Outward Foreign Direct Investment and the Skill Composition in Mexican Regions.

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EXTENDED ABSTRACT

Despite the growing body of literature devoted to studying the employment effects of outward FDI (OFDI) on the home economy, evidence on the net effects is still inconclusive (Elia et al., 2009), while the main focus has been developed economies (Slaughter, 2000; Ekholm & Hakkala, 2006). Theories on multinational firms do not provide clear-cut predictions on the effect of OFDI on the employment level and skill composition in the investing firm and its home country (Barba Navaretti & Venables, 2004, Dunning & Lundan, 2008). Domestic firms might invest at home and abroad, implying both negative and positive effects. Net effects will depend on a variety of factors; type of industry, investment motives and competitive context of host economies, as well as labour market and macroeconomic conditions (Agarwal, 1997). One of the most salient factors being the distinction between resource seeking and market seeking investments (Dunning, 1993). In the case of developed countries, it has been commonly argued that overseas investment is responsible for loss of jobs in the home country. Although the empirical literature on this is not conclusive, most evidence suggests that, in general OFDI increases, at least marginally, overall levels of domestic employment, accompanied by changes in the skills composition (Gagliardi et al., 2015).

OFDI has been generally thought of a consequence of economic development (Dunning & Narula, 1996). Thus, very little attention has been paid to the contribution which OFDI makes to the development of home countries when the investing multinationals are from less advanced economies (Knoerich, 2017). The early 2000s saw significant changes in the patterns of cross-border investments as more companies from developing and emerging economies increased their participation in the world's total foreign direct investment (Padilla-Pérez & Gómes Nogueira, 2015; 2016). Despite the significant rise of emerging country multinationals in the global investment landscape, evidence on OFDI effects on employment and skills in home emerging economies is relatively scant (Debaere et al., 2010). Furthermore, whether the particular destination country of OFDI matters for the employment in the industry-region of the firm, very much remains an empirical question, especially in the context of emerging economies.

This paper addresses three questions in turn. First, we investigate the extent to which OFDI is associated with changes in employment in Mexican industry-regions. In other words, whether investing abroad leads to decreases in the aggregate demand for labour in the relevant labour markets. Second, we enquire if increasing FDI outflows are associated with changes in the skill composition of local labour markets by shifting the demand for certain skills. Lastly, we ask whether the effects on labour demand for different skills vary according to the country of OFDI destination. We tackle these questions by estimating relative labour demand equations for both high and low skilled workers separately (see Adams, 1999; Ahn, Fukao, & Ito, 2008; Elia et al 2009; Driffield, Love, & Taylor, 2005; Ekholm & Hakkala, 2006).

Context

The last two decades have witnessed significant changes in the patterns of Mexican FDI flows. Mexico is still a net recipient of inward FDI, ranking 13th worldwide in 2015 (UNCTAD, 2017). The inward FDI stock by 2015 reached 500 thousand million dollars. Notwithstanding, outward FDI stocks have been rising steadily since the early 2000s. In 2015, the outward FDI stock was around 150 thousand million dollars. Not only has the investment of Mexican firms abroad has risen substantially in the last two decades, but its relative importance to the country's GDP has also increased. The relative share of OFDI increased sharply in 2001 and it has exhibited an upward trend ever since, reaching 12.7 percent in 2015. Although a significant figure, the corresponding share for IFDI in that same year was 44.2 percent of the GDP. In general, it seems that even though Mexico still heavily relies on inward foreign investment, more and more Mexican-based firms are adopting internationalisation strategies to establish presence abroad.

On the skills side, Mexico's educational attainment has increased steadily after the 1970s. A relatively rapid catch up until the 1990s was the result of increases in the coverage of basic education and the reduction of primary school dropout rates (López-Acevedo, 2006). However, enrolments and educational attainment have continued to lag behind, thus remaining below the international trend line. Only 63 percent of the adults have attained lower secondary education; and the proportion of those who have attained at least upper secondary education is as little as 37 percent (OECD, 2014). While access to primary and secondary is universal and compulsory, Mexico has one of the smallest proportions of 15- to 19-year-olds enrolled in education —53 percent— among OECD countries.

Against this background, Mexico represents a good case to study the home-effects of outward FDI for two main reasons. First, as an emerging economy it is still an important recipient of inward

FDI, while at the same time many Mexican firms are becoming important investors abroad. Second, despite these trends, Mexican labour markets are still very fragmented, and the skills distribution remains highly skewed towards the lower end.

Theoretical model

The underlying theoretical model is one of cost minimisation for the firm. This framework has been widely used in the literature (Adams, 1999; Elia et al. 2009). Consider a firm operating in sector k, located in state s in a given time period t. For simplicity in the model derivation we omit said subscripts. The optimisation problem facing the firm can be stated as follows,

$$\min_{x} C = \sum_{i=1}^{n} x_i w_i$$

$$\text{s.t.} \quad Y = f(x_1, \dots, x_n)$$

where the total cost C is the sum of inputs x_i multiplied by their respective price w_i for all factors of production $i = 1,2, \dots n$. The objective function is linear and homogeneous in prices. The total cost function is subject to a level of output Y, which, in turn, is a function of the inputs. Optimising this problem yields a dual minimum cost function which indicates the cost of production when the cost-minimising combination of inputs $\boldsymbol{x}^*$ is used;

$$C^* = f(Y, w_1, \dots, w_n)$$

It is a function of the level of output and the factor prices. Without loss of generality, we aggregate the individual firm's cost function across all firms in sector k, state s and year t. It is possible and convenient, to use a Translog cost function for the econometric estimation of the parameters of interest. Further, using the price of raw materials w_M as the numeraire yields the normalised Translog cost function expressed as a Taylor's series expansion to the second term in its general form;

