Appendix: The Impact of Multinationals Along the Job Ladder

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A Additional data tables and figures

Table 1: Summary statistics: Poaching index sample

	All		Domestic		MN	
	mean	sd	mean	sd	mean	sd
	Worker-years					
Log wage[a]	0.02	0.79	-0.02	0.79	0.14	0.76
Age	38.54	12.60	38.55	12.75	38.51	11.99
Yrs of education	12.68	2.04	12.62	2.04	12.89	2.04
Tenure	4.35	4.69	4.32	4.65	4.45	4.83
Ability[b]	5.29	1.80	5.24	1.80	5.45	1.79
Observations	9,852,743		7,754,9870		2,070,756	
	Establishment-years					
Log employment	2.39	1.02	2.33	0.98	2.90	1.18
Mean log wage	-0.18	0.57	-0.21	0.56	0.00	0.57
Share medium skilled[c]	0.52	0.24	0.52	0.24	0.52	0.21
Share high skilled[d]	0.17	0.23	0.16	0.23	0.22	0.23
Poaching index	0.72	0.15	0.71	0.15	0.77	0.13
Foreign owned	0.11					
Observations	454,409		403,442		50,967	

Notes: Sample of worker-years is worker-years where worker is attached to an establishment for which the poaching index is defined. Sample of establishment-years is establishments for which the poaching index is defined. [a]Log wage is the residual from a regression of log wage at the worker level on year dummies. [b]Cognitive scores (1-9) are available from military records for men born between 1950 and 1993. [c]Medium-skilled workers are those with some high school, high school completed, or with a vocational degree. [d]High skilled workers have a BA or above.

Table 2: Establishments and employment by industry and ownership

	Establishment-years		Worker-years	
	Domestic	MN	Domestic	MN
Agriculture	27,741	46	156,669	800
Fishing	6,993	460	41,687	5,213
Mining	4,076	1,216	121,169	70,318
Manufacturing	105,217	9,497	1,903,557	596,613
Utilities	7,980	122	152,088	1,419
Construction	128,344	3,074	1,074,958	146,129
Wholesale & retail	348,107	37,509	2,363,550	564,255
Hotels & restaurants	56,977	2,109	525,985	60,406
Transport, storage, & communication	96,933	4,587	1,197,380	170,524
Financial intermediation	10,067	2,722	360,305	72,932
Real estate & business services	201,264	12,882	1,395,324	476,625
Public admin, educ. & health	347	4	4,203	23
Other services	94,854	1,518	617,578	30,040
Total	1,097,900	75,746	9,914,483	2,195,297

Notes: Used to construct Figure 1 in the paper.

Table 3: Transitions by poaching index decile for EE movers

		Destination										
		1	2	3	4	5	6	7	8	9	10	n/a
Source	1	8.8	12.0	9.7	11.0	10.1	10.4	8.1	6.5	5.1	4.2	14.2
	2	6.7	11.2	9.1	11.2	10.3	11.9	9.0	7.1	5.6	4.4	13.5
	3	5.0	9.1	8.5	10.9	10.6	11.4	9.8	8.4	7.6	5.1	13.8
	4	3.8	7.5	7.3	9.8	10.6	11.6	10.8	8.8	8.9	7.2	13.6
	5	2.8	5.8	6.1	8.6	10.0	11.9	11.4	9.8	10.8	8.9	13.8
	6	2.4	4.5	4.8	7.3	8.6	12.0	12.2	11.6	13.0	10.6	13.1
	7	1.8	3.4	3.8	5.9	7.5	10.4	11.6	12.1	16.3	14.1	13.2
	8	1.3	2.7	2.9	4.5	6.3	8.7	10.8	12.3	17.0	20.6	12.9
	9	0.9	1.9	2.2	3.5	5.2	7.5	9.2	12.1	17.7	27.5	12.4
	10	0.6	1.2	1.4	2.4	3.4	5.6	7.5	9.9	20.0	36.5	11.5

Notes: Percentage of job-to-job transitions originating in an establishment of a given poaching index decile, by poaching index decile of the destination establishment. n/a refers to establishments for which the poaching index is not defined. This table is used to construct Figure 2 in the paper.

Table 4: Establishment characteristics by poaching index decile

Decile	Poaching index	Avg log wage	Size	Separation rate
1	0.456	-0.679	11.7	0.353
2	0.581	-0.509	14.6	0.336
3	0.638	-0.400	15.7	0.330
4	0.680	-0.330	19.1	0.325
5	0.719	-0.225	21.0	0.313
6	0.755	-0.143	24.4	0.310
7	0.790	-0.047	24.8	0.297
8	0.825	0.033	25.8	0.291
9	0.863	0.158	28.9	0.285
10	0.912	0.233	29.1	0.291

Notes: Averages across establishments by poaching index decile. Average log wage is mean across all establishments of establishment-level average of residual from regressing worker-level log wages on year fixed effects. Share of separations calculated as #employees from previous year who are no longer employed over employment in current year. Columns 1 and 4 are used to construct Figure 3 in the paper.

Table 5: Summary statistics on wage changes for stayers and movers

	p10	p25	p50	p75	p990	Mean	s.d.	N
Stayers	-0.17	-0.06	0.01	0.10	0.26	0.03	0.27	5,311,167
EE movers	-0.22	-0.07	0.05	0.24	0.63	0.13	0.29	987,974

Notes: Wage changes constructed using residuals from regression of log wage on year dummies. Distribution of change in log residual wage between year $t-1$ and year $t+1$. Job stayers are at the same establishment at $t-1$, t, and $t+1$. EE movers are at original establishment in November of year $t-1$, and new establishment in November of years t and $t+1$. Top and bottom percentiles of the distribution are dropped.

Table 6: Multinational wage premia

dep var:	No worker char.			Worker char.			Worker f.e.		
ln(wage)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
foreign	0.081**	0.047**	0.030**	0.067**	0.035**	0.028**	0.031**	0.012**	0.007**
	(0.006)	(0.006)	(0.005)	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
poach index		1.075**	0.791**		0.620**	0.528**		0.509**	0.418**
		(0.032)	(0.024)		(0.020)	(0.017)		(0.016)	(0.014)
ln(size)			0.010**			0.004*			0.010**
			(0.002)			(0.002)			(0.001)
sh med-skill			0.572**			0.187**			0.218**
			(0.020)			(0.013)			(0.007)
sh high-skill			0.962**			0.395**			0.377**
			(0.024)			(0.017)			(0.009)
sh female			-0.371**			-0.109**			-0.095**
			(0.010)			(0.008)			(0.005)
const	11.573**	11.006**	11.038**	8.445**	8.249**	8.262**			
	(0.028)	(0.050)	(0.042)	(0.027)	(0.038)	(0.037)			
R^2	0.24	0.28	0.31	0.50	0.53	0.54	0.79	0.81	0.81
N	12001918	9825743	9825743	11819642	9669646	9669646	11735499	9552034	9552034

Notes: Worker characteristics include age, age squared, tenure, tenure squared, indicators for education level (primary secondary, high school, vocational, BA, MA, PhD; omitted category is no secondary) and female dummy. All regressions include year, 3-digit industry and labor market region dummies. Standard errors are clustered at the establishment level. ** significant at 5%, * significant at 10%.

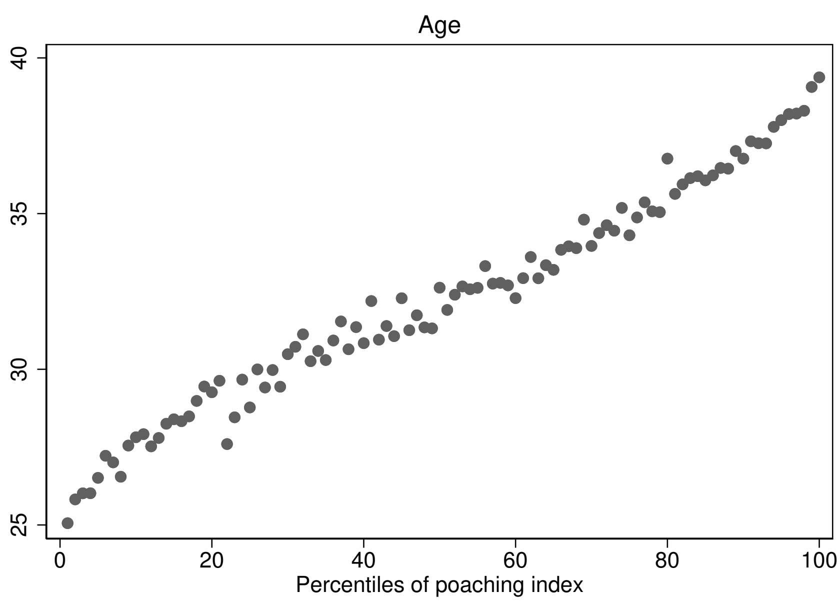


Figure 1: Average age of employees along the job ladder

Notes: Figure plots average age of employees for establishments by percentiles of the poaching index. The poaching index is constructed as described in the text.

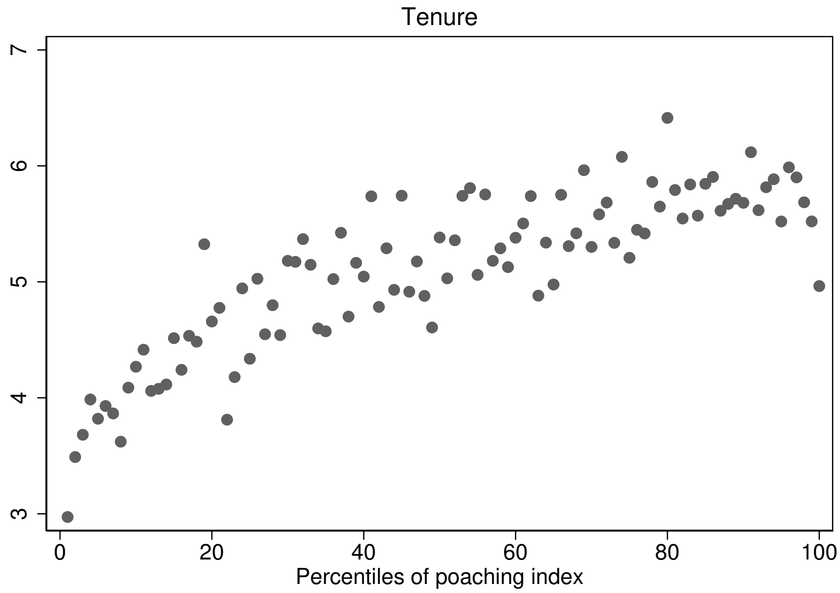


Figure 2: Average tenure of employees along the job ladder

Notes: Figure plots average tenure of employees for establishments by percentiles of the poaching index. The poaching index is constructed as described in the text.

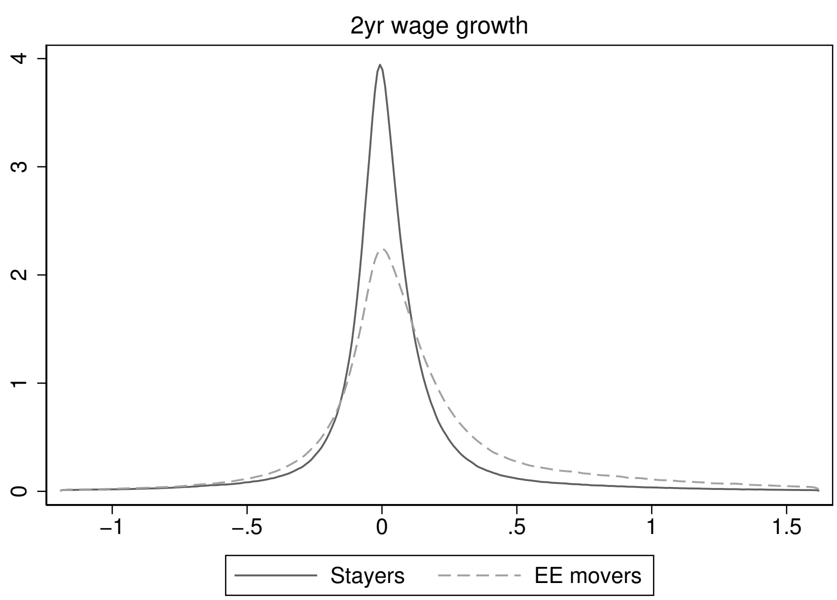


Figure 3: Distribution of 2-year wage gains for job stayers and EE movers

Notes: Wage changes constructed using residuals from regression of log wage on year dummies. Distribution of change in log residual wage between year $t-1$ and year $t+1$. Job stayers are at the same establishment at $t-1$, t, and $t+1$. EE movers are at original establishment in November of year $t-1$, and new establishment in November of years t and $t+1$. Top and bottom percentiles of the distribution are dropped.

