Supplemental Appendix for

How Border and Distance Effects Shape the Multinational Wage Premium

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In this Supplemental Appendix, we first provide a microfoundation of the labour supply curve in Section S.1 and present formal proofs of Propositions 3 and 4 in Sections S.2 and S.3, respectively. We then explore in Section S.4 the border and distance effects on the revenues of multinational firms to assess whether our model can also account for other firm-level patterns in the data. In a third step, we present in Section S.5 an extension of the two-country model outlined in Section III in which we show that our main results still hold when we add national producers without foreign market access as an additional firm type. We provide a detailed analysis of the industry and general equilibrium in Section S.6. In Section S.7, we present a quantitative analysis, using a calibrated version of our three-country model. Further descriptives, further estimation results, alternative forms of clustering standard errors, and evidence on recruitment cost differences between German plants are provided in Sections S.8 to S.11. Finally, in Section S.12, we present a list of countries hosting ultimate owners of German plants, in Section S.13, we provide further discussion of our border concept, in Section S.14, we show further details of the propensity score matching outlined in Section II.C, while in Section S.15 we contrast plant-level descriptives of the universe of plants in Germany with the sample of plants covered by the linked IEB-Orbis data.

S.1 A microfoundation for labour supply curve (6)

We assume that workers have a discrete choice between a set of firms and choose the employer that gives them the highest utility level. Suppressing country indices, indirect utility of workers employed in firm v is given by $u(v) = \ln w(v) + \varepsilon(v)$, where $\varepsilon(v)$ is a firm-specific idiosyncratic utility term. For a given level of $\varepsilon(v) = \varepsilon$, the probability that firm v is the employer offering the highest utility level (and thus is the firm chosen by the workers) is given by[1]

$$\text{Prob}\left[u(v) \geq \max_{v' \neq v} u(v') \Big| \varepsilon(v) = \varepsilon\right] = \prod_{v' \neq v} \text{Prob}\Big[\varepsilon(v') \leq \varepsilon + \ln w(v) - \ln w(v')\Big]. \tag{S.1}$$

Assuming $\varepsilon \in \mathrm{R}$ to be extreme value Gumbel distributed according to $F(\varepsilon, v) = \exp\left[-b(v)\exp(-\beta\varepsilon)\right]$, with $b(v), \beta$ as the location and the scale parameter of $F(\cdot)$, we compute

$$\begin{aligned}\text{Prob}&\left[u(v) \geq \max_{v' \neq v} u(v') \Big| \varepsilon(v) = \varepsilon\right] \\ &= \prod_{v' \neq v} \exp\left\{-\exp\left[-\Big(\varepsilon + \ln w(v) - \ln w(v')\Big)\beta - \ln b(v')\right]\right\}. \end{aligned} \tag{S.2}$$

[1] We illustrate the workers' problem for the case of a discrete set of firms and refer readers interested in an extension to a continuous choice set to Ben-Akiva et al. (1985).

Computing the unconditional probability over all possible realisations of $\varepsilon(v)$ then gives

$$\begin{aligned}\text{Prob}\left[u(v) \geq \max_{v'\neq v} u(v')\right] &= \int_{-\infty}^{\infty} \text{Prob}\left[u(v) \geq \max_{v'\neq v} u(v')\Big|\varepsilon(v) = \varepsilon\right] F_{\varepsilon}'(\varepsilon, v)d\varepsilon \\ &= b(v)\int_{-\infty}^{\infty} \exp\left\{-\exp(-\beta\varepsilon)\sum_{v'} \frac{b(v')w(v')^{\beta}}{w(v)^{\beta}}\right\}\beta\exp(-\beta\varepsilon)d\varepsilon. \end{aligned} \tag{S.3}$$

Substituting $x \equiv -\exp(-\beta\varepsilon)\sum_{v'} \frac{b(v')w(v')^{\beta}}{w(v)^{\beta}}$ and $dx = \beta x(v)d\varepsilon$, we obtain

$$\text{Prob}\left[u(v) \geq \max_{v'\neq v} u(v')\right] = \frac{b(v)w(v)^{\beta}}{\sum_v b(v)w(v)^{\beta}}\int_{-\infty}^{0} \exp(x)\,dx = \frac{b(v)w(v)^{\beta}}{\sum_v b(v)w(v)^{\beta}}. \tag{S.4}$$

Labour supply of firm v can then be computed as the product of the individual probability of a worker to select firm v in Eq. (S.4) with the mass of workers, L. Using the definition of W, which in the case of a discrete set of firms is given by $W = \sum_v b(v)w(v)^{\beta}$, and setting $B = L/W$ then establishes the labour supply curve in Eq. (6).

S.2 Proof of Proposition 3

We first define the auxiliary function $\tilde{\kappa}(\zeta) \equiv \tilde{\kappa}_n(\zeta)+\rho^{-\tilde{\gamma}-\zeta}\tilde{\kappa}_d(\zeta)$, with $\tilde{\kappa}_k(\zeta) \equiv 1-\frac{\tilde{\gamma}+\zeta}{2\tilde{\gamma}+\zeta}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}+\zeta}\right)$ and $\rho > 1$. Differentiating $\tilde{\kappa}_k(\zeta)$ gives $\tilde{\kappa}_k'(\zeta) = -[\tilde{\gamma}/(2\tilde{\gamma}-1)](1-\tilde{\Phi}^{2\tilde{\gamma}+\zeta}) + [(\tilde{\gamma}+\zeta)/(2\tilde{\gamma}+\zeta)]\tilde{\Phi}^{2\tilde{\gamma}+\zeta}\ln\tilde{\Phi} < 0$, which is sufficient for $\tilde{\kappa}(\zeta)$ to decrease in ζ. Making use of Eqs. (21) and (22), we can express ω_{he} as

$$\omega_{he} = \frac{\tilde{\kappa}(0)}{\tilde{\kappa}(1)}\tau_n\frac{2-\tau_n^{-\tilde{\gamma}-1}\tilde{\kappa}(1)}{2-\tau_n^{-\tilde{\gamma}}\tilde{\kappa}(0)}, \tag{S.5}$$

with $\rho \equiv \tau_d/\tau_n > 1$, and $\tilde{\kappa}(0) > \tilde{\kappa}(1)$, implying $\omega_{he} > 1$.

We next show under which condition we have $\omega_{ke} > 1$, $k = n, d$. For this purpose, we rewrite Eq. (23) as $\omega_{ke} = \tilde{\kappa}\tilde{K}_0(\tau_k)$, with

$$\tilde{\kappa} \equiv \frac{\tilde{\kappa}(0)}{\tilde{\kappa}(1)} > 1 \quad \text{and} \quad \tilde{K}_0(\tau_k) \equiv \frac{\tau_k - \tau_k^{1-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}+1}\right)\right]}{1-\tau_k^{-\tilde{\gamma}}\left[1-\frac{1}{2}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}}\right)\right]}. \tag{S.6}$$

According to Eqs. (A12) and (S.6), there is a close resemblance between ω_{fe} and ω_{ke}, with differences between the wage ratios arising from differences in the definitions of $\kappa(\zeta)$ and $\tilde{\kappa}(\zeta)$. In the limiting case of $F_n = F_d \equiv F$, we have $\tilde{\kappa} > \kappa(0)/\kappa(1)$, and in this case $\omega_{ke} > 1$ follows directly from the proof of Proposition 1. Due to differentiability of $\tilde{\kappa}$, the result of $\omega_{ke} > 1$ also extends to (small) differences between F_n and F_d. However, setting $\tau_n = 1$, $\tau_d = 1.01$ $\tilde{\Phi}_n = 0.9$, $\tilde{\Phi}_d = 0.99$, and $\tilde{\gamma} = 7$, we compute $\omega_{ne} = 0.998$, which shows that $\omega_{ke} < 1$ is possible in the three-country model. This completes the proof.

S.3 Proof of Proposition 4

We now contrast wage premia of domestic and foreign multinationals and compute from Eqs. (22) and (23)

$$\omega_{kh} \equiv \frac{\tau_k}{\tau_n} \frac{2-\tau_n^{-\tilde{\gamma}}\tilde{\kappa}(0)}{2-\tau_n^{-\tilde{\gamma}-1}\tilde{\kappa}(1)} \frac{1-\tau_k^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}+1}\right)\right]}{1-\tau_k^{-\tilde{\gamma}}\tilde{\kappa}_k(0)}. \tag{S.7}$$

We distinguish two cases. In the first one, we consider maximum trade cost dispersion and set $\tau_n \equiv 1$, $\tau_d \to \infty$ (and thus $\rho \to \infty$). In this case, we have $\chi_d = 1/2$, $\chi_n = \left(1-\tilde{\Phi}_n^{2\tilde{\gamma}}\right)/4$ and thus $\chi_d > \chi_n$. Moreover, we compute $\omega_{dh} = \infty$ and

$$\omega_{nh} = \frac{\tilde{\gamma}\left(3-\tilde{\Phi}_n^{2\tilde{\gamma}}\right)}{3\tilde{\gamma}+2-(\tilde{\gamma}+1)\tilde{\Phi}_n^{2\tilde{\gamma}+1}} \frac{1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}}{1-\tilde{\Phi}_n^{2\tilde{\gamma}}} \equiv \omega_{nh}^1. \tag{S.8}$$

It is easily verified that $\omega_{nh}^1 >,=,< 1$ if $\psi(\tilde{\Phi}_n) \equiv -2+2(\tilde{\gamma}+1)\tilde{\Phi}_n^{2\tilde{\gamma}}-(2\tilde{\gamma}-1)\tilde{\Phi}_n^{2\tilde{\gamma}+1}-\tilde{\Phi}_n^{4\tilde{\gamma}+1} >,=,< 0$. Accounting for $\psi'(\tilde{\Phi}_n) > (=) 0$ if $\tilde{\Phi}_n < (=) 1$ and for $\psi(1) = 0$, it follows that $\psi(\tilde{\Phi}_n) < 0$ if $\tilde{\Phi}_n < 1$.

We now turn to the second case, in which we show that an outcome with $\omega_{nh} < 1 \leq \omega_{dh}$ is consistent with $\chi_d < \chi_n$. For this purpose, we set $\chi_n = \chi_d$ to solve for $\rho = \left[\left(1+\tilde{\Phi}_d^{2\tilde{\gamma}}\right)/\left(1+\tilde{\Phi}_n^{2\tilde{\gamma}}\right)\right]^{1/\tilde{\gamma}} \equiv \rho_2$. We have $\rho_2 > (=) 1$ if $\tilde{\Phi}_d > (=) \tilde{\Phi}_n$. Setting $\rho = \rho_2$ establishes

$$\omega_{nh} = \frac{2-2\tau_n^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right)\right]}{2-\tau_n^{-\tilde{\gamma}-1}\left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right)\right]-\tau_n^{-\tilde{\gamma}-1}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]\left(\frac{1+\tilde{\Phi}_n^{2\tilde{\gamma}}}{1+\tilde{\Phi}_d^{2\tilde{\gamma}}}\right)^{\frac{\tilde{\gamma}+1}{\tilde{\gamma}}}} \equiv \omega_{nh}^2,$$

$$\omega_{dh} = \frac{\left(\frac{1+\tilde{\Phi}_d^{2\tilde{\gamma}}}{1+\tilde{\Phi}_n^{2\tilde{\gamma}}}\right)^{\frac{1}{\tilde{\gamma}}}\left\{2-2\tau_n^{-\tilde{\gamma}}\left(\frac{1+\tilde{\Phi}_n^{2\tilde{\gamma}}}{1+\tilde{\Phi}_d^{2\tilde{\gamma}}}\right)\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]\right\}}{2-\tau_n^{-\tilde{\gamma}-1}\left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right)\right]-\tau_n^{-\tilde{\gamma}-1}\left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]\left(\frac{1+\tilde{\Phi}_n^{2\tilde{\gamma}}}{1+\tilde{\Phi}_d^{2\tilde{\gamma}}}\right)^{\frac{\tilde{\gamma}+1}{\tilde{\gamma}}}} \equiv \omega_{dh}^2.$$

We first look at ω_{nh}^2 and consider the properties of $\Psi(\tilde{\Phi}_d) \equiv \left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right] \times \left(1+\tilde{\Phi}_d^{2\tilde{\gamma}}\right)^{-\frac{\tilde{\gamma}+1}{\tilde{\gamma}}}$. Differentiation yields (after rearranging terms) $\Psi'(\tilde{\Phi}_d) >,=,< 0$ if $(2\tilde{\gamma}+1)\tilde{\Phi}_d - \tilde{\Phi}_d^{2\tilde{\gamma}+1} - 2\tilde{\gamma} >,=,< 0$ and thus $\Psi'(\tilde{\Phi}_d) < (=) 0$ for $\tilde{\Phi}_d < (=) 1$. Acknowledging $\tilde{\Phi}_n \leq \tilde{\Phi}_d$, this implies $\Psi(\tilde{\Phi}_d) \leq \Psi(\tilde{\Phi}_n)$ and thus

$$\omega_{nh}^2 \leq \frac{1-\tau_n^{-\gamma}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right)\right]}{1-\tau_n^{-\gamma-1}\left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right)\right]} \equiv \tilde{\omega}_{nh}^2 < 1. \tag{S.9}$$

We next look at ω_{dh}^2. From the properties of $\Psi(\tilde{\Phi}_d)$, we know that

$$1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_n^{2\tilde{\gamma}+1}\right) \geq \left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]\left(\frac{1+\tilde{\Phi}_n^{2\tilde{\gamma}}}{1+\tilde{\Phi}_d^{2\tilde{\gamma}}}\right)^{\frac{\tilde{\gamma}+1}{\tilde{\gamma}}},$$

implying that

$$\omega_{dh}^2 \geq X^{\frac{1}{\tilde{\gamma}}} \frac{1-\tau_n^{-\tilde{\gamma}} X^{-1}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]}{1-\tau_n^{-\tilde{\gamma}-1} X^{-1-\frac{1}{\tilde{\gamma}}}\left[1-\frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1-\tilde{\Phi}_d^{2\tilde{\gamma}+1}\right)\right]} \equiv \tilde{\omega}_{dh}^2, \tag{S.10}$$

with $X \equiv (1+\tilde{\Phi}_d^{2\tilde{\gamma}})/(1+\tilde{\Phi}_n^{2\tilde{\gamma}})$. Accounting for $0 < \tilde{\Phi}_n \leq \tilde{\Phi}_d \leq 1$, we have $X \in [1,2)$. To determine the ranking of $\omega_{nh}^2, \omega_{dh}^2$, we can look at the limiting cases $\tilde{\Phi}_d = \tilde{\Phi}_n$ and $\tilde{\Phi}_d = 1, \tilde{\Phi}_n = 0$. In the first case, we have $X = 1$ and thus $\omega_{dh}^2 = \tilde{\omega}_{dh}^2 = \tilde{\omega}_{nh}^2 = \omega_{nh}^2$. In the second case, we have $X = 2$ and thus

$$\omega_{dh}^2 > \tilde{\omega}_{dh}^2 = 2^{\frac{2}{\tilde{\gamma}}} \frac{1-\tau_n^{-\tilde{\gamma}-1}/2}{2^{\frac{1}{\tilde{\gamma}}}-\tau_n^{-\tilde{\gamma}}/2} > 1 > \frac{2-\tau_n^{-\tilde{\gamma}}}{2-\tau_n^{-\tilde{\gamma}-1}} > \frac{1-\tau_n^{-\tilde{\gamma}} \frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}}{1-\tau_n^{-\tilde{\gamma}-1} \frac{\tilde{\gamma}}{2\tilde{\gamma}+1}} = \tilde{\omega}_{nh}^2 > \omega_{nh}^2. \tag{S.11}$$

This establishes $\omega_{dh}^2 > 1 > \omega_{nh}^2$. Noting finally that by an argument of continuity there must be a value of $X \in (1,2)$ such that $\omega_{dh}^2 = 1 > \omega_{nh}^2$ completes the proof.

