The Effects of Foreign Multinationals on Workers and Firms in the United States

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Disclaimer: The opinions expressed here are those of the authors alone and do not reflect the views of the Internal Revenue Service or the U.S. Treasury Department.
Motivation / This paper

- Foreign multinationals in the U.S.
  - account for 6% of private sector employment
  - pay on average 25% higher wages than domestic firms
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2. Direct effects
   - Unpack worker-quality differences from firm wage premia
   - Average foreign firm premium of 7%

3. Indirect effects
   - New identification approach to measure the indirect effects of foreign firms exploiting firm clustering by country of origin
   - 1 job by a foreign firm creates locally 0.42 jobs by domestic firms and raises domestic firms’ value added by 90,000 USD
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Outline

- Data
- Model
- Direct Effects
- Indirect Effects
- Aggregate and Local Implications
Data

- Linked annual tax records from 1999-2017:
  - Worker data: earnings and zip code from W-2
  - Firm data: value added (sales - cost of goods sold) and NAICS from forms 1120 (C-corp), 1120-S (S-corp), and 1065 (partnership)
  - Foreign-ownership: Form 5472 “Information return for a 25% foreign-owned US Corporation”, incl. country of ownership
  - Sample: Prime-aged FTE workers in non-FIRE industries
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- Two data challenges:
  - Many employees of foreign multinationals are employed at non-filing subsidiaries \(\implies\) Infer parent-subsidiary linkages from Form 851 “Affiliations Schedule”
  - Address of firm may not coincide w location of economic activity \(\implies\) Infer firm-location from workers’ commuting zone
Direct Effects of Foreign Multinationals
FIRM PREMIUM VS. WORKER QUALITY

- Estimate the two-way fixed effects wage regression

\[ \log w_{i,t} = \psi_{j(i,t)} + x_i + \chi_i' \beta + \epsilon_{i,t} \]

- \( j(i, t) \) denotes the firm \( j \) that employs worker \( i \) in year \( t \),
- \( \psi \) denotes the firm premium,
- \( x \) denotes worker quality,
- \( \chi \) denotes a vector of observable determinants of earnings (age polynomial, industry-year f.e., and commuting zone-year f.e.).

Known estimation issue:
- Limited worker mobility leads to biased f.e. estimates \( \Longrightarrow \) use Bonhomme, Lamadon, Manresa (2019) bias correction procedure
Direct Effects, Firm Premium Difference

- Total wage difference
- Worker quality difference
- % wage difference explained
Firm Premium with Firm-Worker Interactions

Difference in Firm Premium (deviation from industry and location average)

Log Size

Worker Quality

Quantile

10
30
50
70
90
20
40
60
80
Country-specific Firm Premium Differential vs. Log Wage Differential

Worker quality differentials
Robustness and Implications

- Movers event study design
- Analysis of pre-trends

- Aggregate wage gain due to the direct wage premium at foreign multinationals of about 34 billion USD annually (0.6% of total private sector wage bill)

- Alternatives to a TFP interpretation of firm premiums:
  - Hours worked
  - Risk premium
  - Amenities
Indirect Effects of Foreign Multinationals
Empirical Strategy

- Activity of foreign firms in commuting zones is endogenous
- Exploit spatial clustering of foreign firms by nationality
- Similar to the Card (2001) instrument used to study the effects of immigration
  - Widely used for effects of immigration
  - Has not yet been used to study effects of FDI
Why foreign firms cluster by country of origin?

1. Distance to home country affects trade costs and costs of technology transfer (Keller and Yeaple 2013)

2. Airline routes (Giroud 2013; Campante and Yanagizawa-Drott 2017)

3. Foreign employees want to live near others from the same nationality

4. Foreign firms follow ancestors’ clusters by nationality (Burchardi, Chaney, and Hassan 2016)

5. Information about available sites differs by country origin

6. Countries specialized in different industries (Head, Ries, and Swenson 1995)
SHARE OF WORKERS AT CANADIAN FIRMS

... out of total employment at foreign firms in the CZ
Share of workers at East Asian firms... out of total employment at foreign firms in the CZ
Share of workers at Western European firms... out of total employment at foreign firms in the CZ


**Empirical Strategy**

- Change in outcome at domestic firm $j$ in commuting zone $cz$:
  \[
  \log y_{j,t} - \log y_{j,t-1} = \beta m_{cz(j),t} + \gamma' K_{j,t} + \epsilon_{j,t},
  \]