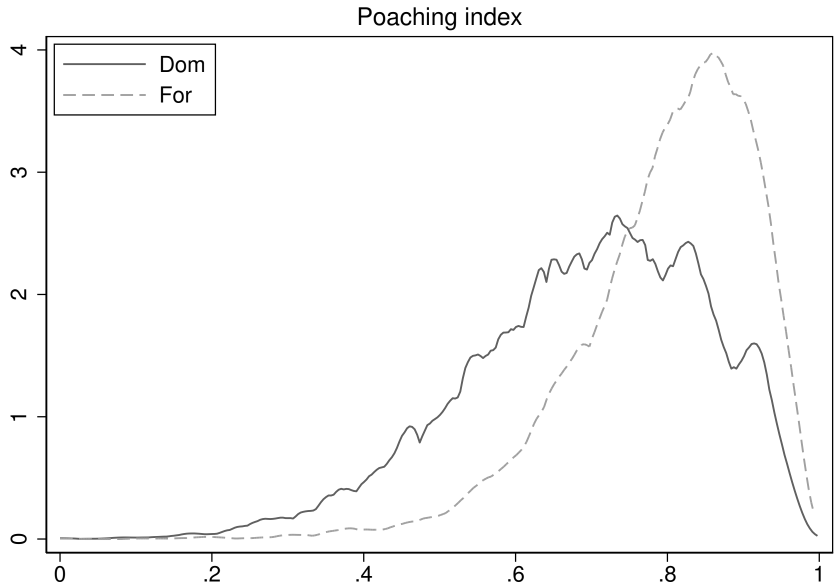


Figure 4: Poaching index distribution: Firms

Notes: Kernel density distribution of the poaching index by firm ownership. The poaching index is constructed as described in the text.

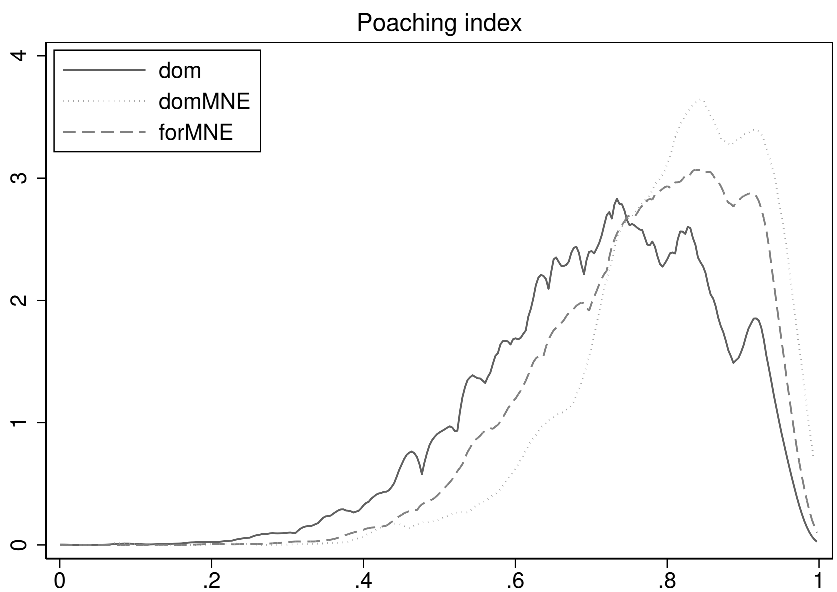


Figure 5: Poaching index distribution including domestic-owned multinationals

Notes: Kernel density distribution of the poaching index by establishment ownership. The poaching index is constructed as described in the text.

B Model: derivations

B.1 Worker value functions, wage functions and productivity cutoff

We can work with the worker value functions to get the expressions for wages in the paper.

Let $F(p)$ be the cdf, and let $f(p)$ be the pdf of the *job offer* distribution, which is defined over the range where firms are active, $\left[\underline{p}, \bar{p}\right]$. We will eventually derive how these distributions are endogenously determined.

B.1.1 Employed worker value function

The value function for a worker paid wage w at firm of type p is:

$$W(w,p) = w + \beta \begin{bmatrix} \delta U + (1-\delta)(1-\lambda s_e) W(w,p) + \\ (1-\delta)\lambda s_e \begin{pmatrix} \int_{\underline{p}}^{q(w,p)} W(w,p) f(x)\, dx + \\ \int_{q(w,p)}^{p} W(w(x,p),p) f(x)\, dx + \\ \int_{p}^{\bar{p}} W(w(p,x),x) f(x)\, dx \end{pmatrix} \end{bmatrix}$$

Since the value of a worker who meets another firm with productivity $< q(w,p)$ is invariant to the productivity of that other firm, this can be rearranged to get:

$$\begin{aligned} &(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p))))) W(w,p) \\ &= w + \beta \begin{bmatrix} \delta U + \\ (1-\delta)\lambda s_e \begin{pmatrix} \int_{q(w,p)}^{p} W(w(x,p),p) f(x)\, dx + \\ \int_{p}^{\bar{p}} W(w(p,x),x) f(x)\, dx \end{pmatrix} \end{bmatrix} \end{aligned}$$

Moreover, we can make use of the fact that wages are set such that workers receive fraction ϕ of match surplus:

$$W(w(q,p),p) = \phi W(p,p) + (1-\phi) W(q,q)$$

to get

$$
\begin{aligned}
&\left(1-\beta\left(1-\delta\right)\left(1-\lambda s_e\left(1-F\left(q\left(w,p\right)\right)\right)\right)\right)W\left(w,p\right)\\
&=w+\beta\left[\begin{array}{c}\delta U+\\ \left(1-\delta\right)\lambda s_e\left(\begin{array}{c}\int_{q(w,p)}^{p}\left[\phi W\left(p,p\right)+\left(1-\phi\right)W\left(x,x\right)\right]f\left(x\right)dx+\\ \int_{p}^{\bar{p}}\left[\phi W\left(x,x\right)+\left(1-\phi\right)W\left(p,p\right)\right]f\left(x\right)dx\end{array}\right)\end{array}\right]
\end{aligned}
$$

This can be rearranged to get:

$$
\begin{aligned}
&\left(1-\beta\left(1-\delta\right)\left(1-\lambda s_e\left(1-F\left(q\left(w,p\right)\right)\right)\right)\right)W\left(w,p\right)\\
&=w+\beta\left[\begin{array}{c}\delta U+\\ \left(1-\delta\right)\lambda s_e\left(\begin{array}{c}\phi W\left(p,p\right)\left(F\left(p\right)-F\left(q\left(w,p\right)\right)\right)+\left(1-\phi\right)\int_{q(w,p)}^{p}W\left(x,x\right)f\left(x\right)dx+\\ \phi\int_{p}^{\bar{p}}W\left(x,x\right)f\left(x\right)dx+\left(1-\phi\right)W\left(p,p\right)\left(1-F\left(p\right)\right)\end{array}\right)\end{array}\right]
\end{aligned}
$$

Now we apply integration by parts to the integral terms in the above expression.

$$
\int_{q(w,p)}^{p}W\left(x,x\right)f\left(x\right)dx=\left[\begin{array}{c}W\left(p,p\right)F\left(p\right)-W\left(q\left(w,p\right),q\left(w,p\right)\right)F\left(q\left(w,p\right)\right)\\ -\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}F\left(x\right)dx\end{array}\right]
$$

$$
\int_{p}^{\bar{p}}W\left(x,x\right)f\left(x\right)dx=W\left(\bar{p},\bar{p}\right)-W\left(p,p\right)F\left(p\right)-\int_{p}^{\bar{p}}\frac{dW\left(x,x\right)}{dx}F\left(x\right)dx
$$

We substitute these expressions into the value function, and rearrange to obtain:

$$
\left(1-\beta\left(1-\delta\right)\left(1-\lambda s_e\left(1-F\left(q\left(w,p\right)\right)\right)\right)\right)W\left(w,p\right)=
$$

$$w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}-\phi W(p,p)F(q(w,p))+\\ -(1-\phi)\left[W(q(w,p),q(w,p))F(q(w,p))+\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}F(x)\,dx\right]+\\ \phi\left[W(\bar{p},\bar{p})-\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)\,dx\right]+\\ (1-\phi)W(p,p)\end{array}\right)\end{array}\right]$$

Now again use the fact that wages are set to deliver workers a fraction ϕ of match surplus, so $\phi W(p,p)-W(w,p)=-(1-\phi)W(q(w,p),q(w,p))$ to substitute out for $-(1-\phi)W(q(w,p),q(w,p))$. Rearranging:

$$(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p)))))W(w,p)=$$

$$w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}-W(w,p)F(q(w,p))\\ (1-\phi)W(p,p)-(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}F(x)\,dx+\\ \phi W(\bar{p},\bar{p})-\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)\,dx\end{array}\right)\end{array}\right]$$

Now by definition of integration,

$$\left[\begin{array}{c}(1-\phi)W(q(w,p),q(w,p))+\\ (1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}(1-F(x))\,dx\end{array}\right]=\left[\begin{array}{c}(1-\phi)W(p,p)\\ -(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}F(x)\,dx\end{array}\right]$$

and

$$\phi W(p,p)+\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}(1-F(x))\,dx=\phi W(\bar{p},\bar{p})-\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)\,dx$$

Making use of these expressions, we get:

$$(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p)))))W(w,p)=$$

$$
w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}-W(w,p)F(q(w,p))\\ (1-\phi)W(q(w,p),q(w,p))+(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}(1-F(x))dx+\\ \phi W(p,p)+\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}(1-F(x))dx\end{array}\right)\end{array}\right]
$$

Now again make use of $W(w,p)-\phi W(p,p)=(1-\phi)W(q(w,p),q(w,p))$ to get

$$
(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p)))))W(w,p)=
$$

$$
w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}-W(w,p)F(q(w,p))\\ W(w,p)-\phi W(p,p)+(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}(1-F(x))dx+\\ \phi W(p,p)+\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}(1-F(x))dx\end{array}\right)\end{array}\right]
$$

so

$$
(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p)))))W(w,p)-\beta(1-\delta)\lambda s_e(1-F(q(w,p)))W(w,p)=
$$

$$
w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}+(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}(1-F(x))dx+\\ +\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}(1-F(x))dx\end{array}\right)\end{array}\right]
$$

and

$$
(1-\beta(1-\delta))W(w,p)=
$$

$$
w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}+(1-\phi)\int_{q(w,p)}^{p}\frac{dW(x,x)}{dx}(1-F(x))dx+\\ +\phi\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}(1-F(x))dx\end{array}\right)\end{array}\right]
$$

Now take the following expression (from way back at the beginning):

$$(1-\beta(1-\delta)(1-\lambda s_e(1-F(q(w,p)))))W(w,p)$$

$$=w+\beta\left[\begin{array}{c}\delta U+\\ (1-\delta)\lambda s_e\left(\begin{array}{c}\phi W(p,p)(F(p)-F(q(w,p)))+(1-\phi)\int_{q(w,p)}^{p}W(x,x)f(x)dx+\\ \phi\int_{p}^{\bar{p}}W(x,x)f(x)dx+(1-\phi)W(p,p)(1-F(p))\end{array}\right)\end{array}\right]$$

and set $w=p$, and use $q(p,p)=p$:

$$(1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(p))))W(p,p)=p+\beta\left[\delta U+(1-\delta)\lambda s_e\ \phi\int_{p}^{\bar{p}}W(x,x)f(x)dx\ \right]$$

Apply integration by parts to the last term:

$$\int_{p}^{\bar{p}}W(x,x)f(x)dx=W(\bar{p},\bar{p})-W(p,p)F(p)-\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)dx$$

Plugging this back in we get:

$$(1-\beta(1-\delta)(1-\phi\lambda s_e))W(p,p)$$

$$=p+\beta\left[\delta U+(1-\delta)\lambda s_e\phi\left(W(\bar{p},\bar{p})-\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)dx\right)\right]$$