S.4 Border and distance effects on firm size

In this extension, we explore the border and distance effects on the revenues of multinational firms. For this purpose, we follow the derivation steps for Eqs. (16) and (17), outlined in Appendix A.A3. We first compute the average revenues of home-market plants of multinationals according to

$$\mathbb{E}\left[r_h|\text{MNE}, h\right] = \frac{1}{\chi}\left\{\int_{\bar{c}/\mu}^{\bar{c}} r_h(c_h) d\Gamma_h(c_h) + \int_{\hat{c}}^{\bar{c}/\mu}\left(\frac{\mu c_h}{\bar{c}}\right)^{\gamma} r_h(c_h) d\Gamma_h(c_h)\right\}, \tag{S.12}$$

where $r_h = p_h q_h = A p_h^{1-\sigma}$ and

$$r_h = A\left(\frac{\sigma}{\sigma-1}\frac{1+\beta}{\beta}\left[\frac{\beta}{B} s c_h\right]^{\frac{1}{1+\beta}}\right)^{1-\sigma} \equiv r_h(c_h)$$

have been used, according to Eqs. (5) and (8). Then, substituting $r_h(c_h)/r_h(\bar{c}) = (c_h/\bar{c})^{\frac{1-\sigma}{1+\beta}}$ as well as $\hat{c}$ and Φ from Eq. (14), and making use of $\tilde{\Phi} = \Phi^{1/(1+\beta)}$, $\tilde{\gamma} = \gamma(1+\beta)$, and $\mu = \tau^{1+\beta}$ from the main text, we compute

$$\mathbb{E}\left[r_h|\text{MNE}, h\right] = \frac{r_h(\bar{c})}{\chi}\frac{\tilde{\gamma}}{\tilde{\gamma}+1-\sigma}\left\{1-\tau^{-(\tilde{\gamma}+1-\sigma)}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\right\}. \tag{S.13}$$

Similarly, we compute the average revenues of foreign-market plants of multinationals according to

$$\begin{aligned}\mathbb{E}\left[r_h|\text{MNE}, f\right] &= \frac{1}{\chi}\left\{\int_{\bar{c}/\mu}^{\bar{c}} \mathbb{E}\left[r_f(c_f)|c_f \leq \bar{c}\right] d\Gamma_h(c_h) + \int_{\hat{c}}^{\bar{c}/\mu}\left(\frac{\mu c_h}{\bar{c}}\right)^{\gamma} \mathbb{E}\left[r_f(c_f)|c_f \leq \mu c_h\right] d\Gamma_h(c_h)\right\} \\ &= \frac{r_h(\bar{c})}{\chi}\frac{\tilde{\gamma}}{\tilde{\gamma}+1-\sigma}\left\{1-\tau^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\right\},\end{aligned} \tag{S.14}$$

where

$$\mathbb{E}\left[r_f(c_f)|c_f \leq c_x\right] = \frac{r_f(c_x)}{\Gamma_f(c_x)}\int_0^{c_x}\left(\frac{c_f}{c_x}\right)^{\frac{1-\sigma}{1+\beta}} d\Gamma_f(c_f) = r_f(c_x)\frac{\tilde{\gamma}}{\tilde{\gamma}+1-\sigma} = r_h(c_x)\frac{\tilde{\gamma}}{\tilde{\gamma}+1-\sigma}$$

are average revenues of foreign subsidiaries with unit cost of appeal provision $c_f \leq c_x$ and $r_f(c_x) = r_h(c_x)$ is used due to the assumption of symmetric countries. Combining Eqs. (S.13) and (S.14) establishes

$$\rho_{fh} \equiv \frac{\mathbb{E}\left[r_h|\text{MNE}, f\right]}{\mathbb{E}\left[r_h|\text{MNE}, h\right]} = \frac{1-\tau^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]}{1-\tau^{-(\tilde{\gamma}+1-\sigma)}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]}. \tag{S.15}$$

To determine the properties of ρ_{fh}, we differentiate Eq. (S.15) with respect to τ. This gives $d\rho_{fh}/d\tau = \tilde{\gamma}\tau^{-\tilde{\gamma}-1}\left\{1-\tau^{-(\tilde{\gamma}+1-\sigma)}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\right\}R_0(\tau)$, with

$$R_0(\tau) \equiv 1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)-\tau^{\sigma-1}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\frac{\tilde{\gamma}+1-\sigma}{\tilde{\gamma}}\rho_{fh}.$$

It is easily confirmed that, holding ρ_{fh} constant, $R_0(\tau)$ decreases in τ. This is sufficient for $d^2\rho_{fh}/d\tau^2 < 0$ if $d\rho_{fh}/d\tau = 0$ and shows that if ρ_{fh} has an extremum in τ, this extremum must be unique and a maximum. Noting further that $\lim_{\tau\to 1}\rho_{fh} = \tilde{\gamma}/(\tilde{\gamma}+1-\sigma) > 1$ and thus $R_0(1) = -[(\sigma-1)/(\tilde{\gamma}+1-\sigma)]\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right) < 0$, while $\lim_{\tau\to\infty}\rho_{fh} = 1$ and thus $\lim_{\tau\to\infty}R_0(\tau) = -\infty$, it follows that $d\rho_{fh}/d\tau < 0$ and $\rho_{fh} > 1$ hold for all finite $\tau > 1$. Summing up, our model therefore produces a positive border effect and a negative distance effect on the revenues of subsidiaries of multinational firms.

We complete the formal discussion in this section by contrasting the expected revenues of foreign-market plants of multinationals with the expected total revenues of exporters, which can be computed according to

$$\begin{aligned}\mathbb{E}\left[r_h^T|\text{EXP}\right] &= \frac{1+\tau^{1-\sigma}}{1-\chi}\left\{\int_0^{\hat{c}} r_h(c_h)d\Gamma_h(c_h)\int_{\hat{c}}^{\bar{c}/\mu}\left[1-\left(\frac{\mu c_h}{\bar{c}}\right)^{\gamma}\right]r_h(c_h)d\Gamma_h(c_h)\right\}\\ &= \frac{(1+\tau^{1-\sigma})r_h(\bar{c})}{1-\chi}\frac{\tilde{\gamma}}{\tilde{\gamma}+1-\sigma}\tau^{-(\tilde{\gamma}+1-\sigma)}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]. \end{aligned} \tag{S.16}$$

We thus compute

$$\rho_{xf} \equiv \frac{\mathbb{E}\left[r_h^T|\text{EXP}\right]}{\mathbb{E}\left[r_h|\text{MNE}, f\right]} = \frac{\chi}{1-\chi}\frac{(1+\tau^{1-\sigma})\tau^{-\tilde{\gamma}+1-\sigma}\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]}{1-\tau^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]}. \tag{S.17}$$

Substituting $\chi = 1-\tau^{-\tilde{\gamma}}(1+\tilde{\Phi}^{2\tilde{\gamma}})/2$ from Eq. (15), we can postulate that $\rho_{xf} >,=,< 1$ if and only if $R_1(\tau,\tilde{\Phi}) >,=,< 0$, where

$$\begin{aligned}R_1(\tau,\tilde{\Phi}) = &\left(\tau^{\tilde{\gamma}}-\frac{1+\tilde{\Phi}^{2\tilde{\gamma}}}{2}\right)(\tau^{\sigma-1}+1)\left[1-\frac{\tilde{\gamma}+1-\sigma}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\\ &-\frac{1+\tilde{\Phi}^{2\tilde{\gamma}}}{2}\left\{1-\tau^{-\tilde{\gamma}}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}+1-\sigma}\left(1-\tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right]\right\}.\end{aligned}$$

We first evaluate $R_1(\tau, \tilde{\Phi})$ at the limiting case $\tilde{\Phi} = 0$, which yields

$$R_1(\tau, 0) = \left(\tau^{\tilde{\gamma}} - \frac{1}{2}\right)(\tau^{\sigma-1} + 1)\frac{\tilde{\gamma}}{2\tilde{\gamma} + 1 - \sigma} - \frac{1}{2}\left[1 - \tau^{-\tilde{\gamma}}\frac{\tilde{\gamma} + 1 - \sigma}{2\tilde{\gamma} + 1 - \sigma}\right].$$

Noting that $R_1(1, 0) = (1/2)\tilde{\gamma}/(2\tilde{\gamma} + 1 - \sigma) > 0$ and that

$$\frac{dR_1(\tau, 0)}{d\tau} = \frac{\tau^{-\tilde{\gamma}-1}}{2}\frac{\tilde{\gamma}}{2\tilde{\gamma} + 1 - \sigma}\left[2\tilde{\gamma}\tau^{2\tilde{\gamma}}\left(\tau^{\sigma-1} + 1\right) + (\sigma - 1)\tau^{\tilde{\gamma}+\sigma-1}\left(2\tau^{\tilde{\gamma}} - 1\right) - \tilde{\gamma} + \sigma - 1\right] > 0,$$

we conclude that $R_1(\tau, 0) > 0$ for all $\tau > 1$. We next evaluate $R_1(\tau, \tilde{\Phi})$ at the limiting case $\tilde{\Phi} = 1$, obtaining $R_1(\tau, 1) = (\tau^{\tilde{\gamma}} - 1)(\tau^{\sigma-1} + 1) - 1 + \tau^{-\tilde{\gamma}}$. Since $R_1(1, 1) = 0$ and

$$\frac{dR_1(\tau, 1)}{d\tau} = \tau^{-\tilde{\gamma}-1}\left[\tau^{2\tilde{\gamma}}(\tau^{\sigma-1} + 1) + (\sigma - 1)\tau^{\tilde{\gamma}+\sigma-1}(\tau^{\tilde{\gamma}} - 1) - \tilde{\gamma}\right] < 0,$$

it follows that $R_1(\tau, 1) > (=)0$ if $\tau > (=)1$.

We finally differentiate $R_1(\tau, \tilde{\Phi})$ with respect to $\tilde{\Phi}$ and obtain $\partial R_1(\cdot)/\partial\tilde{\Phi} = \tilde{\gamma}\tilde{\Phi}^{2\tilde{\gamma}-1}\overline{R}_1(\tau, \tilde{\Phi})$, where

$$\begin{aligned}\overline{R}_1(\tau, \tilde{\Phi}) \equiv & -\left(\tau^{\sigma-1} + 1\right)\left[1 - \frac{\tilde{\gamma} + 1 - \sigma}{2\tilde{\gamma} + 1 - \sigma}\left(1 - \tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right] + \frac{\tilde{\gamma} + 1 - \sigma}{\tilde{\gamma}}\tilde{\Phi}^{1-\sigma}\left(\tau^{\tilde{\gamma}} - \frac{1 + \tilde{\Phi}^{2\tilde{\gamma}}}{2}\right)(\tau^{\sigma-1} + 1) \\ & - 1 + \tau^{-\tilde{\gamma}}\left[1 - \frac{\tilde{\gamma}}{2\tilde{\gamma} + 1 - \sigma}\left(1 - \tilde{\Phi}^{2\tilde{\gamma}+1-\sigma}\right)\right] + \tau^{-\tilde{\gamma}}\tilde{\Phi}^{1-\sigma}\frac{1 + \tilde{\Phi}^{2\tilde{\gamma}}}{2},\end{aligned}$$

$$\begin{aligned}\frac{d\overline{R}_1(\tau, \tilde{\Phi})}{d\tilde{\Phi}} = \tilde{\Phi}^{-\sigma}\Bigg\{ & -\left(\tau^{\sigma-1} + 1\right)(\tilde{\gamma} + 1 - \sigma)\left[\tilde{\Phi}^{2\tilde{\gamma}}\left(1 + \frac{2\tilde{\gamma} + 1 - \sigma}{2\tilde{\gamma}}\right) + \frac{\sigma - 1}{\tilde{\gamma}}\tau^{\tilde{\gamma}}\right] \\ & + \tau^{-\tilde{\gamma}}\left[\tilde{\gamma}\tilde{\Phi}^{2\tilde{\gamma}}\left(1 + \frac{2\tilde{\gamma} + 1 - \sigma}{2\tilde{\gamma}}\right) - (\sigma - 1)\right]\Bigg\},\end{aligned}$$

and $d^2\overline{R}_1(\tau, \tilde{\Phi})/d\tilde{\Phi}^2|_{d\overline{R}_1(\tau,\tilde{\Phi})/d\tilde{\Phi}=0} > 0$. Hence, if $\overline{R}_1(\tau, \tilde{\Phi})$ has an extremum in $\tilde{\Phi}$, it must be a minimum. To determine whether such an extremum exists, we rewrite $d\overline{R}_1(\tau, \tilde{\Phi})/d\tilde{\Phi} = \tilde{\Phi}^{-\sigma}[a(\tau)\tilde{\Phi}^{2\tilde{\gamma}} - b(\tau)]$, where $a(\tau) \equiv (4\tilde{\gamma} + 1 - \sigma)[\tilde{\gamma}\tau^{-\tilde{\gamma}} - (\tau^{\sigma-1} + 1)(\tilde{\gamma} + 1 - \sigma)]/(2\tilde{\gamma})$ and $b(\tau) \equiv (\sigma - 1)[(\tau^{\sigma-1} + 1)(\tilde{\gamma} + 1 - \sigma)\tau^{\tilde{\gamma}}/\tilde{\gamma} + \tau^{-\tilde{\gamma}}]$. Since $d\overline{R}_1(\tau, 0)/d\tilde{\Phi} < 0$, a necessary condition for $\overline{R}_1(\tau, \tilde{\Phi})$ to have a minimum is $\tilde{\gamma}\tau^{-\tilde{\gamma}} > (\tau^{\sigma-1} + 1)(\tilde{\gamma} + 1 - \sigma)$. Evaluating $\overline{R}_1(\tau, \tilde{\Phi})$ at $\tilde{\Phi} = 1$ and imposing this condition yields $\overline{R}_1(\tau, 1) < -(\tau^{\sigma-1} + 1)(2\tilde{\gamma} + 1 - \sigma)/\tilde{\gamma} + 2\tau^{-\tilde{\gamma}} < 0$.