- Employment growth at foreign-owned firms in $cz$
  \[
  m_{cz,t} \equiv \frac{L_{cz,t}^F - L_{cz,t-1}^F}{L_{cz,t-1}^F + L_{cz,t-1}^D}
  \]
Empirical Strategy

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  \[
  m_{cz,t} \equiv \frac{L_{cz,t}^F - L_{cz,t-1}^F}{L_{cz,t-1}^F + L_{cz,t-1}^D}
  \]

- **Use firms’ countries of ownership to construct**
  \[
  S_{cz,t}^o \equiv \frac{L_{cz,t}^F}{\sum_{cz'} L_{cz',t}^F}
  \]

- **Analogous to immigration literature, construct IV for** $m_{cz,t}$
  \[
  Z_{cz,t} = \sum_o (\sum_{cz' \neq cz'} L_{cz',t}^F - L_{cz',t-1}^F) S_{cz,t-5}^o
  \]
  \[
  \frac{L_{cz,t-5}^F + L_{cz,t-5}^D}{L_{cz,t-5}^F + L_{cz,t-5}^D}
  \]
## Indirect Effects, Log Value Added by Firm Type

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>By Firm Size</th>
<th>By Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Size 1-9</td>
<td>Size 10-99</td>
</tr>
<tr>
<td><strong>Outcome: Log Value Added</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2SLS Indirect Effect</td>
<td>0.64**</td>
<td>0.11</td>
<td>0.42***</td>
</tr>
<tr>
<td></td>
<td>(0.27)</td>
<td>(0.08)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>First Stage Coefficient</td>
<td>0.60***</td>
<td>0.63***</td>
<td>0.59***</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>First Stage F-statistic</td>
<td>299</td>
<td>431</td>
<td>292</td>
</tr>
<tr>
<td>Firm Observations (Millions)</td>
<td>41.7</td>
<td>34.9</td>
<td>6.3</td>
</tr>
</tbody>
</table>

- Controls: polynomial in lagged firm size; fixed effects for commuting zone, Census division-year, and 3-digit NAICS industry-year
- Standard errors clustered by commuting zone-year

**OLS** & **Log Full-time Workers** & **Log Wage Bill**
## Indirect Effects, Log Wage by Worker Wage Quintile

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>Quintile 1</th>
<th>Quintile 2</th>
<th>Quintile 3</th>
<th>Quintile 4</th>
<th>Quintile 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome: Log Wage (continuing workers)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2SLS Indirect Effect</td>
<td>0.067</td>
<td>-0.086</td>
<td>-0.038</td>
<td>0.016</td>
<td>0.192**</td>
<td>0.292***</td>
</tr>
<tr>
<td></td>
<td>(0.063)</td>
<td>(0.074)</td>
<td>(0.062)</td>
<td>(0.066)</td>
<td>(0.081)</td>
<td>(0.092)</td>
</tr>
<tr>
<td>First Stage Coefficient</td>
<td>0.599***</td>
<td>0.595***</td>
<td>0.594***</td>
<td>0.598***</td>
<td>0.595***</td>
<td>0.599***</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.036)</td>
<td>(0.035)</td>
<td>(0.035)</td>
<td>(0.035)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>First Stage F-statistic</td>
<td>301</td>
<td>280</td>
<td>282</td>
<td>288</td>
<td>295</td>
<td>280</td>
</tr>
<tr>
<td>Worker Observations (Millions)</td>
<td>369.6</td>
<td>73.9</td>
<td>73.9</td>
<td>73.9</td>
<td>73.9</td>
<td>73.9</td>
</tr>
</tbody>
</table>

- Controls: polynomials in worker age and firm size; fixed effects for commuting zone, Census division-year, and 3-digit NAICS industry-year
- Standard errors clustered by commuting zone-year
Robustness and Implications

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6-digit NAICS</th>
<th>Lagged FDI</th>
<th>Exclude Dom.</th>
<th>Exclude 250m</th>
<th>Exclude Tax Havens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects as a Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinationals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radius from Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome: Log Value Added</th>
<th>2SLS Indirect Effect</th>
<th>First Stage Coefficient</th>
<th>First Stage F-statistic</th>
<th>Firm Observations (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.644** (0.266)</td>
<td>0.598*** (0.035)</td>
<td>299</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>0.712*** (0.220)</td>
<td>0.596*** (0.034)</td>
<td>300</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>0.629** (0.268)</td>
<td>0.591*** (0.035)</td>
<td>291</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>0.579*** (0.221)</td>
<td>0.612*** (0.034)</td>
<td>333</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td>0.610** (0.286)</td>
<td>0.647*** (0.046)</td>
<td>196</td>
<td>41.7</td>
</tr>
<tr>
<td></td>
<td>0.670** (0.295)</td>
<td>0.574*** (0.035)</td>
<td>268</td>
<td>41.7</td>
</tr>
<tr>
<td>Firm Observations (Millions)</td>
<td>41.7</td>
<td>41.7</td>
<td>41.7</td>
<td>40.4</td>
</tr>
</tbody>
</table>