Now set $p=\bar{p}$ to get:

$$W(\bar{p},\bar{p})=\frac{\bar{p}+\beta\delta U}{1-\beta(1-\delta)}$$

Substitute this back in:

$$W(p,p)=\frac{p+\beta\delta U+\beta(1-\delta)\lambda s_e\phi\ \left(\frac{\bar{p}+\beta\delta U}{1-\beta(1-\delta)}-\int_{p}^{\bar{p}}\frac{dW(x,x)}{dx}F(x)dx\right)}{1-\beta(1-\delta)(1-\phi\lambda s_e)}$$

Take the derivative with respect to p (using Leibnitz rule) to get:

$$\frac{dW(p,p)}{dp}=\frac{1}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(p)))}$$

Now we are in a position to substitute back in to get the expression for $W(w,p)$:

$$W(w,p) = \frac{w+\beta\delta U}{1-\beta(1-\delta)} + \frac{\beta(1-\delta)\lambda s_e}{1-\beta(1-\delta)} \left[\begin{array}{c} (1-\phi)\int_{q(w,p)}^{p} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx+ \\ \\ +\phi\int_{p}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx \end{array} \right]$$

B.1.2 Wage function for worker hired from employment

Now we derive the wage function, $w(q,p)$. Remember that:

$$W(w(q,p),p) - \phi W(p,p) - (1-\phi)W(q,q) = 0$$

so

$$(1-\beta(1-\delta))(W(w(q,p),p) - \phi W(p,p) - (1-\phi)W(q,q)) = 0$$

Now we know from the expression we have just derived for $W(w,p)$ that

$$(1-\beta(1-\delta))W(w(q,p),p) = w(q,p)+\beta\delta U+\beta(1-\delta)\lambda s_e \left[\begin{array}{c} (1-\phi)\int_{q}^{p} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx+ \\ \\ +\phi\int_{p}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx \end{array} \right]$$

and

$$-\phi(1-\beta(1-\delta))W(p,p) = -\phi p-\phi\beta\delta U-\beta(1-\delta)\lambda s_e \left[\phi^2 \int_{p}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx\right]$$

and

$$-(1-\phi)(1-\beta(1-\delta))W(q,q)$$

$$= -(1-\phi)q-(1-\phi)\beta\delta U-\beta(1-\delta)\lambda s_e \left[\begin{array}{c} \phi(1-\phi)\int_{q}^{p} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx+ \\ \\ \phi(1-\phi)\int_{p}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx \end{array} \right]$$

Summing these terms:

$$0 = w(q,p)-\phi p-(1-\phi)q+\beta(1-\delta)\lambda s_e(1-\phi)^2 \int_{q}^{p} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx$$

Rearranging, we get the wage function for a worker hired by firm of type p from firm of type q:

$$w(q,p) = \phi p + (1-\phi) q - (1-\phi)^2 \int_q^p \frac{\beta(1-\delta)\lambda s_e (1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx$$

B.1.3 Unemployed worker value function

The value function for an unemployed worker is:

$$U = b + \beta\left[(1-\lambda s_u) U + \lambda s_u \int_{\underline{p}}^{\bar{p}} W(w_0(p), p) f(p) dp\right]$$

Making use of the fact that according to the wage protocol, $W(w_0(p), p) = (1-\phi) U + \phi W(p,p)$, we get

$$U = b + \beta\left[(1-\lambda s_u) U + \lambda s_u \int_{\underline{p}}^{\bar{p}} ((1-\phi) U + \phi W(p,p)) f(p) dp\right]$$

so

$$U = b + \beta\left[(1-\phi\lambda s_u) U + \phi\lambda s_u \int_{\underline{p}}^{\bar{p}} W(p,p) f(p) dp\right]$$

and

$$U = \frac{b}{1-\beta(1-\phi\lambda s_u)} + \frac{\beta\phi\lambda s_u}{1-\beta(1-\phi\lambda s_u)} \int_{\underline{p}}^{\bar{p}} W(p,p) f(p) dp$$

Now define $\underline{p}$ to be the level of productivity such that the unemployed are indifferent between taking an offer from firm of type $\underline{p}$ and remaining unemployed:

$$W\left(w\left(\underline{p},\underline{p}\right), \underline{p}\right) = W\left(\underline{p},\underline{p}\right) = U$$

Use integration by parts to get:

$$\int_{\underline{p}}^{\bar{p}} W(p,p) f(p) dp = W(\bar{p},\bar{p}) F(\bar{p}) - W\left(\underline{p},\underline{p}\right) F\left(\underline{p}\right) - \int_{\underline{p}}^{\bar{p}} \frac{dW(p,p)}{dp} F(p) dp$$

$$\int_{\underline{p}}^{\bar{p}} W(p,p) f(p) dp = W(\bar{p},\bar{p}) - \int_{\underline{p}}^{\bar{p}} \frac{dW(p,p)}{dp} F(p) dp$$

Now note that by definition of integration

$$\int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1-F(x)) dx = W(\bar{p},\bar{p}) - W\left(\underline{p},\underline{p}\right) - \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} F(x) dx$$

so

$$W(\bar{p},\bar{p}) - \int_{\underline{p}}^{\bar{p}} \frac{dW(p,p)}{dp} F(p)\, dp = W\left(\underline{p},\underline{p}\right) + \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx$$

And making use of $W\left(\underline{p},\underline{p}\right) = U$ we get

$$W(\bar{p},\bar{p}) - \int_{\underline{p}}^{\bar{p}} \frac{dW(p,p)}{dp} F(p)\, dp = U + \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx$$

Now substitute back into the value function of the unemployed:

$$U = \frac{b}{1 - \beta(1 - \phi\lambda s_u)} + \frac{\beta\phi\lambda s_u}{1 - \beta(1 - \phi\lambda s_u)} \left[U + \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx \right]$$

Rearrange

$$(1 - \beta(1 - \phi\lambda s_u)) U = b + \beta\phi\lambda s_u \left[U + \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx \right]$$

$$(1 - \beta) U = b + \beta\phi\lambda s_u \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx$$

$$U = \frac{b}{1-\beta} + \frac{\beta\phi\lambda s_u}{1-\beta} \int_{\underline{p}}^{\bar{p}} \frac{dW(x,x)}{dx} (1 - F(x))\, dx$$

Now make use of

$$\frac{dW(p,p)}{dp} = \frac{1}{1 - \beta(1-\delta)(1 - \phi\lambda s_e(1 - F(p)))}$$

to get

$$U = \frac{b}{1-\beta} + \frac{\beta\phi\lambda s_u}{1-\beta} \int_{\underline{p}}^{\bar{p}} \frac{1 - F(x)}{1 - \beta(1-\delta)(1 - \phi\lambda s_e(1 - F(p)))} dx$$

B.1.4 Lower bound for productivity

Take the value function for employed workers:

$$W(w,p) = \frac{w + \beta\delta U}{1 - \beta(1-\delta)} + \frac{\beta(1-\delta)\lambda s_e}{1 - \beta(1-\delta)} \left[\begin{array}{c} (1-\phi) \int_{q(w,p)}^{p} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx + \\ \\ +\phi \int_{p}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx \end{array} \right]$$

Now by definition of $\underline{p}$, a firm of type $\underline{p}$ pays a wage of $\underline{p}$ to all workers it hires. This implies:

$$(1-\beta(1-\delta)) W\left(\underline{p},\underline{p}\right) = \underline{p}+\beta\delta U+\beta(1-\delta)\phi\lambda s_e \int_{\underline{p}}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx$$

Making use of $W\left(\underline{p},\underline{p}\right)=U$ we get

$$(1-\beta)U = \underline{p}+\beta(1-\delta)\phi\lambda s_e \int_{\underline{p}}^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx$$

Now remember that the value function for the unemployed is

$$U = \frac{b}{1-\beta}+\frac{\beta\phi\lambda s_u}{1-\beta}\int_{\underline{p}}^{\bar{p}} \frac{1-F(x)}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(p)))}dx$$

so rearranging:

$$(1-\beta)U = b+\beta\phi\lambda s_u\int_{\underline{p}}^{\bar{p}} \frac{1-F(x)}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(p)))}dx$$

and equating the two expressions for $(1-\beta)U$ we get:

$$\underline{p} = b+\beta\phi\lambda(s_u-(1-\delta)s_e)\int_{\underline{p}}^{\bar{p}} \frac{1-F(x)}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(p)))}dx$$

This expression implicitly defines $\underline{p}$ given $F(p)$ and λ. Note that $\underline{p}>b$ as long as $s_u > (1-\delta)s_e$.

B.1.5 Wage function for workers hired from unemployment

Remember that the wage function for a worker hired by firm of type p from firm of type q is:

$$w(q,p) = \phi p+(1-\phi)q-(1-\phi)^2\int_q^p \frac{\beta(1-\delta)\lambda s_e(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx$$

This implies

$$w_0(p) = w\left(\underline{p},p\right) = \phi p+(1-\phi)\underline{p}-(1-\phi)^2\int_{\underline{p}}^p \frac{\beta(1-\delta)\lambda s_e(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))}dx$$

B.2 Steady state labor flows and worker distribution

B.2.1 Workers in unemployment

In steady state, flows into unemployment must equal flows out of unemployment. Note that the only flows into unemployment are from random separations (there are no endogenous separations to unemployment, only to employment):

$$\delta\left(1-u\right)=\lambda s_u u$$

so

$$u=\frac{\delta}{\lambda s_u+\delta}$$

Remember λ is endogenous, determined in general equilibrium.

B.2.2 Workers in employment

Let $L\left(p\right)$ be the probability that an employed worker works at a firm with productivity $\leq p$. Let $l\left(p\right)$ be the associated pdf. Note that this is a distribution across *workers*, not across *firms*. Note also that since there are $\left(1-u\right)$ employed workers, $\left(1-u\right)L\left(p\right)$ is the *measure* of workers working at firms with productivity $\leq p$. In steady state, the outflow of workers from firms of type p must equal the inflow of workers into firms of type p:

$$\left[\delta+\left(1-\delta\right)s_e\lambda\left(1-F\left(p\right)\right)\right]\left(1-u\right)l\left(p\right)=\lambda\left[us_u+\left(1-u\right)\left(1-\delta\right)s_eL\left(p\right)\right]f\left(p\right)$$

Now make use of

$$\delta\left(1-u\right)=\lambda s_u u$$

$$\left[\delta+\left(1-\delta\right)s_e\lambda\left(1-F\left(p\right)\right)\right]l\left(p\right)=\left[\delta+\lambda\left(1-\delta\right)s_eL\left(p\right)\right]f\left(p\right)$$

Rearranging, we get

$$l\left(p\right)=\left(\frac{\delta+\left(1-\delta\right)\lambda s_eL\left(p\right)}{\delta+\left(1-\delta\right)\lambda s_e\left(1-F\left(p\right)\right)}\right)f\left(p\right)$$

B.3 Vacancy posting decision and offer distribution

Define $J\left(q,p\right)$ to be the value to a firm of productivity p of employing a worker with outside option q. We know the worker gets the value of their outside option, $W\left(p,p\right)$, plus fraction ϕ of match surplus, $W\left(p,p\right)-W\left(q,q\right)$. Meanwhile, the firm gets the value of its outside option, 0, plus fraction $(1-\phi)$ of match surplus. So

$$J(q,p) = (1-\phi)(W(p,p) - W(q,q))$$

$$J(q,p) = W(p,p) - (\phi W(p,p) - (1-\phi) W(q,q))$$

$$J(q,p) = W(p,p) - W(q,p)$$

We can now make use of the expression we have already derived for $W(q,p)$:

$$W(q,p) = \frac{w(q,p) + \beta\delta U}{1-\beta(1-\delta)} + \frac{\beta(1-\delta)\lambda s_e}{1-\beta(1-\delta)} \left[\begin{array}{c} (1-\phi)\int_q^p \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx + \\ \\ +\phi\int_p^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx \end{array} \right]$$

$$W(p,p) = \frac{p + \beta\delta U}{1-\beta(1-\delta)} + \frac{\beta(1-\delta)\lambda s_e}{1-\beta(1-\delta)} \left[\phi \int_p^{\bar{p}} \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx \right]$$

so

$$J(q,p) = \frac{p - w(q,p)}{1-\beta(1-\delta)} - \frac{\beta(1-\delta)\lambda s_e(1-\phi)}{1-\beta(1-\delta)} \left[\int_q^p \frac{(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx \right]$$

Now, make use of the wage function:

$$w(q,p) = \phi p + (1-\phi) q - (1-\phi)^2 \int_q^p \frac{\beta(1-\delta)\lambda s_e(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx$$

so

$$\frac{-w(q,p)}{1-\beta(1-\delta)} = \frac{-\phi p - (1-\phi) q}{1-\beta(1-\delta)} + \frac{(1-\phi)^2}{1-\beta(1-\delta)} \int_q^p \frac{\beta(1-\delta)\lambda s_e(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx$$

Substituting in to the expression for $J(q,p)$, we get

$$J(q,p) = \frac{(1-\phi)}{1-\beta(1-\delta)} \left((p-q) - \int_q^p \frac{\phi\beta(1-\delta)\lambda s_e(1-F(x))}{1-\beta(1-\delta)(1-\phi\lambda s_e(1-F(x)))} dx \right)$$

Note that the vacancy posting decision does not depend on the firm's current stock of workers, nor the distribution of wages across these workers.

