Labor Market Dynamics and Development

Kevin Donovan
Yale SOM

Will Jianyu Lu
Central Bank of Chile

Todd Schoellman
FRB Minneapolis

The views expressed herein are those of the authors and not necessarily those of the Banco Central de Chile, its Board members, the Federal Reserve Bank of Minneapolis, or the Federal Reserve System.

Background

Question: do labor markets in poor countries hinder development?

- Larger share of self-employment, informal or small-scale employment
  - World Development Report 2013: Jobs
- Lower life-cycle wage growth in poorer countries (Lagakos et. al., 2018)

Recent work: experiments that alter labor market behavior

- Providing testing & certification, transport subsidies, resume workshops, referral bonuses (Adebe, et al., 2017; Bassi and Nansamba, 2019; Carranza, et al. 2019; Groh, et al. 2016; Jeong, 2020)

Background

Question: do labor markets in poor countries hinder development?

- Larger share of self-employment, informal or small-scale employment
  - World Development Report 2013: Jobs
- Lower life-cycle wage growth in poorer countries (Lagakos et. al., 2018)

Recent work: experiments that alter labor market behavior

- Providing testing & certification, transport subsidies, resume workshops, referral bonuses (Adebe, et al., 2017; Bassi and Nansamba, 2019; Carranza, et al. 2019; Groh, et al. 2016; Jeong, 2020)

Missing: baseline theory, with frictions

- Candidates: search and matching theories
- Needed: missing necessary empirical ingredients (Feng, et al. 2018)

What We Do

Collect and harmonize microdata from rotating panel LFSs in 42 countries

- Large microdataset (67 million individuals, 515 country-years)
- Wide range of development: $2,000–$70,000
- Panel element allows us to construct flows

Document trends in job finding rate, employment exit rate, job-to-job transition rate

- Consistent definitions
- Re-consider data conventions that may not carry over elsewhere

Explore which theories are useful for thinking about these trends

Results

Three main empirical results: In poor countries,

1. Flows into and out of employment 2–3 times higher
2. Steeper tenure exit-hazards (tenure dist. "accounts" $\approx$ half of cross-country difference)
3. Higher average returns to tenure

Class of models that highlight role of endogenous separation and selection

Accounting to investigate underlying characteristics

- Labor market institutions, firm and worker characteristics
- Patterns continue to hold within narrowly defined groups

Outline

1. **Constructing the Data**
2. Labor Market Flows and Development
3. The Role of Tenure
4. Accounting for Underlying Characteristics

Construction

Seek out countries with rotating panel LFS (42 countries)

- Quarterly panel: Individuals surveyed for *N* quarters, then exit survey
- Microdata with identifiers, to match across quarters
- Merge Q1+Q2, then Q2+Q3, …⇒ data set of quarterly transitions

Data available to merge:

1. Most countries: household & person id, validate age & gender
2. Remaining countries: follow CPS (household id) and validate

Post-stratify weights to adjust for attrition

Harmonized Cross-Country Dataset

Harmonize the following to make them comparable across countries:

- Labor force status, including self-employment
- Job-to-job transitions
- Hours, earnings, wages
- Job tenure
- Contract type
- Formality
- Industry, occupation
- Age, education, gender
- Establishment size of employer or own business if self-employed

Focus on urban workers age 16–65

- 11 countries have only urban data (larger differences with rural, Jeong 2020)

Sample Overview

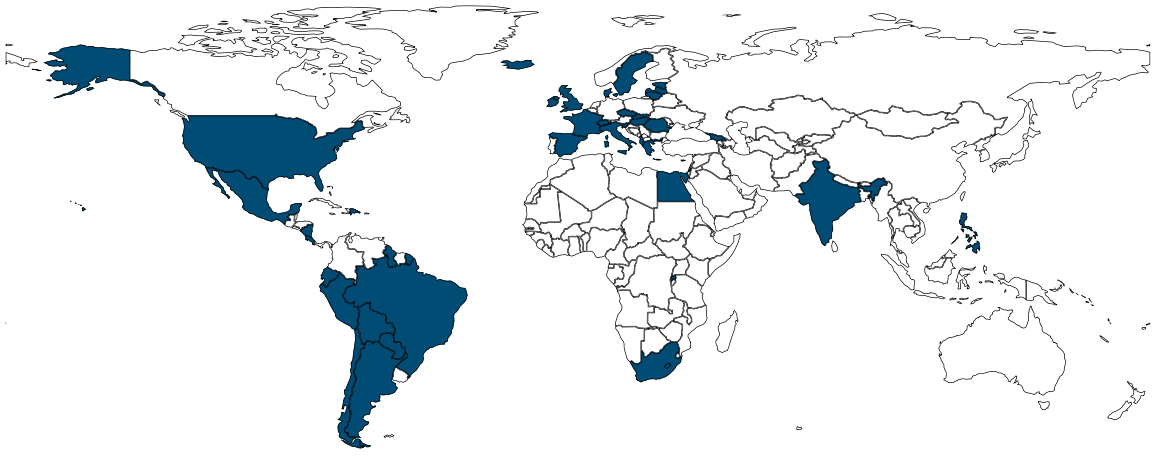
Overall details:

- **Countries:** 42
- **Country-years:** 515
- **Obs:** 67 million
- **GDP per capita:** 2,000 – 70,000

Countries:

- **Poorest:** Nicaragua, India, Palestine, Philippines
- **Richest:** US, much of Europe

Countries Included



Sample Overview

Country	Years	Obs. (1000s)	Country	Years	Obs. (1000s)
Albania	2012–2013	37	Italy	2005–2018	1,793
Argentina	2003–2018	765	Latvia	2007–2018	79
Bolivia	2015–2018	247	Lithuania	2005–2018	187
Brazil	2002–2017	7,323	Malta	2009–2018	49
Chile	2010–2018	1,983	Mexico	1995–2017	15,400
Costa Rica	2010–2018	352	Nicaragua	2009–2012	194
Cyprus	2005–2018	226	Palestine	2000–2015	558
Czech Republic	2005–2010	591	Paraguay	2010–2017	45
Denmark	2007–2018	266	Peru	2003–2018	248
Dominican Republic	2016–2017	52	Philippines	1988–2003	1,989
Ecuador	2007–2017	258	Romania	2005–2018	817
Egypt, Arab Rep.	2008–2012	205	Rwanda	2019	
Estonia	2005–2018	75	Slovak Republic	2005–2018	572
France	2003–2017	3,070	Slovenia	2010–2018	113
Georgia	2009–2016	141	South Africa	2008–2018	1,228
Greece	2005–2018	1,400	Spain	2000–2018	6,843
Guyana	2017–2017	2	Sweden	2005–2018	1,562
Hungary	2005–2018	1,461	Switzerland	2010–2017	373
Iceland	2005–2018	58	United Kingdom	1997–2017	3,591
India	2017–2018	190	United States	1979–2019	9,083
Ireland	2007–2018	732			

Outline

1. Constructing the Data
2. **Labor Market Flows and Development**
3. The Role of Tenure
4. Accounting for Underlying Characteristics

