Wage Inequality and the Role of Multinational Firms: Evidence from German Linked Employer-Employee Data*

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Abstract

This paper contributes to our understanding of how firms' diverse international activities affect wage inequality between observationally identical workers. Using German linked employer-employee data, this study investigates the wage premium of exporters and multinational enterprises, controlling for observable and unobservable firm and worker heterogeneity. In doing so, this study is among the first to (1) jointly estimate the exporter and the multinational wage premium and (2) to further distinguish between wage premia of multinational firms that are foreign owned (inward FDI) and domestically owned (outward FDI). I find evidence that the wage premium of multinational firms is larger than the exporter premium. Moreover, my findings suggest that the so called 'exporter wage premium', as found by previous studies, is in fact driven by multinationals that engage in exporting activity. Another important contribution of the paper is to document how the decision to be a multinational firm relates to the wages payed by these firms across different skill and task groups, and the resulting composition of workers across the different firm types.

JEL classification: F14, F16, J31

Keywords: Trade, FDI, Inequality, Exporter, Wage Premium, Multinational firm

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1. Introduction

The link between increasing globalisation and wage inequality, has become a central topic in economic analysis and policy debate. Motivated by salient features in the data, a growing body of literature, lying at the intersection between trade and labour economics, has focused on studying the potential links between trade participation and wage inequality, to confirm the existence of the exporter wage premium and to suggest theoretical explanations (e.g. Bernard, Jensen, and Lawrence (1995) and Helpman, Itskhoki, Muendler, and Redding (2017)). At the same time, the recent surge in multinational activity, measured by foreign direct investment (FDI), has broken the boundaries of economic activity in space beyond trade in goods and services. In fact, the recent growth of FDI has caught up and at times outpaced the growth of trade and income.[1] This recent development points out that globaliastion, through firms' diverse forms of foreign market entry, is in itself heterogeneous. However, partly due to a lack of suitable data and partly because the surge in FDI is a relatively new phenomenon, the literature has paid less attention to analysing the implications of FDI by multinational enterprises (MNEs) on labour market outcomes.

Using German linked employer-employee data, this paper aims to fill this gap in the literature by studying how firms' internationalisation decisions, via exporting and FDI, affect wage inequality between observationally identical workers.[2] In doing so, this study is among the first to (1) jointly estimate the exporter and the MNE wage premium and (2) to further distinguish between wage premia of multinational firms that are foreign owned (inward FDI) and domestically owned (outward FDI). Unlike other studies, I am able to identify firms with foreign affiliates and thus domestically owned multinationals by using unique information derived from the German establishment survey (IAB). This allows me to analyse the effect of inward and outward FDI on domestic labour market outcomes separately. Furthermore, while it is a stylized fact that exporting firms pay higher wages than non-exporting firms, it is not clear,

[1] Shatz and Venables (2000), Navaretti, Venables, and Barry (2004) and Antràs and Yeaple (2014) provide some stylized facts concerning recent developments regarding exporting and multinational activity.

[2] Recent findings from the labour literature (e.g. Autor, Katz, and Kearney (2008), Dustmann, Ludsteck, and Schönberg (2009) and Card, Heining, and Kline (2013)), emphasise that there has been a rise in wage inequality within narrowly defined industries and occupations, suggesting that inequality has been rising not only *between* groups, defined by educational catagories and\or occupations, but also *within* groups ("residual inequality"). Furthermore, recent studies, such as Song, Price, Guvenen, Bloom, and Von Wachter (2015) and Card, Cardoso, Heining, and Kline (2018), have pointed out that this latter type of wage inequality is driven by significant employer-specific wage differentials.

whether it is exporting per se or MNEs with exporting activity that account for the 'exporter wage premium', as found by Bernard et al. (1995), Schank, Schnabel, and Wagner (2007), Verhoogen (2008) and Helpman et al. (2017). Classifying internationalising firms according to two distinct forms of foreign market entry, i.e. exporting vs FDI, enables me to additionally compare wage premia of exporting firms (without FDI activity), with wage premia of MNEs that also engage in exporting activity.

Moreover, this paper sheds light on the skill and task structure of wage premia by internationalising firms across skill groups and tasks of varying complexity. Previous studies, such as Munch and Skaksen (2008),Baumgarten (2013) and Klein, Moser, and Urban (2013), address this aspect of wage inequality in detail for exporting firms. My analysis is different to these papers in two ways: first, while they focus on the skill structure with respect to educational groups and/or occupations, my paper adds the complexity of tasks performed to the analysis. The German linked employer-employee data set contains information on the task requirement of occupations, which allows me to account for this detail and thus, contributes importantly to the analysis. Second, my analysis includes MNEs.[3] To the best of my knowledge, the skill and task structure of MNE wage premia has not been investigated empirically with linked employer-employee data.

Furthermore, differences in wage premia for various types of workers may capture differences in the demand for heterogeneous workers between internationalising and non-internationalising firms. This in turn, has important implications for the resulting workforce composition of the respective firm types.[4] There are several reasons for the existence of a link between workforce composition, firm's exporting and FDI activity and wages. Theoretical and empirical predictions from the search and matching literature suggest that particular sorting patterns between worker and firm types can arise due to complementarities in the underlying production technology of the firm (e.g. Bagger and Lentz (2014) Eeckhout and Kircher (2018) and Lopes de Melo (2018)). In this context, it is again of particular interest to contrast exporting from multinational firms to addresses the distributional consequences of heterogeneous forms of foreign

[3]Following Autor et al. (2013), many empirical and theoretical contributions in the labour and trade literature, emphasise that distinguishing between educational level and tasks may be important when measuring the skills demanded by firms.

[4]The issue of wage inequality in the context of sorting patterns between workers and firms, has received attention more recently in the labour literature. Card et al. (2013), for example, show that the pattern in firm-worker matching can explain as much as 35% of the recent increase in wage inequality in West Germany.

market entry.

The analysis of this paper is based on linked employer-employee data for Germany (LIAB), which contains detailed information concerning worker and firm characteristics, firms' ownership status, as well as exporting and FDI activity. Information on outward FDI is only available for 2006 and 2010. The classification of firms is in correspondence to the ownership status (foreign or domestic) and the internationalisation decision (exporting and/or FDI) of the firm, which gives rise to five different types of firms: (1) domestic firms with no international activity, (2) exporters (without FDI activiy), (3) domestically owned MNEs, i.e. firms with outward FDI, but no engagement in exporting, (4) MNEs under foreign ownership, but no exporting activity and lastly, (5) 'hybrid firms' that can be classified either as domestic or foreign owned MNEs and additionally engage in exporting. The fact that the major share of German FDI flows is in the form of outward FDI (-reference-), suggests that, when analysing the MNE wage premium for Germany, it is particularly important to include information on German firms' multinational activity. Germany is an ideal testing ground for this exercise as it is the largest economy in Europe, one of the largest exporting countries, a main recipient and sender of FDI in the international market and it has experienced an increase in (residual) wage inequality in recent decades.

In order to assess the existence and magnitude of both, the exporter and MNE wage premium, I first focus on the cross-sectional data of 2006 in order to shed some light on how observed firm and worker heterogeneity can explain part of the variation in wages. For this purpose, I employ a OLS estimation using a Mincer wage regression, including firm and worker characteristics. The cross-sectional analysis provides evidence that even after controlling for firm-size, industry, occupation and worker characteristics, firms with international activities, on average, pay higher wages than firms that only serve the domestic market. Furthermore, the wage premium payed by MNEs is larger than the exporter wage premium. This finding is in line with other studies analysing the exporter wage premium for Germany (e.g. Schank et al. (2007) and Baumgarten (2013)). Among MNEs, firms that export *and* engage in FDI pay the highest wage premia, followed by MNEs that are foreign owned.

I then make use of the available panel dimension (2006-2010), by adding individual-, firm- and spell fixed effects. The analysis of the fixed effects estimations give suggestive evidence for the presence of complementarties between workers' (unobservable) abilities in the production technology, which may determine sorting and matching patterns

between workers and certain firm types. The estimation results from the regression including individual and match-specific fixed effects, seem to confirm some degree of assortative matching on unobserved worker characteristics.

Furthermore, I examine a sample of workers that move firm between 2006 and 2010, to compare the wage growth of workers moving within the same firm type, with the wage growth of individuals transitioning to another type of firm. The estimation results highlight two distinct findings: First, workers that move from a local to an exporter or MNE experience, on average, larger wage gains relative to workers that move within the same firm type. Second, transitions into the opposite direction, i.e. workers moving away from exporters or MNEs to local firms, experience a wage growth that is significantly lower than the equivalent wage growth of individuals that move within the same firm type. These findings confirm the results form the corss-sectional and fixed effects analysis: there are benefits associated with working for firms that engage in international activities, but it is the workers employed by MNEs that benefit the most. These individuals receive higher wages and as the subsequent analysis highlights, work in an environment of workers with higher average abilities. These findings are in line with Martins (2011), who uses Portugues matched emloyer-employee data to study the foreign ownership wage premium. Similar to my analysis, his paper, exploits spells of interfirm mobility and finds that workers moving from domestic to foreign firms pay systematically more than movers from foreign to domestic firms. His paper, however, may be underestimating the effect of MNEs, as his data does not allow him to distinguish between domestic MNEs and domestic firms with no FDI activity. Moreover, my study investigates the exporter wage premium, which is not part of his analysis.