The value to a firm with productivity p of posting v vacancies is:

$$B(p,v) = \max_{v} \left\{ \chi v \left[\frac{us_u}{S} J\left(\underline{p}, p\right) + \frac{(1-u)(1-\delta)s_e}{S} \left(\int_{\underline{p}}^{p} J(x,p)\, l(x)\, dx \right) \right] - c(v) \right\}$$

Note that $l(p)$ gives the measure of employed workers working at a firm of type p so this is all that is needed inside the second term. The first order condition is:

$$\chi \left[\frac{us_u}{S} J\left(\underline{p}, p\right) + \frac{(1-u)(1-\delta)s_e}{S} \left(\int_{\underline{p}}^{p} J(x,p)\, l(x)\, dx \right) \right] = c'(v)$$

This implicitly defines $v(p)$, the measure of vacancies posted by firm of type p.

Given $v(p)$, the pdf of the job offer distribution, $f(p)$, is given by

$$f(p) = \frac{Mv(p)\gamma(p)}{V}$$

and integration gives us the cdf $F(p)$ we have been working with.

Note that the optimal vacancy policy $v(p)$ depends only on p, and not on current employment, so all firms of type p post the same measure of vacancies irrespective of age. Assume that we are in a stationary equilibrium where $\Gamma(p)$, $\gamma(p)$, M, and therefore $F(p)$, $f(p)$, χ, λ and u are fixed. Then the value of a firm with productivity p which enters a period with zero employees is given by

$$\tilde{B}(p) = \frac{B(p, v(p))}{1-(1-\delta_f)\beta}$$

B.4 Firm size distribution

In steady state, $\bar{e}(p)$, the *average* measure of workers employed at a firm of type p (i.e. the average size of a firm of type p) is given by the total measure of workers employed at firms of type p, i.e. $(1-u)\,l(p)$, divided by the measure of firms of type p, i.e. $\gamma(p)\,M$, where M is the total measure of firms. This implies:

$$\bar{e}(p) = \frac{(1-u)\,l(p)}{M\gamma(p)}$$

There will be a size distribution of firms of type p. Per period hires by firms of type p are given by:

$$h(p) = v(p)\,\chi \left(\frac{us_u + (1-u)(1-\delta)s_e L(p)}{S} \right)$$

with

$$\chi = \lambda \left(\frac{S}{V} \right)$$

so

$$h(p) = \frac{v(p)}{V} (1-u) (\delta + (1-\delta) \lambda s_e L(p))$$

Firms that are just born (age $a = 1$) have size:

$$e(p,1) = h(p)$$

Firms of type p which have survived to age 2 have size

$$e(p,2) = h(p) + h(p)(1-\delta_m)(1 - \lambda s_e (1 - F(p))) = h(p)(1 + z(p))$$

where

$$z(p) = (1-\delta_m)(1 - \lambda s_e (1 - F(p))) < 1$$

Firms of type p which have survived to age a have size

$$e(p,a) = h(p) \left(1 + z(p) + z(p)^2 + \ldots + z(p)^{a-1}\right)$$

$$e(p,a) = h(p) \left(\frac{1 - z(p)^a}{1 - z(p)} \right)$$

Long-run size for surviving firms of type p is

$$e^{ss}(p) = \lim_{a \to \infty} e(p,a) = \frac{h(p)}{1 - z(p)}$$

The fraction of firms of age a is given by $(1-\delta_f)^{a-1} \delta_f$. This is the same for all p.

B.5 Within-firm wage distribution

Let $G(w|p)$ be the CDF of wages at firm with productivity p, i.e. the share of employees with wage less than w. Note that $G(p|p) = 1$ because a firm with productivity p will never pay more than p.

The outflow of workers with wage less than or equal to w from firms of type p is given by:

$$[\delta + (1-\delta) \lambda s_e (1 - F(q(w,p)))] \, G(w|p) \, l(p) (1-u)$$

while the inflow is given by:

$$[\lambda s_u u + \lambda s_e (1-\delta)(1-u) L(q(w,p))] f(p)$$

Remember that

$$\delta (1-u) = \lambda s_u u$$

so the inflow is:

$$[\delta + \lambda s_e (1-\delta) L(q(w,p))] f(p)(1-u)$$

In steady state, the inflow equals the outflow, so:

$$G(w|p) = \left[\frac{\delta + (1-\delta)\lambda s_e L(q(w,p))}{\delta + (1-\delta)\lambda s_e (1-F(q(w,p)))}\right] \frac{f(p)}{l(p)}$$

Let $g(w|p)$ be the associated pdf, $g(w|p) = \partial G(w|p)/\partial w$.

B.6 National income accounting

Output is given by

$$y = (1-u) \int_{\underline{p}}^{\bar{p}} l(p) p dp$$

This is divided between wage payments to workers, profits for firm owners (domestic and foreign), and resources used up in posting vacancies. The wage bill is:

$$wagebill = (1-u) \int_{\underline{p}}^{\bar{p}} \int_{\underline{p}}^{p} w(q,p) g(q|p) l(p) dq dp$$

Profits of domestic firms are:

$$profits_D = M_D \int_{\underline{p}}^{\bar{p}} \left[\bar{e}(p) \left(p - \int_{\underline{p}}^{p} w(q,p) g(q|p) dq\right) - c(v(p))\right] \gamma_D(p) dp$$

while profits of multinationals are:

$$profits_F = M_F \int_{\underline{p}}^{\bar{p}} \left[\bar{e}(p) \left(p - \int_{\underline{p}}^{p} w(q,p) g(q|p) dq\right) - c(v(p))\right] \gamma_F(p) dp$$

Resources used up in posting vacancies are:

$$vacancycost = M \int_{\underline{p}}^{\bar{p}} c\left(v\left(p\right)\right)\gamma\left(p\right)dp$$

The measure of firms which die in each period is $\delta_f M$, so in the stationary equilibrium, $\delta_f M$ is the measure of new firms. But investment must also take account of entrants who pay the cost, but get a draw of productivity below the threshold $\underline{p}$. Domestic investment in new firms is given by:

$$entrycost_D = \delta_f M_D \int_{\underline{p}}^{\bar{p}} \frac{B\left(p, v\left(p\right)\right)}{1-\beta-\delta_f}\gamma_D\left(p\right)dp$$

Multinational investment in new affiliates is given by:

$$entrycost_F = \delta_f M_F \int_{\underline{p}}^{\bar{p}} \frac{B\left(p, v\left(p\right)\right)}{1-\beta-\delta_f}\gamma_F\left(p\right)dp$$

Value added is given by output less vacancy costs. This is equal to the wage bill plus total profits, including profits of both domestic and foreign-owned firms.

$$va = y - vacancycost = wagebill + profits_D + profits_F$$

Income of domestic residents is value added less profits rebated to the foreign owners of multinational affiliates:

$$income = wagebill + profits_D = va - profits_F$$

Domestic income is devoted to consumption of domestic agents, and investment by domestic agents:

$$income = cons + entrycost_D$$

Meanwhile, total investment in this economy is given by the sum of investment by domestic agents and investment by foreign agents:

$$inv = entrycost_D + entrycost_F$$

Value added is equal to the sum of consumption, investment and net exports:

$$va = cons + entrycost_D + entrycost_F + (profits_F - entrycost_F)$$

so net exports is given by:

$$nx = profits_F - entrycost_F$$

C Model extension: capital in the production function

Suppose that the production function in firm of type $\hat{p}$ is $y = \hat{p}k^{\kappa}l^{1-\kappa}$. Under the assumption that all firms face the same rental price of capital (exogenous, set on world markets), and there are no frictions in the rental market for capital, the marginal product of capital is equalized across all workers:

$$MP_k(\hat{p}) = \kappa\hat{p}k^{\kappa-1}l^{1-\kappa} = R$$

This implies that the optimal amount of capital hired by firm of type $\hat{p}$ is given by:

$$k(\hat{p}) = \left(\frac{\kappa\hat{p}}{R}\right)^{\frac{1}{1-\kappa}} l(\hat{p})$$

Meanwhile, the marginal product of labor in firm of type $\hat{p}$ is given by:

$$MP_l(\hat{p}) = (1-\kappa)\hat{p}(k(\hat{p})/l(\hat{p}))^{\kappa} = (1-\kappa)\hat{p}^{\frac{1}{1-\kappa}}\left(\frac{\kappa}{R}\right)^{\frac{\kappa}{1-\kappa}}$$

So making use of the optimal amount of capital, the marginal product of labor at firm of type $\hat{p}$ is:

$$MP_l(\hat{p}) = (1-\kappa)\left(\frac{\kappa}{R}\right)^{\frac{\kappa}{1-\kappa}}\hat{p}^{\frac{1}{1-\kappa}} = p$$

Payments to capital from firm of type $\hat{p}$ as a share of total output are given by:

$$\frac{Rk(\hat{p})}{\hat{p}k(\hat{p})^{\kappa}l(\hat{p})^{1-\kappa}} = \frac{R}{\hat{p}}\left(\frac{k(\hat{p})}{l(\hat{p})}\right)^{1-\kappa} = \kappa$$

This implies that our model can be reinterpreted as one where there is a standard Cobb-Douglas production function in capital and labor, capital gets share κ of output, and the remaining $(1-\kappa)$ share is divided between labor and firm profits. Marginal productivity p is the marginal productivity of *equipped* labor, and is a function of true underlying TFP $\hat{p}$, the rental price of capital R, and the capital share κ.

D Additional non-targeted moments: baseline calibration

Table 7: Summary statistics on workers and establishments: model

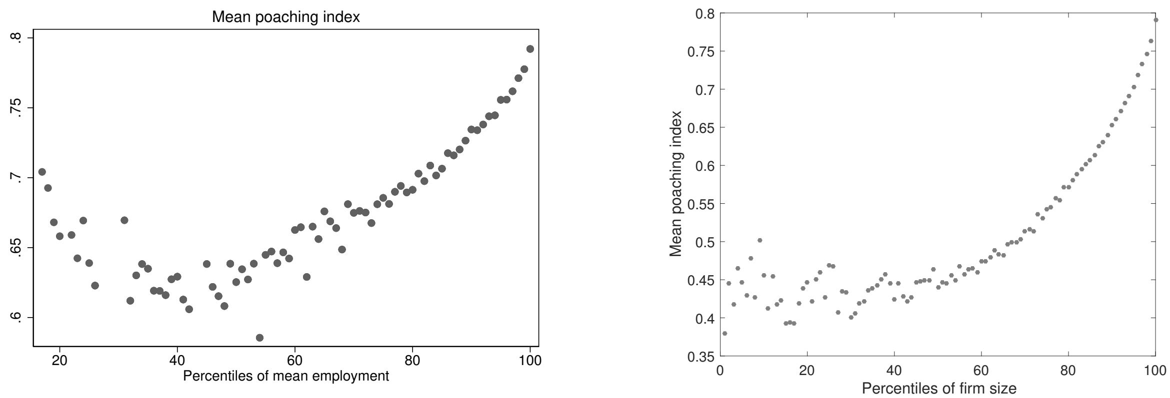
	All		Domestic		MN	
	mean	sd	mean	sd	mean	sd
	Worker-years					
Log wage	0.00	0.66	-0.08	0.64	0.37	0.57
	Establishment-years					
Log employment	1.61	1.24	1.56	1.19	2.49	1.54
Mean log wage	-0.71	0.44	-0.73	0.42	-0.40	0.56

Notes: Constructed using simulated data based on a panel of 1,200.000 workers over 10 years. Share of variance in worker-level wage that is within-firm in the model is 0.17 (data share is 0.21).

