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MNC Subsidiary Closure: What Stays When the MNC Leaves?

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Abstract

We investigate the consequences of MNC subsidiary closures for employees who lose their jobs. We ask to what degree the foreign knowledge that they were exposed to is valued in their new job. We argue theoretically that this foreign knowledge is both valuable and not readily available in the host country but is also distant and therefore difficult to absorb. We predict an inverse u-shaped relationship between the exposure to foreign knowledge and the salary in the new job. We empirically support our predictions for a sample of almost 140,000 affected employees in Portugal from 2002 to 2009.

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ABSTRACT

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Keywords: Knowledge and Productivity Spillovers; Knowledge Management; FDI

INTRODUCTION

Knowledge flows between the subsidiaries of Multinational Companies (MNCs) and their host countries have been a central topic in International Business research (Meyer & Sinani, 2009 provide a recent review). Many host country governments provide substantial incentives to attract foreign direct investment (FDI) as channels for knowledge flows that benefit the productivity of domestic firms. However, the results are oftentimes disappointing because MNCs prevent such knowledge flows or domestic firms cannot absorb them (Feinberg & Majumdar, 2001; Zhao, 2006; Alcacer & Chung, 2007). An element that is largely absent in the discussion so far is knowledge flows that originate from MNC subsidiaries closing down. Knowledge that the employees could absorb while working for foreign MNC subsidiaries becomes available to host country firms. We are, to the best of our knowledge, the first to study the value that new employers assign to the foreign knowledge that former employees were exposed to in their old position with the closed, foreign MNC subsidiary. More precisely, we infer the valuation of the foreign knowledge by the new employer based on salary differences with otherwise identical former employees of domestic firms.

Our study ties into existing research along three dimensions. Firstly, divestures of MNC subsidiaries are frequent challenges to the management of MNCs (see Berry, 2012 for a recent review). They imply that the MNC optimizes its asset structure across countries through investments in some host countries and divestures in others (Chakrabarti, Vidal, & Mitchell, 2011). However, this stream of literature has predominantly focused on the MNC perspective by explaining why certain subsidiaries are divested and what the effects are on MNC performance (Boddewyn, 1983, Boddewyn, 1979; Nachum & Song, 2011). We focus instead on the value that the former employees of MNC subsidiaries can bring to their new employers. Secondly, MNCs have been found to compete with local firms in the host country labor market. De Backer and Sleuwaegen (2003) find that the entry of an MNC propels highly skilled individuals to opt for a career at the subsidiary of an MNC instead of a career in a domestic firm. We investigate the interesting situation in which the conditions are reversed, i.e. skilled employees become available again to the domestic job market. Finally, knowledge flows through personnel mobility have been a major topic in International Business and Strategic

Management literature because employees can transfer not only codifiable elements but also valuable tacit knowledge (Almeida & Kogut, 1999; Song, Almeida, & Wu, 2003; Agrawal, Cockburn, & McHale, 2006). We investigate a unique situation in which the foreign subsidiary releases the employees as carriers of its knowledge voluntarily by closing down the subsidiary. In sum, the focus of our study is novel in the sense that we consider that local subsidiary employees can tie MNC knowledge to the host country and that this knowledge is fully released once the MNC closes its subsidiary and the employees are free to transfer their unique knowledge.

Closing this theoretical gap has high practical relevance. The closures of foreign subsidiaries and resulting job losses have provoked outrage and public protests in many host countries in recent past. Examples include the protests over pharmaceutical company Merck Organon closing its R&D center in the Netherlands, Nokia shifting mobile phone production from Germany to Romania, and Deutsche Post closing its sorting center at Wilmington Airpark in Ohio. Hence, theoretical predictions and empirical tests on the consequences of these job losses are important for a broad audience: Job seekers have a more comprehensive basis to evaluate their career planning when it involves working for an MNC subsidiary. MNC managers can optimize divesture policies taking into account unintended effects from knowledge outflows. Policymakers can design fitting support instruments for employees who have lost their jobs as the result of MNC closures.

We develop new theory for International Business through an interdisciplinary approach. We use a model of Labor Economics as the starting point because the consequences of firm closures on employees are studied intensively in this field. This particular group of job seekers is typically defined as “displaced” employees because they were not dismissed because of individual, low performance or misconduct (Kletzer, 1998). Labor Economics postulates that employees build knowledge stocks throughout their careers. These knowledge stocks differ in their degree of specificity for use outside of the firm in which they were acquired. A displaced employee may face a steep decline in future salaries if her[i] knowledge stock is highly specific to the firm that has just closed down. The closure has essentially depreciated her individual knowledge stock. Empirically, displacement has been found to have a persistent, negative effect on future earnings (Couch & Placzek, 2010). However, these

earnings losses can be reduced if more of the knowledge stock of a displaced employee can be transferred to the new employer.

We build on this displacement model for the particular case of MNC employees along the dimension of distance between host country and MNC knowledge. On the one hand, we argue that working for an MNC subsidiary has exposed the displaced employee to knowledge that is otherwise not available in the host country. MNCs act as social communities and can transfer even tacit knowledge across national borders that could otherwise not be codified or licensed (Kogut & Zander, 1993). This makes the knowledge of a displaced employee from a foreign MNC particularly valuable. The transferred knowledge of MNCs is typically valuable in itself (Kronborg & Thomsen, 2009) and not readily available in the host country. Hiring firms can create unique combinations with their existing knowledge stock and generate competitive advantages based on unique products and processes. On the other hand, foreign knowledge is oftentimes not fully applicable in the host country. It is developed in the dual context of host country and MNC, which means it does not necessarily fit with the requirements of local firms (Almeida & Phene, 2004). Foreign knowledge is more distant from the host country firm's existing knowledge stocks (Meyer & Sinani, 2009). This distance makes it difficult to assess, integrate, and exploit for new employers. In sum, we expect an inverse u-shaped relationship between the foreign knowledge a displaced worker was exposed to and her future earnings. Within a comparison group of displaced employees, a worker who lacks any foreign knowledge will not be able to distinguish herself; one with exclusively foreign knowledge will find it hard to find a new employer who can evaluate and utilize the knowledge.

Furthermore, we argue that two factors moderate the threshold at which the advantages of foreign knowledge are outweighed by the costs associated with evaluating and integrating distant knowledge. Firstly, foreign MNC subsidiaries are evaluated in comparison to other subsidiaries and host countries (Chakrabarti et al., 2011). Closed down MNC subsidiaries may still be highly productive within a host country comparison group. Consequently, the value of knowledge of displaced employees of these foreign MNC subsidiaries will increase with their productivity, and new

employers have incentives to pay more. As a result, the inverse u-shaped relationship outlined above should be positively moderated.

