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Does Outward Foreign Direct Investment affect domestic real wages? An investigation using French micro-data

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Abstract

This paper investigates to which extent outward foreign direct investment (FDI) affects domestic wages. We are first interested in the raw wage differential between multinational and domestic firms. Results reveal that multinational companies pay a wage premium to their employees, even within precise skill-groups (blue-collar workers, intermediate occupations and managers). The wage premium is increasing within the wage distribution. In a second step, we use spell of workers within a firm in a fixed effect model to analyze the effect of outward FDI within job-spells. Results suggest that outward FDI raises wages for managers and reduces wages for workers performing offshorable tasks. The positive effect of FDI on managers' wages is mainly driven by the intensive margin of outward FDI, that is by large firms already established abroad. This result is observed even after controlling for endogenous workers' mobility.

JEL: J24, J31, D21, D23
Keywords: Offshoring, Tasks, Wages, Inequality

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1 Introduction

One important issue in international economics is to understand to which extent globalization contributes to wage inequalities between- and within-demographic groups. Earlier research found a modest impact of globalization on wages and has rather pointed out the effect of technological progress (Katz and Autor (1999), Autor et al. (1998), Krueger (1993), Berman et al. (1994)). Former studies captured wage inequality between low- and high-skilled workers through inequality between sectors. Yet, recent empirical contributions have shown that much of the overall wage inequality occurs within sectors and occupations rather than between sectors and occupations (see Helpman et al. (2012) for evidence on Brazil, Baumgarten (2013) for evidence on Germany, Faggio et al. (2010) for evidence on UK and Akerman et al. (2013) for evidence on Sweden). Previous findings may thus have neglected potential effects on wage inequality within industries and within skill groups.

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As a consequence, recent theoretical models place firm and individual heterogeneity as the core transmission channel of wage inequality, through rent-sharing mechanisms and labor market frictions (Helpman et al. (2010), Davidson et al. (2010), Egger and Kreickemeier (2009)). This theoretical background has opened new areas of empirical research, requiring very detailed employer-employee data to analyze the causes of wage inequality. A recent branch of the literature has focused on the effect of trade and imports of intermediate inputs on within job-spell wages at the firm level (Hummels et al. (2011), Amiti and Davis (2011)) and at the industry level (Autor et al. (2013)). These studies suggest that offshoring has increased wage inequality between high- and low-skilled workers (Geishecker and Görg 2008; Munch and Skaksen 2009; Hummels et al. 2011), and that low-skilled workers appear more vulnerable to import competition from low-wage countries (Autor et al. (2013)). Another part of the literature has focused on wage difference between exporting and non-exporting firms (Baumgarten (2013), Krishna et al. (2011), Helpman et al. (2012), Schank et al. (2007) and Carluccio et al. (2014) using French data). Results suggest that exports contribute to increase wage premiums of high-skilled workers because their employer's internationalization allows them to bargain over higher profits.

In this paper, we use rich French firm-level panel data with matched information on workers' characteristics to study the effect of outward foreign direct investment (FDI) on job-spell wages. The case of France is particularly interesting to study wage inequality, because -compared to others industrialized countries- the rise of wage inequalities has been limited in France (Fontagné et al. (2014)). France is one of the five OECD countries where income inequality and poverty have declined over the past 20 years and this result is mainly due to labor market institutions (OECD 2008).

Evidence on the impact of outward FDI on wages is relatively scarce. Yet, foreign direct investment is an important contributor of the internationalization of firms. In the United States, roughly one-half of U.S imports are transacted within the boundaries of multinational firms rather than across unaffiliated parties (Bernard et al. (2009)). In France, several reports stress that large multinational companies have favored internationalization through in-house foreign production, compared to german firms who has favored internationalization through arm's length production (Fontagné and Toubal (2010)). According to the French office of statistics (Insee), French-owned multinational firms (approximately 3 100 business groups) represented nearly 35% of total employment in French companies in 2011 (excluding the agriculture sector) and 57% of their total value-added. Therefore, outward FDI has potentially a large effect on French workers' working conditions and wages.

Different mechanisms should intervene according to the nature of FDI. First, FDI can act as a form of offshoring if the creation and/or the acquisition of a foreign company allows firms to break up the value chain in several countries, which is often referred to as vertical FDI. Vertical FDI might imply the relocation of low-skilled activities abroad, which might reduce the wage paid to unskilled workers at home, depending on whether domestic and foreign employment are substitutes or complements. Second, outward FDI can be market-seeking and does not necessarily increase the fragmentation of the production process, which is often referred to as horizontal FDI. Market-seeking FDI should mostly affect domestic wages through its effects on the localization of profits and/or the bargaining process of wages. The extent to which domestic workers might benefit from their firm's international expansion will depend on two parameters. First, the share of foreign profits which are repatriated, which especially depends on tax rate and growth

prospects differentials between the home and the foreign country[1]. Second, information asymmetries in the bargaining process, which may give an advantage to the employer since only the employer has the full information about the productivity of foreign plants and/or the share of foreign profits which are repatriated. Domestic workers lacking information about the firm's profitability might lower their wage demands in order to increase the probability of acceptance, as argued by Creane and Davidson (2008) .

Finally, horizontal and vertical FDI might both affect wages through what is known as the "threat effect" (Choi, 2001). Employers' ability to resort to foreign production increases their bargaining power in the wage negotiation, since workers may fear to lose their jobs. For example, using French micro data, Kramarz (2013) shows that the implementation of the Single Market Program (at the end of the 1980s) increased the opportunities for outsourcing and led to significant employment and wage cuts in firms with strong unions. We can apply the same reasoning for multinational firms. The existence of foreign affiliates allows firms to substitute domestic workers with foreign workers more easily, since the sunk costs of FDI have already been supported[2]. A second production facility abroad improves the outside option of a multinational enterprise in its wage bargain with the domestic union.

In this article, we use a very detailed dataset for France covering the period 2002-2007. The data allows us to control for individual characteristics (sex, age, diploma, occupation) as well as firms' (exports and imports, size, productivity, sector). The use of detailed information on employees' characteristics makes it possible to disentangle the effect of foreign direct investment on wages depending on the nature of tasks performed. From the seminal work of Grossman and Rossi-Hansberg (2008), firms trade tasks rather than intermediate inputs and the job content of occupations is a key component of the identification of the winners and the losers in the globalization process. Indeed, skilled and unskilled workers are no longer considered as homogeneous groups who have suffered the same impact following foreign direct investments. Following recent empirical articles, we build different classification of jobs, in terms of skill levels, tasks and occupations (Baumgarten et al. (2013), Geischecker and Gorg (2008), Ebenstein et al. (2009)).

We capture outward FDI with different proxies: the number of subsidiaries abroad, the number of countries deserved by FDI and the international status of the firm (domestic and multinational). Most importantly, we are able to control for other margins of globalization by including imports of intermediate inputs, imports of finished goods and exports. This constitutes a great advantage with respect to the existing literature, since it allows to account for all the firms' internationalization strategies.

Our main results are the following. First, we observe that multinational companies pay a wage premium to their employees, even within precise skill-groups (blue-collars, intermediate profession, managers). The wage premium is increasing within the wage distribution: the wage premium of multinational firms is higher among high-paid workers than among low-paid workers. In a second step, we control for firms and workers' characteristics by using the statistical framework of Abowd, Kramarz and Margolis (1999)

[1]To our knowledge, no paper has investigated the impact of outward FDI on the level of profits in the home country. See Davies et al. (2014) for a recent survey of the literature interested in profit-shifting strategies.

[2]In France, according to a recent survey on global value chains, firms which belong to a business group and report having offshored some part of their domestic activities between 2009 and 2011 indicate that jobs were mostly offshored either to existing foreign affiliates or to foreign subcontractors (see Fontagné and D'Isanto, 2013).

(AKM hereafter) where the determination of wages depends on (i) time varying observable worker and firm characteristics and (ii) firm and worker fixed effects. One crucial concern when attempting to estimate the effect of FDI on wages is that the most productive firms might also be those able to screen workers with greater abilities and skills (which are more likely to seize their employer's surplus in the wage bargaining process). If the matching process between workers and firms is determined by workers' unobservable characteristics, estimates of the effect of FDI on wages may be biased. We thus control for endogenous mobility by including firm-individual match fixed effect in our econometrical specification, following Krishna et al. (2012) and Woodcock (2007). We find this formulation to give little insight with respect to the original formulation of AKM (1999)[3]. Regardless of the model specification, we find two interesting results. First, exports raise wages paid to blue-collar workers and intermediate occupations. Second, outward FDI explains significantly the rise of managers' wages within the firm and reduces the wages of workers performing offshorable tasks. The positive effect on managers' wage is mainly driven by the intensive margin of outward FDI, that is by large firms already established abroad. One explanation of the positive effect of outward FDI on managers' wages might come from their greater ability to capture their firm's productivity gains, or might be the counterpart of greater responsabilities (consisting in monitoring foreign affiliates for example). The negative effect of outward FDI on offshorable tasks is consistent with the existence of substituability between low-skilled workers performing offshorable tasks at home and workers in foreign affiliates.

The paper is organized as follows. The next section gives a brief review of the literature. Section 3 describes the data and the main variables. Section 4 analyzes the results of the wage gap between multinational- and domestic-workers. Section 5 estimates the wage effect of FDI within job-spells and Section 6 concludes.

2 Related literature

There are two sets of theoretical models identifying the source of wage variation across firms. The first line of research assumes neoclassical labor markets in which workers with the same characteristics are paid the same wage. Wages may differ across firms because of differences in the workforce composition. In Yeaple (2005) and Bustos (2011) for instance, a technology shock following trade liberalization may result in a reallocation of workers from the old to the new technology, which increases the demand for qualification. Verhoogen (2008) also highlights the role of production reallocation in favor of high-quality goods on the demand for skills. Hence, following the same reasoning, if multinational firms engage in quality upgrading, average wages in multinational firms should increase due to changes in the skill composition.

The second line of research introduces labor market frictions, so that workers with the same characteristics can be paid different wages by different firms. The first set of labor market frictions is related to the matching process between firms and workers. Since screening workers' abitities is costly (publication of adds, search of candidates, conducting interviews), the most productive firms have a comparative advantage in screening more accurately workers' abilities. The existence of screening costs implies that firms are willing to pay higher wages in order to avoid replacement cost of higher ability workforce (Helpman et al. (2010)). Hence, *ex ante* identical workers may receive different wages, depending on

[3]Card et al. (2012), Davidson et al. (2014), Macis and Schivardi (2014) also find that adding a match specific component yields only a small improvement in the fit of the model.

the employer they are matched with. Since exporters and multinationals exhibit higher levels of productivity (given that exports and FDI imply sunk costs), these firms might also have a greater ability of screening workers and attracting the best profiles.

The second set of labor market frictions lies in the wage bargaining process. First, higher profits can result in higher wages if the wage perceived to be fair increases with firms' revenue (Amiti and Davis (2012)) and if more profitable firms need to pay higher wages in order to elicit workers' full efforts. An additional source of wage inequality within skill groups comes from the use of performance-based pay, which becomes a predominant method of rewarding executive managers (Holmström and Milgrom (1987)[4]. The use of performance-based pay may increase wage inequality within precise skill groups by creating different wage agreements depending on (i) workers' ability to bargain over the firm's surplus and (ii) firms' need to elicit some workers' effort. Based on Norwegian data, Barth et al. (2009) highlight the contribution of pay schemes based on individual output to the rise of within-firm wage inequality. Increasing foreign market competition seems to increase the use of performance-related pay within companies, as suggested by Cuñat and Guadalupe (2009). They show that a higher level of product market competition increases the performance-related component of compensation schemes for executives, but not for workers.

