Careers in Multinational Enterprises

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Abstract

Workers in multinational enterprises (MNEs) earn higher wages and build stronger CVs. To understand the value of MNE experience, we track the jobs and wages of cohorts of workers entering the Dutch labor market over the years 2006 to 2021. Within MNEs, workers accumulate 1 to 14% more wage with experience, relative to workers within domestic firms. When a worker with MNE experience moves employers, the worker earns 2-11% higher wage relative to a worker with domestic firm experience, suggesting that MNE experience pays high and portable premia. We embed the firm's experience value in a standard trade model with hires and promotions and document several stylised facts consistent with the model: Compared to domestic firms, MNEs pay low starting wages and hire large shares of junior workers. However, fewer junior workers remain with the MNE over time, and selection is stronger as workers with a lower earnings fixed effect exit MNE employment earlier.

Keywords: multinationals, wage premium, sorting, knowledge spillovers, firm organization

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1   Introduction

For many workers, multinational enterprises (MNEs) are more attractive employers than domestic firms. It is well documented that MNEs are more productive, attract better workers, and pay higher wages (Girma and Görg, 2007; Fons-Rosen et al., 2021; Setzler and Tintelnot, 2021). A less documented benefit of MNE employment is the addition to the worker's CV. By gaining work experience in an MNE, workers may increase their future earnings potential, as MNEs provide more on-the-job training, use advanced technologies, and foster network effects of productive employees (Poole, 2013; Balsvik, 2011; Koch and Smolka, 2019). Additionally, MNEs may screen their workers more strictly than other firms. Hence, gaining work experience in an MNE may allow a worker to build human capital or signal quality, leading to higher future wages. In this paper, we present evidence that workers accumulate considerable and highly portable wage premia during MNE employment. We also study the impact of experience value for the organization of multinationals through the lense of a trade model with hires and promotions.

We employ the universal matched employer-employee data of the Netherlands over the years 2006-2021 to investigate the dynamic wage effects of MNE employment. Our dataset combines detailed worker- and firm-level information with data on firm nationality and international trading activities. Focusing on cohorts of graduates, we track the wage impacts of MNE employment for up to 16 years starting at workers' career onset. The Netherlands provides an ideal setting to study the impact of MNE employment on workers' wages. In addition to the availability of highly-detailed data, the country represents an open economy with considerable international investment, where MNEs hire around a third of the workers that enter the labor market each year.

To identify the impact of MNE work experience, we use a Mincer regression to explain wages based on previous employment experience (Abowd et al., 1999, AKM henceforth). As a worker's employers likely share characteristics, we include fixed effects at the firm level to avoid mistaking experience for current employment conditions. We also include worker-level fixed effects to account for the possibility of higher skilled workers sorting into multinationals, and to prevent our estimates from picking up differences in workers' unobserved skills. In addition, we control for industry-year shocks, various dimensions of worker mobility, and direct observables of workers and firms.

We document substantial and significant wage premia from a worker's earlier employment in MNEs. As work experience accumulates, pay increases by about 1 to 14% faster over 10 years for workers that stay within an MNE, relative to experience accumulated in a domestic firm. The value of MNE work experience is also highly portable. When workers move between firms, we document 2-11% higher wages, increasing in the years of previous MNE experience, relative to domestic experience accumulated before entering the current employer. These patterns are robust to using more exogenous variation in the data deriving from mass layoffs and company closures, and to multiple variations of the AKM regression. Using the estimates, our findings imply that the accumulated value of experience in MNEs in 2021 represents around 6% of labor income in the Netherlands, relative to a counterfactual situation in which this experience had been accumulated in domestic firms.

We also present several empirical results suggesting that MNEs leverage the career prospects associated with employment at their firm. We set up a stylized trade model with hires and promotions, in which the

firm recognizes its workers' future income benefits associated with current employment. We document several descriptive facts that are consistent with the predictions of such a model. First, MNEs employ a significantly larger share of junior (inexperienced) workers. The intuition is that junior workers require relatively low wage in MNEs as they anticipate higher later wages. Consequently, MNEs hire more junior workers and promote fewer workers to senior positions. Consistent with stricter selection into senior positions at MNEs, the average worker fixed effects in MNEs increase with seniority compared to domestic firms, indicating that only highly able workers remain with MNEs as they gain experience. Second, MNEs pay relatively lower wages to junior workers, as their junior workers receive more valuable experience. In typical wage paths over the course of a career (controlling for workers' fixed effects) the higher total income of workers with MNE experience is driven by high premia during later career stages. At career onset and conditional on worker and firm characteristics, MNEs pay lower wages than domestic firms. Third, MNE experience determines future employment at a different MNE, suggesting that work experience is more important in determining career paths than workers' innate ability.

Our results contribute to a large literature that examines why MNEs pay high wages in local labor markets. MNEs may have a higher level of productivity, driven by technology, management or connectivity (Girma and Görg, 2007; Bircan, 2019; Koch and Smolka, 2019; Andersson et al., 2022), but the higher wage could also be driven by the MNE's selection of workers, as they select the workers of higher ability (Hijzen et al., 2013; Setzler and Tintelnot, 2021; Roesch et al., 2022). Relative to this literature, we propose that careers may play a central role in explaining the wage premia of multinationals. We find that MNEs have a substantial impact on local wages, as the workers who have worked for MNEs receive higher wages later on. Compared to this experience value, the immediate wage benefits of current employment at a multinational are minor. Our results also shed light on the sorting process: Where earlier literature suggests that workers select into MNE employment on time-invariant abilities (e.g., Heyman et al., 2007; Hijzen et al., 2013), we show that the work experience of workers, instead of their time-invariant ability, explains most of the premia that they earn at multinationals. Consistent with sorting on work experience rather than on innate ability, we find that MNE premia are absent for junior workers, and only materialize later in the career. In addition, we find evidence of selection within the MNE over time: Out of a cohort of workers entering an MNE, only those with higher innate abilities stay with the MNE. Similar results have been obtained for domestic firms of different productivity types (Stoyanov and Zubanov, 2012; Serafinelli, 2019; Adda and Dustmann, 2023). In contrast to these results, we focus on the distinction between two discrete and directly observed firm types: multinational and domestic firms.

Related work also studies the spillovers that multinationals cause towards other firms. Most studies rely on firm-level data (e.g., Javorcik, 2004; Keller and Yeaple, 2009; Haskel et al., 2007) but a few worker-level studies suggest that firms hiring workers with previous MNE employment experience become more productive (Balsvik, 2011; Poole, 2013). Balsvik (2011) shows that, within domestic firms, workers with previous MNE experience earn a wage premium over continuing domestic workers. Similarly, Poole (2013) shows that when ex-MNE workers join a domestic firm, the wages of continuing workers rise. Our approach does not identify spillovers directly, but establishes that experience in multinationals increases workers' future pay, and that the value of experience is highly portable between firms.

Most related to our paper are the studies by Mion et al. (2022) and Pesola (2011). Pesola (2011) shows that

workers with preceding job experience in foreign-owned firms (instead of experience in domestic firms) earn higher wages in domestic firms, conditional on worker fixed effects. The estimated wage premia are about half the size of ours and suggest that early-career workers do not forego wage in exchange for experience. There are notable differences between our study and hers: Pesola (2011) uses a sample of Finish workers while we use the universe of cohorts of Dutch workers entering the labor market, allowing us to condition on the workers' full experience profile. Additionally, we focus on multinationals rather than foreign-owned firms, and we control directly for firm-level fixed effects, thus excluding worker sorting into productive firms as an explanation for higher wages of workers with earlier experience in foreign-owned firms. Mion et al. (2022) show for a sample of managers in Portugal that work experience in internationally active firms produces wage premia relative to experience in domestic firms. Their estimates are similar to the estimates in our paper. Mion et al. (2022) also show that the experience premia are lower for blue collar workers. In a complementary analysis, we document that the returns to MNE work experience are significantly lower for workers with lower level ability estimates (i.e. lower fixed effects in the Mincer regressions). There are several important differences with our paper. First, our paper identifies the value of work experience in MNEs simultaneously with that in other internationally active firms. Our findings highlight that MNEs in particular play a large role in forming the overall wage premia. Second, our paper directly estimates the level of worker and firm fixed effects, allowing us to study the implications of experience for the sorting of productive workers to productive firms. Correspondingly, we highlight that work experience plays a crucial role in explaining the sorting of productive workers to MNEs. Third, our paper uses the universe of observations instead of a sample, which is important when identifying fixed effects in a network setting (Jochmans and Weidner, 2019). Fourth, the completeness of our data allows us to shed light on the consequences of the value of MNE work experience for the wage setting and organization of MNEs. Our descriptive results indicate that MNEs adapt their hiring strategy to the value of their workers' experience, consistent with the predictions of our theoretical framework.

The theoretical framework of our paper sheds new light on theories of firm selection into international trade. These theories predict that firms with high levels of (ex-ante) productivity operate at lower marginal costs and are more likely to overcome obstacles to internationalize (Helpman et al., 2004, 2010; Felbermayr et al., 2011). In our formalization, we show that lower marginal costs can similarly be achieved with a high experience value: The experience value pushes down the cost of junior workers, and increases the average productivity of senior workers, assuming that senior labor mobility is not without friction. Hence, heterogeneity in experience value offers an alternative explanation to firm sorting into internationalization, in addition to heterogeneity in firms' level productivity. In the universe of Dutch firms, we find that level productivity estimates, as measured by firm-level fixed effects in Mincer wage equations, are not higher for MNEs than for other firms once we control for the experience of the firms' workforce. Hence, our results suggest that the careers of the MNEs' workers, rather than the MNEs' level productivity explain the internationalization strategy.

The rest of the paper is organised as follows. In Section 2, we present a simple trade model with hires and promotions that frames the theoretical argument of our empirical analysis. In Section 3, we introduce the dataset. Section 4 shows the main empirical results on the value of MNE experience and its implications for the interpretation of the AKM fixed effects. Section 5 explores our theoretical model's implications for the labor

market strategies of multinationals. Finally, Section 6 presents several robustness checks and Section 7 concludes.

2 Theoretical motivation

We employ an off-the-shelve trade model to examine the consequences of valuable on-the-job experience for the organization of international firms. The setting is a monopolistic industry in which firms employ junior and senior workers. All workers produce the same product, but at potentially different productivity levels. Workers offer two periods of labor: one period as a junior, and one period as a senior. Junior workers can use their experience to earn higher wages in the senior stage of their career. If a worker moves between firms after the junior period of employment, the value of her experience is discounted relative to a worker who becomes a senior in the original firm.

Within this setting, we examine how career values within a firm (i.e. the senior wage benefits associated with junior employment in that firm) affect the organization of the firm. In this section, we develop the argument in a stylized setting. We develop a case in which a worker's productivity in a firm is unpredictable before hiring, ignoring level productivity differences among workers and among firms. Moreover, we restrict ourselves to static interpretations, implying that the equilibrium outcomes are stable over time.

2.1 Output market

We consider a symmetric two-country economy in which consumers (indexed i) have CES preferences over products from different firms (indexed j), and there is an elasticity of substitution between products of $1 - 1/\sigma$. On the home output market, firms take the demand function as given $d_j = p_{d,j}^{-\sigma} B$, where $p_{d,j}$ is the delivered price of firm j. The term $B = (\int_i l(i)w(i))di)/(\int_j p_{d,j}^{1-\sigma} dj)$ reflects the market size, which is symmetric across the countries. Firms face iceberg transport costs τ to supply the other country. Firms charge a markup over marginal costs in the home market: $p_j = \sigma/(\sigma - 1)mc_j$ where p_j is the factory door price. Firms charge a price τp_j in the foreign country. The operating profits in the symmetric economy are proportional to $(\sigma/(\sigma - 1)mc_j)^{1-\sigma} B/\sigma$ in the home market and to $\tau^{1-\sigma}(\sigma/(\sigma - 1)mc_j)^{1-\sigma} B/\sigma$, so that operating profits in the home and in the foreign market strictly decrease in the marginal cost level of the firm.

Firms face fixed costs of operating in different markets. The fixed costs are a production volume f required to operate: f_d for domestic operations, f_x for exports to foreign market, and f_m to operate a plant in the foreign market as a multinational. We assume that $f_x < f_m$. For a given level of the firms' marginal costs, firms' strategies are strictly ordered in their marginal costs. Firms have a maximal marginal cost to operate domestically, mc_d, a maximal marginal cost to export, mc_x and a maximal marginal cost to operate as a multinational, mc_m, where $mc_m < mx_x < mc_d$. Hence, the firms with the lowest marginal costs become multinationals.

The marginal costs of the firm are determined by the level productivity of the firm, b_j, the productivity shifters of the specific workers employed by the firm, the value of experience of the workers in the firm, and the wage levels of those workers.

2.2 Labor supply

Workers can offer a unit of employment in the junior stage and in the senior stage of their career. Every worker has a productivity shifter that is specific to the firm of employment: $a(\theta_{i,j})$, where i indexes the worker and a increases in θ. The productivity shifter of worker i in firm j is only known after a period of employment. The density of the productivity distribution $l(\theta_{i,j})$ is known and constant across all firms.

Workers build up experience value after a period of employment in firm j, such that their productivity within the same firm increases by a firm-specific factor $e_j \geq 1$. If the worker continues employment in another firm, we assume that the experience value is discounted by δ, such that the senior productivity is $1 \leq e_j - \delta \leq e_j$. We assume for the moment that the worker's match-specific productivity level $a(\theta_{i,j})$ is independent of the expected productivity level in another firm $a(\theta_{i,j'})$.

2.3 Labor demand

The labor market decisions of firms determine the production process. Firms optimize two choices. First, firms choose how many juniors to promote to senior workers, given the common wage they pay to junior and senior workers. Second, they choose how much output to produce.

The number of junior workers in the firm is L_j^J and the total number of senior workers is L_j^S. As the firm cannot screen junior workers on their productivity, the average productivity shifter of its junior cohort is the expected productivity over the population from the lowest to the highest support $(\underline{\theta_{i,j}}, \overline{\theta_{i,j}})$. Given the firm's overall productivity b_j, the expected productivity of the junior cohort is: $b_j a(\underline{\theta}) = b_j \int_{\underline{\theta_{i,j}}}^{\bar{\theta}} a(\theta) l(\theta) d\theta / L^J$. Here, $\underline{\theta_{i,j}} = \underline{\theta_j}$, as the firm faces the population distribution of productivity. The firm is able to promote junior workers to senior workers. Knowing the worker's productivity $a(\theta_{i,j})$ the firm can choose to promote workers. It promotes more productive workers rather than less productive workers. The least productive worker that is offered promotion is indexed by $\theta_{i,j}^*$. After selection, and taking into account experience, the productivity of a senior worker is $b_j \times e_j \times a(\theta^*) = b_j \times e_j \times \int_{\theta^*}^{\bar{\theta}} a(\theta) l^s(\theta) d\theta / L^S$. For the moment, workers offered a senior wage can only be drawn from the junior cohort, such that $l^S(\theta) \leq l^J(\theta)$.[1]

As promotions are internal to the firm, the number of junior workers L_j^J is at least as large as the number of senior workers L_j^S. We use $s_j = L_j^S/L_j^J \leq 1$ to denote the ratio of senior to junior worker numbers. The ratio also defines the probability of being promoted in the firm. By definition of $a(\theta)$, as a increases in θ and $s_j = (\int_{\theta_j^*}^{\bar{\theta}} l^s(\theta) d\theta)/(\int_{\underline{\theta} < \theta_j^*}^{\bar{\theta}} l^s(\theta) d\theta)$, the expected productivity of the senior cohort is strictly decreasing in the promotion rate s, or conversely, strictly increasing in the selectivity of the firm.

The promotion strategy of the firm can be solved separately from its output quantity decision. The profit function of the firm is $\pi = p_j L_j^J b_j (a(\underline{\theta}) + s_j \times e_j \times a(\theta_j^*)) - L_j^J (w_j^J + s_j w_j^S)$. Optimizing profits for the promotion probability s_j gives the first-order condition

$$w_j^S = p_j b_j \times e_j \times a(\theta_j^*) \times (1 + \varepsilon_{s,j}), \tag{1}$$

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[1] We plan to extend the model to capture dynamics in the external hiring of seniors.

where $\varepsilon_{s,j} = \frac{s_j}{a(\theta_j^*)}\frac{da(\theta_j^*)}{ds_j}$ is the elasticity of average senior productivity with respect to increasing the promotion probability (note $\varepsilon_{s,j} > -1$). This first-order condition balances the firm's cost of increasing the senior cohort size (the worker wage) with the revenue increase (due to an increase in senior production, but a decrease in the selectivity of the senior cohort). Assuming that ε_s is sufficiently unresponsive to s, and given that $\frac{da(\theta^*)}{ds} < 0$, firms are more selective if they face higher senior wages and if their internal experience value e_j is lower. This gives a unique solution $s^* \leq 1$.