To investigate the possibility of different export and MNE wage premia across skill and task groups, I estimate wage regressions that includes interactions between each skill groups/task level and the different firm types. I find that firms participating in international activities pay, on average, more for low and unskilled workers. However, regarding more educated workers and employees performing more complex tasks, only MNEs pay higher wages. Together with the finding that the share of high skilled workers is larger in MNEs, provides supportive evidence for the hypothesis regarding worker-firm-type complementarities, where this effect seems to be strongest for MNEs.While I do not make a structural claim for this relation between the firm type, wages and wor force composition, the literature has proposed and tested various mechanisms that explain the exporter wage premium (see for example Helpman et al. (2017) for Brazil).

Related Literature. More generally, this paper is related to a number of recent studies, which analyse the link between globalisation and wages using firm-level and linked employeremployee data. Apart from the papers mentioned above, which are related to the exporter wage premium, my analysis in particular related to a growing literature that aims at measuring and explaining multinational wage premia. As most studies can not distinguish between domestically owned and foreign owned MNEs, what has been labeled in the literature as MNE wage premium, usually refers to the foreign ownership wage premium. Most closely related to my paper is Tanaka (2015), who estimates the MNE wage premium for Japan. To the best of my knowledge, this is the only other paper, using employer-employee data, to jointly estimate the exporter and MNE premium.

Studies based on firm-level data, e.g. Lipsey (2004) or using linked employer-employee data, such as Heyman, Sjöholm, and Tingvall (2007), Görg, Strobl, and Walsh (2007) and Martins (2011) find that hat after controlling for worker and firm characteristics, wage effects become much smaller, and in some cases disappear altogether or even become negative. However, the overall implications of these recent studies are not well understood, as the results are qualitatively mixed. Some studies seem to confirm the existence of a MNE (foreign ownership) wage premium and others find insignificant or even a negative effect.

Theoretical contributions in the literature have suggested different mechanisms for the existence of the MNE wage premium: most of the theories are build on the notion that the parent firm has access to a superior technology, which is instrumental for the wage premium bayed by its subsidiaries. In Fosfuri, Motta, and Rønde (2001) and Glass and Saggi (2002), for example, foreign affiliates of MNEs pay higher wages to reduce the risk of technology dissipation due to job turnover. Both papers provide justification for the foreign ownership wage premium. The mechanism studied in Egger and Kreickemeier (2013) is based on rent sharing at the firm level, where MNEs pay higher wages because they make higher (global) profits. Gumpert (2015) proposes a model where the MNE premium arises due to the organisation of knowledge within MNEs.

The paper also contributes to research that investigates the effect of openness on the process of matching between firms and workers, as for example studied by Davidson,

[4]Potential reasons for these mixed findings could be differences in country characteristics, and in particular the nature of FDI or because of methodological differences, i.e. different controls and econometric techniques.

Heyman, Matusz, Sjöholm, and Zhu (2012), Sampson (2014), Bombardini, Orefice, and Tito (2015) and Grossman, Helpman, and Kircher (2017).

The remainder of the paper is structured as follows. In Section 2, I introduce the data and provide some descriptive stats as motivating evidence. In section 3 analyse the different wage premia based on different specifications. Section 4 offers empirical evidence for the skill and task structure of wage premia and employment. Lastly, section 5 concludes.

2. Data

2.1. Data Description

The analysis is based on matched employer-employee data for Germany, which is provided in the the linked employer-employee data (LIAB) from the Institute for Employment Research (IAB). I focus on the years 2006 and 2010, which are the years where information on exporting and multinational activity is available. The core of this dataset is the IAB establishment panel, which is a representative employer survey of employment parameters at individual establishments. Using a common establishment identifier, administrative worker-level information from the German Federal Employment agency is matched with the survey.[5]

IAB Establishment Panel

The IAB Establishment Panel is a longitudinal survey, i.e. a large majority of the same establishments are interviewed every year. As a result, it enables both analysis of developments across time through comparison of cross-sectional data at different points in time, and also longitudinal studies of individual establishments. It contains about 16,000 establishments in Germany that employ at least one worker who pays social security contributions. The survey was launched in western Germany in 1993, with the aim of building up a representative information system for continuous analysis of labour demand. It was extended to eastern Germany in 1996, making it a nationwide survey. Establishments in the IAB Panel are surveyed on various employment policy-related subjects, including business policy and business development, employ-

[5]Alda, Bender, Gartner et al. (2005) provide an overview of the LIAB data set.

ment development, personnel structure, wages and salaries, investment activities and other general data on the establishment. The survey also includes varying focal topics every year. The IAB Establishment Panel is regarded as containing high data quality, achieved by means of the high-quality sample, the high exploitation level and the sophisticated process of data monitoring and error correction.[6]

Individual-Level Data

Data on individuals come from the Integrated Employment Biographies (IEB) of the IAB. The IEB cover all workers, subject to social security contributions. This amounts to about 80 percent of German workers, excluding civil servants, self-employed, family workers and workers in marginal employment. This data includes detailed information on several worker characteristics, such as gender, age, nationality, education, tenure and wage compensation. According to the social security notification regulations, employers ought to report these data at the end of each year, and at the beginning and end of each employment spell. However, because of a reporting ceiling in the German social-security system, wages are right-censored at the contribution limit. The data allows to comprehensively follow individuals over time, including a large number of individuals who switch from one plant in the sample to another one also in the sample.

International Activity and Classification of Firms

At the plant-level, the data comprise information about exporting as well as multinational activity of firms for the years 2006 and 2010. Exporting is measured as the share of sales obtained in export markets. As the LIAB contains variables that can be used as proxies for outward FDI, I am able to distinguish between domestic and foreign owned MNEs. First, one can use the ownership status of the firm to distinguish between domestically and foreign owned firms. By definition, a firm under foreign ownership is a multinational enterprise. Furthermore, we can use information on whether a firm reported 'foreign investments in 2004 and 2005' in the 2006 survey to account for the share of multinational firms under domestic ownership in 2006 and whether they have current activity abroad (takeover, foundation or equity participation) in 2010 for

[6]Fischer, Janik, Müller, and Schmucker (2009) provide an in-depth discussion about the sampling methods.

the respective year.[7]

The classification of firms is in correspondence to the ownership status (foreign or domestic) and the internationalisation decision (exporting and/or FDI) of the firm , which gives rise to 5 different types of firms:

1. *Local*: firms that are domestically owned and do not participate in international markets.
2. *Exporters*: these are the 'pure' exporting firms, i.e. firms that are domestically owned and serve foreign markets via exporting, but do not report outward FDI.
3. *Domestically owned MNEs*: firms under domestic ownership that report positive outward FDI, but do not export.
4. *Foreign owned MNEs*: are establishments under foreign ownership, without positive exports.
5. *Hybrid*: firms that report positive exports and are MNEs, i.e. either fall into category (3) or (4)

Sample Restriction

The sample includes all firms within the private sector, for which we have information on ownership, industry and size of the workforce (at least 5 employees). On the worker side, I take all individuals into account that are within the working age population, i.e. between 16 and 65 years. Furthermore, I restrict the sample to all fulltime workers where information is available in both sample years.

2.2. Descriptive and Non-parametric Statistics

Firm Level Statistics

Table 1 gives the frequency distribution of firms and workers by firm-type for the year 2006. Among 4,963 firms in the sample, 3,013 (61%) are local, 1,228 (25%) are exporters and a total of 722 (14%) are MNEs. Within the category of MNEs only 41 (0.81%) are domestically owned MNEs, 200 (4%) are foreign owned MNEs and 481 (10%) are

[7]Information about the export destination and FDI recipient countries is limited and, thus, cannot be used for the purpose of this study.

hybrid MNEs, i.e. firms that export and engage in FDI activity.

With respect to the number of workers by firm-type, we ascertain that the majority (43%) works for local firms , 27% for exporters and about 30% is employed by MNEs, where 2% work for domestic MNEs, 6% in foreign owned MNEs and 23% in hybrid MNEs. The total number of employees in the sample is 1,198,622. Notice that although the percentage share of MNEs accounts for only 14% , these firms employ an over-proportional fraction of the total workforce in the sample. This observation suggests that MNEs tend to be on average larger firms.

[*Table 1 here*]

Worker-Level Statistics

Wages by Firm Type. Worker-level descriptive statistics of daily wages according to the different firm-types are presented in Table 2. The table indicates that local firms pay the lowest wages, followed by ascending order of exporters, foreign owned MNEs, domestic MNEs and hybrid MNEs.

[*Table 2 here*]

Figure 1 shows the kernel density of the (log) daily wage in the 2006 wage sample for the three main categories of firm-types: Local firms, exporters and MNEs. The figure supports the descriptive evidence from Table 2 that MNEs, on average, pay higher wages than exporters and locals, respectively. Jointly Table 2 and Figure 1, indicate that the differentiation between exporter and MNEs is important when studying the implications of globalistaion for wage inequality in Germany.

