Selection of Job-to-job Migrants on Match Quality

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Motivation

Selection on unobservable skills

- Large fraction of selection is on unbservable skills (Borjas, Kauppinen, & Poutvaara, 2019).
- Value of unobservable skills measured by wage residuals (Borjas, Bronars, & Trejo, 1992; Abramitzky, 2009; Borjas et al., 2019)

Job match quality

- Wage residuals also reflect job match quality, randomness independent of skills (Mortensen, 2003).

Job-to-job (contracted) migration

- Labor related migration is often job-to-job, occuring after successful job search (Saben, 1964; Detang-Dessendre & Molho, 1999).
- Job-to-job migrants observe their job match qualities prior to migration choice.

$\rightarrow$ **Job-to-job migrants are selected on job match quality**

Overview

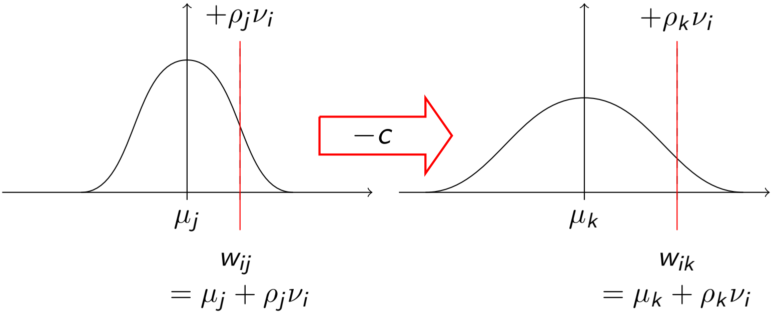
- Extend **Roy-Borjas migrant selection model** for **job-to-job migration**.
  - Negative selection on match quality in the source
  - Positive selection on match quality in the destination
- Extend model with **mobility mode choice** and **heterogenous mobility costs**.
  - **Chosen mobility mode** can be interpreted as a **proxy for mobility costs**.
  - Show how **comparison of two mobile groups** with different mobility mode can **identify selection effects**.
- Compare selection of **migrants** and **commuters** on residuals.
  - Selection on job match quality explains the data better than selection on unobservable skills.

Why Care?

- Labor related migration is **mostly job-to-job**.
- Interpreting **selection on wage residuals** without taking job match quality into account
  - **underestimates positive selection** on unobservable skills **in the source**.
  - **overestimates positive selection** on unobservable skills **in the destination**.
- Results on **identification of the effect of mobility costs on selection**.

Model

Roy-Borjas Model

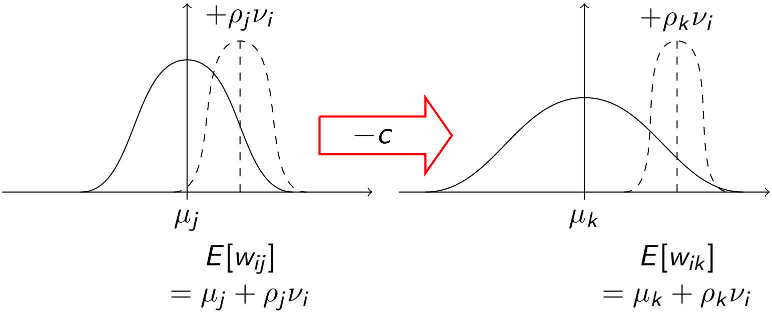


Let $\nu_i \sim \mathcal{N}(0,1)$

migrant iff $c < w_{ik} - w_{ij} = \mu_k - \mu_j + (\rho_k - \rho_j)\nu_i$

Model

Within Skill Wage Dispersion



Let $\nu_i \sim \mathcal{N}(0,1)$

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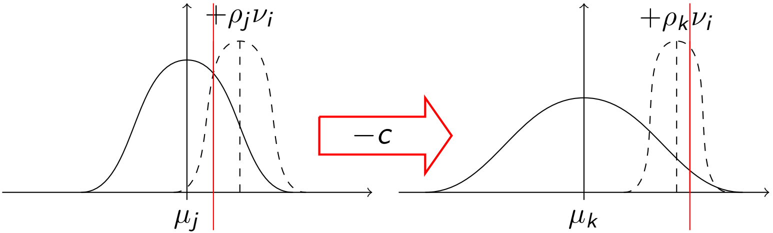
Model

