CESifo Group Munich.

UNCTAD (2014). *Investment by TNCs and Gender: Preliminary Assessment and Way Forward*. Investment for Development Policy Research Series. Geneva.

UNCTAD (2021). *The International Transmission of Gender Policies and Practices: The Role of Multinational Enterprises*. Geneva.

Wang, Z. (2018). Bringing the State back in: Explaining women's economic empowerment in an era of globalization. *Political Studies* 66(4), pp. 1043–66.

World Bank and World Trade Organization (2020). *Women and Trade: The Role of Trade in Promoting Gender Equality*. Washington, DC: World Bank.