Noting finally that $\lim_{\tilde{\Phi}\downarrow 0}\overline{R}_1(\tau, \tilde{\Phi}) = \infty$, we conclude that $\overline{R}_1(\tau, \tilde{\Phi})$ is either positive for all $\tilde{\Phi} \in (0, 1)$ or positive for small values of $\tilde{\Phi}$ and negative for large ones. In both cases, $R_1(\tau, \tilde{\Phi})$ is positive for all $\tilde{\Phi} \in (0, 1)$, given that $R_1(\tau, 0) > 0$ and $R_1(\tau, 1) > (=)0$. This establishes that total revenues of exporters exceed the revenues of foreign-market plants of multinationals, which in turn exceed those of home-market plants of multinationals.[2]

[2]Owing to its parsimonious structure, the baseline model is not designed to replicate the firm size patterns documented in Table S.3, which confirm the widely observed empirical regularity that multinational firms are larger than non-multinational firms, including exporters (see Keller and Yeaple, 2013; Antràs and Yeaple, 2014). To reconcile the model with these size patterns, one can extend it to allow for two-sided firm heterogeneity. In particular, introducing heterogeneity in consumer perceptions of varieties generates an additional demand-side dimension of firm heterogeneity. We show in an extension that, under sufficiently strong correlation between demand- and cost-side heterogeneity, the model can reproduce the empirical pattern of multinational plants earning higher average revenues than exporters, while preserving the wage profile results derived in Section III. For interested readers, the formal details of this extension are available upon request.

S.5 Existence of national producers

In this extension, we show that the results from Section III are robust to the existence of national producers (superscript ℓ for local), who do not have access to the foreign market. We assume that national firms use a different technology and have to employ $1/\zeta > 1$ units of labour to produce one unit of output. Except for their lack of access to foreign markets and their lower productivity, national producers are identical to exporters and multinationals and face the demand and supply curves from Eqs. (5) and (6), respectively. Accordingly, their wage function is still given by Eq. (8), whereas their price-setting rule and operating profits reflect the productivity disadvantage:

$$p^{\ell}(c_h) = \frac{\sigma}{\sigma - 1} \frac{1+\beta}{\beta} \frac{w(c_h)}{\zeta}, \qquad \pi^{\ell}(c_h) = \pi^m(c_h)\zeta^{\sigma-1}. \tag{S.18}$$

The zero-cutoff profit condition for the least profitable national firm is then given by $s = \pi^m(\bar{c}^{\ell})\zeta^{\sigma-1}$. Making use of Eq. (12), this condition allows us to compute

$$\frac{\bar{c}^{\ell}}{\bar{c}} = \left[(1+F)\frac{\gamma(1+\beta) - \sigma + 1}{2\gamma(1+\beta) - \sigma + 1}\right]^{\frac{1+\beta}{\sigma-1}} \zeta^{1+\beta}. \tag{S.19}$$

Ceteris paribus, national firms make lower profits than multinational firms. Therefore, their cost for appeal provision must be sufficiently small to compensate them for both, the lack of profits from foreign sales and their productivity disadvantage. Intuitively, $\bar{c}^{\ell}/\bar{c} < 1$ is therefore achieved for a sufficiently low ζ.

The average wage paid by national firms can be computed according to

$$\mathbb{E}[w|\text{NAT}] = \int_0^{\bar{c}^{\ell}} w(c_h) d\Gamma_h(c_h) = w(\bar{c}) \frac{\tilde{\gamma}}{\tilde{\gamma}+1} \left(\frac{\bar{c}^{\ell}}{\bar{c}}\right)^{\frac{\tilde{\gamma}+1}{1+\beta}}, \tag{S.20}$$

where $\tilde{\gamma} = \gamma(1+\beta)$. Making use of Eq. (15) and (A10), we can then express the ratio of average wage paid by national firms and exporters as follows

$$\frac{\mathbb{E}[w|\text{NAT}]}{\mathbb{E}[w|\text{EXP}]} = \tau \frac{1 - \frac{1}{2}\left(1 - \tilde{\Phi}^{2\tilde{\gamma}}\right)}{1 - \frac{\tilde{\gamma}+1}{2\tilde{\gamma}+1}\left(1 - \tilde{\Phi}^{2\tilde{\gamma}+1}\right)} \left(\frac{\bar{c}^{\ell}}{\bar{c}}\right)^{\frac{\tilde{\gamma}+1}{1+\beta}} \equiv \omega_{\ell e}, \tag{S.21}$$

with $\tilde{\Phi} = \Phi^{1/(1+\beta)}$. It is immediate that $\omega_{\ell e}$ increases in productivity parameter ζ. If ζ is sufficiently small, we have $\omega_{\ell e} < 1$. The ratio of average wages paid by home-market and foreign-market plants of multinationals relative to national firms then follow as $\omega_{h\ell} \equiv \omega_{he}/\omega_{\ell e}$ and $\omega_{f\ell} = \omega_{fe}/\omega_{\ell e}$, respectively. This allows us to formulate the following conclusion. Multinationals pay higher wages than both types of non-multinationals, i.e. $\omega_{he}, \omega_{h\ell} > 1$ and $\omega_{fe}, \omega_{f\ell} > 1$, if the productivity of national firms is sufficiently small.

S.6 Industry and general equilibrium

In what follows, we provide a formal discussion on how to close our model in the industry and the general equilibrium. We thereby focus on the three-country model outlined in Section IV, noting that the two-country model of Section III is captured by the limiting case in which $\tau_n = \tau_d \equiv \tau$

and $F_n = F_d \equiv F$. To solve for the industry equilibrium, we assume that firms have to make the investment sF_e up front, which gives them a single draw of c_h from distribution $\Gamma(c_h) = (c_h/c_0)^\gamma$, where c_0 is the upper bound of the cost distribution. Depending on the realisation of c_h firms then choose to produce or stay out of the market, with firms featuring high realisations of c_h opting for foreign investment and multinational production (see Sections III and IV). Firms choose to make the upfront payment of sF_e only if their expected profit – the expected operating profit minus expected fixed costs of production and foreign investment – exceeds this payment.

To determine expected profits prior to the payment of sF_e, we first determine economy-wide operating profits Π. The total of operating profits of all exporters can be computed according to

$$\Pi^e = \frac{M}{2} \sum_{k=d,n} \left\{ \int_{\hat{c}_k}^{\bar{c}/\mu_k} \left[1 - \left(\frac{\mu_k c_h}{\bar{c}} \right)^\gamma \right] \pi^e(c_h) d\Gamma_h(c_h) + \int_0^{\hat{c}_k} \pi^e(c_h) d\Gamma_h(c_h) \right\},$$

where $[\mu_k c_h/(\bar{c})]^\gamma$ is the ex ante probability of drawing $c_f < \mu_k c_h$ when investing in foreign country k and M is the total mass of firms with headquarters in h. Making use of Eqs. (10) and (14), we compute

$$\Pi^e = M\pi^m(\bar{c}) \frac{\tilde{\gamma}}{\tilde{\gamma} - \sigma + 1} \frac{1}{2} \sum_{k=d,n} \left(1 + \tau_k^{1-\sigma} \right) \tau_k^{-(\tilde{\gamma}-\sigma+1)} \left[1 - \frac{\tilde{\gamma} - \sigma + 1}{2\tilde{\gamma} - \sigma + 1} \left(1 - \tilde{\Phi}_k^{2\tilde{\gamma}-\sigma+1} \right) \right],$$

where $\tau_k = \mu_k^{1/(1+\beta)}$, $\tilde{\Phi}_k = \Phi_k^{1/(1+\beta)}$, and $\tilde{\gamma} = \gamma(1+\beta)$ have been used.

Moreover, total operating profits of multinationals in their home-market plants are given by

$$\Pi_h^m = \frac{M}{2} \sum_{k=d,n} \left\{ \int_{\bar{c}/\mu_k}^{\bar{c}} \pi^m(c_h) d\Gamma_h(c_h) + \int_{\hat{c}_k}^{\bar{c}/\mu_k} \left(\frac{\mu_k c_h}{\bar{c}} \right)^\gamma \pi^m(c_h) d\Gamma_h(c_h) \right\},$$

which making use of Eqs. (10) and (14) can be solved for

$$\Pi_h^m = M\pi^m(\bar{c}) \frac{\tilde{\gamma}}{\tilde{\gamma} - \sigma + 1} \left\{ 1 - \frac{1}{2} \sum_{k=d,n} \tau_k^{-(\tilde{\gamma}-\sigma+1)} \left[1 - \frac{\tilde{\gamma} - \sigma + 1}{2\tilde{\gamma} - \sigma + 1} \left(1 - \tilde{\Phi}_k^{2\tilde{\gamma}-\sigma+1} \right) \right] \right\}.$$

Finally, total operating profits of multinationals in their foreign-market plants are given by

$$\Pi_f^m = \frac{M}{2} \sum_{k=d,n} \left\{ \int_{\bar{c}/\mu_k}^{\bar{c}} \mathbb{E}\left[\pi^m(c_k) \middle| c_k \leq \bar{c} \right] d\Gamma_h(c_h) + \int_{\hat{c}_k}^{\bar{c}/\mu_k} \left(\frac{\mu_k c_h}{\bar{c}} \right)^\gamma \mathbb{E}\left[\pi^m(c_k) \middle| c_k \leq \mu_k c_h \right] d\Gamma_h(c_h) \right\},$$

with $\mathbb{E}\left[\pi^m(c_k) \middle| c_k \leq c_x \right] = \pi^m(c_x)\tilde{\gamma}/(\tilde{\gamma} - \sigma + 1)$. Making use of Eqs. (10) and (14), we compute

$$\Pi_f^m = M\pi^m(\bar{c}) \frac{\tilde{\gamma}}{\tilde{\gamma} - \sigma + 1} \left\{ 1 - \frac{1}{2} \sum_{k=d,n} \tau_k^{-\tilde{\gamma}} \left[1 - \frac{\tilde{\gamma}}{2\tilde{\gamma} - \sigma + 1} \left(1 - \tilde{\Phi}_k^{2\tilde{\gamma}-\sigma+1} \right) \right] \right\}.$$

Adding up operating profits over the different firm types, we obtain for the economy-wide operating profits

$$\Pi = M\pi^m(\bar{c}) \frac{\tilde{\gamma}}{\tilde{\gamma} - \sigma + 1} \bar{\Pi}_0, \tag{S.22}$$

with

$$\bar{\Pi}_0 \equiv 2 + \frac{\sigma - 1}{2\tilde{\gamma} - \sigma + 1} \frac{1}{2} \sum_{k=d,n} \tau_k^{-\tilde{\gamma}} \left(1 - \tilde{\Phi}_k^{2\tilde{\gamma}-\sigma+1}\right). \tag{S.23}$$

Average profits of active firms, $\bar{\psi}$, are then obtained by subtracting from Π/M average firm-level fixed costs of foreign investment and production, $(s/2)\sum_{k=d,n} F_k\left[1 - (\hat{c}_k/\overline{c})^{\gamma}\right]$ and s, respectively. Making use of Eqs. (11), (12), and (20) to substitute for $\pi^m(\overline{c})$ and $\hat{c}_k/\overline{c}$, we compute[3]

$$\bar{\psi} = \frac{s(1+F)(\sigma-1)}{2\tilde{\gamma}-\sigma+1}\left[1 + \frac{1}{2}\sum_{k=d,n}\tau_k^{-\tilde{\gamma}}\left(\frac{\tilde{\gamma}}{2\tilde{\gamma}-\sigma+1} + \frac{\tilde{\gamma}+\sigma-1}{2\tilde{\gamma}-\sigma+1}\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma+1}\right)\right]. \tag{S.24}$$

Setting $\Gamma(\overline{c})\bar{\psi} = sF_e$, we can explicitly solve for $\overline{c}$, with $\overline{c}/c_0 < 1$ requiring a sufficiently low F_e.

We next determine industry-wide W as the sum of $b^m(c_h)w(c_h)^{\xi}$ over all local producers (including the foreign plants of foreign multinationals). Thereby, we use superscript m to denote appeal of multinational producers. From Eq. (9), we compute for exporters

$$\begin{aligned} W^e &= Mb^m(\overline{c})w(\overline{c})^{\beta}\sum_{k=d,n}\frac{1+\tau_k^{1-\sigma}}{2}\left\{\int_{\hat{c}_k}^{\overline{c}/\mu_k}\left[1-\left(\frac{\mu_k c_h}{\overline{c}}\right)^{\gamma}\right]\left(\frac{c_h}{\overline{c}}\right)^{-\frac{\sigma}{1+\beta}} d\Gamma_h(c_h) + \int_0^{\hat{c}_k}\left(\frac{c_h}{\overline{c}}\right)^{-\frac{\sigma}{1+\beta}} d\Gamma_h(c_h)\right\} \\ &= Mb^m(\overline{c})w(\overline{c})^{\beta}\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma}\frac{1}{2}\sum_{k=d,n}(1+\tau_k^{1-\sigma})\tau_k^{-(\tilde{\gamma}-\sigma)}\left[1-\frac{\tilde{\gamma}-\sigma}{2\tilde{\gamma}-\sigma}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma}\right)\right]. \end{aligned}$$

In a similar vein, we compute for home market plants of multinationals

$$\begin{aligned} W_h^m &= Mb^m(\overline{c})w(\overline{c})^{\beta}\frac{1}{2}\sum_{k=d,n}\left[\int_{\overline{c}/\mu_k}^{\overline{c}}\left(\frac{c_h}{\overline{c}}\right)^{-\frac{\sigma}{1+\beta}} d\Gamma_h(c_h) + \int_{\hat{c}_k}^{\overline{c}/\mu_k}\left(\frac{\mu_k c_h}{\overline{c}}\right)^{\gamma}\left(\frac{c_h}{\overline{c}}\right)^{-\frac{\sigma}{1+\beta}} d\Gamma_h(c_h)\right] \\ &= Mb^m(\overline{c})w(\overline{c})^{\beta}\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma}\left\{1-\frac{1}{2}\sum_{k=d,n}\tau_k^{-(\tilde{\gamma}-\sigma)}\left[1-\frac{\tilde{\gamma}-\sigma}{2\tilde{\gamma}-\sigma}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma}\right)\right]\right\}, \end{aligned}$$

while we have for foreign plants of foreign multinationals

$$\begin{aligned} W_f^m = M\frac{1}{2}\sum_{k=d,n}\Bigg\{&\int_{\overline{c}/\mu_k}^{\overline{c}}\mathbb{E}\left[b^m(c_k)w(c_k)^{\beta}\middle|c_k \le \overline{c}\right] d\Gamma_h(c_h) \\ &+ \int_{\hat{c}_k}^{\overline{c}/\mu_k}\left(\frac{\mu_k c_h}{\overline{c}}\right)^{\gamma}\mathbb{E}\left[b^m(c_k)w(c_k)^{\beta}\middle|c_k \le \mu_k c_h\right] d\Gamma_h(c_h)\Bigg\}, \end{aligned}$$

with

$$\mathbb{E}\left[b^m(c_k)w(c_k)^{\beta}\middle|c_k \le c_x\right] = b^m(c_x)w(c_x)^{\beta}\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma}.$$

Therefore, we compute

$$W_f^m = Mb^m(\overline{c})w(\overline{c})^{\beta}\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma}\left\{1-\frac{\tau_k^{-\tilde{\gamma}}}{2}\left[1-\frac{\tilde{\gamma}}{2\tilde{\gamma}-\sigma}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma}\right)\right]\right\}.$$

[3]We use Eqs. (11) and (20) to determine $sF_k(\hat{c}_k/\overline{c})^{\gamma} = \pi^m(\overline{c})[(\sigma-1)/(\gamma-\sigma+1)]\tau_k^{-\tilde{\gamma}}\tilde{\Phi}^{2\tilde{\gamma}-\sigma+1}$. Moreover, we use Eq. (12) to determine $\pi^m(\overline{c}) = s(1+F)(\tilde{\gamma}-\sigma+1)/[2\tilde{\gamma}-\sigma+1]$, with $F = (F_n+F_d)/2$.

