From bricklayers to waiters: Reallocation in a deep recession

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Motivation

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- These shocks can transform entire industries and have lasting effects **(scars)** on worker's labor market trajectories.
- Yet, little is known about how workers adapt to such negative shocks.

In this paper

Research question

How does an abrupt **structural shift** affect exposed workers' job prospects and how do they adapt?

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1. Do workers in more and less affected regions experience persistent differences in earnings and employment prospects?

2. As construction jobs decline, what are workers doing to reallocate?

3. Is the local sectoral composition important to incumbent workers' adjustment and long-term prospects?

Related literature and contribution

- A sizable literature documents **large and long lasting** consequences of job loss (Jacobson et al. 1993; Gulyas et al. 2019; Yagan 2019; Mian and Sufi 2014; Autor et al. 2014; Dix-Carneiro and Kovak 2017)
- As Blanchard et al. (1992) argue geographical mobility can attenuate the effects of demand shocks. Recent empirical studies, however, often find a moderate geographical response to local negative shocks. (Autor et al. 2014; Dix-Carneiro 2014)
- Sectoral reallocation may help to mitigate the impact of large shocks on worker's outcomes (Yi et al. 2016; Rogerson 2005)

Contribution

- Document the consequences of the construction sector's employment bust on workers' earnings and employment.
  - Assess the evolution of the shock's impact **over time** and the **heterogeneity** of the effects according to individual and regional characteristics.

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  - Assess the evolution of the shock's impact **over time** and the **heterogeneity** of the effects according to individual and regional characteristics.
- Show that sectoral rather than geographical mobility is the primary **adjustment** margin in this context.
- Study *how* sectoral variation in a local labor market affects the worker's ability to adapt.
  - What is the worker's relevant labor market? (Schubert et al. 2020; Caldwell and Danieli 2018; Yi et al. 2016; Macaluso et al. 2017)

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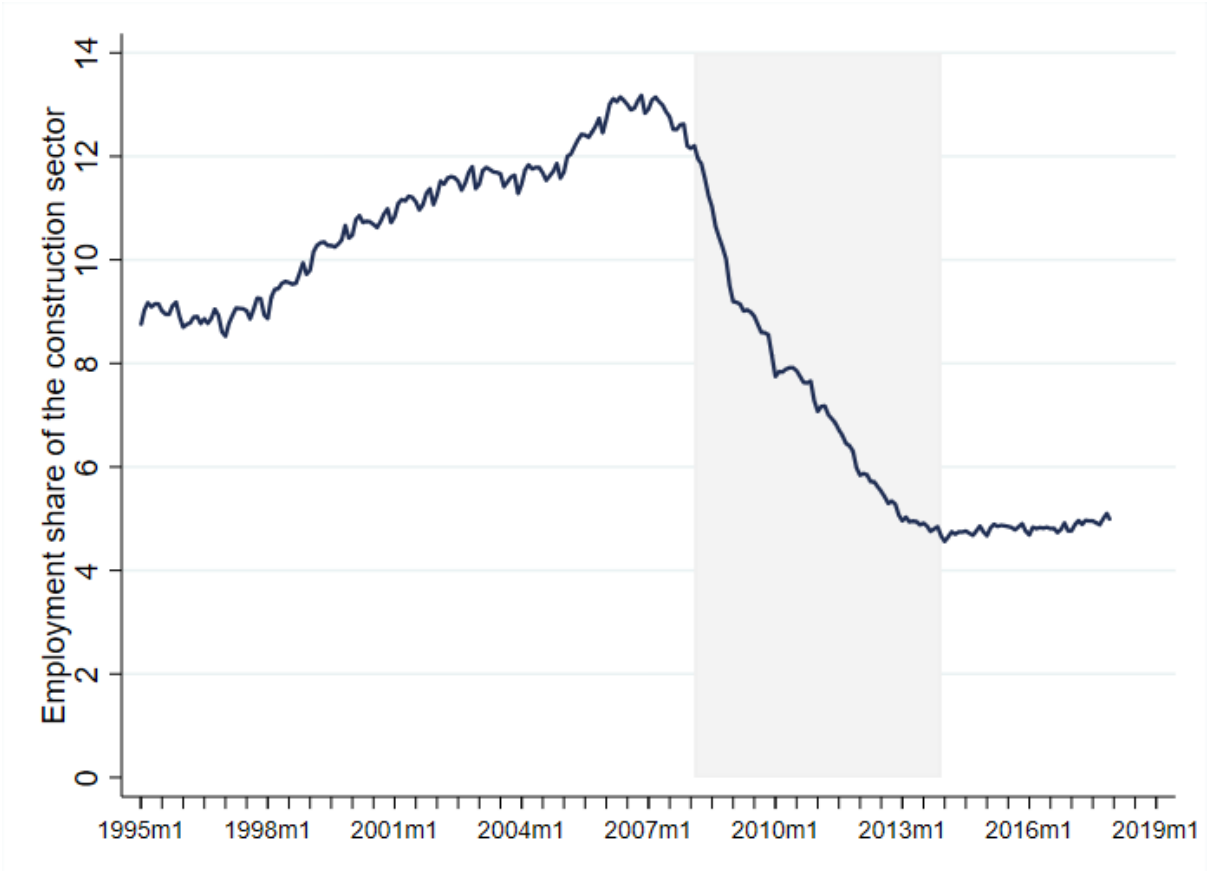
- The difference in exposure between the 25 and 75th percentile corresponds to a **27%** loss of initial annual earnings over the 2007-2012 period.
- Employment prospects for workers in the most affected provinces catch up to those in the less affected provinces by 2015.
- Sectoral rather than geographic mobility is the most important margin of adjustment.
- Sectoral variation in a local labor market impacts workers' chances to adapt, affecting the mismatch between worker's characteristics and the local labor demand.

Outline

1. Introduction
2. Labor market consequences
3. Sectoral vs geographical reallocation
4. Sectoral composition and the distribution of employment opportunities
5. Robustness and additional results
6. Conclusions

Employment contraction in the construction sector

- After the Great Recession and the subsequent burst of the Spanish property bubble, **millions of jobs were lost.**



Notes: Employment share of the construction sector from January 1995 to December 2017. Sample: workers aged 18-60 years old and employed during the reference period. The shaded area covers January 2008 to December 2013.

Male | Native | Manufacture

Before and after the Great Recession

(a) "Brick fever won't stop"

(b) Spain, the country of waiters: half of the new jobs are in the hospitality sector

Descriptive Comparison

Data

- Spain's Continues Sample of Working Lives (MCVL), 2006-2017.
  - 4% random sample of Spain's Social Security records.
- **Longitudinal** administrative records.
- Tracks the complete labor market histories of workers since 1962 (workers, recipients of unemployment benefits, and retirees).

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  Sample restrictions:
  1. Native workers.
  2. Aged 18-50 years old.
  3. High labor force attachment to the construction sector.
- In the descriptive analysis, I include a **wider set** of workers.

Descriptive statistics:

Construction workers

	2004	2007	2012	2017
Observations	40494	54431	21296	19959
Age				
< 24	0.162	0.132	0.043	0.030
24-35	0.452	0.449	0.362	0.237
35-45	0.244	0.272	0.370	0.410
45$<$	0.143	0.147	0.225	0.323
Average age	33.6	34.3	38.1	40.7
Education				
Below secondary	0.764	0.753	0.661	0.675
Secondary	0.153	0.158	0.195	0.185
Tertiary	0.083	0.089	0.143	0.140
Type of contract				
Part-time	0.038	0.038	0.077	0.092
Fixed-term	0.727	0.666	0.478	0.508
Foreign born	0.157	0.270	0.187	0.191
Occupations				
Very-high skilled	0.020	0.023	0.049	0.043
High skilled	0.043	0.046	0.078	0.069
Medium-high skilled	0.053	0.054	0.084	0.073
Medium-low skilled	0.579	0.599	0.629	0.640
Low skilled	0.305	0.278	0.161	0.175

Notes: Descriptive statistics of workers in the construction sector 2004, 2007, 2012, and 2017.

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Shock's regional variation

$$Shock_r = \frac{EmploymentShare^{c.s.}_{r(2012)} - EmploymentShare^{c.s.}_{r(2007)}}{EmploymentShare^{c.s.}_{r(2007)}}$$

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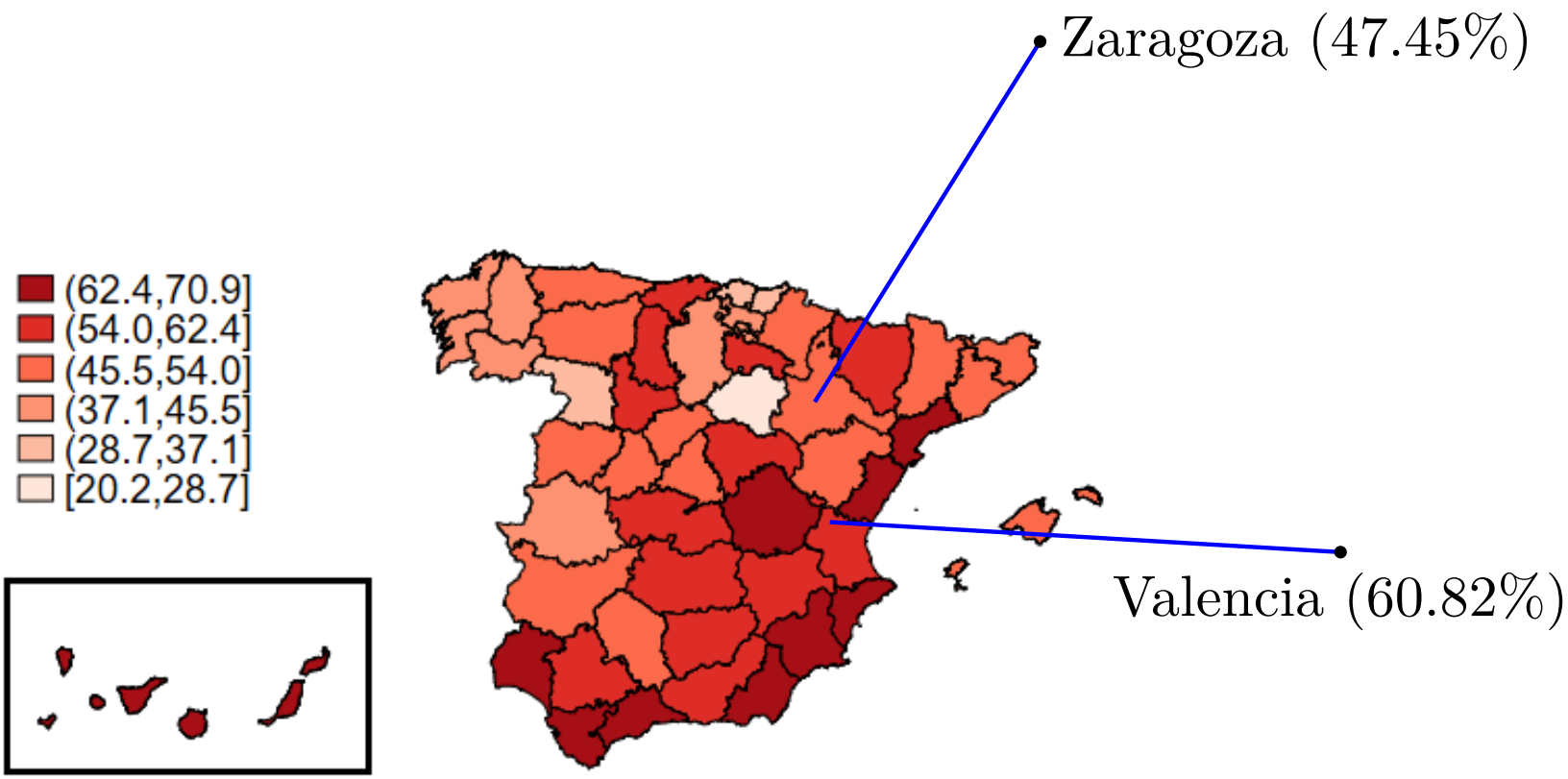

InitialEmployment Descriptives

Estimating equation:

$$y_{i(2012)} = \beta_0 + \beta_1 Shock_{r(i2007)} + \beta X_i + \varepsilon_i$$

- $y_{i(2012)}$ is the individual's outcome variable (total earnings, employment, average earnings).
  - Cumulative earnings, 2007-2012.

$$\frac{\sum_{t=07}^{12} Earnings_{i,t}}{InitialEarnings_i}$$

  - Cumulative employment, 2007-2012.
  - Average non-zero earnings, 2007-2012.

