

Spatial Allocation of Workers and Immigration

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The paper in a nutshell

Macroeconomic effects of the **spatial allocation channel**: foreign-born workers tend to allocate themselves to regions of the U.S. where their productivity is higher

1. New empirical facts: a) Foreign-born wage allocation premium, b) U.S.-born workers accept lower wages to move back to their birth region (→ pull of high amenities)
2. Understand location choices through the prism of a Rosen-Roback spatial model
3. Add a production structure (labor, capital, housing) to close the model and quantify the effects of the spatial allocation channel on TFP

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⇒ Great paper! Interesting motivating fact and quantitative assessment of its implications

1. Foreign-born wage allocation premium

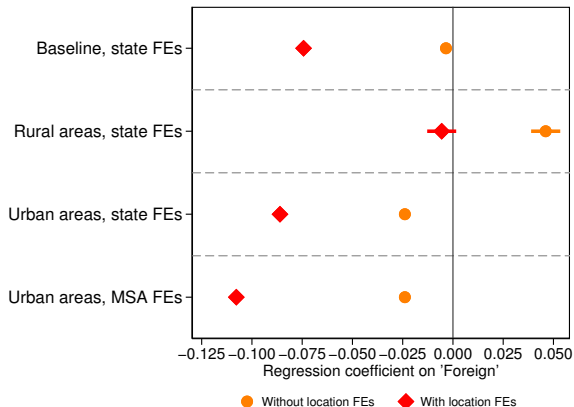
$$\log w_i = \alpha + \beta \text{Foreign}_i + \underbrace{\mathbf{D}_i' \gamma}_{\text{location FEs}} + \underbrace{\mathbf{X}_i' \vartheta}_{\text{indiv. controls}} + \varepsilon_i$$

- ▶ Foreign-born are paid less than U.S.-born workers (after controlling for \mathbf{X}_i 's). Yet, better location choices *mitigate* the wage penalty of foreign-born workers
- ▶ Foreign-born wage penalty β **with** the \mathbf{D}_i 's should be larger than **without** the \mathbf{D}_i 's included

	1990:	
Foreign-born wage premium	-0.0130 (0.001)	-0.0832 (0.001)
Observations	5,144,969	5,144,969
R ²	0.131	0.155

- ▶ Try to get a better understanding of what drives the wage premium (same 1990 Census data)

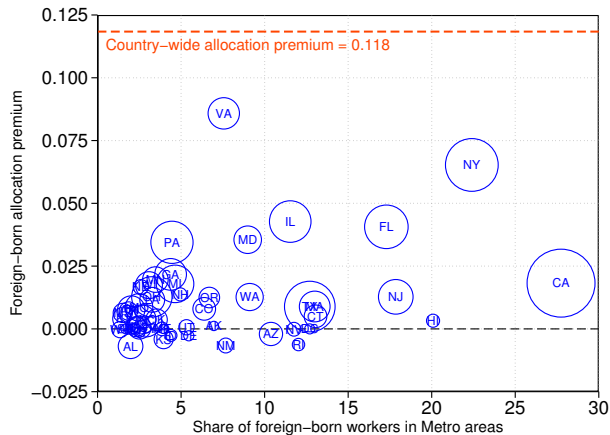
1. Foreign-born wage allocation premium



⇒ Foreign-born workers allocate themselves to U.S. states with “better” cities (MSAs)

⇒ Are cities the relevant geographic unit to analyze the spatial allocation channel in the U.S.?

1. Foreign-born wage allocation premium



State = relevant unit of analysis – foreign-born workers choose states with “better” cities overall

Hard to find labor demand shocks that are plausibly exogenous at the state level (see below)

2. Understanding location choices

$$v_i(\ell|g) = w(\ell|g) \times \tau(\ell|g) \times \underbrace{\varepsilon_i(\ell)}_{\substack{\text{taste shock} \\ \text{governed by } \theta}}$$