Observability of Wages



w_{ij}
$= \mu_j + \rho_j\nu_i + q_{ij}$

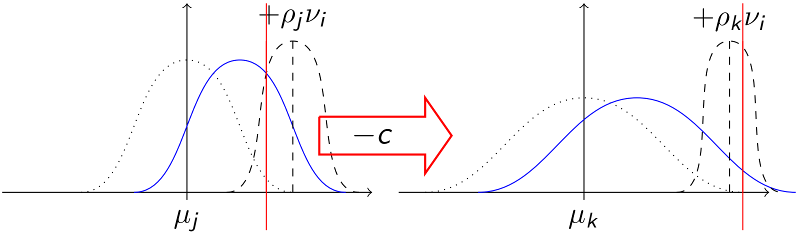
w_{ik}
$= \mu_k + \rho_k\nu_i + q_{ik}$

Let $\nu_i \sim \mathcal{N}(0,1)$ $\quad q_{ih} \sim \mathcal{N}(0,\sigma_h^2)$ for $h = j, k$

migrant iff $c < w_{ik} - w_{ij} = \mu_k - \mu_j + (\rho_k - \rho_j)\nu_i + q_{ik} - q_{ij}$

Model

Exogenous selection to possibility of migration



$$w_{ij} = \mu_j + \rho_j\mu_\nu + \rho_j(\nu_i - \mu_\nu) + q_{ij} \qquad w_{ik} = \mu_k + \rho_k\mu_\nu + \rho_k(\nu_i - \mu_\nu) + q_{ik}$$

Let $\nu_i | i \in \mathcal{I} \sim \mathcal{N}(\mu_\nu, \sigma_\nu^2)$ $\qquad q_{ih} \sim \mathcal{N}(0, \sigma_h^2)$ for $h = j, k$

migrant iff $c < w_{ik} - w_{ij} = \mu_k - \mu_j + (\rho_k - \rho_j)\nu_i + q_{ik} - q_{ij}$

Selection of Job-to-job Migrants

(i) the expected source location wages are

$$E[w_{ij}|migrant] = \mu_j + E[\rho_j \nu_i|migrant] + E[q_{ij}|migrant],$$

(ii) the expected destination location wages are

$$E[w_{ik}|migrant] = \mu_k + E[\rho_k \nu_i|migrant] + E[q_{ik}|migrant],$$

where $\sigma_\Delta^2 := \sigma_k^2 + \sigma_j^2 + (\rho_k - \rho_j)^2 \sigma_\nu^2$, $\lambda(z) := \phi(z)/(1 - \Phi(z))$ is the inverse Mill's ratio, where ϕ, and Φ denote the density and distribution functions of the standard normal, respectively, and

$$z_{jk} := \frac{1}{\sigma_\Delta} \left(\mu_j - \mu_k + \pi_{jk} - (\rho_k - \rho_j)\mu_\nu \right).$$

Selection of Job-to-job Migrants

(i) the expected source location wages are

$$E[w_{ij}|migrant] = \mu_j + \underbrace{\rho_j\mu_\nu + \frac{\sigma_\nu^2}{\sigma_\Delta}(\rho_k - \rho_j)\rho_j\lambda(z_{jk})}_{E[\rho_j\nu_i|migrant]} \underbrace{-\frac{\sigma_j^2}{\sigma_\Delta}\lambda(z_{jk})}_{E[q_{ij}|migrant]},$$

(ii) the expected destination location wages are

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Selection of Job-to-job Migrants

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Migrants vs Stayers

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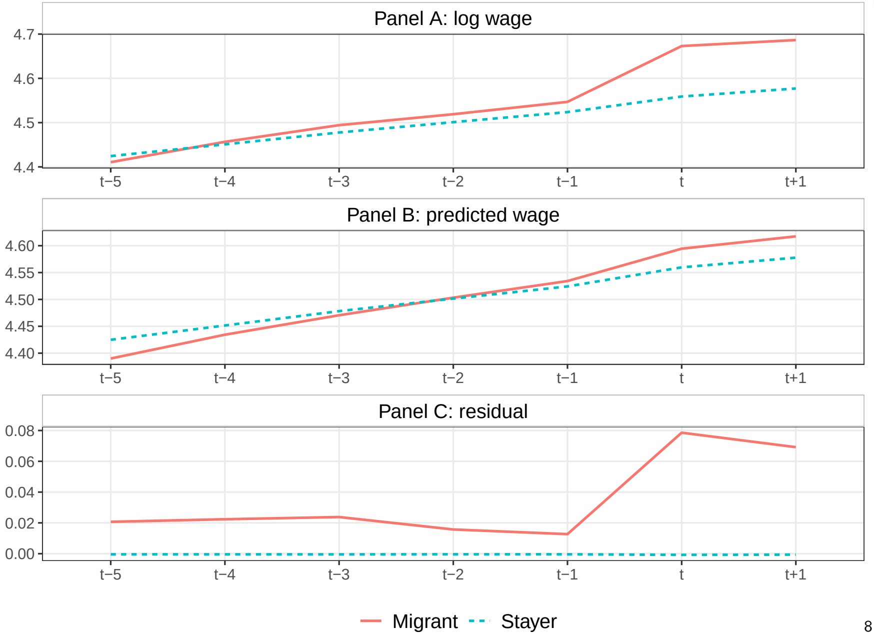
Selection into $\mathcal{I}$:

1. Search interregionally
2. Receive a job offer

$$\implies \mu_\nu > 0.$$


Panel A: log wage
4.7
4.6
4.5
4.4
t−5
t−4
t−3
t−2
t−1
t
t+1
Panel B: predicted wage
4.60
4.55
4.50
4.45
4.40
t−5
t−4
t−3
t−2
t−1
t
t+1
Panel C: residual
0.08
0.06
0.04
0.02
0.00
t−5
t−4
t−3
t−2
t−1
t
t+1
Migrant
Stayer

Migrants vs Commuters

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$$E[u_{ik}|migrant] = \rho_k \mu_\nu + \frac{1}{\sigma_\Delta}(\sigma_\nu^2(\rho_k - \rho_j)\rho_k + \sigma_k^2)\lambda^m$$

They are similar:

- Search interregionally, receive a job offer, are in $\mathcal{I}$
- Have the same ρ_h

They are different:

- Migrants tend to incur larger mobility costs

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Model of Mobility Mode Choice

- Each i in $\mathcal{I}$ has a cost type $(\pi^m_{ijk}, \pi^c_{ijk})$
- Each i chooses the least costly mobility mode

Potential migrants

$$\pi^m_{ijk} < \pi^c_{ijk}$$

Accept iff

$$w_{ik} - w_{ij} > \pi^m_{ijk}$$

Potential commuters

$$\pi^m_{ijk} > \pi^c_{ijk}$$

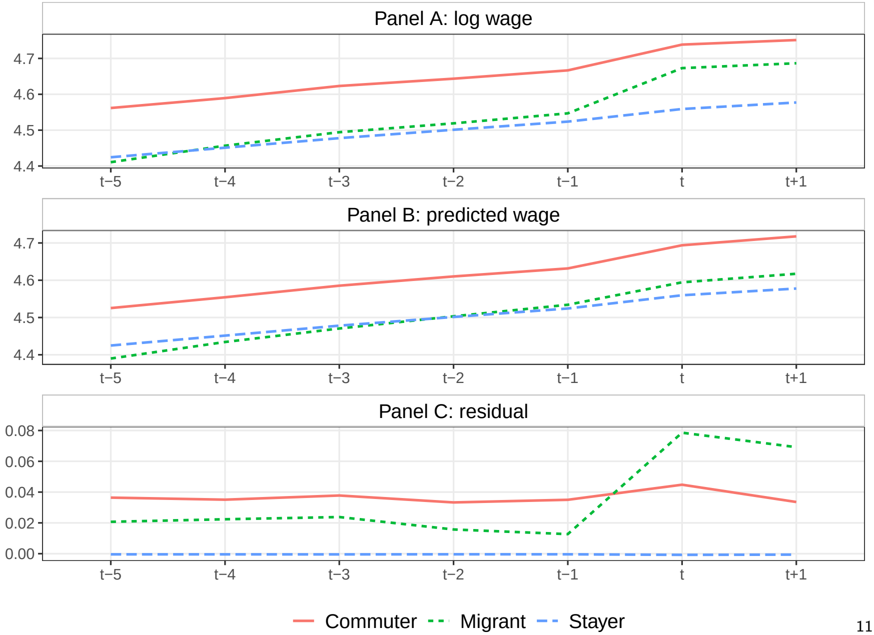
Accept iff

$$w_{ik} - w_{ij} > \pi^c_{ijk}$$

$$\bar{\pi}^m_{jk} > \bar{\pi}^c_{jk} \iff \left\{\pi^m_{ijk} | \pi^m_{ijk} < \pi^c_{ijk} \quad FOSD \quad \pi^c_{ijk} | \pi^c_{ijk} < \pi^m_{ijk}\right\}$$