Framework

$$y_{i(2012)} = \beta_0 + \beta_1 Shock_{r(i2007)} + \beta X_i + \varepsilon_i$$

- $Shock_{r(i2007)}$: Employment decline of the construction sector in worker's initial province, 2007-2012
- X_i: vector of worker and regional characteristics at baseline.
  - Interactions of gender, age, and education attainment.
  - Type of contract, occupational skill group, tenure, experience and experience squared.
  - Local unemployment rate, bartik-type control, HHI, initial employment share of the construction sector.

Bartik-type control

$$Bartik_r = \sum_{j=1}^{12} EmplShare^{j}_{2006,r} \cdot \ln \frac{empl^{j}_{2012,r}}{empl^{j}_{2007,r}}$$

- $EmplShare^{j}_{2006,r}$: Employment share of the sector j in province r.
- $empl^{j}_{t,r}$: Employed workers in sector j at time t in province r.

Table: Earnings consequences of the decline in construction

	(1)	(2)	(3)	(4)
		OLS		IV
	Cumulative earnings, 2007-2012			
Shock	-3.795***	-2.808***	-1.993***	-2.517***
	(0.488)	(0.309)	(0.278)	(0.621)
F-test				1229.26
Observations	45370	45370	45370	45296
Ind. controls	Yes	Yes	Yes	Yes
Job controls	No	Yes	Yes	Yes
Regional controls	No	No	Yes	Yes

Robust standard errors in parentheses are clustered at the province level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Columns (1)-(3) are estimated by OLS. Column (4) instruments the shock using the regional employment growth in construction in the pre-recession period (2000-2006).

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IV

- 25th percentile: Zaragoza 47.45%
- 75th percentile: Valencia 60.82%
- β_{shock} : -1.956

$$-1.993 \cdot (0.608 - 0.475) = 0.27$$

Workers in the 75th percentile decrease their total earnings by and additional 27% of the initial annual earnings compared to workers in the 25th percentile of exposure.

- Employment:

$$\sum_{t=07}^{12} DaysEmployed_{it}$$

- Average non-zero earnings:

$$\frac{AverageEarnings_i^{07-12}}{InitialEarnings_i}$$

Table: Earnings and employment consequences of the decline in construction

	(1) Cumulative earnings	(2) Employment	(3) Average earnings
Shock	-1.956***	-1.672***	-0.002
	(0.274)	(0.177)	(0.004)
Observations	45370	45370	45370
Controls	Yes	Yes	Yes

Robust standard errors in parentheses are clustered at the province level

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Notes: Each column additionally controls for the worker and regional characteristics at baseline.

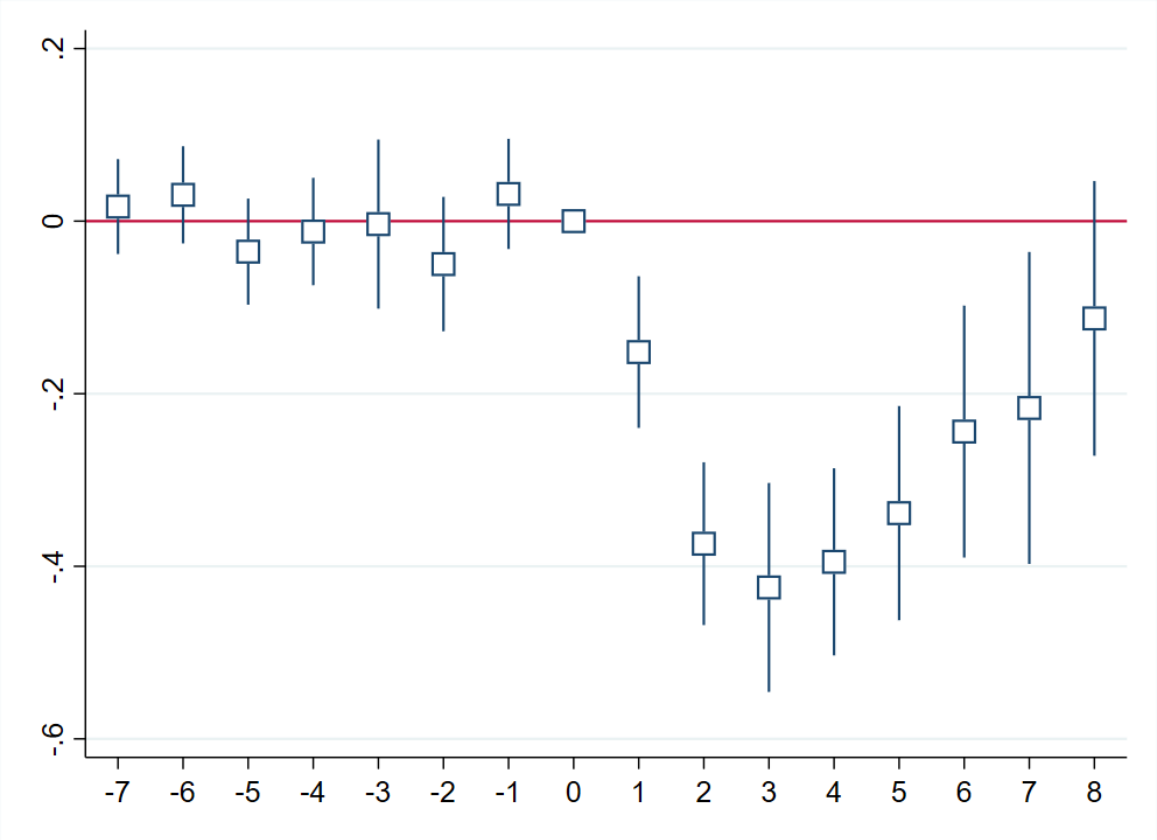


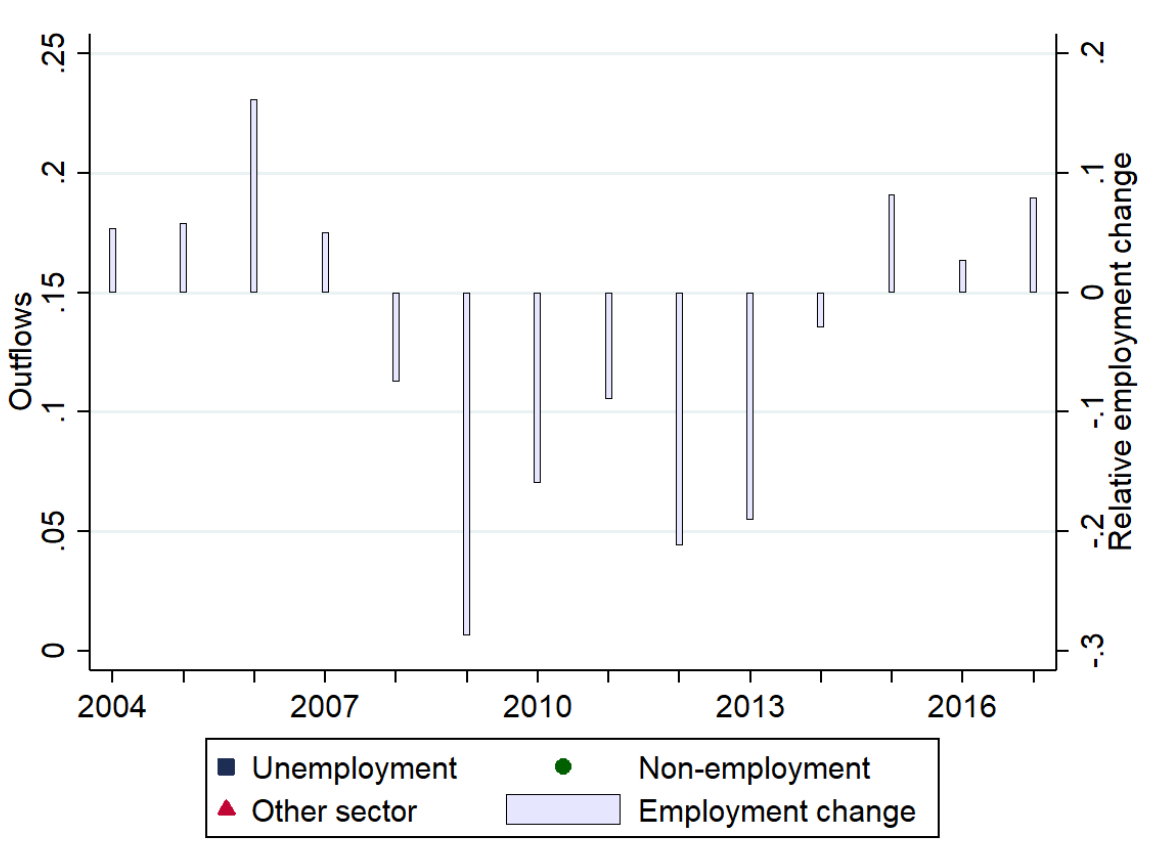
Figure: Impact of shock on employment

Notes: Workers aged 29-35 and employed in the construction sector in 2007. Coefficients of the shock variable on a dummy variable for employment (1=Employed in year t). Each column additionally controls for the worker and regional characteristics at baseline.

AverageEarnZeros AverageEarnStayers

2. Sectoral vs geographical reallocation

Aggregate flows: Outflows from the construction sector



Notes: The figure presents the employment status of workers in the construction sector in $t-1$ who moved into another sector, non-employment or unemployed in t. This is proportional to the construction workers in $t-1$. The blue bars represent the relative change in the construction sector employment. The sample is restricted to yearly observations between 2003 and 2017 of workers aged 18-60.

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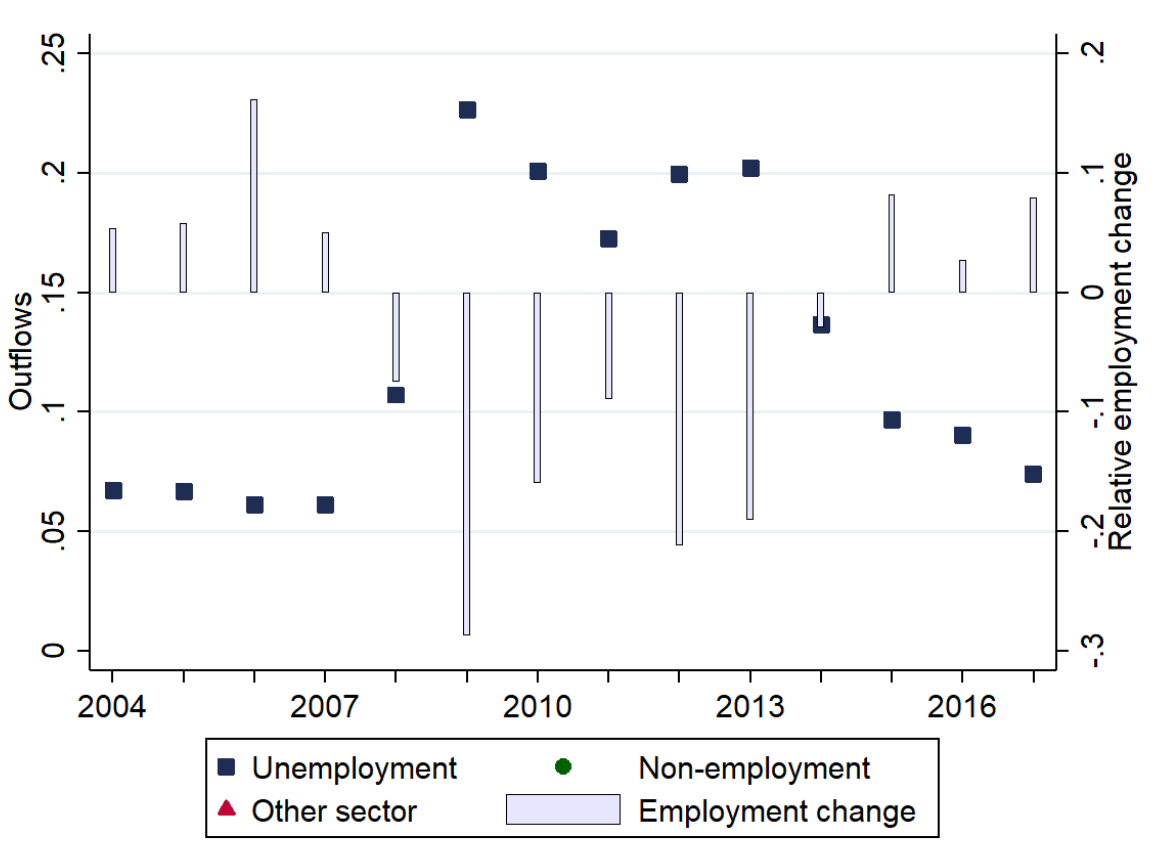