Secondly, new employers are heterogeneous in their ability to assess, integrate, and exploit the foreign knowledge that a displaced employee can bring to their firm. Leading firms have higher absorptive capacities (Cohen & Levinthal, 1994) and more potentials for recombining foreign knowledge with existing knowledge stocks (Salomon & Jin, 2010). As a consequence, they should pay higher salaries to a displaced employee with foreign knowledge because they can derive more value from the employee and are better prepared to absorb the distant knowledge. Again, we predict a positive moderation of the inverse u-shaped relationship.

We test and support these hypotheses for a sample of almost 140,000 displaced employees in Portugal between 2002 and 2009 based on dynamic fixed effects regression models. Our findings have immediate relevance for management research and practice.

On the academic side, we provide fresh impulses for research that has investigated knowledge flows based on labor mobility between firms in general (Agrawal et al., 2006) as well as between MNCs and their host countries in particular (Almeida & Kogut, 1999). More precisely, we find that the closure of a foreign MNC subsidiary creates a pool of foreign knowledge in the host country that is valued by the new employers as evidenced by comparatively higher salaries for displaced employees of foreign MNC subsidiaries and domestic firms respectively. However, this pool of knowledge is not equally valued by all host country firms; i.e., leading firms assign higher values to the foreign knowledge. The combination of both effects provides new opportunities to theoretically model the interaction between MNCs and the host country in which MNCs cannot automatically be assumed to prevent knowledge flows (as opposed to e.g. Alcacer & Chung, 2007; Zhao, 2006). Also, the closure of a foreign MNC subsidiary is not necessarily a completely negative event for the host country (extending the work reviewed recently by Berry, 2012). What is especially intriguing for International Business research focused on competition between MNCs and host country firms in factor markets is the notion that the crowding-out of host country labor markets once an MNC enters the market (De Backer & Sleuwaegen, 2003) cannot be simply reversed if the MNC leaves. Instead, we find an

inverse u-shaped relationship. Apparently, some foreign knowledge is too specific to the MNC and cannot be valued by host country firms.

In Labor Economics research, job displacement is a well-studied and reviewed phenomenon (Kletzer, 1998). Our findings indicate that foreign MNC subsidiaries are distinctive based on the particularly valuable knowledge they provide as well as the specificity for using it. Studies that ignore this unique situation of displaced employees of foreign MNCs suffer from biases in their findings.

THEORY

International Business literature has devoted a great deal of attention to MNCs' interactions with their host country environment. One of the most interesting aspects within this context is the competition for skilled workers, scientists, and engineers with host country rivals (Almeida & Kogut, 1999; De Backer & Sleuwaegen, 2003). However, these studies are narrowly focused on the hiring of new employees into MNC subsidiaries. Little is known about what happens to host country employees if the foreign subsidiary closes down.

Closures of subsidiaries are not an unusual occurrence (a recent review can be found in Berry, 2012). They are part of an MNC's reconfiguration of international assets to maximize performance resulting in investments in some locations and divestment in others (Chakrabarti et al., 2011). We will focus on the consequences for the former employees of the closed down foreign subsidiary.

With our model we want to explain the value of an employee's knowledge in her new job once her former employer, the foreign subsidiary, has closed down. We assume that the salary is the expected value of the productivity that the employee will bring to her new firm (Ranft & Lord, 2000). We argue that this expected value is a function of the employee's knowledge stock.

The closure of a subsidiary entails that the employees are not dismissed because of individual misbehavior or low performance. Following Kletzer (1998) we define this particular group of employees as "displaced", i.e. as "…individuals with established work histories, involuntarily separated from their jobs by mass layoff or plant closure (rather than because of individual job performance), who have little chance of being recalled to jobs with their old employer" (Kletzer, 1998: 116). Displacement has been studied intensively in Labor Economics. The literature reviews of Fallick

(1996), Kletzer (1998), and, more recently, Couch and Placzek (2010) show that job displacement results in earnings losses, which appear to persist for a very long time.

This loss in earnings is typically explained by the way in which employees acquire knowledge while working for a company. Knowledge stocks, routines, and procedures at the firm level shape the potential for knowledge acquisition of each employee. It is important to note that the resulting knowledge stock of the employees varies in how specific it is to the firm in which it was acquired (Kletzer, 1998). Employee knowledge that is general in nature can be applied in different contexts and organizations, e.g. using standard software tools or word processors. Specific employee knowledge, however, only has value in the particular context or organization in which it was acquired, e.g. operating custom-made machinery or software. Logically, the value of an employee's knowledge stock for another firm is limited to the general, transferable component. If the firm in which the specific knowledge stock was accumulated closes down, the knowledge stock of the employees depreciates because the strictly firm-specific components will not be of value to future employers.

However, the severity of the resulting drop in salary for displaced employees varies. Empirical evidence shows that earnings losses are larger when displaced employees change to a position that does not share a large amount of similarities with their previous jobs, e.g. in different industries, occupations, or geographic regions (Jacobson, LaLonde, & Sullivan, 1993; Fallick, 1996). This variation can be explained based on the distance in knowledge stocks between the closed down firm and the new firm. Firms that are more similar (i.e. less distant) are more likely to benefit from knowledge exchanges because it is easier to recognize and value external knowledge (Lane & Lubatkin, 1998). With increasing similarity, a new employer will recognize value in the knowledge stock of a displaced employee that other employers cannot. Consequently, the wage of a displaced employee in a new job is comparatively higher if the new employer is similar to the past employer.

We argue that this theoretical model from Labor Economics is only partially able to predict the future earnings of displaced employees of foreign MNC subsidiaries for two primary reasons. Firstly, the model underestimates the degree to which displaced workers of foreign MNC subsidiaries were exposed to knowledge that is valuable and not readily available in the host country. This

particular knowledge should increase their value to future employers compared to competitors in the job market with strictly domestic knowledge stocks. Secondly, having worked for a foreign subsidiary before adds a layer of distance to the displaced employee's knowledge stock that is distinctively different from industry or regional difference. We will explore both extensions of the model.

Employees who have developed their knowledge stock working for a foreign MNC subsidiary have had access to a pool of valuable knowledge that is otherwise not readily available in the host country. This follows the basic rationale that knowledge flows much more easily within countries than across country boundaries (Audretsch & Feldman, 1996). These boundaries between knowledge pools in different countries persist because of linguistic, cultural, or institutional differences at the national level (Kogut, 1991). It can also be traced back to limitations in the willingness of knowledge carriers, e.g. scientists or engineers, to move (Almeida & Kogut, 1999). MNCs have been found to be especially efficient channels to overcome barriers in international knowledge flows. They can function as social communities with shared routines and understandings of knowledge across international subsidiaries (Kogut & Zander, 1993). Hence, tacit elements of the MNCs' knowledge stock can be transferred efficiently. Employees who are exposed to these intra-MNC knowledge flows can build a unique knowledge stock in the host country.