- Per job at a foreign-owned firm
  - indirectly increases employment at domestic firms by 0.42,
  - indirectly increases value added at domestic firms by 92,000 USD.
Concluding remarks

- Find sizable direct and indirect benefits of foreign firms in the US on firms and workers
  - (on average, and especially for high skilled workers)

- Foreign multinationals face entry costs to enter the US
  - Explains why they are more productive
  - Interestingly, even conditional on size, foreign firm premium persists

- Other studies on indirect effects of foreign firms focus on national industry-level effects finding mixed results
  - New angle: local labor market approach
  - Indirect effects estimates are comparable to the literature’s estimates for domestic firm expansions
Appendix
Direct Effects, Total Wage Difference

Unconditional Mean Diff.

Mean Diff. by Size Bin

Log Size (deviation from industry and location average)
Direct Effects, Worker Quality Difference

Unconditional Mean Diff. Mean Diff. by Size Bin

-0.05 0.00 0.05 0.10 0.15 0.20 0.25

Log Size (deviation from industry and location average)

Difference in Mean Worker Quality
**Direct Effects, Wage Difference Explained**

![Graph showing % Wage Difference Explained vs Log Size (deviation from industry and location average)](image)

- **Worker Quality (%)**
- **Firm Premiums (%)**

The graph illustrates the relationship between log size (deviation from industry and location average) and the explained wage differences, categorized by worker quality and firm premiums.
## Robustness of Average Firm Premium Estimate: Event Study Approach

<table>
<thead>
<tr>
<th>Outcome:</th>
<th>Shorter-term Wage Growth</th>
<th>Longer-term Wage Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\log(w_t) - \log(w_{t-1})$</td>
<td>$\log(w_{t+1}) - \log(w_{t-2})$</td>
</tr>
<tr>
<td>Domestic to Foreign Moves:</td>
<td>N = 364,732</td>
<td>0.045***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.002)</td>
</tr>
<tr>
<td>Foreign to Domestic Moves:</td>
<td>N = 265,566</td>
<td>-0.042***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.002)</td>
</tr>
<tr>
<td>Domestic to Domestic Moves:</td>
<td>N = 12,485,029</td>
<td>0.005***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.001)</td>
</tr>
<tr>
<td>Foreign to Foreign Moves:</td>
<td>N = 275,301</td>
<td>0.014***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.004)</td>
</tr>
<tr>
<td>Stayers at Foreign Firms:</td>
<td>N = 4,661,673</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.001)</td>
</tr>
<tr>
<td>Stayers at Domestic Firms:</td>
<td>N = 58,780,343</td>
<td>(Omitted Category)</td>
</tr>
</tbody>
</table>

- Controls: polynomials in firm size; fixed effects for commuting zone-year and 3-digit NAICS industry-year (for movers, separate controls for origin and destination)

- Standard errors clustered by commuting zone-year
Event Study for Movers to and from Foreign Firms

Mean Wage

Event Time relative to Move

Type of Spell: Domestic -> Foreign

Foreign -> Domestic

Domestic Stayer (Omitted Category)

Controls: polynomials in age and firm size; fixed effects for commuting zone-year and 3-digit NAICS industry-year (for movers, separate controls for origin and destination)
Country-specific Worker Quality Differentials

Log Wage Differential

Worker Quality Differential

Back
### Indirect Effects, OLS Regression

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome:</strong> Log Value Added</td>
<td>-1.21***</td>
<td>0.32**</td>
<td>0.64**</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.13)</td>
<td>(0.27)</td>
</tr>
<tr>
<td>Firm Observations (Millions)</td>
<td>41.7</td>
<td>41.7</td>
<td>41.7</td>
</tr>
</tbody>
</table>

**Specification:**
- Controls for CZ-Year, Industry-Year, and Size: ✓ ✓ ✓
- Instrument for FDI Growth: ✓ X ✓

- Controls: polynomial in lagged firm size; fixed effects for commuting zone, Census division-year, and 3-digit NAICS industry-year
- Standard errors clustered by commuting zone-year
## Indirect Effects, Log Full-Time Workers by Firm Type