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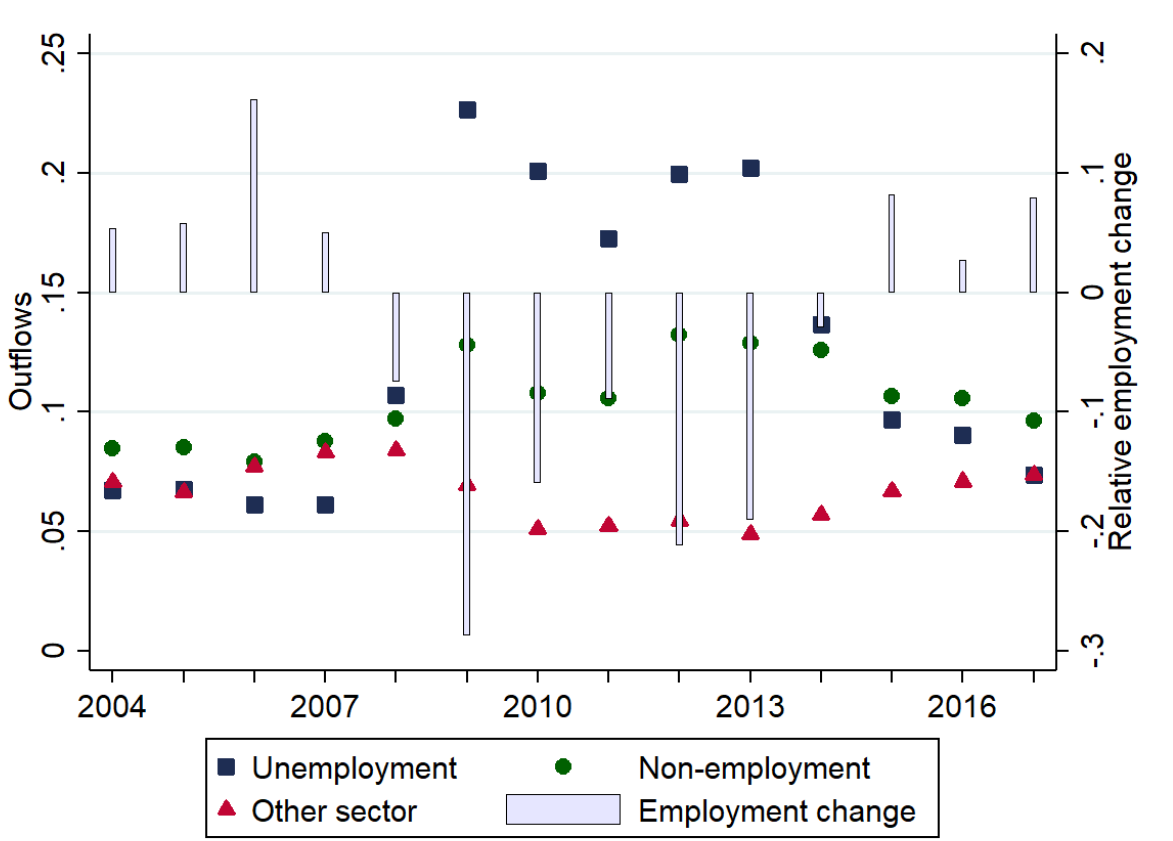

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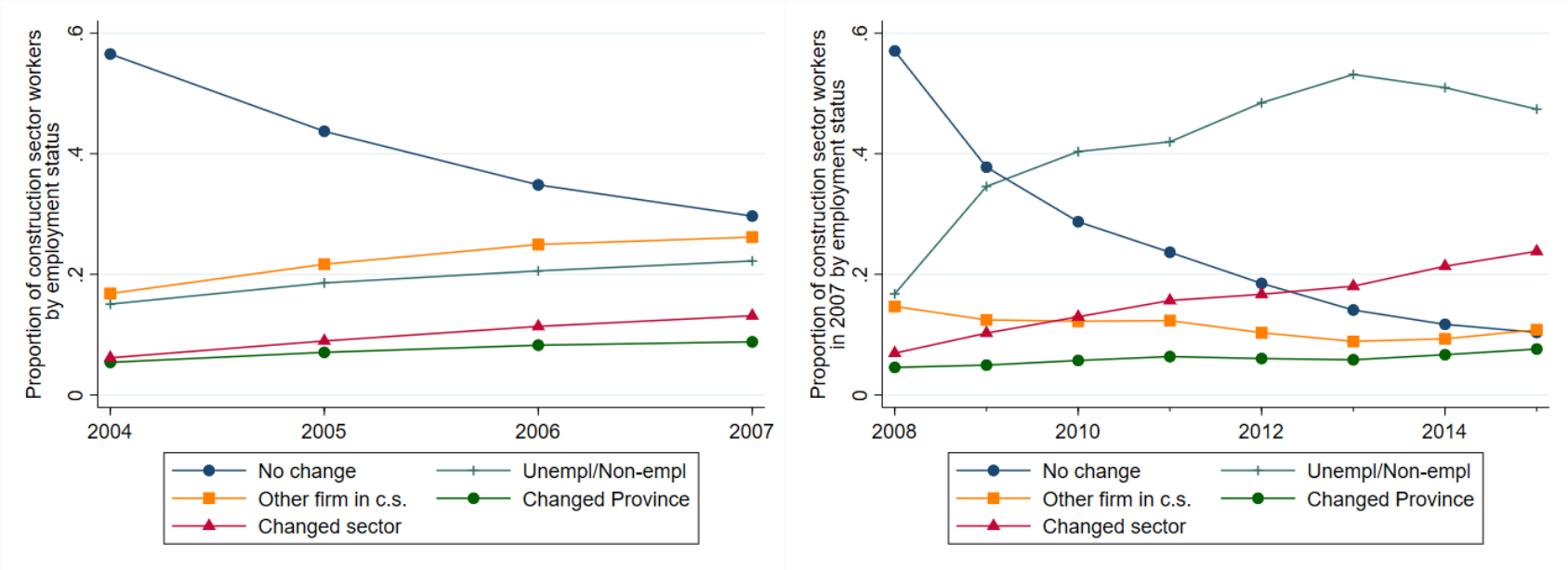
2. Sectoral vs geographical reallocation

Employment status of workers in the construction sector in 2007



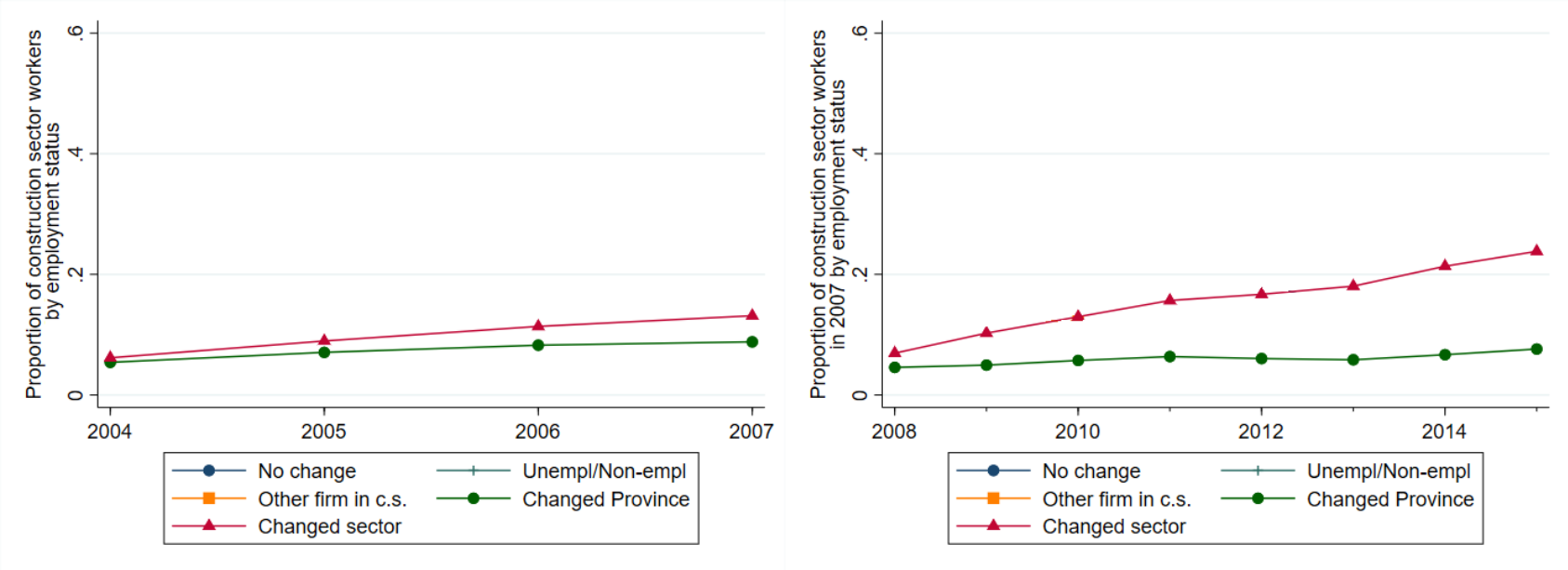
(a) Before the Great Recession (b) After the Great Recession

Notes: Panel (a) tracks the employment status of workers employed in the construction sector in 2003. Panel (b) Panel (a) the employment status of workers employed in the sector in 2007.

High-skilled

2. Sectoral vs geographical reallocation

Employment status of workers in the construction sector in 2007



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High-skilled

To study the margins of adjustment I estimate:

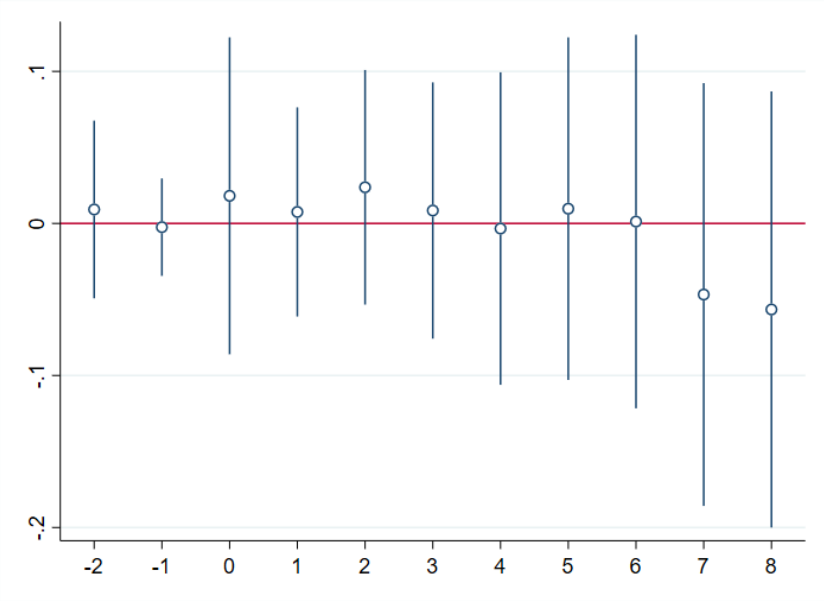
$$e_i = \beta_0 + \beta_1 Shock_{r(i2007)} + \beta X_i + \varepsilon_i$$

- **Sector:** $\mathbb{I}\{ChangeSector = 1\}$
- **Province:** $\mathbb{I}\{ChangeProvince = 1\}$

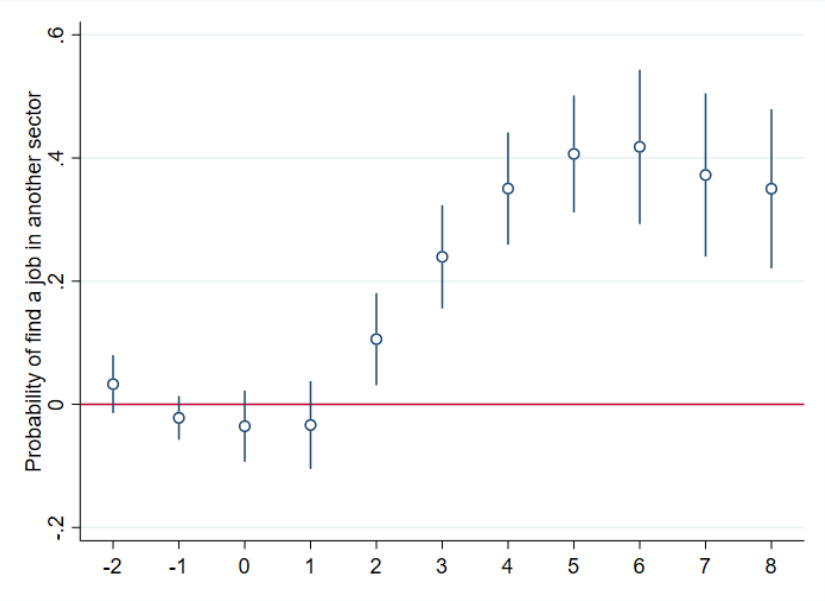
X_i**:** Individual and regional controls at baseline.