2.4 Wage setting

The firm can offer a senior wage w_j^S to a junior worker after one period. For the junior worker to accept the promotion, the wage needs to (marginally) exceed the value of the outside option, which is to work at a different firm. As the worker's match-specific productivity in the outside firm is not known to a new employer j', the expected productivity of the senior worker in an outside firm is $(e_j - \delta) \times a(\underline{\theta}) \times b_{j'}$, and any wage exceeding this productivity will convince the worker to accept an internal promotion. The term $b_{j'}$ is the expected level productivity of the outside employer. We assume for now that workers are randomly matched to a new employer.

On the junior market, firms need to convince junior workers to start their career in their firm. A junior job offer implies a junior period wage, but also a potential offer for a senior wage. If the worker does not receive the senior offer, she needs to go on the senior worker market for a different firm. In that market, workers have no further promotion opportunities, so they are paid their expected marginal productivity. The expected return to the two periods is: $w_j^J + s_j^*(e_j - \delta)a(\underline{\theta})b_{j'} + (1 - s_j^*)(e_j - \delta)a(\underline{\theta})b_{j'}$. This value simplifies to $w_j^J + (e_j - \delta)a(\underline{\theta})b_{j'}$, which is independent of the promotion probability: as the worker is indifferent between the internal senior wage and the senior outside option, the promotion probability no longer matters. An alternative career implies employment at any other firm j', which offers $w_{j'}^J + (e_{j'} - \delta)a(\underline{\theta})b_{j'}$. The firm with no experience value ($e_{j'} = 1$) offers two times the ex ante expected wage, and the competitive offer relative to all firms in the market is: $2a(\underline{\theta})b_{j'}$. This implies that in a homogeneous junior worker population, firms fully devalue their junior wage with the expected experience value. Firm j, facing the outside option for juniors, offers

$$w_j^J = a(\underline{\theta})(2 - (e_j - \delta))b_{j'}. \tag{2}$$

This result shows that firms pay their juniors the expected productivity, deducting a compensation for the expected future wage gains from working at the firm. Hence, junior wages are lower in firms with a higher experience value, and if the transferability δ of the value is higher.

2.5 Marginal costs and internationalization strategy

Given the optimal promotion strategy s_j, the firm maximizes profit by selecting the size of the junior cohort, thus selecting the output level. The total production of the firm is $L^J a(\underline{\theta}) + L^S e a(\theta^*)$. The total costs for the firm are: $TC = L^J w^J + L^S w^S = L^J(w^J + sw^S)$.

Writing the marginal costs of production as $mc = \frac{dTC}{dL^J} / \frac{dQ}{dL^J}$ gives

$$mc_j = \frac{1}{b_j} \frac{2 - (e_j - \delta)(1 - s_j^*)}{1 + e_j s_j^* a(\theta_j^*)/a(\underline{\theta})}. \tag{3}$$

Our central result is that firms with higher experience value e_j have lower marginal costs. This follows straight from eq. (3), noting that by the envelope condition $dmc_j/ds_j = 0$ and $dmc_j/de_j < 0$.

The intuition is as follows. A firm with higher experience value e_j can offer juniors a lower wage. The low wage balances with compensations later in the worker's career. A leaving worker will earn more at a next firm, but the original firm does not pay for that higher wage. A worker who is internally promoted similarly receives a higher wage, but that wage is still below her marginal productivity in the firm. The reason that the firm does not pay its senior worker the full marginal productivity is twofold: The worker's experience value is lower outside the firm (if $\delta > 0$), and the worker's post-selection match-specific productivity $(a(\theta_{i,j}) > a(\theta^*))$ does not imply a high match-specific productivity of that worker with another firm.

In our formalization, following eq. (3), multinational strategies arise if a firm has high experience value for its juniors (e_j), a high overall productivity level (b_j), or a sufficiently favorable combination of the two.

2.6 Other testable results

A central argument to our model is that firms vary in how their junior workers improve their senior job prospects. Whether multinational firms' work experience contributes to their workers' later wages can be tested directly. Our formalization implies two corollary insights on how firms exploit their experience value.

First, workers within multinationals see larger wage growth as they transition into seniority. This is the consequence of i) a larger experience evalue within the firm and ii) accepting lower wages in the junior phase of their career. The ratio of senior to junior wage is

$$\frac{w^S}{w^J} = \frac{a(\theta_j^*) b_j \times e_j \times (1 + \varepsilon_{s,j})}{a(\underline{\theta})(2 - (e_j - \delta)) b_{j'}}, \tag{4}$$

which shows that the senior wage is high relative to the junior wage if the experience value within the firm is high, and the selection within the firm is strong $(a(\theta_j^*)/a(\underline{\theta}))$.

Second, and related, the promotion probabilities in multinational firms are smaller, leading to a steeper hierarchy: There are more junior workers for every senior worker. Using the first-order condition on promotion probability eq. (1), and inserting the senior wage $(e_j - \delta) \times a(\underline{\theta}) \times b_{j'}$, the selectivity of the firm is

$$\frac{a(\theta_j^*)}{a(\underline{\theta})} = \frac{e_j - \delta}{e_j} \frac{b_{j'}}{b_j p(1 + \varepsilon)}. \tag{5}$$

The selectivity increases in e_j, implying that the share of junior workers that is promoted s_j is smaller in firms with large experience values.

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3   Data

We employ different administrative sources of Statistics Netherlands to assemble a yearly employer-employee matched dataset for the period 2006 to 2021. Our data follows workers in the Netherlands up from labor market entry, combined with the MNE (foreign and domestic), international or domestic status of their employers.

A marked benefit of the Dutch data is that employers and employees are assigned consistent identifiers that allow us to combine different data sources. At the employer-level, we extract information on ownership structures and broad NACE industry from the General Business Register and enrich the data with information on imports and exports from the official trade statistics. In a first step, we aggregate the employer-level information to the yearly company group level for those employers that are part of a company group. Hence, our empirical analysis treats company groups as a unique firm and employer.[2] Subsequently, we identify three distinct types of firms. We classify a firm as an MNE if its ultimate owner, which controls strategic decisions, is non-Dutch, or if the firm reports affiliates abroad. In total, around 19k of the 207k firms in our dataset are MNEs. We classify the remaining firms as either domestic, or international (importing and/or exporting but no multi-country establishments) if the yearly-average sum of imports and exports exceeds 10k Euro.

Our employee-level data is based on information that employers send to the Dutch national employment agency (Uitvoeringsinstitut Werknemersverzekeringen). As the data's main purpose is to identify pension and labor market insurance claims, it allows us to pin down the exact start and end dates of an employer-employee relation. At the worker-level, the data provides information on workers' demographics, regular- and overtime-pay, any additional allowances and the associated hours worked. It also allows us to identify full-time equivalents and internships. For the analysis, we remove internships from the dataset and aggregate the remaining observations to the yearly worker-firm level. We focus on workers in full-time positions (≥ 0.7 fte) and remove all workers that ever hold more than one full-time position at the same time (about 5% of workers). For all remaining worker-firm matches in the data, we calculate hourly wages as total income over total hours worked to measure earnings.

According to the discussion in Section 2, we need to separate the within- and across-firm effects of experience for the lifetime wage developments of workers. To follow workers' careers up from labor market entry, we add graduations from Dutch middle- and higher-level educational institutions across the years 2004 to 2021 to the data.[3] We select workers aged 18 and above that start working within three years after graduation from a full-time study and that are not enrolled in another educational program after labor market entry. By using the start and end dates of their employment relations, we construct four measures of experience. Within firms, we allow the number of days spent at the current employer to accumulate over time. Across firms, we leverage worker mobility to separately identify the number of days a worker spent in MNEs, international and domestic firms before entering a new employer.

The final dataset follows the lifetime career developments of over one million workers for up to 16 years.

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[2]On average around 1.8% (sd = 2.2) of the firms in a given year are company groups.

[3]Specifically, we include Dutch universities (wo), universities of applied science (hbo) and the theoretical track of the Dutch secondary vocational education institutions (mbo-bol).

Tables A1 and A2 in Appendix A provide an overview of the dataset. Workers are around 24 years old when entering the labor market and hold two different jobs throughout the observation period. Although MNEs make up less than 10% of the firms, about 30% of workers start their career at an MNE. On average, workers in MNEs earn 9% higher wages than workers in domestic firms, while workers with past MNE experience earn 8% higher wages at their current employer than workers with past domestic experience.

4   The value of MNE experience

To identify the expected change in a worker's wages for a year of work experience in an MNE, we use a Mincer regression with firm and worker fixed effects (Abowd et al., 1999). The regression explains a worker's log wage from work experience within his or her own firm, and from work experience in other firms. Specifically, the regression equation is

$$y_{ijt} = \psi_j + \alpha_i + \gamma_t + \sum_{c \in C} \delta_c a_{it}^c + \sum_{c \in C} \beta_c w_{ijt}^c + \mathbf{x}_{ijt}' \nu + \epsilon_{ijt}, \tag{6}$$

where y_{ijt} is the log hourly wage of a worker indexed i, at a firm j, in year t. The variable w_{ijt}^c captures the years of experience within the worker's firm. Similarly, a_{it}^c captures the years of experience at employers before the current firm. We differentiate the years of experience in a firm by the type of the firm, c: multinational, international (importing and/or exporting but no multi-country establishments), or domestic. We use the domestic firm type as the reference group.

The coefficients of interest are δ and β. The coefficient δ_{MNE} measures the log contribution to a worker's current wage of a year of experience in a previous employer that is an MNE, as compared to when that year of experience was with a domestic firm. The coefficient β_{MNE} measures the log wage contribution of a year of employment within the worker's current multinational firm, relative to when that firm would have been domestic. To allow the wage contributions to vary flexibly with years of experience, we estimate the impact using a set of indicator variables by year of (cumulative) experience.

We condition the estimates of the value of experience on a set of other explanations, following the literature on matched employer-employee data. Workers with valuable experience may sort into firms that are highly productive or pay high wages for other reasons. To exclude this interpretation, we introduce a firm-level fixed effect ψ_j in the specification. Similarly, we difference out worker-specific level difference in pay with a worker fixed effect, α_i. Exploiting within-worker variation, we identify the impacts of experience from worker-specific changes in experience levels over time, and rule out that high-ability workers both earn more and accumulate multinational-specific experience more often. In addition, we difference out year-specific industry fixed effects γ_t to prevent industry shocks, such as technology or demand, that generate employment as well as wage differences from explaining the association between experience and wage.[4] Finally, vector $\mathbf{x}$ contains observed characteristics. We use the log of employment size of the firm to control directly for any size-related explanations of wage. To

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[4]In practice, we first demean log hourly wages by γ_t on a dataset that includes the wages of all workers in the Netherlands. Then we use the residuals to estimate the other parameters in the sample of labor market entrants.

control for the mobility of workers, we also include dummies for the number of jobs a worker has held up to time t and their interaction with tenure inside the firm. The term ϵ_{ijt} is an error term.

To account for serial correlation of the errors within workers, we cluster the standard errors at the worker level. Later we will study estimates of the firm- and worker-level fixed effects. As usual in the literature studying the mobility of workers between firms, we estimate our fixed effects model on the largest set of firms that are connected by worker mobility (Abowd et al., 1999, 2002). In Section 6, we offer several robustness checks pertaining to the specification of our empirical model and the mobility of workers (Bonhomme et al., 2019).

The full estimation results are in Table F1 in Appendix F. Figure 1 summarizes the main estimates of eq. (6). Panel (a) shows the coefficient estimates for δ_{MNE}, the expected wage premium for an additional year of MNE work experience instead of domestic work experience in an earlier firm. The results show an immediate and statistically significant premium of around 2% with the first year of experience in an MNE relative to a domestic firm. With more years of experience in a previous MNE employer, the expected premium rises monotonically, up to around 11% with seven years of experience. At that point, the coefficient curve is flatter, pointing to smaller marginal contribution of an additional year of experience.

Panel (b) of Figure 1 summarizes the estimates of β_{MNE}, the wage premium of a year of multinational experience inside the same firm. The wage premia drawn from experience external to the firm (Panel (a))) and internal to the firm (Panel (b))) are every similar, although the internal premia are slightly higher.

For comparison, Figure 1 shows the wage premia for experience in an international firm relative to a domestic firm, too. The premia on experience in an international firm are significantly below those of the multinational firm, but positive over domestic firm experience.

Figure 1: The wage premia of MNE experience.
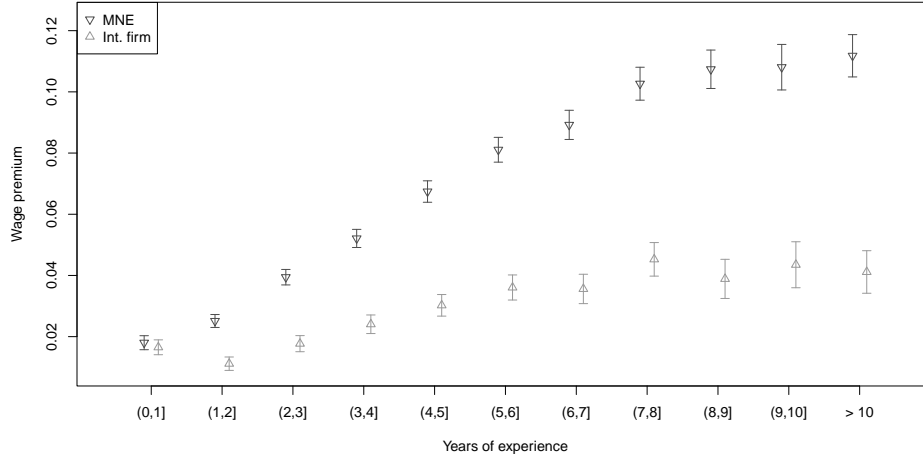
(a) Across-firm
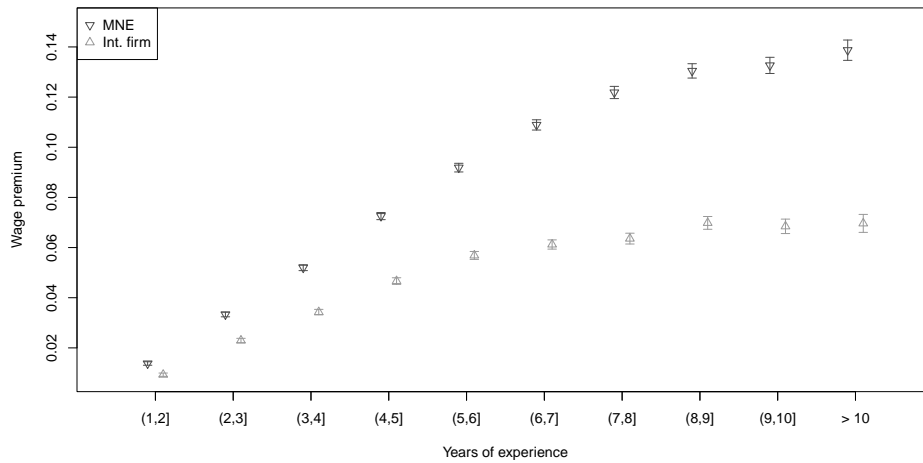
(b) Within-firm

Notes: The plots depict calculated wage premia and their 95%-confidence intervals (see eq. (6) and the discussion in Section 4). The full regression results are in Table F1 in Appendix F. Wage premia are calculated as the coefficients for MNE/international firm experience minus the respective coefficients for domestic firm experience. Experience within and across firms are based on actual days worked and cut in yearly splines. MNEs comprise foreign firms (ultimate owner located abroad) and domestic firms with foreign subsidiaries. International firms are defined as (non-multinational) firms with an average yearly sum of imports and exports that exceeds 10k EUR. Standard errors are clustered at the worker level.

4.1 What does the experience value imply for the firm fixed effects?

Our theoretical framework implies that wages in MNEs and domestic firms can differ because of differences in firm-level productivity, and the value of work experience. In our AKM wage model (6), the firms' fixed effects are estimated conditional on the workers' fixed effects, whereby the firm fixed effects measure differences in pay premia between firms for similar workers. They are commonly used to measure static pay premia of MNEs (e.g. Andrews et al., 2009; Setzler and Tintelnot, 2021) and more broadly interpreted as measures of firm-level productivity. In this section, we disentangle the wage effect of the static firm fixed effect from that of the dynamic accumulation of wage with experience.

To understand the relative importance of workers' experience in MNEs in explaining the fixed effects, we assess the distribution of firm-level fixed effects when accounting for work experience. Figure 2 displays the distributions of firm-level fixed effects of domestic firms (dashed line) versus those of MNEs (solid line). Panel (a) shows the distribution derived from a static AKM decomposition, which attributes wages to firm fixed effects, worker fixed effects, and industry-year fixed effects only. In the static model, the fixed effects of MNEs are around 8% higher than those of domestic firms.[5] Once controlling for the experience value that varies by the type of firm that the worker was previously employed in, MNEs have lower average firm fixed effects than domestic firms. Panel (b) controls for experience (as in equation (6)) but ignores the log firm size control. The difference in distributions implies that MNEs have on average around 6% lower fixed effects. Panel (c) adds the size control, resulting in fixed effects of MNEs that are about 1% lower than those of domestic firms. This suggests that the full ex-ante premium of MNEs can be explained by their workers' experience.