Standardized (US) Definitions of Labor Market Statuses

Employed: Anyone who

- Worked in reference week for pay
- Self-employed (detailed in poor countries)
- $\geq$ 15 hours as unpaid family worker
- Temporarily absent from job with defined return period (vacation, sick)

Unemployed: Not employed and satisfies

- Want to work
- Available for work
- Searched in past month, or waiting to be recalled

Inactive: Anyone left over

Comparing Statuses & Flows Across Countries

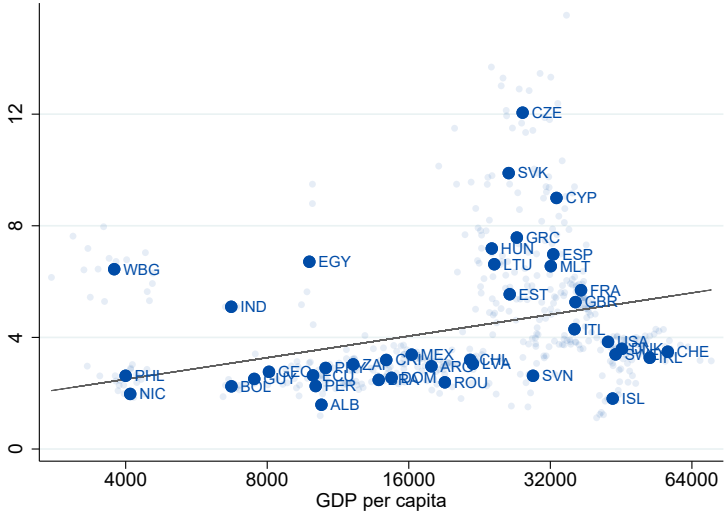
Goal: map evidence to search & matching theory

- matching function: matches = m(job seekers, vacancies)

Who are the job seekers?

- Conventional starting point: the unemployed
  - May not be appropriate in countries e.g. without unemployment insurance
- Revisit this convention using test in spirit of Flinn-Heckman

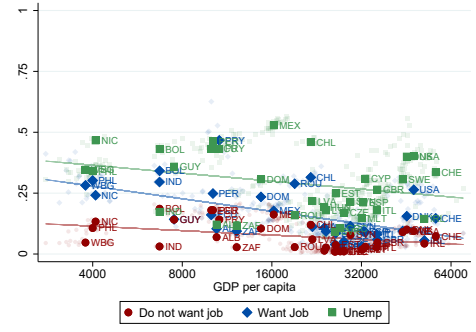
Relative JFR: Unemployed / Inactive



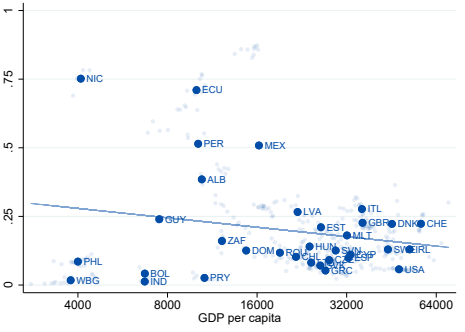
More non-employed in poor countries are “marginally attached”

Characterize non-employed into three groups

- **Unemployed**
- **Marginally attached:** inactive, desire to work
- **Out of the labor force:** inactive, no desire to work



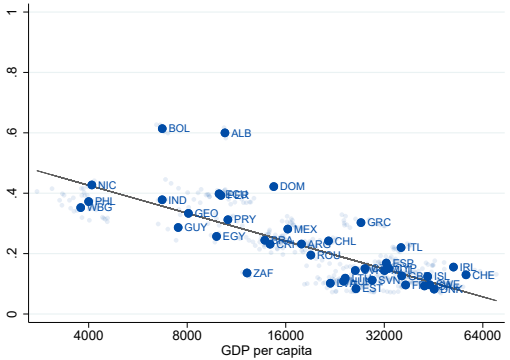
JFR by Type



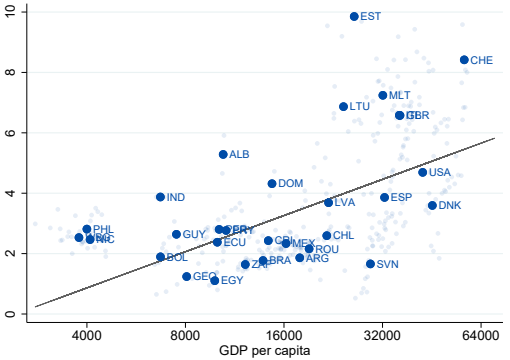
Marginally Attached Share of Inactive

Self-Employment and Job Flows

Recent work: self-employment in poor countries is unemployment insurance + search

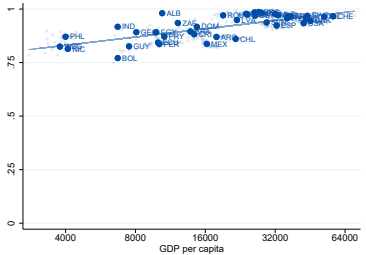


Self-Employment Share of Employment

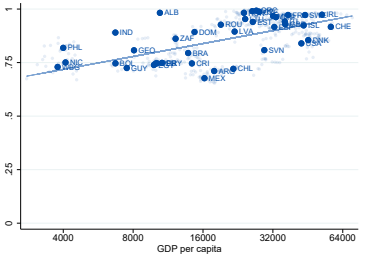


Relative flows to W: $\frac{\text{Unemployed}}{\text{Self-Employed}}$

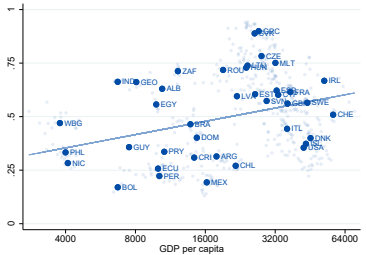
Labor Force Status Persistence



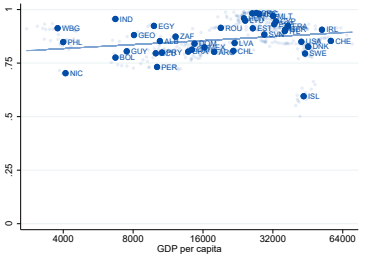
Wage Work



Self-Employment



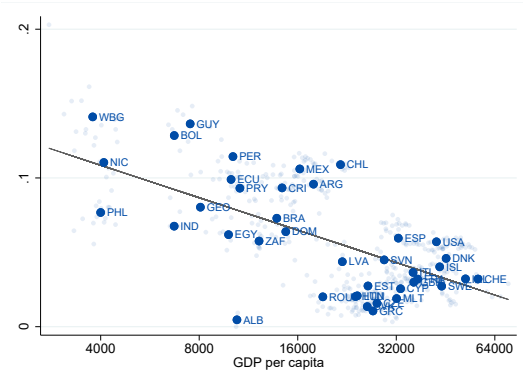
Unemployment



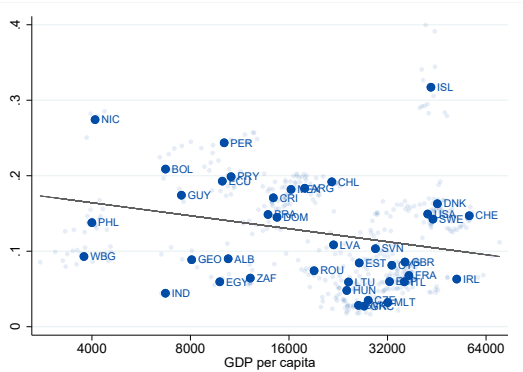
Inactivity

Fact 1: Labor Market Flows, Preferred Aggregation

Employment Exit Rate: from employed to not employed
Job Finding Rate: from not employed to employed