Adding up over the three different firm types, we then obtain

$$W = Mb^m(\bar{c})w(\bar{c})^{\beta}\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma}\bar{W}_0, \tag{S.25}$$

with

$$\bar{W}_0 \equiv 2 + \frac{1}{2}\sum_{k=d,n}\tau_k^{-\tilde{\gamma}}\left\{(\tau_k - 1)\left[1 - \frac{\tilde{\gamma}-\sigma}{2\tilde{\gamma}-\sigma}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma}\right)\right] + \frac{\sigma}{2\tilde{\gamma}-\sigma}\left(1-\tilde{\Phi}_k^{2\tilde{\gamma}-\sigma}\right)\right\} > 1.$$

Substituting into Eq. (6) and accounting for $B = L/W$ finally establishes

$$l^m(\bar{c}) = \frac{L}{M}\frac{\tilde{\gamma}-\sigma}{\tilde{\gamma}}\frac{1}{\bar{W}_0}. \tag{S.26}$$

For the general equilibrium, we consider an Ethier (1982)-type model in which the differentiated products available in each country are assembled to a homogeneous final good, using a textbook linear-homogenous production function with a constant elasticity of substitution between varieties. The homogeneous final good is freely tradable between the two countries at zero costs and serves as the numéraire. This implies that aggregate revenues equal economy-wide output of the homogeneous final good: $\sigma\Pi = Y$.[4] Moreover, we assume that the final good serves as the fixed input, establishing $s = 1$. Since prices are set as a constant multiple of wages, according to Eq. (8) and since one unit of labour input produces one unit of output of the differentiated good, we have for the least profitable firm $w(\bar{c}) = (\sigma-1)[\beta/(1+\beta)]\pi^m(\bar{c})/l^m(\bar{c})$. Making use of $A = Y = \sigma\Pi$, we can express operating profits of the least profitable producer as $\pi^m(\bar{c}) = \Pi\left[\sigma\pi^m(\bar{c})/l^m(\bar{c})\right]^{1-\sigma}$. Substituting $\Pi, l^m(\bar{c})$ from above then allows us to solve for the mass of firms with headquarters in h according to

$$M = \left[\frac{L}{\bar{W}_0}\frac{1}{\sigma\pi^m(\bar{c})}\frac{\tilde{\gamma}-\sigma}{\tilde{\gamma}}\left(\frac{\tilde{\gamma}}{\tilde{\gamma}-\sigma+1}\bar{\Pi}_0\right)^{\frac{1}{\sigma-1}}\right]^{\frac{\sigma-1}{\sigma-2}}, \tag{S.27}$$

where $\pi^m(\bar{c})$ is given by Eq. (12). Thereby, $\sigma > 2$ is assumed to guarantee stability of the general equilibrium. This completes the formal discussion of the industry and the general equilibrium.

S.7 A quantitative analysis

In this section, we calibrate key model parameters, using a methods-of-moments (just-identified GMM) estimator that minimizes the distance between variables observed for 2015 in our merged IEB-Orbis dataset and their theoretical counterparts. We then use the calibrated version of our three-country model to shed light on changes in the fractions of multinationals and their wage premia over time.

Parameter calibration and model fit:

Since we are unable to estimate all relevant model parameters, we impose three assumptions and set *(i.)* $\tau_n = 1$, implying that trade costs with nearby countries are zero; *(ii.)* $\tilde{\Phi}_d = 1$, implying

[4] The finding that operating profits are a constant fraction $1/\sigma$ of a firm's revenues follows from the proof in Appendix A.A1.

that the fixed costs of foreign investment in distant countries are at the maximum possible level admitted by our model; and *(iii.)* $\sigma = 5$, imposing a trade elasticity in absolute terms of 4, which is in the range of parameter estimates reported in the literature (see Costinot and Rodriguez-Clare, 2014, for an overview). We then determine values for the two fundamental parameters $\tilde{\gamma}$ and τ_d as well as for the composite term $\tilde{\Phi}_n$ using the minimum distance estimator

$$\underset{\{\tilde{\gamma},\tau_d,\tilde{\Phi}_n\}}{\arg\min}\ \mathbf{m}'\mathbf{W}\mathbf{m}, \tag{S.28}$$

where $\mathbf{m}$ is a 3x1 vector of the moment conditions and $\mathbf{W}$ is a 3x3 positive semi-definite weighting matrix. We specify our moment conditions as the difference between observed (o) and computed values, respectively, for the following three variables:

1. the wage premium of German multinationals, with $m_1 \equiv \omega^o_{he} - \omega_{he}$ and ω_{he} determined by Eq. (22);

2. the number of German plants owned by foreign MNEs from nearby relative to the number of German-owned plants, with $m_2 \equiv \chi^o_n - \chi_n$ and χ_n determined by Eq. (21);

3. the number of German plants owned by foreign MNEs from far away relative to the number of German-owned plants, with $m_3 \equiv \chi^o_d - \chi_d$ and χ_d determined by Eq. (21).

Since the parameter triple $\{\tilde{\gamma}, \tau_d, \tilde{\Phi}_n\}$ is just-identified by the solution to problem (S.28), the weighting matrix is irrelevant, and we can therefore set $\mathbf{W}$ equal to the identity matrix.

Our parameter estimates are listed in the first four columns of Table S.1. We find that the 2015 trade costs between Germany and distant countries are only slightly larger than the trade costs between Germany and nearby countries, which we have normalised to zero. An estimate of $\tilde{\Phi}_n < 1$ indicates that the fixed cost of foreign investment is lower in nearby than in distant countries. With the assumed value of $\sigma = 5$ we can explicitly solve for these fixed costs and obtain values of $F_n = 0.327$ and $F_d = 0.405$, respectively. Thereby, F_k can be interpreted as the foreign investment cost in country $k = n, d$ *relative* to the fixed cost of production (with the latter normalised to one in our model).

Table S.1: *Calibration of model parameters*

$\tilde{\gamma}$	τ_d	$\tilde{\Phi}_n$	F_n	F_d
6.741	1.055	0.925	0.327	0.405
(0.260)	(0.003)	(0.004)	(0.022)	(0.021)

Notes: Parameter values $\tilde{\gamma}, \tau_d$, and $\tilde{\Phi}_n$ are determined using the minimum distance estimator in Eq. (S.28). Observed moments refer to year 2015, and multinational wage premia are estimated relying on Model (1) of Table 3. Parameters F_n, F_d follow from setting $\sigma = 5$ and combining estimated $\tilde{\Phi}_n$ as well as imposed $\tilde{\Phi}_d = 1$ with the definition of Φ_k in Eq. (20). Standard errors in parentheses are computed from 50 bootstrapped samples of our database.

Based on the parameter values in Table S.1, we evaluate in a next step the model fit by predicting the multinational wage premium ω_{he} for other years of our sample period. We thereby proceed as follows. We use observed fractions of foreign multinationals χ_n and χ_d and compute for these observables time-specific values of τ_d and $\tilde{\Phi}_n$ according to Eq. (21), keeping $\tau_n = 1$ and $\tilde{\Phi}_d = 1$ constant.[5] We then use the thus determined parameter values to predict the wage premium paid by German plants of domestic multinationals, making use of Eq. (22). The respective predictions and their observed counterparts are reported for the years 2013 to 2017 in Table S.2.[6]

Table S.2: *Predicted and observed multinational wage premia for selected years*

ω_{he}	2013	2014	2015	2016	2017
observed	1.176	1.187	1.179	1.168	1.169
computed	1.174	1.178	1.179	1.178	1.178

Overall, our model does a good job in capturing the wage premium paid by domestic multinationals. However, it underpredicts the variation of this wage premium over time. Presumably, this happens because imputing trade cost changes, which in turn determine changes in the multinational wage premia, from observed changes in the share of multinationals via Eq. (21) is putting a lot of structure on our data. In a next step, rather than imputing trade cost changes, we estimate them following existing empirical work.

Observed changes in trade costs and predicted multinational wage premia:

We consider the period 1997 to 2015 and estimate trade cost changes during this period following Novy (2013) and Duval et al. (2015). We combine data on trade flows and production levels from the OECD Trade in Value Added database and compute a symmetric trade cost parameter between countries i and j in period t according to

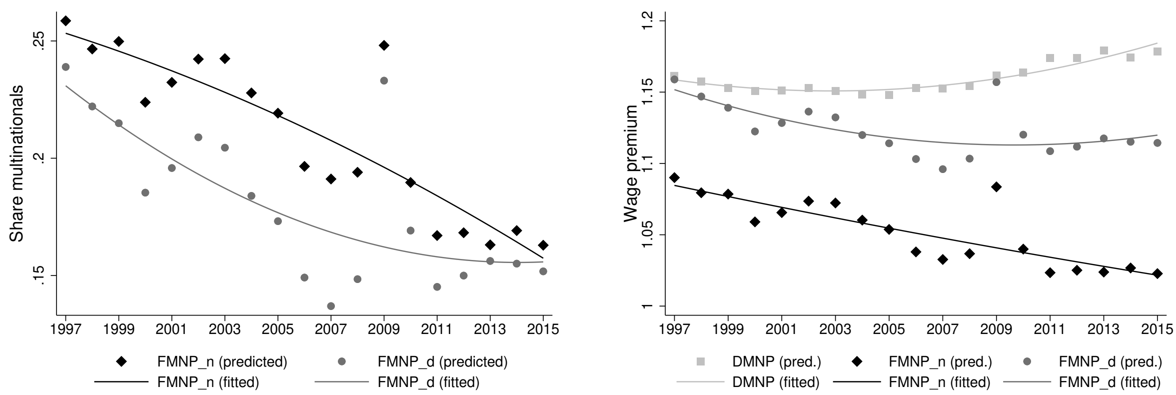
$$\tau_{ijt} = \left(\frac{x_{iit} x_{jjt}}{x_{ijt} x_{jit}} \right)^{\frac{1}{2(1-\sigma)}}, \tag{S.29}$$

where x_{iit} is the value of country i production sold domestically in period t and x_{ijt} are the imports of country i production by country j in period t. In line with our parametrisation, we set $\sigma = 5$ and compute import-weighted averages of German trade costs with neighbouring and distant countries, associated with τ_{nt} and τ_{dt} in our model. We then use these estimates to compute trade cost changes over the years 1997 to 2015 and observe for these almost two decades a decline in the trade costs with nearby and distant countries of 4.8 and 4.2 percentage points, respectively. To ensure consistency of trade costs with our empirical results, we set τ_{n2015} equal to one, implying for $\tilde{\Phi}_n = 0.925$ that χ_n equals its observed level in 2015. Moreover, we set τ_{d2015} equal to its calibrated level of 1.055, implying for $\Phi_d = 1$ that χ_d equals its observed level in 2015.

To study theory-consistent effects of the changes in trade costs between 1997 and 2015, we consider the estimated changes in the trade costs with nearby and distant countries, τ_{nt}, τ_{dt}. We report the results from this quantitative analysis in Figure S.1. In the left panel, we see that the observed changes in τ_n, τ_d reduce the shares of distant and nearby foreign multinationals, with the decline of the former somewhat more pronounced in earlier years and the decline of the latter

[5] For given $\tilde{\Phi}_d = 1$, changes in $\tilde{\Phi}_n$ require simultaneous adjustments of F_n and F_d, according to the definition of Φ_k in Eq. (20).

[6] For 2015, ω_{he} has been used as targeted wage premium in our minimum distance estimation, and hence its computed and observed values coincide by construction.



Notes: Solid lines represent the outcome of fractional polynomial regressions and are added to make the plots easier readable. FMNP_n, FMNP_d refers to foreign multinational parents from nearby or distant countries, respectively. DMNP refers to multinational parents from Home.

Figure S.1: *Effects of trade costs on the shares of multinationals and their wage premia*

somewhat more pronounced in later years.[7] The evolution of wage premia due to observed changes in trade costs is depicted in the right panel of the figure. There, we see that both the negative border effect on the foreign multinational wage premium – captured by FMNP_n/DMNP < 1 – as well as the positive distance effect – captured by FMNP_n/FMNP_d < 1 – are observed throughout the observation period and are more pronounced in later observation years with lower trade costs.

S.8 Further descriptives

Table S.3 presents descriptives of the characteristics of multinational and non-multinational plants and workers. Similar to other studies, multinational plants in our dataset are larger than their competitors (see, for instance, Malchow-Møller et al., 2013; Egger et al., 2020). However, there is little difference between multinational and non-multinational plants in terms of their prevalence in Eastern Germany, and hence no evidence in our data that Eastern and Western Germany differ in their attractiveness for multinational investors. Multinational and non-multinational plants show only small differences in the population densities of their labour market regions indicating similar patterns of local supply of workers.[8] Moreover, for multinational plants it is more common that workers are employed full-time, whereas the employment growth over the previous business year is less pronounced than for non-multinational plants. Zooming in on workforce characteristics, we observe that employees in multinational plants are better paid, more highly skilled, and work in more complex occupations than employees in non-multinational plants.[9] Workers in multinational plants are on average less experienced and more likely to be non-German. Notable differences be-

[7]The monotonic decrease in χ_n, χ_d follows from the observed decline in trade costs between nearby and distant countries, keeping fixed costs of investment constant over time.

[8]Following the German Federal Institute for Research on Building, Urban Affairs and Spatial Development, we distinguish 257 labour market regions with an average (one-way) commuting time of less than 45 minutes (see Mitze and Kosfeld, 2022, for further discussion).

[9]Low-skilled workers are employees with a secondary school-leaving certificate but no vocational training. Medium-skilled workers are employees with a secondary school-leaving certificate and vocational training. Finally, employees with a degree from a university of applied sciences or a university are classified as highly skilled. To differentiate occupations according to their level of complexity, we use the fifth digit of the German occupation classification KldB 2010 (see Paulus and Matthes, 2013, for a discussion).

Table S.3: *Descriptives of plant and worker characteristics*

	Non-multinationals		Multinationals	
	mean	sd	mean	sd
		Plant characteristics		
Plant size (in 1,000)	0.027	0.079	0.084	0.530
Eastern Germany	0.195	0.397	0.193	0.394
Log population density in LMR	5.763	0.943	5.911	0.959
Share full time	0.679	0.252	0.752	0.268
Employment growth > 10 percent	0.254	0.435	0.206	0.405
Observations	874,318		257,950	
		Worker characteristics		
Log (imputed) real wage	4.492	0.440	4.847	0.482
Education				
Low-skilled	0.074	0.262	0.075	0.263
Medium-skilled	0.787	0.409	0.686	0.464
High-skilled	0.139	0.345	0.239	0.427
Occupations				
Unskilled occupations	0.136	0.342	0.109	0.311
Skilled occupations	0.630	0.483	0.520	0.500
Complex specialist occupations	0.134	0.341	0.206	0.405
Highly complex occupations	0.101	0.301	0.165	0.371
Age structure				
Age 18-24	0.091	0.287	0.075	0.263
Age 25-34	0.235	0.424	0.235	0.424
Age 35-44	0.224	0.417	0.237	0.425
Age 45-54	0.295	0.456	0.303	0.459
Age 55 +	0.155	0.362	0.151	0.358
Job tenure	6.673	7.267	6.052	7.057
Non-German	0.082	0.274	0.090	0.286
Male	0.724	0.447	0.771	0.420
Observations	14,192,294		16,585,916	

Notes: Source is the merged IEB-Orbis dataset. Plant characteristics are computed at the plant level, whereas worker characteristics are computed at the individual level. Parents maintain at least 25 percent of controlling interest.

tween multinational and non-multinational plants in terms of age structure or gender composition do not exist.