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[5]A formal comparison of these distributions can be found in Appendix B (Combes et al., 2012; De la Roca and Puga, 2017).

Figure 2: Firm fixed effects.

(a) Static model

(b) Dynamic model w/o size control

(c) Dynamic model
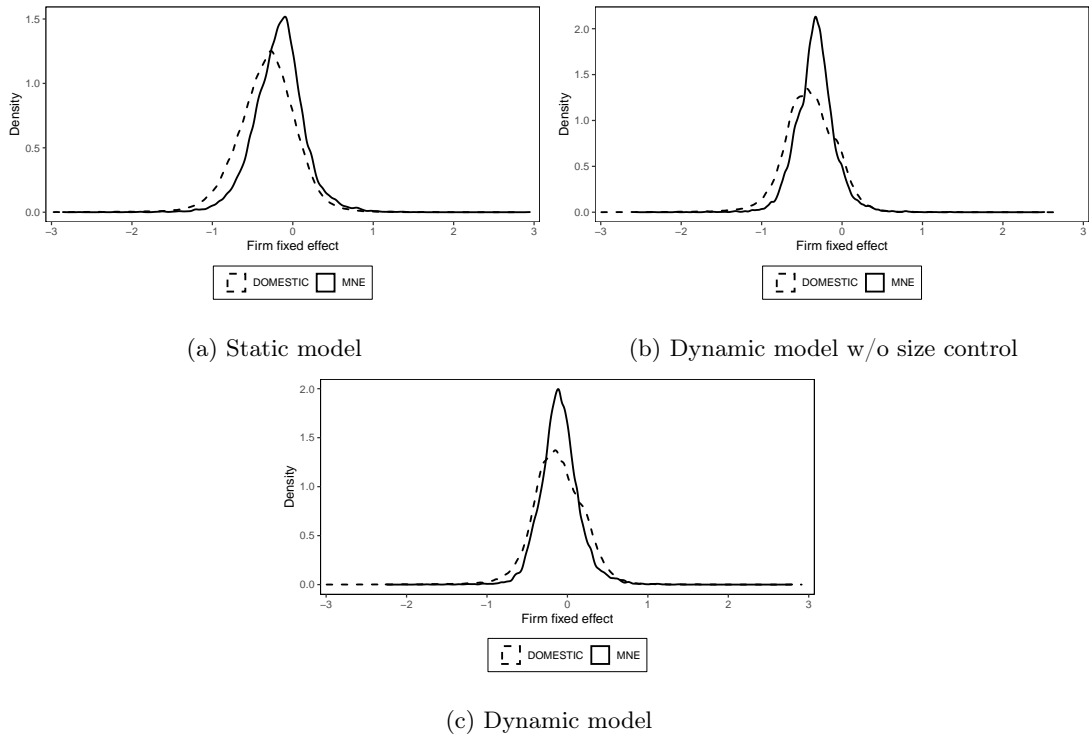
Notes: The plots show the distributions of firm fixed effect estimates derived from different models. The estimates include the fixed effects of MNEs and domestic firms that do not change status. The firm fixed effects are derived from (a) a static model with only a worker fixed effect, firm fixed effect and industry-year fixed effect; (b) a dynamic model with MNE, international and domestic experience included (see eq. (6)) but excluding the log firm size control; (c) our main dynamic model with MNE, international and domestic experience included (see eq. (6)). A formal comparison of the distributions is in Table B2 in Appendix B.

4.2 What does the experience value imply for worker sorting?

A worker's experience likely correlates with her overall earnings potential. Conversely, an analysis decomposing wages into firm-level and worker-level factors might interpret the portion of a worker's wage attributed to experience from prior firms as the worker's unobserved skill, as measured by the worker-level fixed effect. Consequently, the high skill level observed in multinationals might be attributed to their workers' past employers.

Figure 3 displays the distributions of the worker-level fixed effects for workers in domestic firms (dashed line) and MNEs (solid line). To avoid observing workers multiple times, we focus on the assignment of workers in 2014, roughly the middle of the data's time span.[6] When estimated from a static AKM model with worker-level, firm-level and industry-year fixed effects only, the mean worker fixed effect is approximately 8% higher in MNEs than in domestic firms.[7] This statistic would suggest that MNEs tend to hire workers with greater earning abilities. Panels (b) and (c) exhibit the worker-level fixed effect from our dynamic AKM model with experience included (see eq. (6)), with the only variation being the incorporation of a firm size control in Panel (c). When accounting for workers' experience, the average difference in worker fixed effects between MNEs and domestic firms reduces to roughly 4-6%. This indicates that neglecting the value of prior work experience (as in Panel (a)) exaggerates the role of innate worker ability in wage determination.

If the returns to MNE experience are heterogeneous across workers' abilities, the fixed effects in Panels (b) and (c) could overestimate ability at the top of the distribution and underestimate it at the bottom. Accounting for this, Panel (d) of Figure 3 depicts distributions from a dynamic AKM model permitting heterogeneity in the experience value according to the worker fixed effects (De la Roca and Puga, 2017). We will discuss the implications of this heterogeneity in MNE experience in Section 4.3. Once the heterogeneity is factored in, the distributions largely coincide, and the mean difference approaches zero. This suggests that workers entering MNEs do not differ much from workers entering domestic firms: It is the experience of workers, rather than their innate ability, that defines the high skill level of the MNE workforce.

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[6]The results are qualitatively similar when using a different year to fix worker assignment.

[7]See Appendix B for a formal comparison (Combes et al., 2012; De la Roca and Puga, 2017).

Figure 3: Worker fixed effects.
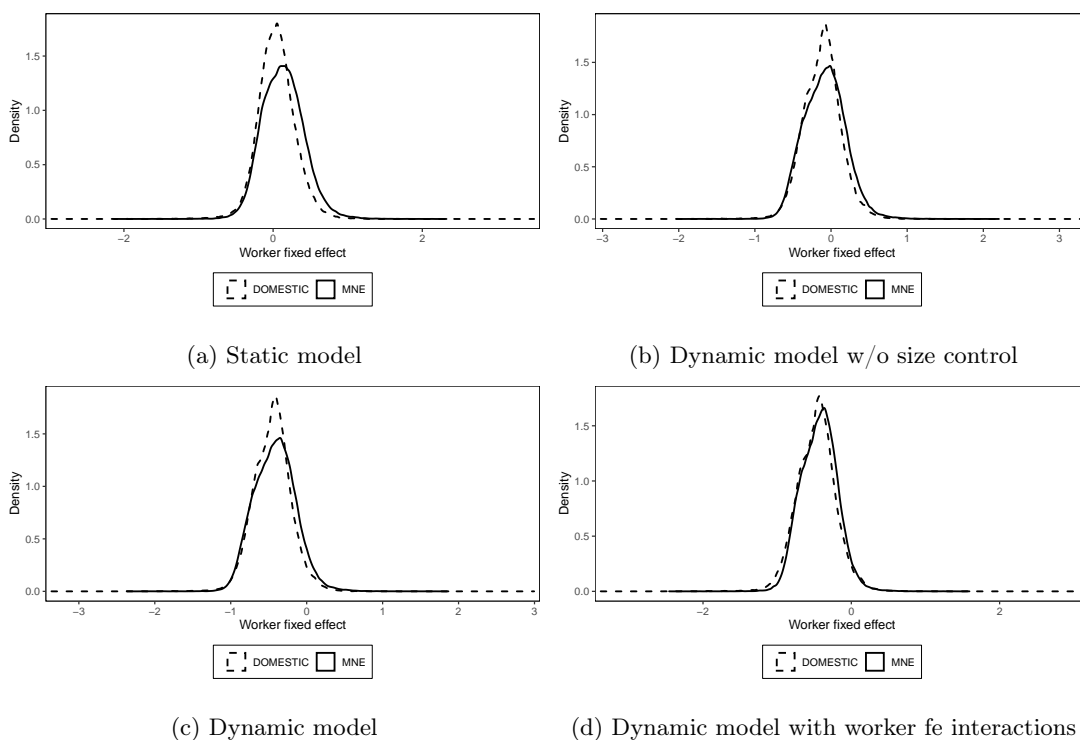
(a) Static model

(b) Dynamic model w/o size control

(c) Dynamic model

(d) Dynamic model with worker fe interactions

Notes: The plots show the distributions of worker fixed effect estimates derived from different models. The estimates are based on a snapshot of the data in 2014, and include the fixed effects of workers in MNEs and domestic firms that do not change status. The worker fixed effects are derived from (a) a static model with only a worker fixed effect, firm fixed effect and industry-year fixed effect; (b) a dynamic model with MNE, international and domestic experience included (see eq. (6)) but excluding the log firm size control; (c) our main dynamic model with MNE, international and domestic experience included (see eq. (6)); (d) a dynamic model with MNE, international and domestic firm experience, and their interactions with the worker fixed effects included (see eq. (7)). A formal comparison of the distributions is in Table B1 in Appendix B.

4.3 The value of MNE experience by workers' innate ability

It is plausible that a worker's inherent, time-invariant ability correlates with the potential to enhance wage improvements from a year of employment, such as through learning. This correlation is relevant for two primary reasons. First, a high correlation can lead to the misattribution of high returns from past work experiences to high inherent ability. In other words, neglecting to account for experience might cause workers with valuable past work experiences to be classified as high-ability workers. Second, this correlation between earnings ability and learning ability might have important implications for assortative matching on the labor market.

To investigate whether worker fixed effects are systematically associated with wage returns from employment in multinationals, we refine our original wage model. We introduce an interaction term between the worker's level fixed effect, denoted as α_i, and the external and internal experience terms a_{it}^c and w_{ijt}^c. The coefficients for these interactions are δ_c^α and β_c^α. We also account for a full set of interactions between within-firm experience, the number of jobs a worker has held, and the worker fixed effects. The resulting equation is

$$y_{ijt} = \psi_j + \alpha_i + \gamma_t + \sum_{c\in C}(\delta_c + \delta_c^\alpha \alpha_i)a_{it}^c + \sum_{c\in C}(\beta_c + \beta_c^\alpha \alpha_i)w_{ijt}^c + \mathbf{x}_{ijt}'\nu + \eta_{ijt}, \tag{7}$$

where the definitions of eq. (6) apply, and η_{ijt} is an error term.

If the coefficients δ_c^α and β_c^α are significantly larger than zero, this indicates that workers with higher level fixed effects (α_i) reap larger returns from employment in firms of type c compared to workers with lower level fixed effects.

Directly estimating the equation with worker fixed effect interactions, denoted as eq. (7), is not feasible. Instead, we follow De la Roca and Puga (2017), using an iterative method where the worker fixed effects from eq. (6) provide the initial estimate for α_i. These estimates are then updated in eq. (7) until convergence is reached to an error margin of 10^{-4}.

Complete coefficient estimates are in Table F2 in Appendix F. The interaction between worker fixed effect and multinational experience is positive and significant across all timeframes, for both experience internal and external to the firm. The coefficient estimates increase consistently with the years of experience. This suggests that workers with higher fixed effects realize higher wage returns from a year of experience in a multinational, compared to a year in a domestic firm.

To visualize the regression results, Figure 4 illustrates the wage premia of MNE (over domestic) experience for workers of high, medium and low ability, classified as the 75th, 50th, and 25th percentile of the fixed effects distribution.[8] Panel (a) displays wage returns to MNE experience for workers who moved to a different firm. High-ability workers gain the highest returns on previous MNE experience, reaching a wage premium up to 26% over domestic experience. Medium-ability workers also receive a wage premium when changing employers, but this premium is smaller and increases less with experience. For low-ability workers, there is no significant

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[8]Figure C1 in Appendix C illustrates the estimates for other international (non-multinational) firms. Notably, that group of firms shows no heterogeneity in returns.

advantage from MNE experience over domestic experience when changing employers. The patterns for intra-firm experience are similar. However, low-ability workers earn a significant negative wage premium during their first six years at an MNE.

Figure 4: Wage premia of MNE experience by worker ability.
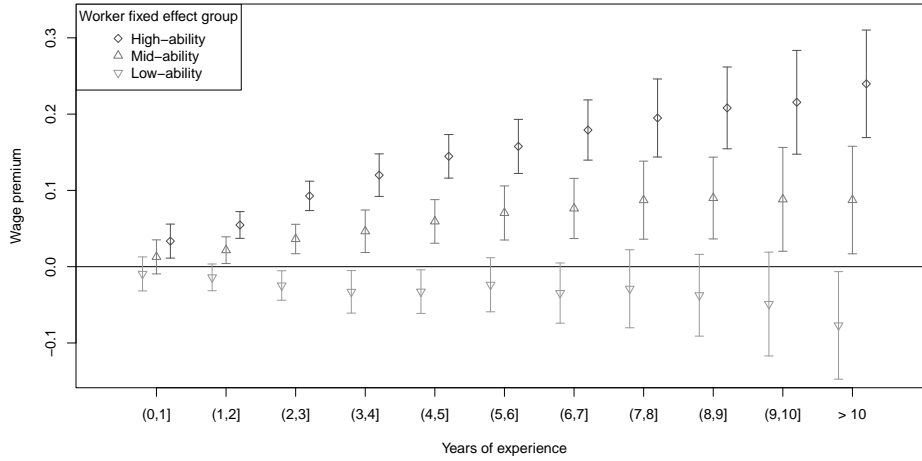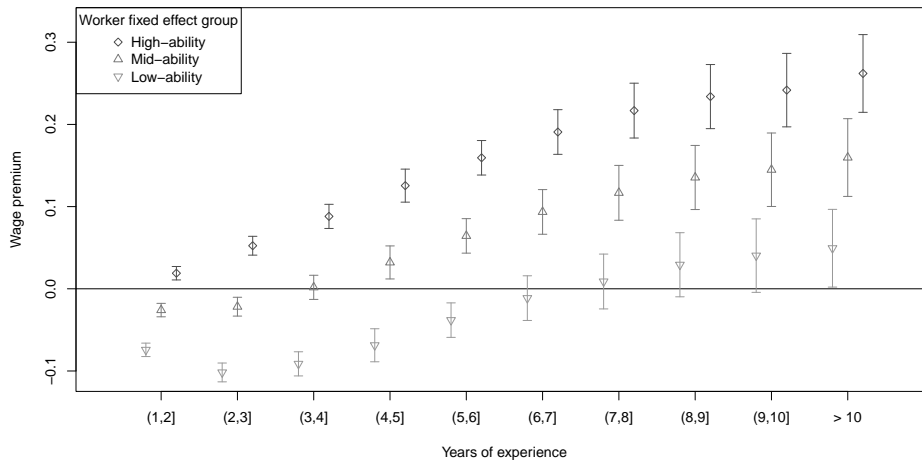
(a) Across-firm

(b) Within-firm

Notes: The plots depict calculated wage premia per worker ability group and their 95%-confidence intervals, as estimated by a wage regression with interactions between MNE/international firm/domestic firm experience and the worker fixed effects (see eq. (7)). The full regression results are in Table F1 in Appendix F. Wage premia are calculated as the coefficients for MNE experience minus the respective coefficients for domestic firm experience. Experience within and across firms are based on actual days worked and cut in yearly splines. High-ability workers are in the 75th percentile and low-ability workers in the 25th percentile of the worker fixed effects distribution. Standard errors are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

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4.4 Evidence from firm closures and mass layoffs

The causal interpretation of our estimates assumes that worker mobility is fully described by our Mincerian wage equations. Equations (6) and (7) allow for endogenous mobility of workers, based on the identify of the worker, the firm and the workers' past work experience. However, they do not account for unobserved time-varying factors that may drive worker mobility. One particular source of endogeneity is if workers self-select into moving up the job ladder towards higher wage establishment over time, for example as workers' learn about new outside job opportunities (Woodcock, 2008); respond to idiosyncratic labor demand shocks (Helwege, 1992); or learn about their ability or match quality (Gibbons et al., 2005; Menzio and Shi, 2011). In order to gauge the impact of such endogenous mobility, we follow the literature in exploiting a sample of workers that are involved in firm closures and mass layoffs. These events generate more exogenous variation in worker mobility, if displaced workers accept any job offer that is preferable to unemployment (see e.g., Huttunen et al., 2018; Dauth et al., 2021; Di Addario et al., 2023).

We focus our analysis on workers that were involved in a firm closure or mass layoff of a firm with at least 10 employees. We identify a mass layoff when 80% or more of workers exit the firm in a given year, or the firm ceases to exist. We additionally require that less than 30% of the exiting workers enter the same new firm, in order to avoid picking up untracked changes in firm identifiers (Benedetto et al., 2007). Then we focus on the observations of workers in their first job after the mass layoff, when worker-firm mobility is caused by the plausibly exogenous layoff event, rather than self-selection of workers into mobility. Table D1 in Appendix D shows that around 2800 (4600) MNE (international firm) workers in the data are displaced in a mass layoff or firm closure, while around 6000 workers are involved in a mass layoff or closure of a domestic firm. This is a small group of workers compared to the around 1 million workers in our sample, and we focus on estimating eq. (6) and eq. (7) with linear experience profiles for displaced workers at their next employer. We follow Mion et al. (2022) in adding linear profiles for the respective estimated firm and worker fixed effects, in order to control for their effect on forming wage at the next employer after a mass layoff.