Employment Exit Rate

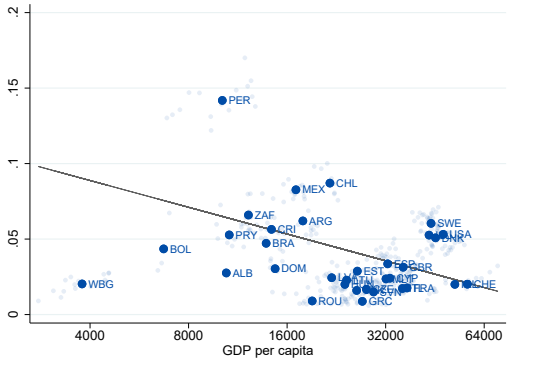


Job Finding Rate

[more moments]

Job-Job Flows

Self-Employment to Wage Work



Wage Work to Wage Work

Patterns as Compared to Literature

All countries	Exit Rate	JFR	S.E. - Wage	Job-Job
Log GDP per capita	-0.035***	-0.017***	-0.033***	-0.012***
	(0.002)	(0.004)	(0.003)	(0.002)
Observations	486	486	486	409
R-squared	0.460	0.029	0.173	0.061
Sample Average	0.057	0.120	0.071	0.040
Rich countries	Exit Rate	JFR	S.E. - Wage	Job-Job
Log GDP per capita	0.019***	0.105***	0.015	0.034***
	(0.003)	(0.012)	(0.009)	(0.003)
Observations	286	286	286	271
R-squared	0.098	0.207	0.009	0.366
Sample Average	0.035	0.098	0.044	0.030

Patterns as Compared to Literature

All countries	Exit Rate	JFR	S.E. - Wage	Job-Job
Log GDP per capita	-0.035***	-0.017***	-0.033***	-0.012***
	(0.002)	(0.004)	(0.003)	(0.002)
Observations	486	486	486	409
R-squared	0.460	0.029	0.173	0.061
Sample Average	0.057	0.120	0.071	0.040
Rich countries	Exit Rate	JFR	S.E. - Wage	Job-Job
Log GDP per capita	0.019***	0.105***	0.015	0.034***
	(0.003)	(0.012)	(0.009)	(0.003)
Observations	286	286	286	271
R-squared	0.098	0.207	0.009	0.366
Sample Average	0.035	0.098	0.044	0.030

Identifying (Narrowing Down) Plausible Theories

Many plausible candidates

1. Differences in labor market institutions
   (Ljungqvist and Sargent, 1998; Krause and Uhlig, 2012; Jung and Kuhn, 2014; Engbom, 2017)
2. Differences in worker/job composition
   (Wolcott, 2019; Samaniego de la Parra and Fernández Bujanda, 2020)
3. Differences in firm composition
   (Albrecht et al., 2009; Poschke, 2018; Bobba et al., 2018)
4. …

Identifying (Narrowing Down) Plausible Theories

Many plausible candidates

1. Differences in labor market institutions
   (Ljungqvist and Sargent, 1998; Krause and Uhlig, 2012; Jung and Kuhn, 2014; Engbom, 2017)
2. Differences in worker/job composition
   (Wolcott, 2019; Samaniego de la Parra and Fernández Bujanda, 2020)
3. Differences in firm composition
   (Albrecht et al., 2009; Poschke, 2018; Bobba et al., 2018)
4. …

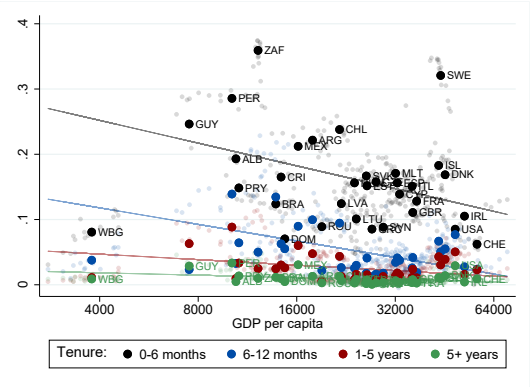
Start with an informative moment: the role of tenure

(Jovanovic, 1979, 1984; Menzio and Shi, 2011)

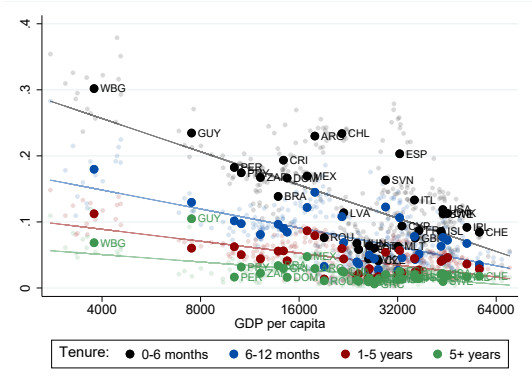
Outline

1. Constructing the Data
2. Labor Market Flows and Development
3. **The Role of Tenure**
4. Accounting for Underlying Characteristics

Fact 2a: Turnover is Low at High Tenure in All Countries



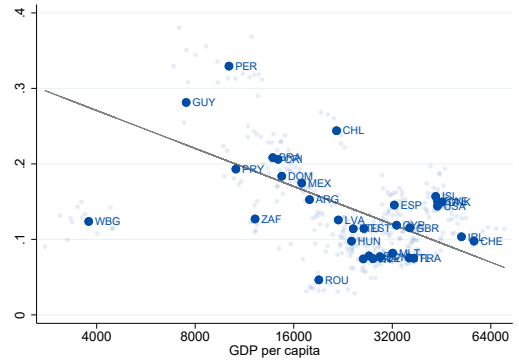
Transition to New Job



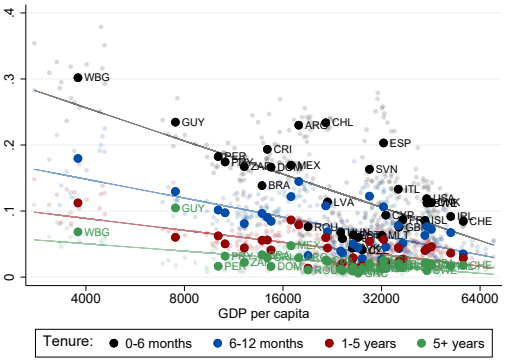
Transition to Non-Employment

Parallels finding for US time series (Mercan, 2017; Pries and Rogerson, 2019)