There are three types of empirical studies analyzing the effect of globalization on wage inequality: those analyzing the effect of offshoring, those analyzing the effect of exports and those analyzing the effect of inward foreign direct investment.

The first part of the literature has analyzed the effect of offshoring, as measured by imports of intermediate inputs on wage inequality. Ebenstein et al. (2010) seek to analyze the effect of offshoring on US workers' wage over the period 1983 to 2002, at the industry level and at the individual level. They first use data on the U.S. manufacturing sector between 1979 and 1990 and find modest effects of offshoring on wages. They argue that focusing on workers which stay within the manufacturing sector might lead to underestimate the effect of offshoring on wages. Workers' wage cuts may be more important when they are pushed to search for a new job outside the manufacturing sector. The authors indeed show that the wage impact of offshoring is higher when the analysis is redefined at the occupational level. On German data, Baumgarten et al. (2010) study the effect of offshoring on wages. They investigate to which extent workers with highly interactive or non-routine occupations are more affected by offshoring than routine occupations. They show that increased offshoring (approximated by imported intermediate inputs) reduces by 0.38 euro the hourly wage of medium skilled workers when performing routine tasks, and increases the hourly wage for medium-skilled workers performing non-routine tasks by 0.07 to 0.27 euro. They also analyze the wage effect of offshoring when workers move across industries by applying the same methodology as in Ebenstein et al. (2010). The authors observe a greater wage cut than the one observed in the partial equilibrium case. Hummels et al. (2011) track workers outcome after a job spell. The authors' idea is to test whether wage losses for workers displaced from outsourcing are more pronounced than for workers displaced for other reasons, because their skills become obsolete and are specialized in tasks imported from abroad. They observe that workers excluded from firms that have increased their intermediate goods imports experience a larger wage decline than those excluded from other firms. They also note that both skilled and unskilled workers suffer a pay cut, but this decline is lower for skilled workers. Finally, they study the wage

[4]According to Lemieux et al. (2007), an increasing fraction of jobs in the U.S. labor market explicitly pay workers for their performance, using bonus pay, commissions, or piece-rate contracts.

effect of outsourcing shocks conditional on occupational characteristics. They observe that wage gains are larger for social science or language skill intensive occupations.

The second part of the literature has analyzed the effect of exports on wage inequality. Klein et al. (2013) highlight a significant wage premium for high-skilled workers and a wage discount for low-skilled workers among exporting firms. They show on German data over the period 1993-2007 that export activity is associated with up to 30% of within and between skill group wage inequality. Baumgarten (2013) show that this exporter wage gap, conditional on workers' skill levels, contributed to the growth in wage inequality in Germany. Krishna et al. (2011) find a positive effect of trade liberalization in Brazil on average wages at exporting firms compared to non-exporting firms. However, this effect turns out to be insignificant when controlling for endogenous assignment of workers. Amiti and Davis (2012) use Indonesian data over the period 1991-2000 and show that a fall in output tariffs increases wages at exporting firms. Finally, Helpman et al. (2012) estimate a modified version of the model developed in Helpman et al. (2010) on Brazilian data. They show that openness to trade raises wage inequality by around 10 percent.

The literature has also analyzed the effect of inward FDI on wages. Most studies on developed and developing countries find that foreign-owned firms pay higher wages, on average, than privately owned local firms (see Girma and Gorg (2007) for the United Kingdom, Huttunen (2007) for evidence on Finland, Lipsey and Sjoholm (2010) for evidence on Indonesia, Heyman et al. (2007) for evidence on Sweden and Feenstra and Hanson (1997) for evidence on Mexico). The existence of spillovers has been indicated as one of the reasons why inward FDIs might benefit a host economy. Indeed, imitation of technological innovation and workers' mobility from foreign-owned to domestic firms may increase the productivity of other firms in the host country (Fosfuri et al. (2001)).

However, little attention has been paid on the effect of outward foreign direct investment on wages. The choice to realize an outward foreign direct investment compared to international subcontracting is a deliberate choice, often realized to protect against subcontractors' opportunistic behavior and against technology leakages. Outward FDI may lead to transfers of firms' specific technological and managerial knowledge in foreign affiliates, which may hurt skilled workers depending on whether foreign and domestic skilled-workers are complements or substitutes. On the one hand, outward FDI may raise the need for specific language, communication and supervision skills in the home country, which in turns may raise the wages of workers holding those particular skills. On the other hand, the transfer of skilled-intensive production may reduce wages for skilled workers if they become substitutes with workers in foreign affilliates. This article intends to shed more light on the effect of outward foreign direct investments on wages within different occupational groups.

3 The data

Our database is constructed with six micro-data sources. Three of them are employee-level databases (Déclaration Annuelles des Données Sociales (DADS), Échantillon Démographique Permanent (EDP), the French survey on working conditions). These data share a common firm identifier in order to merge them with three others firm-level databases ("Liaison Finanière" dataset (LIFI), customs data and "Enquête Annuelle Entreprise" (EAE)).[5]. Since several changes have been conducted to improve these databases, we

[5]We are really grateful to the CASD, the Genes (groupes des écoles nationales d'économie et de statistique) and the national institute of french statistic for having provided these data.

only provide detailed descriptions of the data for our period of observation (2002-2007).

Employee Level Information. The administrative panel - Déclaration Annuelles des Données Sociales - is built from confidential yearly social-security records, treated and transmitted by the French National Institute for Statistics (INSEE). Administrative records are based on firms' mandatory report of workers subject to payroll taxes to fiscal authorities. The database covers all firms in the private and public sectors. From this administrative record, a panel of individuals born in October is built. Each observation consists of an employer-employee match and reports the sex, age, residence and workplace's region, yearly real earnings (in 2007 euros) and the number of hours and days worked each year by the individual[6].

Since wages and careers are likely to be affected by personal events such as birth or marriage, we use data enhanced by information from the Permanent Demographic Sample ("échantillon démographique permanent", EDP). The Permanent Demographic Sample is augmented with variables from the annual census surveys. Currently, about 900,000 individual's social and professional trajectories are well tracked. The sample includes all the civil status and information from census surveys for individuals born one of the first four days of October each year. This data source gives details on education, marital status and number of children.

Finally, we use the French working condition survey produced by the French "Direction de l'Animation de la Recherche, des Etudes et des Statistiques" (DARES) in 2005. The inquiry is realized every 7 years on a sample of 19,000 workers and measures several aspects of working conditions based on the statements of employees. In particular, we are interested in questions related to the use of computers. We derive an index on the intensity of the use of computers at the occupation level. The index is derived from the yes/no question: "do you need to work, even occasionally, with a computer connected to a network or to other computers?". A negative answer is coded 0 while a positive answer is coded 1. We build an index reflecting the intensity of the use of computer at the occupational level. The index is the ratio of the sum of answers over the total number of workers in a particular 2-digit occupation, such as $\frac{1}{n_{io}} \sum_i d_{io}$ where d_{io} is a dummy equal to 1 if the worker i answers 'yes' to the question on the use of computer and 0 if the answer is no. n_{io} is the total number of workers i in a particular occupation o. The more workers in a particular occupations declare using computers, the higher the index is[7].

We build a second task index in order to measure the routinization of occupations. We aim at providing an index that captures the routine nature of tasks, in order to classify occupations according to their offshorability. The index is built on nine specific questions about job activities, ranging according to their frequency. These questions are related to a number of tasks: routine manual tasks, non-routine interactive and analytical tasks. The higher the index is, the more workers perform routine tasks and the easier it is to relocate these occupations.

We map the index of offshorability to occupations in three steps. First, we sum the values attributed to each answer to the nine questions for each respondent. Second, we

[6]Workers in the DADS can be identified in several position, we only keep the worker-firm match for which the job spell and salary is the highest.

[7]Managers have an index of 0.905 (90% of respondents in the occupation of managers declared using a computer), engineers have an index of 0.931, administrative workers of 0.805, technicians of 0.799, foremen of 0.610, secretary of 0.805, skilled blue collar workers of 0.311 and unskilled blue collar of 0.206.

calculate the average of the index for the 412 PCS-ESE 4-digit occupations. Finally, we normalize by the maximum and minimum index value in any occupation so that the offshorability index varies between zero and one across occupations. With this standardization, each occupation is assigned a number between 0 and 1 that measures its degree of routine tasks. More details about the construction of the index is given in appendix A.

Firm level information. Firm level information comes from two confidential databases. The first one is the *"Liaisons Finanières"* survey (LIFI), which collects all financial links involving at least one French firm and allows to identify firms which own at least one FDI (i.e. firms having 10 % or more of voting stock in a foreign firm). We are able to identify both the firm's parent company and the firm's foreign subsidiaries. We sum the number of foreign subsidiaries in order to construct our FDI measure. We control our results by building a second measure of FDI as the number of countries where the firms owns at least one FDI.

Second, we use a firm survey from the French Manufacturing Census, called *"Enquête Annuelle Entreprise"* (EAE). This database provides the detailed income statements of all French manufacturing firms with more than 20 employees. The database allows to build several control variables of the firm's characteristics, such as tangible assets, revenue and firm's productivity. The firm's productivity is approximated by a measure of total factor productivity which is derived from the approach of Levinsohn and Petrin (2003) allowing to control for endogeneity, resulting from the correlation between unobservable productivity shock and input level. We use operating expenses as the proxy variable for productivity shocks, value-added as the dependent variable as well as the number of employees as a proxy of the labor force and the total fixed assets as a capital proxy[8].

Finally, the last database is derived from the French customs and contains the amount of exports and/or imports by product (CN8 nomenclature) and by destination country for each year between 2002 and 2007. We distinguish imports of finished and imports of intermediate goods. Finished goods are defined as CN8 products that correspond to the same 3-digit NACE code of the main activity of the firm[9]. Other imported goods are defined as intermediate goods. Our measure of outsourcing is the share of imports of intermediate inputs and finished goods over the firm's sales: $\frac{II_{it}^c}{T_{it}}$ and $\frac{TG_{it}^c}{T_{it}}$ respectively, with II_{it}^c corresponding to firm's i imports of intermediate inputs at time t from country group c, TG_{it}^c corresponds to the firm's imports of finished goods at time t from country group c, and T_{it} the firm i sales at time t. We define two groups of countries. The group of high-income countries corresponds to high-income OECD countries (as defined by the OECD in 2007)[10] and the group of low-income countries corresponds to all other countries.

Initially, the sample of the DADS covered the private sector establishments, government owned establishments and hospitals. By merging these databases, we only keep

[8]We have used different proxies for technological change, such as investment in R&D, proximity to the sector technological frontier and software investment. The proximity to the sector's frontier represents the gap between the (log) productivity of a particular firm and the highest productivity (or the highest percentile productivity) in the same industry. The productivity of the firm is measured as the value added per worker such as: $Proximity_{ikt} = P^{95} \log\left(\frac{VA}{L}\right)_{kt} - \log\left(\frac{VA}{L}\right)_{ikt}$. We use the 95 order percentile in order to have a robust measure, by excluding outliers. The lower the variable is, the more productive the firm is. Our main conclusions do not depend on the proxy which is chosen

[9]Correspondence tables exist between NC8 classification and the CPA classification (classification of products by activity) for which each product is associated to a single activity (NACE code).