- ▶ Mobility as a form of **spatial arbitrage**: $v_i(\ell|g) = v_i(\ell'|g)$ for the marginal worker
- ▶ For some distribution of the ε_i 's, the model provides, for a given θ , a mapping between

$$\underbrace{\frac{\pi(\ell|g)}{\pi(\ell'|g)}}_{\text{rel. pop. shares}} \quad \text{and} \quad \underbrace{\frac{w(\ell|g)}{w(\ell'|g)}}_{\substack{\text{rel. wages} \\ \text{(observed)}}} \times \underbrace{\frac{\tau(\ell|g)}{\tau(\ell'|g)}}_{\substack{\text{rel. amenities} \\ \text{(unobserved)}}$$

- ▶ Panel regression of $\log \frac{\pi(\ell|g)}{\pi(\ell'|g)}$ on $\log \frac{w(\ell|g)}{w(\ell'|g)}$ to estimate θ
 - ▶ Assuming that the $\tau(\ell|g)/\tau(\ell'|g)$ follow a linear trend over time
 - ▶ And up to a normalization in some base period

2. Understanding location choices

- ▶ Conditions that seem required to recover θ through this regression:
 - (C1) Shocks to wages should be localized and driven by demand
 - (C2) Control for effects of these shocks on housing prices (as they feed into $\tau(\ell|g)/\tau(\ell'|g)$)
- ▶ Example: Plausibly exogenous opening of large manufacturing plants (Greenstone et al. [JPE '10]) or big manufacturing plant closures (Behrens et al. ['21])
- ▶ However, such demand shocks are hard to come by, and too localized for state-level analysis
- ▶ Open question: (C2) suggests controlling for housing prices in this regression

2. Understanding location choices

- ▶ Authors define a residualized amenity that takes away the effects of housing prices:

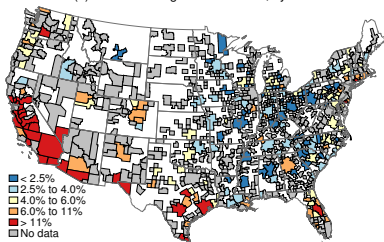
$$\tau(\ell|g) = \underbrace{\bar{\tau}(\ell|g)}_{\text{residual (i.e., net of housing) amenity}} \times \underbrace{P_H(\ell)^{-\rho}}_{\text{housing prices } (\rho = \text{housing exp. share})}$$

- ▶ Given (observed) housing expenditure share ρ , housing demand $H^d(\ell)$ is trivially given by $\sum_g w(\ell|g)N(\ell|g)$ (since no savings or borrowing in the model)
- ▶ Housing supply $H^s(\ell) = \bar{H}(\ell)P_H(\ell)^\eta$, with $\bar{H}(\ell)$ land and η the housing supply elasticity
- ▶ Literature emphasizes misallocation of U.S. workers across space due to housing constraints in some cities (see Hsieh & Moretti [AEJ:Mac '19])

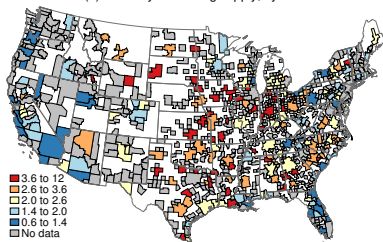
2. Understanding location choices

- ▶ Authors use $\eta = 1.75$
- ▶ Panel (b): Data from Saiz, A., August 2010. The Geographic Determinants of Housing Supply. *Quarterly Journal of Economics*, Vol. 125, No. 3, pp. 1253-1296

(a) Share of foreign-born workers, by MSA



(b) Elasticity of housing supply, by MSA



2. Understanding location choices

After purging $\tau(\ell|g)$ from effects of housing, the residual $\bar{\tau}(\ell|g)$ may still capture:

1. Labor search frictions that may affect foreign- and U.S.-born workers differently
2. Discrimination in wages or access to jobs against foreign-born workers
3. Barriers to forming human capital faced by workers from different backgrounds
4. ...