2. Sectoral vs geographical reallocation

Adjustment to the shock



(a) Geographical reallocation, 2005-2015



(b) Sectoral reallocation, 2005-2015

How does the shock's spatial correlation affect the migration response?

How does the shock's spatial correlation affect the migration response?

$$Shock_r^{adj} = Shock_r - \sum_{k \neq r} \mu_{r \to k} Shock_k$$

- $Shock_r$: Employment decline of the construction sector in province r.
- $\mu_{r \to k}$: Migration probability from province r to k.

Based on: Borusyak, K., Dix-Carneiro, R., & Kovak, B. (2022).

Table: Geographical and sectoral reallocation after the decline in the construction sector

	(1)	(2)	(3)	(4)
	Change province		Change sector	
Shock	0.0097		0.407***	
	(0.056)		(0.047)	
AdjustedShock		0.078		0.349***
		(0.059)		(0.077)
Observations	30402	30402	30402	30402
Controls	Yes	Yes	Yes	Yes

Robust standard errors in parentheses are clustered at the province level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Shock adjusted considers the decline of the construction sector on provinces other than the region of residence weighted by the probability that the worker moves to each province. The sample restricts to worker's aged 18-45 years old in 2007 and employed in 2012.

Match of worker i and sectors in province r:

$$M(X_i, r) = \sum_j \underbrace{\frac{P(J = j, X = X_i)}{P(X = X_i)P(J = j)}}_{A}$$

- A: **Matching probabilities.**
  - How likely is for a worker with characteristics X_i to be employed in sector j

Reallocation index for worker i and region r:

$$\mathcal{P}(X_i, r) = \sum_j \underbrace{\frac{P(J=j, X=X_i)}{P(X=X_i)P(J=j)}}_{A} \underbrace{P(J=j|R=r)}_{B}$$

$$= \sum_j P(J=j|X=X_i) \frac{EmploymentShare_j^r}{EmploymentShare_j}$$

- A: **Matching probabilities.**
  - Employment likelihood in sector j for workers with characteristics X_i.
- B: **Employment share of sector j in region r**
  - Diversity of each sector within the province.

- Two step approach
  - **First stage:** Estimate the probability of being in each sector conditional on worker's characteristics. Full sample 2000-2006
  - **Second stage:** Predict in the main sample the probability of having a job in each sector within a region.

$$\mathcal{P}(X_i, r) = \sum_j P(J = j|X = X_i) \frac{EmploymentShare^r_{j,2006}}{EmploymentShare_{j,2006}}$$

3. Sectoral composition and the distribution of employment opportunities

Reallocation index

$$y_i = \beta_0 + \sum_{k=1}^{4} Q_i^k Shock_{r(i2007)} \beta_k + \beta X_i + \epsilon_i \qquad (1)$$

- $Shock_{r(i2007)}$: Employment decline of the construction sector in worker's initial province, 2007-2012
- Q_i^k: Quartile k of the reallocation probabilities
- X_i: vector of worker's characteristics

3. Sectoral composition and the distribution of employment opportunities

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative earnings		Employment		Average earnings	
Shock	-2.006***		-1.891***		0.0005	
	(0.198)		(0.177)		(0.0009)	
$Q_1 \cdot Shock$		-2.569***		-2.417***		0.0003
		(0.318)		(0.297)		(0.0016)
$Q_2 \cdot Shock$		-2.038***		-1.867***		-0.00002
		(0.231)		(0.223)		(0.0012)
$Q_3 \cdot Shock$		-1.832***		-1.712***		-0.00001
		(0.214)		(0.204)		(0.0013)
$Q_4 \cdot Shock$		-1.666***		-1.645***		0.0008
		(0.246)		(0.253)		(0.0012)
Observations	46244	46244	46244	46244	46244	46244
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses are clustered at the province level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Robustness

- Falsification test. More
- Reallocation probabilities using transition matrix. More
- Residualized reallocation probabilities. More
- Diversification and worker's adjustment. More

Conclusion

- Workers in provinces expering a greater decline in the construction sector experienced persistent labor market disadvantages over the following years.
  - Substantial loss of earnings.
  - Workers in provinces experiencing a greater decline in the construction sector experienced persistent labor market disadvantages over the following years
- There is no significant effect of the decline in construction and the probability of moving to another province.
- Main takeaway: Sectoral reallocation is more important than generally thought, but local sectoral composition is a relevant factor as there is a mismatch between worker and local labor demand.

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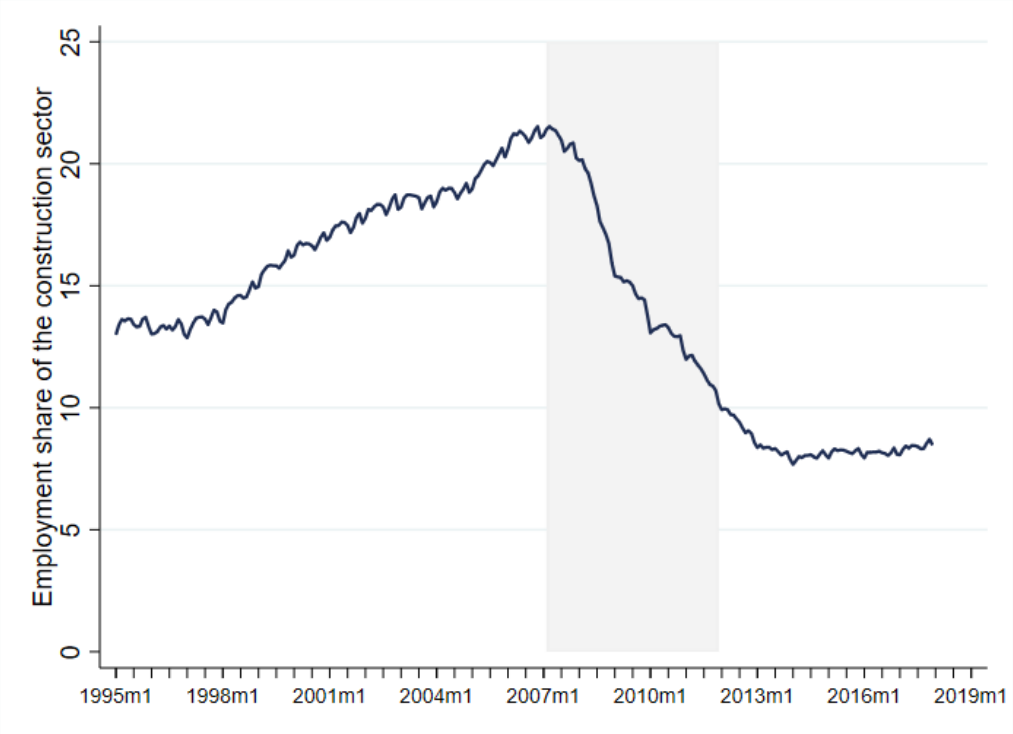
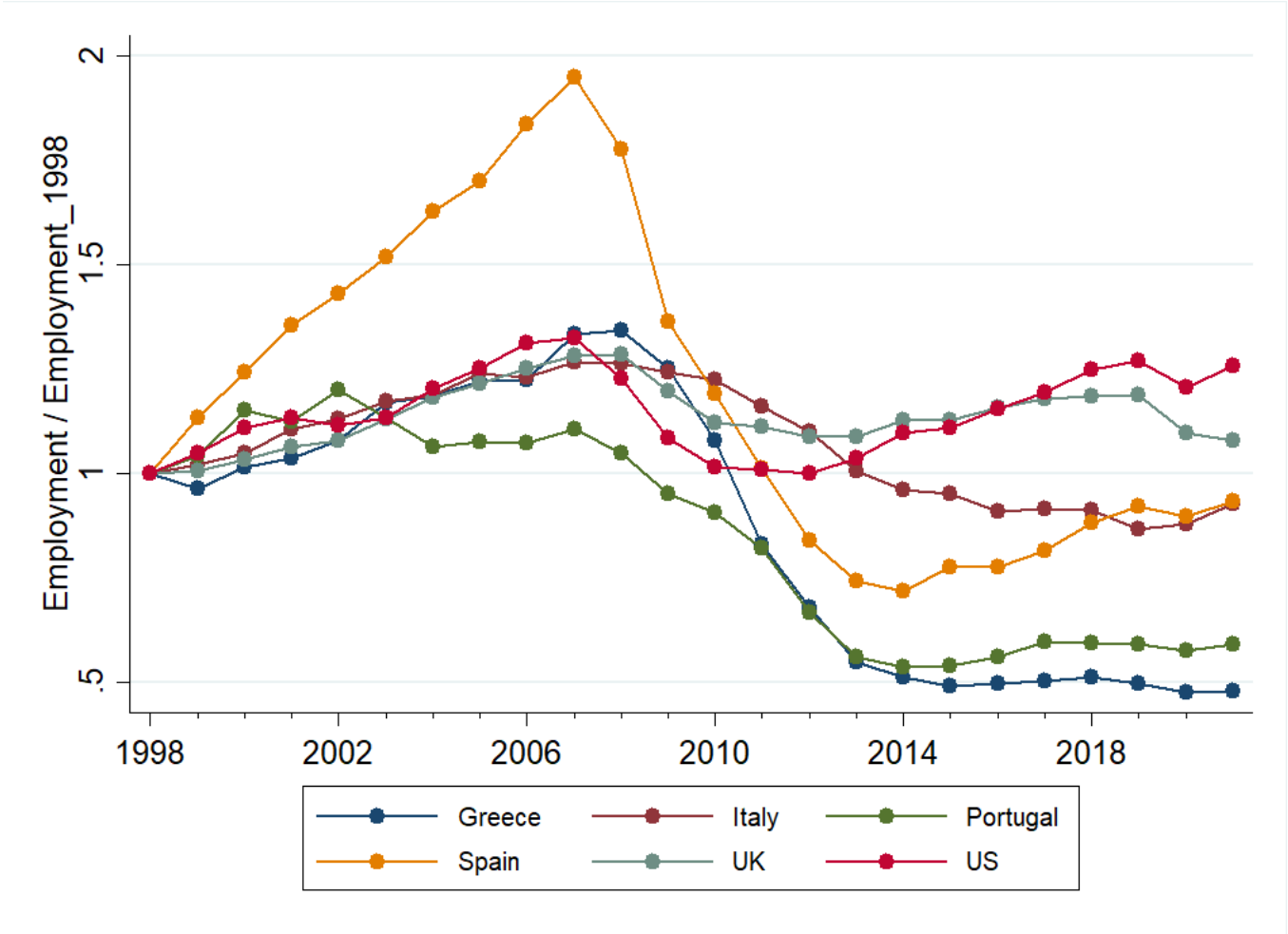
Employment share of the construction sector



Notes: Proportion of workers in the construction sector from January 1995 to December 2017. Sample: male workers aged 18-60 years old and employed during the reference period. The shaded area covers January 2008 to December 2013.