$$\iff$$

$$\lambda^m := E\left[\lambda(z_{ijk}(\pi^m_{ijk})) | \pi^m_{ijk} < \pi^c_{ijk}\right] > E\left[\lambda(z_{ijk}(\pi^c_{ijk})) | \pi^m_{ijk} > \pi^c_{ijk}\right] =: \lambda^c$$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4.7
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t−5
t−4
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t−1
t
t+1
Panel B: predicted wage
4.7
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4.5
4.4
t−5
t−4
t−3
t−2
t−1
t
t+1
Panel C: residual
0.08
0.06
0.04
0.02
0.00
t−5
t−4
t−3
t−2
t−1
t
t+1
Commuter
Migrant
Stayer

Selection on Source Location Residuals

Model

Dependent variable:	$\hat{u}_{ij}$			
Migrant	-0.0223^{***}	-0.0217^{***}	-0.0209^{***}	-0.0134^{***}
(ref: Commuter)	(0.0035)	(0.0052)	(0.0053)	(0.0051)
Cost controls				
Distance to new job	No	No	Yes	Yes
Commuting distance	No	No	Yes	Yes
$j-k-l$ triad FE	No	Yes	Yes	Yes
$\hat{E}_{ik}[w]$, $\hat{E}_{ij}[w]$	No	No	No	Yes
Year FE	No	Yes	Yes	Yes
Constant term	Yes	No	No	No
Observations	101,254	101,254	101,254	101,254
Migrants	29,181	29,181	29,181	29,181
Commuters	72,073	72,073	72,073	72,073
R^2, $\hat{u}_{ij}$	0.0005	0.0090	0.0011	0.0317

Table: **Selection on source location residuals.** *Notes: * $p<0.05$; ** $p<0.01$; *** $p<0.001$. Columns 3 and 4 additionally control for all the main and interaction effects of indicators of employed industry or occupation changes. White heteroskedasticity robust standard errors clustered at residence-source-destination municipality level in parenthesis.*

Selection on Destination Location Residuals

Model

Dependent variable:	$\hat{u}_{ik}$			
Migrant	0.0356***	0.0310***	0.0311***	0.0276***
(ref: Commuter)	(0.0035	(0.0047)	(0.0047)	(0.0047)
Cost controls				
Distance to new job	No	No	Yes	Yes
Commuting distance	No	No	Yes	Yes
$j-k-l$ triad FE	No	Yes	Yes	Yes
$\hat{E}_{ik}[w]$, $\hat{E}_{ij}[w]$	No	No	No	Yes
Year FE	No	Yes	Yes	Yes
Constant term	Yes	No	No	No
Observations	101,254	101,254	101,254	101,254
Migrants	29,181	29,181	29,181	29,181
Commuters	72,073	72,073	72,073	72,073
R^2, $\hat{u}_{ik}$	0.0012	0.0016	0.0019	0.0249

Table: **Selection on destination location residuals.** *Notes: * p<0.05; ** p<0.01; *** p<0.001. Columns 3 and 4 additionally control for all the main and interaction effects of indicators of employed industry or occupation changes. White heteroskedasticity robust standard errors clustered at residence-source-destination municipality level in parenthesis.*

Selection on Source Job Match Quality

Identification Model ρ

$$\tau_j = \frac{1}{\sigma_\Delta}\left(\sigma_\nu^2(\rho_k - \rho_j)\rho_j - \sigma_j^2\right)[\lambda(z_{ijk}^m) - \lambda(z_{ijk}^c)].$$

ρ measure:	$sd(\hat{u}_{ih})$	$sd(w_{ih})$	$sd(\hat{u}_{ih})$	$sd(w_{ih})$
Sample:	$\rho_k - \rho_j > 0$		$\rho_k - \rho_j < 0$	
Dependent variable:	$\hat{u}_{ij}$			
Migrant	−0.0123	−0.0134	−0.0107	−0.0087
(ref: Commuter)	(0.0066)	(0.0069)	(0.0076)	(0.0078)
Observations	44,487	44,523	37,144	37,108
Migrants	13,953	13,945	13,370	13,378
Commuters	30,534	30,578	23,774	23,730
R^2	0.0403	0.0444	0.0475	0.0386

Table: *Notes: * p<0.05; ** p<0.01; *** p<0.001. Controls as in column 4 above. White heteroskedasticity robust standard errors clustered at residence-source-destination municipality level in parenthesis.*