[10]countries whose per capita gross national income (GNI) has been for at least two consecutive years above the World Bank graduation threshold ($6275).

manufacturing firms of the private sector with more than 20 employees[11]. We give a detailed descriptive statistics of principal variables for the pooled sample (in appendix).

4 Preliminary Findings

4.1 Source of wage inequality

Recent evidence has shown that much of the overall wage inequality occurs within sectors and occupations rather than between sectors and occupations (Redding et al. (2012), Baumgarten (2013)). A natural starting point for our analysis is thus to analyze trends in wage dispersion in France over the period 2002-2007.

We start by decomposing overall wage inequality into within and between-group component along different groups. We index workers by i and the different demographic groups by k such as the overall wage variance can be decomposed as follows:

$$\sum_{i=1}^{p}\sum_{k=1}^{n}\left(w_{ik}-\bar{w}\right)^2=\sum_{k=1}^{n}N_k\left(\bar{w}_k-\bar{w}\right)^2+\sum_{i=1}^{p}\sum_{k=1}^{n}\left(w_{ik}-\bar{w}_k\right)^2$$

Where overbars denote average of log hourly gross wages, k denotes a particular group and i the individuals. We run the analysis on the balanced-panel sample of full-time, full-year workers, working in the manufacturing sector. We follow Baumgarten (2013) by defining skill and occupation groups as 40 age*education cells and 20 age*occupations cells. Education and occupations are described in appendix D. We define five groups of age starting with one window of workers between 18 to 25 years, then 4 windows of 10 years each starting from 25 until 65 years old.

Table 1: Variance analysis of log-wage change (2002-2007)

	2002		2007		Change	
Between-skill groups	288.597	[42.41]	303.113	[43.06]	3,606	[3.29]
Within-skill groups	391.948	[57.59]	400.849	[56.94]	105.923	[96.71]
Between-occupations	199.837	[26.27]	245.309	[31.15]	8.203	[6.78]
Within-occupations	560.769	[73.73]	542.242	[68.85]	112.848	[93.22]
Between industries	13.519	[1.62]	11.845	[1.35]	0.096	[0.07]
Within industries	823.553	[98.38]	864.293	[98.65]	133.761	[99.93]
Between firms	521.872	[62.37]	544.898	[62.19]	75.961	[56.75]
Within firms	314.841	[37.63]	331.239	[37.81]	57.896	[43.25]
Within-occupations: between firms	434.717	[62.50]	402.067	[61.53]	66.905	[57.41]
Within-occupations: within firms	260.869	[37.50]	251.402	[38.47]	49.631	[42.59]

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Reading: The share of the different components of variance analysis is given in square brackets (in %).
Note: The between- and within- firm component of within-occupation inequality has been obtained by calculating the residuals of a linear regression of log-wages overs $age \times occupations$ dummies, and then calculating the within/between variance decomposition

At least two conclusions arise from the results in table 1. First, aggregate data at the industry level may not highlight the channels through which outward FDI affects

[11] We also keep employees observed during a full year and those having a full-time contract. Furthermore, the Hausman test rejects the assumption of random attrition in the unbalanced panel sample. Hence, we run regressions on the balanced sample. However, results on the unbalanced sample report similar coefficient and standard errors of the main variables of interests so our conclusions remain unchanged. We do not present results on the group of administrative employees because we do not have enough observations.

wages, since most of the change in wages occurs within industries[12]. Second, analyzing wage inequality between occupations is less relevant than analyzing wage dispersion within occupations, since 93.22% and 96.71% of the variance of wage change during the period sample is explained by within-skills and -occupations components.

Table 1 also highlights that between-firm component are much larger to account for the variance of log wages in 2002 and 2007, similarly to what is obtained in other countries[13]. In 2002, 62.50% of the variance of the real wage is explained by between-firms components and 37.50% is due to within-firms elements. The contributions of within-firm and between-firm components to the level of wage inequality in 2007 are very close.

When looking at inequality within skill groups, the contribution of the between-firm component to the wage change between 2002 and 2007 is dominant and account for 57.41%, which is very similar to what is obtained with German data (Baumgarten (2013) and Faggio et al. (2010))[14].

The significant contribution of within-industry components to within-occupation wage dispersion might reflect the fact that there are relevant transmission channels such as profit bargaining, search and matching advantages, fair wages perceptions that may explain the between-firm component of wage inequality. Performance related-pay, organizational change and profit bargaining may explain the within-firm component of wage inequality.

Table 2: Descriptive statistics: Gross hourly wages by occupations and firms

	Domestic	importers	exporters	importers and exporter	multinational with one subsidiary	multinational with 2 to 4 subsidiaries	multinational with more than 5
Managers							
Average hourly gross wage	27.708	29.403	26.995	31.533	30.285	31.846	32.526
standard deviations	[10.402]	[12.668]	[9.783]	[14.470]	[9.803]	[11.111]	[12.288]
observations	234	410	341	5031	751	1132	1728
Blue-collar workers							
Average hourly gross wage	12.889	13.056	12.537	13.319	13.831	13.924	14.575
standard deviations	[3.260]	[4.185]	[3.244]	[3.420]	[3.484]	[3.232]	[3.496]
observations	1700	2080	1651	21514	2571	3619	3005
Intermediate occupations							
Average hourly gross wage	17.417	18.059	16.854	18.384	18.547	18.808	19.612
standard deviations	[12.519]	[4.862]	[4.583]	[5.027]	[4.976]	[4.881]	[5.077]
observations	491	713	500	8862	1385	1850	2170
Administrative employee							
Average hourly gross wage	12.754	13.973	13.188	13.934	14.744	14.534	15.109
standard deviations	[3.083]	[4.478]	[3.193]	[3.364]	[3.663]	[3.702]	[3.833]
observations	150	189	187	1896	287	350	456

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 2 depicts the mean raw wage according to firm's international status, within each

[12]Some papers however suggest that looking at intra-industry effects leads to underestimate the effects of offshoring on wages: the most significant wage cuts would occur when displaced workers are forced to switch industries (Ebenstein et al. 2009; Baumgarten, Geishecker, and Görg 2013).

[13]See Helpman et al. 2012 for evidence on Brazil, Baumgarten 2013 for evidences on Germany and Faggio and al. (2010) for evidences on UK.

[14]In contrast, results on Brazil highlighted the growth of wage inequality within sector-occupations to be almost entirely explained by wage inequality between firms. Here, in contrast, the within-firm component of wage inequality is not dominant but still account for 42.59% of the variance.

groups of occupations (managers, intermediate occupations, administrative employees, blue-collars). We observe that for each category, workers in multinational companies globally earn more than workers in all other types of firms: exporting, importing firms, domestics firms and those displaying only one form of internationalization (imports or exports). Mean wages also appear to increase with the number of foreign affiliates. The mean wage gap between workers in domestic firms and workers in multinational firms with at least 5 foreign subsidiaries goes from 13% for intermediate occupations and blue-collar workers to 17% for managers and 18% for administrative employees. This preliminary result highlights a wage premium for workers employed in large multinational companies compared to other workers.

The average wage premium might be due to a different skill-composition within multinational firms as illustrated by Figure 4 in appendix D. The figure depicts the differences in the workforce composition between multinational and domestic firms. For each occupation category, the share of workers with a professional college or university degree is higher among multinational firms, stressing their ability to attract the best workers[15]. Around 60% of managers have a high school diploma in multinational firms against only 40% of them in domestic firms. This trend is also observed in unskilled occupations, since blue collar workers in multinational firms are on average more qualified than the ones in domestic firms.

Our empirical analyses proceeds in two parts. First, we are interested in the raw wage differential between individuals working in domestic firms and those working in multinational firms. Second, we use the basic statistical framework of Abowd, Kramarz and Margolis (1999) (AKM hereafter) where the determination of wages depends on (i) time varying observable worker and firm characteristics and (ii) firm and worker fixed effects. We use spell of workers within a firm in a fixed effect model to analyze the effect of outward FDI on workers' wage.

4.2 The wage premium of workers in multinational firms

In order to analyze the wage-premium by controlling for firms and workers' characteristics, we apply a year-specific regression to depict the mean raw wage difference between individuals employed in a multinational firm and those employed in a domestic firm. The regression is the following:

$$\ln w_{ij} = \beta_1 F_j + \beta_2 X_{ij} + u_{ijt} \tag{1}$$

Where X_{ij} are workers and firms? characteristics (age, marriage, revenue, sector dummy, capital, exports, total factor productivity, imports and the constant) and F_j is a binary indicator equals to one if worker i is employed in a multinational firm and zero otherwise.

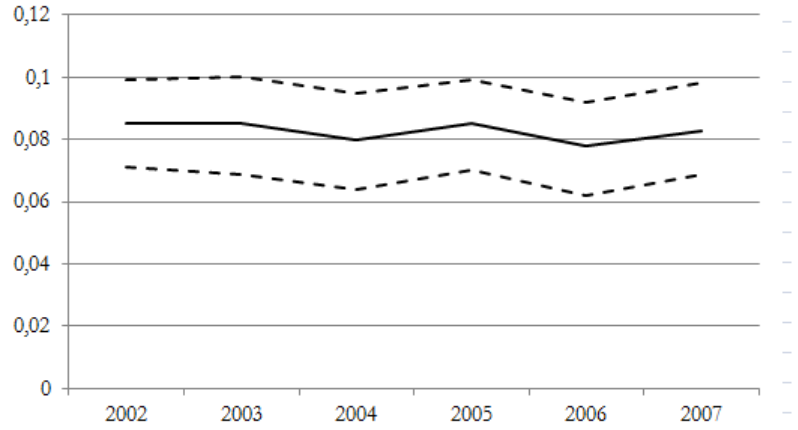
From 2002 to 2007 Figure 1 depicts a wage premium for being employed in a multinational firm. The log wage premium was of around 0.08 log-wage during the period of observation. There is a wage premium within group of occupations, as shown by Figure 5 in appendix D[16]. For each group of occupations we observe a wage-premium for being

[15]Skilled workers are defined as workers having at least 3 years of education after high-school and unskilled workers are those having less than 3 years of education after high-school.

[16]We distinguish four group of occupations: managers include engineers and executives; employees include administrative employees and commercials; intermediate occupations include administrative intermediates (accountants, technicians or foremen); and blue collar workersThese categories are defined by INSEE and are summarized in table 6 in appendix.

employed in a multinational firm during the period 2002-2007.

Figure 1: Evolution in the wage premium of multinational firms



Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Note: The figure shows the mean log-wage gap and its 95% interval associated

To gain deeper insight on wage differential between multinational and domestic firms, we apply a quantile regression of Mincer equations to consider adjusted wages at different points of the wage distribution. The model used is the following[17]:

$$D_k\left(w|X_{ij}\right) = \beta_1 F_j + \beta_2 X_{ij} + u_{ijt} \tag{2}$$

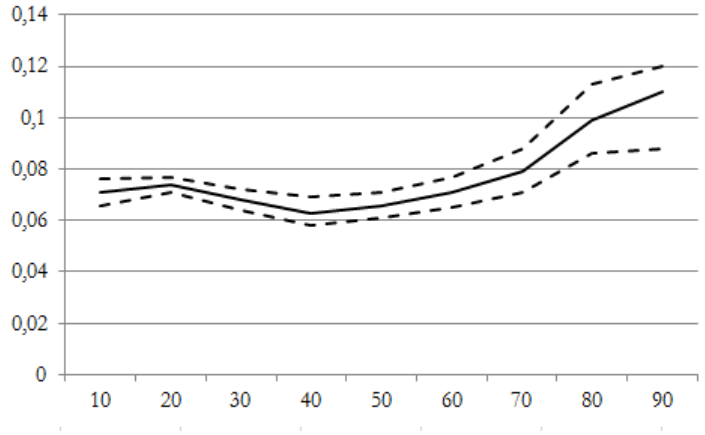
Where X_{ij} are workers and firms' characteristics as detailed previously. k represents the decile's number and i and j denotes workers and firms respectively. F_j is a dummy variable equals to one if the worker is employed in a multinational firm and zero otherwise.