⇒ Importance of these factors is likely endogenous to the share of foreign-born workers in each ℓ

3. Main quantification exercises

When adding a production structure to close the model:

- ▶ Capital (perfectly mobile across locations)
 - ✓ User cost is different across ℓ 's, which matters for measuring worker's productivity
 - ✗ Complicates the analysis with occupational capital, occupational tools, different depreciation rates, ..., with little impact on the results
- ▶ Nests of the production function
 - ▶ Workers from different groups g within location ℓ are sent to \neq production functions
 - ▶ Effect of g' on productivity of g 's is only through the agglomeration effect in ℓ
 - ▶ ✗ Makes it important to estimate the agglomeration elasticity, ϕ , within the model
 - ▶ CES bundling workers from different groups g within each ℓ would seem more natural

3. Main quantification exercises

- ▶ Implications of the spatial allocation channel for TFP – A decomposition exercise

3. Main quantification exercises

- Implications of the spatial allocation channel for TFP – A decomposition exercise...
- ... with many potential channels

$$\begin{aligned}
 \underbrace{d \log \left(\frac{Y}{N^\alpha K^\psi} \right)}_{\text{Total TFP Change}} &= \underbrace{\sum_{g,\ell} \lambda(\ell|g) \alpha d \log \left(\frac{N(g)}{N} \right)}_{\text{Labor Composition Effect}} + \underbrace{\sum_{g,\ell} \lambda(\ell|g) \psi d \log \left(\frac{K(g)}{K} \right)}_{\text{Capital Composition Effect}} \\
 &+ \underbrace{\sum_{g,\ell} \lambda(\ell|g) d \log P(\ell)}_{\text{Direct Price Effect}} + \underbrace{\sum_{g,\ell} \lambda(\ell|g) d \log \bar{A}(\ell|g)}_{\text{Direct Skills Effect}} + \underbrace{\sum_{g,\ell} \lambda(\ell|g) \phi d \log N(\ell)}_{\text{Direct Agglomeration Effect}} \\
 &+ \underbrace{\sum_{g,\ell} \lambda(\ell|g) \psi d \log \left(\frac{K(\ell|g)}{K(g)} \right)}_{\text{Capital Reallocation Effect}} + \sum_{g,\ell} \lambda(\ell|g) \frac{\alpha \hat{\theta}}{1 - \psi} \underbrace{\left[\left(d \log P(\ell) - \mathbb{E}_\ell [d \log P(\ell)] \right) \right]}_{\text{Indirect Price Effect}} \\
 &+ \underbrace{\left(d \log \bar{A}(\ell|g) - \mathbb{E}_\ell [d \log \bar{A}(\ell|g)] \right)}_{\text{Indirect Skills Effect}} + \underbrace{\phi \left(d \log N(\ell) - \mathbb{E}_\ell [d \log N(\ell)] \right)}_{\text{Indirect Agglomeration Effect}} \\
 &+ \sum_{g,\ell} \lambda(\ell|g) \alpha \hat{\theta} \left[\underbrace{\left(d \log \bar{\tau}(\ell|g) - \mathbb{E}_\ell [d \log \bar{\tau}(\ell|g)] \right)}_{\text{Exogenous Amenities Effect}} - \underbrace{\rho \left(d \log P_h(\ell) - \mathbb{E}_\ell [d \log P_h(\ell)] \right)}_{\text{Congestion Effect}} \right]
 \end{aligned}$$

3. Main quantification exercises

- ▶ “Bringing U.S.-born workers 0.01% closer to foreign-born workers in terms of productivity $\bar{A}(\ell|g)$ and amenities $\bar{\tau}(\ell|g)$ ” → Why?

⇒ Other potentially interesting counterfactuals:

1. Share of foreign-born has been on the rise for decades → effect on TFP and welfare
2. Effects of prolonging the trend for the next decade?
3. Effects of having more targeted migration in terms of education and occupations
4. Changes in the composition of foreign-born workers, and implications for TFP and welfare

Conclusion

Insight/Takeaway: Foreign-born are, on average and conditional on location, less productive than U.S.-born workers; Yet they contribute positively to TFP through the spatial allocation channel

- ▶ Important to estimate/calibrate the migration elasticity, θ , and the agglomeration elasticity, ϕ , internally to make it a fully-fledged quantitative exercise
- ▶ Given the emphasis on the role of housing amenities, it could be useful to explore the role of spatial heterogeneity in the housing supply elasticity, η
- ▶ Counterfactual exercises that show how the rise of the foreign-born workforce contributed to TFP over the past decades, and what will happen next