Figure D1 in Appendix D shows the distribution of worker fixed effects in mass layoffs. Panel (a) compares the distribution of displaced workers (in all firms) against those of all other workers that are not involved in a mass layoff. The comparison shows that displayed workers exhibit around 6% lower fixed effects on average than non-displaced workers, suggesting that the two groups are similar, yet differ slightly in their time-invariant ability to earn high wages. Panels (b) and (c) split the distribution of displaced workers up by the multinational status of the origin and destination firm. The distribution of workers leaving MNEs and domestic firms in a mass layoff, and that of workers entering an MNE or domestic firm as the next employer after a mass layoff, look very similar, showing no pattern of diverging fixed effect between the two groups.

The results are summarised in Table 1.[9] Column 1 shows the within- and across-firm returns to experience across all worker classes, as in eq. (6). Column 2 allows for heterogeneity across the worker fixed effects. The results are similar to those that we present in Figures 1 and 4, which use the full set of workers and allow for dynamic wage profiles, rather than a linear profile estimated from laid off workers' wages at the next employer.

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[9]The full regression results are in Table D2 in Appendix D.

The estimates in Column 1 suggest that for each year of previous MNE experience, a worker accumulates about 0.74% (= $exp(0.0469 - 0.0395)$; $t(12192) = 8.79$, $p < 0.001$) more wage than when that experience had been acquired in a domestic firm. Within the next employers, wage growth is higher by about 0.74% per year spent in an MNE, relative to a domestic firm. The estimates in Column 2 of Table 1 show that the wage benefits of MNE experience are higher for workers with higher fixed effects, similar to the result in Section 4.3.

Table 1: Evidence from firm closures and mass layoffs (short table).

	log(hourly wage) (detrended)	
	(1)	(2)
Domestic firm experience	0.0395***	0.0523***
	(0.0007)	(0.0033)
International firm experience	0.0445***	0.0602***
	(0.0007)	(0.0032)
MNE experience	0.0469***	0.0825***
	(0.0007)	(0.0027)
Years in firm	0.0496***	0.0477***
	(0.0010)	(0.0053)
Years in firm × International firm	0.0021*	0.0082
	(0.0010)	(0.0051)
Years in firm × MNE	0.0074***	0.0285***
	(0.0010)	(0.0055)
Worker fe interactions		
Domestic firm experience × Worker fe		0.0389***
		(0.0057)
International firm experience × Worker fe		0.0438***
		(0.0056)
MNE experience × Worker fe		0.0858***
		(0.0046)
Years in firm × Worker fe		0.0151
		(0.0102)
Years in firm × International firm × Worker fe		0.0042
		(0.0097)
Years in firm × MNE × Worker fe		0.0393***
		(0.0102)
Other variables		
Controls	✓	✓
Worker fe	✓	✓
Firm fe	✓	✓
Observations	42,558	42,558
R^2	0.8067	0.8192

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. The full estimation results are in Table D2 in Appendix D. The dependent variable is a workers' log hourly wage, detrended by industry-year fixed effects on the full firm-worker network. The estimations focus on the observations of workers at their first employer, after the worker was involved in a firm closure or mass layoff; see Section 4.4. 'Years in firm' refers to experience accumulated while a worker is employed at the current employer of type MNE, international firm and domestic firm (reference category). MNE/international firm/domestic firm experience refers to experience accumulated before entering the current employer. Experience is calculated based on actual days worked. Column 1 adds the fixed effects of an estimation of eq. (6) as linear regressors. Column 2 adds those of eq. (7). Standard errors in Column 1 are clustered at the worker level. Standard errors in Column 2 are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

5 Firm strategy and the labor market

5.1 Career profiles

As the value of work experience differs by firm, workers with different career paths follow different wage paths. To interpret the results in this light, we use the estimates of the within- and across experience accumulated throughout different worker careers. We collect the coefficients to construct career wage paths of workers that work for MNEs with the average MNE characteristics and for domestic firms with average domestic firm characteristics.

Figure 5 illustrates the predictions, with the y-axis showing the predicted log hourly wage as experience accumulates over a ten-year period from the point of entry into the labor market. The wage paths are net of industry-year fixed effects, firm size, and worker fixed effects. The dotted line indicates that starting a career in an MNE is associated with a lower entry wage compared to starting in a domestic firm (solid line), as measured by the firm fixed effects of a typical MNE career. As experience years accumulate, the wage level in the MNE rises faster, and in three years, the wage of a worker in an MNE surpasses the wage of a similar worker in a domestic firm.

The figure shows that experience is portable between domestic firms and MNEs. In careers that start in an MNE but switch to a domestic firm (gray lines), workers generally experience a drop in wage after the move. The drop may lead to a wage below that of a worker who worked for a domestic firm all years, but subsequently outgrows the wage of that worker. An earlier move to a domestic firms leads to lower wages in the final years, as relatively more experience is domestic (and the first years of experience in a domestic firm lead to stronger increases in wage than later years of experience in the domestic firm).

Figure 5: Wage developments of different career paths.
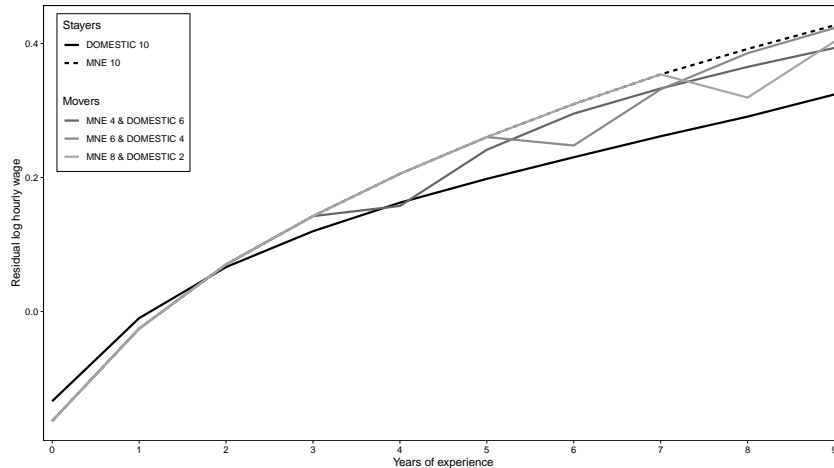
Notes: The figure shows the predicted wage paths of a worker up from labor market entry and for different career paths. Predictions are based on eq. (6), while differencing out the effect of firm size and worker fixed effects on log hourly wages. The average fixed effects of MNE and domestic firms are worker-population averages, see the estimates in Table A3 in Appendix A.

The career profiles also show that domestic wages are above multinational wages for workers with few years of experience. This is consistent with the formal framework, in which multinationals effectively pay junior workers in deferred pay later in their career.

To test whether initial wages structurally differ between MNEs and domestic firms, we employ a weighted least squares regression that explains firm fixed effects from MNE status. The estimated firm fixed effect, conditional on experience values of the workers and their fixed effects, gives the expected wage for a worker who enters the firm with no experience. We regress the firm fixed effects on an MNE dummy and an intercept, weighting the regression by the average employment size of the respective firm to estimate a worker-population average. As the firm fixed effects are time-invariant, we focus on MNEs and domestic firms that do not change status throughout the sample period.

The results are reported in Table A3 of Appendix A. The table shows that the fixed wage premium of MNE careers net of experience is around 3% below that of domestic careers. The difference is statistically significant under standard errors block-bootstrapped at the worker level. This holds both for the weighted fixed effects of our main dynamic model (see eq. (6)) and the model with worker ability interactions (see eq. (7)).

5.2   Selection within the multinational

According to our model, the value of experience in MNEs can drive MNEs to hire relatively more junior workers. As junior workers accept lower wages in exchange for later higher wages, they are cheap relative to their productivity, and the MNE hires more of them.

To examine whether junior workers are more likely to be employed by MNEs than senior workers, we explain the employment in an MNE ($MNE_{ijt} = 1$) from the worker's time since labor market entry. The regression equation is

$$MNE_{ijt} = \sigma_i + \psi_j + \gamma_t + \mu l_{it} + \mathbf{x_{ijt}}\nu + u_{ijt}, \tag{8}$$

where again i, j, j index workers, firms and years; σ_i is a worker fixed effect; ψ_j is a firm fixed effect; γ_t is an industry-year fixed effect; l_{it} is years since labor market entry; x_{ijt} includes the controls log firm size and number of jobs; and u_{ijt} is an error term.

When estimating eq. (8) we replace the l_{it}'s by yearly dummy variables where we set the year of labor market entry as the reference category. Their coefficients, μ, capture the sorting of workers into MNE employment up from labor market entry. They allow us to compare the relative number of experienced workers (l_{it} high) to inexperienced workers (l_{it} low) in MNE employment, while adjusting for firm, industry and worker-level differences.

Panel (a) of Figure 6 plots the estimates for labor market sorting.[10] The y-axis counts years since labor market entry and the x-axis shows the difference in the probability of a worker to be employed at an MNE relative to the entry year. According to the estimates MNEs employ relatively more inexperienced workers than experienced workers. The top coefficient implies that more than ten years after entry, workers are about 0.7 percentage points less likely to be employed at an MNE than right at labor market entry. Given that around 31.2% of entrants start at an MNE this suggests that the odds of MNE employment decrease by about 3.2%,

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[10]The full regression results are in Table F3 in Appendix F.

implying a small sorting effect of workers out of MNE employment over time. The remaining coefficients show that sorting out of MNE employment is particularly relevant after six years of labor market experience when a trend break is visible. A Wald test confirms a statistically significant difference between the coefficients for seven and more years and less than seven years on the labor market ($\chi^2(1) = 5.2$, p < 0.05).

To test for sorting on unobserved ability over time we augment the linear probability model in eq. (8) with interactions between ability and years since labor market entry,

$$MNE_{ijt} = \sigma_i + \psi_j + \gamma_t + (\mu + \mu^\alpha \alpha_i)l_{it} + \mathbf{x_{ijt}}\nu + v_{ijt}. \tag{9}$$

When $\mu^\alpha \neq 0$ the specification includes an interaction term between a worker's time since labor market entry, l_{it}, and her innate ability, α_i (measured by the worker fixed effects in eq. (7)). v_{ijt} is the error term.

The full estimation results are in Table F4 in Appendix F.3. They show positive and statistically significant interaction effects between worker ability and labor market experience, suggesting that ability explains worker moblity. Panel (b) of Figure 6 shows estimates of worker sorting to MNEs for two distinct and observed groups of worker ability. Downward facing triangles depict the sorting of low-ability workers (in the 25th percentile of the worker fixed effect distribution) and upward facing triangles those of high ability workers (in the 75th percentile). The estimates for high-ability workers exhibit small positive, largely stagnating estimates and their 95%-confidence intervals overlap with zero. In contrast, the estimates for low-ability workers are negative, decreasing in a worker's labor market experience and their confidence intervals do not overlap with zero. Hence, inexperienced and experienced high-ability workers are just as likely to work at MNEs. However, low ability workers appear to sort out of MNE employment as they gain labor market experience. As around 28.5% of low-ability workers start their career in an MNE, the odds that a low-ability worker is still in MNE employment ten or more years after labor market entry are about 7.8% lower than at entry. This points to the exit of lower ability workers from MNE employment as an explanation for the decreasing MNE employment among experienced workers.

Figure 6: Sorting of experienced and inexperienced workers to MNEs.
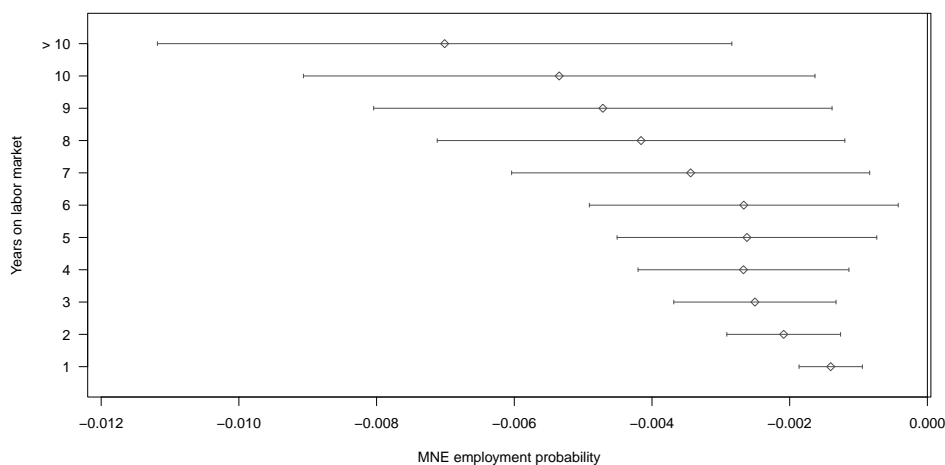
(a) Overall
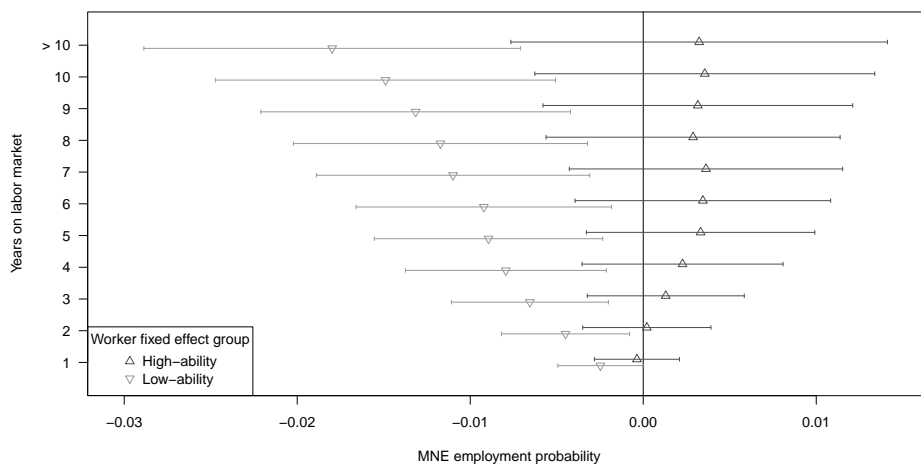
(b) By worker ability

Notes: The plots depict point estimates and their 95%-confidence intervals of labor market sorting relative to the year of labor market entry. Estimates in Panel (a) are based on a linear probability model with an MNE employment dummy as the dependent variable and are conditional on number of jobs, log firm size; and worker, firm and industry-year fixed effects (see eq. (8)). Panel (b) splits the estimates up by worker the worker fixed effects of a wage regression (see eq. (9) and the discussion in Section 5.2). High-ability workers are in the 75th percentile and low-ability workers in the 25th percentile of the worker fixed effects distribution. The full regression results are in Appendix F.3. Standard errors in Panel (a) are clustered at the worker level. Standard errors in Panel (b) are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

5.3 Experience and hiring by multinationals

According to our theoretical framework the productivity advantage of MNEs is embedded in its workforce. In this section we present evidence that among experienced workers, a worker's previous work experience is more important than her innate ability in explaining labor mobility towards MNEs.

Table 2 uses observations of moving workers to estimate the relative important of experience and innate ability in explaining sorting. In specific, the regression explains entry into an MNE after a worker's first job by a worker's previous experience in an MNE, international and domestic firm and her innate ability. For comparability of the estimates, Column 3 uses standardized measures of experience and ability (standardized to mean zero and variance one).

Column 3 of Table 2 shows that a one standard deviation increase in a workers previous experience in an MNE increases the probability of moving to an MNE by 2.75%-points. This is equivalent to a 12.6% increase in the odds of observing a (senior) job mover entering an MNE, relative to the mean of 35% of entries to MNEs. On the other hand, a one standard deviation increase in ability increases the probability by only 1.52%-points, or the odds by 6.8%. Previous experience in international and domestic firms have a negative effect. Taken together, the estimates suggest that earlier MNE experience matters more in explaining mobility towards MNEs than workers' innate ability. The results are not explained by the industry and size composition of MNEs as the specification includes an industry-year fixed effect and controls for log firm size.

Table 2: Sorting of experienced workers.