Estimations are realized for each decile of the distribution of the conditional log hourly wage. β_2 denotes how the specified decile changes with one-unit change in X_{ij}. β_1 compares the k^{th} decile of the log hourly wage distribution of workers employed in multinational firms (conditionally to all other variables) with the k^{th} decile of the log hourly wage distribution of workers employed in domestic firms (conditionally to all other variables). We report the results for the coefficients associated with our variable of interest measuring the international status of the firm (Figure 2).

This coefficient associated to our variable of interest is positive for each decile and is higher for the upper deciles. Log hourly wages of *multinational-workers* are systematically higher than log hourly wage of *domestic-workers*, but those differences are higher in the upper and lower deciles of the log wage distribution, conditionally on other characteristics, shaping a polarized curve. The 9th decile of the log wage distribution of *multinational workers* is higher of 0.11 log hourly-wage. The 4th decile has the lowest difference (around 0.06 log-hourly wage), while the first two deciles have a difference of around 0.07-0.08 log hourly wage.

[17]For details on the methodology refer to appendix C.

Figure 2: Estimated FDI coefficient by quantile of wage



Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Note: The figure shows coefficients associated with the number of foreign affiliates for 9 different hourly wage deciles, measured by quantile regression estimator over the pooled sample and its 95% confidence interval (dashed line).

5 The impact of outward FDI on wage dispersion within occupations

The previous section was interested in identifying the wage gap between multinational and domestic firms. There is a wage premium for being employed in a multinational company in each decile of the wage distribution. This section is interested in measuring the effect of within-firm outward FDI on wages for different skill groups. We pay particular attention to endogenous mobility, meaning that worker mobility may not be random conditionally on observables and worker/firm fixed effects.

5.1 Methodology

Our goal is to estimate the impact of outward FDI on wages within each group of occupation. The AKM (1999) framework allows to decompose information on individual worker's wage into individual and firm heterogeneity as well as time varying firm and individual characteristics. It allows to estimate unobserved time-invariant person and firm effects. The model is as follows. Let $j(i,t)$ be a function indicating the firm at which worker i is employed at time t. The authors propose the following model for wages:

$$y_{ijt} = x_{it}\beta + x_{j(i,t)t}\tau + \theta_i + \psi_{j(i,t)} + \epsilon_{ijt} \tag{3}$$

Where y_{ijt} is the logarithm of real hourly gross wage of worker $i = 1, ..., N$ in firm $j = 1, ..., J$ in period $t = 1, ..., T$. θ and ψ are person and firm fixed effects respectively. Person effects are common to all the employment spells of one individual while firm effects are common to all employees of the same firm (which can be assimilated as the firm's wage premium). We include time dummies in the vector of covariates. The heterogeneity terms θ_i and $\psi_{j(i,t)}$ are decomposed such that we are able to define observable and unobservable components $(u_i, q_{j(i,t)})$ respectively, such as

$$\theta_i = \alpha_i + u_i\eta$$
$$\psi_j = \phi_j + q_j\rho$$

A key condition for equation 3 to give consistent estimate is that residuals ϵ_{it} are orthogonal to time-varying individual characteristics, firm and person effects, which is:

$$E\left[\varepsilon_{it}|x_{it}, x_{j(i,t)t}, u_i, q_{j(i,t)}, \alpha_i, \phi_{j(i,t)}, \mu_t\right] = 0$$

This condition implies that the unobserved component of wages does not predict worker's mobility decisions. This condition is violated when the work-firm assignment is not random, i.e when unobservable characteristics of the match between worker i and firm j are correlated with the explanatory variable, such that workers' mobility is endogenous. This hypothesis of job assignment based on unobservables has been explored theoretically. Helpman et al. (2008) assume heterogeneous firms and heterogeneous workers in their unobserved productivity. They show that the most productive workers are employed in the most productive firms and receive higher wages. Egger et Kreickemeier (2009) build a model in which workers have a bargaining power and prefer being employed in more productive firms because they pay higher wages.

The problematic issue of endogenous assignment of workers to firm can be tackled by adding worker-firm match fixed effect in equation 3 as in Woodcock (2007). The match effect model accounts for the fact that workers mobility can be endogenous since the match between high productive workers and high productive firms might be driven by unobserved abilities. The empirical specification is similar to equation 3 where a term ϕ_{ij} is added and represents the returns to unobserved time-invariant characteristics of worker-firm matches, such as:

$$y_{ijt} = x_{it}\beta + x_{j(i,t)t}\tau + \theta_i + \psi_{j(i,t)} + \phi_{ij} + \epsilon_{ijt} \tag{4}$$

Identifying workers, firms and match effect is cumbersome, especially because differentiating by workers does not allow to give the same result as LSDV[18]. We therefore decide to adopt the technique of Krishna et al. (2011) by time-demeaning covariates over the match firm-worker combination in order to compare results of the worker-firm model with the ones of the match effect model. The inclusion of these effects obviates the need to separate firm and workers fixed effects, but does not allow to identify firm, workers and match heterogeneity.

If one assumes strict exogeneity assumption, estimators β, γ, ψ and ϕ are unbiased, but there still might be endogeneity bias due to reverse causality or omitted variables. Indeed, our results could be biased if the decision of engaging in outward FDI is jointly determined with wage settings, or if unobserved variables affect simultaneously outward FDI and wage determination. Following Baumgarten et al. (2013), we test the exogeneity of our FDI measure by using a methodology inspired by Blundell and Bond (2000), which consists in using lagged values as instruments. Table 11 in appendix appendix E reports the results

[18]To circumvent this problem, Woodcock (2007) estimates a mixed model specifications that rely on firm, person and match effects being orthogonal.

of relevant post-estimation tests when we use the lagged values of the number of FDIs as instruments (with a lag of one and two years). The Hansen-J stats indicates that our instruments are orthogonal to the error term. Orthogonality conditions are not sufficient for an instrument to be good, it also needs to be correlated with included endogenous variable. The *rk* and F-test of joint significance of instruments in the first-stage regression reveal that our instruments are sufficiently strong.

We are unable to reject the exogeneity assumption and the variable *FDI* may not be treated as endogenous. The use of two instruments yields the loss of two observations per individuals. We have checked the robustness of this result when using one-year lagged value as an instrument and obtain similar statistics. However, we prefer to report statistics with two instruments, since it allows to check instruments' validity.

5.2 Results

We estimate various specification of equation 3 and 4 for different occupation groupings and tasks. We test the robustness of our results, by using different proxies of firms' outward FDI.

Table 3 displays estimation results from equation 3. We control for unobserved worker heterogeneity in the form of individual fixed effects. Workers' fixed effects are collinear with education and gender variables, so these variables cannot be included in the model. Similarly, the age and tenure effects are absorbed by the time dummies, hence age squared is the only individual-level variable that can be included when controlling for unobservable and time invariant individual characteristics. We add time varying individual characteristics such as the number of children and a dummy indicating if the worker is married. We also control for unobserved firm heterogeneity in the form of fixed effects, and add firm's time-varying characteristics (sales, capital, total factor productivity, exports, imports), as described in section 3[19].

We are interested in the impact of outward FDI on domestic wages within occupations. We divide our sample into four main occupations: managers (column (3) and (4)), blue collar workers (column (5) and (6)) and intermediate occupations (column (7) and (8)). We run the regression separately for each occupation, since each regressor might have a differentiated impact on wages depending on the type of occupation.

The first two columns of table 3 show the results for the whole sample. The first column presents results for the match effect model, which controls for endogeneous mobility, and the second column reports the results for the person-firm fixed effect model.

We first look at the coefficients of controls. Hourly wages appear to decrease when workers get married. This result is mainly driven by intermediate professions and managers (column (3) and (5)). These results might reflect either a lower propensity of workers to consent great efforts for their careers the year of their marriage, or a lower propensity of employers to give them additional responsibilities this particular year. Changes in the number of children are not found to affect hourly wages. The age-squared variable has also

[19]One should note that we have also tested our regressions with a dummy for foreign-owned firms (see results in table 10). The most productive firms within an industry tend to be the targets of foreign acquisitions (Blonigen et al. (2012), Arnold and Javorcick (2009)). Hence, the non-inclusion of firm nationality would result in an endogeneity problem, since the most productive firms also pay higher wages. Yet, our main conclusions regarding the effect of outward FDI remain unchanged. We still prefer results without the inclusion of a firm's nationality, since collinearity problems with firm fixed effect might arise. Only 123 observations have changed nationality in the group of intermediate occupations, 73 in the group of managers and 256 in the group of blue-collar workers.

a negative and significant coefficient for all occupations, reflecting a decreasing impact of age on wages for the oldest workers.

Looking at firms' controls, hourly wages increase with firm's productivity, especially for blue-collar workers[20]. Increasing tangible assets has a positive and significant effect on blue collars' wages: these workers might need to develop new skills when their company invests in new machines and tools and this might improve their bargaining power in wage negociations. The coefficient associated with the level of exports is also highly significant, and this result is obtained in each sub-sample except managers, highlighting a wage-premium associated with exports. Reversely, imports are not found to affect domestic wages, whether we consider imports of intermediates or imports of finished goods in the sample of blue-collar workers and managers. In the sample of intermediate occupations, imports of finish goods have a positive effect on their wages.

Our variable of interest is the measure of outward FDI. In our base regression, we account for outward FDI with the number of foreign affiliates. This variable has a positive and significant effect on wages, but only when we restrict the sample to managers. Considering the number of countries where the firm owns foreign affiliates, instead of the number of foreign affiliates, provides similar results (Table 9 in appendix E). As argued above, the positive effect of outward FDI on managers' wages might reflect several mechanisms. First, the creation of affiliates abroad might come with greater responsibilities for managers in the parent company, such as supervising and monitoring new entities or managing cultural and linguistic differences. These additional skills and responsibilities might translate into higher wages. Second, managers might be in a better position than other employees to capture productivity gains associated with outward FDI.

One way of identifying the productivity effect of outward FDI is to drop controls for firms' productivity in the regression and to compare the results with our actual regression. We observe that the coefficient associated with the number of FDIs increases when we drop controls for productivity, meaning that this variable captures the productivity effect of outward FDI in our base regression (see table 12 in appendix E). This confirms that outward FDI affects productivity and it is possible that only managers are able to capture these productivity gains if there are information asymmetries in the wage bargaining process.

We test for a differentiated impact of outward FDI depending on the level of technology inside the industry[21]. We observe that for managers, the coefficient associated with outward FDI is nearly eight times higher when we restrict the sample to high-technology industries. Intermediate occupations in high-technology industries also experience a positive effect of outward FDI, while we do not observe this effect for low-technology industries. The choice to make a foreign direct investment in high-technology intensive industry may be related to the will to maintain an ownership advantage. Firms can then transfer high-technology intensive production in the foreign subsidiary without fear of technology leakages. The transfer of firm's specific technology in foreign units may increase the wage paid to some workers at home, in particular those whose skills complement the ones in the foreign subsidiary. This idea is related to the skill-biased technological change that increase the wage premium of skilled workers. Transfer of technology-intensive production may increase the wage paid to workers, whose jobs require technology and communication

[20] One should note that we have used several other proxies for technological change at the firm level, such as proximity with the firm's technological frontier, investment in R&D or value added per worker. Main conclusions remain unchanged.