Table 8: Transitions by poaching index decile for EE movers: model

		Destination										
		1	2	3	4	5	6	7	8	9	10	n/a
Source	1	6.0	1.3	2.7	4.1	5.9	6.5	8.4	10.0	12.9	16.6	25.7
	2	5.4	1.1	2.1	3.5	5.3	6.3	8.6	10.0	13.2	17.3	27.4
	3	5.2	0.9	1.8	3.0	4.5	5.7	8.2	9.9	13.5	18.0	29.2
	4	5.1	0.9	1.7	2.7	4.2	5.3	7.5	9.7	13.8	18.3	30.7
	5	4.8	0.7	1.3	2.1	3.2	4.6	6.7	9.3	13.6	19.8	34.0
	6	5.1	0.7	1.2	1.8	2.9	3.9	5.9	8.5	13.5	19.9	36.6
	7	5.3	0.8	1.3	1.9	2.7	3.4	5.2	7.6	12.5	20.0	39.5
	8	5.9	0.8	1.1	1.7	2.4	2.8	4.3	6.5	11.1	19.9	43.6
	9	7.4	0.9	1.4	1.8	2.6	2.7	3.8	5.3	8.8	17.5	47.7
	10	11.2	1.4	2.0	2.7	3.6	3.4	4.3	5.3	7.1	12.8	46.2

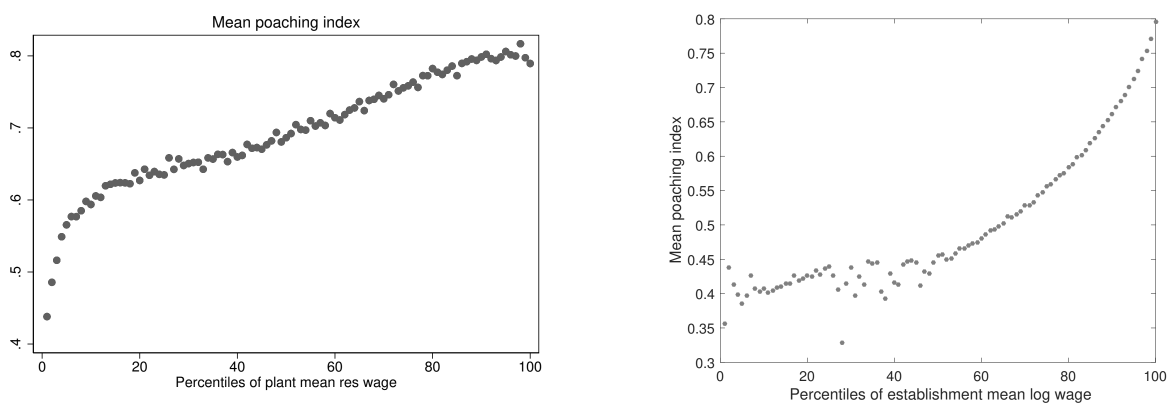
Notes: Constructed using simulated data based on a panel of 1,200,000 workers over 10 years. Percentage of job-to-job transitions originating in an establishment of a given poaching index decile, by poaching index decile of the destination establishment. n/a refers to establishments for which the poaching index is not defined. Share of transitions for which poaching index is defined for both origin and destination that move horizontally or up the ladder is 0.79. Corresponding share in the data is 0.66.



(a) Data (b) Model

Figure 6: Poaching index and size

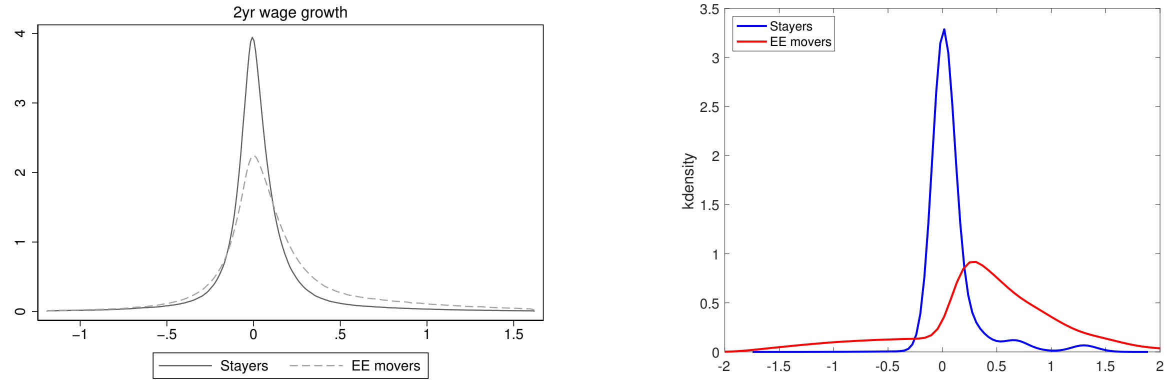
Notes: Panel (a) is based on dividing establishments in the data into bins by their percentiles of the size distribution, and constructing the average across all establishments within a size percentile of the poaching index. The vertical axis is the average of the poaching index, and the horizontal axis is percentile of the size distribution. Panel (b) is based on implementing the same exercise in the simulated data.



(a) Data (b) Model

Figure 7: Poaching index and wages

Notes: Panel (a) is based on dividing establishments in the data into bins by their percentiles of the establishment-level average log wage distribution, and constructing the average across all establishments within a size percentile of the poaching index. The vertical axis is the average of the poaching index, and the horizontal axis is percentile of the establishment wage distribution. Panel (b) is based on implementing the same exercise in the simulated data.



(a) Data (b) Model

Figure 8: Wage growth for job stayers and EE movers

Notes: Panel (a) uses the data to plot the distribution of change in log wage between year $t-1$ and year $t+1$. Job stayers are at the same establishment at $t-1$, t, and $t+1$. EE movers are at original establishment in November of year $t-1$, and new establishment in November of years t and $t+1$. Panel (b) shows the corresponding figure for the simulated data.

E Additional results on baseline counterfactual

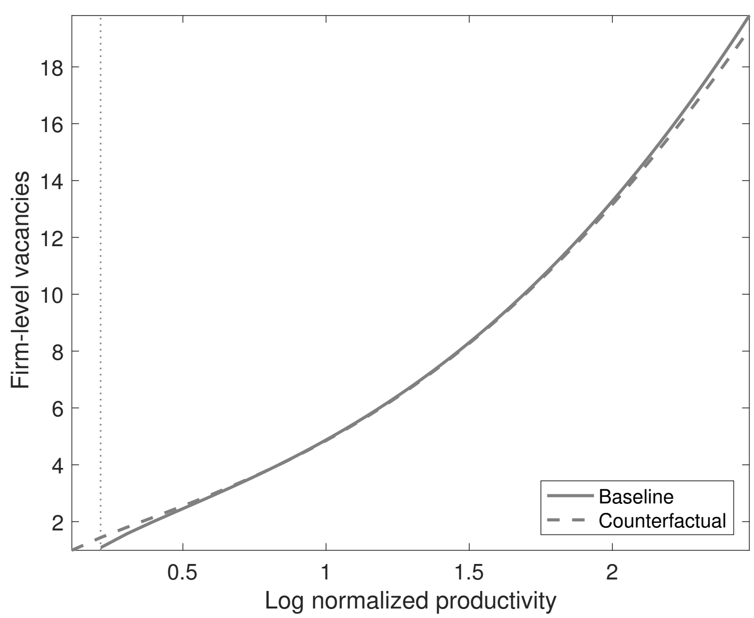


Figure 9: Firm-level vacancies in baseline and counterfactual

Notes: Figure plots firm-level vacancies by firm productivity in the baseline econonomy and in the counterfactual economy without multinationals.

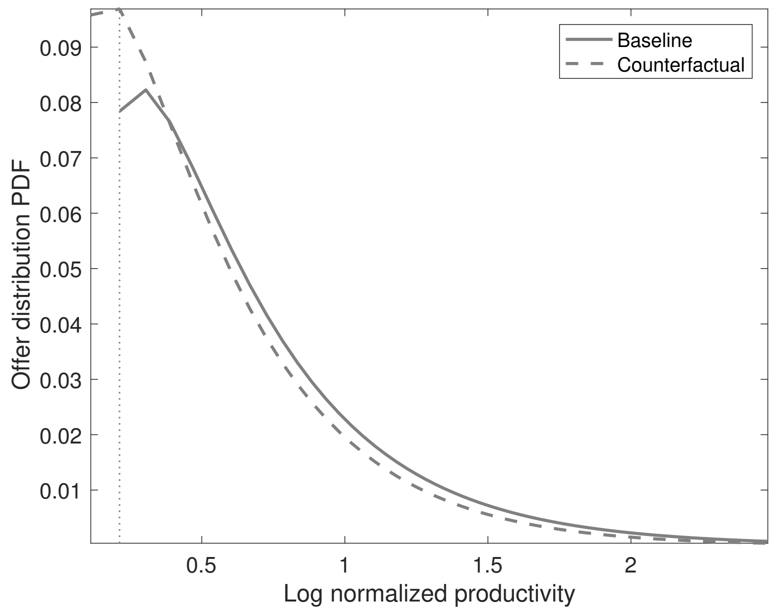


Figure 10: PDF of offer distribution in baseline and counterfactual

Notes: Figure plots offer distribution $f(p)$ in the baseline econonomy and in the counterfactual economy without multinationals.

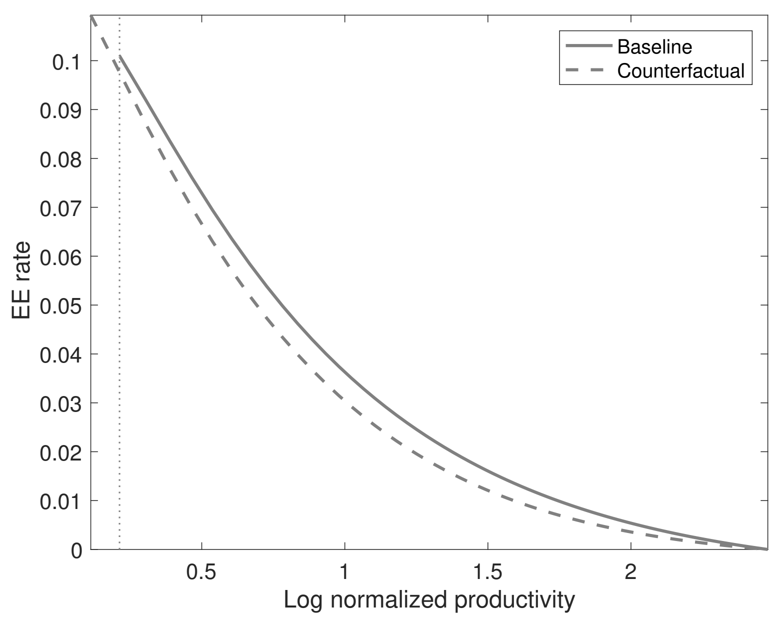


Figure 11: EE rate in baseline and counterfactual

Notes: Figure plots EE rate by productivity in the baseline econonomy and in the counterfactual economy without multinationals.