New employers can benefit from this access to unique knowledge in the host country along two dimensions. Firstly, they can increase the uniqueness of the firms existing knowledge stock by creating novel combinations (Cassiman & Veugelers, 2006). Unique knowledge facilitates the creation of products, processes, and services that cannot be easily imitated by competitors. This uniqueness makes it a major source of sustainable competitive advantage (King, 2007). Secondly, the acquisition of external knowledge allows firms to shorten the time and reduce the resources necessary for developing the knowledge in-house (Fleming & Sorenson, 2004). In sum, displaced employees of foreign MNC subsidiaries have a higher potential to create value for their new employers than the average displaced employee. Their salaries should therefore be comparatively higher.

However, the knowledge originating from foreign MNCs is also significantly more distant from the knowledge stock of the average new employer in the host country. The domestic environment

shapes the knowledge stock of firms and their employees. They become aligned with the host country environment based on exposure over time, through interactions, feedback mechanisms, as well as shared experiences (Zaheer & Mosakowski, 1997). In this regard, the knowledge that employees can acquire from foreign MNC subsidiaries is necessarily more distant. Employees of MNCs operate in a dual context (Almeida & Phene, 2004). Practices and procedures have to be compatible with both host country as well as intra-MNC requirements. This implies that by design, foreign MNC subsidiaries cannot seamlessly fit into the host country context because this would create frictions within the MNC. Mezias (2002) finds for example that intra-MNC management practices increase the probability for labor lawsuits of subsidiaries in the US. Foreign MNC subsidiaries have been found to suffer from a persistent liability of foreignness, resulting in comparatively more frequent errors, risk, and additional costs (Zaheer, 1995; Zaheer & Mosakowski, 1997). Hence, the knowledge that a displaced employee has acquired at a foreign MNC subsidiary will be more distant from the new employer's knowledge stock compared with the average displaced employee. With increasing distance, a new employer would find it difficult to evaluate the knowledge that the displaced worker could bring to the company. As a result, the salary of the displaced worker could be expected to be lower than for domestic counterparts.

In conclusion, we arrive at a theoretical model in which displaced employees differ from the average displaced employee along two dimensions. The knowledge that the displaced employees have acquired at the foreign MNC subsidiary is valuable but also more distant for new employers in the host country. We argue that the theoretical predictions on the new salary of these displaced employees depend on the degree to which they were exposed to foreign knowledge. In this sense, all displaced workers have a profile based on the knowledge acquisition in their previous firm that consists of domestic and foreign knowledge. The total knowledge that they have acquired while working for a firm is finite. A displaced employee of a domestic firm would have a knowledge profile that is 100% domestic without any foreign knowledge. This would not be rare for a new employer but also not distant and therefore not difficult to transfer, all other things being equal. The distinctive value of the knowledge of a displaced employee increases with the share of foreign knowledge, but so does the

distance with the new employer's knowledge stock because the domestic component decreases. In extreme cases, the displaced worker was exclusively exposed to foreign knowledge. This would imply that both potential value and distance are at a maximum. A future employer could acquire a great deal of otherwise unavailable knowledge by hiring the displaced worker but would have hardly any basis on which to evaluate it. We conclude that a combination of domestic and foreign knowledge outperforms the extreme cases of strictly domestic and strictly foreign knowledge profiles. The relationship of the share of foreign knowledge that a displaced employee was exposed to and her salary with a new firm can therefore be expected to be inverse u-shaped. We propose:

> Hypothesis 1. The relationship between the level of a displaced employee's exposure to foreign knowledge and her salary in the new job is inverse u-shaped; i.e., it increases up to a certain threshold after which it declines.

Performance deficits are the primary reason for the closure of international MNC subsidiaries (Berry, 2012). This would suggest that the knowledge that a displaced employee can bring to a new firm is generally less valuable. However, the performance comparisons of MNC subsidiaries are based on intra-MNC benchmarks and reference groups. They cannot be readily extended to comparisons with host country rivals. Put differently, an MNC subsidiary may be very successful compared to host country competitors and still be closed down because the MNC can shift its activities to subsidiaries with even higher productivity (e.g. based on comparative cost advantages).

MNC subsidiaries are heterogeneous in the roles that they perform for the MNC as a whole. Some subsidiaries have mandates that are merely exploiting existing MNC knowledge, e.g. in production, while others explore new products, processes, and markets (Cantwell & Mudambi, 2005). For the purpose of our study it is important that subsidiaries of an MNC are in competition with one another for these mandates (Birkinshaw & Hood, 1998). The decision on the closure of a particular MNC subsidiary is therefore not necessarily an indication of its own performance. It merely implies that another subsidiary can take over its mandate based on superior capabilities.

A firm interested in hiring the displaced employee of a foreign MNC subsidiary will assign little relevance to intra-MNC comparisons of subsidiary performances. Instead, the firm will evaluate

the knowledge that the displaced worker can bring to the company relative to host country standards. The value that a new employer can therefore assign to a displaced worker depends on how productive the foreign MNC subsidiary was compared to the host country average. A highly productive foreign MNC subsidiary may have been closed down based on intra-MNC criteria. The same logic cannot be applied to displaced employees of strictly domestic firms.

In sum, we have argued in hypothesis 1 that the relationship between the salary of a displaced employee and her exposure to foreign knowledge is inverse u-shaped in nature. This curvilinear relationship is essentially the result of a trade-off between the unique value of the knowledge that a displaced worker of a foreign MNC subsidiary can bring to the new company and the distance of this knowledge from the firm's existing knowledge stock. Based on the previous arguments, we conclude that the value of the knowledge from the closed down MNC subsidiary is higher if the subsidiary was more productive than the host country average, all other things being equal. Consequently, for displaced employees of highly productive, foreign MNC subsidiaries, the threshold at which the value of the knowledge that they bring to the new company is outweighed by increasing costs for absorbing it, should occur at higher shares of foreign knowledge in a displaced worker's knowledge profile. Put differently, the knowledge of a displaced employee of an unproductive, foreign MNC subsidiary would not outweigh the costs for absorbing it into the new employer's knowledge stock. We propose:

> Hypothesis 2. The relationship between the level of a displaced employee's exposure to foreign knowledge and her salary in the new job increases up to a certain threshold after which it declines, and this relationship is positively moderated by the productivity of the foreign MNC subsidiary. This threshold occurs at higher levels of the displaced employee's exposure to foreign knowledge.

Finally, the new employers of displaced workers cannot be assumed to be homogeneous in their ability to absorb foreign knowledge. Some may benefit more from access to foreign knowledge through displaced employees than others. A major discussion in International Business literature has been whether leading or lagging firms benefit more from international knowledge (for recent reviews see Meyer & Sinani, 2009 or Salomon & Jin, 2010). The leading or lagging status is typically inferred

based on the technological capabilities of a company compared to the average firm in a country and an industry. Intuitively lagging firms have more to gain from accessing international knowledge. However, most empirical studies find that leading companies benefit most from acquiring international knowledge (Penner-Hahn & Shaver, 2005; Salomon & Jin, 2010).