Fact 2b: Short Tenure More Common in Poor Countries



Share with $\leq$ 6m tenure



Exit by tenure

Tenure "accounts" for 45% of employment exit rate

- Twice any other observable characteristic (coming later)

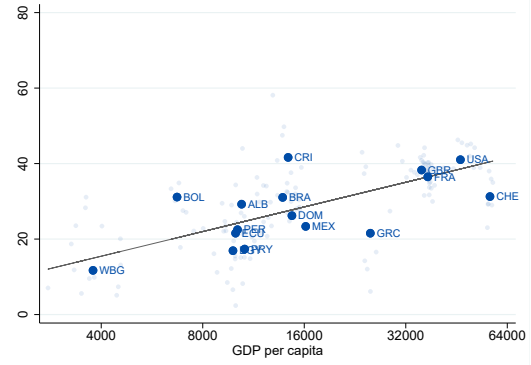
Fact 3: Estimate Tenure-Wage Profile

For each country, pool all years and run

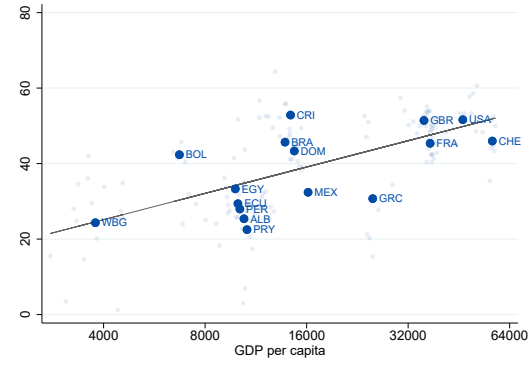
$$\log(w_{it}) = \alpha + \phi_x + \xi_\tau + \rho_{edu} + \gamma_t + \varepsilon_{it}.$$

- w_{it}: Real hourly wage for individual *i* at date *t*
- ϕ: "returns" to experience = age - edu - 6,
- ξ: "returns" to tenure = years in firm

Fact 3: Returns to experience are lower … (Lagakos, et. al, 2018)

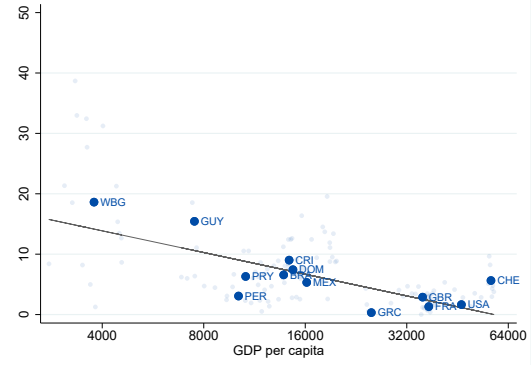


Wage Returns to 5-9 Years

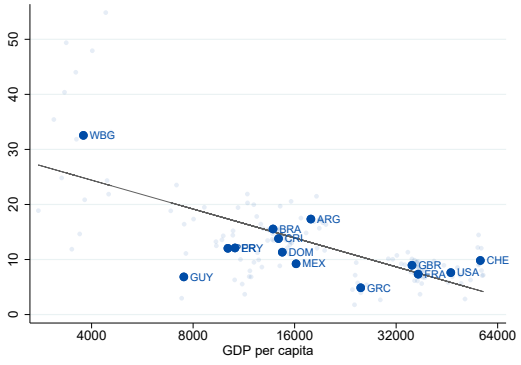


Wage Returns to 10–19 Years

Fact 3: …but returns to tenure are higher



Wage Returns to 6-12 Months Tenure



Wage Returns to 1–4 Years Tenure

Key Empirical Results

Poor countries have

1. High turnover
2. Steep tenure-exit hazards
3. High “returns” to tenure

Class of models with role for endogenous separation can explain all three

- Common insight: tenure matters because of selection

[DMP?]

Simple Learning Model

Consider meeting between worker and firm (Menzio and Shi, 2011)

- Linear payoffs, joint outside option b
- Decide whether to produce

Simple Learning Model

Consider meeting between worker and firm (Menzio and Shi, 2011)

- Linear payoffs, joint outside option b
- Decide whether to produce

Draw unknown match-specific productivity x, plus signal s

- $x \sim F(x)$, mean μ
- $s = x$ with probability p, $s \sim F$ with probability $1 - p$

Simple Learning Model

Consider meeting between worker and firm (Menzio and Shi, 2011)

- Linear payoffs, joint outside option b
- Decide whether to produce

Draw unknown match-specific productivity x, plus signal s

- $x \sim F(x)$, mean μ
- $s = x$ with probability p, $s \sim F$ with probability $1 - p$

Production generates x

- Worker and firm learn x with probability λ
- Match destroyed exogenously with probability δ

Simple Learning Model

Consider meeting between worker and firm (Menzio and Shi, 2011)

- Linear payoffs, joint outside option b
- Decide whether to produce

Draw unknown match-specific productivity x, plus signal s

- $x \sim F(x)$, mean μ
- $s = x$ with probability p, $s \sim F$ with probability $1 - p$

Production generates x

- Worker and firm learn x with probability λ
- Match destroyed exogenously with probability δ

Simple Learning Model

Consider meeting between worker and firm (Menzio and Shi, 2011)

- Linear payoffs, joint outside option b
- Decide whether to produce

Draw unknown match-specific productivity x, plus signal s

- $x \sim F(x)$, mean μ
- $s = x$ with probability p, $s \sim F$ with probability $1 - p$ *($p = 0$: experience good, $p=1$: inspection)*

Production generates x

- Worker and firm learn x with probability λ
- Match destroyed exogenously with probability δ

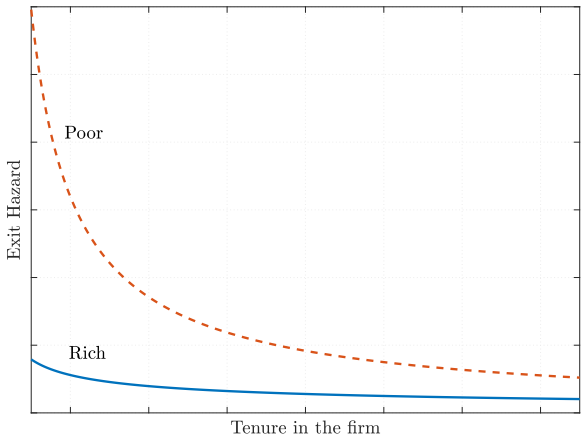
Model Intuition (Rich = Inspection; Poor = Experience)

1. **Job finding rate: higher in poor countries**
   - **Inspection:** $1 - F(b)$ matches lead to production
   - **Experience:** all matches lead to production
2. **Employment exit: higher in poor countries**
   - **Inspection:** all matches have $x > b$, no endogenous exit
   - **Experience:** learn about mistakes, additional exit