$$\ln \frac{C^*}{w_M} = \nu_0 + \nu_y \ln Y + \sum_{i \neq M} \nu_i \ln \frac{w_i}{w_M} + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \ln \frac{w_i}{w_M} \ln \frac{w_j}{w_M} + \sum_i \gamma_{iy} \ln \frac{w_i}{w_M} \ln Y + \sum_i \gamma_{iu} u_i \ln \frac{w_i}{w_M} + u_C$$

where $\boldsymbol{\nu}$ are the first order conditions and $\boldsymbol{\gamma}$ are second order conditions or cross-derivatives. Since we are interested in assessing changes in the demand for certain factors of production, we work

out the first order partial derivatives of the cost function by differencing with respect to the relative prices, which by the Shepherd's lemma, yield the cost share or conditional demand for input i;

$$\frac{\partial \ln (C^*/w_M)}{\partial \ln (w_i/w_M)} = x_i(w_i, Y) = S_i$$

Estimation methods

As in Adams (1999), we adopt a quasi-fixed Translog cost function, considering three variable inputs for the state-sector cost function; low-skilled labour $\mathcal{L}$, high-skilled labour $\mathcal{H}$, and raw materials $\mathcal{M}$. Further, because of their slower rate of adjustment, we augment the cost function by three quasi-fixed inputs that condition the factors' demand; capital $\mathcal{K}$, technology $\mathcal{A}$ and outward foreign investment $\mathcal{OFDI}$. Finally, for our purposes we obtain the conditional demand for high-skilled, $\mathcal{H}$, and low-skilled workers $\mathcal{L}$. The augmented system of equations is thus;

$$\begin{cases} S_{\mathcal{H}} = \alpha_{\mathcal{H}} + \sum_{j=\mathcal{H},\mathcal{L}} \beta_{\mathcal{H},j} \ln(w_j/w_m) + \beta_{\mathcal{H},Y} \ln Y + \beta_{\mathcal{H},\mathcal{K}} \ln \mathcal{K} + \beta_{\mathcal{H},\mathcal{A}} \ln \mathcal{A} + \beta_{\mathcal{H},O} \ln \mathcal{OFDI} + u_{\mathcal{H}} \\ S_{\mathcal{L}} = \alpha_{\mathcal{L}} + \sum_{j=\mathcal{H},\mathcal{L}} \beta_{\mathcal{L},j} \ln(w_j/w_m) + \beta_{\mathcal{L},Y} \ln Y + \beta_{\mathcal{L},\mathcal{K}} \ln \mathcal{K} + \beta_{\mathcal{L},\mathcal{A}} \ln \mathcal{A} + \beta_{\mathcal{L},O} \ln \mathcal{OFDI} + u_{\mathcal{L}} \end{cases}$$

Note that the term for raw material disappears after taking the first order conditions. However, it is implicit in the relative prices for different types of workers. The above system of equations is estimated by seemingly unrelated equations (SUR) technique. Under SUR, the right-hand side variables are assumed to be independent of the errors. Factor prices are determined by the factor markets and are exogenous.

Description of the database.

Data is collected from two main sources. First, the measure of OFDI is extracted from the ORBIS database from Bureau Van Dijk. The historical ownership database contains year-to-year information of the ownership links between a subsidiary and its parents or shareholders from 2007 to 2017. Second, the number of low- and high-skilled workers and their respective average wages, as well as the aggregate inputs such as capital, technology and other economic variables, are sourced from the Economic Censuses from the national statistics agency in Mexico (INEGI).

Census rounds are collected every 5 years. The resulting database is a panel of 32 states by 19 sectors during an 11-year period, yielding a total sample size of 6,688 observations.

Our outcome variables are the natural logarithm of the number of low-skilled ($\mathcal{S}_{\mathcal{L}}$) and high skilled ($\mathcal{S}_{\mathcal{H}}$) employment in sector $\mathcal{k}$, located in state $\mathcal{s}$ in a given time period $\mathcal{t}$. INEGI considers high-skilled employees those that performed tasks within administration, accounting, professional services, management, planning and executive supervision. Conversely, low-skilled employees are those performing tasks related to sales, machinery and equipment operation, production line supervision, auxiliary tasks such as packaging, warehousing, maintenance, cleaning and transportation.

The main variable of interest, OFDI, intends to capture the financial resources that are not invested domestically but are instead directed abroad. To this end, we use the ORBIS historical files that contain year-to-year information of the ownership links between a subsidiary and its parents or shareholders. For the present analysis we only consider Mexican Global Ultimate Owners as the only type of relationship, which implies that the company is independent, and consequently has no foreign Ultimate Owner. In other words, we only consider Mexican companies that are the shareholder with the highest percentage of ownership of a subsidiary located outside of Mexican territory. By this criterion, we end up with a regionalised subsample of 1,363 unique Mexican-owned firms with affiliates abroad during the study period.

The data is collapsed by state-sector-year. In the same way, we are able to retrieve the number of subsidiaries abroad by state and year, which comes down to 14,395 unique affiliates. These two counts will constitute the basis of our measures of OFDI at the 32-states ($\mathcal{s}$) and 19-sectors ($\mathcal{k}$) level for the 2007-2017 period. The variable is thus defined as the logarithmic transformation of the count for state-sector in every year. Ideally, we would use a more nuanced measure of OFDI, such as the number of employees or total assets in foreign affiliates. Unfortunately, this information has a substantive amount of missing values, for this reason we prefer to use the number of shareholders or foreign affiliates. Nevertheless, we rest assured that the national sums for these variables and the national OFDI stocks reported by UNCTAD, follow a very similar temporal trend.

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