	Entry to MNE		
	(1)	(2)	(3)
			standardized
MNE exp.	0.0232***	0.0178***	0.0275***
	(0.0003)	(0.0003)	(0.0004)
Int. firm exp.	-0.0112***	-0.0099***	-0.0143***
	(0.0003)	(0.0002)	(0.0004)
Dom. firm exp.	-0.0191***	-0.0063***	-0.0091***
	(0.0003)	(0.0003)	(0.0004)
Worker ability (standardized)	0.0334***	0.0152***	0.0152***
	(0.0006)	(0.0005)	(0.0005)
log(firm size)		0.0884***	0.0884***
		(0.0002)	(0.0002)
Fixed-effects			
Industry-year (324)	✓	✓	✓
Observations	1,271,658	1,271,658	1,271,658
R^2	0.2378	0.4306	0.4306

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimated on a sample of entry positions to new employers after the first employer. The dependent variable is a binary indicator that identifies a worker's entry into an MNE. MNE/international firm/domestic firm experience capture the years of work experience a worked collected before entering the current employer. 'Worker ability' refers to the worker fixed effects of an estimation of eq. (7). MNE/International firm/domestic firm experience (Column 3) and Worker ability (all columns) are standardized to mean zero and variance 1. Standard errors are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

6   Robustness checks

We estimate several variations of eq. (6) to explore the sensitivity of our main result to alternative explanations and our modeling choice.

1. **Base Salary.** We focus only on the hourly wage rate that follows from a workers' base income, excluding the impact of overtime and bonus payments. This approach arises from the understanding that MNEs may compensate overtime differently than domestic firms and provide substantial bonuses to certain employees (Vahter and Masso, 2019). Likewise, a worker's past MNE experience could be rewarded with bonus payments when joining a new employer. As our theoretical framework abstracts from such explanations, we check whether our results also hold for a worker's base hourly wage.

2. **Excluding acquisitions.** We exclude changes in the multinational status of firms from contributing to the identification of our estimates, as MNEs may 'cherry pick' targets with high wage growth for acquisition (Almeida, 2007). To exclude acquisitions, we permanently classify a firm as an MNE if it is observed as such for at least three quarters of its years in the panel. This classification holds true even in years when the firm is not observed as an MNE. MNEs that do not fulfill this requirement are consistently identified as either international or domestic firms.

3. **Large firms.** We limit our focus to a subsample of large firms with at least 250 employees in a given year. Since MNEs are generally larger than domestic firms, our estimates could capture wage premia due to firm size (Bloom et al., 2018), rather than the multinational status of firms, potentially bypassing our firm-size control variable.

4. **Discounting.** We apply a discount to a worker's past work experience before joining the current firm. According to our empirical approach, an additional year of experience a worker gained T years ago carries the same weight in identifying the estimates as a year of experience collected T+1 years ago. However, older experience may be less relevant for current wage, and the diminishing returns in Figure 1 might be an outcome of this modeling choice. To assess the impact of this, we introduce a worker-year-specific discount factor to eq. (6). This means that experience gained T+1 years contributes less to identifying the estimate, compared to experience obtained T years ago. We determine the optimal discount factor by estimating our model under different discount factors and selecting the one that results in the lowest root mean squared error.

5. **MNE vs. industry experience.** We introduce two types of control variables to disentangle a MNE experience from industry-specific experience. Previous research has underscored the critical role of industry-specific human capital as a determinant of wage (e.g., Sullivan, 2010). If this industry-specific human capital proves to be integral in explaining worker mobility and wage structure, its omission could lead us to conflate wage accumulation within MNEs (and other firms) with wage growth due to industry-specific experience. Hence, we add as an additional control variable wage profiles that captures a workers' past experience within the same 2-digit NACE industry as the current employer. In addition, MNEs are more present in some industries than in others (see e.g., Roesch et al., 2022). If MNEs are concentrated in industries with high experience values generally, i.e. regardless of whether industry experience is gained in

an MNE or a domestic firm, we could confuse a workers' past MNE experience with experience gained in those industries. To address this concern, we add an additional linear control variable that captures the employment-weighted share of MNEs in the 2-digit NACE industries that a worker has worked for in the past.

6. **Bargaining.** We control for a workers' lagged (log) wage and lagged (log) employer size, following the argumentation in Mion et al. (2022). While our approach accounts for wage growth based on the internationalisation status of a workers' current and previous firms, internationalisation may correlate with other factors that determine a workers' bargaining position, such as the size and wage at the previous employer. Bonhomme et al. (2019) propose that a worker's previous wage and the identity of her previous employer capture complex wage negotiation structures, suggesting that lower past wage determines higher wage growth. Similarly, on-the-job search models like that of Postel-Vinay and Robin (2002), highlight the importance of both the present and potential employers in determining worker mobility and wages. In these modes, the more productive a worker's firm is, the higher is the worker's wage growth, irrespective of whether the worker changes firms. In contrast, Di Addario et al. (2023) find that empirically the identity of a worker's previous employer is unimportant in determining wage at the next employer for a sample of Italian firms.

7. **Firm-year fixed effects.** We substitute the firm fixed effects with firm-year fixed effects to capture changes in a firm's wage policy over time, such as productivity shocks that are both firm-specific and time-varying, potentially driving the selection of firms into MNE status (Roesch et al., 2022; Engbom et al., 2023). With the inclusion of firm-year fixed effects, the coefficients on the within- and across-returns to MNE experience are identified by the variation in wage among workers with different experience levels within the same firm in the same year.

8. **Across-firm returns by firm type.** We examine the interaction between across-firm returns to experience and the firm type of a worker's current employer. Our empirical framework suggests that workers accrue benefits from past experience at an MNE as compared to experience at a domestic firm, irrespective of their subsequent post-MNE employment choices. However, it could be that only other MNEs value MNE experience, implying that workers transitioning from an MNE to a domestic firm might not realize any wage premium. To comprehensively assess whether workers generally benefit from MNE experience, we split the MNE experience premia up based on the firm type of the workers' current employer.

9. **Spell fixed effects.** We substitute firm and worker fixed effects with worker-firm-spell fixed effects. Our theoretical framework posits that selection into senior jobs is based on a unique productivity factor specific to each worker-firm match, which does not influence wage. If this match-specific wage heterogeneity does account for wage differences between MNEs and domestic firms, eq. (6) would conflate the impact of within-firm experience on wage with the match-specific factor. A drawback of including spell effects is that they are collinear with a worker's past experience before joining their current employer. Consequently, we can only obtain estimates for within-firm returns to MNE experience when spell fixed effects are included.

The estimates of different approaches to estimating the across- and within-firm returns to MNE experience are in Figures 7 and 8. The different specifications lead to differing estimates on the returns to MNE experience.

However, an overarching picture emerges: Work experience in an MNE yields a wage premium over experience in a domestic firm, both when workers remain with the same firm and when they switch firms, even if the new employer is not an MNE. The wage premia are largely increasing with a worker's years of experience, with an exception for more than six years of experience when we include firm-year fixed effects in the specification. Notably, our method for estimating the discount factor of experience identifies a factor of 0.99, suggesting that the impact of past experience on current wages nearly fully carries over from one year to the next.

6.1 Limited mobility bias

If few workers link the firm fixed effects in our data, resulting in few worker movements to identify the fixed effects, a "limited mobility bias" might arise. While the level estimates of the fixed effects are generally unbiased under limited mobility, the "plug-in" estimator of their variance may yield biased estimates (see e.g., Andrews et al., 2008; Jochmans and Weidner, 2019; Bonhomme et al., 2023). This means that the OLS estimates of our wage profiles remain unaffected by limited mobility, as do the level estimates of the firm fixed effects that we use in computing the MNE wage premium in Section 4.1.[11] However, we rely on the variance to compare the distributions of firm fixed effects, which may introduce bias. Here, we investigate whether limited mobility bias affects our conclusion that MNE experience drives the MNE wage premium.

To assess the influence of limited mobility, we employ a clustering approach to the firm fixed effects (Bonhomme et al., 2019). Specifically, we employ a K-means clustering algorithm to identify $K = 10, 20, 50$ clusters of firms, using percentile cutoffs of the within-firm wage distribution after demeaning log hourly wages by industry-year fixed effects. Same as in Section 4.1, we re-estimate eq. (6) with and without experience profiles included, but with cluster-level instead of firm-level fixed effects. Clustering addresses the issue of limited mobility bias, since many movers identify a single cluster-level fixed effect (Bonhomme et al., 2019). Column 2 of Table 3 presents Jochmans and Weidner (2019)'s network connectivity measure, which indicates how susceptible the network is to limited mobility. The network with firm-level fixed effects features low connectivity, while cluster-level networks exhibit up to 133 times higher connectivity. This suggests that clustering effectively counteracts biases stemming from limited mobility.

We extract the cluster-level fixed effect estimates to compute the MNE wage premium in both the static (without experience) and dynamic (with experience) model. To determine the MNE wage premium, we follow Setzler and Tintelnot (2021) in calculating the difference in the average cluster-level fixed effect experienced by MNE and domestic workers. A limitation of the clustering method is that it precludes the direct computation of standard errors and p-values for the MNE wage premium. To estimate the standard error, we apply a block-bootstrap approach over 100 iterations, which involves randomly sampling workers' entire employment histories with replacement and re-estimating all components, including the MNE wage premium.

Table 3 compiles the derived MNE wage premia under various clustering strategies. For reference, the table's

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[11]Appendix E includes Figure E1, which depicts our estimates for the wage returns to MNE experience when using $K = 10, 20, 50$ clusters for the firm fixed effects (Bonhomme et al., 2019). These estimates broadly align with our main results in Figure 1, implying that limited mobility does not influence our findings on the wage premia of MNE experience.

Figure 7: Returns to MNE experience under different regression specifications (1).
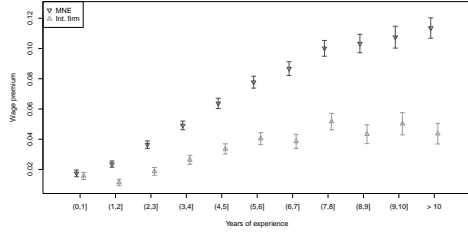
(a) Base salary: across-firm
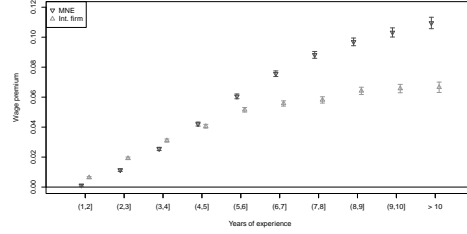
(b) Base salary: within-firm
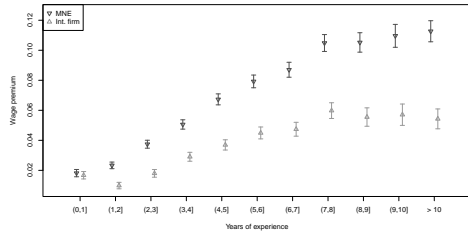
(c) Excluding acquisitions: across-firm
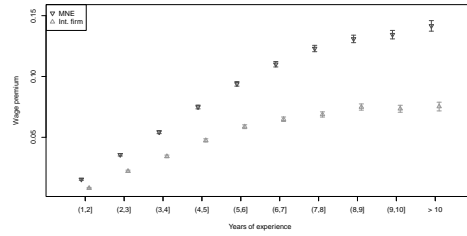
(d) Excluding acquisitions: within-firm
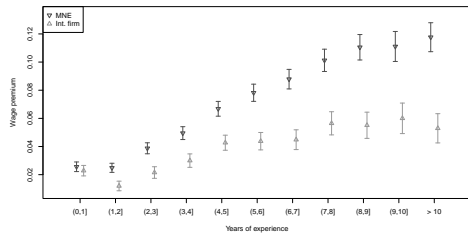
(e) Large firms (≥ 250 workers): across-firm (f) Large firms (≥ 250 workers): within-firm
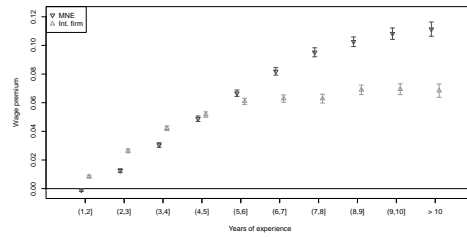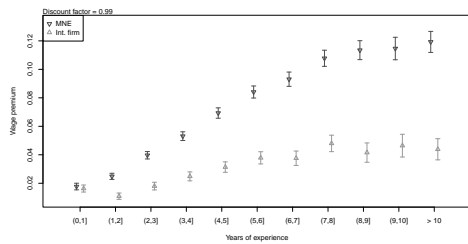
(g) Discounting experience: across-firm
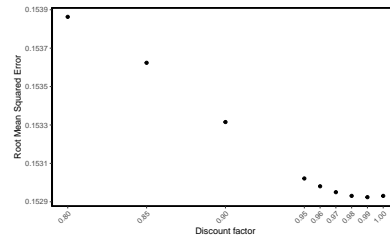
(h) Discounting experience: RMSE

Notes: The figure shows the estimated wage return to MNE experience under different variations of eq. (6); see Section 6 for details. The returns are split up by within-firm (continuing workers) and across-firm (moving workers) returns. Panel (h) shows the Root Mean Squared Error (RMSE) derived when applying different discount factor to the across-firm returns. Panel (g) shows the corresponding model with the lowest RMSE.

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Figure 8: Returns to MNE experience under different regression specifications (2).
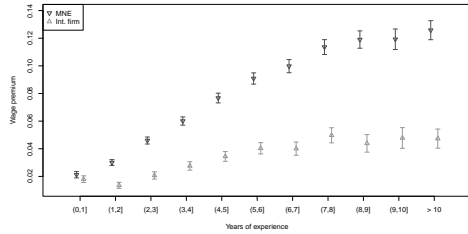
(a) Industry experience control: across-firm
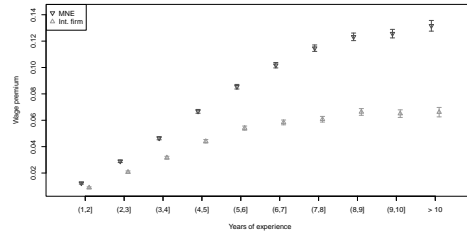
(b) Industry experience control: within-firm
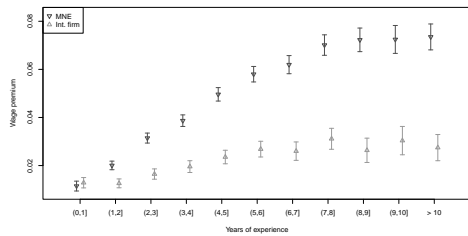
(c) Bargaining power controls: across-firm
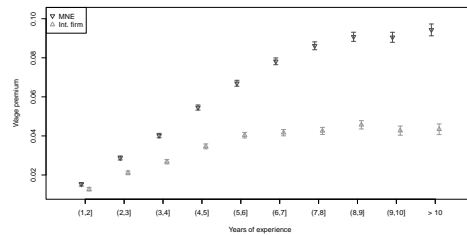
(d) Bargaining power controls: within-firm
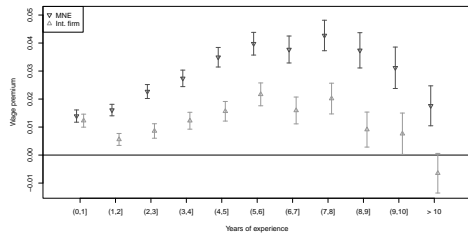
(e) Firm-year fixed effects: across-firm
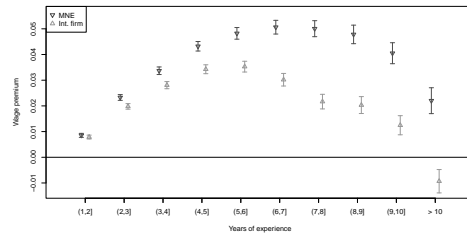
(f) Firm-year fixed effects: within-firm
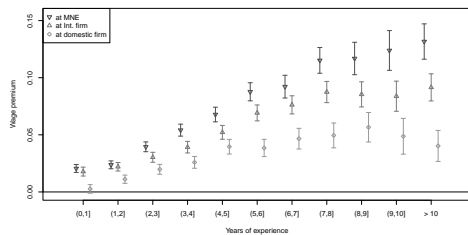
(g) By firm type: across-firm
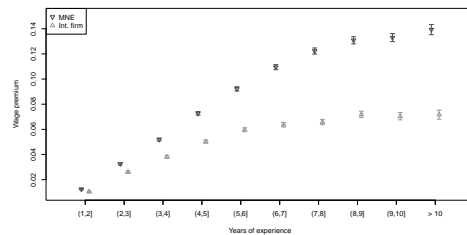
(h) Spell fixed effects: within-firm

Notes: The figure shows the estimated wage return to MNE experience under different variations of eq. (6); see Section 6 for details. The returns are split up by within-firm (continuing workers) and across-firm (moving workers) returns.

bottom panel also provides the MNE wage premium calculated using firm-level fixed effects without clustering. The estimates fluctuate with the number of clusters and between the static and dynamic models. However, across all configurations, the static estimate is positive with smaller standard errors, whereas the MNE wage premium in the dynamic specification is near-zero with broad standard errors. This reinforces our conclusion that considering the dynamic wage benefits of MNE experience diminishes the MNE wage premium, even after correcting for the limited mobility of workers.

Table 3: T-tests on MNE wage premium under different k-means clustering approaches.