Tables S.4 and S.5 summarise descriptives of additional plant-level control variables used in Section II. The first set of covariates reported in Table S.4 make use of parent information. In line with Table 1, we find a sizable difference in the corporate network sizes of multinationals and non-multinationals.[10] Moreover, for multinationals it is less likely that the ultimate owner is also the direct owner of the German plant. The reported overlap between the groups of ultimate and direct owners is in general fairly high, indicating that ownership hierarchies are flat in our

[10]The reported network size in Table S.4 is determined at the plant level. This implies that larger corporate networks with multiple German plants are counted multiple times. This explains the considerable difference to the network sizes reported in Table 1.

dataset.[11] Tax havens cover the ten most important tax havens in terms of portfolio investment according to Hines (2010). By construction, non-multinationals have a parent in Germany, and hence the tax haven dummy for them is always zero. In contrast, we observe that almost 10 percent of foreign-owned plants have a parent in one of the ten tax havens in our dataset.

Table S.4: *Additional plant characteristics*

	Non-multinationals		Multinationals	
	mean	sd	mean	sd
		Parent characteristics		
Network size	1.569	9.679	860.365	2,138.998
Eastern Ultimate = direct owner	0.992	0.090	0.931	0.253
Parent from tax haven	0.000	0.000	0.094	0.292
		Further plant characteristics		
Education				
Share low-skilled	0.115	0.143	0.106	0.141
Share medium-skilled	0.763	0.221	0.696	0.260
Share high-skilled	0.122	0.196	0.198	0.261
Occupations				
Share unskilled occupations	0.180	0.227	0.107	0.202
Share skilled occupations	0.631	0.287	0.561	0.327
Share complex occupations	0.113	0.182	0.187	0.254
Share highly complex occupations	0.075	0.160	0.146	0.211
Age structure				
Share age 18-24	0.125	0.148	0.114	0.152
Share age 25-34	0.199	0.178	0.217	0.180
Share age 35-44	0.212	0.174	0.227	0.173
Share age 45-54	0.274	0.197	0.285	0.204
Share age 55+	0.190	0.183	0.157	0.178
Share non-German	0.078	0.150	0.083	0.138
Share male	0.626	0.284	0.575	0.320

Notes: Source is the merged IEB-Orbis dataset. Parents maintain at least 25 percent of controlling interest.

The second set of controls in Table S.4 refer to workforce characteristics and are determined as aggregates at the plant level. They include workers who were dropped from our final sample, such as part-time workers, apprentices, and marginal workers. Therefore, the respective characteristics are not simple aggregates of the worker characteristics reported in Table S.3. Despite these differences, important insights from the individual data remain intact. Workers in multinational plants are more highly skilled, work in more complex occupations, and are more likely to be non-German than those in non-multinational plants. Moreover, there is no clear difference in the age structure of the workforce between multinationals and non-multinationals. The only notable difference between the worker and the plant data is the gender composition. Covering also part-time workers, the share of male workers is lower at the plant level, with a particularly pronounced decrease in multinationals.

Table S.5 lists 25 broad sector categories, which are constructed using the two-digit NACE Rev

[11] We do not construct direct ownership ourselves, but use the information provided by Orbis for our analysis.

Table S.5: *Descriptives of industrial affiliation of workforce (in shares)*

	Nace Rev 2	Non-multinationals		Multinationals	
	2-digit	mean	sd	mean	sd
Agriculture	1-3	0.008	0.088	0.003	0.057
Mining	5-9	0.002	0.050	0.003	0.057
Manufacture of food, beverages, and tobacco products	10-12	0.012	0.110	0.010	0.097
Manufacture of textiles, wearing apparel, leather, and related products	13-15	0.005	0.068	0.003	0.058
Manufacture of wood and of products of wood and cork	16	0.007	0.085	0.002	0.043
Manufacture of paper, paper products, and media	17, 18, 58, 59	0.020	0.139	0.013	0.114
Manufacture of coke and refined petroleum products	19	0.000	0.013	0.001	0.030
Manufacture of chemicals, chemical products, and pharmaceutical products	20, 21	0.005	0.069	0.015	0.122
Manufacture of rubber and plastic products	22	0.011	0.105	0.011	0.105
Manufacture of other non-metallic mineral products	23	0.008	0.089	0.012	0.109
Manufacture of basic and fabricated metals	24, 25	0.054	0.225	0.024	0.153
Manufacture of machinery and equipment n.e.c.	28	0.025	0.156	0.029	0.168
Manufacture of computer, electronic and optical products, and electrical equipment	26, 27	0.018	0.133	0.027	0.161
Manufacture of motor vehicles, trailers and semi-trailers, and other transport equipment	29, 30	0.004	0.063	0.012	0.107
Other manufacturing (including furniture)	31, 32	0.019	0.137	0.008	0.087
Electricity, gas, steam, air conditioning supply, and water collection, treatment and supply	35, 36	0.006	0.077	0.022	0.145
Construction of buildings, civil engineering, and specialized construction activities	41-43	0.196	0.397	0.024	0.153
Wholesale and retail trade, repair and installation	33, 45-47, 95	0.255	0.436	0.332	0.471
Accommodation, food and beverage service activities	55, 56	0.023	0.148	0.022	0.147
Transport, warehousing, postal and courier services, and travel	49-53, 79	0.054	0.226	0.150	0.357
Financial services and insurance	64-66	0.009	0.095	0.025	0.157
Programming, consultancy, information services, research and development, real estates, household services	62, 63, 68, 72, 77, 97	0.062	0.240	0.073	0.260
Other services (including legal ones)	69-71, 73, 74, 78, 80-82, 96, 98	0.132	0.338	0.137	0.344
Public services (including sewerage, waste collection, telecommunication, etc.)	37-39, 60, 61, 75, 84, 86-88, 90-94, 99	0.057	0.231	0.034	0.180
Education	85	0.009	0.096	0.008	0.089

Notes: Source is the merged IEB-Orbis dataset. Parents maintain at least 25 percent of controlling interest.

2.2 industry classification system. The table describes in detail how the 88 industry divisions are aggregated into the 25 broad sector categories. Comparing the sectoral affiliations of multinationals and non-multinationals reveals some notable differences. For instance, multinational plants are less prevalent in the manufacture of basic and fabricated metals, construction, and public services, while they are more prevalent in utilities, transportation, and financial services.

S.9 Further estimation results

In this section, we present additional estimation results that complement the empirical evidence discussed in Section II. We begin by examining the role of further determinants of individual workers' wages, which were included as control variables in the estimations reported in Tables 2 and 3, but omitted from those tables for reasons of space. The choice of these variables is based on a large literature applying Mincer-type regressions for estimating individual wages and recent empirical research on the determinants of German wage dispersion (see Dustmann et al., 2009; Antonczyka et al., 2010; Card et al., 2013, 2018). The full set of estimation results is provided in Table S.6, where column (2) corresponds to column (1) in Table 2, and column (3) corresponds to column (1) in Table 3.

A first set of controls includes individual characteristics that prior research has identified as important determinants of wage payments. In this regard, our findings corroborate existing evidence of a substantial gender wage gap, as well as wage premiums associated with higher levels of education, greater work experience, and older age. We also observe a wage premium for employees in occupations requiring higher skill levels. Furthermore, our results suggest a wage premium for native German workers.

In addition to individual-level characteristics, we incorporate plant- and firm-level controls, reflecting the well-documented influence of employers on wage outcomes. Consistent with previous studies, we find evidence of a size premium along two dimensions: larger plants and those affiliated with bigger multinational networks tend to offer higher wages. Moreover, we identify a persistent negative wage effect associated with location in East Germany, indicating that wage convergence between the formerly divided regions has yet to be fully achieved.

To mitigate the risk of omitted variable bias, in particular regarding unobserved plant heterogeneity, we include additional plant-level covariates. One key factor in this context is productivity, which has been extensively studied in the literature on firm heterogeneity (see, e.g., Egger et al., 2013; Helpman et al., 2017). While we explicitly control for estimated total factor productivity in a robustness check, we argue that including variables such as firm size, occupational composition within the plant, and recent employment growth helps to alleviate concerns that unobserved productivity differences may bias the estimated effects of multinational affiliation.

In the next step, we discuss robustness checks for the border and distance effects in the multinational wage premium highlighted in Table 3. These checks are reported in Table S.7, where we replicate our baseline specification from column (1) of Table 3 to facilitate comparison with the six extensions presented in columns (2) to (7). These extensions include: *(i.)* a reduced set of control variables, aligned with the matching covariates used in Table 4; *(ii.)* weights based on industry-wide export shares; *(iii.)* the inclusion of dummies for the rule of law and a common official or native language, to account for heterogeneity among countries hosting the parents of German multinational plants; and *(iv.)* refined distance groups and alternative definitions of nearby and remote parent countries. The main findings regarding a negative border effect and a positive distance effect of foreign ownership remain robust across all these specifications.

In column (8), we examine the border and distance effects on log revenues instead of log daily wages, in order to assess the model's ability to explain observed patterns in firm size, as formally

Table S.6: *Wages, multinational ownership, and distance: Extended list of covariates*

	MNP status			*Plant controls*	
Multinational plant	0.156**		Plant size	0.003**	0.003**
	(0.007)			(0.000)	(0.000)
Domestic multinational plant		0.164**	Share medium-skilled	0.071**	0.073**
		(0.003)		(0.024)	(0.024)
Foreign multinational plant $\leq$ 850 km		0.133**	Share high-skilled	0.462**	0.464**
		(0.008)		(0.009)	(0.009)
Foreign multinational plant $>$ 850 km		0.160**	Share age 25-34	-0.199**	-0.195**
		(0.006)		(0.022)	(0.020)
			Share age 35-44	-0.014	-0.013
	Worker controls			(0.023)	(0.022)
Male	0.129**	0.129**	Share age 45-54	0.074**	0.075**
	(0.005)	(0.005)		(0.028)	(0.027)
Non-German	-0.026**	-0.026**	Share age 55+	-0.143**	-0.139**
	(0.001)	(0.001)		(0.016)	(0.016)
Job tenure	0.007**	0.007**	Share skilled occupations	0.052**	0.050**
	(0.000)	(0.000)		(0.017)	(0.015)
Low-skilled	-0.189**	-0.190**	Share complex occupations	0.080**	0.077**
	(0.006)	(0.006)		(0.015)	(0.013)
High-skilled	0.165**	0.165**	Share highly complex occupations	-0.015	-0.016
	(0.001)	(0.001)		(0.019)	(0.019)
Age 25-34	0.218**	0.218**	Share male	0.053**	0.053**
	(0.007)	(0.007)		(0.005)	(0.006)
Age 35-44	0.309**	0.309**	Share non-German	-0.109**	-0.107**
	(0.014)	(0.014)		(0.014)	(0.014)
Age 45-54	0.332**	0.332**	Share full time	0.134**	0.137**
	(0.017)	(0.017)		(0.007)	(0.006)
Age 55+	0.307**	0.307**	Eastern Germany	-0.245**	-0.245**
	(0.017)	(0.017)		(0.003)	(0.003)
Skilled occupations	0.151**	0.151**	Log population density in LMR	0.033**	0.033**
	(0.004)	(0.003)		(0.001)	(0.001)
Complex specialist occupations	0.359**	0.359**	Employment growth $>$ 10 percent	-0.033**	-0.033**
	(0.006)	(0.006)		(0.001)	(0.001)
Highly complex occupations	0.513**	0.512**	Network size	0.000*	0.000*
	(0.002)	(0.002)		(0.000)	(0.000)
			R-squared	0.596	0.596
			Observations		30,778,210

Notes: Source is the merged IEB-Orbis dataset. The dependent variable is the log of the (imputed) daily wage. The specifications follow the preferred models presented in column (1) of Tables 2 and 3. Each specification includes a constant, 24 sector fixed effects, and five year fixed effects (not reported). Standard errors (in parentheses) are clustered at the parent country level. Significance levels: $** \ p < 0.01$, $* \ p < 0.05$.

Table S.7: *Multinational wages or revenues and distance – robustness*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Domestic multinational plant	0.164**	0.191**	0.164**	0.164**	0.164**	0.164**	0.164**	0.314**
	(0.003)	(0.012)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.009)
Foreign multinational plant $\leq$ 850 km	0.133**	0.169**	0.110**	0.133**	0.118**	0.133**		0.402**
	(0.008)	(0.027)	(0.018)	(0.008)	(0.003)	(0.008)		(0.020)
Foreign multinational plant $>$ 850 km	0.160**	0.241**	0.120**	0.164**	0.152**			0.440**
	(0.006)	(0.014)	(0.012)	(0.006)	(0.011)			(0.030)
Foreign multinational plant $851 - 7,000$ km						0.156**		
						(0.005)		
Foreign multinational plant $> 7,000$ km						0.167**		
						(0.015)		
Foreign multinational plant, neighbour							0.135**	
							(0.010)	
Foreign multinational plant, other							0.155**	
							(0.008)	
Constant	3.361**	3.961**	3.506**	3.335**	3.373**	3.361**	3.360**	-3.171**
	(0.009)	(0.014)	(0.037)	(0.014)	(0.019)	(0.009)	(0.009)	(0.125)
Dependent Variable:								
Log (imputed) daily wage	Y	Y	Y	Y	Y	Y	Y	N
Log revenues	N	N	N	N	N	N	N	Y
Observations	30,778,210	30,778,210	27,369,759	30,736,215	30,309,530	30,778,210	30,778,210	23,858,192
R-squared	0.596	0.416	0.605	0.597	0.597	0.596	0.596	0.374

Notes: Source is the merged IEB-Orbis dataset. The dependent variable is the log of the (imputed) daily wage. Unless otherwise stated, the specification corresponds to the preferred model reported in column (1) of Table 3 in the main text, which is reproduced here in column (1) for ease of comparison. Column (2) controls for the matching covariates used in column (1) of Table 4. Column (3) presents estimates weighted by the industry-level export share. In columns (4) and (5), we account for further heterogeneity among countries hosting the foreign parents of German multinational plants by including, respectively, an indicator for the rule of law in column (4) and dummies for a common official or native language with Germany in column (5). Column (6) divides the group of distant foreign multinational plants into two subgroups. Column (7) differentiates between nearby and distant foreign multinational plants based on the existence of a shared border with Germany. Finally, in column (8), we use log revenues as the dependent variable and exclude plant size from the set of covariates to mitigate concerns regarding reverse causality. Standard errors (in parentheses) are clustered at the parent country level. Significance levels: $** \; p < 0.01$, $* \; p < 0.05$.

discussed in Section S.4 of this Supplemental Appendix. Consistent with our theoretical framework, we find a positive border effect of multinational ownership on firm-level revenues. However, the positive but statistically insignificant distance effect on revenues does not align with our theoretical predictions. We interpret this as evidence that our model may be too parsimonious to fully capture the border and distance effects of foreign ownership. One possible extension to better account for the observed revenue patterns would be to introduce an additional channel through which the distance between the parent and its foreign subsidiary directly influences firm size. For instance, allowing multinationals to export part of their production to third markets could serve as such a mechanism. In this case, foreign parent firms located far from Germany might find it attractive to shift a larger share of production to their German subsidiary in order to serve consumers in nearby countries at low trade costs. By contrast, foreign multinationals located closer to Germany may find this option less appealing, as they can serve those same consumers directly from their home country at similar trade costs.