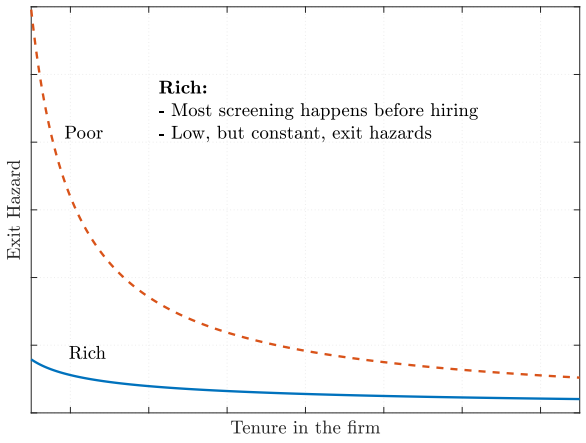
Model Intuition (Rich = Inspection; Poor = Experience)

1. **Job finding rate: higher in poor countries**
   - **Inspection:** $1 - F(b)$ matches lead to production
   - **Experience:** all matches lead to production
2. **Employment exit: higher in poor countries**
   - **Inspection:** all matches have $x > b$, no endogenous exit
   - **Experience:** learn about mistakes, additional exit
3. **Tenure hazard: steeper in poor countries**

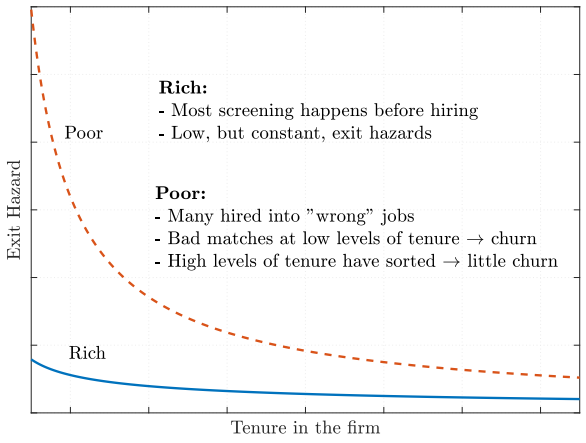
Exit Hazards



Exit Hazards



Exit Hazards



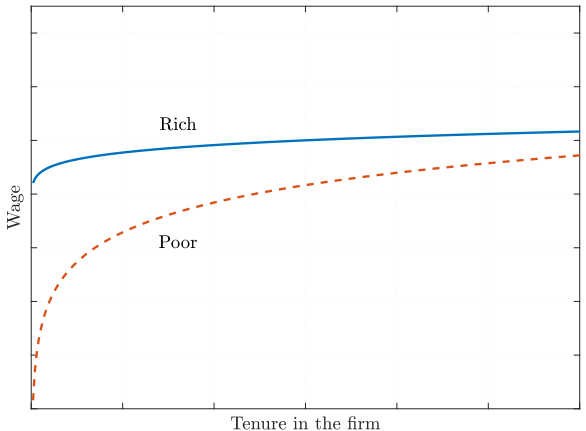
Model Intuition (Rich = Inspection; Poor = Experience)

1. **Job finding rate: higher in poor countries**
   - **Inspection:** $1 - F(b)$ matches lead to production
   - **Experience:** all matches lead to production
2. **Employment exit: higher in poor countries**
   - **Inspection:** all matches have $x > b$, no endogenous exit
   - **Experience:** learn about mistakes, additional exit
3. **Tenure hazard: steeper in poor countries**
   - **Inspection:** flat at δ
   - **Experience:** starts at $\delta + \lambda[1 - F(b)]$, declines to δ

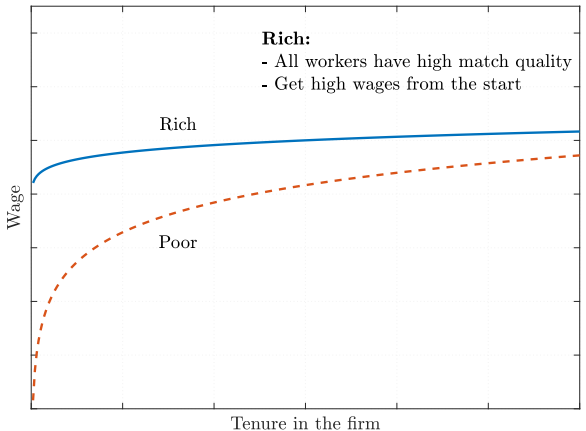
Model Intuition (Rich = Inspection; Poor = Experience)

1. **Job finding rate: higher in poor countries**
   - **Inspection:** $1 - F(b)$ matches lead to production
   - **Experience:** all matches lead to production
2. **Employment exit: higher in poor countries**
   - **Inspection:** all matches have $x > b$, no endogenous exit
   - **Experience:** learn about mistakes, additional exit
3. **Tenure hazard: steeper in poor countries**
   - **Inspection:** flat at δ
   - **Experience:** starts at $\delta + \lambda[1 - F(b)]$, declines to δ
4. **Tenure-wage profile: higher "returns" in poor countries**

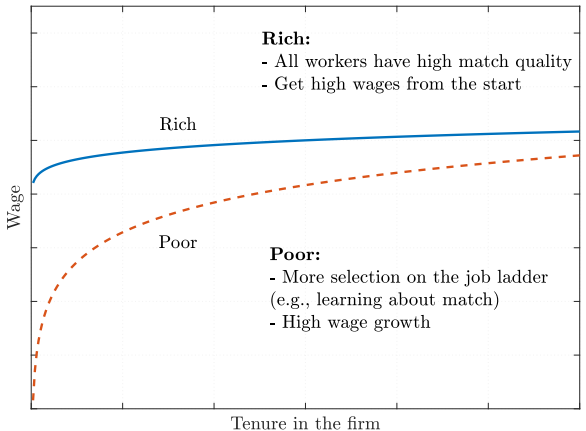
Average Tenure-Wage Profiles



Average Tenure-Wage Profiles



Average Tenure-Wage Profiles



Model Intuition (Rich = Inspection; Poor = Experience)

1. **Job finding rate: higher in poor countries**
   - **Inspection:** $1 - F(b)$ matches lead to production
   - **Experience:** all matches lead to production
2. **Employment exit: higher in poor countries**
   - **Inspection:** all matches have $x > b$, no endogenous exit
   - **Experience:** learn about mistakes, additional exit
3. **Tenure hazard: steeper in poor countries**
   - **Inspection:** flat at δ
   - **Experience:** starts at $\delta + \lambda[1 - F(b)]$, declines to δ
4. Tenure-wage profile: higher "returns" in poor countries
   - **Inspection:** flat
   - **Experience:** rises from μ to $\mathbb{E}(x|x > b)$

All predictions are continuous in p `[model math]`

Linking Theory and Reality

How does the model actually generate the empirics?

- True technological difference across countries (micro evidence on first slide)
- Implication of underlying differences in characteristics

Ex: Firms better informed about more educated or formal workers?

(Arcidiacono et al., 2010; Samaniego de la Parra and Fernández Buajnda 2020)

- More uneducated + informal workers in poor countries

Outline

1. Constructing the Data
2. Labor Market Flows and Development
3. The Role of Tenure
4. **Accounting for Underlying Characteristics**

Accounting for Worker & Firm Characteristics

Focus on exit rates:

- **Showed that $\beta < 0$:** $T_{ct} = \alpha + \beta \log(y_{ct}) + \varepsilon_{ct}$

What accounts for that relationship?