[*Figure 1 here*]

Workforce Composition. The way firms choose to access foreign markets, is likely also going to determine their demand for labour of various abilities, who perform various tasks within the firm. In other words the underlying production technology for firms, determines the workforce composition within and across employers. In order to get a better sense of the workforce composition of the different firm types, and re-

spectively, how different types of workers are being rewarded across firms, this section will further explore some descriptive statistics concerning the differences in pay by the various firm-types for workers of different educational levels. Furthermore, I explore whether different firm types reward workers, performing tasks of varying complexity differently.[8]

[*Table 3 here*]

Table 3 provides some descriptive statistics concerning the skill and task composition by the three different firm types. [9] The share of highly educated workers serves a proxy of the average ability of the workforce. The share of workers performing highly complex tasks can be taken as a measure of the labour composition of tasks across the different firm types. This may also give further indications for the different production processes and consequently, labour demand of local and internationalising firms.

Recent research, e.g. by Barth, Davis, and Freeman (2018), provide evidence that more skilled workers are at larger and more capital intensive firms and Schank et al. (2007), Munch and Skaksen (2008) and Frías, Kaplan, and Verhoogen (2009) report differences in workforce composition between exporters and non-exporters.

Figure 2 shows the kernel density of the (log) daily wage in the 2006 sample for the three main categories of firm-types by educational level, i.e. low, medium and high. The figure supports the suggestive evidence from Figure 1 that MNEs, on average, pay higher wages than exporters and locals, respectively. The graph suggests that especially highly educated workers benefit from working in MNEs.

[*Figure 2 here*]

Following Autor et al. (2013), many empirical and theoretical contributions in the labour and trade literature, emphasise that distinguishing between educational level and tasks may be important when measuring the skills demanded by firms. A higher demand for skills, in turn, may capture underlying features of the production process,

[8]See Appendix for a description of the classification of occupations according to their task complexities.

[9]The "share of skilled" captures the share of workers with high educational level in the firm. The "share of complex" gives the share of workers performing highly complex tasks in the firm. Statistics calculated using data for 2006 and 2010.

such as complementarities between firm productivity and worker ability. Complementarities are important for the sorting and matching of heterogeneous labour. Workers may sort into industries and choose occupations whose requirements are complementary to their skills and they will match with other workers and with technologies and other factors that enhance their own productivity. Figure 3 indicates that MNEs, on average, pay more for workers performing more complex tasks.

[*Figure 3 here*]

Overall, these observations suggest that Firms participating in international activities have, on average, a workforce of higher average ability that performs tasks of higher complexity. Furthermore, descriptive evidence indicates that MNEs, on average, reward highly educated workers and employees performing highly complex tasks more.

3. The Exporter and MNE Wage Premium

3.1. Empirical Methodology - Wage Premia

This section outlines the empirical strategy to analyse the existence and magnitude of the MNE and exporter wage premium. In the baseline regression I focus on the cross-sectional data of 2006 in order to shed some light on how observed firm and worker heterogeneity can explain part of the variation in wages. The subsequent subsection then accounts for unobserved firm and worker characteristics by adding fixed effects to the baseline regression. For this purpose, I explore the panel dimension of the data (2006-2010).[10] This enables us to disentangle the different sources of the wage premia and may highlight potential mechanism. Complementary, the analysis of a sample of firm-movers, examines and compares the wage growth of workers moving to different firm types.

[10]Note, while in 2006 establishments were asked whether they had any 'foreign investment in 2004-2005', 2010 the question is formulated in a more general sense, whether they have 'current activity abroad (takeover, foundation or equity participation)'. Foreign investment involves extensive ownership stakes in domestic companies and assets of more than 10%. Whereas, the question in 2010 refers to equity participation in general, which may be less than 10% of the foreign company's asset.

3.1.1. Baseline Regression Set-Up

Using German linked employer-employee data for the year 2006, I test whether firms that participate in international markets via different modes of market entry (i.e. exporting, FDI or both), pay different wages relative to firms that are only active in the domestic market. I employ a OLS estimation using the following Mincer wage regression

$$logw_{ij} = d_s + d_o + FTYPE'_j\beta_1 + FSIZE'_j\beta_2 + X'_i\beta_3 + v_{ij}, \tag{1}$$

where the index j identifies the firm at which worker i is employed. The dependent variable is the log daily wage $logw_{ij}$ of individual i; d_s and d_o denote sector and occupation fixed effects; the categorical variable $FTYPE_j$ indicates the firm type, i.e. $Local$, $Exporter$, MNE_{For}, MNE_{Dom} and $Hybrid$. $FSIZE_j$ controls for the size of the firm, measured by the log size of the firm's workforce, X_i is a vector of observable worker characteristics and v_{ij} is a residual. The coefficients of interest are contained in the vector β_1, which captures the wage premia the different firm types pay, i.e. an exporter wage premium and premia for working for any of the three types of MNEs (domestic MNEs, foreign owned MNEs and hybrid MNEs). Moreover, β_2 represents the employment size wage premium.

The five different firm types follow the classification as outlined in section 2.1. Furthermore, I control for worker observables nonparametrically, including, gender, age, nationality (foreign or not), education (low, medium, high), occupation and tenure at the firm.

3.1.2. Extended Specification

The cross-sectional analysis ignored the possible sorting of workers with higher unobserved ability into specific firm types. In order to account for time invariant unobserved worker and firm heterogeneity, I estimate a regression of log daily wages on worker and firm observables, including worker, firm or spell fixed effects. For this estimation, I use the available data for 2006 and 2010. I next extend the baseline regression in (1) to exploit the panel dimension of the data. The adjusted OLS mincer wage estimation is

[10]The survey questions in 2006 and 2010 on foreign investment determine the number of domestic MNEs in each year; given that the fraction of domestic MNEs is rather small (0.81%) and assuming that a firm type is stable over the short sample period, I have a sample ranging from 2006-2010.

then given by

$$logw_{ijt} = d_s + d_o + FTYPE'_{jt}\beta_1 + FSIZE'_{jt}\beta_2 + X'_{it}\beta_3 + \mu + \alpha_i + \psi_j + v_{ijt} \qquad (2)$$

again firms are indexed by j and workers by i and $logw_{ijt}$ is the log daily wage worker i employed by firm j at time t. This estimation now includes a year fixed effect μ, an individual fixed effect α_i and an establishment fixed effect ψ_j. Introducing worker fixed effects allows me to address the issue of workers sorting on unobserved ability into specific firm types. A firm fixed effect controls for time-invariant firm characteristics. For this specification I aggregate the three different MNEs firm types together as I will focus on the difference in pay between local firms, exporters and MNEs as a whole.

The estimation results of specification (1) and (2) are presented in in section 4.

3.1.3. Firm-Type Switchers

Another way to test whether there is a positive association between wages and firms' international activity is to analyse a panel of workers moving to different firm types. If it is the exporter/MNE status that matters then we should expect to see that (conditioning for firm size and other firm characteristics) the wage growth for workers who move from local to exporters/MNEs to be different to the wage growth for those who move in the opposite direction or remain within the same firm type.[11] The diagram below presents the different types of movers that will be the basis of this analysis: Firstly, workers that move to another firm but remain in the same firm type, including local to local ($L-L$), exporter to exporter ($E-E$) and MNE to MNE ($M-M$) switchers. I denote these movers as *Same*-switchers, as shown in the diagonal of the matrix. Second, individuals that switch to and from local firms: Local to exporter ($L-E$), local to MNE ($L-M$), exporter to local ($E-L$) and MNE to local ($M-L$). Third, workers switching between exporter and MNEs, namely exporter to MNE ($E-M$) and MNE to exporter ($M-E$) switchers.[12]

[*Diagram here*]

[11]The table in the Appendix B presents estimation results based on a regression as in equation (2), additionally controlling for whether a worker moved during the sample period. Based on a simple POLS estimation firm-movers earn on average 3.8% less and the firm fixed specification suggests that movers are being payed about 7% less relative to stayers.

[12]The Appendix provides information concerning relative frequencies of firm-type switchers.

To facilitate the dynamic benefits and losses of moving to different firm types, I subsequently estimate the following specification with firm switchers ($SWITCH$), where I now consider wage growth ($\Delta w_{ij} = logw_{ij,2010} - logw_{ij,2006}$) as the dependent variable:

$$\Delta w_{ij} = \psi_j + d_s + d_o + FTYPE'_j\beta_1 + FSIZE'_j\beta_2 + \Delta FSIZE'_j\beta_3 + SWITCH'_j\beta_4 + X'_{it}\beta_5 + v_{ij} \quad (3)$$

where again the index j identifies the firm at which worker i is employed. As in the previous specifications, d_s and d_o denote sector and occupation fixed effects; the categorical variable $FTYPE_j$ indicates the firm type, i.e local, exporter or MNE. Additional to the the size of the firm ($FSIZE_j$), I control for the change in firm size ($\Delta FSIZE_j$) between 2006-2010. X_i is the vector of time-varying observable worker characteristics, including age, education tenure and occupation and v_{ij} is a residual. The firm fixed effect ψ_j accounts for unobserved firm heterogeneity. The main coefficient of interest is now the vector β_4, which captures the difference in pay between the different firm-type switchers. The reference group are the *Same*-switchers, i.e. workers that move firm but remain within the same firm type.