Return

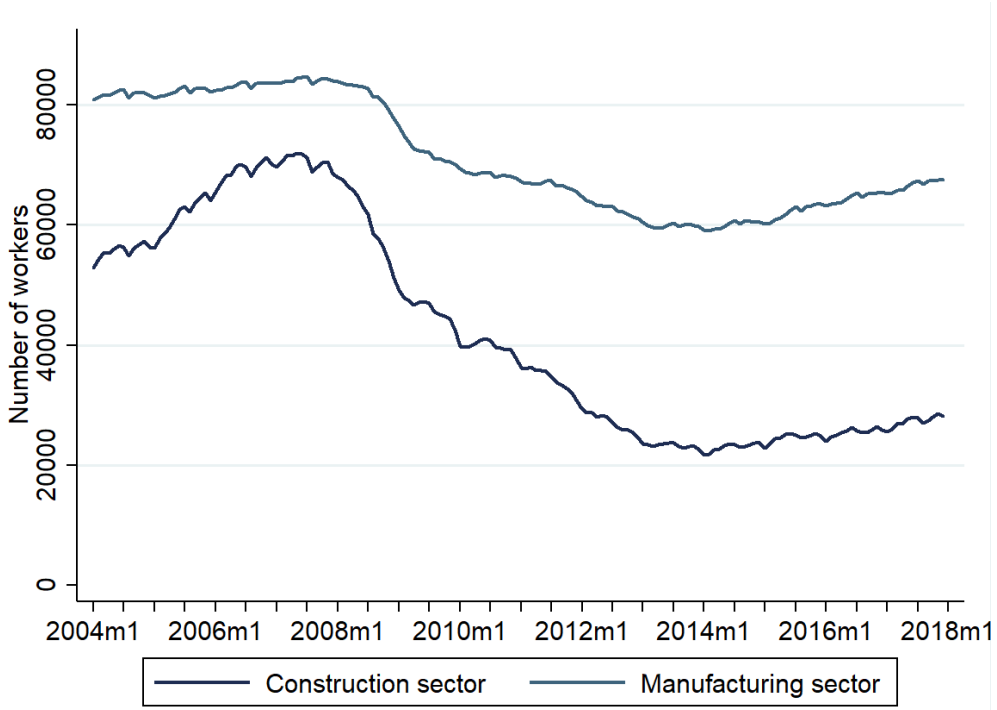
Figure: Employment in the construction sector by country, 1998-2020



Data from OECD (2023), Employment by activity (indicator).

Return

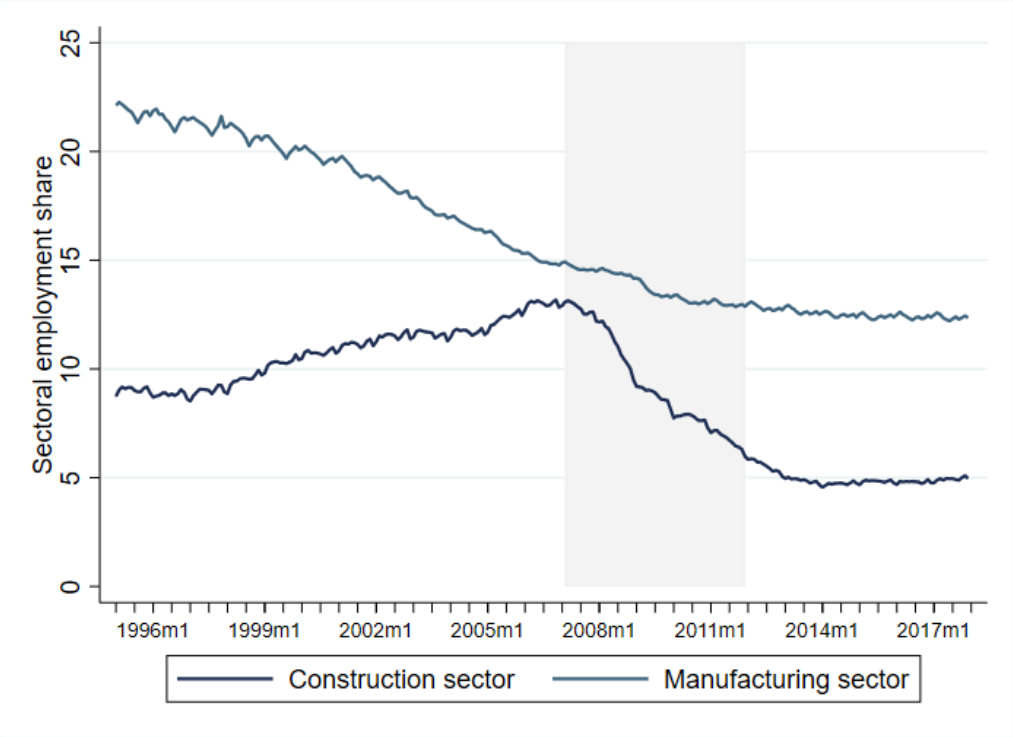
Employees in construction sector and manufacturing



Notes: Number of workers in the construction sector and manufacture from January 1995 to December 2017. Sample: workers aged 18-60 years old and employed during the reference period. The shaded area covers January 2008 to December 2013.

Return

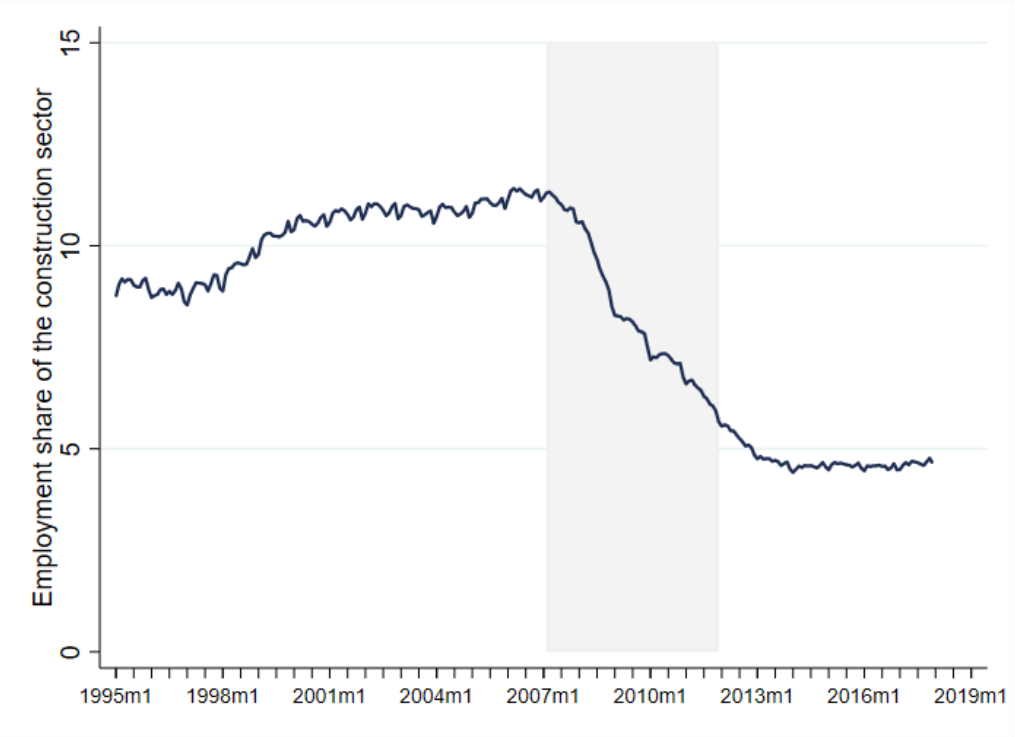
Employment contraction by sector



Notes: Proportion of workers in the construction sector and manufacture from January 1995 to December 2017. Sample: workers aged 20-60 years old and employed during the reference period. The shaded area covers January 2008 to December 2013.

Return

Employment share of the construction sector



Notes: The plot shows the proportion of native workers in the construction sector from January 1995 to December 2017. Sample: native workers aged 18-60 years old and employed during the reference period.

Return

Descriptive statistics:

	2004	2007	2012	2017
Age				
<24	0.174	0.149	0.043	0.028
24-35	0.440	0.434	0.361	0.242
35-45	0.228	0.250	0.361	0.405
45<	0.158	0.167	0.234	0.325
Average age	33.7	34.4	38.2	40.7
Education				
Below secondary	0.765	0.745	0.644	0.656
Secondary	0.147	0.152	0.196	0.187
Tertiary	0.088	0.103	0.160	0.156
Type of contract				
Part-time	0.038	0.040	0.069	0.085
Fixed-term	0.704	0.620	0.438	0.476
Occupations				
Very-high skilled	0.023	0.029	0.057	0.051
High skilled	0.049	0.060	0.092	0.082
Medium-high skilled	0.059	0.068	0.096	0.084
Medium-low skilled	0.596	0.605	0.620	0.632
Low skilled	0.273	0.238	0.134	0.151

Notes: Descriptive statistics of native workers in the construction sector 2004, 2007,2012 and 2017.

Return

Descriptive statistics:

	2007
Age	
<24	0.194
24-35	0.464
35-45	0.261
45-50	0.080
Average age	31.823
Education	
Below secondary	0.754
Secondary	0.149
Tertiary	0.097
Type of contract	
Part-time	0.000
Fixed-term	0.679
Foreign	0.000
Occupations	
Very-high skilled	0.023
High-skilled	0.052
Medium-high skilled	0.061
Medium-low skilled	0.576
Low skilled	0.289

Notes: Descriptive statistics of workers in the construction sector 2007. Estimation sample: high labor force to the construction sector and natives aged 18-50.

Return

Descriptives of the decline in the Spanish construction sector

Descriptives	
min	0.2021
max	0.7086
variance	0.0116
Percentiles	
25%	0.4745
50%	0.5267
75%	0.6082

Return

- Consider an economy characterized by S sectors (indexed by s) and R regions (indexed by r).
- The workers face a continuum of competitive firms, the total measure of workers and firms at each period are fixed and normalized to one.
- Workers are identified by their characteristics $X \in \mathcal{X}$, and firms are grouped into J sectors

- Workers live for T periods after labor market entry, and firms live forever.

- Newborn workers begin their working life in the construction sector

- Workers face a region-specific probability of losing their job at the construction sector μ_r

Matching

- In the spirit of Burdett and Mortensen (1980) I assume job seekers randomly receive job offers within their labor market. As in Schubert et al. (2020) I follow a probabilistic definition of the relevant labor market of the individual

- For simplicity, I first present the framework considering that workers receive offers depending on the probability $\mathcal{P}(X_i, r)$. I later expand this probability, accounting for the composition of workers and firms in each local labor market.

$V_t(X_i, r)$ summarizes the individual's utility at period t

$$V_t(X_i, r) = w^r(X_i) + (1 - \mu_r)V_{t+1}(X_i, r) + \mu_r \tilde{V}_{t+1}(X_i, r) \quad (2)$$

$\tilde{V}(X_i, r)$ is the continuation value if the worker is hit by the shock:

$$\tilde{V}_t(X_i, r) = \sigma^r_{cs} V_{t+1}(X_i, r) + (1 - \sigma^r_{cs})\mathbb{P}(X_i, r)\tilde{W}_t(r) \quad (3)$$

$V_t(X_i, r)$ summarizes the individual's utility at period t

$$V_t(X_i, r) = w^r(X_i) + (1 - \mu_r)V_{t+1}(X_i, r) + \mu_r \tilde{V}_{t+1}(X_i, r) \quad (2)$$

$\tilde{V}(X_i, r)$ is the continuation value if the worker is hit by the shock:

$$\tilde{V}_t(X_i, r) = \sigma_{cs}^r V_{t+1}(X_i, r) + (1 - \sigma_{cs}^r)\mathbb{P}(X_i, r)\tilde{W}_t(r) \quad (3)$$

Therefore, by combining both expressions we get:

$$V_t(X_i, r) = \underbrace{w^r(X_i) + V_{t+1}(X_i, r)}_{\text{Utility in absense of shock}} - \underbrace{\mu_r(1 - \sigma_{cs}^r)V_{t+1}(X_i, r)}_{\text{Impact of the shock}} + \underbrace{\mu_r(1 - \sigma_{cs}^r)(\mathbb{P}(X_i, r)\tilde{w}_t(r)}_{\text{Attenuation of the shock}}$$

Return

Empirical specification

The previous expression could be expressed as:

$$\frac{V_t(X_i,r)}{W_0(X_i)} = \frac{w(X_i)+V_{t+1}(X_i,r)}{W_0(X_i)} - \mu_r(1-\sigma_{cs}^r)\frac{V_{t+1}(X_i,r)}{W_0(X_i)} + \mu_r(1-\sigma_{cs}^r)\mathbb{P}(X_i,r)\frac{\tilde{W}_t(r)}{W_0(X_i)}.$$

Empirical specification

The previous expression could be expressed as:

$$\frac{V_t(X_i,r)}{W_0(X_i)} = \frac{w(X_i)+V_{t+1}(X_i,r)}{W_0(X_i)} - \mu_r(1-\sigma_{cs}^r)\frac{V_{t+1}(X_i,r)}{W_0(X_i)} + \mu_r(1-\sigma_{cs}^r)\mathbb{P}(X_i,r)\frac{\tilde{W}_t(r)}{W_0(X_i)}.$$