There are two primary explanations for these findings. Firstly, leading companies can already draw from a superior knowledge stock. This allows them to realize more valuable complementarities when they integrate this existing knowledge stock with foreign knowledge (Penner-Hahn & Shaver, 2005). Secondly, a firm's ability to absorb external knowledge depends upon its prior related knowledge (Cohen & Levinthal, 1994). A firm with an established, superior knowledge stock will find it easier to identify valuable knowledge in its environment, assimilate it with existing knowledge stocks, and exploit its value more fully (Cohen & Levinthal, 1990, Cohen & Levinthal, 1989). Taking both arguments together, lagging firms will find that the foreign knowledge is of comparatively less use for them but very costly to absorb (Meyer & Sinani, 2009).

This line of argumentation can be directly translated to our setting. A leading host country firm should be able to derive more value from hiring the displaced employees of foreign MNC subsidiaries because it has more opportunities to exploit valuable complementarities and larger capacities to absorb the knowledge. This implies that the trade-off between the value of foreign knowledge and its distance to existing knowledge stocks is less pronounced. Leading firms can absorb more foreign knowledge before experiencing the detrimental effects from absorbing distant knowledge. We hypothesize:

> Hypothesis 3. The relationship between the level of a displaced employee's exposure to foreign knowledge and her salary in the new job increases up to a certain threshold after which it declines, and this relationship is positively moderated by the productivity of the hiring firm. This threshold occurs at higher levels of the displaced employee's exposure to foreign knowledge.

EMPIRICAL STUDY

Data and Sample

We use the Quadros de Pessoal (QP) micro-data, a Portuguese longitudinal matched employer-employee data set for the period 2002-2009 to test the hypotheses. Portugal is an especially fitting host country on which to study our research question because the country has been a major recipient of foreign direct investment (FDI) following its accession to the European Union (EU) and the single European currency, the euro (OECD, 2013). This is mostly explained by comparatively low labor costs, economic reforms, and access to the large EU markets. However, the country has found itself in competition for FDI with Eastern European countries joining the EU. Portugal has attracted investments from major, foreign MNCs such as Volkswagen (Germany) and Renault (France) but has also experienced painful retreats of foreign MNCs such as when the biggest exporting firm of the country, the subsidiary of German semiconductor producer Qimonda, closed its operations down, and when General Motors moved production to Spain. Hence, Portugal provides an ideal setting for studying displacement following foreign MNC subsidiary closures. Portugal has been suffering recently from a financial crisis, which required severe macroeconomic corrections. We therefore choose an observation period from 2002 to 2009 that should not suffer from these extraordinary effects. In sum, Portugal provides an empirical setting in this period that allows generalizable insights for many other medium technology-intensive countries worldwide that compete for FDI.

QP is gathered annually by the Portuguese Ministry of Labor and includes data from all private firms with at least one wage earner. Participation is mandated by law, and misinformation is punishable. The integrity of the data collection is therefore high. Biases originating from selection or narrow industry coverage can be eliminated (the data do not cover public administration). The survey collects detailed information on each individual employee as well as basic information about the firm, such as size, ownership, sales turnover, industry (ISIC), and location (NUTS).

Each annual survey includes 300,000 firms and nearly 3,000,000 workers who can be tracked over time through a unique identification number. Our sample comprises employees who moved from a closing firm to another firm in Portugal the subsequent year. Following Mata and Portugal (2002),

we classify a firm as a closing firm when it does not report information for three years in a row (this time lag allows the differentiation between firms that closed down and firms with missing values).[ii] Firms can also divest subsidiaries through alternative methods, e.g. sales or initial public offerings (IPOs) (Berry, 2012). For the purpose of our study, it is crucial to capture employee displacement following subsidiary closure. Employees may also experience changes in wages if their company is sold. We avoid this potential source of bias by including only employees from closed down firms (foreign and domestic) in our sample because we can apply identical closure identification to them. Our unit of observation is the individual displaced employee. We capture 138,256 displaced employees from 36,684 firms in our sample during the observation period. 646 foreign MNCs have closed subsidiaries during the observation period and displaced 17,139 employees.

Variables

Dependent variable. Based on the widely accepted assumption that the wage is a reflection of the value attributed by the firm to the employee (Ranft & Lord, 2000), our dependent variable is the hourly wage of the displaced employee in the new firm (in logs). We deflate it using the yearly consumer price index. The fact that we only observe employees who find a job after the displacement might imply a selection problem. Displaced employees may remain unemployed, retire, or stop searching for employment. Our dataset covers exclusively employed persons and cannot be merged with alternative data sources, e.g. unemployment records, due to data protection laws. This has two consequences for our empirical analysis. Firstly, our findings are limited to displaced employees who find a new job within one year and this should be born in mind when interpreting the empirical results. We conduct a consistency check estimation with a two-year time horizon which supports the results of the main model. Secondly, the estimations would only suffer from a selection bias if displaced employees of foreign MNC subsidiaries would have a significantly different probability for finding a new job than domestic counterparts. This is not the case. The correlation between foreign ownership of a former employer and the probability of finding a new job is just 0.07 in QP.

Independent variables. We argue theoretically that foreign MNC subsidiary employees have

foreign knowledge that differentiates them from domestic firm employees. However, knowledge is elusive to measure. There is a rich stream of literature on entry mode choices based on transaction economics, emphasizing that MNCs choose wholly owned subsidiaries as well as equity joint ventures depending on the level of intra-MNC knowledge that they will transfer to the host country and need to protect (Hennart, 2009). Firms increase equity shares when they face appropriability hazards of their knowledge (Oxley, 1997). The equity share of a foreign MNC in a subsidiary can therefore be considered as a proxy for the foreign knowledge that was transferred (Blodgett, 1991). We test our hypotheses by including a variable that measures the displaced employee's exposure to foreign knowledge: the percentage of foreign capital of the closing firm. Since we predict an inverse u-shaped relationship between this variable and the dependent variable, the squared term is also included. The share of foreign ownership is only an indirect measure of exposure to foreign knowledge.

Firms may also possess foreign knowledge based on exporting, and our variable based on foreign capital investment cannot capture this (Cassiman & Golovko, 2011). A control variable for exporting is not available. However, this factor induces a downward bias in our estimations because the displaced employees of export-intensive, domestically owned firms will end up in the control group. Significant findings should therefore be considered as conservative estimates.

In hypotheses 2 and 3 we claim that the value given by companies to the displaced employee's access to foreign knowledge is also dependent on the level of productivity of the closing firm and the level of productivity of the new employer. Productivity is measured as labor productivity, i.e. sales per employee. To test these hypotheses, we include the variables of sales per worker of the closing firm and sales per worker of the hiring firm in our model, and we interact them with the foreign capital variable. We follow Brauer & Wiersema (2012) for testing the shift of a threshold in the inverse u-shaped relationships (Hypotheses 2 and 3) and interact these variables with both the linear and the quadratic term of the share of foreign capital.