[21] Details about the division of low-tech and high-tech industries are given in appendix E.2.

skills. This assumption has been validated in the United States, to explain the role of technological progress on the evolution of wage inequality (Acemoglu and Autor (2011), Goos and Manning (2007), Firpo et al. (2011) Autor et al. (2006), Autor and Handel (2013)).

We now investigate whether the positive effect of outward FDI on domestic wages is driven by the extensive margin of outward FDI (meaning domestic firms which decide to go multinational) or by the intensive margin (multinationals which change their number of foreign affiliates). In order to focus on the impact of outward FDI at the extensive margin, we change our FDI measure and use a dummy indicating if the firm has foreign affiliates or not (rather than the number of foreign affiliates). Results in table 14 in appendix E suggest that the effect of outward FDI at the extensive margin is lower: managers experience a wage increase when their firm goes multinational, but the magnitude of the effect is smaller than in the base regression. However, we observe that a change in the firm's international status, from domestic to multinational companies has a positive effect on intermediate occupations' hourly wages, which was not observed in the base specification.

We now look at the effect at the intensive margin by restricting the sample to employees which always belong to a multinational firm during the whole period (measuring outward FDI with the number of foreign affiliates, as in the base regression). This time, results are very similar to results in our base regression (see table 14) in the sample of managers, which highlights that the effect of outward FDI is mostly driven by the intensive margin. In order to check whether our results are driven by some large multinationals which open affiliates overseas, we run our base regression on the sample restricting to firms with less than five foreign affiliates: the coefficient associated with the number of foreign affiliates is found non-significant (see table 13 in appendix E), suggesting that the positive effect of outward FDI on domestic wages only becomes visible in very large multinational corporations.

As argued in introduction, the nature of the underlying mechanisms should differ according to the nature of FDI (vertical *versus* horizontal). This is why we distinguish the number of foreign affiliates according to their location: low income countries or high income countries[22]. We notice that the positive effect of outward FDI on manager's wage is mainly driven by FDI in low income countries (see table 4). One potential explanation is that emerging economies offer greater growth prospects and/or constitute ideal locations for offshoring. Therefore, investments in low-income countries might allow managers to bargain on higher profits. Another explanation could be that managing affiliates in low-income countries is more demanding (necessity of implementing new technologies or new managerial methods in the affiliate) and implies more complex tasks.

[22]High income countries are composed by EU-15 countries and Norway, Japan, Switzerland, the United States, Australia, Canada, New Zealand, Liechtenstein, Monaco, Gibraltar, Iceland, Alaska and Andorra, while other countries are considered as low-income countries .

Table 3: Person and firm effect model and match effect model

	All		Managers		Blue-collar workers		Intermediate Occupations	
	Match	Person/Firm	Match	Person/Firm	Match	Person/Firm	Match	Person/Firm
Number of children	0.001	0.001	-0.001	-0.001	0.003	0.003	-0.005	-0.005
	[0.003]	[0.003]	[0.007]	[0.007]	[0.004]	[0.004]	[0.004]	[0.004]
Marriage	-0.003	-0.002	-0.034**	-0.034**	0.013	0.012	-0.017**	-0.018**
	[0.006]	[0.006]	[0.016]	[0.016]	[0.009]	[0.009]	[0.009]	[0.009]
Number of FDI abroad	0.030**	0.030**	0.075***	0.075***	0.015	0.015	0.008	0.008
	[0.012]	[0.012]	[0.023]	[0.023]	[0.027]	[0.027]	[0.016]	[0.016]
Revenue	0.001**	0.001**	0.001	0.001	0.002*	0.002*	0.002***	0.002***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Capital	0.001**	0.001**	-0.000	-0.000	0.003**	0.003**	0.001	0.001
	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
TFP	0.000	0.070***	-0.000	0.028	0.000**	0.005	-0.000	-0.031
	[0.000]	[0.007]	[0.000]	[0.064]	[0.000]	[0.044]	[0.000]	[0.030]
Imports of II	-0.000	0.000	-0.000	-0.000	-0.000	0.000**	-0.001	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]
Imports of FG	0.000	0.000	0.000	0.000	-0.000	-0.000	0.001***	0.001***
	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.000]	[0.000]
Computer use	0.070***	-0.000	0.027	-0.000	0.007	-0.000	-0.039	-0.001
	[0.007]	[0.000]	[0.064]	[0.000]	[0.045]	[0.000]	[0.031]	[0.001]
Age-squared	-0.046***	-0.047***	-0.063***	-0.063***	-0.040***	-0.040***	-0.049***	-0.049***
	[0.002]	[0.002]	[0.005]	[0.005]	[0.003]	[0.003]	[0.003]	[0.003]
Exports	0.027***	0.027***	-0.004	-0.003	0.047***	0.046***	0.015**	0.015**
	[0.005]	[0.005]	[0.014]	[0.014]	[0.009]	[0.009]	[0.007]	[0.007]
Constant	3.775***	3.775***	4.401***	4.401***	3.180***	3.180***	3.970***	3.970***
	[0.038]	[0.051]	[0.106]	[0.153]	[0.045]	[0.056]	[0.066]	[0.091]
Observations	48,234	48,234	9,144	9,144	23,867	23,867	15,223	15,223
R-squared	0.103	0.106	0.120	0.120	0.076	0.076	0.131	0.131
Log Likelihood	51324.066	48234.000	9224.395	9144.000	25716.348	23867.000	18778.634	15223.000

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 4: Person and firm effect model: discrimination on offshoring destination

	All	Managers	Blue-collar workers	Intermediate Occupations
Number of children	0.001	-0.001	0.003	-0.005
	[0.003]	[0.007]	[0.004]	[0.004]
Marriage	-0.003	-0.033**	0.013	-0.017**
	[0.006]	[0.016]	[0.009]	[0.009]
Number of FDI to LI	0.054	0.173**	-0.041	0.018
	[0.040]	[0.078]	[0.082]	[0.054]
Number of FDI to HI	0.011	-0.004	0.054	-0.002
	[0.032]	[0.064]	[0.059]	[0.047]
Revenue	0.001**	0.001	0.002*	0.002***
	[0.001]	[0.001]	[0.001]	[0.001]
Capital	0.001**	-0.000	0.003**	0.001
	[0.001]	[0.002]	[0.001]	[0.001]
TFP	0.000	-0.000	0.000**	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Imports of II	-0.000	-0.000	-0.000	-0.001
	[0.000]	[0.000]	[0.000]	[0.001]
Imports of FG	0.000	0.000	-0.000	0.001***
	[0.000]	[0.001]	[0.001]	[0.000]
Computer use	0.070***	0.026	0.007	-0.038
	[0.007]	[0.064]	[0.045]	[0.031]
Age-squared	-0.046***	-0.063***	-0.040***	-0.049***
	[0.002]	[0.005]	[0.003]	[0.003]
Exports	0.027***	-0.005	0.047***	0.015**
	[0.005]	[0.014]	[0.009]	[0.007]
Constant	3.775***	4.401***	3.180***	3.970***
	[0.038]	[0.106]	[0.045]	[0.066]
Observations	48,234	9,144	23,867	15,223
R-squared	0.103	0.120	0.076	0.131
Log Likelihood	51324.325	9225.547	25716.706	18778.665

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

5.2.1 Task decomposition

Several studies have underlined a non-monotonous wage change along the wage distribution (Autor, Levy and Murnane (2003), Oldenski (2012)). Skilled workers and unskilled workers are no longer considered as two homogeneous groups who have suffered the same impact following the adoption of new technologies or intensification of world trade. Job content of occupations becomes a central component to analyze the labor market with a new eye. This section takes part to this question empirically by analyzing the wage effect of offshoring depending on the nature of tasks carried out by workers.

Different criteria have been used to define offshorable tasks. According to Autor, Levy and Murnane (2003) (ALM hereafter), the degree to which one task is codified determines its potential of relocation. The more a task is determined by specific rules, the less it relies on tacit knowledge and the easier it is to explain this task to someone else and to control it. According to Blinder and Krueger (2007,2009), the offshorability of a task depends on its potential to be realized in another location without loss of quality and also on the importance of face-to-face interactions with people other than fellow workers.

Table 5: Person and firm effect model: Task offshorability index

	(1)	(2)
FDI	0.185***	
	[0.059]	
FDI to LI countries		-0.000
		[0.000]
FDI to HI countries		0.000
		[0.000]
FDI*Offshorability	-0.340***	
	[0.127]	
FDI LI*Offshorability		-0.008*
		[0.004]
FDI HI*Offshorability		-0.000
		[0.003]
Offshorability index	-0.096***	-0.095***
	[0.031]	[0.031]
Revenue	0.001**	0.001**
	[0.001]	[0.001]
Capital	0.001**	0.001**
	[0.001]	[0.001]
Total factor productivity	0.000	0.000
	[0.000]	[0.000]
Imports of intermediate inputs	-0.001	-0.001
	[0.001]	[0.001]
Imports of finished goods	0.000	0.000
	[0.000]	[0.000]
Computer use	0.032**	0.032**
	[0.014]	[0.014]
Age squarred	-0.046***	-0.046***
	[0.002]	[0.002]
Exports	0.026***	0.026***
	[0.005]	[0.005]
Number of children	-0.003	-0.003
	[0.006]	[0.006]
Marriage	0.001	0.001
	[0.006]	[0.006]
Constant	3.845***	3.844***
	[0.044]	[0.044]
Observations	48.234	48.234
R-squared	0.104	0.104
Log Likelihood	51336.803	51335.853

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

We build a task index derived from a French survey on working conditions as detailed in section A. The higher the index is, the more workers perform routine tasks and the easier it is to relocate these occupations[23]. The offshorability indexes is included in an interactive way[24], such as the effect of offshoring on wages depends on the value of the

[23]We have also run the regression based on an index developed from the ONET databases. The results are very similar when using one or the other index. In particular, the interaction term between FDI to low-income country and the offshorability index is significant at the 5% level. Tables are available upon requests.

[24]The offshorability index is constant if a worker does not change occupation. However, the classification PCS-ESE is sufficiently detailed to have 41.5% of workers that change occupations and thus change offshorability index.

offshorability index. Equation 3 can include the interactive term such as:

$$y_{ijt} = x_{it}\beta_1 + Offshorability_{it}\beta_2 + FDI_{j(i,t)t}\gamma_2 + x_{j(i,t)t}\gamma_1 + (Offshorability_{it} \times FDI_{j(i,t)t})\beta_3 + \theta_i + \psi_{j(i,t)} + \epsilon_{ijt} \quad (5)$$

The regression coefficients $Offshorability$ and FDI are a conditional relationship, i.e. they reflect the change of one coefficient when the other is set to zero. Studies often center variables in order to make the results more interpretable, by comparing the effect of one variable compared to the average level of the other. The index varies between zero and one. A value of one represents a routine-intensive occupation while a value of zero represents an interactive- and analytic-intensive occupation. We thus center our second offshorability index by using individual specific-means[25]. When centering, the value of zero represents an occupation in which routine and non-routine tasks are performed with roughly the same intensity.