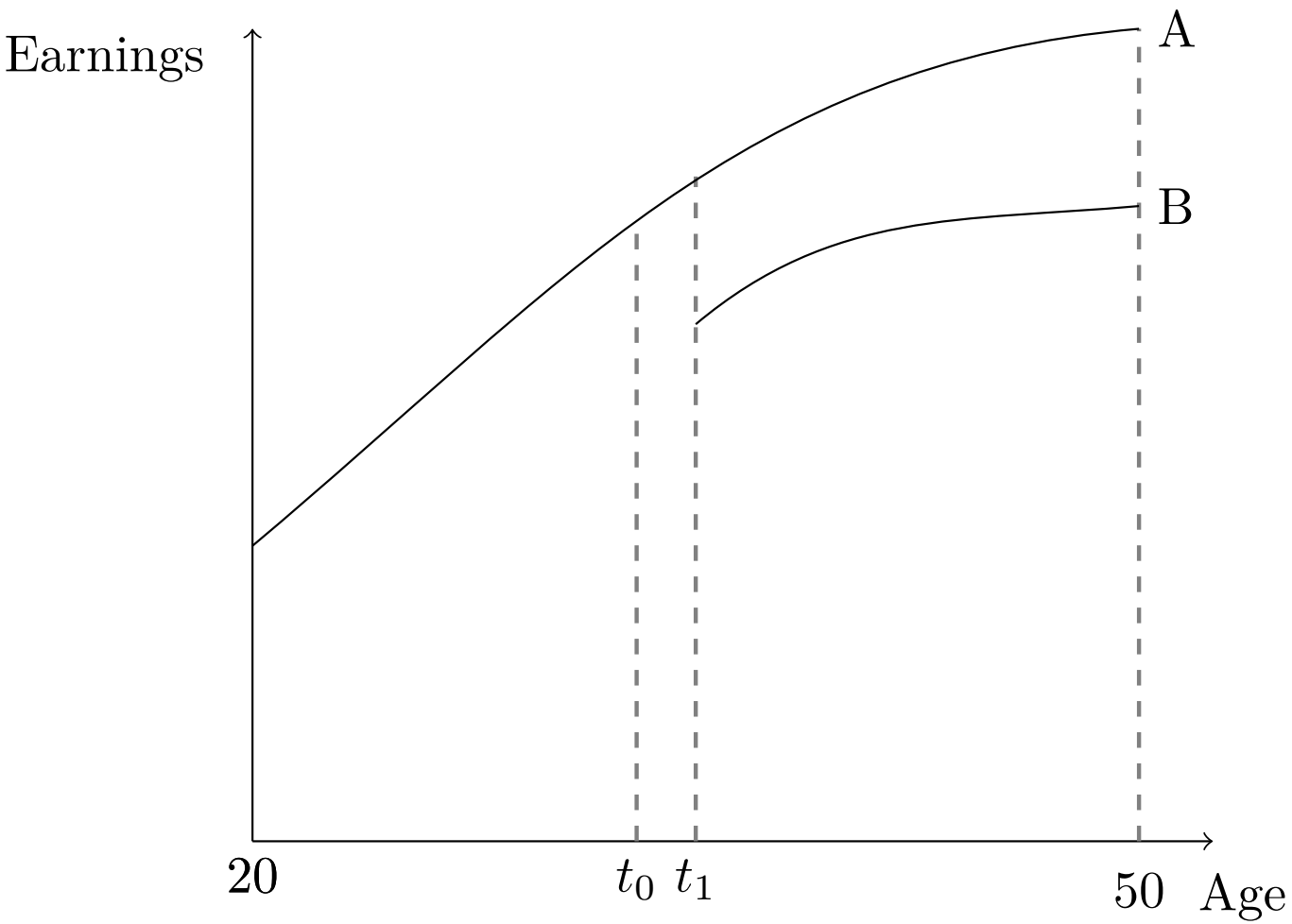
Comparison to the empirical specification:

$$E_i = f(X_i,r) + \mu_i^r\theta + \mu_i^r\mathbb{P}(X_i,r)\delta + \epsilon_i$$

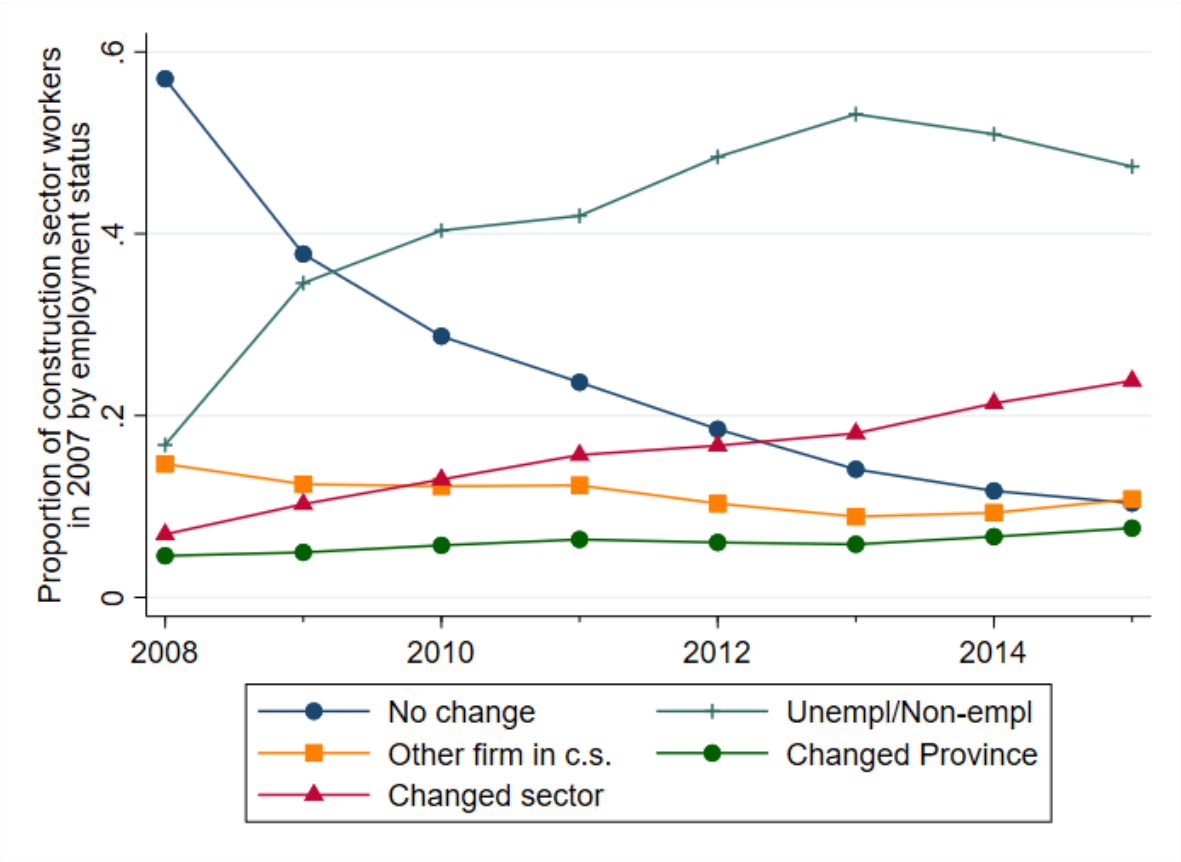
.

Framework

- Assume workers lose their job at t_0 and get a new job in another sector until age t_1
- In the absence of worker-level adjustment, the impact of losing their job would be all the are below the earnings profile of the sector A.
- Workers attenuate by moving to sector B. But, earnings trajectories is less steep.



Working status of workers in the construction sector in 2007



Notes: The shares are computed based on workers in the construction sector in 2007, and every year I tracked their working status up to 2015

HighSkilled

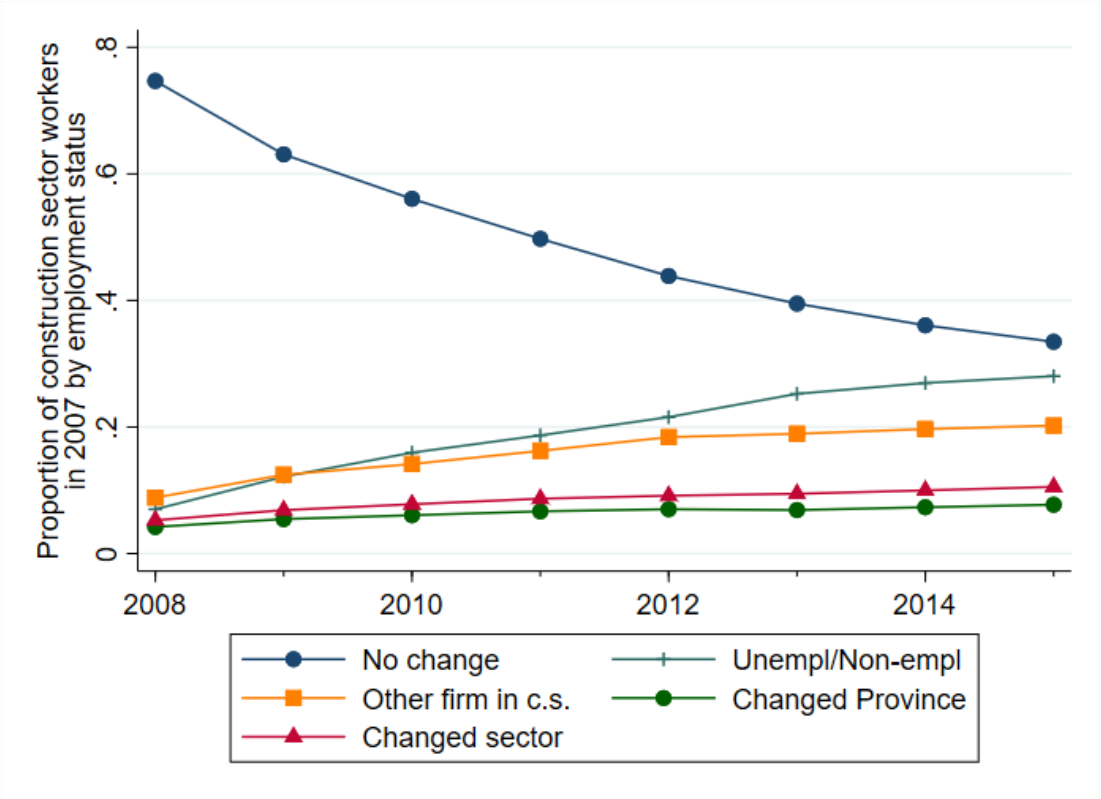
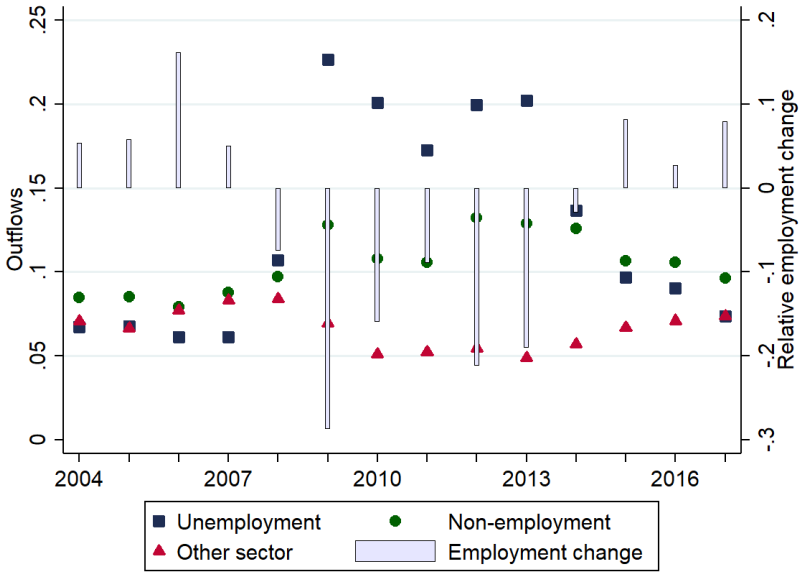


Figure: Working status of high-skilled workers in 2007

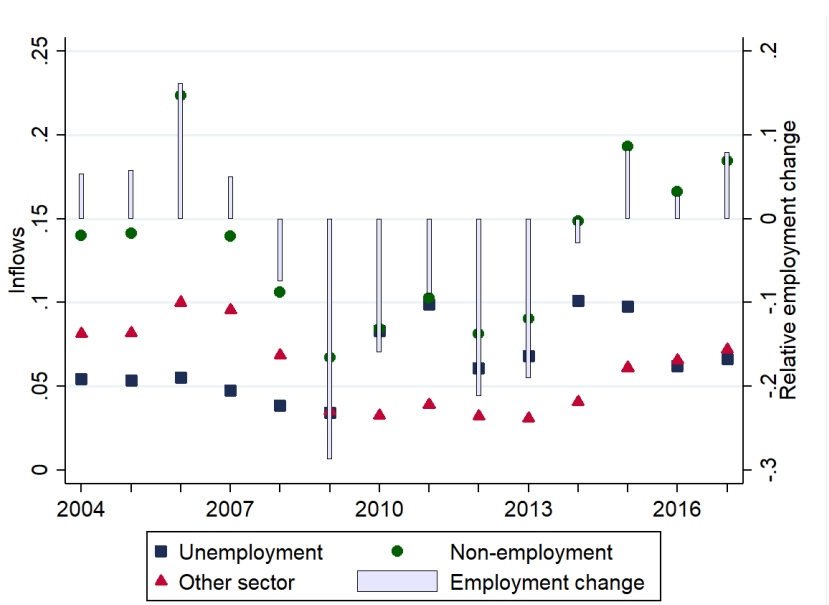
Notes: Sample restricts to workers employed in high-skilled occupations in 2007.