In a further step, we examine in Table S.8 robustness checks for the treatment effects estimator discussed in Section II.C, focussing on the subsample of workers switching their employer. In column (1), we replicate the results from the main specification in column (4) of Table 4 to facilitate comparison with the alternative specifications presented in columns (2) to (8). These include seven extensions that can be summarised as follows: *(i.)* the inclusion of firm-level log revenues and estimated productivities among the covariates used for matching treatment and control units; *(ii.)* the addition of sector-by-year and state-by-year fixed effects as further controls

Table S.8: *Treatment effect of multinational takeover – robustness*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Takeover by domestic MNE	0.068^{**}	0.064^{**}	0.060^{**}	0.069^{**}	0.069^{**}	0.061^{**}	0.068^{**}	0.067^{**}
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)
Takeover by nearby foreign MNE	0.024^{**}	0.020^{**}	0.012^{*}	0.024^{**}	0.025^{**}	-0.017^{*}		
	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)	(0.007)		
Takeover by distant foreign MNE	0.097^{**}	0.092^{**}	0.096^{**}	0.097^{**}	0.099^{**}	0.091^{**}		
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.008)		
Takeover by foreign MNE							0.025^{**}	0.037^{**}
							(0.004)	(0.005)
Takeover by for. MNE × distance							0.010^{**}	
							(0.001)	
Takeover by for. MNE × tariff								0.006^{**}
								(0.002)
Observations	270,892	210,358	129,558	270,892	270,892	225,062	270,892	259,751

Notes: Source is the merged IEB-Orbis dataset. The dependent variable is the log of the (imputed) daily wage. Unless otherwise stated, the specification corresponds to the preferred model reported in column (4) of Table 4 in the main text, which is reproduced here in column (1) for ease of comparison. Columns (2) and (3) additionally include log revenues and estimated productivities, respectively, as matching covariates. Columns (4) and (5) incorporate sector-by-year and state-by-year fixed effects, respectively, as additional covariates in the outcome model. Column (6) excludes (vertical) multinational plants whose owner operates in a different one-digit sector, based on the 2008 German sectoral classification. Finally, columns (7) and (8) impose a simpler multi-valued treatment estimator, where differential effects of foreign takeover are captured by interaction terms with distance and tariffs, respectively. Standard errors (in parentheses) are clustered at the plant level. Significance levels: $** \; p < 0.01$, $* \; p < 0.05$.

in the second-stage difference-in-differences estimation; *(iii.)* the exclusion of vertical multinational plants, defined as those whose parent belongs to a different one-digit sector according to the 2008 German industry classification; and *(iv.)* alternative treatment specifications in which distance and tariff effects are captured through interaction terms. While these modifications alter the point estimates, our findings continue to support a negative border effect and a positive treatment effect of multinational takeovers.

In a final step, we report the coefficients of all relevant matching covariates from the multinomial logit estimation that underpins the construction of the inverse propensity score weights used in the treatment effects estimation presented in Section II.C. The corresponding results for the full sample used in columns (1) to (3) of Table 4 are shown in columns (1) to (3) of Table S.9. These results indicate that most of the matching covariates significantly affect the probability of being acquired by a domestic multinational, a nearby foreign multinational, or a distant foreign multinational. In particular, plant-level characteristics such as larger size, activity in manufacturing or services, and recent employment growth are positively associated with the likelihood of treatment. At the worker level, being male, younger, and highly skilled also increases the probability of treatment.

Columns (4) to (6) of Table S.9 present the corresponding estimation results for the subsample of workers who switched employers between two consecutive years. The coefficients from this estimation are used to construct the inverse propensity score weights applied in the treatment effects estimation shown in columns (4) to (6) of Table 4. The estimated coefficients are broadly similar to those for the full sample, with one notable difference: workers employed in the largest firms are less likely to be treated. This finding aligns with the notion that larger firms tend to offer higher wages to reduce turnover, making their employees less likely to move to multinational-owned

Table S.9: *The probability of acquisition by a domestic, nearby or distant foreign multinational*

	Full sample			Plant switcher		
	$T_i = 1$	$T_i = 2$	$T_i = 3$	$T_i = 1$	$T_i = 2$	$T_i = 3$
Plant size 10-49	0.291**	0.213**	0.105*	0.221**	0.157**	0.129**
	(0.032)	(0.039)	(0.053)	(0.028)	(0.032)	(0.043)
Plant size 50-499	1.250**	0.852**	1.003**	0.440**	0.432**	0.367**
	(0.046)	(0.057)	(0.074)	(0.036)	(0.046)	(0.053)
Plant size 500-999	1.561**	0.857**	0.791*	-0.197	-0.544**	-0.877**
	(0.166)	(0.301)	(0.377)	(0.145)	(0.136)	(0.124)
Plant size 1,000-1,499	1.700**	0.829	0.974	-0.310	-1.170**	-1.143**
	(0.291)	(0.669)	(0.903)	(0.210)	(0.163)	(0.180)
Plant size $\geq$ 1,500	2.116**	-0.525	-1.726**	-0.230	-1.049**	-1.218**
	(0.307)	(0.725)	(0.211)	(0.215)	(0.168)	(0.169)
Manufacturing, other	1.129**	0.587**	1.319**	0.438**	0.450**	0.771**
	(0.141)	(0.169)	(0.227)	(0.067)	(0.063)	(0.071)
Manufacturing, metal	1.126**	0.900**	1.753**	0.646**	0.652**	1.035**
	(0.129)	(0.174)	(0.203)	(0.062)	(0.061)	(0.068)
Manufacturing, transport	2.070**	1.439**	1.814**	0.805**	0.794**	1.461**
	(0.356)	(0.463)	(0.351)	(0.185)	(0.184)	(0.309)
Services	0.622**	0.915**	1.267**	0.443**	0.471**	0.837**
	(0.116)	(0.119)	(0.166)	(0.057)	(0.054)	(0.059)
Agricultutre	-0.304	0.027	0.059	0.041	-0.061	-0.415
	(0.240)	(0.267)	(0.418)	(0.209)	(0.165)	(0.261)
Emp. growth >10 percent	0.121°	0.138°	0.344*	0.055*	0.165**	0.114**
	(0.070)	(0.077)	(0.166)	(0.027)	(0.033)	(0.036)
Male	0.194**	0.167**	0.246**	0.274**	0.141**	0.124**
	(0.047)	(0.062)	(0.063)	(0.034)	(0.032)	(0.037)
Age	-0.015**	-0.029**	-0.029**	-0.027**	-0.020**	-0.028**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Low-skilled	-0.000	0.235**	0.131*	-0.033	0.041	-0.014
	(0.046)	(0.047)	(0.056)	(0.038)	(0.043)	(0.052)
High-skilled	0.473**	0.342**	0.562**	0.539**	0.384**	0.780**
	(0.041)	(0.070)	(0.074)	(0.038)	(0.041)	(0.049)
Constant	-5.180**	-5.562**	-6.553**	-1.584**	-2.257**	-2.814**
	(0.119)	(0.137)	(0.217)	(0.094)	(0.072)	(0.086)
Observations	8,964,654	8,964,654	8,964,654	270,892	270,892	270,892

Notes: The source is the merged IEB-Orbis dataset. The dependent variable is a categorical indicator with four possible outcomes: 0 indicates no acquisition; 1, acquisition by a domestic multinational; 2, acquisition by a nearby foreign multinational; and 3, acquisition by a distant foreign multinational. We estimate the likelihood of each treatment using a multinomial logit model. Columns (1) to (3) report results for the full sample of all workers in the treatment and control groups, while columns (4) to (6) restrict the sample to workers who changed employers between two consecutive years. Standard errors (in parentheses) are clustered at the plant level. Significance levels: $** \ p < 0.01$, $* \ p < 0.05$, $\circ \ p < 0.1$.

plants.

S.10 Clustering standard errors at different levels

In Tables 2 and 3, we report standard errors clustered at the parent country level. This choice is motivated by two considerations. First, Orbis provides uneven coverage of firms across countries, which may reflect differences in data collection practices, reporting standards, or the market penetration of the data provider (see Kalemli-Özcan et al., 2024). Such heterogeneity can introduce country-specific patterns in measurement error. Second, firms from the same parent country are more likely to share unobserved characteristics, such as regulatory environments, reporting practices, or exposure to macroeconomic shocks, potentially leading to correlated residuals within countries. Failing to account for this correlation could result in underestimated standard errors and inflated statistical significance.

However, alternative clustering levels may also be justifiable. For example, clustering at the firm level could be appropriate if firm-specific heterogeneity relevant to wage-setting is not fully accounted for, implying residual correlation within firms. Similarly, one might argue for clustering at the plant level, since the multinational ownership dummies are constructed based on parent-plant distances, effectively assigning treatment at the plant level. In this case, workers within a plant may share unobserved characteristics that affect outcomes.

Table S.10: *Clustering standard errors in OLS estimation*

	(1)	(2)	(3)	(4)	(5)	(6)
Multinational plant	0.156**	0.156**	0.156**			
	(0.007)	(0.003)	(0.008)			
Domestic multinational plant				0.164**	0.164**	0.164**
				(0.003)	(0.005)	(0.012)
Foreign multinational plant $\leq$ 850 km				0.133**	0.133**	0.133**
				(0.008)	(0.004)	(0.008)
Foreign multinational plant $>$ 850 km				0.160**	0.160**	0.160**
				(0.006)	(0.005)	(0.008)
Constant	3.364**	3.364**	3.364**	3.361**	3.361**	3.361**
	(0.009)	(0.019)	(0.034)	(0.009)	(0.019)	(0.036)
Observations	30,778,210	30,778,210	30,778,210	30,778,210	30,778,210	30,778,210
R-squared	0.596	0.596	0.596	0.596	0.596	0.596
Post-estimation F-tests						
DMP = FMP_{nearby} (p-value)				0.000	0.000	0.029
FMP_{nearby}= $\text{FMP}_{distant}$ (p-value)				0.003	0.000	0.001
DMP=$\text{FMP}_{distant}$ (p-value)				0.507	0.620	0.809

Notes: Source is the merged IEB-Orbis dataset. The dependent variable is the log of the (imputed) daily wage. Column (1) reproduces the preferred specification from Table 2, with standard errors clustered at the parent country level. Columns (2) and (3) use the same specification as column (1), but cluster standard errors at the plant and firm levels, respectively. Column (4) reproduces the preferred specification from Table 3, again with clustering at the parent country level. Columns (5) and (6) apply the same specification as column (4), but cluster standard errors at the plant and firm levels, respectively. Clustered standard errors are reported in parentheses. Significance levels: ** $p < 0.01$, * $p < 0.05$.

In Table S.10, we assess whether the choice of clustering level materially affects statistical inference in our OLS estimations. Columns (1) and (4) reproduce the baseline results with standard errors clustered at the parent country level, while columns (2) and (5) report standard errors clustered at the plant level, and columns (3) and (6) at the firm level. The results show that our main inference is robust to the choice of clustering level.

The issue of clustering is equally pertinent in the context of our treatment effects estimation reported in Table 4. Given that unobserved heterogeneity among workers within plants may be more pronounced in this setting, particularly when using inverse propensity score weighting, we consider clustering at the plant level to be the most appropriate choice. This motivates our use of plant-level clustering in the main results presented in Table 4.

To examine the sensitivity of our inference to this choice, we conduct a robustness check using alternative clustering levels, reported in Table S.11. This table presents results for both the full sample of workers (columns (1) to (3)) and the subsample of workers who switch employers (columns (4) to (6)), following the same clustering order as in Table S.10. In contrast to the OLS results, we find that the level of clustering can have a more noticeable impact on statistical inference in the treatment effects setting. Nevertheless, the key qualitative insights regarding the statistical significance of the estimated border and distance effects remain robust.

Table S.11: *Clustering standard errors in treatment effects estimation*

	(1)	(2)	(3)	(4)	(5)	(6)
Takeover by domestic MNE	0.035**	0.035**	0.035**	0.068**	0.068**	0.068**
	(0.000)	(0.002)	(0.002)	(0.001)	(0.004)	(0.005)
Takeover by nearby foreign MNE	0.031**	0.031**	0.031**	0.024	0.024**	0.024
	(0.010)	(0.002)	(0.010)	(0.025)	(0.004)	(0.024)
Takeover by distant foreign MNE	0.066**	0.066**	0.066**	0.097**	0.097**	0.097**
	(0.006)	(0.004)	(0.005)	(0.004)	(0.005)	(0.007)
Observations	8,964,654	8,964,654	8,964,654	270,892	270,892	270,892
Post-estimation χ^2-tests						
$T_1 = T_2$ (p-value)	0.654	0.112	0.659	0.081	0.000	0.072
$T_1 = T_3$ (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
$T_2 = T_3$ (p-value)	0.004	0.000	0.002	0.005	0.000	0.003

Notes: Source is the merged IEB-Orbis dataset. The dependent variable is the log of the (imputed) daily wage. Columns (1) to (3) reproduce the specification from column (1) of Table 4, with standard errors clustered at the parent country level, at the plant level, and at the firm level, respectively. Columns (4) to (6) reproduce the specification from column (4) of Table 4, with standard errors clustered at the parent country level, at the plant level, and at the firm level, respectively. Clustered standard errors are reported in parentheses: $** \ p < 0.01$, $* \ p < 0.05$. Significance levels: $** \ p < 0.01$, $* \ p < 0.05$.

S.11 Evidence on recruitment costs differences between German plants

In the theoretical model outlined in Section III, we argue that differences in the exogenous cost parameter c_j can explain the wage patterns reported in Section II due to selection of firms into different modes of foreign market entry. Thereby, parameter c_j can be interpreted as the cost of providing sufficient appeal to recruit the marginal worker at a given wage rate. To measure these costs for German plants, we rely on the quarterly IAB-Job Vacancy Survey. This survey covers several thousand plants and contains detailed information on the recruitment costs for the last vacancy filled for the fourth quarter of the years 2014, 2015, and 2017. Within this dataset, we can distinguish monetary recruitment costs, which cover expenditures on job advertisements, headhunters, travel allowances, etc., from the working hours spent by a plant to fill its last vacancy. We merge these costs to our IEB-Orbis dataset resulting in a sample of about 6,000 plants with information on both marginal recruitment costs and ownership type.

We use the thus constructed dataset to shed light on whether the reported marginal recruitment costs of German plants are in line with the ranking of non-multinational and multinational plants by the unit cost parameter c_j required by our model to predict the existence of a multinational wage premium that shows a negative border effect and a positive distance effect (see Section II). A first requirement for this is that marginal recruitment costs – as our empirical proxy for c_j – are higher for multinational plants than for non-multinational plants. This is supported by the simple averages of monetary expenditures and working hours spent on recruitment reported in the first and second columns of Table S.12.