Table 5 presents the results for the whole sample. The positive and significant coefficient associated with outward FDI suggests that workers having an offshorability score of zero experience a significant wage increase while their employer increases the number of foreign affiliates. The negative and significant coefficient associated with the offshorability index is consistent with the intuition that the more workers perform offshorable tasks, the lower their wages are. The coefficient associated with the interaction term is significantly negative: the more a worker performs offshorable tasks, the more increasing outward FDI has a negative effect on wages.

When we split the results into FDI in low-income countries and high-income country, the interaction term associated with FDI in low-income countries turns out to be significant. Outward FDI in low-income countries is more likely to correspond to offshoring, which is more damaging for manual-intensive workers. This result is consistent with evidence that workers with routine tasks experience larger wage cuts when their industry increases offshoring (Hummels et al. 2011).

6 Conclusion

This article analyzes the effect of outward FDI on hourly wages within occupations, using panel data on French firms for the years 2002-2007. We use a rich French firm-level panel data with matched information on workers' characteristics. We first analyze the evolution of the wage dispersion during the period 2002-2007. In line with a recent literature, we observe that most of the variance of wage inequality took place within occupations. This wage dispersion is mainly due to firm heterogeneity and to a lesser extent to wage dispersion within firms. Our paper focuses on the contribution of firm heterogeneity and more precisely on the role of outward FDI in explaining wage inequality within occupations.

We find evidence of a *multinational* wage premium within each skill groups, regardless of observable firm and individuals' characteristics. We isolate the impact of outward FDI on wage dispersion within occupations, using the framework developed by AKM (1999), in order to control for firm and person fixed effects and for the non-random matching process between firms and workers. The study reveals that outward FDI in low-income

[25]Ozer-Balli and Sorensen (2010) show that centering in panel data should be subtracted to the interaction term by using individual specific-means and not the average across all observations.

countries, which is a proxy for intra-firm offshoring, has a significant and positive impact on managers' wages. Reversely, outward FDI decreases the wage of workers whose tasks are more easily offshorable. The negative effect of outward FDI on offshorable tasks is consistent with the existence of subsituability between low-skilled workers performing offshorable tasks and workers in foreign affiliates.

Our data does not allow us to identify precisely the channels through which outward FDI acts on domestic wages, especially in the case of managers. First, outward FDI might push multinational firms to increase workers' range of skills as well as their span of control and/or workload. Individualized wage settings can be a good answer to create incentives for workers to provide full effort in the decentralization process (Lemieux (2009)). Second, managers might prove to be more effective in bargaining over their employer's profits. They might consider themselves as great contributors to the success of foreign affiliates and might claim greater wage expectations compared to other workers in the firm. Finally, increased competition might push multinational firms to adopt new technologies. Following Nelson and Phelps (1966) view on human capital, skilled workers might adapt more quickly to changes in the organization of the firm and to the adoption of defensive technology. Since these changes may require additional training and efforts, skilled-workers may be rewarded for it.

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A Task measures

We build a routinization index derived from the French survey on working conditions, produced by the French Direction de l'Animation de la Recherche, des Etudes et des Statistiques (DARES) for the year 2005. The inquiry is realized every 7 years on a sample of 19,000 workers.

We build an index derived from 9 questions on job characteristics:
Do you directly interact with a public? (always=1; often=2; sometimes=3; never=4)

Is your job imposed by the automatic movement of a machine? (No=1; Yes=2)

Is your job imposed by the automatic movement of a product? (No=1; Yes=2)

Are you an assembly-line production worker? (No=1; Yes=2)

Does your job consists in repeating a series of gesture or operation? (No=1; Yes=2)

Does your job involves monotonous tasks? (Never=1; sometimes=2; often=3; always=4)

Does your job involves complex tasks? (Always=1; often=2; sometimes=3; never=4)

does your job involves you to read documents? (Most of the time=1; half of the time=2; one quarter of the time=3; less than one quarter of the time=4; never=5)

does your job involves you to write documents? (Most of the time=1; half of the time=2; one quarter of the time=3; less than one quarter of the time=4; never=5)

For each respondent we build a routine index as the sum of the value attributed to each answer. The higher the index is, the more workers performs routine tasks. We then normalize the index by the maximum and minimum in any occupation, such that the index varies between zero and one across occupations. We map the index to occupations by measuring the average task index in a given PCS-ESE 4-digit occupation, such as $\frac{1}{n_{io}} \sum_i d_{io}$ where d_{io} is the sum of the values attributed to the nine questions and n_{io} is the total number of workers i in a particular occupation o.

Figure 3: Task index by occupations with the French classification

Note: Average routinization index in eight 2-digit occupations: managers, engineers, technicians, administrative, foremen, secretary, skilled blue-collar workers, unskilled blue-collar workers. Source: French survey on working conditions, year 2005, author's calculation.

The questions selected in the French survey offer a clear lecture of routinization. Managers and Engineers have the lowest index of routinization while skilled and unskilled blue-collar workers have the highest index.

The French index has the advantage of being build on the French PCS-ESE classification but has the disadvantage of relying on a small number of tasks related to the working condition of the employee.

B Details on AKM Methodology

Given equation **??** the least squares estimation problem is to solve the following equation

$$\begin{pmatrix} \hat{\beta} \\ \hat{\theta} \\ \hat{\psi} \end{pmatrix} = \begin{pmatrix} X'X & X'D & X'F \\ D'X & D'D & D'F \\ F'X & F'D & F'F \end{pmatrix}^{-1} \begin{pmatrix} X'y \\ D'y \\ F'y \end{pmatrix} \tag{6}$$

However, estimating two high dimensional fixed effects implies computing difficulties in terms of memory space[26]. Abowd et al. (2002) have shown that including N dummy variables for each unit of analysis gives the same solution as including dummy variables for the firm heterogeneity. This transformation consists in subtracting the person mean for all observations. By construction, this transformation eliminates firm's dummies when the worker stays in the same firm during the whole period. Therefore, to capture the firm effect, one need to rely on workers mobility between firms, since it is the only sub-sample which does not eliminate the firm effect. Therefore, following Cornelissien (2008) we can decompose equation 6 such as:

$$\begin{aligned} \begin{pmatrix} X'X & X'F \\ F'X & F'F \end{pmatrix} &= \begin{pmatrix} X'X & 0 \\ 0 & 0 \end{pmatrix} + \sum_{i \in movers} \begin{pmatrix} 0 \\ F_i' y_i \end{pmatrix} \\ \begin{pmatrix} X'y \\ F'y \end{pmatrix} &= \begin{pmatrix} X'y \\ 0 \end{pmatrix} + \sum_{i \in movers} \begin{pmatrix} 0 \\ F_i' y_i \end{pmatrix} \end{aligned} \tag{7}$$

Equation 7 shows that the F matrix is null in the subsample of workers who stay in the same firm, therefore the F matrix is only identified for movers. Our worker-firm record gives information on both plant and firms, but, information on subsidiaries are only recorded at the firm level. Therefore, to account for the firm's foreign strategy we run our analysis at the firm level and we consider movers as workers who have changed firms during the period 2002-2007.[27]

Once equations in (7) are completed, we can solve equation 6 to obtain the coefficient vector $\hat{\beta}$ and $\hat{\psi}$. Then we can recover estimates of the person fixed effect $\hat{\theta}$ where $\hat{\theta}_i = \bar{y}_i - \bar{x}_i\hat{\beta} - \bar{x}_{j(i)}\hat{\gamma}$.

C Details on the quantile regression

Let Y be a random variable with cumulative function distribution $F_Y(y) = P(Y \leq y)$

The τ order quantile $\in [0;1]$ of a random variable Y is defined by $Q_\tau(u) = inf\{y|F_u(y) \geq \tau\}$

Let F_U be derivable and strictly increasing and define $\rho_\tau(u) = (\tau - \mathbb{1}_{y>0})\, y$.

A specific quantile can be found by minimizing the expected loss of $Y - u$ with respect to u and we can show that:

[26]With our datasets, we need to invert a matrix of dimension $(K + J) \times (K + J)$ and we need to store J mean deviations for N^* observations, meaning that our data matrix is of size $N^*.(K + J).8$ bytes = 11 gigabytes

[27]Our database count 5804 movers for the period.

$$q_\tau(Y) \in \arg\min_a E\left(\rho_t\left(Y-u\right)\right)$$

Indeed, following D'haultfœuille and Givord, we have:

$$E\left(\rho_t\left(Y-u\right)\right) = (\tau-1)\int_{-\infty}^{u}(y-u)f_Y(y)dy + \tau\int_{u}^{+\infty}(y-u)f_Y(y)dy$$

$$E\left(\rho_t\left(Y-u\right)\right) = \tau\left(E\left(Y\right)-u\right) - \int_{-\infty}^{u}(y-u)f_Y(y)dy$$

This function can be derived with respect to u, such as:

$$\frac{\partial E\left(\rho_t\left(Y-u\right)\right)}{\partial u} = -\tau - \left(u-u\right)f_Y(u) + \int_{-\infty}^{u} f_Y(y)dy$$

This function is convex and attains its minimum in $q_\tau(Y)$.

this approach extends easily to a conditional framework, where we assume $q_\tau(Y|X) = X^{'}\beta_\tau$ and then:

$$\beta_\tau = \arg\min_\beta E\left(\rho_t\left(Y - X^{'}\beta\right)\right)$$

The quantile regression estimator for quantile q minimizes the objective function:

$$q\left(\beta_\tau\right) = \tau\sum_{i:y_i \geq X_i^{'}\beta}^{N}(Y_i - X_i^{'}\beta) + (1-\tau)\sum_{i:y_i \leq X_i^{'}\beta}^{N}(Y_i - X_i^{'}\beta)$$

D Descriptive Statistics

Note: Education and occupations description for variance analysis as described in footnote **??**

Table 6: Education and occupation description

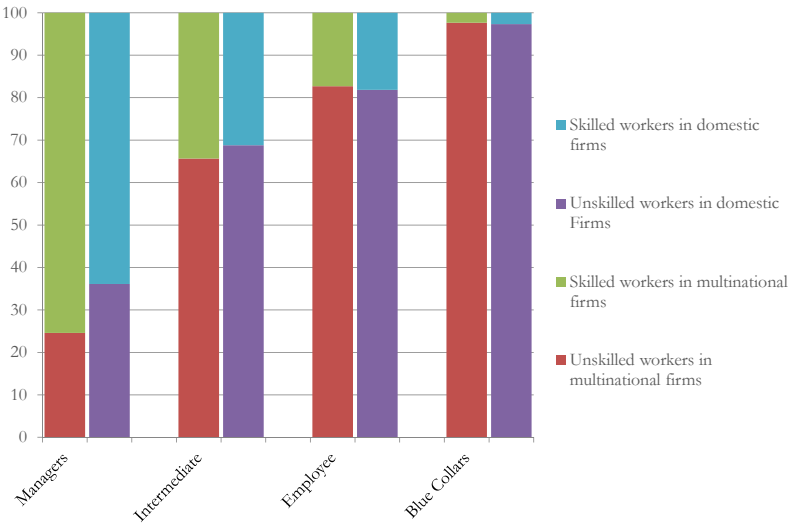
label code	Education
0	No degree reported
1	Completed elementary school
2	Completed junior high-school
3	Basic professional degree
4	Professional high school degree
5	General high school degree
6	Professional college degree
7	University degree, engineering school, Grandes écoles
	CSP
3	Managers
4	Intermediate occupations
5	Employees
6	Blue collar workers