Control variables. We control for several other employee and firm characteristics that were identified by the literature to influence wage levels.

Firstly, we identify a number of control variables at the individual level. The level of education also influences the wage level of an employee. Three binary variables categorize employees according to their education level: basic, secondary, and college education. We include a binary variable controlling for gender, since female employees have been found to earn lower wages than their male colleagues. We also control for the employee's experience in the firm as well as in general through her age (Psacharopoulos, 1985). Furthermore, we control for the nationality of the employee including a binary variable that identifies foreign individuals. This allows us to eliminate biases originating from expat employees who may have provided foreign knowledge. Within each firm, employees have different functions that imply different levels of complexity, skill requirements, responsibility, and, consequently, wage. Therefore, we control for the employee's function within the closing firm by including two binary variables for functions: Professionals as well as managers/supervisors (apprentices, interns, and trainees as well as untrained workers constitute the control group).

Secondly, it is likely to expect serial correlation when using wages as a dependent variable. We include the average wage of the last two years that the employee worked for at the closed firm. This variable is specific to the individual employee but not merely a binary variable as with standard fixed effects estimations. Past wages allow controlling for any other unobserved factor not controlled elsewhere. Empirical models dealing with individuals are quite likely to suffer from these omitted variable biases because individuals are highly heterogeneous and wage differences could be based on hardly observable factors such as motivation or social connections. However, these factors should have become visible in the wages of the displaced employee in the past. We will return to this variable when describing the estimation method.

Thirdly, at the firm level, we control for the firm size, knowledge-intensity, the industry, and the share of foreign capital of the hiring firm. We measure the firm size using the natural logarithm of the number of employees in the firm. Larger firms may have more resources for hiring new employees

(Gibson & Stillman, 2009). Also, especially MNC subsidiaries have been found to vary in their knowledge-intensity (Cantwell & Mudambi, 2005). We use the share of employees with college education to capture this effect. We also include four binary variables that differentiate industries because the opportunities and mechanisms for absorbing external knowledge have been found to be highly industry-specific (Koehler, Sofka, & Grimpe, 2012): manufacturing (ISIC code 15-37), energy and construction (ISIC code 40-45), services (ISIC code 50-74), and community, social, and personal services (ISIC code 75-99). Our reference group is the primary sector (ISIC code 1-14). We include a binary variable that identifies individuals that did not switch industries (at the two-digit ISIC level) as it may indicate a separate devaluation of specific knowledge (Kletzer, 1998). The share of foreign capital of the hiring firm is included because, as discussed in the theory section, the existence of foreign capital may affect the wage policy of a firm and influence the dependent variable.

Fourthly, we control for differences in the efficiencies of labor markets. Labor markets are geographically confined. We include a binary variable that identifies firms located in Portugal's two large metropolitan areas (Lisbon and Oporto). These regions have an intense economic activity when compared with the rest of the country, since they contain around 70% of the wage employees present in QP.

Also, in more inefficient labor markets, new firms may not need to pay higher salaries for the value that they recognize in displaced employees because of a surplus in labor supply. This situation cannot be ruled out because, due to the closure, many job seekers will enter the job market at the same time. However, this situation would add a downward bias to our estimation results; i.e., it would become increasingly unlikely that we would find significant differences in wages. Hence, we may underestimate the effects but not overestimate them if labor markets are not fully efficient.

Finally, year binary variables are included for the years 2006, 2007, 2008, and 2009 in order to control for the business cycle (2005 is the reference year). The other years of the observation period are not used for the estimation because we calculate the past wage variable based on the initial years.

Descriptive Statistics and Correlations

Table 1 provides descriptive statistics (the correlation coefficients for the independent and the control variables are available upon request). The descriptive statistics allow the characterization of the average displaced employee in our sample: He is a 38 years old, Portuguese man with limited education and more than six years of tenure in the closing firm. He is hired by a firm in the same industry and earns a slightly higher wage than in the previous two years with the closing firm. We inspect the dataset for multicollinearity. We find an average variance inflation factor of 6.58 which is within commonly applied standards (for a discussion see Brauer & Wiersema, 2012). To ensure that estimation results are not biased by multicollinearity we conduct consistency check estimations that rely on sample splits instead of multiplicative interaction terms (Salomon & Jin, 2010). They provide no indication of multicollinearity determining the estimation results (see end of results section).

'Table 1 goes about here'

Estimation Method

Estimating empirical models with wage as the dependent variable has two primary challenges. Firstly, individuals have many unobserved characteristics that may bias the estimation results, e.g. motivation. Secondly, wages are highly time-dependent, e.g. based on union labor contracts, and serial correlation becomes a challenge. We address both issues by estimating dynamic fixed effects models, which include pre-sample information of the dependent variable (i.e. wages before displacement). Lach & Schankerman (2008) introduce this approach that has the advantage that it does not rely on the assumption of strict exogeneity of the regressors, leading still to efficient estimators and accounting for the impact of unobserved fixed effects on the firm level. The approach has multiple advantages (Salomon & Jin, 2010; Czarnitzki, Hottenrott, & Thorwarth, 2011). It reduces the risk for serial correlation of errors and allows for a dynamic, firm-specific component, as opposed to the static nature of most fixed-effect specifications.

RESULTS

Table 2 shows the results of the regression analyses. We report the coefficients of the dynamic fixed effects regression model. Model I shows the baseline model specification without any interaction effects and is the basis for testing hypothesis 1. Model II and model III introduce the interaction terms of the foreign capital variable with the productivity of the closing firm variable and with the productivity of the hiring firm, respectively. We test these hypotheses in separate models because of concerns of multicollinearity. These two models will allow us to test hypotheses 2 and 3.

'Table 2 goes about here'

Table 1 shows that the linear term of the share of foreign capital of the closed firm is positive and the quadratic term is negative and significant in all the specifications of the model. These findings support hypothesis 1 since they show an inverse u-shaped relationship between the share of foreign knowledge that a displaced employee was exposed to and her salary with a new firm. Figure 1 illustrates this finding. The threshold occurs at 63% of foreign ownership. Besides, we find that the salary of a displaced employee is a substantial 6% higher than the average for every standard deviation of foreign capital in the closed firm. Hence, the effect is significant and has considerable magnitude.

In sum, the wage of a displaced employee in a new firm increases with the level of her access to foreign knowledge until a certain threshold is reached. At this point, there exists an optimal balance between novelty and distance of the knowledge. Beyond this threshold, the advantages of exposure to foreign knowledge are outweighed by the need to absorb increasingly distant knowledge in the new firm. As stated in the development of the hypotheses, we find that the combination of domestic and foreign knowledge outperforms the extreme cases of strictly domestic and strictly foreign knowledge profiles.