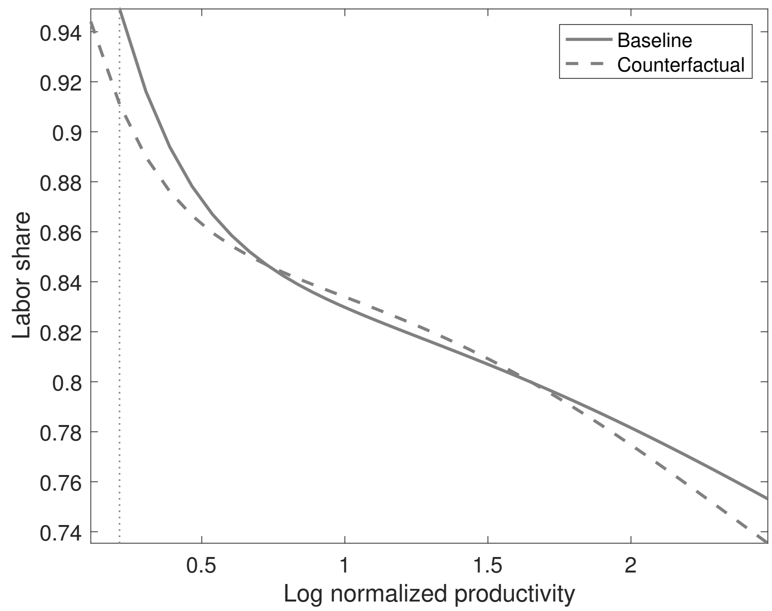


Figure 12: Labor share in baseline and counterfactual

Notes: Figure plots the labor share by productivity in the baseline econonomy and in the counterfactual economy without multinationals.

F Calibration & counterfactual robustness: homogeneous labor

F.1 Baseline calibration, inelastic domestic firm entry

Table 9: Impact of restricting multinational entry on output and components

	Level		Share of output	
	Base	No MN	Base	No MN
Output	1	0.80		
Payments to labor	1	0.80	0.599	0.598
Domestic firm profit	1	1.11	0.07	0.10
Foreign firm profit	1	0.00	0.03	0.00
Payments to capital	1	0.90	0.25	0.25
Hiring cost	1	0.80	0.06	0.06
Labor + dom profit	1	0.83	0.67	0.69
Labor + dom profit - dom entry cost	1	0.83	0.63	0.66

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed inelastic. Left panel reports various different aggregates relative to their levels in the baseline economy. Right panel reports each of these aggregates as shares of total output.

Table 10: Impact on workers and local firms of restricting multinational entry

	Base	No MN
Nonemployment rate	0.157	0.149
Average worker-level wage	1	0.79
Wage Gini coefficient	0.32	0.33
Measure of firms	1	1.34
Measure of domestic firms	1	1.43
Average firm size	10.26	7.93
Average domestic firm size	9.00	7.93

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed inelastic.

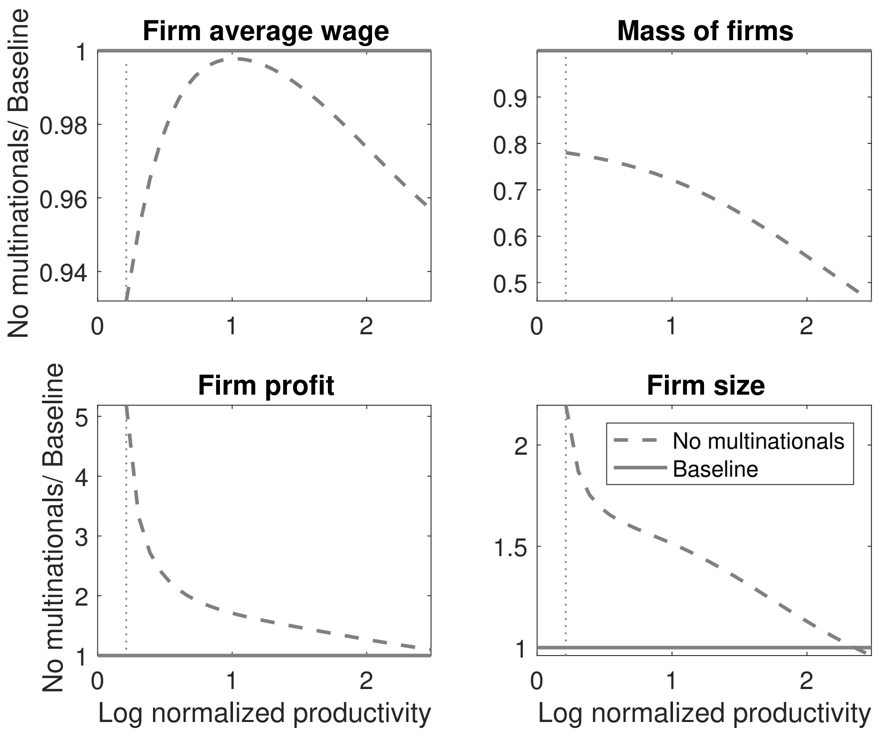


Figure 13: Heterogeneous impact of restricting multinational entry: inelastic entry

Notes: Top left panel plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline. Top right panel plots mass of firms in the counterfactual economy without multinationals relative to that in baseline. Bottom left panel plots firm profit in the counterfactual economy without multinationals relative to firm profit the baseline. Bottom right panel plots firm size in the counterfactual economy without multinationals relative to that in the baseline. Note that in each case, the variables of interest are not defined for productivity levels such that there are active firms in the counterfactual economy but no active firms in the baseline economy.

F.2 Calibration and counterfactual results with $\kappa = 0.1$

Table 11: Calibration targets and parameter estimates: $\kappa = 0.1$

Target	Data	Model	Parameter	Value
Outside data (source)				
EE quarterly transition rate (Eurostat)	0.03	0.03	s	0.55
Labor share (Statistics Norway)	0.60	0.60	ϕ	0.40
Nonemployment rate 25-54 (Statistics Norway)	0.155	0.155	A	0.32
Our data				
P99 log establishment employment	4.73	4.89	α	0.51
Average establishment size	10.29	10.23	M	0.08
Share of active establishments that are domestic	0.94	0.94	ω	0.0017
P99-P25 establishment avg log wage	1.52	1.53	σ^D	2.42
Average establishment size, MN	28.89	29.06	μ^F	1.32
P99 log establishment employment, MN	5.78	5.60	σ^F	1.20

Table 12: Impact of restricting multinational entry on output and components: $\kappa = 0.1$

	Level		Share of output	
	Base	No MN	Base	No MN
Output	1	0.85		
Payments to labor	1	0.86	0.596	0.601
Domestic firm profit	1	1.15	0.15	0.20
Foreign firm profit	1	0.00	0.06	0.00
Payments to capital	1	0.85	0.10	0.10
Hiring cost	1	0.84	0.10	0.10
Labor + dom profit	1	0.91	0.74	0.80
Labor + dom profit - dom entry cost	1	0.90	0.67	0.71

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic. Left panel reports various different aggregates relative to their levels in the baseline economy. Right panel reports each of these aggregates as shares of total output.

Table 13: Impact on workers and local firms of restricting multinational entry: $\kappa = 0.1$

	Base	No MN
Nonemployment rate	0.155	0.142
Average worker-level wage	1	0.84
Wage Gini coefficient	0.37	0.37
Measure of firms	1	1.47
Measure of domestic firms	1	1.57
Average firm size	10.23	7.35
Average domestic firm size	8.96	7.35

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic.

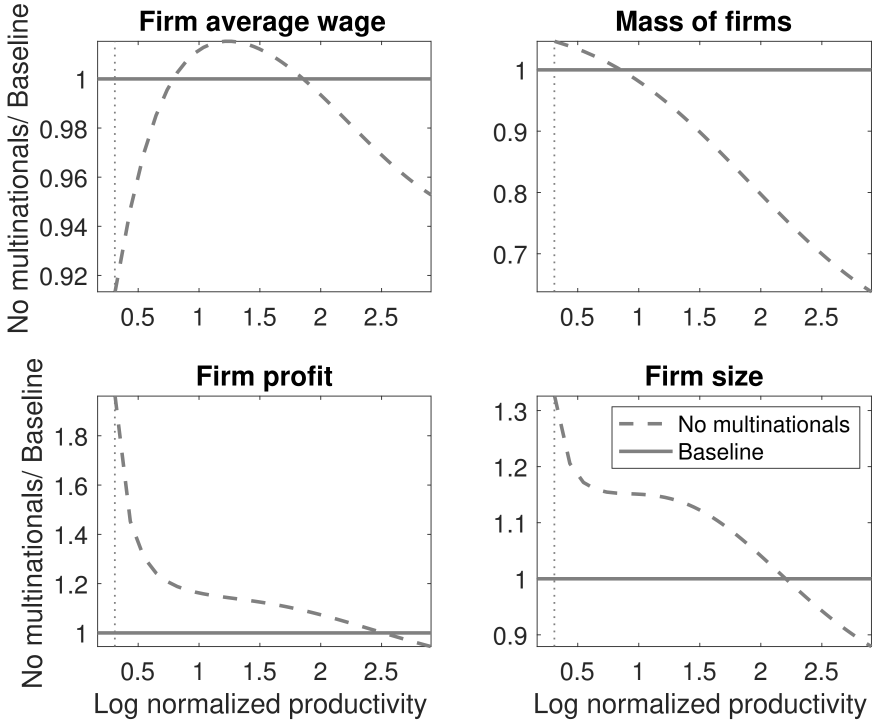


Figure 14: Heterogeneous impact of restricting multinational entry: $\kappa = 0.1$

Notes: Top left panel plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline. Top right panel plots mass of firms in the counterfactual economy without multinationals relative to that in baseline. Bottom left panel plots firm profit in the counterfactual economy without multinationals relative to firm profit the baseline. Bottom right panel plots firm size in the counterfactual economy without multinationals relative to that in the baseline. Note that in each case, the variables of interest are not defined for productivity levels such that there are active firms in the counterfactual economy but no active firms in the baseline economy. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic.

F.3 Calibration and counterfactual results with $\kappa = 0.2$

Table 14: Calibration targets and parameter estimates: $\kappa = 0.2$

Target	Data	Model	Parameter	Value
Outside data (source)				
EE quarterly transition rate (Eurostat)	0.03	0.03	s	0.56
Labor share (Statistics Norway)	0.60	0.60	ϕ	0.51
Nonemployment rate 25-54 (Statistics Norway)	0.155	0.156	A	0.33
Our data				
P99 log establishment employment	4.73	4.91	α	0.52
Average establishment size	10.29	10.32	M	0.08
Share of active establishments that are domestic	0.94	0.94	ω	0.0008
P99-P25 establishment avg log wage	1.52	1.52	σ^D	2.53
Average establishment size, MN	28.89	28.85	μ^F	1.61
P99 log establishment employment, MN	5.78	5.60	σ^F	1.19

Table 15: Impact of restricting multinational entry on output & components: $\kappa = 0.2$

	Level		Share of output	
	Base	No MN	Base	No MN
Output	1	0.87		
Payments to labor	1	0.87	0.598	0.601
Domestic firm profit	1	1.17	0.09	0.13
Foreign firm profit	1	0.00	0.04	0.00
Payments to capital	1	0.87	0.20	0.20
Hiring cost	1	0.86	0.07	0.07
Labor + dom profit	1	0.91	0.69	0.73
Labor + dom profit - dom entry cost	1	0.90	0.65	0.67

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic. Left panel reports various different aggregates relative to their levels in the baseline economy. Right panel reports each of these aggregates as shares of total output.

Table 16: Impact on workers and local firms of restricting multinational entry: $\kappa = 0.2$

	Base	No MN
Nonemployment rate	0.156	0.143
Average worker-level wage	1	0.86
Wage Gini coefficient	0.34	0.34
Measure of firms	1	1.45
Measure of domestic firms	1	1.55
Average firm size	10.32	7.56
Average domestic firm size	9.07	7.56

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic.