3.2. Estimation Results - Wage Premia

3.2.1. Baseline Results

Table 4 summarises the estimation results based on five different types of wage regressions, which differ with respect to the controls included at the right hand side. The first regression in column 1, captures the 'raw' difference in pay between the different firm types, excluding any further controls for firm or worker characteristics. The wage premia can consequently be interpreted as follows: Firms that serve foreign markets by exporting only, pay on average, 11.5% higher wages than local firms. Foreign MNEs, domestic MNEs and hybrids,on average, pay a premium of 18.3%, 17.2% and 21.9%, respectively. Not surprisingly, this reduced form regression has a very low adjusted R^2 of 0.035.

The second specification (see column 2) adds the log of the total number of employees to the regression. Consistent with a large empirical literature in labour economics, larger firms on average pay higher wages (see for example ...).[13] As MNEs and export-

[13]The coefficient for the log of employment is given by 0.097, implying that an increases in employment by one percent, increases the wage rate by about 0.097 percent.

ing firms tend to be larger than local firms, the coefficients for the different firm types decrease. Note, however, that after controlling for the size of the firm, the coefficient for exporters negative, implying a negative exporter premium of -0.7%. As documented by Felbermayr, Hauptmann, and Schmerer (2014) the exporter wage premium in Germany is non-monotonic, with firms with medium-sized export shares paying the largest premium. Note as well that I classify exporters in a more narrow way than previous studies, who would include hybrid-MNEs, i.e. firms that engage in FDI and exporting activity into their 'exporter' category. This, together with the fact that I do not control for firms' export shares, might explain the negative, yet very small coefficient after controlling for the size of the firm.[14] The coefficients for the different MNEs become more similar to one another, but remain with on average 11% still relatively large. Similarly, the small increase of the adjusted R^2 to 0.154, suggests that some of the observed differences in pay of exporters and MNEs, relative to local firms (see column 1), can be explained by the size of the firms.

[*Table 4 here*]

The results in column 3 and 4 are based on a regression that further includes industry and occupation fixed effects, respectively. The exporter premium now becomes positive again, implying that industry and occupation characteristics are strongly enough correlated with the export status to reestablish a positive premium of about 1.7%. The decrease in the coefficients for the different MNEs under these specifications suggests that the difference in pay between the different firm types, as captured in column 1, are mainly due to specific industry and occupation characteristics. This result implies that MNEs belong to high-wage industries and/or have a larger share of high-paying occupations. The strong increase of the adjusted-R^2 to now 0.431 in column 4 confirms this finding. Thus, after controlling for firm-size, industry and occupation fixed effects, the exporter wage premium is still about 1.7% and that of MNEs on average about 7%.

The last specification, presented in column 5, adds the vector X_i of worker characteristics, including gender, age, nationality (dummy for whether worker is foreign),

[14]The Table presented in the Appendix includes also those workers that appear only in one period. The coefficient for exporters for that sample remains positive and significant at the 1% level throughout all specifications. Additional robustness checks, where I only use data for the manufacturing industry, are in line with the findings discussed above, with the exporter premium being positive in all specifications.

education and tenure at the firm, to the regression. As expected, adding worker observables further raises the adjusted-R^2, now taking a value of 0.565. However, the coefficients for the different firm types change very little relative to the previous specification with industry and occupation fixed effects. More precisely, the exporter wage premium reduces to 1.3% and for foreign owned MNEs, domestic MNEs and hybrids to 8.2%, 3.7% and 7.3%, respectively.[15]

In summary, estimations based on this cross-sectional analysis show that even after controlling for firm-size, industry, occupation and worker characteristics, firms with international activities, on average, pay higher wages than local firms. Furthermore, the wage premium payed by MNEs is larger than the exporter wage premium. Among MNEs, firms that export *and* engage in FDI, pay the highest wage premia, followed by MNEs that are foreign owned.

3.2.2. Results from Fixed Effects Regression

Table 5 summarises the estimation results of the above equation.[16] Firm type coefficients remain significant at the 1% level for all specifications and coefficients for exporters and MNE status are significantly different from each other. The first column captures the results of a simple pooled ordinary least squares (POLS) estimation including year fixed effects. This estimation confirms the findings presented in Table 4 that MNEs pay higher wage premia than exporters. Note, however, that relative to the numbers from the cross-sectional analysis, the premium for exporters has now increased slightly, taking a value of 2.9% and the equivalent coefficient for MNEs has decreased from about 8% to 4.9%.

[*Table 5 here*]

The second column shows the results for the individual fixed effect regression, which takes care of unobserved worker heterogeneity, such as ability, productivity, social competence, networks and so forth. The increase in the R^2 from 0.486 to 0.576, indicates that unobserved characteristics of workers, captured by individual fixed effects, contribute to the variance of log wages. This is also reflected in lower wage premia

[15]The coefficients of the different firm-types are statistically significant at the 1% in all four specifications.

[16]In the Appendix I provide results for the panel regression with the more detailed classification of MNEs.

for exporters and MNEs, where the coefficient for MNEs reduces by relatively more, suggesting a potentially stronger correlation between worker unobservables and MNE status.

The third column includes firm fixed effects to control for time-invariant unobserved firm heterogeneity. The results of this regression, however, have to be interpreted with caution. One potential limitation is that there may be only little variation in the firm-type variable during this relatively short period of 4 years (2006-2010). Furthermore, variation in firm-types, may not be caused by actual changes in the way firms participate in international activity, but may be due to to the fact that the survey questions concerning outward FDI vary slightly in the two given years.[17] This caveat may affect the estimated coefficient for exporter and MNE wage premia. Keeping this caveat in mind, the table reports that after controlling for unobserved characteristics of employers, captured by employer fixed effects, the exporter wage premium (2.6%) is now larger than the premium payed by MNEs (1.6%). The low value of the R^2, relative to the other specifications, suggest that firm fixed effects on their own contribute little to the variance of log wages.

Combining worker fixed effects and firm fixed effects (see column 4) through a spell fixed effect, accounts for unobserved match-specific heterogeneity. A potential source of match heterogeneity in wages is complementarity between the skills of the worker and the needs of the firm. To the extent that the individual worker has significant bargaining power, this complementarity will be rewarded in the form of higher wages. Concerning the validity of the coefficients, however, the same caveats hold as were the case for the firm fixed effects specification: within-group variation may be a noisy measure of true firm-type changes. Under this last specification, MNEs on average, pay the highest wages with a premium of 2.5% and the exporter premium is 1.9%. Under this last specification the R^2 takes the highest value of 0.580.

In summary, after including worker fixed effects the exporter and MNE wage premia reduce significantly, implying that unobserved worker characteristics are positively correlated with firms' international activities. Additionally, taking results from the spell fixed effects regression into account, gives suggestive evidence for complementarities between (unobserved) worker skills and firm technologies.

[17] In 2006 establishments were asked whether they had any 'foreign investment in 2004-2005'. In 2010 the question is formulated in a more general sense, whether they have 'current activity abroad (takeover, foundation or equity participation)'. Foreign investment involves extensive ownership stakes in domestic companies and assets of more than 10%. Whereas, the question in 2010 refers to equity participation in general, which may be less than 10% of the foreign company's asset.

3.2.3. Results: Firm-Type Switchers

Table 6 presents the estimation results of the switchers regression. The first column shows the results for the OLS regression and the second column presents the results after controlling for unobserved firm heterogeneity. The estimated switcher dummies seem to confirm the hypothesis stated above, i.e. workers moving from a local firm to a firm that participates in international activities, experience, on average, a larger wage gain than workers moving within the same firm type. Focusing on the firm fixed effects specification in column 2 shows that workers that switch from a local firm to an exporter ($L-E$) receive a mobility premium of about 17.6% and local to MNE movers ($L-M$) 30.1% respectively. Contrary, movers in the opposite direction experience, on average, wage changes that are lower than that of *Same*-switchers. For workers moving from an exporter to a local firm ($E-L$) the average wage change is about 31,3% lower and that of $M-L$ switchers about 36.8% respectively. Note, that the disadvantages from moving away from exporters or MNEs are larger than the advantages from a transition to one of these firm-types. One explanation for this finding could be that separations and the direction of the transition is endogenous and may capture some underlying sorting patterns. Additional worker and match-specific fixed effect would be a way to control for this. However, it is not possible to include worker fixed effects into the specification, where the dependant variable is the change in the log of the wage, as the panel includes only two time periods.

[*Table 6 here*]

All coefficients, apart from the one for the $L-E$ switchers, are significant at the 1% level. The $L-E$ coefficient is significant at the 5% significance level. The coefficients for movers that switch among Exporters and MNEs are relatively small compared to the ones described for the other switchers; the coefficients for $M-E$ and $E-M$ switchers are not significant. It should be noted that the estimated coefficients capture static and dynamic advantages of switching to a particular firm type, i.e. there may be first a jump in the wage the moment the worker switches firm type and additionally, dynamic advantages associated with working within a particular firm type, such as learning by working for a MNE. Given the relatively short sample period (2006-2010), the coefficents can only be interpreted as capturing the static and dynamic advantages within this time frame, and do not take wage changes beyond this period into account.