<table>
<thead>
<tr>
<th></th>
<th>Full Sample</th>
<th>By Firm Size</th>
<th>By Sector</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Size 1-9</td>
<td>Size 10-99</td>
<td>Size 100+</td>
<td>Tradables</td>
</tr>
<tr>
<td>Outcome: Log FTW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2SLS Indirect Effect</td>
<td>0.45***</td>
<td>0.08</td>
<td>0.39***</td>
<td>1.23***</td>
<td>0.89**</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.06)</td>
<td>(0.14)</td>
<td>(0.43)</td>
<td>(0.38)</td>
</tr>
<tr>
<td>First Stage Coefficient</td>
<td>0.60***</td>
<td>0.63***</td>
<td>0.58***</td>
<td>0.53***</td>
<td>0.56***</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>First Stage F-statistic</td>
<td>297</td>
<td>434</td>
<td>292</td>
<td>151</td>
<td>171</td>
</tr>
<tr>
<td>Firm Observations (Millions)</td>
<td>45.9</td>
<td>38.3</td>
<td>7.0</td>
<td>0.5</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Notes:**

- Controls: polynomial in lagged firm size; fixed effects for commuting zone, Census division-year, and 3-digit NAICS industry-year
- Standard errors clustered by commuting zone-year
## Indirect Effects, Log Wage Bill by Firm Type

### Full Sample By Firm Size By Sector

<table>
<thead>
<tr>
<th>Size 1-9</th>
<th>Size 10-99</th>
<th>Size 100+</th>
<th>Tradables</th>
<th>Non-tradables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SLS Indirect Effect</td>
<td>0.47*** (0.14)</td>
<td>0.03 (0.09)</td>
<td>0.37** (0.16)</td>
<td>1.15*** (0.42)</td>
</tr>
<tr>
<td>First Stage Coefficient</td>
<td>0.60*** (0.03)</td>
<td>0.63*** (0.03)</td>
<td>0.58*** (0.03)</td>
<td>0.53*** (0.04)</td>
</tr>
<tr>
<td>First Stage F-statistic</td>
<td>297</td>
<td>434</td>
<td>292</td>
<td>151</td>
</tr>
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<td>38.3</td>
<td>7.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

- **Controls:** polynomial in lagged firm size; fixed effects for commuting zone, Census division-year, and 3-digit NAICS industry-year
- **Standard errors clustered by commuting zone-year**
**Indirect Effects, Log Full-Time Workers, Robustness**

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6-digit NAICS</th>
<th>Lagged FDI as a Control</th>
<th>Exclude Dom. Multinationals</th>
<th>Exclude 250m Radius from Tax Havens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2SLS Indirect Effect</strong></td>
<td>0.446*** (0.125)</td>
<td>0.434*** (0.120)</td>
<td>0.441*** (0.125)</td>
<td>0.410*** (0.120)</td>
<td>0.449*** (0.134)</td>
</tr>
<tr>
<td><strong>First Stage Coefficient</strong></td>
<td>0.598*** (0.035)</td>
<td>0.597*** (0.035)</td>
<td>0.592*** (0.035)</td>
<td>0.609*** (0.034)</td>
<td>0.648*** (0.046)</td>
</tr>
<tr>
<td><strong>First Stage F-statistic</strong></td>
<td>297</td>
<td>298</td>
<td>289</td>
<td>325</td>
<td>195</td>
</tr>
<tr>
<td><strong>Firm Observations (Millions)</strong></td>
<td>45.9</td>
<td>45.9</td>
<td>45.9</td>
<td>44.5</td>
<td>45.9</td>
</tr>
</tbody>
</table>
# Indirect Effects, Log Wage Bill, Robustness

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>6-digit NAICS Fixed Effects</th>
<th>Lagged FDI as a Control</th>
<th>Exclude Dom. Multinationals</th>
<th>Exclude 250m Radius from Z</th>
<th>Exclude Tax Havens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2SLS Indirect Effect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.466***</td>
<td>0.457***</td>
<td>0.453***</td>
<td>0.455***</td>
<td>0.477***</td>
<td>0.487***</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td>(0.137)</td>
<td>(0.138)</td>
<td>(0.140)</td>
<td>(0.151)</td>
<td>(0.152)</td>
</tr>
<tr>
<td><strong>First Stage Coefficient</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.598***</td>
<td>0.597***</td>
<td>0.592***</td>
<td>0.609***</td>
<td>0.648***</td>
<td>0.574***</td>
</tr>
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