- **Exit rate as weighted sum:** $T_{ct} = \sum_g \omega_{gct} T_{gct}$

Accounting for Worker & Firm Characteristics

Focus on exit rates:

- **Showed that $\beta < 0$:** $T_{ct} = \alpha + \beta \log(y_{ct}) + \varepsilon_{ct}$

What accounts for that relationship?

- **Exit rate as weighted sum:** $T_{ct} = \sum_g \omega_{gct} T_{gct}$
- **Fixed weight transitions:** $\tilde{T}_{ct} = \sum_g \overline{\omega}_{gct} T_{gct}$

Accounting for Worker & Firm Characteristics

Focus on exit rates:

- **Showed that $\beta < 0$:** $T_{ct} = \alpha + \beta \log(y_{ct}) + \varepsilon_{ct}$

What accounts for that relationship?

- **Exit rate as weighted sum:** $T_{ct} = \sum_g \omega_{gct} T_{gct}$
- **Fixed weight transitions:** $\tilde{T}_{ct} = \sum_g \overline{\omega}_{gct} T_{gct}$
- **Run same regression:** $\tilde{T}_{ct} = \tilde{\alpha} + \tilde{\beta} \log(y_{ct}) + \tilde{\varepsilon}_{ct}$

Accounting for Worker & Firm Characteristics

Focus on exit rates:

- **Showed that $\beta < 0$:** $T_{ct} = \alpha + \beta \log(y_{ct}) + \varepsilon_{ct}$

What accounts for that relationship?

- **Exit rate as weighted sum:** $T_{ct} = \sum_g \omega_{gct} T_{gct}$
- **Fixed weight transitions:** $\tilde{T}_{ct} = \sum_g \overline{\omega}_{gct} T_{gct}$
- **Run same regression:** $\tilde{T}_{ct} = \tilde{\alpha} + \tilde{\beta} \log(y_{ct}) + \tilde{\varepsilon}_{ct}$

Accounting metric: how attenuated relationship with fixed weights?

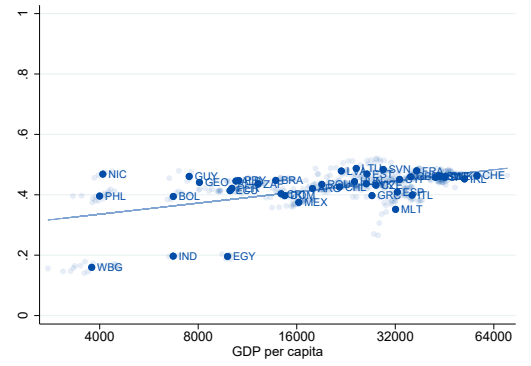
$$share = 1 - \frac{\tilde{\beta}}{\beta}$$

Accounting Results

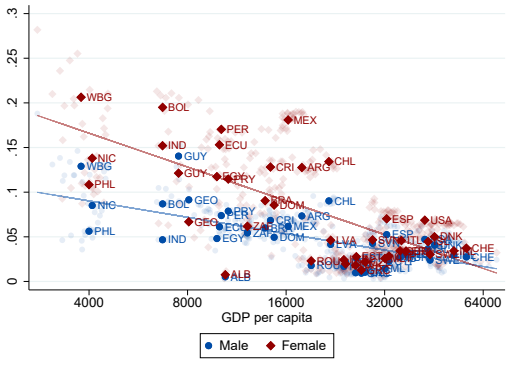
	Share Accounted for (%)	
	Total Employment	Wage Employment
Gender	-3.3	-6.6
Sectors	–	10.7
Establishment Size	21.5	11.3
Education	13.4	16.3
Informality	–	19.0
Age	9.6	19.0
Occupation	–	20.5

Observable worker & firm characteristics account for a small share of trend

Example: Accounting for Gender

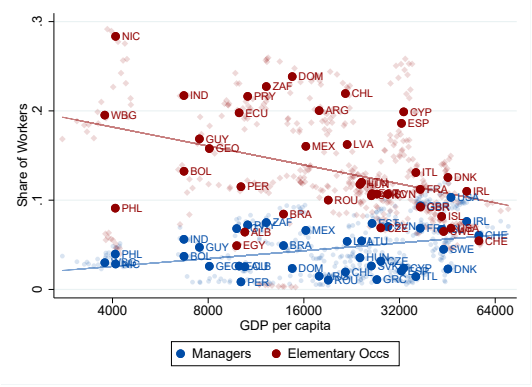


Female Share of Workers

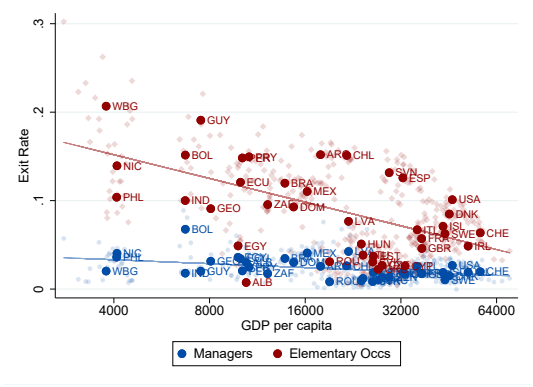


Exit Rate

Example: Accounting for Occupation



Share of Workers



Exit Rate

Accounting Results: Multiple Factors

	Share Accounted for (%)	
	Total Employment	Wage Employment
Establishment Size + Edu	29.4	20.3
Establishment Size + Age	29.7	24.6
Age + Edu + Gender	17.6	27.4
Occ + Establishment Size	–	28.1
Occ + Edu	–	29.6
Occ + Age	–	30.2
Occ + Sector	–	30.5
Occ + Sec + Size + Education + Age	–	56.1

Combinations account for just more than half (recall tenure "accounts" for 45%)

Accounting for Labor Market Regulations

Correlation with WB employment protection measures, 2014 – 2018

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP per capita	-0.044 (0.005)***	-0.033 (0.008)***	-0.045 (0.004)***	-0.042 (0.006)***	-0.049 (0.006)***	-0.040 (0.006)***	-0.046 (0.004)***	-0.019 (0.004)*
Severance pay (weeks of salary)		0.008 (0.002)***						
Annual paid leave (days of work)			-0.016 (0.003)***					
Existence of labor court				0.01 (0.009)				
Fixed-term contracts legal for permanent?					-0.009 (0.006)			
Min wage/VA p.w.						0.018 (0.016)		
Probationary period (months)							0.000 (0.000)*	
1st principal component								0.011 (0.003)***
Sample Average	0.051	0.051	0.051	0.051	0.051	0.051	0.051	0.051
Obs.	113	113	113	74	113	88	103	42
R^2	0.439	0.487	0.542	0.440	0.450	0.451	0.526	0.662

Conclusion

New dataset + facts about labor market flows across countries

- Flows 2–3$\times$ higher in poorer countries
- Concentrated at low tenure levels

Models of endogenous tenure seem promising

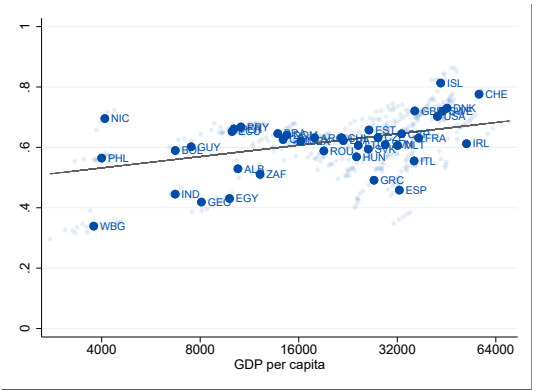
- Learning or job ladder
- Additional prediction: wage-tenure profiles should be steeper in poor countries

Why might workers exhibit higher turnover in these theories?