Summing up, the results of the switchers analysis highlights two distinct findings: First, workers that move from a local to an exporter or MNE experience, on average, larger wage gains relative to workers that move within the same firm type. Second, transitions into the opposite direction, i.e. workers moving away from exporters or MNEs to local firms, experience a wage growth that is significantly lower than the equivalent wage growth of individuals that move within the same firm type.

It should be noted that the estimated coefficients capture static and dynamic advantages of switching to a particular firm type, i.e. there may be first a jump in the wage the moment the worker switches firm type and additionally, dynamic advantages associated with working within a particular firm type, such as learning by working for a MNE. Given the relatively short sample period (2006-2010), the coefficients can only be interpreted as capturing the static and dynamic advantages within this time frame, and do not take wage changes beyond this period into account. This would be of particular interest to test whether e.g. wage growth exhibits a u-shaped pattern after moving firm type.

4. The Skill and Task Structure of Wage Premia and Employment

The results above indicate that worker characteristics are important factors in driving differences in pay across the different firm types. In order to get a better sense for what exactly is driving the results reported above, this section will further explore whether and to what extend there are differences in pay by the various firm-types for workers of different educational levels and performing tasks of variying in complexity.

4.1. Empirical Methodology - Wage premia across skill groups and task levels

The three educational groups are defined as follows: the first category captures workers with a 'low' educational level, who at most have a high-school diploma and no vocational training. The second group refers to workers with a medium level of education, i.e. with a high-school diploma at most and vocational training or Abitur qualification for university entrance without vocational training or Abitur qualification for university entrance with vocational training. Respectively, the group with a high

level of education has a university diploma or a technical college diploma.

Furthermore, I explore whether different firm types reward workers, performing tasks of varying complexity differently. Here, the formal qualification of the person practicing the occupation is irrelevant; the subject of consideration is rather the requirement level that is typically demanded for this occupational activity. The objective of classifying occupations according to their complexity is to be able to depict the various degrees of complexity within those occupations which have a high similarity of occupational expertise. This need not be based on the educational level, but can also be acquired through work experience and learning-by-doing. Four requirement levels are distinguished to map the degree of complexity of an occupation: (1) unskilled/semiskilled task, (2) skilled task, (3) complex task and (4) highly complex task.[18]

4.1.1. Differences in pay by educational group

To analyse whether exporters and MNEs pay relatively more for different types of workers, I will next run a regression as in (1) with an additional interaction term between the firm type and the educational variable.[19]

[*Table 7 here*]

Column 1 of Table 7, presents the estimation results for a specification including the firm type variable, whereas in column 2 it has been omitted. Looking at column 1, if we were to analyse the differential effect of a specific worker type employed by different firm types, we would have to add the firm type coefficient and the respective interaction term together. Fore example he differential effect between a high skilled worker in a local firm and an equivalent worker in a MNE firm is about 5.16%, i.e. 11.4% - 6.24%. The second specification precisely implies this calculation and thus, makes it easier to interpret the interaction effects. I will subsequently use column 2 as basis of my analysis. The interpretation of the coefficients is then as follows: The coefficient of the educational variable is the expected effect of being a medium/high skilled worker among

[18]See Appendix for a description of the classification of occupations according to their task complexities.

[19]The Appendix presents the results for an alternative approach, where we split up the sample by educational level/task requirement. These estimation results are in line with the results from a regression with added interactions between firm type and educational level/task requirement.

the non-international firms, i.e. the difference in pay between a low and medium (25%) or low and high (41.7%) educated worker where both are employed by local firms. The coefficients of the interaction between firm type and the educational variable, gives the differential effect of a particular worker type being employed by a different firm type. The effect of being employed by an exporter, relative to a local firms, is 7.35% for low-, 0.34% for medium- and 0.32% for high educated workers. The respective effect for MNes is 11.4% for low-, 6.97% for medium- and 5.12% for high educated workers. The numbers suggest that MNEs pay relatively more for each worker type, while the exporter coefficients for medium and high skilled workers are close to zero. Only low educated workers receive, on average, about 7.35% more than an equivalent worker in a local firm.

It should be noted that, without the firm type coefficient, the MNE premium for low educated workers is statistically not significant, whereas in the first column it was significant at the 1% level. All other coefficients remain significant at least at the

4.1.2. Differences in pay by task requirement

Following Autor et al. (2013), many empirical and theoretical contributions in the labour and trade literature, emphasise that distinguishing between educational level and tasks may be important when measuring the skills demanded by firms. A higher demand for skills, in turn, may capture underlying features of the production process, such as complementarities between firm productivity and worker ability.

[*Table 8 here*]

Table 8 captures the results of regressions with the interaction of the firm type with the variable measuring the complexity of tasks performed. The interpretation of the coefficients follow the same logic as above for the interaction with the educational variable. Again, I will focus on column 2 as the basis of analysis. All estimated coefficients in this specification are statistically significant at least at the 5% level.

The coefficient of the task complexity variable is the expected effect of a worker in a skilled,complex or highly complex task among the non-international firms, i.e. the difference in pay between an unskilled and skilled (13.3%), unskilled vs complex (65.4%) and unskilled vs highly complex (42.3%) task, where workers are employed by local firms. Surprisingly, the coefficient for performing highly complex tasks is smaller

than that of complex tasks.

The differential effect of being employed by an exporter, relative to a local firms, is 3.3% for unskilled-, 1.2% for skilled-, 1.0% for complex and -1.5% for highly complex tasks. The respective effect for MNEs is 9.5% for unskilled-, 7.4% for skilled-, 7.2% for complex and 2.9% for highly complex tasks. The estimation results provide a more detailed picture of what type of task is particularly rewarded by different firm types: MNEs pay relatively more for each task performed , while the respective exporter coefficients are smaller for all task types. Furthermore, this specification points out that workers performing highly complex tasks, on average, are being payed more by local firms than by exporters.

Taken together, Table 7 and 8 provide a more nuanced picture of which type of firm rewards different worker types more. While internationling firms reward low educated workers and unskilled tasks relatively more than local firms, the results for more educated workers and employees performing more complex tasks are more nuanced.

4.2. Workforce Composition

The above analysis gives suggestive evidence for the presence of complemantarities between (unobserved) worker ability and firm types: First, results from the fixed effects estimation in section 1.2 pointed out that unobserved worker and firm heterogeneity are important factors in explaining some of the variation in wages among observationally identical individuals. Moreover, I show that wage premia reduce after controlling for worker and spell fixed effects and that MNE wage premia reduce relatively more. These results are indicative for positive assortative matching between worker and firm type. Second, the analysis in section 2 highlights that MNEs, on average, reward highly educated workers and employees performing highly complex tasks more than local firms and exporters. The latter fact, in turn, is additional evidence for worker-firm-type complementarities in the underlying firm technologies. As discussed in the labour literature studying sorting and matching in the labour market, firms' production technologies determine the allocation of heterogeneous workers between firms.[20] If the inference from Fact 1 & 2 are correct, we can predict that MNEs and potentially exporters, ought to have a workforce of a higher average ability. In order to test this hypothesis I will employ an OLS regression for the following specification for the 2006 cross-section:

[20]See for example Shimer and Smith (2000), Rogerson, Shimer, and Wright (2005) and Chade, Eeckhout, and Smith (2017) for reviews of the search and matching literature.

$$\phi_j = d_s + FTYPE'_j\beta_1 + FSIZE'_j\beta_2 + X'_m\beta_3 + v_j \tag{4}$$

where ϕ_j is the share of skilled workers in firm j and the firm controls are as before, an industry fixed effect (d_s), firm size ($FSIZE$) and the firm type ($FTYPE$). The vector X_m aggregates several worker characteristics yup to the firm level, i.e. the share of foreign and female workers and the average and tenure in the firm.

In a similar fashion to Table 1, Table 6 summarises the estimation results based on different types of wage regressions, which differ with respect to the controls included at the right hand side. The estimated coefficients in column 4, based on a specification including all firm controls, suggest that exporters and MNEs employ, on average, more skilled workers than local firms. The coefficient for exporters takes a value of 0.0259 and for MNEs 0.0568, respectively. The estimated coefficients in all specifications are significant at the 1% and the exporter and MNE coefficient are significantly different from each other in all estimations.

[*Table 9 here*]

This observed sorting pattern, i.e. the fact that more skilled workers match with firms that participate in global markets, provides supportive evidence for the hypothesis regarding worker-firm-type complementarities. Furthermore, this finding is in line with theoretical and empirical predictions from the search and matching literature, where sorting arises due to complemenatirties in the production technology of the firm (e.g. Bagger and Lentz (2014) Eeckhout and Kircher (2018) and Lopes de Melo (2018)). As has been pointed out by Eeckhout and Kircher (2011), wages can give information about the strength of sorting, which is consistent with my the result that MNEs pay higher premia for high skilled workers.[21]

The same analysis can be carried out for the share of workers performing complex or highly complex tasks, where the specification follows (4). The estimation results in table 7 are in line with the discussion concerning the share of high skilled workers: exporters employ, on average, more workers performing complx/highly-complex tasks than local firms, as captured by the significant and positive coefficent of 0.0263. The

[21]However, Eeckhout and Kircher (2011) argue , from wage data alone, one cannot distinguish a model that features positive sorting from a model of negative sorting, due to non-monotinic relationship between wages and firm type.

respective coefficient for MNEs takes a value of 0.0784, implying that MNEs, on average, have the highest share of occupations that are of either complex or highly complex task content.