Table 7: Descriptive Statistics according to firm's international status

	All			Domestic Firms			Multinational Firms		
	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD
Diploma:									
No diploma	114,439	0.134	0.341	83,481	0.144	0.351	30,958	0.109	0.313
Completed Elementary-School	114,439	0.061	0.238	83,481	0.061	0.241	30,958	0.056	0.231
Completed Junior High-school	114,439	0.085	0.281	83,481	0.089	0.286	30,958	0.075	0.264
Basic Professional degree (CAP)	114,439	0.229	0.421	83,481	0.236	0.425	30,958	0.212	0.409
Basic Professional degree (BEP)	114,439	0.121	0.326	83,481	0.124	0.329	30,958	0.115	0.319
Professional high-school degree	114,439	0.045	0.208	83,481	0.044	0.205	30,958	0.050	0.218
General high-school degree	114,439	0.108	0.311	83,481	0.108	0.31	30,958	0.109	0.312
Professional college degree	114,439	0.121	0.326	83,481	0.114	0.318	30,958	0.139	0.346
University degree	114,439	0.093	0.291	83,481	0.078	0.269	30,958	0.132	0.339
Sex:									
Female	129,110	0.292	0.454	94,407	0.293	0.455	34,703	0.289	0.453
Male	129,110	0.708	0.454	94,407	0.707	0.455	34,703	0.711	0.453
Number of Children	126,185	0.993	1.076	92,215	0.988	1.077	33,970	1.013	1.075
Marriage	127,385	0.479	0.499	92,215	0.471	0.499	34,254	0.504	0.499
Age	129,110	39.82	9.746	94,407	39.493	9.715	34,703	40.707	9.774
Value-added per worker	128,811	71.381	264.79	94,110	68.221	286.533	34,703	79.951	196.661
Capital per worker	128,811	20.712	55.634	94,110	14.541	49.461	34,703	37.447	66.872
Revenue per worker	128,811	247.687	969.539	94,110	231.129	1085.933	34,701	292.595	537.056
Exports in euros	129,110	212,701.7	633,469.6	94,407	132,057.2	565,857	34,703	432,089.2	745,702.7
FDI	129,110	2.274	9.319	94,407	0	0	34,703	8.460	16.456
Subsidiaries in France	129,110	1.984	5.708	94,407	0.633	2.137	34,703	5.656	9.503

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.

FIGURE 4: Share of High-skilled workers in domestic and multinational firms (in %)



Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.

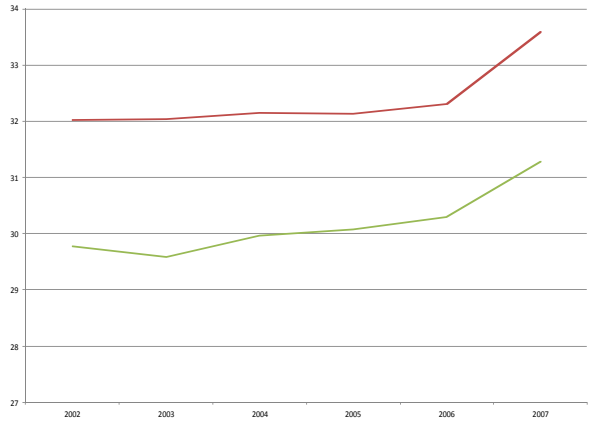
Note: Skilled workers are defined as those having at least level of diploma 6, as reported by table **??**

Table 8: Descriptive Statistics by sector

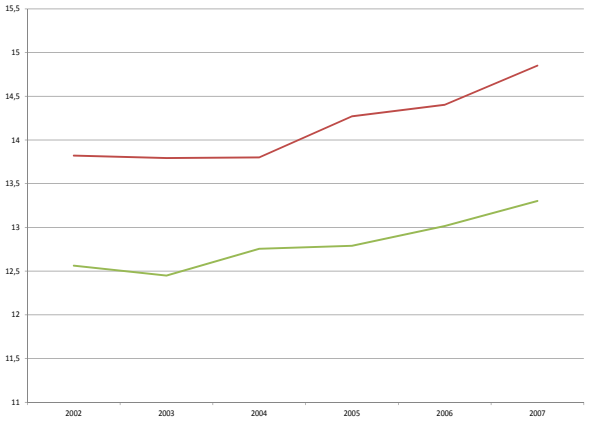
		Managers	Intermediate Occupations	Employee	Blue collar Workers
Leather, clothing	Mean hourly wage	29.773	15.941	11.320	10.381
	Standard error	[12.450]	[6.829]	[3.827]	[2.714]
	Share of (in %)	7.120%	17.688%	18.953%	55.769%
Publishing, printing and reproduction	Mean hourly wage	28.225	17.529	13.044	14.322
	Standard error	[54.678]	[6.301]	[3.860]	[5.618]
	Share of (in %)	30.491%	16.341%	13.616%	39.212%
Pharmaceuticals, perfumery and personal care	Mean hourly wage	35.943	20.468	14.491	13.637
	Standard error	[18.722]	[7.149]	[4.734]	[4.340]
	Share of (in %)	21.929%	40.257%	6.505%	31.178%
Home equipment	Mean hourly wage	29.791	16.809	12.123	11.609
	Standard error	[12.282]	[5.160]	[3.181]	[3.138]
	Share of (in %)	12.098%	19.929%	8.602%	59.073%
Automobile industry	Mean hourly wage	30.062	17.957	13.914	13.337
	Standard error	[13.191]	[6.645]	[4.563]	[3.687]
	Share of (in %)	10.580%	21.185%	3.639%	64.497%
Shipbuilding, aircraft and rail construction	Mean hourly wage	30.615	18.718	16.336	14.384
	Standard error	[11.705]	[5.129]	[4.864]	[4.963]
	Share of (in %)	2.484%	24.599%	5.994%	44.474%
Machinery industry	Mean hourly wage	29.151	17.152	12.596	12.867
	Standard error	[10.698]	[5.313]	[3.600]	[11.989]
	Share of (in %)	13.715%	25.150%	6.707%	53.963%
Electrical-equipment	Mean hourly wage	30.541	17.357	13.376	12.045
	Standard error	[12.510]	[5.462]	[4.263]	[3.627]
	Share of (in %)	36.364%	26.847%	6.184%	3.034%
Mineral product	Mean hourly wage	31.307	17.858	12.551	13.088
	Standard error	[13.667]	[5.063]	[3.706]	[3.832]
	Share of (in %)	10.100%	2.046%	7.738%	61.426%
Textile	Mean hourly wage	29.044	16.063	12.286	11.052
	Standard error	[11.771]	[5.375]	[3.248]	[2.749]
	Share of (in %)	6.996%	16.340%	8.626%	67.535%
Wood and paper product	Mean hourly wage	31.036	18.829	12.773	12.880
	Standard error	[12.300]	[9.501]	[3.495]	[4.445]
	Share of (in %)	7.423%	15.640%	6.309%	70.037%
Chemicals, rubber, and plastics	Mean hourly wage	33.628	18.884	13.486	13.014
	Standard error	[18.983]	[37.423]	[4.238]	[4.246]
	Share of (in %)	11.915%	25.049%	6.122%	56.618%
Non ferrous metals mettallurgical transformation	Mean hourly wage	28.980	17.545	13.072	12.710
	Standard error	[12.248]	[5.278]	[3.755]	[3.645]
	Share of (in %)	7.673%	18.828%	5.857%	67.174%
Electrionic component	Mean hourly wage	29.810	17.392	12.400	12.575
	Standard error	[15.462]	[5.497]	[3.892]	[3.651]
	Share of (in %)	20.089%	24.915%	4.879%	50.010%

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.

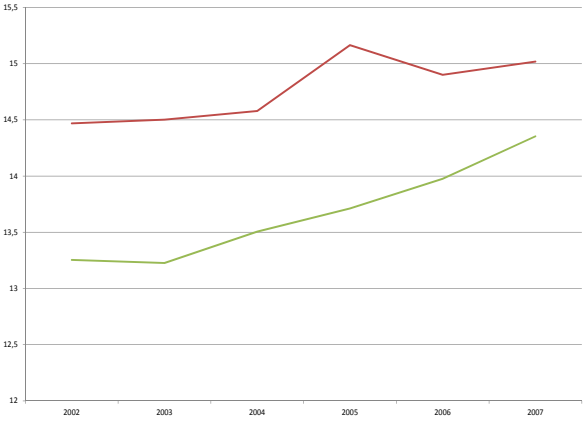
Figure 5: Evolution of wage premium by occupations between multinational- and domestic-workers



(a) Managers



(b) Blue collar workers



(c) Employees

(d) Intermediate Occupations

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007. Statistics made on balanced sample, excluding energy sector.

Note: The red curves report the average wage for workers employed in multinational firms, the green curves report the average wage for workers employed in domestic firms.

E Additional Results

E.1 Person-firm effect model

Table 9: Robustness test: Number of countries deserved by Foreign Direct Investment

	All	Managers	Blue-collar workers	Intermediate Occupations
Number of children	0.001	-0.001	0.003	-0.005
	[0.003]	[0.007]	[0.004]	[0.004]
Marriage	-0.005	-0.033**	0.013	-0.017**
	[0.006]	[0.016]	[0.009]	[0.009]
Number of countries deserved	0.053**	0.135***	0.048	0.013
	[0.022]	[0.043]	[0.046]	[0.029]
Revenue	0.001**	0.001	0.002*	0.002***
	[0.001]	[0.001]	[0.001]	[0.001]
Capital	0.001**	-0.000	0.003**	0.001
	[0.001]	[0.002]	[0.001]	[0.001]
TFP	0.000*	-0.000	0.000**	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Imports of II	-0.000	-0.000	-0.000	-0.001
	[0.000]	[0.000]	[0.000]	[0.001]
Imports of FG	0.000	0.000	-0.000	0.001***
	[0.000]	[0.001]	[0.001]	[0.000]
Computer use	0.070***	0.028	0.007	-0.039
	[0.007]	[0.065]	[0.045]	[0.031]
Age-squared	-0.047***	-0.063***	-0.040***	-0.049***
	[0.002]	[0.005]	[0.003]	[0.003]
Exports	0.028***	-0.004	0.047***	0.015**
	[0.005]	[0.014]	[0.009]	[0.007]
Constant	3.774***	4.399***	3.179***	3.970***
	[0.037]	[0.106]	[0.045]	[0.066]
Observations	48,234	9,144	23,867	15,223
R-squared	0.106	0.120	0.076	0.131
Log Likelihood	55181.374	9223.718	25717.089	18778.624

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 10: Robustness test: Inclusion of group nationality

	All	Managers	Blue-collar workers	Intermediate Occupations
Number of children	0.001	-0.001	0.003	-0.005
	[0.003]	[0.007]	[0.004]	[0.004]
Marriage	-0.003	-0.034**	0.013	-0.017**
	[0.006]	[0.016]	[0.009]	[0.009]
Number of FDI abroad	-0.067	-0.528	-0.175	0.212
	[0.174]	[0.391]	[0.218]	[0.211]
Nationality	-0.003	0.004	-0.008*	-0.001
	[0.003]	[0.007]	[0.004]	[0.004]
Revenue	0.001**	0.001	0.002*	0.002***
	[0.001]	[0.001]	[0.001]	[0.001]
Capital	0.001*	-0.000	0.003**	0.001
	[0.001]	[0.002]	[0.001]	[0.001]
TFP	0.000	-0.000	0.000**	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Imports of II	-0.000	-0.000	-0.000	-0.001
	[0.000]	[0.000]	[0.000]	[0.001]
Imports of FG	0.000	0.000	-0.000	0.001***
	[0.000]	[0.001]	[0.001]	[0.000]
Computer use	0.070***	0.027	0.006	-0.039
	[0.007]	[0.064]	[0.045]	[0.031]
Age-squared	-0.046***	-0.063***	-0.040***	-0.049***
	[0.002]	[0.005]	[0.003]	[0.003]
Exports	0.026***	-0.004	0.046***	0.015**
	[0.005]	[0.014]	[0.009]	[0.007]
Constant	3.776***	4.399***	3.179***	3.971***
	[0.038]	[0.106]	[0.045]	[0.066]
Observations	43,521	7,494	21,858	13,150
R-squared	0.106	0.121	0.068	0.130
Log Likelihood	46528.915	7601.932	23569.178	16393.762

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 11: Exogeneity test of FDI

	All sample	Managers	Blue Collars	Intermediate occupations
F-test: First stage	F=28.58	F=13.74	F=11.56	F=21.40
	p=0.000	p=0.000	p=0.000	p=0.000
Kleibergen-Paap rk LM-	Chi^2=59.051	Chi^2=25.678	Chi^2=26.051	Chi^2=20.084
stat of underidentification	p=0.000	p=0.000	p=0.000	p=0.000
C-test of Endogeneity	Chi^2=0.239	Chi^2=1.687	Chi^2=0.721	Chi^2=1.470
	p=0.6247	p=0.194	p=0.3958	p=0.2254

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007. Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10. Exluded instruments FDI_{-1}, FDI_{-2}.