Clusters	Network Connectivity	Specification	MNE premium	s.e. (bootstrapped)	p-value
10	0.6978	Static model	0.0662	0.0017	0.0160
10	0.6978	Dynamic model	0.0111	0.0021	0.1214
20	0.8083	Static model	0.0801	0.0081	0.0639
20	0.8083	Dynamic model	0.0232	0.0099	0.2561
50	0.8640	Static model	0.1007	0.0076	0.0478
50	0.8640	Dynamic model	0.0426	0.0103	0.1507
max	0.0065	Static model	0.0709	0.0010	0.0089
max	0.0065	Dynamic model	-0.0378	0.0017	0.0285

Notes: The table shows t-tests on the (weighted) average difference in fixed effects of MNEs and domestic firms. The fixed effects derive from an estimation of eq. (6) with $K = 10, 20, 50$ clusters of firm fixed effects. Firm fixed effect clusters are found using a K-means clustering algorithm on the within-firm distribution of (detrended) hourly wages (Bonhomme et al., 2019), and by picking 20 random initital assignments. 'Clusters = max' refers to the firm fixed effects of a model without clustering. 'Network connectivity' refers to Jochmans and Weidner (2019)'s limited mobility indicator. 'MNE premium' shows the weighted average difference in (cluster) firm fixed effect between MNEs domestic firms, with weights according to observed worker-firm matches in the data. 's.e. bootstrapped' shows block-bootstrapped standard errors (worker-level) of the MNE premium. The bootstrap randomly samples with replacement the full employment histories of workers across 100 iterations.

7 Conclusion

Multinational firms are known to be more productive and pay higher wages than domestic firms. A less-discussed advantage of MNE employment is the value it adds to a worker's CV, allowing workers to build human capital or signal quality, which leads to higher future wages. Using the universal matched employer-employee data of the Netherlands from 2006-2021, we present evidence that workers accumulate considerable and highly portable wage premia during MNE employment. Workers with past MNE experience earn 2-11% higher wages at a new firm and workers staying within an MNE earn 1-14% higher wages with tenure, compared to experience accumulated in a domestic firm. This effect is stronger for workers of higher innate ability, as measured by the workers' earnings fixed effect. We find similar results when identifying the value of MNE experience from workers' mobility after mass layoff events. Our estimates imply that MNEs are important drivers of workers' income: The total accumulated value of experience in MNEs in 2021 amounts to around 6% of labor income in the Netherlands, relative to a counterfactual situation in which this experience had been accumulated in domestic

firms.

Our analysis sheds light on the interpretations of the firm and worker fixed effects in an AKM-type decomposition (Abowd et al., 1999). The full ex-ante premium of MNEs is explained by their workers' experience, suggesting that the experience embedded in its workforce explains the higher firm fixed effects of MNEs. Regarding worker sorting, when the full worker heterogeneity in experience is taken into account, the fixed effects of workers entering MNEs do not differ much from those of workers entering domestic firms. Hence, experience, rather than fixed firm and worker characteristics, appears to explain the sorting of productive workers to MNEs.

To study the labor market consequences of the MNE's experience value, we develop a theoretical framework in which firms anticipate their experience value. MNEs in the model are characterized by their ability to achieve lower marginal costs by adapting their strategy of hires and promotions to the outside value of their workers' accumulated experience. The intuition is that a firm with a higher experience value can promote better workers to senior positions and offer junior workers a lower wage. For juniors, the low wage is balanced with compensations later in the worker's career. A leaving worker will earn more at a next firm, but the original firm does not pay for that higher wage. Similarly, a worker who is internally promoted receives a higher wage, but that wage is still below her marginal productivity in the firm. This is because senior wages depend on a worker's outside option: On the one hand, the worker's experience value is lower outside the firm if experience is imperfectly mobile. On the other hand, employing the worker as a junior allows the firm to observe the worker's match-specific productivity and select workers that fit better into senior positions within the firm. As a part of worker productivity is match-specific, it has no implications for the worker's match-specific productivity in another firm, and hence senior wages.

We present several stylized facts consistent with the framework's predictions. Our estimates suggest that the average multinational career entails a 3% wage penalty at career onset, implying that it takes three years for the wage level to catch up with that of a domestic firm. We show that MNEs employ large shares of young inexperienced workers and lower shares of experienced workers. This is explained by the exit of workers with lower fixed effects from MNE employment over time, suggesting stronger selection in MNEs. We also shed light on the sorting process, showing that the work experience of workers explains most of the premia that they earn at multinationals, consistent with sorting based on work experience rather than innate ability.

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A Supporting tables and figures

Table A1: Overview of the matched employer-employee dataset.

Firm type	Firms	Workers	Observations
MNE	19,020	517,870	2,721,956
International	61,618	580,370	2,831,073
Domestic	133,357	517,872	2,501,994
	207,074	1,059,991	8,055,023

Notes: The table shows the number of firms, workers and observations split up by three firm types: MNE, international and domestic firms. MNEs comprise foreign firms (ultimate owner located abroad) and domestic firms with foreign subsidiaries. International firms are defined as (non-multinational) firms with an average yearly sum of imports and exports that exceeds 10k EUR. Domestic firms are all remaining firms.

Table A2: Summary statistics.

	All workers		2006 cohort	
	Mean	SD	Mean	SD
Workers	1,059,991		37,496	
Age at labor market entry	23.84	3.11	23.31	3.12
Number of different employers	2.26	1.34	3.33	1.80
First job at				
MNE (probability)	0.31	0.46	0.28	0.45
International firm (probability)	0.34	0.47	0.34	0.47
Domestic firm (probability)	0.35	0.48	0.38	0.49
Tenure at				
MNE (years)	1.73	2.65	3.30	4.28
International firm (years)	1.92	2.73	3.44	4.17
Domestic firm (years)	1.56	2.45	2.65	3.62
MNE (hourly wage)	21.42	10.35	23.98	13.55
International firm (hourly wage)	21.07	8.26	22.12	12.24
Domestic firm (hourly wage)	19.64	8.42	20.02	9.27
Past experience from				
MNE (years)	0.94	2.00	2.24	3.51
International firm (years)	0.88	1.89	2.04	3.14
Domestic firm (years)	0.87	1.88	2.00	3.15
MNE (hourly wage)	24.80	12.37	28.11	13.86
International firm (hourly wage)	24.74	10.64	27.18	16.41
Domestic firm (hourly wage)	22.92	9.23	24.68	12.65

Notes: The table provides summary statistics for two groups of workers: all workers in the sample and workers who entered the labor market in 2006. Tenure shows the average maximum number of years that workers have been with their current employer. Past experience shows the average maximum number of years of prior work of workers before joining their current employer. Hourly wages are averages of total reported earnings divided by total reported hours worked. MNEs comprise foreign firms (ultimate owner located abroad) and domestic firms with foreign subsidiaries. International firms are defined as (non-multinational) firms with an average yearly sum of imports and exports that exceeds 10k EUR. Domestic firms are all remaining firms.

Table A3: The static wage premium of careers in MNEs.

| | Firm fixed effect | |
	(1)	(2)
Intercept	-0.1339***	-0.1193***
	(0.0038)	(0.0032)
MNE-career	-0.0295***	-0.0322***
	(0.0019)	(0.0019)
Observations	144,396	144,396
R^2	0.0038	0.0047

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Weighted Least Squares regressions with weights according to average employment size. The dependent variable are the respective firm fixed effects of two different specification: (1) including MNE/international firm/domestic firm work experience (see eq. (6)); (2) including full interactions between work experience and the worker fixed effects (see eq. (7)). Bootstrapped standard errors in parentheses (re-estimating firm fixed effects until convergence in all 100 iterations).

B Comparing the fixed effects distributions

In this section we develop a formal decomposition of the difference in the fixed effects distributions between MNEs and domestic firms to complement the discussion in Sections 4.1 and 4.2. Specifically, we decompose the difference in the firm and worker fixed effects distributions of MNEs and domestic firms into differences in mean and dilation, using the quantile approach of Combes et al. (2012). The approach minimizes the mean quantile difference between the observed fixed effect distribution in MNEs and an approximated distribution, where the approximation is formed by shifting and dilating the observed distribution in domestic firms. For the worker fixed effects and in order to avoid counting moving workers more than once, we use a snapshot of the data in 2014 when applying the Combes et al. (2012) method. For the firm fixed effects, we focus on firms that never change status throughout our sample period.[12]

Table B1 reports estimates of shift and dilation for the worker fixed effects in different specifications. In Column 1, we first consider the worker fixed effects of a static estimation that ignores the benefits of MNE experience, and includes only industry-year fixed effects, worker fixed effects and firm fixed effects. The shift parameter is 0.08 and the dilation parameter is greater than one, implying that in this specification worker ability is more dispersed in MNEs than in domestic firms. The statistically significant shift parameter reflects the exclusion of the time-varying benefits of experience. Ignoring them causes the worker fixed effect estimates to not only pick up time-invariant characteristics of workers but also time-variant differences in the accumulation of experience. Column 3 adjusts the estimates for experience but restricts its to returns to be homogeneous across worker ability (as in eq. (6)). The shift parameter falls to 0.06, while the dilation parameter remains almost unchanged. As discussed in Section 4.3, the returns to MNE experience are heterogeneous across workers, whereby the fixed effects underlying Column 2 overestimate ability at the top of the distribution and underestimate ability at the bottom of the distribution. Column 4 addresses these issues and adjusts for heterogeneous time-varying differences in the wage accumulation with experience across different levels of the worker fixed effects (as in eq. (7)). The dispersion parameter is just below one, suggesting that worker ability varies less in MNEs. The mean difference estimate is negative, close to zero and statistically insignificant. In summary, the change in shift parameter across Columns 1 to 4 suggests that the worker-level disparities between MNEs and domestic firms arise from faster wage growth with MNE experience and heterogeneous returns to experience for workers of different ability, not from innate ability differences among workers.

Table B2 shows the estimates of shift and dilation for the firm fixed effects in the same set of modules. For the firm fixed effects of the static model in Column 1, the shift parameter is 0.08, implying that MNEs have higher average fixed effects than domestic firms. Column 2 adds experience to the estimation but ignores the effect of firm size on wages. The shift parameter turns negative to -0.06, implying that the fixed effects of MNEs are lower than those of domestic firms. Column 3 additionally adds a control for firm size and Column 4 allows the effect of experience on wage to vary by the worker fixed effects. In both cases, the shift parameter is negative. The estimates for the dilation parameters are consistently smaller than one, implying that the fixed effects of MNEs vary less than those of domestic firms. All estimates are statistically significant. Taken together, the

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[12]The results are qualitatively similar when using a different snapshot or including firms that change status.

change in shift estimate implies that the ex ante wage premium of MNEs (Column 1) is fully explained by the accumulation of experience in the workforce of MNEs (Columns 2 to 4).

Table B1: Comparison of worker fixed effect distributions, MNEs vs Domestic firms.

	(1)	(2)	(3)	(4)
Shift A	0.0842***	0.0418***	0.0591***	-0.00854
	(0.00152)	(0.00197)	(0.00573)	(0.00489)
Dilation D	1.069***	1.053***	1.053***	0.900***
	(0.0119)	(0.0121)	(0.0121)	(0.00989)
Observations	241566	241566	241566	241566
R^2	0.776	0.404	0.396	0.599

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of shift and dilation in the Combes et al. (2012) method applied to the distribution of worker fixed effects. The estimates are based on a snapshot of the data in 2014, and include the fixed effects of workers in MNEs and domestic firms that do not change status. The columns refer to different worker fixed effect estimates described by (1) a static model with only a worker fixed effect, firm fixed effect and industry-year fixed effect; (2) a dynamic model with MNE, international and domestic experience included (see eq. (6)) but excluding the log firm size control; (3) our main dynamic model with MNE, international and domestic experience included (see eq. (6)); (4) a dynamic model with MNE, international and domestic firm experience, and their interactions with the worker fixed effects included (see eq. (7)). Standard errors (in parantheses) are block-bootstrapped at the worker level (re-estimating the fixed effects until convergence in all 100 iterations).

Table B2: Comparison of firm fixed effect distributions, MNEs vs Domestic firms.

	(1)	(2)	(3)	(4)
Shift A	0.0829***	-0.0630***	-0.0160***	-0.0134***
	(0.00473)	(0.00540)	(0.00193)	(0.00234)
Dilation D	0.792***	0.673***	0.684***	0.674***
	(0.0159)	(0.0141)	(0.0145)	(0.0151)
Observations	144396	144396	144396	144396
R^2	0.775	0.722	0.636	0.642

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of shift and dilation in the Combes et al. (2012) method applied to the distribution of firm fixed effects. The estimates include the fixed effects of MNEs and domestic firms that do not change status. The firm fixed effects are derived from (1) a static model with only a worker fixed effect, firm fixed effect and industry-year fixed effect; (2) a dynamic model with MNE, international and domestic experience included (see eq. (6)) but excluding the log firm size control; (3) our main dynamic model with MNE, international and domestic experience included (see eq. (6)); (4) a dynamic model with MNE, international and domestic firm experience, and their interactions with the worker fixed effects included (see eq. (7)). Standard errors (in parantheses) are block-bootstrapped at the worker level (re-estimating the fixed effects until convergence in all 100 iterations).

C   Additional results on other international (non-multinational) firms

Figure C1: Wage premia of international firm experience by worker ability.
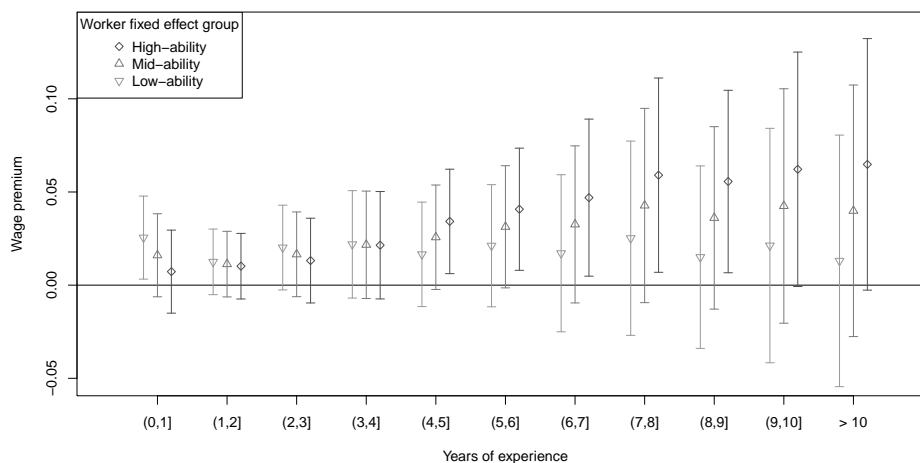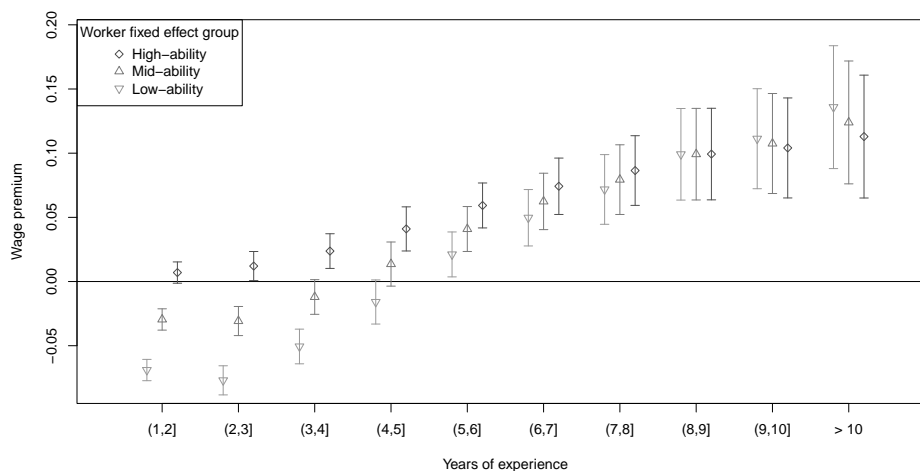
(a) Across-firm

(b) Within-firm

Notes: The plots depict calculated wage premia per worker ability group and their 95%-confidence intervals, as estimated by a wage regression with interactions between MNE/international firm/domestic firm experience and the worker fixed effects (see eq. (7)). The full regression results are in Table F1 in Appendix F. Wage premia are calculated as the coefficients for international firm experience minus the respective coefficients for domestic firm experience. Experience within and across firms are based on actual days worked and cut in yearly splines. High-ability workers are in the 75th percentile and low-ability workers in the 25th percentile of the worker fixed effects distribution. Standard errors are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

D   Evidence from firm closures and mass layoffs

Table D1: Firm closures and mass layoffs.

Firm type	Firms	Workers
MNE	386	2,813
International	979	4,602
Domestic	1,521	5,956

Notes: The table shows the number of firms and workers involved in mass layoffs, split up by three firm types: MNE, international and domestic firms. MNEs comprise foreign firms (ultimate owner located abroad) and domestic firms with foreign subsidiaries. International firms are defined as firms with an average yearly sum of imports and exports that exceeds 10k EUR. A Mass layoff event identifies a firm with at least 10 employees that ceases to exist or lays off more than 80% of its workers in a given year, with less than 30% of the exiting workers entering the same new firm.