[*Table 10 here*]

5. Concluding Comments

This paper contributes to our understanding of how firms' international activities affect wage inequality between observationally identical workers. The joint estimation of exporter and MNE wage premia allows me to distinguish between heterogeneous forms of globalisation and enables me to analsye the resulting distributional implications for wages and employement.

Using German linked employer-employee data, this study provides empirical evidence for the wage premium of exporters and multinational enterprises. I find that, even after controlling for observed and unobserved firm and worker heterogeneity, firms participating in global markets pay higher wages than firms that operate only in the domestic market, where MNEs pay higher premia than exporters. In particular, estimation results from the regression including individual and match-specific fixed effects, seem to confirm some degree of assortative matching on unobserved worker characteristics.

Moreover, I show that firms participating in international activities, on average, reward highly educated workers and employees performing highly complex tasks more, where workers employed by MNEs benefit the most. Another important contribution of the paper has been to document how the decision to be a MNE firm relates to the wages payed by these firms across different skill and task groups, and the resulting composition of workers across the different firm types.

This paper has established an interesting stylised fact: exporters and MNEs are clearly ranked in terms of the wages they pay, and in terms of the skill they require. This observed hierarchy of firms' mode of market access merits further investigation.

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Appendix A. Tables & Figures

A.1. Tables

Table 1: Number of firms and workers by firm-type (2006)

Firm type	No. of firms	%	No. of workers	%
Local	**3,013**	**60.71**	**511,325**	**42.66**
Exporter	**1,228**	**24.74**	**321,964**	**26.86**
MNE	**722**	**14.55**	**365,333**	**30.48**
Domestic	41	0.83	24,568	2.05
Foreign	200	4.03	69,379	5.79
Hybrid	481	9.69	271,386	22.64
Total	**4,963**	**100.00**	**1,198,622**	**100.00**

[*Output for Table 2 under disclosure review by the IAB*]

[*Output for Table 3 under disclosure review by the IAB*]

Table 4: Unravelling the different wage premia (2006)

	(1) No Controls	(2) +Size	(3) +Industry	(4) +Occ	(5) +obs
Exporter	0.115***	-0.00681***	0.00421*	0.0166***	0.0130***
	(0.00178)	(0.00176)	(0.00214)	(0.00187)	(0.00163)
MNE_{For}	0.183***	0.118***	0.0888***	0.0957***	0.0824***
	(0.00414)	(0.00389)	(0.00393)	(0.00339)	(0.00296)
MNE_{Dom}	0.172***	0.105***	0.107***	0.0209***	0.0372***
	(0.00611)	(0.00573)	(0.00574)	(0.00489)	(0.00428)
MNE_{Hyb}	0.219***	0.113***	0.116***	0.0705***	0.0728***
	(0.00200)	(0.00193)	(0.00233)	(0.00203)	(0.00177)
Observations	348756	348756	348756	348756	348756
R^2	0.035	0.154	0.187	0.431	0.565

Standard errors in parentheses

Dependant variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Controlling for Unobserved Heterogeneity

	(1)	(2)	(3)	(4)
Exporter	0.0299***	0.0206***	0.026***	0.0191***
	(0.000877)	(0.000958)	(0.00165)	(0.000932)
MNE	0.0492***	0.0269***	0.0161***	0.0250***
	(0.000932)	(0.00104)	(0.00181)	(0.00102)
Individual FE		x		
Firm FE			x	
Spell FE				x
Time FE	x	x	x	x
Worker controls	x	x	x	x
Firm controls	x	x	x	x
Observations	665290	665290	665290	665290
R^2	0.487	0.574	0.456	0.579

Standard errors in parentheses

The dependent variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Analysing Firm-Type Switchers

	(1) POLS	(2) Firm-fe
Exporter	-0.165***	
	(0.0345)	
MNE	-0.227***	
	(0.0289)	
1 L-EX	0.0969**	0.176**
	(0.0373)	(0.0604)
2 L-MNE	0.295***	0.308***
	(0.0260)	(0.0316)
3 EX-MNE	0.113***	0.0587
	(0.0241)	(0.0306)
4 MNE-EX	0.000276	-0.0489
	(0.0393)	(0.0619)
5 EX-L	-0.206***	-0.313***
	(0.0323)	(0.0473)
6 MNE-L	-0.148***	-0.368***
	(0.0324)	(0.0487)
Observations	7302	7302
R^2	0.271	0.213

Standard errors in parentheses

Dependant variable is the change in the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Wage Premia by educational level

	(1)	(2)
firmtype		
Exporter	0.0735***	
	(0.00362)	
MNE	0.1140***	
	(0.00384)	
education		
medium	0.2503***	0.2503***
	(0.00293)	(0.00293)
high	0.417***	0.417***
	(0.00446)	(0.00446)
type#edu		
Exp#low		0.0735***
		(0.00362)
Exp#medium	-0.0696***	0.0034***
	(0.00379)	(0.001781)
Exp#high	-0.0702***	0.0032**
	(0.00545)	(0.004244)
MNE#low		0.1140
		(0.447)
MNE#medium	-0.0442***	0.0697***
	(0.00402)	(0.0018325)
MNE#high	-.0624***	0.0512***
	(0.00555)	(0.004156)
Observations	332,645	332,645
R^2	0.5655	0.5655

Standard errors in parentheses

Dependant variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Wage Premia by task requirement

	(1)	(2)
firmtype		
Exporter	0.0330***	
	(0.00932)	
MNE	0.0951***	
	(0.00929)	
level		
skilled	0.1334***	0.1334***
	(0.02838)	(0.02838)
complex	0.6540***	0.6540***
	(0.05227)	(0.05227)
highlycompl.	0.4228***	0.4228***
	(0.11126)	(0.11126)
type#edu		
Exp#unskilled		0.0330***
		(0.00931)
Exp#skilled	-0.0209**	0.0121***
	(0.00944)	(0.00181)
Exp#complex	-0.0230*	0.0100**
	(0.01021)	(0.01004)
Exp#highlycompl.	-0.0484***	-0.0154**
	(0.01054)	(0.00513)
MNE#unskilled		0.0951***
		(0.00929)
MNE#skilled	-0.0214**	0.0736***
	(0.009435)	(0.00188)
MNE#complex	-0.0235**	0.0716***
	(0.0105)	(0.00423)
MNE#higlycompl	-0.0659***	0.0291***
	(0.01048)	(0.00489)
Observations	321,133	321,133
R^2	0.512	0.512

Standard errors in parentheses

Dependant variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9 : Share of High Skilled Workers (2006)

	(1) no Controls	(2) +Size	(3) +industry fe	(4) +means
Exporter	0.0198***	0.0124***	0.0261***	0.0259***
	(0.00331)	(0.00338)	(0.00355)	(0.00353)
MNE	0.0589***	0.0438***	0.0552***	0.0568***
	(0.00418)	(0.00447)	(0.00445)	(0.00443)
Observations	4779	4779	4779	4779
R^2	0.042	0.058	0.176	0.192

Standard errors in parentheses

Dependant variable is the share of High Skilled workers in a firm

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10 : Share of Workers performing Complex Tasks (2006)

	(1) no Controls	(2) +Size	(3) +industry fe	(4) +means
Exporter	0.0122*	0.000146	0.0267***	0.0263***
	(0.00487)	(0.00497)	(0.00501)	(0.00496)
MNE	0.0733***	0.0486***	0.0759***	0.0784***
	(0.00616)	(0.00657)	(0.00628)	(0.00624)
Observations	4779	4779	4779	4779
R^2	0.029	0.049	0.233	0.251

Standard errors in parentheses

Dependant variable is the share of High Skilled workers in a firm

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A.2. Robustness Check

This table presents estimation results equivalent to the ones in Table 4, where here workers are included that may only appear in the sample in 2006.

Robustness: Unravelling the different wage premia (2006)

	(1) No Controls	(2) +Size	(3) +Industry	(4) +Occ	(5) +obs
Exporter	0.216***	0.110***	0.0412*	0.00305***	0.0316***
	(0.00125)	(0.00124)	(0.00148)	(0.00127)	(0.00116)
MNE_{For}	0.250***	0.177***	0.110***	0.103***	0.0846***
	(0.00231)	(0.00222)	(0.00219)	(0.00187)	(0.00158)
MNE_{Dom}	0.172***	0.105***	0.107***	0.0209***	0.0372***
	(0.00611)	(0.00573)	(0.00574)	(0.00489)	(0.00428)
MNE_{Hyb}	0.324***	0.186***	0.156***	0.0645***	0.0624***
	(0.00346)	(0.00333)	(0.00326)	(0.00138)	(0.00116)
Observations	355274	355274	355274	355274	355274
R^2	0.056	0.138	0.219	0.446	0.609

Standard errors in parentheses

Dependant variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fixed-Effects Estimation Detailed Firm Types