Table 12: Wage-regression capturing the productivity effect

	All	Manager	Blue Collar Workers	Intermediate Occupations
Number of Children	-0.002	-0.004	0.001	-0.005
	[0.002]	[0.007]	[0.003]	[0.004]
Marriage	-0.013**	-0.038**	-0.006	-0.017**
	[0.005]	[0.015]	[0.008]	[0.009]
Age-squared	0.032*	0.102***	0.011	0.005
	[0.016]	[0.033]	[0.030]	[0.025]
Number of FDI abroad	-0.048***	-0.067***	-0.041***	-0.048***
	[0.002]	[0.005]	[0.002]	[0.003]
Number of subsidiaries in France	0.000	-0.001	0.000	0.000
	[0.000]	[0.001]	[0.001]	[0.001]
Exports	0.046***	0.004	0.076***	0.031***
	[0.003]	[0.010]	[0.006]	[0.005]
Constant	3.799***	4.494***	3.402***	3.938***
	[0.033]	[0.086]	[0.045]	[0.062]
Year fixed-effects	Yes	Yes	Yes	Yes
Observations	63,421	9,317	35,060	15,389
R-squared	0.099	0.124	0.075	0.128
Number of match	13,542	2,334	7,870	4,141
Log Likelihood	64037.061	9331.250	34838.330	18931.943

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 13: Robustness test: Sample of firms having less than 5 subsidiaries

	All	Managers	Blue-collar workers	Intermediate Occupations
Number of children	0.003	0.002	0.002	-0.000
	[0.003]	[0.008]	[0.004]	[0.005]
Marriage	-0.001	-0.054***	0.014	-0.019**
	[0.006]	[0.018]	[0.009]	[0.009]
Number of FDI abroad	-0.074	-0.453	-0.130	0.246
	[0.178]	[0.382]	[0.216]	[0.206]
Revenue	0.002***	0.001	0.001	0.000
	[0.001]	[0.002]	[0.001]	[0.001]
Capital	0.002**	0.000	0.004***	0.001
	[0.001]	[0.002]	[0.001]	[0.001]
TFP	0.000	-0.000	0.000**	0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Imports of II	-0.000	-0.000	-0.000	-0.001
	[0.000]	[0.000]	[0.000]	[0.001]
Imports of FG	0.001	0.000	-0.000	0.001***
	[0.000]	[0.001]	[0.001]	[0.000]
Computer use	0.070***	0.001	0.017	-0.041
	[0.008]	[0.069]	[0.048]	[0.033]
Age-squared	-0.045***	-0.065***	-0.040***	-0.046***
	[0.002]	[0.006]	[0.003]	[0.003]
Exports	0.020***	0.001	0.033***	0.029***
	[0.007]	[0.016]	[0.010]	[0.009]
Constant	3.708***	4.462***	3.165***	3.885***
	[0.042]	[0.119]	[0.048]	[0.071]
Observations	40,495	7,494	21,858	13,150
R-squared	0.102	0.121	0.068	0.130
Log Likelihood	43284.391	7601.337	23567.741	16393.349

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

Table 14: Robustness test: Extensive versus Intensive margin

	All		Managers		Blue-collar workers		Intermediate Occupations	
	Extensive	Intensive	Extensive	Intensive	Extensive	Intensive	Extensive	Intensive
Number of children	0.001	-0.004	-0.001	-0.002	0.003	0.004	-0.005	-0.024***
	[0.003]	[0.005]	[0.007]	[0.012]	[0.004]	[0.008]	[0.004]	[0.008]
Marriage	-0.003	-0.007	-0.032**	-0.050*	0.013	0.026	-0.018**	0.005
	[0.006]	[0.011]	[0.016]	[0.025]	[0.009]	[0.018]	[0.009]	[0.016]
Number of FDI abroad	0.005*	0.028**	0.015**	0.071***	-0.001	0.014	0.007*	0.007
	[0.003]	[0.012]	[0.007]	[0.025]	[0.004]	[0.025]	[0.004]	[0.015]
Revenue	0.001**	0.001	0.001	-0.001	0.002*	0.001	0.002**	0.002**
	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Capital	0.002**	0.001	-0.000	-0.001	0.003**	0.000	0.001	0.002
	[0.001]	[0.001]	[0.002]	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]
TFP	0.000	-0.000	-0.000	-0.000	0.000**	-0.000	-0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Imports of II	-0.000	-0.002	-0.000	-0.002	-0.000	-0.001	-0.000	-0.001
	[0.000]	[0.001]	[0.000]	[0.003]	[0.000]	[0.003]	[0.001]	[0.002]
Imports of FG	0.000	0.001	0.000	0.001	-0.000	-0.000	0.001***	0.001**
	[0.000]	[0.000]	[0.001]	[0.002]	[0.001]	[0.001]	[0.000]	[0.000]
Computer use	0.070***	0.076***	0.027	0.240	0.007	-0.022	-0.038	-0.069
	[0.007]	[0.013]	[0.065]	[0.174]	[0.045]	[0.083]	[0.031]	[0.053]
Age-squared	-0.046***	-0.049***	-0.063***	-0.066***	-0.040***	-0.034***	-0.049***	-0.054***
	[0.002]	[0.003]	[0.005]	[0.009]	[0.003]	[0.005]	[0.003]	[0.005]
Exports	0.028***	0.035***	-0.001	0.014	0.046***	0.083***	0.017**	0.006
	[0.005]	[0.008]	[0.014]	[0.026]	[0.009]	[0.016]	[0.007]	[0.010]
Constant	3.774***	3.662***	4.398***	4.302***	3.180***	3.138***	3.966***	3.862***
	[0.038]	[0.056]	[0.106]	[0.218]	[0.045]	[0.087]	[0.066]	[0.090]
Observations	48,234	14,225	9,144	3,457	23,867	5,681	15,223	5,087
R-squared	0.103	0.133	0.119	0.105	0.076	0.133	0.131	0.161
Log Likelihood	51321.281	15412.108	9220.554	3186.371	25715.830	6550.163	18775.691	6496.885

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.

E.2 Regression based on industries

We use the OECD classification to assign industries either to the low- or to the medium/high-tech sector[28]. We run separate estimations in the sample of firms belonging to the high tech and low-tech industries in order to test whether the offshoring activities had a stronger impact on wage inequalities in high tech sectors compared to low tech sectors.

Results are reported in the following Table.

[28]The classification of low-tech and high-tech industries are based on the NACE classifications. Chemicals; pharmaceuticals; machines and equipment; computers, electronic and optical products and transports are classified in the high-tech industries, while the others are classified in the low-tech industries.

Table 15: Spell fixed effects by low-tech and high-tech industries

	All		Managers		Blue-collar workers		Intermediate Occupations	
	low-tech	high-tech	low-tech	high-tech	low-tech	high-tech	low-tech	high-tech
Number of children	-0.001	0.004	-0.002	-0.006	-0.000	0.007	-0.008	0.003
	[0.004]	[0.004]	[0.008]	[0.015]	[0.006]	[0.006]	[0.006]	[0.008]
Marriage	-0.017**	0.007	-0.051***	-0.013	0.021	-0.002	-0.033***	-0.002
	[0.008]	[0.010]	[0.020]	[0.033]	[0.013]	[0.014]	[0.012]	[0.015]
Number of FDI abroad	0.023*	0.090	0.066***	0.573***	0.012	-0.112	0.002	0.195*
	[0.012]	[0.075]	[0.023]	[0.195]	[0.026]	[0.108]	[0.017]	[0.114]
Revenue	-0.001**	0.008***	0.001	0.004	-0.005***	0.010***	0.000	0.007***
	[0.001]	[0.002]	[0.002]	[0.005]	[0.001]	[0.003]	[0.001]	[0.002]
Capital	0.002***	-0.026***	-0.000	-0.047***	0.005***	-0.026***	0.002*	-0.023***
	[0.001]	[0.004]	[0.002]	[0.012]	[0.002]	[0.007]	[0.001]	[0.005]
TFP	0.000***	-0.000	-0.000	-0.000	0.000***	-0.000	0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Imports of FG	0.001**	-0.000	-0.001	-0.002	0.000	-0.000	0.002***	-0.000
	[0.000]	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
Imports of II	-0.000	-0.000	0.002	-0.000	-0.000	-0.000	-0.002	0.000
	[0.000]	[0.000]	[0.002]	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]
Computer use	0.070***	0.070***	-0.005	0.504**	0.048	-0.057	0.018	-0.082
	[0.010]	[0.012]	[0.069]	[0.255]	[0.074]	[0.067]	[0.044]	[0.051]
Age-squared	-0.047***	-0.046***	-0.064***	-0.066***	-0.039***	-0.043***	-0.045***	-0.051***
	[0.003]	[0.003]	[0.006]	[0.010]	[0.004]	[0.004]	[0.004]	[0.005]
Exports	0.038***	0.006	0.010	-0.037	0.080***	0.041*	0.021**	-0.002
	[0.007]	[0.013]	[0.016]	[0.038]	[0.014]	[0.024]	[0.010]	[0.015]
Constant	3.572***	3.476***	4.442***	4.080***	3.149***	3.272***	3.589***	3.763***
	[0.043]	[0.051]	[0.124]	[0.310]	[0.068]	[0.070]	[0.077]	[0.092]
Observations	23,702	19,771	5,886	2,693	9,790	11,309	8,026	5,769
R-squared	0.120	0.090	0.123	0.121	0.093	0.070	0.135	0.136
Log Likelihood	26240.959	20060.222	5956.029	2654.020	11442.383	11576.548	9772.545	7189.584

Source: LIFI survey, French annual census for manufacturing (EAE), French Déclaration annuelles des donnés sociales (Panel DADS-EDP); period: 2002-2007.
Robust standard error in brackets, *** p<0.01, ** p<0.5, * p<0.10.