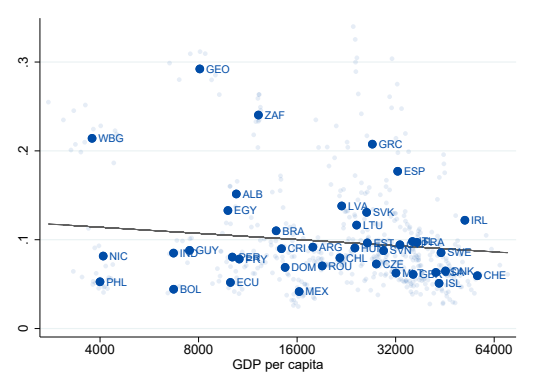
- Learning: **imprecise information**, outside options
- Job ladder: offer arrival rate, outside options

extra slides

Cross-Sectional Labor Market Facts



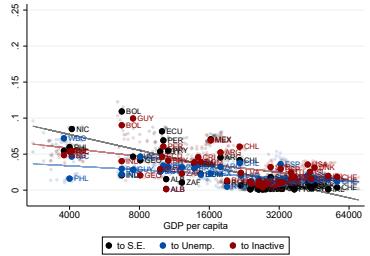
Employment-to-Population Ratio



Unemployment Rate

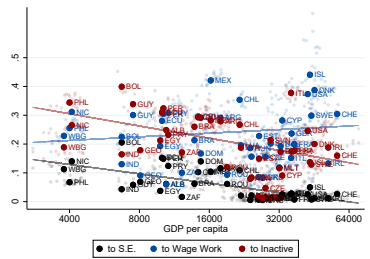
[back]