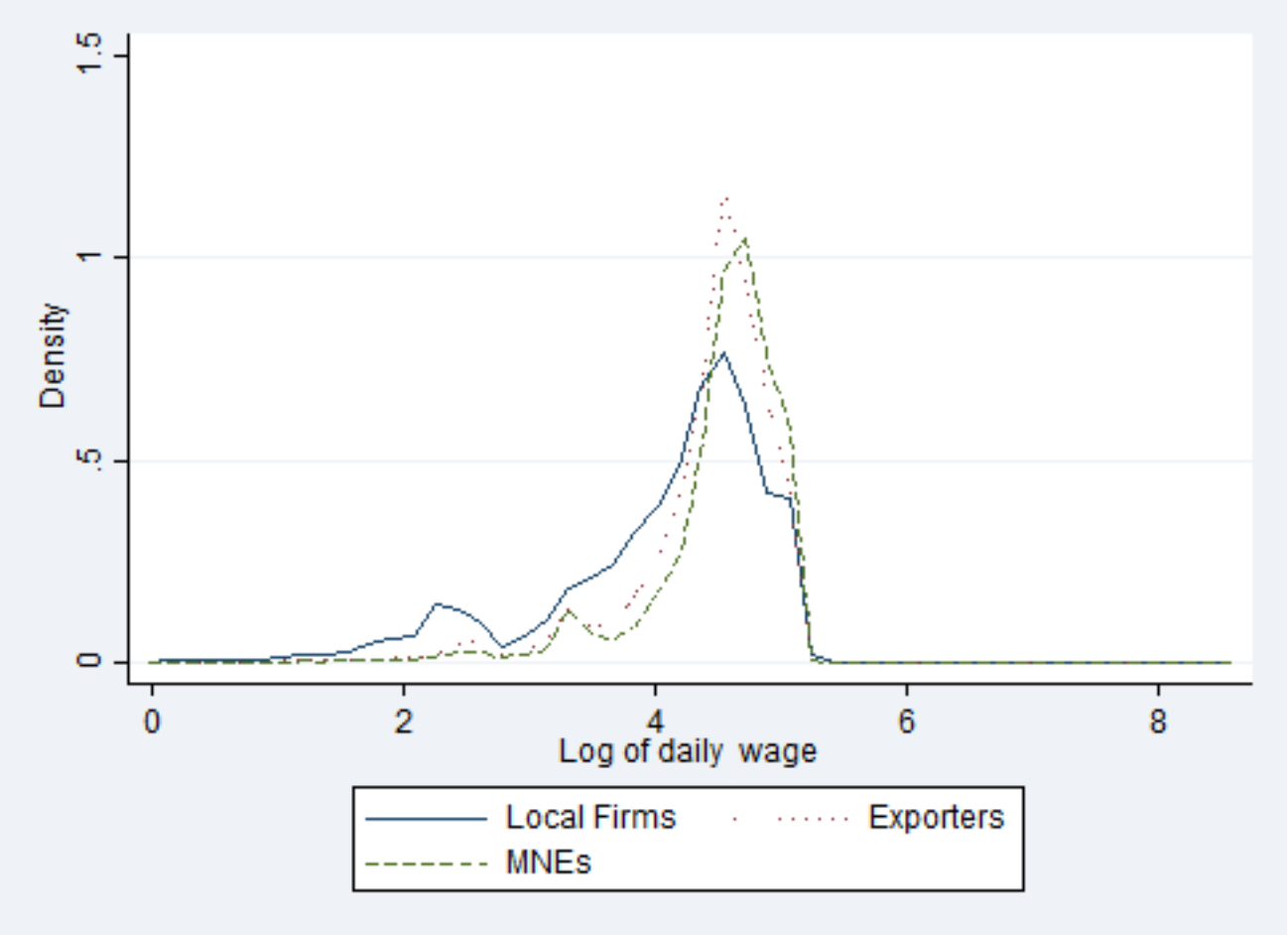
	(1)	(2)	(3)	(4)
Exporter	0.0327***	0.0247***	0.0276***	0.0228***
	(0.000888)	(0.000981)	(0.00171)	(0.000957)
MNE_{For}	0.0436***	0.0136***	0.00943**	0.0136***
	(0.00175)	(0.00188)	(0.00329)	(0.00184)
MNE_{Dom}	0.0284***	0.00818***	0.00919**	0.00829***
	(0.00171)	(0.00177)	(0.00308)	(0.00173)
MNE_{Hyb}	0.0540***	0.0342***	0.0181***	0.0313***
	(0.000985)	(0.00112)	(0.00195)	(0.00109)
Individual FE		x		x
Firm FE			x	x
Time FE	x	x	x	x
Worker controls	x	x	x	x
Firm controls	x	x	x	x
Observations	348756	348756	5459	362195
R^2	0.489	0.576	0.454	0.581

Standard errors in parentheses

The dependent variable is the log daily wage

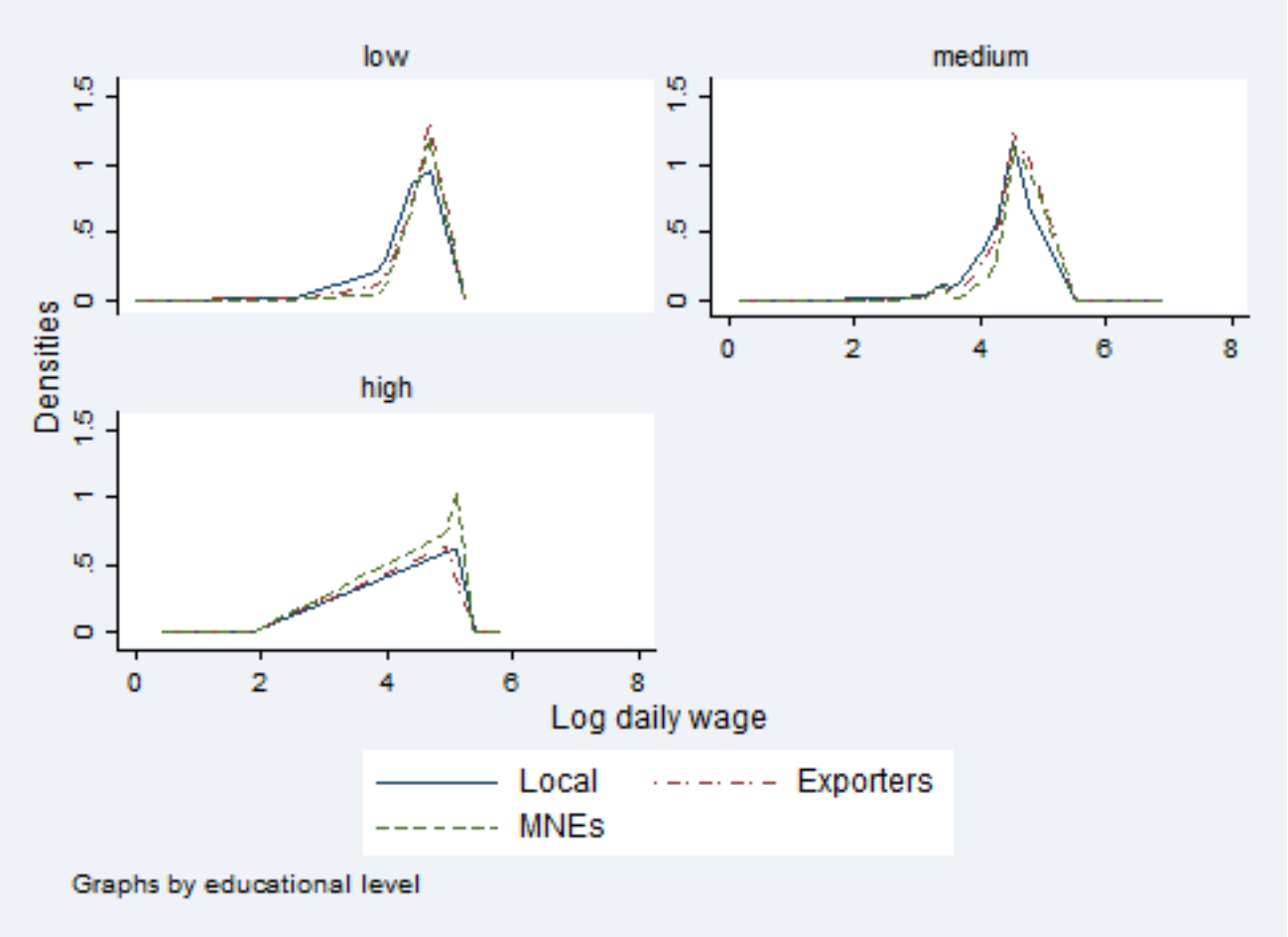
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A.3. Figures