'Figure 1 goes about here'

The main effect of the variable that measures the productivity of the closing firm, sales per worker, is positive and significant at the 99% level. The interaction effects with the linear and the quadratic terms of the foreign capital variable are also significant at the 99% level. The interaction with the linear effect is negative but positive with the quadratic term. These results show that for more

productive firms the inverse u-shaped relationship between the share of foreign capital of the closing firm and the wage of the displaced employee becomes flatter. The coefficients of the interaction terms do not provide an immediate answer to hypothesis 2 because with a change in the linear and quadratic slopes the threshold could shift in both directions. We graph the relationship in Figure 2. It shows the relationship between the foreign capital variable of the closed firm and wage in the new firm, at three different levels of productivity of the closed firm: 25%-percentile, mean, and 75%-percentile. It shows a shift of the threshold to higher values when the productivity of the closing firm increases, giving support to hypothesis 2 (equivalent mathematical derivation available upon request). Hence, the inverse u-shaped relationship tested in hypothesis 1 is positively moderated by the productivity of the closed firm.

'Figure 2 goes about here'

Model 3 shows similar results for the productivity of the hiring firm variable and for the associated interaction terms. The main effect of this variable is positive and significant at the 99% level. The interaction effects with the linear and the quadratic terms of the foreign capital variable of the closed firm are also significant at the 99% level. The interaction with the linear effect is negative and positive for the quadratic term. Figure 3 shows the relationship between the share of foreign capital of the closed firm and the wage in the hiring firm for three different levels of productivity of the hiring firm: 25%-percentile, mean, and 75%-percentile. The graph provides evidence that supports hypothesis 3 (an equivalent mathematical derivation available upon request). When employees join firms with higher productivity, the advantages associated to the novelty of the foreign knowledge gain more relative weight when compared with the possible disadvantages associated to knowledge distance. Hence, the inverse u-shaped relationship tested in hypothesis 1 is positively moderated by the productivity of the hiring firm.

'Figure 3 goes about here'

The results for the control variables are in line with the literature, showing the robustness of our model. Wages increase with education, age, experience, and degree of responsibility and are lower for female employees. At the firm level, firm size and productivity lead to higher wages.

We test the consistency of the estimation results through a variety of procedures such as alternative dynamic fixed effect specifications, replacing continuous variables of foreign capital with category-dummies and sample splits. All tests support our main findings and are available upon request.

DISCUSSION AND CONCLUSION

In this study we adopt the perspective of the displaced employees of closed MNC subsidiaries. We investigate the value of the foreign knowledge that they were exposed to while working for the MNC subsidiary for their new employers. Our theoretical predictions are fully supported by the empirical study. We find that the foreign knowledge is valuable when we compare displaced employees of closed MNC subsidiaries with counterparts of closed domestic firms. However, the relationship is not linear but inverse u-shaped because at a certain threshold the advantages of accessing foreign knowledge are outweighed by the costs of evaluating and absorbing it. This threshold occurs at higher levels of exposure to foreign knowledge if the MNC subsidiary was leading in the host country and when the new employer is leading in the host country. We had predicted the latter relationship based on the theoretical argument that these leading companies benefit more from combinations with an already existing superior knowledge stock and stronger absorptive capacities.

Our findings have immediate relevance for research and practice. From a research perspective the implications are threefold. Firstly, we introduce displacement as a channel for knowledge flows between MNC subsidiaries and the host country, an element which is currently absent in the literature (e.g. in the review of Meyer & Sinani, 2009). Our findings show that MNCs create a valuable pool of knowledge for host country firms when they close down subsidiaries. The displaced employees are conceptually different from employees who are selectively hired from other companies for acquiring knowledge (Song et al., 2003). In the case of displacement, the MNC makes knowledge carriers voluntarily available by closing down its subsidiary. The importance of this channel for knowledge flows is most likely underestimated in current International Business research because of two factors: closures occur frequently (Berry, 2012), and knowledge transfers through individuals are highly efficient (they can transfer tacit elements of knowledge as opposed to codified ones such as licensing)

(Agrawal, 2006). At the same time, we find that not all MNC subsidiaries produce knowledge of high value. Instead, the value increases with productivity of the closed down MNC subsidiary compared to the host country. Similarly, leading firms are more likely to extract value from the knowledge of the displaced employees when they hire them. Hence, future studies would (a) suffer from biases if they ignore the knowledge flow channel through displacement and (b) assume that knowledge sources and recipients from displacement are randomly distributed among host country firms.

Secondly, International Business studies have found a crowding-out of human resources in the host country when MNCs enter (De Backer & Sleuwaegen, 2003). Interestingly, the reverse mechanism cannot be assumed to hold when the MNC leaves. We find instead that parts of the knowledge that employees acquire while working for MNC subsidiaries cannot be valued by new employers once the distance to host country knowledge stocks increases.

Finally, Labor Economics has studied job displacement intensively (Kletzer, 1998). However, the specific situation of foreign MNC subsidiaries has been largely absent in the discussion so far. The situation of displaced employees of such firms is significantly different from all other displaced employees in the host country because they were exposed to knowledge that is otherwise not available. Subsequently, this knowledge is not only particularly valuable in the host country but also more distant and hence difficult to absorb. Studies that ignore this particular effect suffer from biased results.

With regard to practice we find three primary groups that will benefit from our findings. Firstly, individual job seekers can incorporate our findings in their decision making. Fully rational decision makers would like to maximize their earnings over the course of their careers. This includes necessarily the likelihood of being displaced. We find that the negative outcomes of such an event are comparatively lower if an employer provides both domestic and foreign knowledge. Such an employer should therefore be the preferable choice for a job seeker, all other things being equal. Secondly, the management of MNCs at global headquarters has to consider the valuable knowledge that it makes available to host country rivals when it closes down a subsidiary and must try to capture that knowledge. If the subsidiary under consideration for closing is productive by host country standards

and if there are host country firms that can absorb the knowledge embedded in its employees, a sale is preferable to the closure. Finally, policymakers are oftentimes called upon to intervene when foreign MNC subsidiaries close down. While the closure of foreign MNC subsidiaries can attract disproportionately more media attention, the displaced employees are generally better off than displaced employees of strictly domestic firms. Our findings indicate that support measures, such as temporary employment agencies, subsidies, and job centers, are best directed at displaced workers who had no or exclusive exposure to foreign knowledge. In both cases, the cuts in salaries that they can expect in the new job are especially pronounced.

Finally, our study provides future opportunities to understand in more detail the relationships that we discovered. Firstly, not all types of knowledge of displaced employees can be assumed to be equally valuable in new jobs. We suspect that relational knowledge, e.g. contacts to leading foreign customers or suppliers, could be at least as valuable as technological knowledge. Secondly, not all employees in an MNC subsidiary are exposed equally to foreign knowledge. Some may work intensively with colleagues in other subsidiaries and global headquarters while others may largely deal with domestic issues. Accordingly, their opportunities for absorbing foreign knowledge differ. Qualitative studies are required to study such distinctions in more detail.