Detailed Quarterly Transition Rates

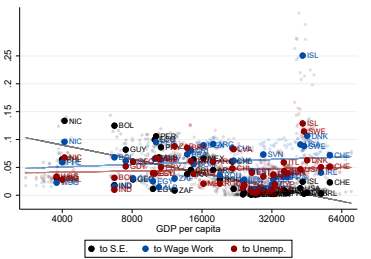


From Wage Work

From Self-Employment

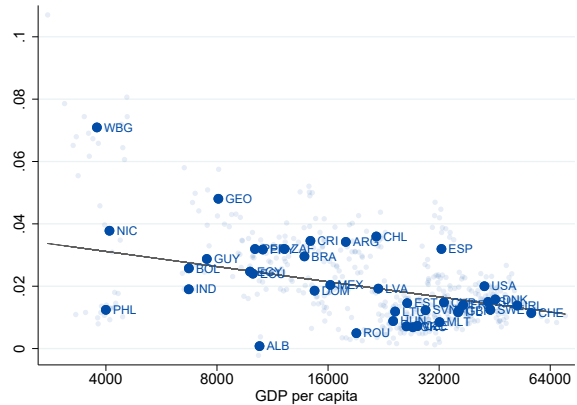


From Unemployment

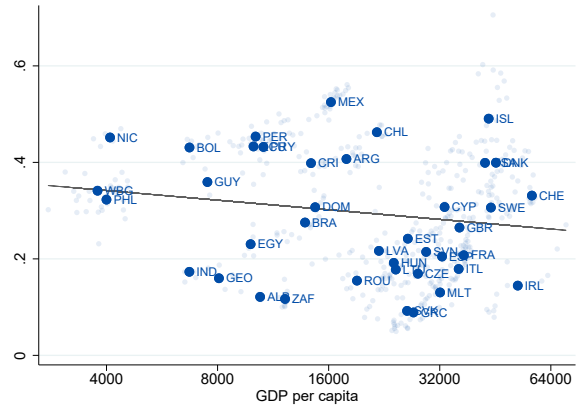


From Inactivity

Labor Market Flows: Excluding Inactivity

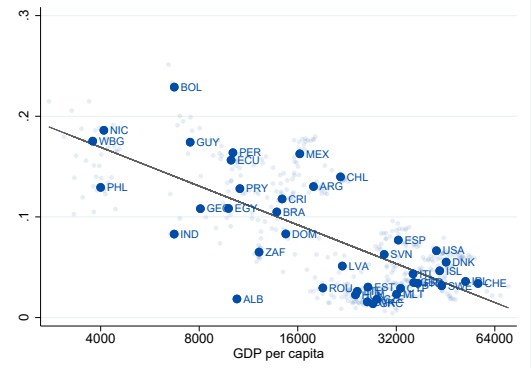


Employment Exit Rate

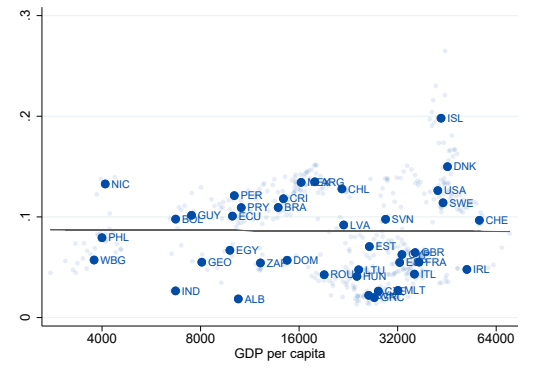


Job Finding Rate

Labor Market Flows: Self-Employment Included in Unemployment

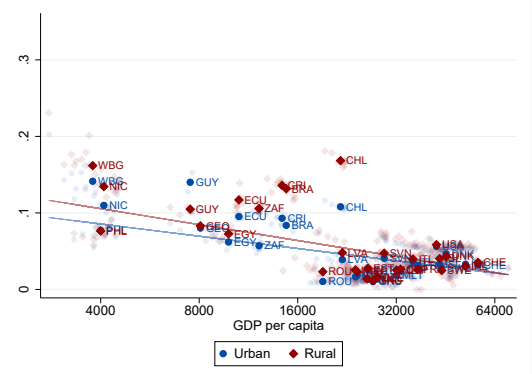


Employment Exit Rate

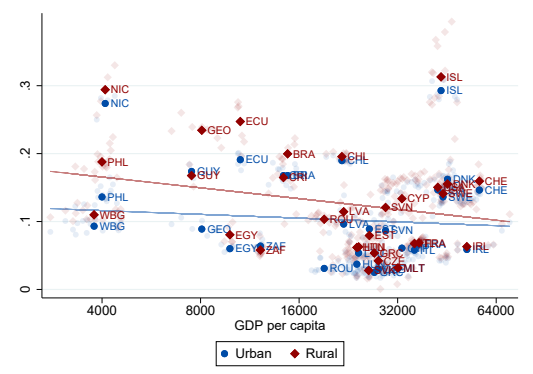


Job Finding Rate

Rural-Urban Differences



Exit Rate



Job Finding Rate

Job Finding Rates and Labor Market Institutions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP per capita	-0.022 (0.011)**	-0.032 (0.013)**	-0.023 (0.011)**	-0.020 (0.014)	-0.033 (0.012)***	-0.018 (0.014)	-0.027 (0.012)**	-0.013 (0.024)
Severance pay (weeks of salary)		-0.008 (0.006)						
Annual paid leave required (days of work)			-0.017 (0.009)*					
Existence of labor court				0.006 (0.020)				
Legal to have fixed-term contracts for permanent work?					-0.024 (0.013)*			
Min Wage/VA per worker						0.029 (0.037)		
Probationary period (months)							-1.942e-3 (2.840e-3)	
1st principal component								0.009 (0.008)
Sample Average	0.130	0.130	0.130	0.128	0.130	0.130	0.129	0.125
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Obs.	128	128	128	82	128	101	118	48
R^2	0.035	0.045	0.063	0.030	0.060	0.043	0.053	0.073

[back]

Simple DMP Model

Potential Workers:

- Employed: work, earn wage w
- Unemployed: search for work, receive unemployment benefits b

Firms:

- Jobs: produce x, pay w
- Post vacancies at cost κ

Flows: vacancy creation is key endogenous margin

- Job destruction is exogenous, rate δ
- Job creation is governed by the matching function $m(n, v) = Mn^{\eta}v^{1-\eta}$

[back]

Key Model Implication

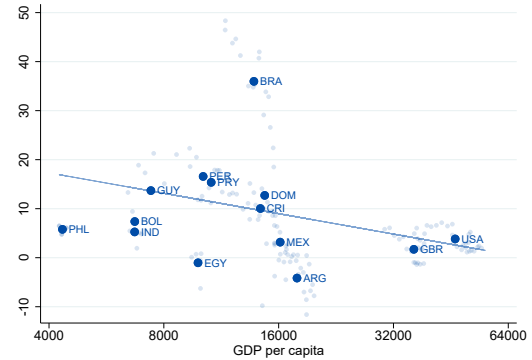
Normalize by productivity x: $\hat{w} \equiv w/x$, etc. Impose free entry.

$$\text{job finding rate} = M^{\frac{1}{\eta}} \hat{\kappa}^{\frac{\eta-1}{\eta}} \left[\frac{1-\hat{w}}{r+\delta}\right]^{\frac{1-\eta}{\eta}}$$

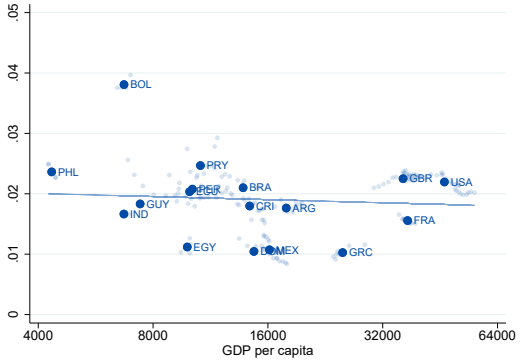
Three reasons firms are willing to post more vacancies ($\Longrightarrow$ high jfr)

1. Low match destruction (δ): contrary to the data
2. Lower wage ($\hat{w}$)
3. Less discounting of future profits (r)

Remaining Components Decline with Income



Interest Rate



Wage Share of GDP

Model Moments (assume $\mu > b$)

Job finding rate: $1 - F\left(\frac{b-(1-p)\mu}{p}\right)$

Employment exit rate: $\lambda\Big[\underbrace{(1-p)F(b)}_{\text{type-1 errors}} + \overbrace{p\left[F(b) - F\left(\frac{b-(1-p)\mu}{p}\right)\right]}^{\nu := \text{share of jobs that produce with } x<b}\Big]$ (type-2 errors)

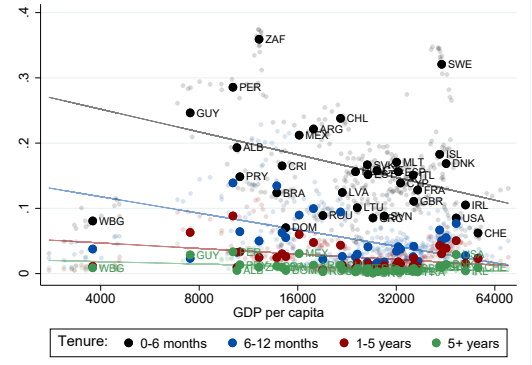
Tenure-Exit hazard: $d_\tau = \delta + (1-\lambda)^{\tau-1}\lambda\nu$

Tenure-wage profile: assume workers and firms equally split surplus (not critical)

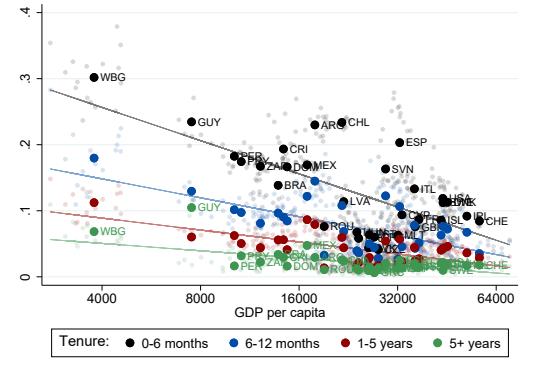
$$w^k = \frac{\mathbb{E}(x|x>b)}{2} - \frac{b}{2} \qquad w^u = \frac{\left[p\mathbb{E}\left(x|x > \frac{b-(1-p)\mu}{p}\right) + (1-p)\mu\right]}{2} - \frac{b}{2}.$$

[back]

J-J vs employment exit by tenure



Transition to New Job



Transition to Non-Employment

Job Ladder Model

Offer distribution:

- Wage offers w drawn from $F(w)$
- Arrive to everyone at rate λ

Unemployed:

- Search for work, receive benefits b
- All offers acceptable, find job at rate λ

Employed:

- Work, receive wage w
- Exogenous match destruction at rate δ
- Receive better off and move at rate $\lambda[1 - F(w)]$

Predictions of Job Ladder Model

J-J flows higher in poor countries $\Rightarrow$ more offers λ

Prediction 1: Wage-tenure profiles steeper in poor countries (Ridder and Berg, 2003)

- On-the-job wage draws pull out the least productive people
- Only high initial wage draws remain until late in tenure profile

Prediction 2: J-J flows decline with tenure (Ridder and Berg, 2003)

- $\delta + \lambda(1 - F(w))$ leave current job ($EU + EE$)
- Rationale for J-J result follows from Prediction 1