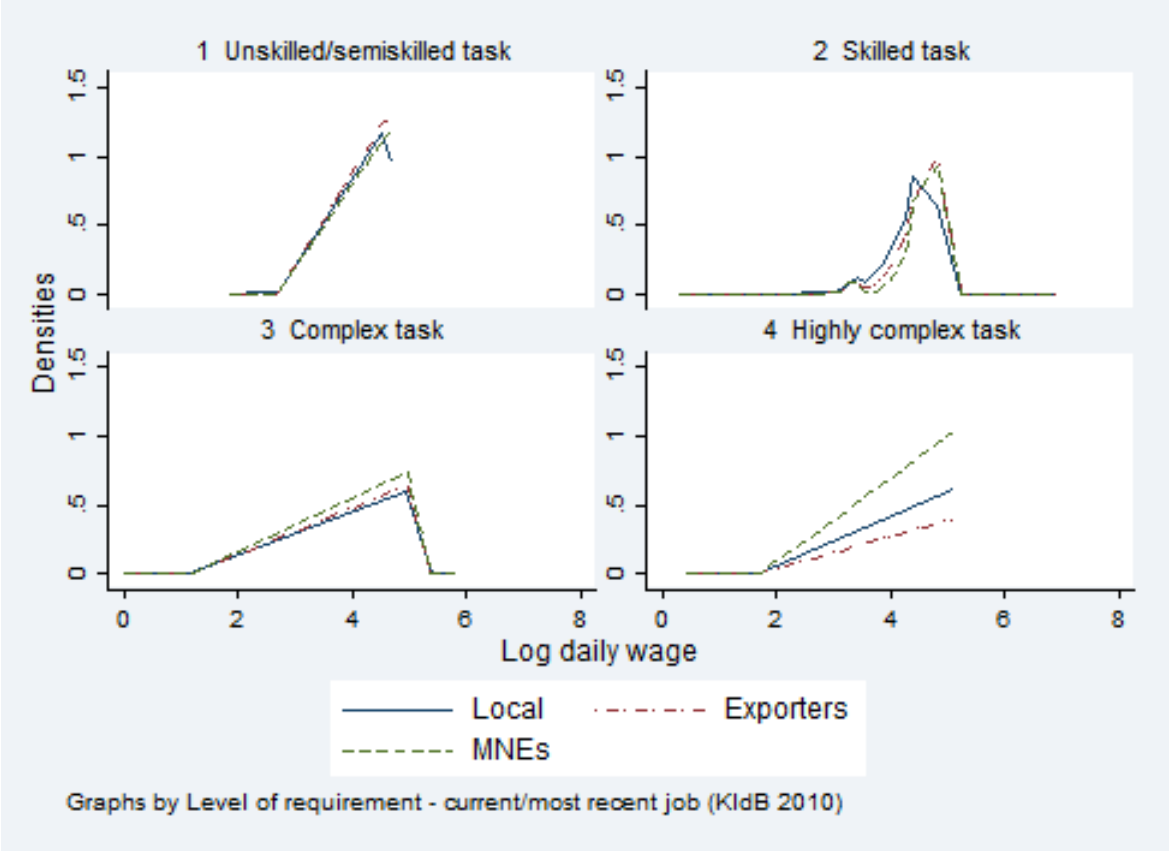
Notes: The figure shows the kernel density of the (log) daily wage distribution in 2006, broken down by firm-types, i.e. Local firms , exporters and MNEs. MNEs here include, foreign owned MNEs, domestic MNEs and hybrid MNEs. Statistics refer to all observations in the sample. See Table 1 & 2 for detailed descriptive statistics on individuals and firms. The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 1: Wage density by firm-type



Notes: The figure shows the kernel density of the (log) daily wage distribution in 2006, broken down by firm-types, i.e. Local firms , exporters and MNEs, for each educational level (low, medium and high). MNEs here include, foreign owned MNEs, domestic MNEs and hybrid MNEs Statistics refer to all observations in the sample. The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 2: Wage density by firm-type for educational levels



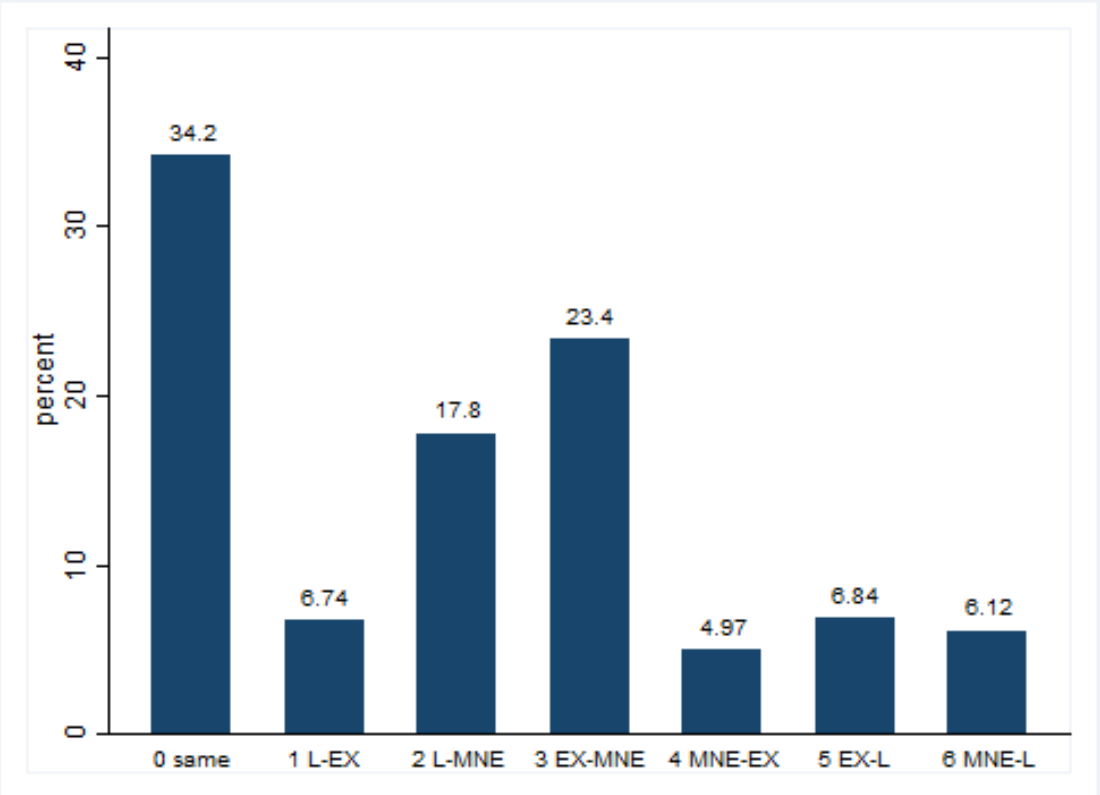
Notes: The figure shows the kernel density of the (log) daily wage distribution in 2006, broken down by firm-types, i.e. Local firms , exporters and MNEs, for task complexity (unskilled/semi-skilled -, skilled -, complex- and highly complex tasks,). MNEs here include, foreign owned MNEs, domestic MNEs and hybrid MNEs Statistics refer to all observations in the sample.The kernel is Epanechnikov and the kernel width is the Stata default one.

Figure 3: Wage density by firm-type for task complexity

Firm-type Switchers

2006 \ 2010	Local	Exporter	MNE
Local	SAME	L-E	L-MNE
Exporter	E-L	SAME	E-M
MNE	M-L	M-E	SAME

Relative Frequency of Firm-type Switchers



Appendix B. Firm Movers

Table 6 presents estimation results based on a regression as in equation (2), additionally controlling for whether a worker moved during the sample period.[22] As shown in the table, based on a simple POLS estimation firm-movers earn on average 3.8% less and the firm fixed specification suggests that movers are being payed about 7% less relative to stayers.

Estimation Results: Firm -Movers

	(1)	(2)	(3)	(4)
Exporter	0.0224***	0.0212***	0.0241***	0.0225***
	(0.00980)	(0.00105)	(0.00186)	(0.00103)
MNE	0.0406***	0.0180***	0.0199***	0.0185***
	(0.00948)	(0.00156)	(0.00287)	(0.00115)
Mover	-0.0378***		-0.0699***	
	(0.00312)		(0.00392)	
Individual FE		x		x
Firm FE			x	x
Time FE	x	x	x	x
Worker controls	x	x	x	x
Firm controls	x	x	x	x
Observations	515544	515544	515544	515544
R^2	0.501	0.568	0.465	0.577

Standard errors in parentheses

The dependent variable is the log daily wage

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

One potential explanation for this finding could be that movers had some unemployment spell between moving from one firm to another. Another reason that might explain why movers earn less on average may be that these workers accept a lower starting wage at another firm in exchange of a steeper wage profile during their time at the new firm. Alternatively, incentives may be going the other way: because movers are dissatisfied with their low wages they move to a different firm, with the expectation of receiving more at another firm.

[22] This includes individuals that appear for the first time in 2010.

Appendix C. Data Description

This study uses the Linked-Employer-Employee Data (LIAB) cross-sectional model 2 1993-2014 (LIAB QM2 9314), provided by the German Institute for Employment Research (IAB). Data access was provided via on-site use at the UK Data Archive at the University of Essex and subsequently remote data access.

C.1. Complexity of tasks performed

Occupations can be described on the basis of the requirement level. The objective of classifying occupations according to their complexity is to be able to depict the various degrees of complexity within those occupations which have a high similarity of occupational expertise. Four Requirement Levels are distinguished to map the degree of complexity of an occupation. The assumption behind it is that a certain standard of skills, abilities and knowledge must exist for practicing a certain occupation. The standard of skills, abilities and knowledge required for practicing an occupation need not be based on the educational level, but can also be acquired through work experience and learning-by-doing. Here, the formal qualification of the person practicing the occupation is irrelevant; the subject of consideration is rather the Requirement Level that is typically demanded for this occupational activity.[23]

[23]For further information see Paulus, Matthes et al. (2013).