Table S.12: *Averages of marginal recruitment costs of German plants*

	Non-multin.	Multinational	Dom.-owned multinational	For.-owned multinational ≤ 850km	For.-owned multinational 851-7,000 km	For.-owned multinational >7,000 km
Monetary costs	783.45	1,921.36	1,565.45	1,987.94	2,104.86	3,738.48
Working hours	18.46	21.76	22.24	20.25	22.21	22.47

Notes: Sources are the IAB-Job Vacancy Survey and IEB-Orbis database. The sample period covers the three survey waves 2014, 2015, and 2017 (fourth quarter). Observation numbers for reported means of monetary costs and working hours are 5,897 and 6,451, respectively.

The mean differences reported in Table S.12 also provide evidence for the existence of border and distance effects in the marginal recruitment costs of multinational plants. The last three columns provide evidence for a distance effect for both the monetary expenditures and the working hours spent by German plants on recruitment costs for the last vacancy filled. Moreover, while a border effect is not observed for monetary costs, it is clearly present for the reported hours spent on recruitment. Although the descriptive evidence in Table S.12 gives good reason to believe that the theoretical model outlined in Sections III and IV provides a relevant framework for explaining the observed wage patterns reported in Section II, it is possible that simply comparing means leads to omitted variable bias. To rule out the possibility that the conclusion from Table S.12 is altered by adding further controls, we report the results of a more extensive regression analysis regarding the impact of ownership type on marginal recruitment costs in the Supplemental Appendix to this manuscript. Our conclusions about the differences in marginal recruitment costs between plant categories are robust to this modification.

Of course, by simply comparing the means of recruitment costs, our analysis may omit other important determinants of their differences and thus lead to a biased picture of the role of ownership type. To address this concern, we can control for plant size, workforce composition, industry affiliation, the location of the plant in former West or East Germany, and time as obvious candidates for determining the size of marginal recruitment costs. Our dataset allows us to add these controls and to estimate more precisely marginal recruitment cost differences by ownership type. To make the comparison between firms easier, we focus on monetary expenditures and report the estimation results in Table S.13.

The first column of Table S.13 confirms our findings from the first and second column of Table S.12 that multinational plants have higher marginal recruitment costs than non-multinational plants. The second column of Table S.13 shows evidence largely consistent with the one reported in the third column of Table S.12. Finally, the positive distance effect in the third column of Table S.13, where we zoom in on the sub-sample of foreign multinational plants, is well in line with the means reported in the last three columns of Table S.12. Overall, the results from the richer regression models considered here indicate that concerns of qualitatively wrong conclusions when looking at simple mean differences of marginal recruitment costs are not supported by our data.

S.12 List of countries hosting ultimate owners of German plants

In Table S.14, we list the 105 countries hosting ultimate owners of German plants (in alphabetic order). There, we also report for each country the minimum, maximum, and median parent-plant

Table S.13: *Marginal recruitment costs by plant type*

	(1)	(2)	(3)
Multinational plant	640.025**		
	(119.858)		
Domestic multinational plant		282.032°	
		(148.796)	
Foreign multinational plant		1,064.654**	
		(159.120)	
Foreign multinational plant 851 - 7,000 km			478.031
			(519.246)
Foreign multinational plant > 7,000 km			1,392.056*
			(610.800)
Constant	899.417	913.558	3,398.559
	(579.249)	(578.499)	(3373.801)
Observations	5,897	5,897	609
R-squared	0.056	0.059	0.146

Notes: Source is the merged IAB-Job Vacancy Survey and IEB-Orbis database. The sample period covers the three years 2014, 2015, and 2017 (fourth quarter). The dependent variable is the monetary recruitment cost for the last filled vacancy, covering expenditures for job posting, headhunters, compensation for traveling costs etc. In all specifications, we control for plant size, the shares of workers by age category, education, and occupation, dummies for 25 industries, a dummy indicating whether the plant is located in former East Germany and year dummies. Parents maintain at least 25 percent of controlling interest. Standard errors in parentheses: ** $p < 0.01$, * $p < 0.05$, and ° $p < 0.1$.

geographic distances as well as the number of plant-year observations in our dataset ultimately owned by local parents.

Table S.14: *Country list and parent-plant distances*

Country	Distance in kilometers			Plant-year
	Minimum	Maximum	Median	Observations
Albania	1,103	1,629	1,103	5
Andorra	1,011	1,011	1,011	3
Argentina	11,467	11,467	11,467	1
Australia	13,586	16,594	16,240	263
Austria	3	977	493	7,305
Bahamas	7,442	7,895	7,696	75
Bahrain	4,266	4,605	4,421	15
Bangladesh	7,107	7,115	7,107	7
Barbados	7,613	7,613	7,613	1
Belarus	1,282	1,282	1,282	4
Belgium	9	788	373	3,672
Belize	8,815	9,225	9,116	16
Bermuda	5,995	6,539	6,191	857
Bonaire, Saint Eustatius and Saba	7,906	7,906	7,906	1
Bosnia and Herzegovina	660	1,021	709	15
Brazil	7,447	10,919	9,836	106
British Virgin Islands	7,075	7,698	7,268	409
Bulgaria	1,314	1,691	1,321	28

Table S.14: *Country list and parent-plant distances (contd.)*

Country	Distance in kilometers			Plant-year
	Minimum	Maximum	Median	Observations
Canada	4,981	8,527	6,288	1,058
Cayman Islands	8,163	8,770	8,388	1,208
Chile	11,753	12,367	12,049	16
China	1,145	9,277	8,117	1,002
Colombia	8,414	8,935	8,513	47
Costa Rica	9,239	9,239	9,239	3
Croatia	455	978	910	27
Curacao	7,907	8,459	8,086	302
Cyprus	2,179	2,838	2,602	665
Czechia	46	750	384	210
Denmark	8	968	524	7,320
Egypt	2,889	3,259	2,892	31
Estonia	1,038	1,515	1,420	9
Fiji	16,186	16,211	16,198	6
Finland	1,019	2,161	1,493	911
France	3	1,385	595	11,510
Germany	1	843	3	1,011,769
Gibraltar	1,763	2,350	1,935	118
Greece	1,382	2,212	1,841	116
Guernsey	637	1,187	795	58
Guyana	7,901	8,392	8,068	23
Hong Kong	8,730	9,318	9,150	407
Hungary	482	1,143	817	120
Iceland	1,965	2,690	2,142	79
India	5,719	7,782	6,579	546
Indonesia	11,187	11,672	11,672	4
Iran	3,189	4,348	3,918	39
Ireland	892	7,970	1,107	821
Israel	2,488	3,241	2,852	526
Italy	112	1,788	679	4,724
Jamaica	8,163	8,163	8,163	4
Japan	8,604	9,645	9,282	4,465
Jersey	783	1,150	825	17
Kuwait	3,717	4,165	3,951	110
Latvia	656	1,481	1,214	16
Lebanon	2,602	3,048	2,864	50
Liberia	5,107	5,577	5,545	12
Libya	2,302	2,333	2,306	8
Liechtenstein	64	828	472	777
Lithuania	715	1,312	1,014	19
Luxembourg	5	709	273	5,441
Malaysia	9,296	10,725	9,832	180
Malta	1,369	2,130	1,772	130
Marshall Islands	12,926	13,718	13,336	207
Mauritius	8,914	9,365	9,304	34
Mexico	8,851	9,840	9,179	297
Moldova	1,692	1,698	1,698	3

Table S.14: *Country list and parent-plant distances (contd.)*

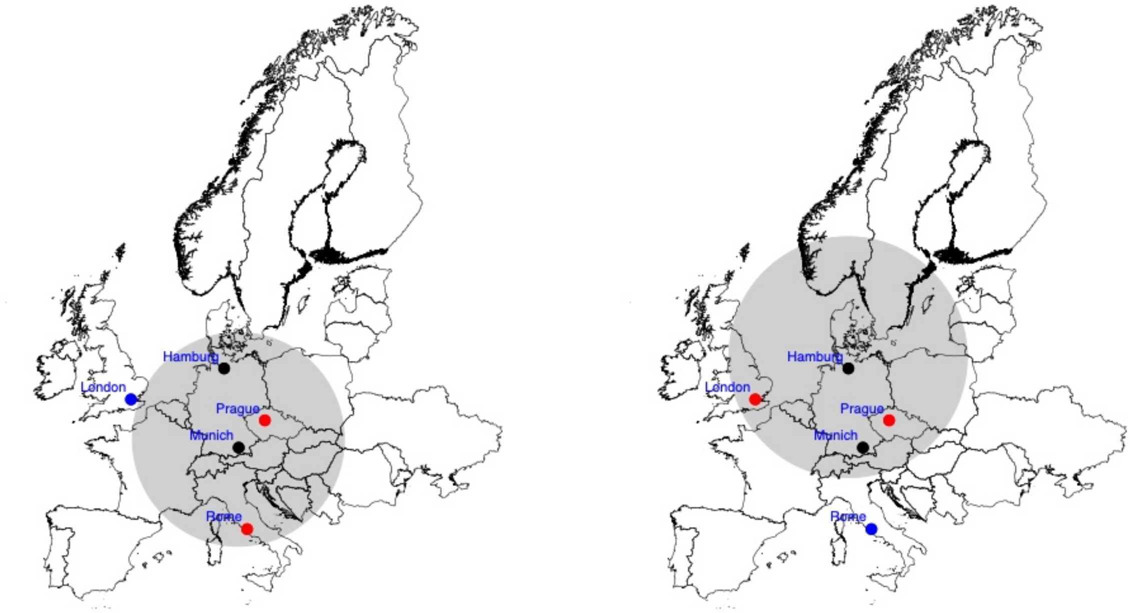
Country	Distance in kilometers			Plant-year
	Minimum	Maximum	Median	Observations
Monaco	612	612	612	2
Mozambique	7,817	7,817	7,817	5
Netherlands	2	762	358	11,817
New Zealand	17,739	18,578	18,185	83
North Korea	7,977	8,523	8,353	36
Norway	525	1,858	1,014	453
Oman	5,121	5,346	5,175	7
Panama	8,913	9,421	9,173	34
Philippines	10,042	10,138	10,090	4
Poland	44	1,140	674	445
Portugal	1,556	2,306	1,776	114
Qatar	4,286	4,704	4,574	30
Romania	1,056	4,446	1,366	29
Russia	825	5,430	1,981	255
Saint Kitts and Nevis	7,222	7,251	7,240	8
Samoa	15,578	15,932	15,820	27
Saudi Arabia	3,858	4,487	4,233	53
Serbia	697	1,460	1,067	8
Seychelles	7,247	7,763	7,482	26
Singapore	9,884	10,397	10,188	245
Slovakia	314	890	550	66
Slovenia	261	1,005	524	103
South Africa	8,369	9,610	8,888	233
South Korea	8,123	8,895	8,695	317
Spain	909	3,738	1,434	1,636
Sweden	241	1,931	1,011	3,599
Switzerland	1	979	397	14,807
Taiwan	8,818	9,631	9,373	299
Thailand	8,561	9,065	8,830	28
Tunisia	1,571	1,625	1,571	8
Turkey	1,477	2,890	2,005	273
Turks and Caicos Islands	7,338	7,764	7,716	17
Ukraine	1,206	1,937	1,274	10
United Arab Emirates	4,477	5,046	4,830	180
United Kingdom	349	1,393	758	8,693
United States	2,395	11,887	6,806	20,069
Uruguay	11,377	11,696	11,377	17
Zambia	7,833	7,833	7,833	4

Notes: Source is the merged IEB-Orbis dataset. Distance of ultimate owner j to German plant i is measured in km by using the great circle' formula: $D_{ij} = 6,378.39 \arccos(\sin[\text{rad}(Y_i) \cdot \text{rad}(Y_j)] + \cos[\text{rad}(Y_i) \cdot \text{rad}(Y_j) \cdot \cos(\text{rad}(b_j) - \text{rad}(X_i))])$, where X and Y are longitude and latitude in degrees. Parents maintain at least 25 percent of controlling interest.

S.13 Distance between ultimate owners and their German plants

Figure S.2 illustrates our border region concept for MNE plants located in Munich (Panel A) and MNE plants located in Hamburg (Panel B). MNE plants can have a domestic or a foreign owner.

Moreover, in the case of foreign ownership the parent can be from a nearby or a distant location, and we use a threshold of 850 kilometers – corresponding to the maximum plant-parent distance for domestic multinationals – to distinguish between the two groups of foreign-owned plants. In Figure S.2, we capture nearby parent locations by a grey circular area around the location of the German plant and associate the foreign part of this area with the *border region*. Since the border region is plant-specific it differs for plants from Munich and Hamburg. Accordingly, an ultimate owner from Rome belongs to the border region of a plant from Munich but not to the border region of a plant from Hamburg. Similarly, an ultimate owner from London belongs to the border region of a plant from Hamburg but not of a plant from Munich. Finally, an ultimate owner from Prague belongs to the border region of plants from Munich as well as from Hamburg.



Panel A. Munich plants *Panel B. Hamburg plants*

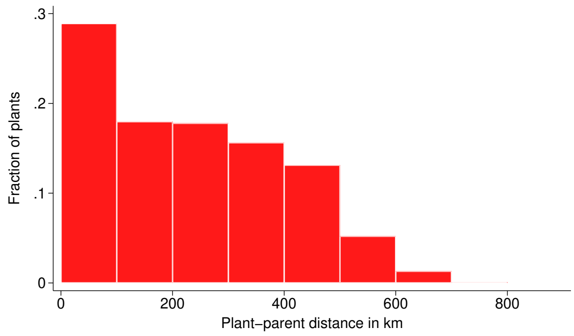
Notes: Authors' illustration based on Esri World Countries (2016) boundary data (Esri, ArcGIS Data & Maps) and publicly available geographic coordinate information.

Figure S.2: *Border regions for German plants from Munich and Hamburg*

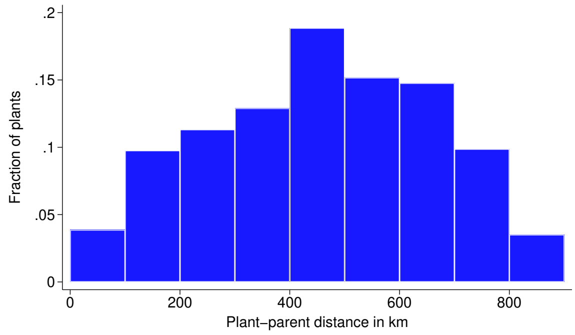
Due to strict data protection rules, Figure S.2 can only provide an illustrative example of possible cases in our dataset, with no reference to an actually observed ownership linkage. Figure S.3 shows remaining differences in parent-plant distances for domestic multinationals and foreign multinationals within the border region. Since the observed differences between domestic and foreign multinationals in their plant-parent distances suggest that our empirical results underestimate the strength of the border effect, we are not overly concerned about their existence.

S.14 Propensity-score matching

Tables S.15 and S.16 report balancing tests for the propensity score matching used to compute inverse probability weights for the treatment effects estimators reported in columns 1 and 4 of Table 4.