Return

Employment decomposition



(a) Outflows from the construction sector



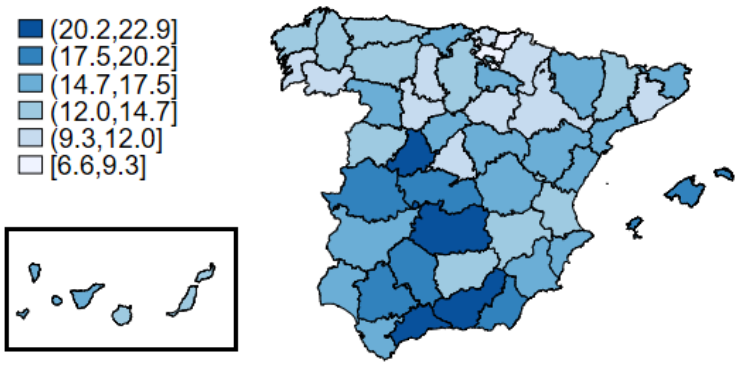
(b) Inflows to the construction sector

Figure: Aggregate flows from/to construction sector

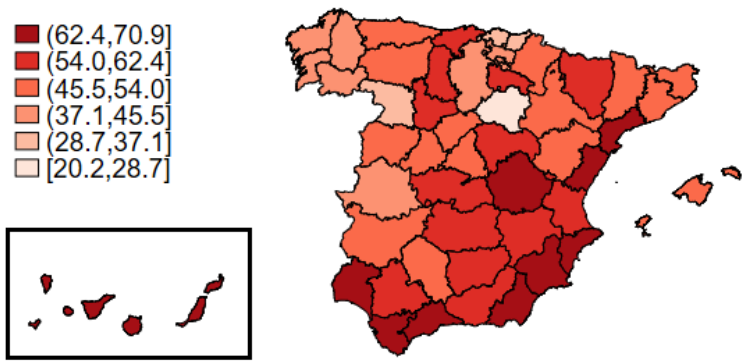
Notes: Panel (a) follows individuals in the construction sector in $t-1$ and in another sector, non-employment or unemployed in t, proportional to the population in $t-1$. Panel (b) follows individuals in another sector, non-employment or unemployed in $t-1$ as proportion of construction sector workers' in $t-1$. The sample is restricted to yearly observations between 2003 and 2017 of workers aged 20-60

Return

Regional variation



(a) Employment share in the construction sector, 2007

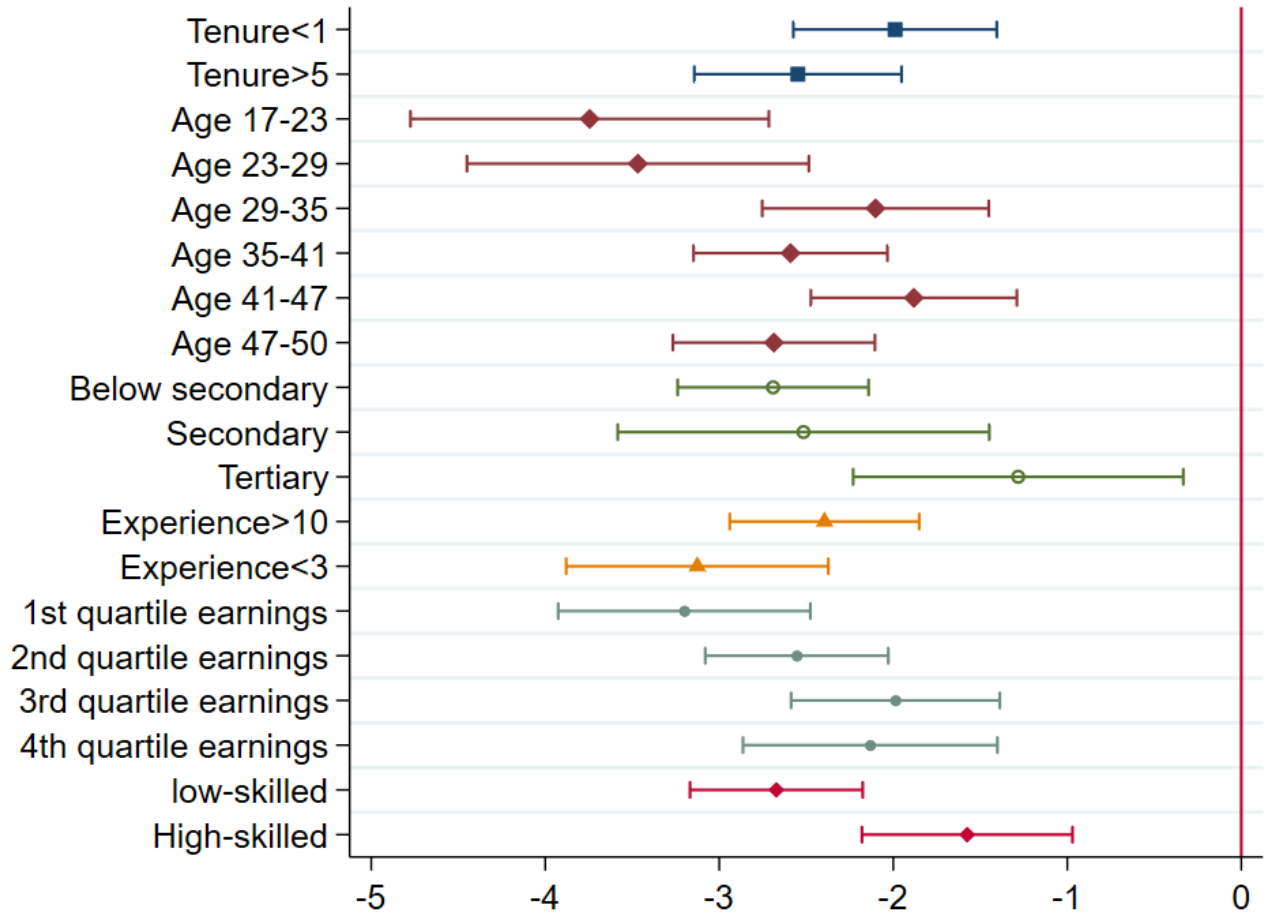


(b) Employment decline in the construction sector, 2007-2012

Notes: Panel (a) shows workers' share in the construction sector to total employment by provinces in 2007. Panel (b) shows the relative change in the construction sector's employment share between 2007 and 2012.

Return

Shock's impact



Return

	(1)	(2)	(3)	(4)
	Change Province		Change sector	
shock	-0.200	-0.460	0.582*	0.408
	(0.371)	(0.404)	(0.236)	(0.245)
Outside	0.0343	-0.386	-0.0144	-0.267***
	(0.0649)	(0.202)	(0.0271)	(0.0794)
Interaction		0.762*		0.458***
		(0.333)		(0.134)
Constant	-1.523**	-1.588**	-1.091***	-1.153***
	(0.510)	(0.565)	(0.298)	(0.277)
Observations	48111	48111	48111	48111
Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Coefficients from probit model of indicator variables if worker changed province, sector or firm within the same sector between 2008 and 2012. Each regression controls education, age, interactions between education and age, foreign status, occupational skill group, the decrease in the local employment share of the construction sector and the initial employment share of the construction sector, Bartik variable and the Outside option measure. Sample is constrained to individuals in the construction sector in 2007, and is based on a yearly panel with observations from 2005 to 2017 .

Source: CSWL 2006-2017

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative wage			Cumulative years		
Shock	-26.21***	-25.22***	-27.26***	-1.441***	-1.414***	-1.523***
	(3.203)	(3.557)	(3.586)	(0.191)	(0.207)	(0.202)
Reallocation		0.551	-2.608*		0.0156	-0.154*
		(0.289)	(1.008)		(0.0193)	(0.0625)
Interaction			5.712**			0.307**
			(1.664)			(0.107)
Constant	86.37***	87.88***	87.08***	5.700***	5.743***	5.700***
	(4.262)	(4.048)	(4.152)	(0.271)	(0.280)	(0.285)
N	48125	48125	48125	48125	48125	48125
Controls	Yes	Yes	Yes	Yes	Yes	Yes

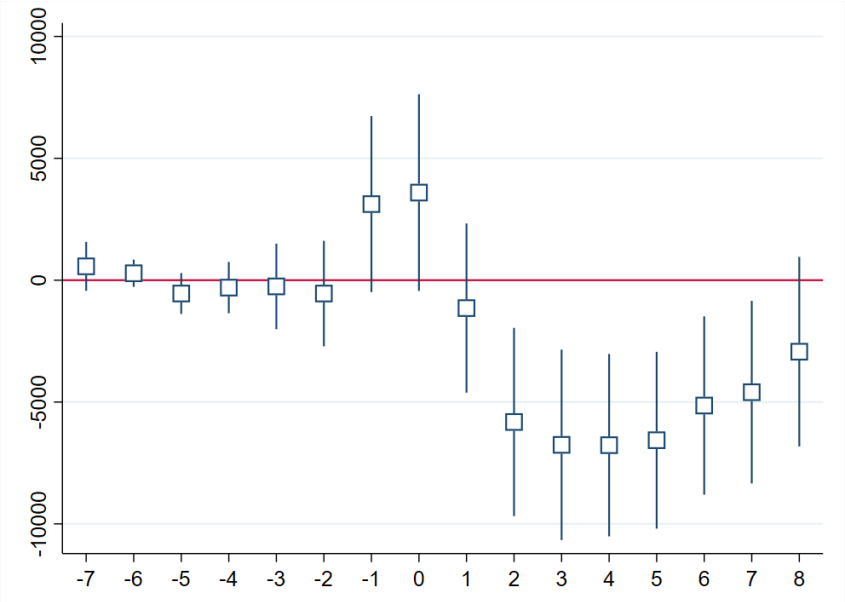
Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: The sample is restricted to native workers aged 20-50 years old in 2007 and working in the construction sector. Cumulative variables are computed between 2007 and 2012. Wage is standardized by the average wage in 2006 of months with non zero earnings. Every regression controls by: gender, age, education, skill group, and foreign status, interactions of age and educational level, and interactions of age and if the last contract in 2007 was fixed-term. Additionally controls for initial experience and tenure before the Great Recession. At the local level controls for the initial size of the construction sector and unemployment rate per province in 2006, additionally a Bartik type variable which is computed without considering the construction sector and predicted values for the outside option are from a first stage **probit model**.
Source: CSWL, 2006-2017

Dynamic analysis

Average yearly wage

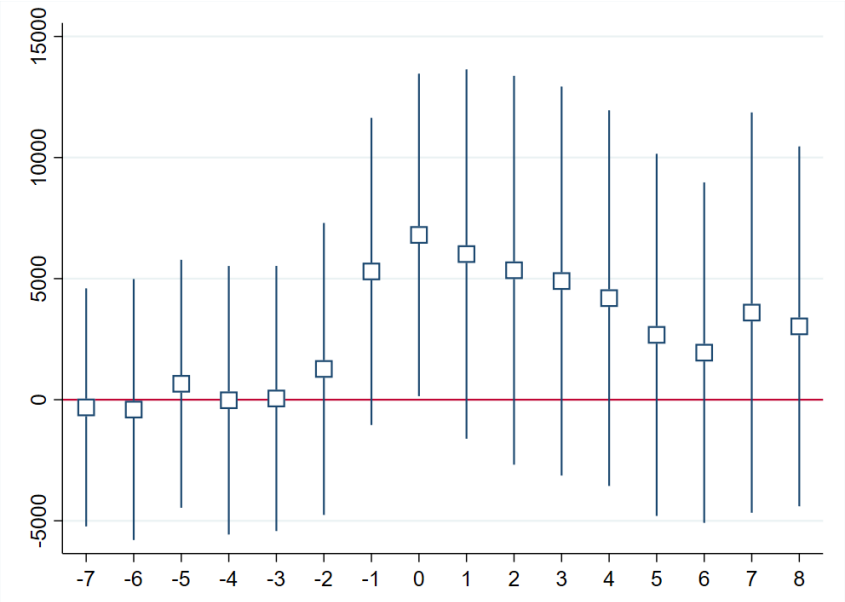


Notes: Sample restricts to workers aged 29-35 and working in the construction sector in 2007. Coefficients of the shock using an outcome variable indicate if the worker has a valid spell each year. (1: the worker appears in the year, 0: the worker is not in the sample) Additional controls by initial share of construction sector employment, Bartik type variable, demographic characteristics.