Figure D1: Worker fixed effects in firm closures and mass layoffs.
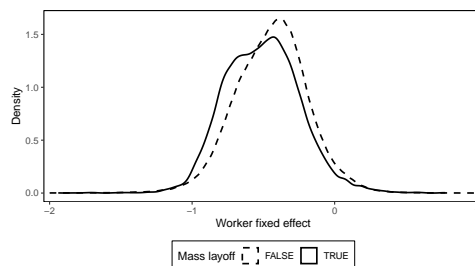
(a) Mass layoffs vs. other workers
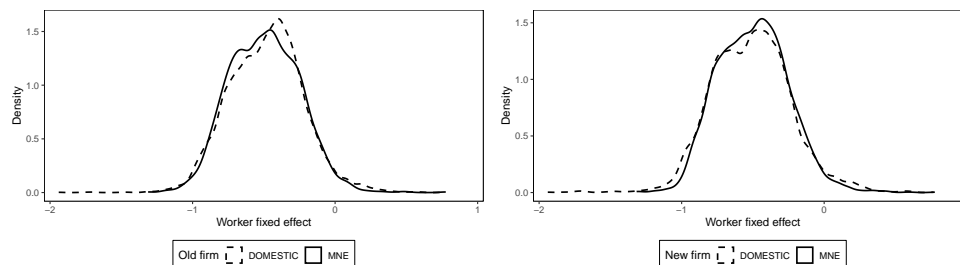
(b) At old firm

(c) At new firm

Notes: The plots show different distributions of worker fixed effects derived from a wage regression (see eq. (7)). Panel (a) splits the distribution up by workers involved in a mass layoff event. A mass layoff event identifies a firm with at least 10 employees that ceases to exist or lays off more than 80% of its workers in a given year, with less than 30% of the exiting workers entering the same new firm. Panel (b) splits the distribution up by the MNE/domestic firm status of the origin firm where the mass layoff occurs. Panel (c) splits the distribution up by the destination firm where workers are observed following a mass layoff.

Table D2: Evidence from firm closures and mass layoffs (full table).

	log(hourly wage) (detrended)	
	(1)	(2)
Domestic firm experience	0.0395***	0.0523***

	(0.0007)	(0.0033)
International firm experience	0.0445***	0.0602***
	(0.0007)	(0.0032)
MNE experience	0.0469***	0.0825***
	(0.0007)	(0.0027)
Years in firm	0.0496***	0.0477***
	(0.0010)	(0.0053)
Years in firm × International firm	0.0021*	0.0082
	(0.0010)	(0.0051)
Years in firm × MNE	0.0074***	0.0285***
	(0.0010)	(0.0055)
log(firm size)	0.0363***	0.0297***
	(0.0004)	(0.0006)
Employer number = 3	0.0569***	0.0247·
	(0.0037)	(0.0131)
Employer number = 4	0.0538***	-0.0011
	(0.0047)	(0.0206)
Years in firm × Employer number = 3	-0.0089***	-0.0057
	(0.0012)	(0.0039)
Years in firm × Employer number = 4	-0.0098***	-0.0101·
	(0.0016)	(0.0059)
Worker fe	0.9239***	0.7476***
	(0.0042)	(0.0092)
Firm fe	0.9354***	0.9728***
	(0.0051)	(0.0112)
Domestic firm experience × Worker fe		0.0389***
		(0.0057)
International firm experience × Worker fe		0.0438***
		(0.0056)
MNE experience × Worker fe		0.0858***
		(0.0046)
Years in firm × Worker fe		0.0151
		(0.0102)
Worker fe × Employer number = 3		-0.0181
		(0.0237)
Worker fe × Employer number = 4		-0.0983**
		(0.0344)
Worker fe × years in firm × Employer number = 3		-0.0069
		(0.0080)
Worker fe × years in firm × Employer number = 4		-0.0135
		(0.0103)
Years in firm × Worker fe × International firm		0.0042
		(0.0097)
Years in firm × Worker fe × MNE		0.0393***

		(0.0102)

Fit statistics		
Observations	42,558	42,558
R^2	0.8067	0.8192

E   Limited mobility bias

Figure E1: Returns to MNE experience with K = 10, 20, 50 clustered firm fixed effects.

(a) 10 firm fe clusters: across-firm

(b) 10 firm clusters: within-firm

(c) 20 firm fe clusters: across-firm

(d) 20 firm fe clusters: within-firm

(e) 50 firm fe clusters: across-firm

(f) 50 firm fe clusters: within-firm

Notes: The plots depict calculated wage premia and their 95%-confidence intervals (see eq. (6) and the discussion in Sections 4 and 6.1) for $K = 10, 20, 50$ clusters in the firm fixed effects. Wage premia are calculated as the coefficients for MNE/international firm experience minus the respective coefficients for domestic firm experience. Experience within and across firms are based on actual days worked and cut in yearly splines. Firm fixed effect clusters are found using a K-means clustering algorithm on the within-firm distribution of (detrended) hourly wages (Bonhomme et al., 2019), and by picking 20 random initital assignments. Standard errors are clustered at the worker level.

F   Full regression tables for the main estimates

F.1   The value of MNE experience

Table F1:   Wage profile estimates.

	log(hourly wage) (detrended)
	(1)

Years in firm = (1,2]	0.1240***
	(0.0003)
Years in firm = (2,3]	0.2003***
	(0.0004)
Years in firm = (3,4]	0.2538***
	(0.0005)
Years in firm = (4,5]	0.2964***
	(0.0006)
Years in firm = (5,6]	0.3319***
	(0.0007)
Years in firm = (6,7]	0.3642***
	(0.0008)
Years in firm = (7,8]	0.3956***
	(0.0009)
Years in firm = (8,9]	0.4249***
	(0.0010)
Years in firm = (9,10]	0.4580***
	(0.0012)
Years in firm = (10,Inf]	0.5189***
	(0.0014)
International firm × years in firm = (1,2]	0.0093***
	(0.0003)
International firm × years in firm = (2,3]	0.0229***
	(0.0004)
International firm × years in firm = (3,4]	0.0343***
	(0.0006)
International firm × years in firm = (4,5]	0.0466***
	(0.0007)
International firm × years in firm = (5,6]	0.0569***
	(0.0008)
International firm × years in firm = (6,7]	0.0612***
	(0.0009)
International firm × years in firm = (7,8]	0.0636***
	(0.0011)
International firm × years in firm = (8,9]	0.0698***
	(0.0013)
International firm × years in firm = (9,10]	0.0685***
	(0.0015)
International firm × years in firm = (10,Inf]	0.0696***
	(0.0018)
MNE × years in firm = (1,2]	0.0138***
	(0.0004)
MNE × years in firm = (2,3]	0.0333***
	(0.0005)

MNE × years in firm = (3,4]	0.0520***
	(0.0006)
MNE × years in firm = (4,5]	0.0726***
	(0.0007)
MNE × years in firm = (5,6]	0.0919***
	(0.0009)
MNE × years in firm = (6,7]	0.1089***
	(0.0010)
MNE × years in firm = (7,8]	0.1218***
	(0.0012)
MNE × years in firm = (8,9]	0.1304***
	(0.0015)
MNE × years in firm = (9,10]	0.1326***
	(0.0016)
MNE × years in firm = (10,Inf]	0.1387***
	(0.0021)
Years in firm = (1,2] × Employer number = 2	-0.0401***
	(0.0003)
Years in firm = (1,2] × Employer number = 3	-0.0506***
	(0.0004)
Years in firm = (1,2] × Employer number = 4	-0.0578***
	(0.0004)
Years in firm = (2,3] × Employer number = 2	-0.0624***
	(0.0004)
Years in firm = (2,3] × Employer number = 3	-0.0830***
	(0.0005)
Years in firm = (2,3] × Employer number = 4	-0.0991***
	(0.0006)
Years in firm = (3,4] × Employer number = 2	-0.0784***
	(0.0005)
Years in firm = (3,4] × Employer number = 3	-0.1061***
	(0.0007)
Years in firm = (3,4] × Employer number = 4	-0.1292***
	(0.0008)
Years in firm = (4,5] × Employer number = 2	-0.0888***
	(0.0006)
Years in firm = (4,5] × Employer number = 3	-0.1232***
	(0.0008)
Years in firm = (4,5] × Employer number = 4	-0.1502***
	(0.0010)
Years in firm = (5,6] × Employer number = 2	-0.0960***
	(0.0008)
Years in firm = (5,6] × Employer number = 3	-0.1349***
	(0.0010)

Years in firm = (5,6] × Employer number = 4	-0.1648***
	(0.0013)
Years in firm = (6,7] × Employer number = 2	-0.1004***
	(0.0009)
Years in firm = (6,7] × Employer number = 3	-0.1437***
	(0.0013)
Years in firm = (6,7] × Employer number = 4	-0.1763***
	(0.0017)
Years in firm = (7,8] × Employer number = 2	-0.1060***
	(0.0011)
Years in firm = (7,8] × Employer number = 3	-0.1499***
	(0.0016)
Years in firm = (7,8] × Employer number = 4	-0.1867***
	(0.0024)
Years in firm = (8,9] × Employer number = 2	-0.1040***
	(0.0014)
Years in firm = (8,9] × Employer number = 3	-0.1552***
	(0.0019)
Years in firm = (8,9] × Employer number = 4	-0.1934***
	(0.0031)
Years in firm = (9,10] × Employer number = 2	-0.1083***
	(0.0015)
Years in firm = (9,10] × Employer number = 3	-0.1664***
	(0.0023)
Years in firm = (9,10] × Employer number = 4	-0.2082***
	(0.0038)
Years in firm = (10,Inf] × Employer number = 2	-0.1244***
	(0.0019)
Years in firm = (10,Inf] × Employer number = 3	-0.1872***
	(0.0031)
Years in firm = (10,Inf] × Employer number = 4	-0.2383***
	(0.0057)
MNE experience = (0,1]	0.0362***
	(0.0009)
MNE experience = (1,2]	0.0759***
	(0.0009)
MNE experience = (2,3]	0.1296***
	(0.0010)
MNE experience = (3,4]	0.1792***
	(0.0012)
MNE experience = (4,5]	0.2281***
	(0.0014)
MNE experience = (5,6]	0.2694***
	(0.0016)

MNE experience = (6,7]	0.3071***
	(0.0019)
MNE experience = (7,8]	0.3409***
	(0.0021)
MNE experience = (8,9]	0.3753***
	(0.0024)
MNE experience = (9,10]	0.4003***
	(0.0029)
MNE experience = (10,Inf]	0.4515***
	(0.0027)
International firm experience = (0,1]	0.0347***
	(0.0010)
International firm experience = (1,2]	0.0619***
	(0.0009)
International firm experience = (2,3]	0.1078***
	(0.0011)
International firm experience = (3,4]	0.1511***
	(0.0012)
International firm experience = (4,5]	0.1909***
	(0.0014)
International firm experience = (5,6]	0.2244***
	(0.0016)
International firm experience = (6,7]	0.2535***
	(0.0019)
International firm experience = (7,8]	0.2835***
	(0.0021)
International firm experience = (8,9]	0.3068***
	(0.0025)
International firm experience = (9,10]	0.3357***
	(0.0030)
International firm experience = (10,Inf]	0.3809***
	(0.0027)
Domestic firm experience = (0,1]	0.0182***
	(0.0010)
Domestic firm experience = (1,2]	0.0508***
	(0.0009)
Domestic firm experience = (2,3]	0.0901***
	(0.0011)
Domestic firm experience = (3,4]	0.1271***
	(0.0013)
Domestic firm experience = (4,5]	0.1607***
	(0.0015)
Domestic firm experience = (5,6]	0.1883***
	(0.0016)

	log(hourly wage) (detrended)
Domestic firm experience = (6,7]	0.2179***
	(0.0019)
Domestic firm experience = (7,8]	0.2382***
	(0.0021)
Domestic firm experience = (8,9]	0.2679***
	(0.0024)
Domestic firm experience = (9,10]	0.2923***
	(0.0027)
Domestic firm experience = (10,Inf]	0.3397***
	(0.0025)
log(firm size)	0.0294***
	(0.0005)
Employer number = 2	0.1124***
	(0.0007)
Employer number = 3	0.1487***
	(0.0011)
Employer number = 4	0.1570***
	(0.0015)
Fixed-effects	
Worker (1,059,991)	✓
Firm (207,074)	✓
Observations	8,055,023
R^2	0.8288

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of eq. (6) based on the full sample of workers that are observed up from labor market entry. The dependent variable is the natural logarithm of hourly wage (total wage over total hours worked), detrended by industry-year fixed effects on the full sample of all workers in a first step. 'Years in firm' refers to experience accumulated while a worker is employed at the current employer of type MNE, international firm and domestic firm (reference category). MNE/international firm/domestic firm experience refers to experience accumulated before entering the current employer. Experience is calculated based on actual days worked and cut in yearly splines. Employer number refer to the cumulative number of distinct firms that a worker has been observed at, with one being the reference category. log(firm size) is the natural logarithm of the total number of (full-time) employees observed in a firm in a given year. Clustered (worker-level) standard-errors in parentheses.

F.2 The value of MNE experience by workers' innate ability

Table F2: Wage profile estimates (worker fixed effects interactions).

	log(hourly wage) (detrended)
	(1)
Years in firm = (1,2]	0.0817***
	(0.0008)
Years in firm = (2,3]	0.1434***

	(0.0013)
Years in firm = (3,4]	0.2045***
	(0.0015)
Years in firm = (4,5]	0.2605***
	(0.0018)
Years in firm = (5,6]	0.3126***
	(0.0019)
Years in firm = (6,7]	0.3609***
	(0.0025)
Years in firm = (7,8]	0.4058***
	(0.0028)
Years in firm = (8,9]	0.4478***
	(0.0035)
Years in firm = (9,10]	0.4899***
	(0.0039)
Years in firm = (10,Inf]	0.5650***
	(0.0046)
Worker fe × years in firm = (1,2]	-0.0938***
	(0.0016)
Worker fe × years in firm = (2,3]	-0.1285***
	(0.0023)
Worker fe × years in firm = (3,4]	-0.1112***
	(0.0029)
Worker fe × years in firm = (4,5]	-0.0794***
	(0.0036)
Worker fe × years in firm = (5,6]	-0.0402***
	(0.0038)
Worker fe × years in firm = (6,7]	-0.0021
	(0.0047)
Worker fe × years in firm = (7,8]	0.0301***
	(0.0056)
Worker fe × years in firm = (8,9]	0.0602***
	(0.0068)
Worker fe × years in firm = (9,10]	0.0814***
	(0.0075)
Worker fe × years in firm = (10,Inf]	0.1149***
	(0.0091)
International firm × years in firm = (1,2]	0.0217***
	(0.0010)
International firm × years in firm = (2,3]	0.0293***
	(0.0013)
International firm × years in firm = (3,4]	0.0381***
	(0.0016)
International firm × years in firm = (4,5]	0.0520***

	(0.0020)
International firm × years in firm = (5,6]	0.0667***
	(0.0022)
International firm × years in firm = (6,7]	0.0790***
	(0.0027)
International firm × years in firm = (7,8]	0.0893***
	(0.0031)
International firm × years in firm = (8,9]	0.0993***
	(0.0043)
International firm × years in firm = (9,10]	0.1027***
	(0.0047)
International firm × years in firm = (10,Inf]	0.1085***
	(0.0056)
MNE × years in firm = (1,2]	0.0370***
	(0.0010)
MNE × years in firm = (2,3]	0.0823***
	(0.0015)
MNE × years in firm = (3,4]	0.1228***
	(0.0021)
MNE × years in firm = (4,5]	0.1631***
	(0.0028)
MNE × years in firm = (5,6]	0.1976***
	(0.0032)
MNE × years in firm = (6,7]	0.2299***
	(0.0041)
MNE × years in firm = (7,8]	0.2571***
	(0.0049)
MNE × years in firm = (8,9]	0.2735***
	(0.0054)
MNE × years in firm = (9,10]	0.2807***
	(0.0061)
MNE × years in firm = (10,Inf]	0.3032***
	(0.0062)
Years in firm = (1,2] × Employer number = 2	-0.0077***
	(0.0009)
Years in firm = (1,2] × Employer number = 3	-0.0165***
	(0.0011)
Years in firm = (1,2] × Employer number = 4	-0.0237***
	(0.0012)
Years in firm = (2,3] × Employer number = 2	-0.0119***
	(0.0013)
Years in firm = (2,3] × Employer number = 3	-0.0288***
	(0.0013)
Years in firm = (2,3] × Employer number = 4	-0.0489***