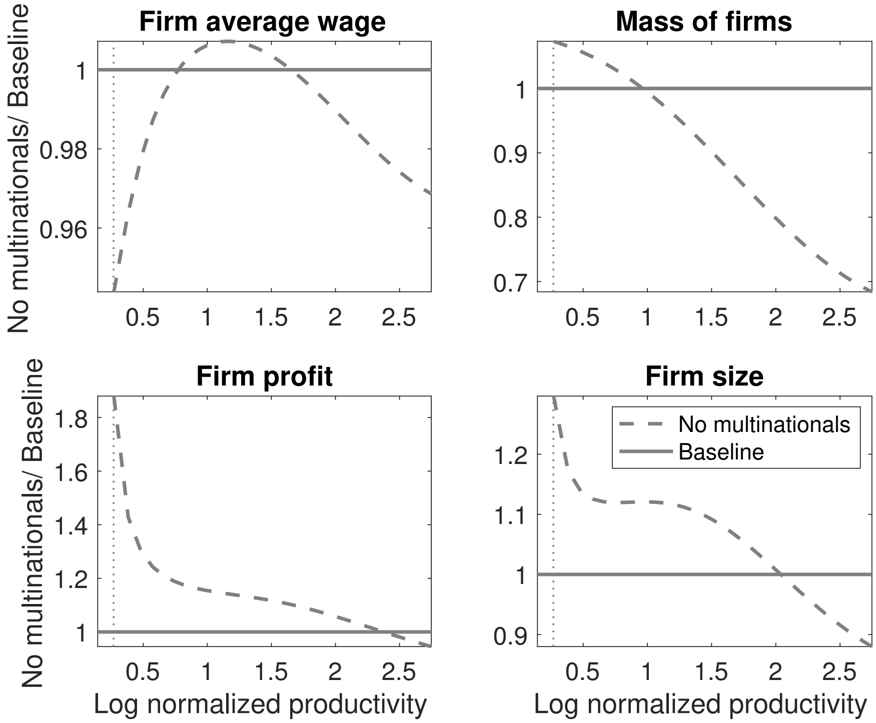


Figure 15: Heterogeneous impact of restricting multinational entry: $\kappa = 0.2$

Notes: Top left panel plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline. Top right panel plots mass of firms in the counterfactual economy without multinationals relative to that in baseline. Bottom left panel plots firm profit in the counterfactual economy without multinationals relative to firm profit the baseline. Bottom right panel plots firm size in the counterfactual economy without multinationals relative to that in the baseline. Note that in each case, the variables of interest are not defined for productivity levels such that there are active firms in the counterfactual economy but no active firms in the baseline economy. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic.

F.4 Calibration and counterfactual results with $\kappa = 1/3$

Table 17: Calibration targets and parameter estimates: $\kappa = 1/3$

Target	Data	Model	Parameter	Value
Outside data (source)				
EE quarterly transition rate (Eurostat)	0.03	0.03	s	0.56
Labor share (Statistics Norway)	0.60	0.60	ϕ	0.77
Nonemployment rate 25-54 (Statistics Norway)	0.155	0.157	A	0.33
Our data				
P99 log establishment employment	4.73	4.93	α	0.57
Average establishment size	10.29	10.25	M	0.08
Share of active establishments that are domestic	0.94	0.94	ω	0.0003
P99-P25 establishment avg log wage	1.52	1.52	σ^D	2.73
Average establishment size, MN	28.89	28.92	μ^F	0.39
P99 log establishment employment, MN	5.78	5.58	σ^F	1.69

Table 18: Impact of restricting multinational entry on output & components: $\kappa = 1/3$

	Level		Share of output	
	Base	No MN	Base	No MN
Output	1	0.92		
Payments to labor	1	0.92	0.600	0.601
Domestic firm profit	1	1.24	0.03	0.04
Foreign firm profit	1	0.00	0.01	0.00
Payments to capital	1	0.92	0.33	0.33
Hiring cost	1	0.91	0.03	0.03
Labor + dom profit	1	0.93	0.63	0.64
Labor + dom profit - dom entry cost	1	0.92	0.61	0.62

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic. Left panel reports various different aggregates relative to their levels in the baseline economy. Right panel reports each of these aggregates as shares of total output.

Table 19: Impact on workers and local firms of restricting multinational entry: $\kappa = 1/3$

	Base	No MN
Nonemployment rate	0.157	0.146
Average worker-level wage	1	0.90
Wage Gini coefficient	0.29	0.29
Measure of firms	1	1.37
Measure of domestic firms	1	1.46
Average firm size	10.25	7.98
Average domestic firm size	8.99	7.98

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic.

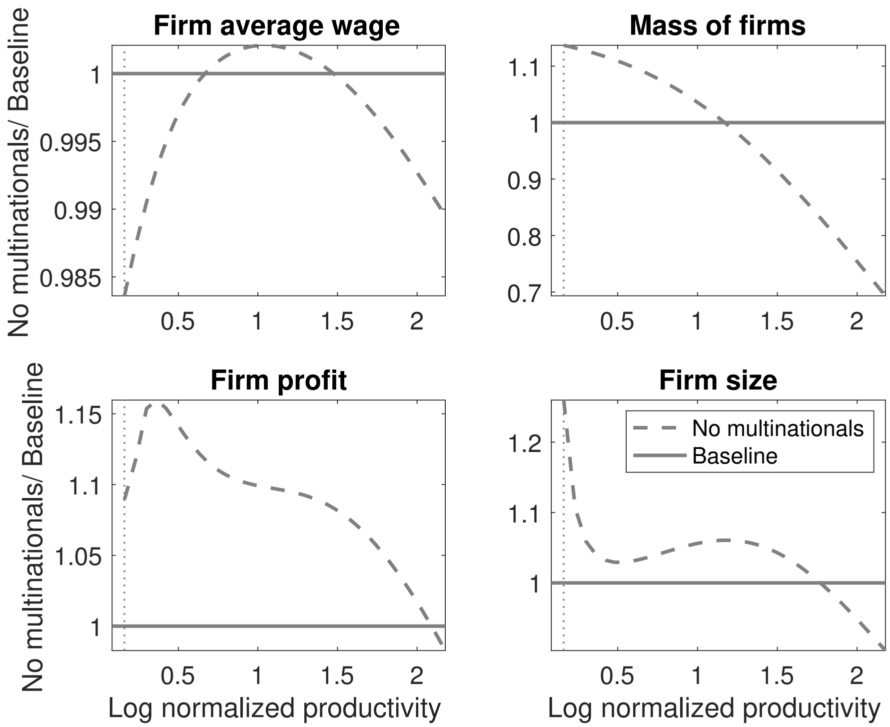


Figure 16: Heterogeneous impact of restricting multinational entry: $\kappa = 1/3$

Notes: Top left panel plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline. Top right panel plots mass of firms in the counterfactual economy without multinationals relative to that in baseline. Bottom left panel plots firm profit in the counterfactual economy without multinationals relative to firm profit the baseline. Bottom right panel plots firm size in the counterfactual economy without multinationals relative to that in the baseline. Note that in each case, the variables of interest are not defined for productivity levels such that there are active firms in the counterfactual economy but no active firms in the baseline economy. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic.

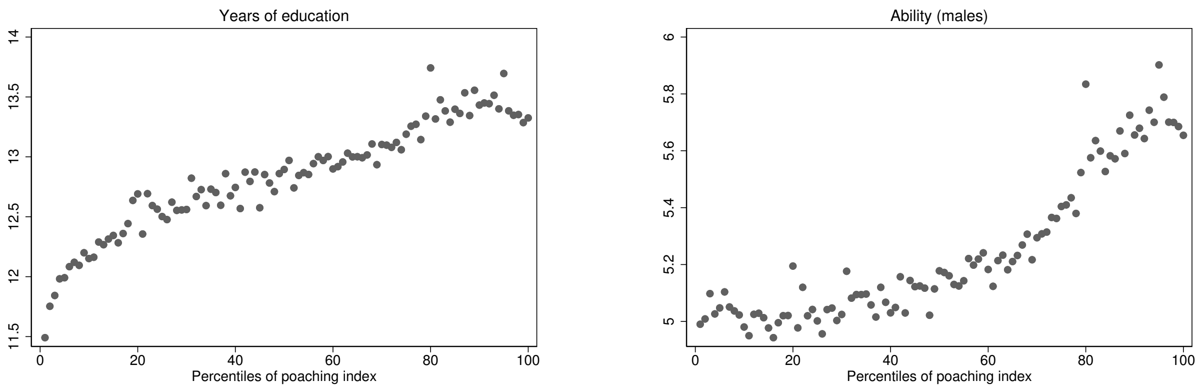
G Robustness: model with labor heterogeneity

G.1 Sorting of workers along the job ladder

Using the poaching index to measure the rungs of the job ladder, and standard observable measures of skill to measure worker type, we observe positive sorting of workers to establishments.[1]The left panel of Figure 17 plots the mean number of years of education for workers at establishments at different percentiles of the poaching index. The right panel plots mean ability for male workers at establishments at different percentiles of the poaching index. Average education and average ability of male workers are both increasing in the poaching

[1]Fixed effects from log wage regressions are often used as measures of establishment and worker types. (see Abowd et al. [1999]). These measures rely on monotonicity of wages in establishment and worker types, and on workers not selecting into establishments based on the idiosyncratic component of wages, assumptions which may be violated in job ladder models. See, e.g. Postel-Vinay and Robin [2002] and Bagger and Lentz [2018].

index, consistent with positive sorting along the job ladder. For calibrating a model, it is helpful to fix a small number of skill types. The skill levels we pick are low (less than primary, primary, and lower secondary education: ISCED 0-2), medium (upper secondary and post-secondary non-tertiary education: ISCED 3-5) and high (tertiary education: ISCED 6-8). Table 20 shows the share of employment in firms of a given poaching index decile that is accounted for by workers of each of these three skill types, in 1998.



(a) Education (b) Ability

Figure 17: Skill proxies & the poaching index

Notes: To construct Panel (a), we first calculate average years of education at the establishment-year level. This is then averaged across all years that an establishment appears in the sample. Establishments are then divided into percentiles of the poaching index, and the average of the years of education variable for all establishments in this bin is calculated. The mean poaching index across all establishments in a given percentile for which the poaching index is defined is then plotted on the y-axis. Panel (b) is constructed analogously, with average ability for male employees for which ability is available replacing average years of education.

Table 20: Share of employment in each poaching index decile by skill group, 1998

Decile	Low	Med	High	Total
1	0.35	0.54	0.10	1.00
2	0.33	0.54	0.13	1.00
3	0.32	0.54	0.14	1.00
4	0.28	0.55	0.17	1.00
5	0.26	0.56	0.19	1.00
6	0.25	0.55	0.20	1.00
7	0.23	0.54	0.23	1.00
8	0.20	0.53	0.27	1.00
9	0.18	0.52	0.30	1.00
10	0.16	0.54	0.30	1.00

Notes: Low skill have less than 10 years of education. Medium skill have 10-13 years of education. High skill have more than 13 years of education.

G.2 Calibration

We work with three skill types, $h = low, med, hi$. We assume that the share of match surplus obtained by workers is the same for all skill types: $\phi_{low} = \phi_{med} = \phi_{hi} = \phi$. We assume that the vacancy posting cost function is the same for all types:

$$c_h(v_h) = \frac{v_h^{1+\frac{1}{\alpha}}}{1+\frac{1}{\alpha}}$$

However we allow the shifter in the matching function to differ across types:

$$\mu_h(S_h, V_h) = A_h S_h^{\theta} V_h^{1-\theta}$$

We normalize $b_{low} = 1$, and calibrate b_{med} and b_{hi}. We allow separation rates to differ across types, so $\delta_h = \delta_f + \delta_{hm}$ for $h \in \{low, med, hi\}$, where δ_f, the firm death rate, is the same for all types. We allow the search intensity of the employed, s_h, to differ across types. We normalize $\eta_{low} = 1$ and $\nu_{low} = 1$. We assume $\eta_{hi} \geq \eta_{med} \geq \eta_{low}$ and $\nu_{hi} \geq \nu_{med} \geq \nu_{low}$.

We preset the following parameters. Each period in the model is a quarter, so we set $\beta = (0.95)^{1/4}$. Based on the literature, we set $\theta = 0.5$. We set $\delta_f = 0.01$ based on Table 1 of Balsvik and Haller [2010] which reports exit rates for manufacturing plants in Norway in 1996, 2000 and 2004. As in the baseline calibration, we set $\kappa = 0.25$.

Our three skill groups are, as noted above:

1. "Low skilled" - less than primary, primary, and lower secondary education: ISCED 0-2,

2. "Medium skilled" - upper secondary and post-secondary non-tertiary education: ISCED 3-5

3. "High skilled" - tertiary education: ISCED 6-8.

From our data, we can see the share of each of these groups in employment, but not in the population. From Eurostat, we obtain nonemployment rates for almost identical skill groups, for the 25-54 age group.[2] We average these over the period 1996-2007 to obtain $u_{low} = 0.291$, $u_{med} = 0.15$, $u_{hi} = 0.099$. We use the employment shares from our data together with these nonemployment rates to recover the population shares of each group, $z_{low} = 0.337$, $z_{med} = 0.544$, $z_{hi} = 0.119$.