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TABLES

Table 1: Descriptive statistics

Variable	Mean	Standard deviation
Wage in the new firm	5.940	5.324
Last 2 years average wage – old firm (log)	5.655	5.025
Foreign capital - old firm (share)	0.095	0.279
Sales per worker - old firm (in thousands)	135.979	580.669
Sales per worker - new firm (in thousands)	115.400	878.111
Basic education (d)	0.236	0.424
Secondary education (d)	0.216	0.411
Tertiary education (d)	0.107	0.309
Gender (d)	0.398	0.490
Age	37.861	10.065
Tenure in the old firm	6.367	7.081
No industry switch after displacement (d)	0.881	0.323
Foreign nationality (d)	0.052	0.223
Professionals (d)	0.659	0.474
Managers / supervisors (d)	0.128	0.334
Employees with higher education - old firm (share)	0.104	0.181
Foreign capital - new firm (share)	0.115	0.304
Size – new firm (log)	1550.737	4179.411
Location Lisbon/Oporto (d)	0.516	0.500
Manufacturing (d)	0.244	0.430
Energy (d)	0.151	0.358
Services (d)	0.514	0.500
Community, social and personal services (d)	0.066	0.248
2006 (d)	0.150	0.357
2007 (d)	0.194	0.395
2008 (d)	0.201	0.401
2009 (d)	0.206	0.405
Nº observations	138256	

Table 2: Results of dynamic fixed effects regression on hourly salary in new firm

	I	II	III
Foreign capital - old firm (share)	0.173***	1.864***	1.221***
	(0.018)	(0.139)	(0.186)
Foreign capital squared - old firm (share)	-0.138***	-2.463***	-1.651***
	(0.018)	(0.145)	(0.189)
Sales per worker - old firm (log)	0.001*	-0.000	0.001†
	(0.001)	(0.001)	(0.001)
Foreign capital - old firm * Sales per worker - old firm		-0.142***	
		(0.012)	
Foreign capital squared - old firm * Sales per worker - old firm		0.196***	
		(0.012)	
Sales per worker - new firm (log)	0.018***	0.017***	0.015***
	(0.001)	(0.001)	(0.001)
Foreign capital - old firm * Sales per worker - new firm			-0.089***
			(0.016)
Foreign capital squared - old firm * Sales per worker new firm			0.130***
			(0.016)
Last 2 years average wage – old firm (log)	0.728***	0.724***	0.726***
	(0.002)	(0.002)	(0.002)
Basic education (d)	0.031***	0.030***	0.031***
	(0.002)	(0.002)	(0.002)
Secondary education (d)	0.079***	0.077***	0.079***
	(0.002)	(0.002)	(0.002)
Tertiary education (d)	0.143***	0.142***	0.143***
	(0.003)	(0.003)	(0.003)
Gender (d)	-0.060***	-0.061***	-0.060***
	(0.002)	(0.002)	(0.002)
Age	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
Tenure in the old firm	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
No industry switch after displacement (d)	0.001	0.002	0.000
	(0.002)	(0.002)	(0.002)
Foreign nationality (d)	-0.006†	-0.006*	-0.006*
	(0.003)	(0.003)	(0.003)
Professionals (d)	0.057***	0.057***	0.058***
	(0.002)	(0.002)	(0.002)
Managers / supervisors (d)	0.184***	0.186***	0.186***
	(0.003)	(0.003)	(0.003)
Employees with higher education - old firm (share)	0.131***	0.129***	0.129***
	(0.005)	(0.005)	(0.005)
Foreign capital - new firm (share)	-0.004†	0.004	-0.003
	(0.003)	(0.003)	(0.003)

	I	II	III
Size – new firm (log)	0.011***	0.011***	0.011***
	(0.000)	(0.000)	(0.000)
Location Lisbon/Oporto (d)	0.016***	0.017***	0.015***
	(0.002)	(0.002)	(0.002)
Manufacturing (d)	-0.042***	-0.030***	-0.038***
	(0.005)	(0.005)	(0.005)
Energy (d)	-0.020***	-0.011*	-0.017***
	(0.005)	(0.005)	(0.005)
Services (d)	-0.018***	-0.007	-0.015***
	(0.004)	(0.005)	(0.005)
Community, social and personal services (d)	-0.011*	0.007	-0.005
	(0.005)	(0.005)	(0.005)
2006 (d)	-0.027***	-0.024***	-0.026***
	(0.002)	(0.002)	(0.002)
2007 (d)	-0.027***	-0.025***	-0.026***
	(0.002)	(0.002)	(0.002)
2008 (d)	-0.022***	-0.021***	-0.023***
	(0.002)	(0.002)	(0.002)
2009 (d)	-0.011***	-0.008***	-0.010***
	(0.002)	(0.002)	(0.002)
Constant	0.113***	0.129***	0.135***
	(0.009)	(0.009)	(0.009)
Observations	138,256	138,256	138,256
R-squared	0.813	0.814	0.814
F test	22308.526	20910.308	20859.100

† p<0.10, * p<0.05, ** p<0.01, *** p<0.001; standard errors in parentheses.