Selection on Destination Job Match Quality

Identification Model

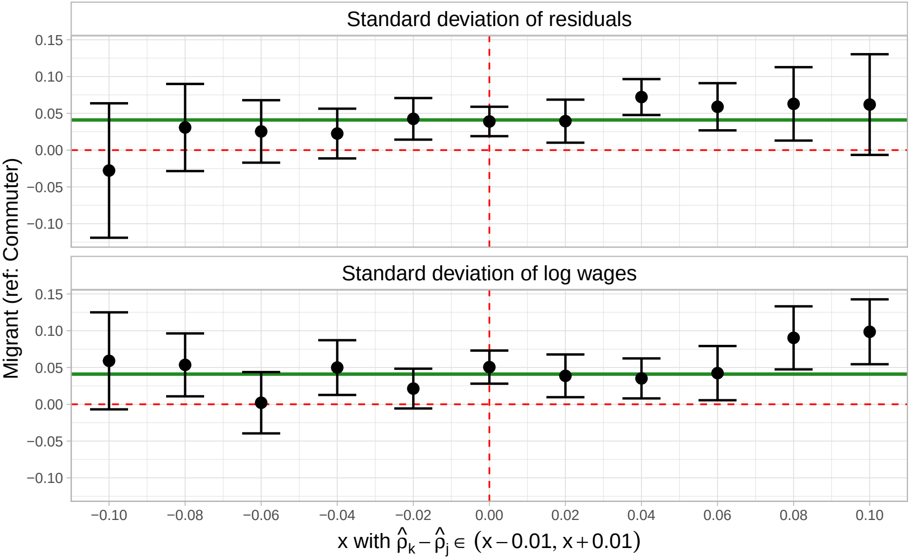
$$\tau_k = \frac{1}{\sigma_\Delta}(\sigma_\nu^2(\rho_k - \rho_j)\rho_k + \sigma_k^2)[\lambda(z_{ijk}^m) - \lambda(z_{ijk}^c)].$$

ρ measure:	$sd(\hat{u}_{ih})$	$sd(w_{ih})$	$sd(\hat{u}_{ih})$	$sd(w_{ih})$
Sample:	$\rho_k - \rho_j > 0$		$\rho_k - \rho_j < 0$	
Dependent variable:	$\hat{u}_{ik}$			
Migrant	0.0391***	0.0463***	0.0161**	0.0134
(ref: Commuter)	(0.0063)	(0.0065)	(0.0074)	(0.0074)
Observations	44,487	44,523	37,144	37,108
Migrants	13,953	13,945	13,370	13,378
Commuters	30,534	30,578	23,774	23,730
R^2	0.0411	0.0360	0.0253	0.0280

Table: *Notes: * $p<0.05$; ** $p<0.01$; *** $p<0.001$. Controls as in column 4 above. White heteroskedasticity robust standard errors clustered at residence-source-destination municipality level in parenthesis.*

DiD in Subsamples by $\rho_k - \rho_j$

Identification Full sample table ρ



Mechanisms: costs

Model

Dependent variable:	$\hat{u}_{ik} - \hat{u}_{ij}$				
Cost proxy, $t-1$:	Lives alone	Spouse working	Lives rental	Owns house	Owns a car
Migrant * Cost proxy (ref: Commuter * Cost proxy)	-0.0284^{**} (0.0094)	0.0275^{**} (0.0091)	-0.0084 (0.0106)	0.0066 (0.0098)	0.0258^{**} (0.0096)
Observations	101,254	101,254	101,254	101,254	101,254
Migrants	29,181	29,181	29,181	29,181	29,181
Commuters	72,073	72,073	72,073	72,073	72,073
R^2	0.0831	0.0831	0.0829	0.0829	0.0833

Table: **Selection on post-mobility residuals.** *Notes: $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$. Controls as in column 4 above. White heteroskedasticity robust standard errors clustered at residence-source-destination municipality level in parenthesis.*

Summary

- Extend **Roy-Borjas migrant selection model** for **job-to-job migration**.
  - Negative selection on match quality in the source
  - Positive selection on match quality in the destination
- Extend model with **mobility mode choice** and **heterogenous mobility costs**.
  - **Chosen mobility mode** can be interpreted as a **proxy for mobility costs**.
  - Show how **comparison of two mobile groups** with different mobility mode can **identify selection effects**.
- Compare selection of **migrants** and **commuters** on residuals.
  - Selection on job match quality explains the data better than selection on unobservable skills.

Thank you!

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