Panel A. Domestic multinationals



Panel B. Foreign multinationals within border region

Figure S.3: *The distribution of plant-parent distances*

S.15 Comparison of plant descriptives in IEB and IEB-Orbis

As noted in the main text, Orbis is a selective database that primarily includes larger firms exceeding certain thresholds (see Footnote 5 for further details). Consequently, the plants in the linked IEB-Orbis dataset are only a subpopulation of all plants in Germany. To address potential selection bias, Table S.17 presents a comparison between the plants in our dataset and the universe of all plants. The plant characteristics for the universe of all plants come from the Establishment History Panel (BHP) that consists of data from the German social security system aggregated at the level of the plant (for details on the BHP, see Ganzer et al., 2020).

It should be noted, however, that the BHP provides information for the universe of all plants as of June 30 of the observation year, whereas the linked dataset uses data from 31st December to align with the reporting standards of Orbis. This end-of-year information was separately provided to us by the Research Data Centre and is only available for the linked sample.

Table S.17 shows that smaller plants are underrepresented in the linked dataset, resulting in higher average employment levels. Furthermore, plants in the IEB-Orbis data exhibit a higher proportion of full-time employees and a greater share of skilled occupations. Sectoral differences are also evident: plants in construction and wholesale trade are overrepresented, while those in real estate are underrepresented.

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Table S.15: *Balancing test for the propensity-score matching – Table 4, column 1*

Variable	Sample	Treatment 1				Treatment 2				Treatment 3			
		Mean		Stand.	Bias	Mean		Stand.	Bias	Mean		Stand.	Bias
		Treatment	Control	difference	reduction	Treatment	Control	difference	reduction	Treatment	Control	difference	reduction
Plant covariates													
Plant size 10-49	Unmatched	0.180	0.390	-0.338		0.263	0.390	-0.193		0.222	0.390	-0.262	
Plant size 10-49	Matched	0.386	0.384	0.003	0.991	0.376	0.384	-0.012	0.938	0.396	0.384	0.017	0.934
Plant size 50-499	Unmatched	0.558	0.414	0.205		0.564	0.414	0.214		0.633	0.414	0.318	
Plant size 50-499	Matched	0.429	0.419	0.014	0.933	0.434	0.419	0.022	0.898	0.420	0.419	0.001	0.998
Plant size 500-999	Unmatched	0.097	0.053	0.116		0.080	0.053	0.075		0.067	0.053	0.040	
Plant size 500-999	Matched	0.054	0.055	-0.001	0.988	0.061	0.055	0.019	0.751	0.055	0.055	0.000	0.991
Plant size 1,000-1,499	Unmatched	0.043	0.023	0.079		0.034	0.023	0.047		0.033	0.023	0.043	
Plant size 1,000-1,499	Matched	0.022	0.024	-0.009	0.886	0.024	0.024	-0.001	0.977	0.022	0.024	-0.009	0.784
Plant size $\geq$ 1,500	Unmatched	0.095	0.033	0.179		0.013	0.033	-0.096		0.003	0.033	-0.160	
Plant size $\geq$ 1,500	Matched	0.029	0.034	-0.022	0.878	0.024	0.034	-0.042	0.561	0.027	0.034	-0.028	0.823
Manufacturing, other	Unmatched	0.189	0.134	0.105		0.116	0.134	-0.040		0.149	0.134	0.030	
Manufacturing, other	Matched	0.121	0.135	-0.030	0.714	0.140	0.135	0.009	0.764	0.139	0.135	0.007	0.777
Manufacturing, metal	Unmatched	0.196	0.142	0.101		0.166	0.142	0.046		0.241	0.142	0.179	
Manufacturing, metal	Matched	0.126	0.144	-0.036	0.640	0.151	0.144	0.014	0.703	0.142	0.144	-0.004	0.976
Manufacturing, transport	Unmatched	0.040	0.009	0.144		0.020	0.009	0.065		0.018	0.009	0.057	
Manufacturing, transport	Matched	0.007	0.010	-0.021	0.851	0.010	0.010	0.003	0.954	0.010	0.010	0.004	0.924
Services	Unmatched	0.525	0.557	-0.045		0.637	0.557	0.115		0.555	0.557	-0.003	
Services	Matched	0.617	0.557	0.086	-0.890	0.557	0.557	0.000	0.998	0.554	0.557	-0.004	-0.471
Agriculture	Unmatched	0.001	0.005	-0.050		0.002	0.005	-0.038		0.001	0.005	-0.050	
Agriculture	Matched	0.006	0.005	0.007	0.858	0.006	0.005	0.009	0.771	0.005	0.005	0.001	0.989
Emp. growth >10 percent	Unmatched	0.175	0.191	-0.031		0.211	0.191	0.035		0.241	0.191	0.085	
Emp. growth >10 percent	Matched	0.194	0.191	0.004	0.868	0.197	0.191	0.010	0.715	0.173	0.191	-0.033	0.610
Worker covariates													
Male	Unmatched	0.734	0.733	0.002		0.733	0.733	0.000		0.758	0.733	0.041	
Male	Matched	0.710	0.733	-0.037	-18.207	0.719	0.733	-0.022	-149.360	0.724	0.733	-0.014	0.647
Age	Unmatched	39.976	41.927	-0.121		38.037	41.927	-0.241		38.091	41.927	-0.240	
Age	Matched	41.100	41.847	-0.046	0.618	41.597	41.847	-0.015	0.936	40.988	41.847	-0.053	0.779
Low-skilled	Unmatched	0.073	0.066	0.020		0.096	0.066	0.078		0.085	0.066	0.051	
Low-skilled	Matched	0.066	0.066	-0.002	0.896	0.062	0.066	-0.012	0.847	0.068	0.066	0.004	0.921
High-skilled	Unmatched	0.204	0.129	0.144		0.174	0.129	0.091		0.204	0.129	0.144	
High-skilled	Matched	0.144	0.131	0.027	0.810	0.135	0.131	0.010	0.894	0.138	0.131	0.014	0.902

Notes: Source is the merged IEB-Orbis dataset.

Table S.16: *Balancing test for the propensity-score matching – Table 4, column 4*

Variable	Sample	Treatment 1				Treatment 2				Treatment 3			
		Mean		Stand.	Bias	Mean		Stand.	Bias	Mean		Stand.	Bias
		Treatment	Control	difference	reduction	Treatment	Control	difference	reduction	Treatment	Control	difference	reduction
Plant covariates													
Plant size 10-49	Unmatched	0.354	0.378	-0.035		0.351	0.378	-0.040		0.353	0.378	-0.038	
Plant size 10-49	Matched	0.369	0.371	-0.003	0.914	0.371	0.371	0.000	0.999	0.368	0.371	-0.004	0.889
Plant size 50-499	Unmatched	0.503	0.415	0.125		0.531	0.415	0.165		0.530	0.415	0.164	
Plant size 50-499	Matched	0.446	0.445	0.002	0.986	0.447	0.445	0.003	0.981	0.449	0.445	0.006	0.963
Plant size 500-999	Unmatched	0.042	0.062	-0.064		0.031	0.062	-0.104		0.026	0.062	-0.125	
Plant size 500-999	Matched	0.056	0.054	0.006	0.902	0.055	0.054	0.001	0.989	0.055	0.054	0.002	0.986
Plant size 1,000-1,499	Unmatched	0.015	0.025	-0.047		0.007	0.025	-0.102		0.008	0.025	-0.091	
Plant size 1,000-1,499	Matched	0.021	0.021	0.001	0.988	0.020	0.021	-0.005	0.949	0.020	0.021	-0.007	0.924
Plant size $\geq$ 1,500	Unmatched	0.017	0.025	-0.038		0.008	0.025	-0.096		0.008	0.025	-0.094	
Plant size $\geq$ 1,500	Matched	0.022	0.022	0.001	0.974	0.021	0.022	-0.002	0.978	0.022	0.022	0.003	0.969
Manufacturing, other	Unmatched	0.089	0.087	0.006		0.089	0.087	0.005		0.087	0.087	0.001	
Manufacturing, other	Matched	0.087	0.087	-0.001	0.855	0.088	0.087	0.002	0.596	0.085	0.087	-0.005	-5.579
Manufacturing, metal	Unmatched	0.124	0.094	0.070		0.122	0.094	0.064		0.127	0.094	0.075	
Manufacturing, metal	Matched	0.103	0.103	0.001	0.982	0.106	0.103	0.008	0.869	0.107	0.103	0.010	0.865
Manufacturing, transport	Unmatched	0.010	0.006	0.030		0.010	0.006	0.027		0.014	0.006	0.051	
Manufacturing, transport	Matched	0.008	0.008	0.000	0.986	0.008	0.008	0.003	0.873	0.008	0.008	0.001	0.986
Services	Unmatched	0.692	0.684	0.012		0.696	0.684	0.019		0.715	0.684	0.047	
Services	Matched	0.686	0.688	-0.003	0.741	0.683	0.688	-0.008	0.598	0.684	0.688	-0.006	0.870
Agriculture	Unmatched	0.003	0.004	-0.017		0.002	0.004	-0.021		0.001	0.004	-0.039	
Agriculture	Matched	0.004	0.003	0.002	0.909	0.003	0.003	0.001	0.961	0.003	0.003	-0.004	0.896
Emp. growth >10 percent	Unmatched	0.253	0.240	0.022		0.278	0.240	0.062		0.269	0.240	0.048	
Emp. growth >10 percent	Matched	0.243	0.246	-0.005	0.786	0.248	0.246	0.003	0.960	0.242	0.246	-0.006	0.870
Worker covariates													
Male	Unmatched	0.792	0.756	0.061		0.779	0.756	0.039		0.766	0.756	0.018	
Male	Matched	0.765	0.763	0.002	0.965	0.766	0.763	0.004	0.890	0.765	0.763	0.003	0.853
Age	Unmatched	34.165	37.140	-0.195		34.820	37.140	-0.149		34.204	37.140	-0.194	
Age	Matched	36.282	36.340	-0.004	0.981	36.294	36.340	-0.003	0.981	36.085	36.340	-0.016	0.915
Low-skilled	Unmatched	0.101	0.094	0.017		0.106	0.094	0.028		0.098	0.094	0.009	
Low-skilled	Matched	0.096	0.096	0.001	0.962	0.095	0.096	-0.004	0.870	0.095	0.096	-0.003	0.663
High-skilled	Unmatched	0.183	0.128	0.107		0.158	0.128	0.060		0.218	0.128	0.169	
High-skilled	Matched	0.141	0.143	-0.004	0.965	0.141	0.143	-0.003	0.944	0.138	0.143	-0.010	0.939

Notes: Source is the merged IEB-Orbis dataset.

Table S.17: *Comparison of plant descriptives*

	Establishment History Panel (BHP)				Combined IEB-Orbis dataset			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
				Workforce & size				
Share low-skilled	0.118	0.238	0.000	1.000	0.113	0.142	0.000	1.000
Share medium-skilled	0.698	0.354	0.000	1.000	0.748	0.233	0.000	1.000
Share high-skilled	0.118	0.250	0.000	1.000	0.139	0.215	0.000	1.000
Share non-German	0.115	0.267	0.000	1.000	0.079	0.148	0.000	1.000
Share full time	0.317	0.365	0.000	1.000	0.695	0.258	0.001	1.000
Share male	0.407	0.394	0.000	1.000	0.615	0.293	0.000	1.000
Share unskilled occupations	0.215	0.330	0.000	1.000	0.164	0.223	0.000	1.000
Share skilled occupations	0.539	0.406	0.000	1.000	0.615	0.298	0.000	1.000
Share complex occupations	0.083	0.212	0.000	1.000	0.130	0.203	0.000	1.000
Share highly complex occupations	0.062	0.186	0.000	1.000	0.091	0.176	0.000	1.000
Share age 18-24	0.089	0.189	0.000	1.000	0.122	0.149	0.000	1.000
Share age 25-34	0.169	0.260	0.000	1.000	0.203	0.179	0.000	1.000
Share age 35-44	0.201	0.286	0.000	1.000	0.216	0.174	0.000	1.000
Share age 45-54	0.276	0.328	0.000	1.000	0.277	0.198	0.000	1.000
Share age 55+	0.265	0.344	0.000	1.000	0.183	0.182	0.000	1.000
Plant size	12.043	98.927	1.000	64,194	39.907	263.295	1.000	65,093
Size categories								
Plant size < 10	0.802	0.398	0.000	1.000	0.424	0.494	0.000	1.000
Plant size 10-49	0.160	0.367	0.000	1.000	0.432	0.495	0.000	1.000
Plant size 50-499	0.036	0.186	0.000	1.000	0.136	0.343	0.000	1.000
Plant size 500-999	0.001	0.036	0.000	1.000	0.006	0.077	0.000	1.000
Plant size 1,000-1,499	0.000	0.018	0.000	1.000	0.001	0.038	0.000	1.000
Plant size $\geq$ 1,500	0.000	0.018	0.000	1.000	0.001	0.038	0.000	1.000
Observations		21,190,781				1,132,268		

Table S.17: *Comparison of plant descriptives (continued)*

	Establishment History Panel (BHP)				Combined IEB-Orbis dataset			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
				Sector affiliation				
Agriculture	0.026	0.158	0.000	1.000	0.007	0.082	0.000	1.000
Mining	0.001	0.028	0.000	1.000	0.003	0.051	0.000	1.000
Manufacturing								
Food	0.010	0.099	0.000	1.000	0.012	0.107	0.000	1.000
Textiles & leather	0.002	0.049	0.000	1.000	0.004	0.066	0.000	1.000
Wood	0.003	0.055	0.000	1.000	0.006	0.077	0.000	1.000
Paper	0.009	0.094	0.000	1.000	0.018	0.134	0.000	1.000
Coke	0.000	0.008	0.000	1.000	0.000	0.018	0.000	1.000
Chemicals	0.002	0.040	0.000	1.000	0.007	0.084	0.000	1.000
Rubber	0.002	0.050	0.000	1.000	0.011	0.105	0.000	1.000
Non-metal	0.003	0.057	0.000	1.000	0.009	0.094	0.000	1.000
Basic Metal	0.015	0.121	0.000	1.000	0.047	0.211	0.000	1.000
Machinery	0.006	0.075	0.000	1.000	0.026	0.159	0.000	1.000
Electric	0.005	0.068	0.000	1.000	0.020	0.140	0.000	1.000
Transport & travel	0.001	0.038	0.000	1.000	0.006	0.076	0.000	1.000
Other	0.009	0.093	0.000	1.000	0.016	0.127	0.000	1.000
Utilities	0.003	0.057	0.000	1.000	0.010	0.097	0.000	1.000
Construction	0.085	0.279	0.000	1.000	0.157	0.364	0.000	1.000
Services								
Wholesale	0.172	0.377	0.000	1.000	0.272	0.445	0.000	1.000
Hotel	0.066	0.249	0.000	1.000	0.022	0.148	0.000	1.000
Transport & travel	0.035	0.185	0.000	1.000	0.076	0.265	0.000	1.000
Finance	0.026	0.160	0.000	1.000	0.013	0.113	0.000	1.000
Real estate	0.203	0.402	0.000	1.000	0.064	0.245	0.000	1.000
Other, n.e.c.	0.152	0.359	0.000	1.000	0.133	0.340	0.000	1.000
Public	0.140	0.347	0.000	1.000	0.051	0.221	0.000	1.000
Education	0.023	0.151	0.000	1.000	0.009	0.094	0.000	1.000
Observations		21,190,781				1,132,268		