FIGURES

Figure 1: Foreign capital of the closed firm vs hourly wage

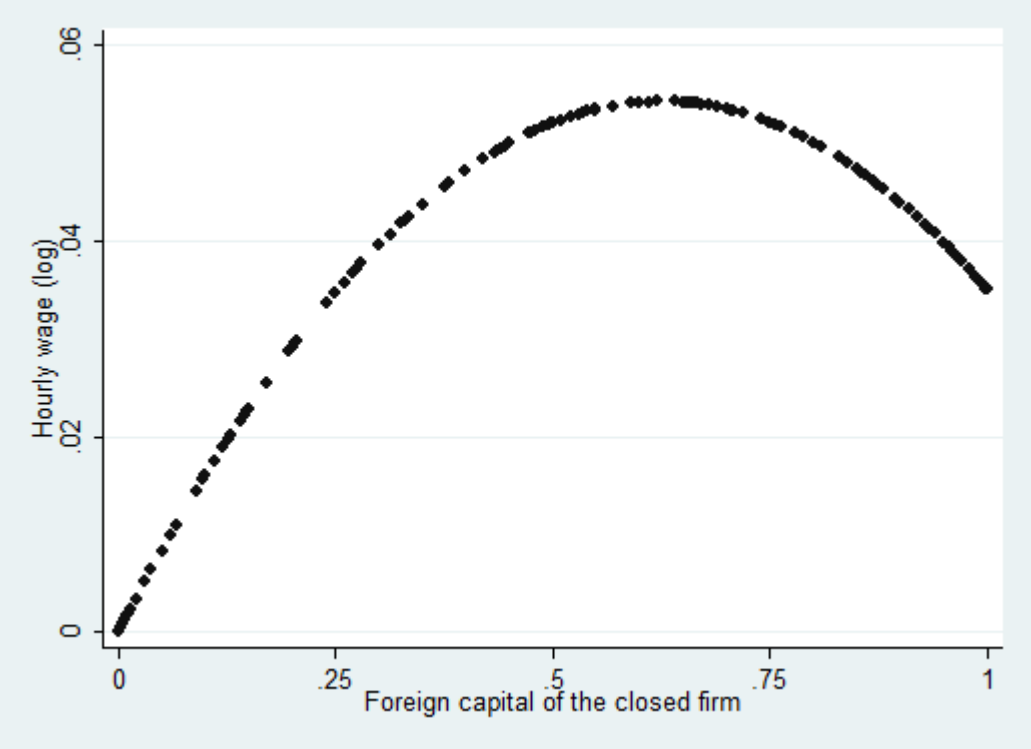


Figure 2: Foreign capital of the closed firm vs hourly wage for three different levels of productivity of the closed firm

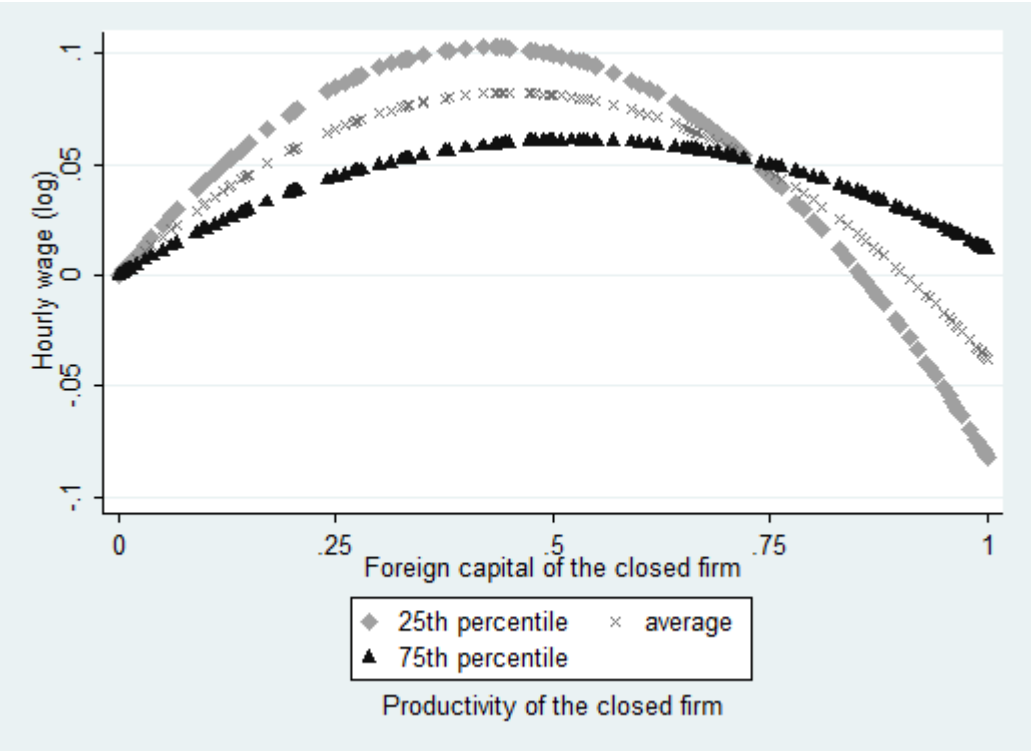
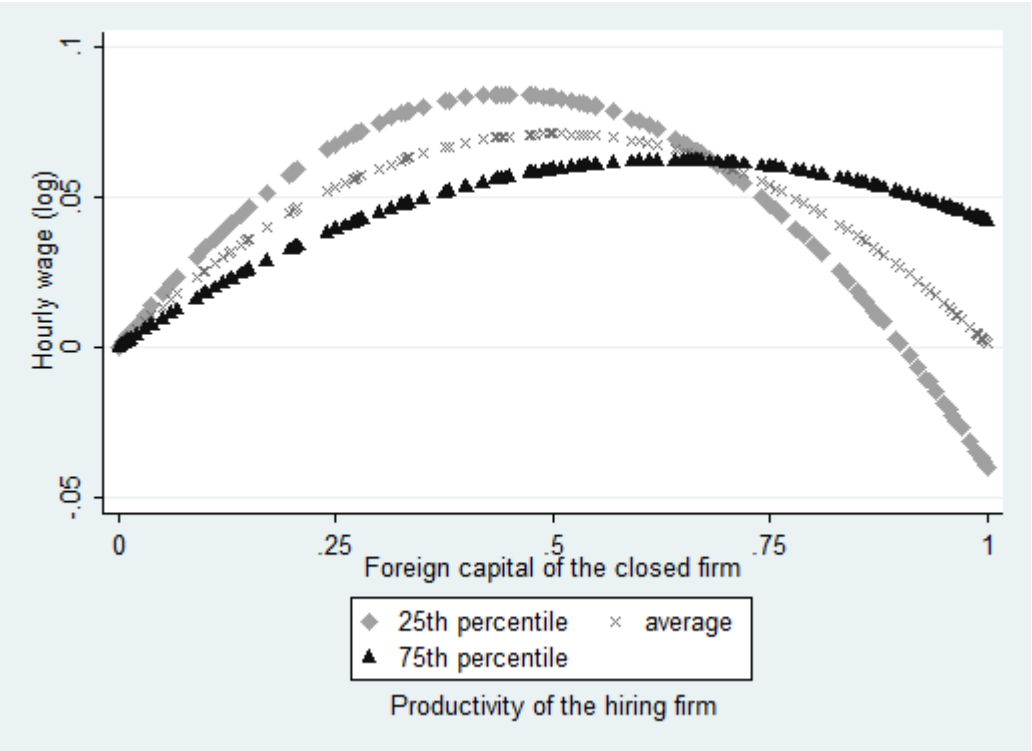


Figure 3: Foreign capital of the closed firm vs hourly wage for three different levels of productivity of the hiring firm



[i] For convenience in writing and reading, we choose the female form as a default when we refer to employees throughout the text, i.e. by using “she” and “her.” This should not be misunderstood as relating exclusively to women. All theoretical argumentations apply to male and female employees equally, but “her/his” and “she/he” would make the text harder to read and distract from the core of the article.

[ii] Based on this procedure, mergers and acquisitions cannot be ruled out; however, Mata and Portugal (2002) show that this problem occurs in very few cases and does not differently affect MNC subsidiaries and domestic firms. Therefore, this factor cannot be expected to bias our results.