	(0.0016)
Years in firm = (3,4] × Employer number = 2	-0.0290***
	(0.0015)
Years in firm = (3,4] × Employer number = 3	-0.0534***
	(0.0017)
Years in firm = (3,4] × Employer number = 4	-0.0817***
	(0.0022)
Years in firm = (4,5] × Employer number = 2	-0.0422***
	(0.0018)
Years in firm = (4,5] × Employer number = 3	-0.0793***
	(0.0022)
Years in firm = (4,5] × Employer number = 4	-0.1078***
	(0.0030)
Years in firm = (5,6] × Employer number = 2	-0.0568***
	(0.0021)
Years in firm = (5,6] × Employer number = 3	-0.1013***
	(0.0030)
Years in firm = (5,6] × Employer number = 4	-0.1356***
	(0.0041)
Years in firm = (6,7] × Employer number = 2	-0.0669***
	(0.0027)
Years in firm = (6,7] × Employer number = 3	-0.1235***
	(0.0036)
Years in firm = (6,7] × Employer number = 4	-0.1582***
	(0.0048)
Years in firm = (7,8] × Employer number = 2	-0.0800***
	(0.0033)
Years in firm = (7,8] × Employer number = 3	-0.1375***
	(0.0047)
Years in firm = (7,8] × Employer number = 4	-0.1813***
	(0.0071)
Years in firm = (8,9] × Employer number = 2	-0.0816***
	(0.0046)
Years in firm = (8,9] × Employer number = 3	-0.1461***
	(0.0069)
Years in firm = (8,9] × Employer number = 4	-0.1868***
	(0.0086)
Years in firm = (9,10] × Employer number = 2	-0.0933***
	(0.0044)
Years in firm = (9,10] × Employer number = 3	-0.1695***
	(0.0069)
Years in firm = (9,10] × Employer number = 4	-0.2145***
	(0.0099)
Years in firm = (10,Inf] × Employer number = 2	-0.1223***

	(0.0060)
Years in firm = (10,Inf] × Employer number = 3	-0.1902***
	(0.0083)
Years in firm = (10,Inf] × Employer number = 4	-0.2569***
	(0.0158)
Worker fe × International firm × years in firm = (1,2]	0.0226***
	(0.0021)
Worker fe × International firm × years in firm = (2,3]	0.0081**
	(0.0027)
Worker fe × International firm × years in firm = (3,4]	0.0028
	(0.0032)
Worker fe × International firm × years in firm = (4,5]	0.0079·
	(0.0040)
Worker fe × International firm × years in firm = (5,6]	0.0183***
	(0.0041)
Worker fe × International firm × years in firm = (6,7]	0.0355***
	(0.0051)
Worker fe × International firm × years in firm = (7,8]	0.0527***
	(0.0063)
Worker fe × International firm × years in firm = (8,9]	0.0605***
	(0.0088)
Worker fe × International firm × years in firm = (9,10]	0.0704***
	(0.0094)
Worker fe × International firm × years in firm = (10,Inf]	0.0797***
	(0.0117)
Worker fe × MNE × years in firm = (1,2]	0.0492***
	(0.0022)
Worker fe × MNE × years in firm = (2,3]	0.1080***
	(0.0029)
Worker fe × MNE × years in firm = (3,4]	0.1640***
	(0.0036)
Worker fe × MNE × years in firm = (4,5]	0.2185***
	(0.0052)
Worker fe × MNE × years in firm = (5,6]	0.2627***
	(0.0057)
Worker fe × MNE × years in firm = (6,7]	0.3079***
	(0.0073)
Worker fe × MNE × years in firm = (7,8]	0.3490***
	(0.0093)
Worker fe × MNE × years in firm = (8,9]	0.3740***
	(0.0105)
Worker fe × MNE × years in firm = (9,10]	0.3902***
	(0.0116)
Worker fe × MNE × years in firm = (10,Inf]	0.4410***

	(0.0119)
Worker fe × years in firm = (1,2] × Employer number = 2	0.0749***
	(0.0020)
Worker fe × years in firm = (1,2] × Employer number = 3	0.0790***
	(0.0021)
Worker fe × years in firm = (1,2] × Employer number = 4	0.0788***
	(0.0023)
Worker fe × years in firm = (2,3] × Employer number = 2	0.1191***
	(0.0025)
Worker fe × years in firm = (2,3] × Employer number = 3	0.1274***
	(0.0026)
Worker fe × years in firm = (2,3] × Employer number = 4	0.1166***
	(0.0031)
Worker fe × years in firm = (3,4] × Employer number = 2	0.1162***
	(0.0031)
Worker fe × years in firm = (3,4] × Employer number = 3	0.1220***
	(0.0035)
Worker fe × years in firm = (3,4] × Employer number = 4	0.1065***
	(0.0039)
Worker fe × years in firm = (4,5] × Employer number = 2	0.1067***
	(0.0037)
Worker fe × years in firm = (4,5] × Employer number = 3	0.0971***
	(0.0042)
Worker fe × years in firm = (4,5] × Employer number = 4	0.0870***
	(0.0054)
Worker fe × years in firm = (5,6] × Employer number = 2	0.0863***
	(0.0043)
Worker fe × years in firm = (5,6] × Employer number = 3	0.0686***
	(0.0055)
Worker fe × years in firm = (5,6] × Employer number = 4	0.0500***
	(0.0078)
Worker fe × years in firm = (6,7] × Employer number = 2	0.0700***
	(0.0054)
Worker fe × years in firm = (6,7] × Employer number = 3	0.0326***
	(0.0069)
Worker fe × years in firm = (6,7] × Employer number = 4	0.0161·
	(0.0091)
Worker fe × years in firm = (7,8] × Employer number = 2	0.0494***
	(0.0070)
Worker fe × years in firm = (7,8] × Employer number = 3	0.0092
	(0.0087)
Worker fe × years in firm = (7,8] × Employer number = 4	-0.0192
	(0.0130)
Worker fe × years in firm = (8,9] × Employer number = 2	0.0379***

	(0.0097)
Worker fe × years in firm = (8,9] × Employer number = 3	-0.0045
	(0.0127)
Worker fe × years in firm = (8,9] × Employer number = 4	-0.0269·
	(0.0164)
Worker fe × years in firm = (9,10] × Employer number = 2	0.0197*
	(0.0092)
Worker fe × years in firm = (9,10] × Employer number = 3	-0.0356**
	(0.0120)
Worker fe × years in firm = (9,10] × Employer number = 4	-0.0596**
	(0.0188)
Worker fe × years in firm = (10,Inf] × Employer number = 2	-0.0148
	(0.0118)
Worker fe × years in firm = (10,Inf] × Employer number = 3	-0.0465**
	(0.0154)
Worker fe × years in firm = (10,Inf] × Employer number = 4	-0.0988***
	(0.0277)
Domestic firm experience = (0,1]	0.0171***
	(0.0029)
Domestic firm experience = (1,2]	0.0813***
	(0.0027)
Domestic firm experience = (2,3]	0.1413***
	(0.0033)
Domestic firm experience = (3,4]	0.1965***
	(0.0044)
Domestic firm experience = (4,5]	0.2423***
	(0.0043)
Domestic firm experience = (5,6]	0.2840***
	(0.0055)
Domestic firm experience = (6,7]	0.3199***
	(0.0055)
Domestic firm experience = (7,8]	0.3474***
	(0.0075)
Domestic firm experience = (8,9]	0.3829***
	(0.0072)
Domestic firm experience = (9,10]	0.4042***
	(0.0086)
Domestic firm experience = (10,Inf]	0.4640***
	(0.0096)
Worker fe × Domestic firm experience = (0,1]	-0.0052
	(0.0058)
Worker fe × Domestic firm experience = (1,2]	0.0599***
	(0.0056)
Worker fe × Domestic firm experience = (2,3]	0.1037***

	(0.0072)
Worker fe × Domestic firm experience = (3,4]	0.1436***
	(0.0092)
Worker fe × Domestic firm experience = (4,5]	0.1717***
	(0.0086)
Worker fe × Domestic firm experience = (5,6]	0.2034***
	(0.0107)
Worker fe × Domestic firm experience = (6,7]	0.2202***
	(0.0115)
Worker fe × Domestic firm experience = (7,8]	0.2367***
	(0.0149)
Worker fe × Domestic firm experience = (8,9]	0.2486***
	(0.0143)
Worker fe × Domestic firm experience = (9,10]	0.2441***
	(0.0170)
Worker fe × Domestic firm experience = (10,Inf]	0.2706***
	(0.0191)
International firm experience = (0,1]	0.0208***
	(0.0022)
International firm experience = (1,2]	0.0910***
	(0.0020)
International firm experience = (2,3]	0.1531***
	(0.0028)
International firm experience = (3,4]	0.2178***
	(0.0028)
International firm experience = (4,5]	0.2799***
	(0.0036)
International firm experience = (5,6]	0.3285***
	(0.0037)
International firm experience = (6,7]	0.3727***
	(0.0049)
International firm experience = (7,8]	0.4130***
	(0.0056)
International firm experience = (8,9]	0.4464***
	(0.0060)
International firm experience = (9,10]	0.4743***
	(0.0080)
International firm experience = (10,Inf]	0.5389***
	(0.0064)
Worker fe × International firm experience = (0,1]	-0.0333***
	(0.0047)
Worker fe × International firm experience = (1,2]	0.0563***
	(0.0037)
Worker fe × International firm experience = (2,3]	0.0929***

	(0.0055)
Worker fe × International firm experience = (3,4]	0.1429***
	(0.0060)
Worker fe × International firm experience = (4,5]	0.1988***
	(0.0071)
Worker fe × International firm experience = (5,6]	0.2334***
	(0.0083)
Worker fe × International firm experience = (6,7]	0.2660***
	(0.0112)
Worker fe × International firm experience = (7,8]	0.2886***
	(0.0114)
Worker fe × International firm experience = (8,9]	0.3108***
	(0.0123)
Worker fe × International firm experience = (9,10]	0.3069***
	(0.0155)
Worker fe × International firm experience = (10,Inf]	0.3500***
	(0.0118)
MNE experience = (0,1]	0.0589***
	(0.0025)
MNE experience = (1,2]	0.1493***
	(0.0022)
MNE experience = (2,3]	0.2568***
	(0.0027)
MNE experience = (3,4]	0.3461***
	(0.0035)
MNE experience = (4,5]	0.4212***
	(0.0043)
MNE experience = (5,6]	0.4768***
	(0.0048)
MNE experience = (6,7]	0.5404***
	(0.0059)
MNE experience = (7,8]	0.5857***
	(0.0061)
MNE experience = (8,9]	0.6386***
	(0.0073)
MNE experience = (9,10]	0.6709***
	(0.0087)
MNE experience = (10,Inf]	0.7650***
	(0.0080)
Worker fe × MNE experience = (0,1]	0.0607***
	(0.0051)
Worker fe × MNE experience = (1,2]	0.1652***
	(0.0044)
Worker fe × MNE experience = (2,3]	0.2838***

	(0.0053)
Worker fe × MNE experience = (3,4]	0.3782***
	(0.0063)
Worker fe × MNE experience = (4,5]	0.4437***
	(0.0075)
Worker fe × MNE experience = (5,6]	0.4815***
	(0.0100)
Worker fe × MNE experience = (6,7]	0.5479***
	(0.0110)
Worker fe × MNE experience = (7,8]	0.5800***
	(0.0113)
Worker fe × MNE experience = (8,9]	0.6252***
	(0.0130)
Worker fe × MNE experience = (9,10]	0.6497***
	(0.0178)
Worker fe × MNE experience = (10,Inf]	0.7562***
	(0.0153)
log(firm size)	0.0300***
	(0.0005)
Employer number = 2	0.0188***
	(0.0021)
Employer number = 3	0.0269***
	(0.0030)
Employer number = 4	0.0073*
	(0.0037)
Worker fe × Employer number = 2	-0.1958***
	(0.0042)
Worker fe × Employer number = 3	-0.2536***
	(0.0061)
Worker fe × Employer number = 4	-0.3241***
	(0.0075)
Fixed-effects	
Worker (1,059,991)	✓
Firm (207,074)	✓
Observations	8,055,023
R^2	0.8331

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of eq. (7) based on the full sample of workers that are observed up from labor market entry. Estimated using the iterative procedure of De la Roca and Puga (2017); see Section 4.3. The dependent variable is the natural logarithm of hourly wage (total wage over total hours worked), detrended by industry-year fixed effects on the full sample of all workers in a first step. 'Years in firm' refers to experience accumulated while a worker is employed at the current employer of type MNE, International firm and domestic firm (reference category). MNE/international firm/domestic firm experience refers to experience accumulated before entering the current employer. Experience is calculated based on actual days worked and cut in yearly splines. Employer number refer to the cumulative number of distinct firms that a worker has been observed at, with one being

the reference category. log(firm size) is the natural logarithm of the total number of (full-time) employees observed in a firm in a given year. Standard errors in parantheses are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).

F.3 Selection within the multinational

Table F3: MNE employment probabilities.

	MNE
	(1)
Labor market experience = (0,1]	-0.0014***
	(0.0002)
Labor market experience = (1,2]	-0.0021***
	(0.0004)
Labor market experience = (2,3]	-0.0025***
	(0.0006)
Labor market experience = (3,4]	-0.0027***
	(0.0008)
Labor market experience = (4,5]	-0.0026**
	(0.0010)
Labor market experience = (5,6]	-0.0027*
	(0.0011)
Labor market experience = (6,7]	-0.0034**
	(0.0013)
Labor market experience = (7,8]	-0.0042**
	(0.0015)
Labor market experience = (8,9]	-0.0047**
	(0.0017)
Labor market experience = (9,10]	-0.0053**
	(0.0019)
Labor market experience = (10,Inf]	-0.0070***
	(0.0021)
log(firm size)	0.0474***
	(0.0005)
Employer number = 2	0.0032***
	(0.0003)
Employer number = 3	0.0040***
	(0.0004)
Employer number = 4	0.0062***
	(0.0006)
Fixed-effects	
Worker (1,059,991)	✓
Firm (207,074)	✓

Industry-year (332)	✓
Observations	8,055,023
R^2	0.9331

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of eq. (8) based on the full sample of workers that are observed up from labor market entry. The dependent variable is an indicator that identifies observations at MNEs. 'Labor market experience refers to the number of years since a worker entered the labor market. Employer number refer to the cumulative number of distinct firms that a worker has been observed at, with one being the reference category. log(firm size) is the natural logarithm of the total number of (full-time) employees observed in a firm in a given year. Clustered (worker-level) standard-errors in parentheses.

Table F4: MNE employment probabilities (worker fixed effect interactions).

	MNE
	(1)
Labor market experience = (0,1]	0.0000
	(0.0005)
Labor market experience = (1,2]	0.0011
	(0.0008)
Labor market experience = (2,3]	0.0028*
	(0.0011)
Labor market experience = (3,4]	0.0042**
	(0.0015)
Labor market experience = (4,5]	0.0057**
	(0.0018)
Labor market experience = (5,6]	0.0059**
	(0.0021)
Labor market experience = (6,7]	0.0065**
	(0.0022)
Labor market experience = (7,8]	0.0057*
	(0.0024)
Labor market experience = (8,9]	0.0063*
	(0.0027)
Labor market experience = (9,10]	0.0071*
	(0.0031)
Labor market experience = (10,Inf]	0.0073*
	(0.0033)
Worker ability × Labor market experience = (0,1]	0.0032***
	(0.0008)
Worker ability × Labor market experience = (1,2]	0.0072***
	(0.0012)
Worker ability × Labor market experience = (2,3]	0.0120***
	(0.0014)
Worker ability × Labor market experience = (3,4]	0.0157***

	(0.0017)
Worker ability × Labor market experience = (4,5]	0.0188***
	(0.0019)
Worker ability × Labor market experience = (5,6]	0.0194***
	(0.0021)
Worker ability × Labor market experience = (6,7]	0.0224***
	(0.0024)
Worker ability × Labor market experience = (7,8]	0.0224***
	(0.0026)
Worker ability × Labor market experience = (8,9]	0.0250***
	(0.0025)
Worker ability × Labor market experience = (9,10]	0.0283***
	(0.0027)
Worker ability × Labor market experience = (10,Inf]	0.0325***
	(0.0032)
log(firm size)	0.0472***
	(0.0008)
Employer number = 2	0.0030***
	(0.0005)
Employer number = 3	0.0040***
	(0.0007)
Employer number = 4	0.0067***
	(0.0009)
Fixed-effects	
Worker (1,059,991)	✓
Firm (207,074)	✓
Industry-year (332)	✓
Observations	8,055,023
R^2	0.9332

Notes: ***Significant at the 0.1% level; **significant at the 1% level; *significant at the 5% level; .significant at the 10% level. Estimates of eq. (9) based on the full sample of workers that are observed up from labor market entry. The dependent variable is an indicator that identifies observations at MNEs. 'Worker ability' refers to the worker fixed effects of an estimation of eq. (7); see Section 5.2. 'Labor market experience' refers to the number of years since a worker entered the labor market. Employer number refer to the cumulative number of distinct firms that a worker has been observed at, with one being the reference category. log(firm size) is the natural logarithm of the total number of (full-time) employees observed in a firm in a given year. Standard errors in parentheses are block-bootstrapped at the worker level (re-estimating worker fixed effects until convergence in all 100 iterations).