[2] Eurostat assigns ISCED 5, vocational qualification, to "High skill" while we assign it to "medium skill." This group accounts for only 4% of employment in our data.

We need EN transition rates by skill group to pin down $\{\delta_h\}$. Causa et al. [2021] report annual EN transition rates by skill group[3] for Norway, among other OECD countries. We convert these annual transition rates to quarterly rates. Based on this, we set: $\delta_{low} = 0.054$, $\delta_{med} = 0.031$, $\delta_{hi} = 0.022$. They also report annual EE transition rates.

The vector of parameters to be calibrated internally is

$$\{\{A_h\}, \{s_h\}, \{\eta_h\}, \{\nu_h\}, \{b_h\}, \alpha, \phi, \sigma_D, \mu_F, \sigma_F, \omega, M\}.$$

In terms of targets, the calibration strategy follows closely our approach in the baseline model with a single labor type. However now we have three nonemployment targets (one for each skill group) and three EE transition rate targets (one for each skill group, also obtained from Causa et al. [2021]). With the normalizations $\eta_{low} = \nu_{low} = 1$ we need targets for the four parameters governing the relationship between skill, firm productivity, and output, and for the reservation utility flows of the medium- and high-skilled. The targets we pick are skill premia and employment shares along the job ladder, calculated using our data. More precisely we target (1) the average wage of the medium-skilled relative to the average wage of the low skilled, (2) the average wage of the high-skilled relative to the average wage of the low-skilled, the share of (3) high- and (4) low-skilled in total employment at establishments in the top decile of the poaching index, and the share of (5) high- and (6) low-skilled in total employment in establishments in the bottom two deciles of the poaching index.

The solution algorithm follows that for the model with a single labor type. Given values for M and ω, equilibrium in each labor market can be separately determined. We do not impose that firms of all productivity types post vacancies in all three skill markets.

Table 21 lists the target moments, the source for each moment, their values in the data, the fitted values in the model, the corresponding parameter, and its fitted value.

[3] Orsetta et al assign ISCED 5, vocational qualification, to "High skill" while we assign it to "medium skill."

Table 21: Calibration targets and parameter estimates: Three labor types

Target	Data	Model	Parameter	Value
Outside data (source)				
EE quarterly transition rate, *low* (Causa et al. [2021])	0.019	0.019	s_{low}	0.89
EE quarterly transition rate, *med* (Causa et al. [2021])	0.020	0.020	s_{med}	0.74
EE quarterly transition rate, *high* (Causa et al. [2021])	0.024	0.021	s_{hi}	0.83
Nonemployment rate 25-54, *low* (Eurostat)	0.291	0.340	A_{low}	0.21
Nonemployment rate 25-54, *med* (Eurostat)	0.150	0.152	A_{med}	0.40
Nonemployment rate 25-54, *high* (Eurostat)	0.099	0.095	A_{hi}	0.24
Labor share (Statistics Norway)	0.60	0.61	ϕ	0.59
Our data				
Skill premium, *med*	1.206	1.207	η_{med}	1.011
Skill premium, *high*	1.742	1.761	η_{high}	1.163
Employment sh. of *low*, 10th decile of poach ind	0.16	0.19	ν_{med}	1.004
Employment sh. of *high*, 10th decile of poach ind	0.30	0.19	ν_{high}	1.016
Employment sh. of *low*, deciles 1&2 of poach ind	0.34	0.39	b_{med}	0.367
Employment sh. of *high*, deciles 1&2 of poach ind	0.11	0.08	b_{high}	0.505
P99 log establishment employment	4.73	4.06	α	0.009
Average establishment size	10.29	10.59	M	0.08
Share of active establishments that are domestic	0.94	0.94	ω	0.06
P99-P25 establishment avg log wage	1.52	1.54	σ^D	3.93
Average establishment size, MN	28.89	29.99	μ^F	0.02
P99 log establishment employment, MN	5.78	4.32	σ^F	1.36

G.3 Counterfactual

Table 22: Impact of restricting multinational entry on output & components: Three labor types

	Level		Share of output	
	Base	No MN	Base	No MN
Output	1	0.74		
Payments to labor	1	0.81	0.605	0.659
Domestic firm profit	1	1.05	0.06	0.08
Foreign firm profit	1	0.00	0.08	0.00
Payments to capital	1	0.74	0.25	0.25
Hiring cost	1	0.67	0.00	0.00
Labor + dom profit	1	0.83	0.66	0.74
Labor + dom profit - dom entry cost	1	0.81	0.63	0.69

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic. Left panel reports various different aggregates relative to their levels in the baseline economy. Right panel reports each of these aggregates as shares of total output.

Table 23: Impact on workers and local firms of restricting multinational entry: Three labor types

	Base	No MN
Nonemployment rate	0.208	0.202
Average worker-level wage	1	0.80
Skill premium, *med*	1.207	1.116
Skill premium, *high*	1.761	1.493
Wage Gini coefficient	0.34	0.22
Wage Gini, *low*	0.26	0.16
Wage Gini, *med*	0.34	0.22
Wage Gini, *high*	0.37	0.22
Measure of firms	1	1.08
Measure of domestic firms	1	1.15
Average firm size	10.59	9.87
Average domestic firm size	9.37	9.87

Notes: The counterfactual results (No MN) in this table refer to the case where domestic firm entry is assumed elastic

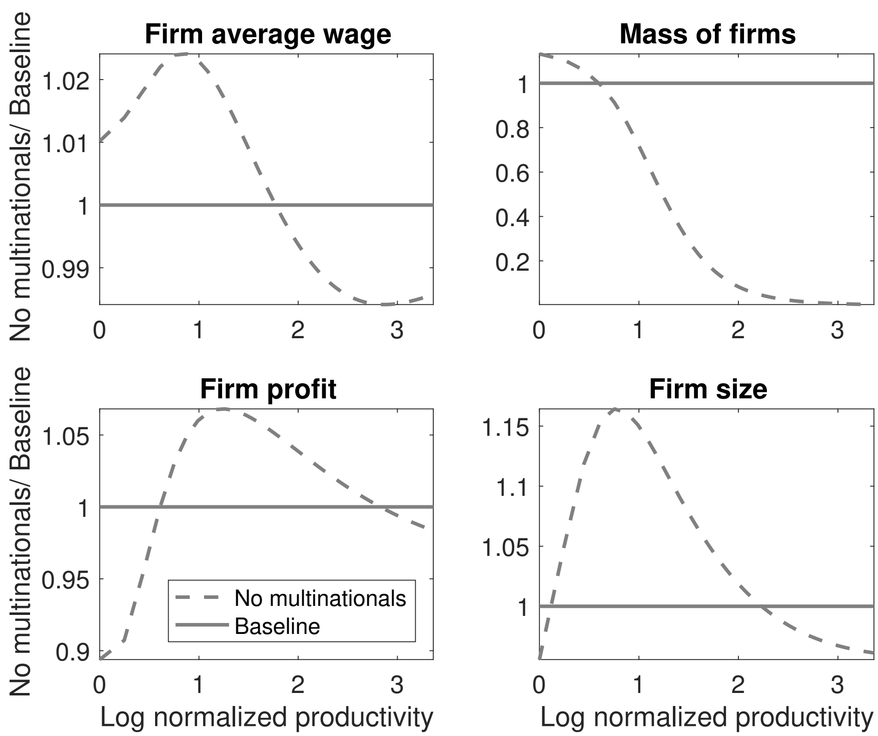


Figure 18: Heterogeneous impact of restricting multinational entry: Three labor types

Notes: Top left panel plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline. Top right panel plots mass of firms in the counterfactual economy without multinationals relative to that in baseline. Bottom left panel plots firm profit in the counterfactual economy without multinationals relative to firm profit the baseline. Bottom right panel plots firm size in the counterfactual economy without multinationals relative to that in the baseline. Note that in each case, the variables of interest are not defined for productivity levels such that there are active firms in the counterfactual economy but no active firms in the baseline economy. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic

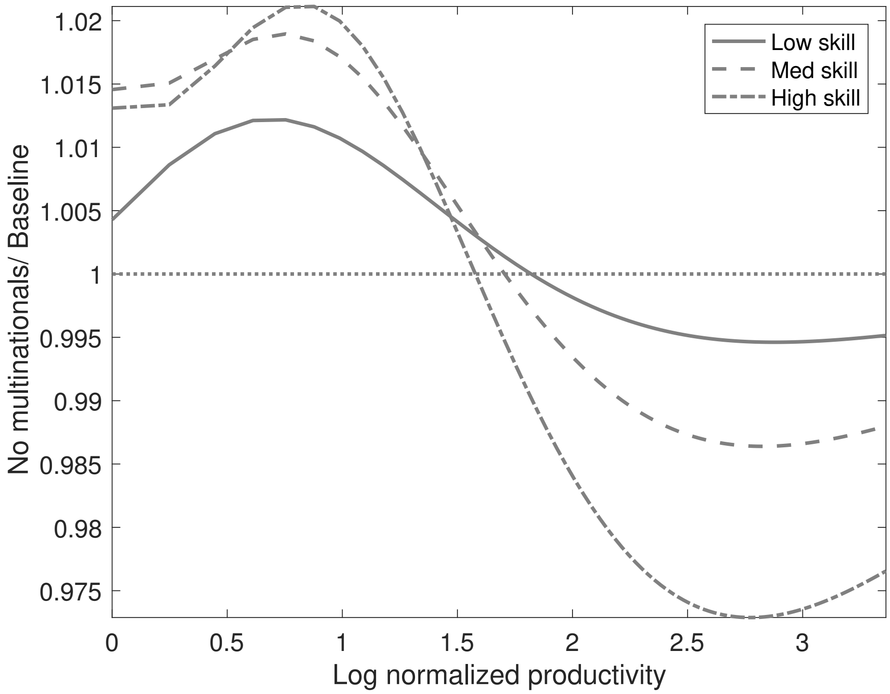


Figure 19: Impact on firm average wage of restricting multinational entry: Three labor types

Notes: Figure plots firm-level average wage in the counterfactual economy without multinationals relative to the baseline, for the three different skill groups. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic

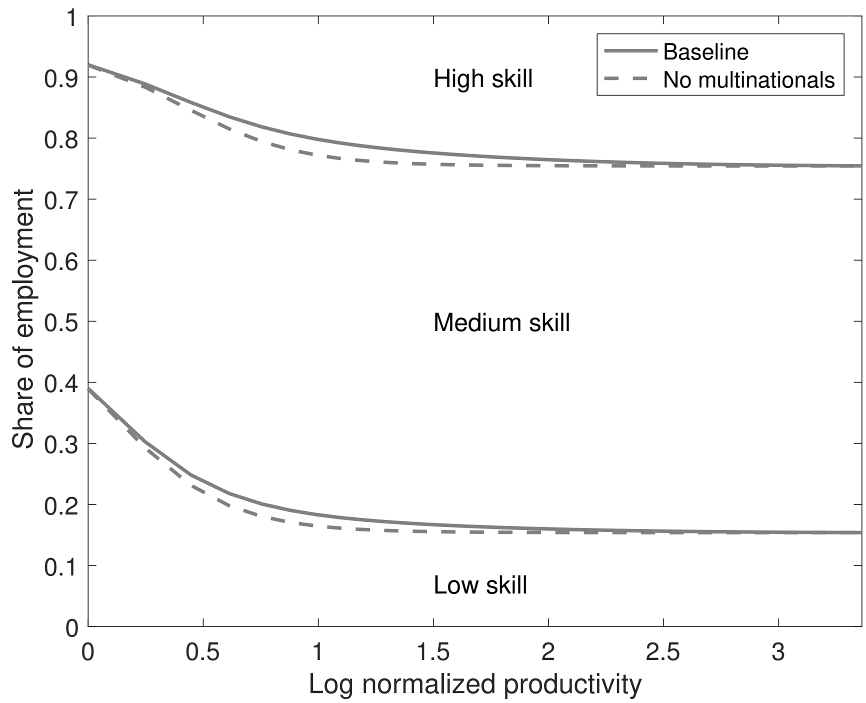


Figure 20: Impact on labor sorting of restricting multinational entry: Three labor types
Notes: Figure shows the share of employment for the three different skill groups by firm productivity level, in the baseline, and in the counterfactual. Shares sum to 1. The counterfactual results (No multinationals) in this figure refer to the case where domestic firm entry is assumed elastic

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