Return

Dynamic analysis

Average yearly wage



Notes: Sample restricts to workers aged 29-35 and working in the construction sector in 2007. Coefficients of the shock using an outcome variable indicate if the worker has a valid spell each year. (1: the worker appears in the year, 0: the worker is not in the sample) Additional controls by initial share of construction sector employment, Bartik type variable, demographic characteristics.

Return

3. Sectoral composition and the distribution of employment opportunities

Diversification

Table: Sectoral composition and the probability of change sector

	(1)	(2)	(3)
		Change sector	
Shock	0.489*	0.574**	
	(0.219)	(0.198)	
HHI	2.642	4.492*	4.391*
	(2.275)	(1.998)	(1.993)
Reall. Prob.		0.0602**	
		(0.0197)	
$Q_1 \times Shock$			0.371
			(0.212)
$Q_2 \times Shock$			0.543**
			(0.210)
$Q_3 \times Shock$			0.548**
			(0.192)
$Q_4 \times Shock$			0.603**
			(0.192)
Constant	0.109	-0.114	-0.0546
	(0.193)	(0.180)	(0.177)
Observations	46288	46288	46288
Controls	Yes	Yes	Yes

Robust standard errors in parentheses are clustered at the province level

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Return

3. Sectoral composition and the distribution of employment opportunities

Residualized reallocation probabilities

	(1)	(2)	(3)	(4)	(5)	(6)
	Cumulative earnings		Employment		Average earnings	
Shock	-2.329***	-2.367***	-1.819***	-1.844***	-0.00736*	-0.00777*
	(0.240)	(0.232)	(0.162)	(0.159)	(0.00335)	(0.00323)
Resid.Reall	0.0534***	-0.110	0.0359***	-0.0716	0.000283	-0.00147
	(0.0128)	(0.0702)	(0.00872)	(0.0480)	(0.000317)	(0.00136)
Shock × *Resid.Reall.*		0.293*		0.193*		0.00316
		(0.115)		(0.0884)		(0.00213)
Constant	6.620***	6.636***	5.014***	5.024***	0.116***	0.117***
	(0.147)	(0.143)	(0.116)	(0.109)	(0.00295)	(0.00312)
Observations	46386	46386	46386	46386	46386	46386
R^2	.2327	.2329	.3221	.3222	.0313	.0314
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Return

Table: Probability a worker is non-employed during the Great Recession conditional con observables

	(1)	(2)
	Non-employment	
Foreign	0.253***	0.250***
	(0.00837)	(0.00785)
$ShareCS_{2006}$		-0.309***
		(0.0701)
Shock		0.0682
		(0.0472)
Constant	0.131***	0.136***
	(0.00983)	(0.0222)
Observations	96507	96507

Standard errors in parentheses are clustered by province

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Probability, a worker disappear from my sample between 2007 and 2012 conditional on worker characteristics. The estimated probability from a linear probability model on an indicator variable if the worker disappears between 2007 and 2012. Controlling by education, age, foreign status, occupational skill group, regional shock, and the construction sector's initial size. The sample is based on yearly observations of workers in the construction sector before the Great Recession

Source: CSWL 2006-2017

Return

Table: Probability a worker is non-employed during the Great Recession conditional con observables

	(1)	(2)
	Non-employment	
Foreign	0.253***	0.250***
	(0.00837)	(0.00785)
$ShareCS_{2006}$		-0.309***
		(0.0701)
Shock		0.0682
		(0.0472)
Constant	0.131***	0.136***
	(0.00983)	(0.0222)
Observations	96507	96507

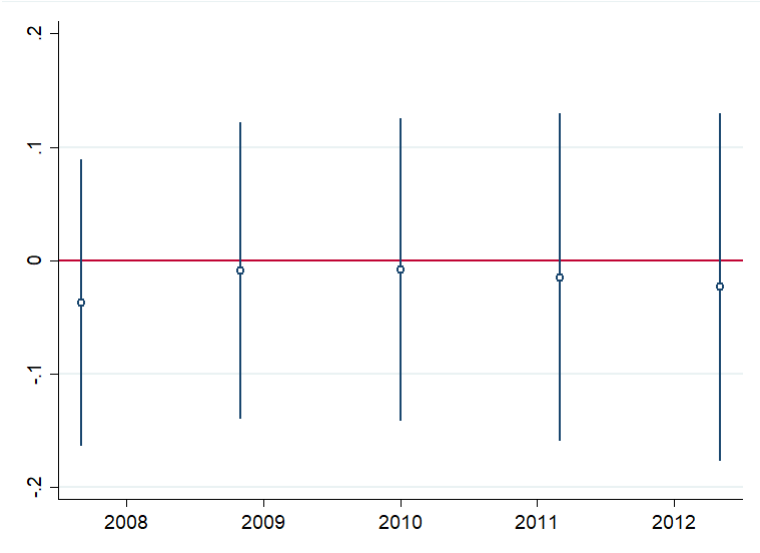
Standard errors in parentheses are clustered by province

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

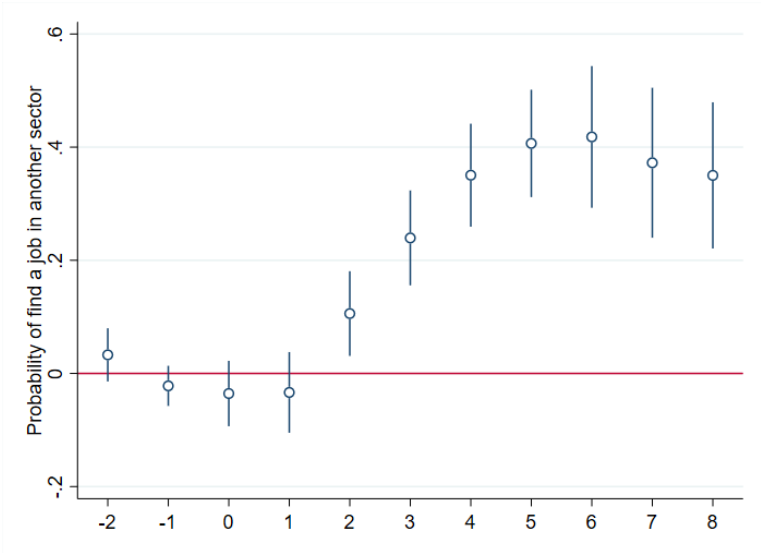
Notes: Probability, a worker disappear from my sample between 2007 and 2012 conditional on worker characteristics. The estimated probability from a linear probability model on an indicator variable if the worker disappears between 2007 and 2012. Controlling by education, age, foreign status, occupational skill group, regional shock, and the construction sector's initial size. The sample is based on yearly observations of workers in the construction sector before the Great Recession

Source: CSWL 2006-2017

Return



(a) Change province



(b) Change sector

Return

	(1)	(2)	(3)	(4)
	Change province		Change sector	
main shock	-0.267		0.611*	
	(0.399)		(0.250)	
$Q_1 \cdot$ shock		-1.416		0.0270
		(0.895)		(0.401)
$Q_2 \cdot$ shock		-0.0406		0.324
		(0.470)		(0.361)
$Q_3 \cdot$ shock		0.140		0.888
		(0.480)		(0.492)
$Q_4 \cdot$ shock		0.430		1.023***
		(0.451)		(0.228)
Constant	-1.604***	-2.046***	-1.052***	-1.348***
	(0.481)	(0.608)	(0.311)	(0.274)
N	48111	48111	48111	48111
Controls	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

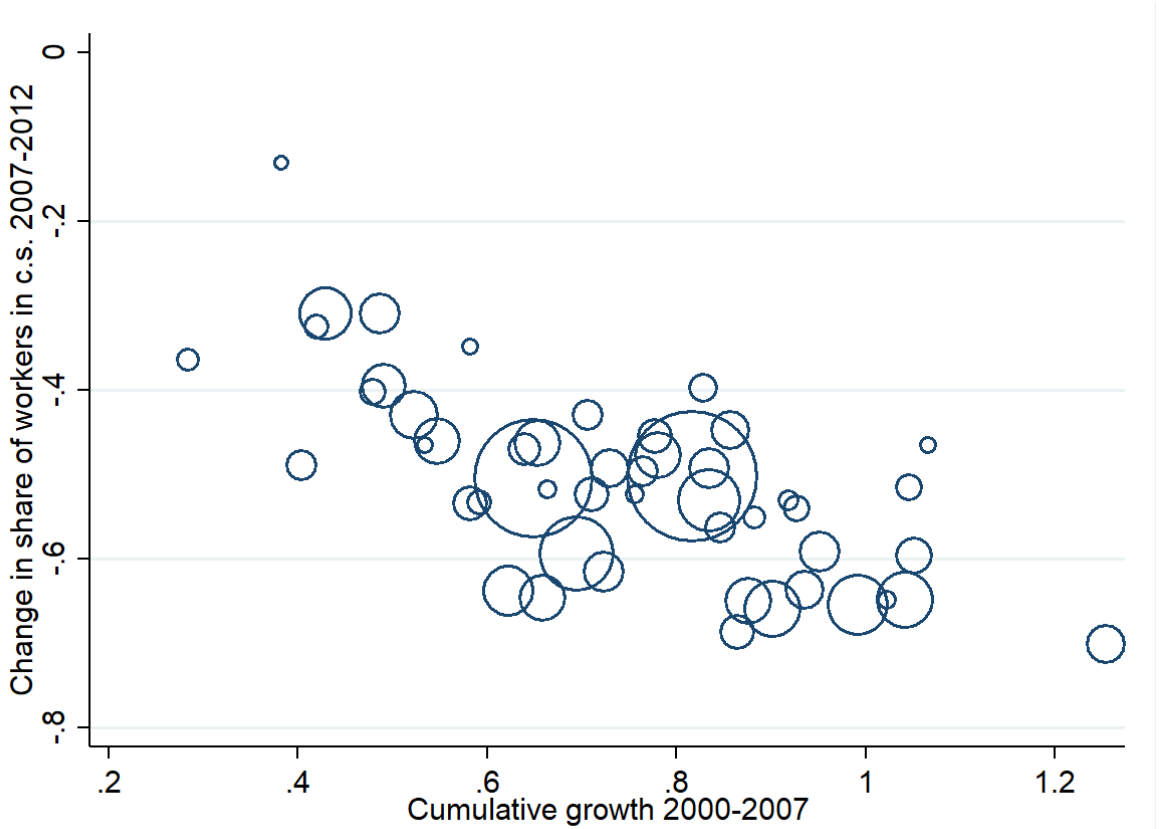
Notes: Coefficients from probit model of indicator variables if worker changed province or sector between 2008 and 2012. Controls: education, age, interactions of education and age, occupational skill group, the initial employment share of the construction sector, Bartik variable. Sample is constrained to individuals in the construction sector in 2007.

Source: CSWL 2006-2017

LinearModel

Instrumental variables

Instrument: Cumulative growth 2000-2007



Notes: Change in employment share of the construction sector from 2007 to 2012. Cumulative employment growth in the construction sector from 2000 to 2007.

Table: First stage: Regression of the 2007-2012 employment decline of the construction sector on the cumulative employment growth from 2000 to 2007

	(1) Shock
$\text{C.Growth}_{2000-2007}$	0.224^{***}
	(0.00182)
F	1229.3
Controls	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

return

Instrumental variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cumulative wage				Cumulative year			
shock	-25.22***	-27.26***	-31.41***	-37.07***	-1.414***	-1.523***	-1.527***	-1.857***
	(3.557)	(3.586)	(7.412)	(8.241)	(0.207)	(0.202)	(0.449)	(0.482)
Reallocation	0.551	-2.608*	0.446	-4.658*	0.0156	-0.154*	0.0137	-0.283*
	(0.289)	(1.008)	(0.290)	(1.814)	(0.0193)	(0.0625)	(0.0200)	(0.114)
Interaction		5.712**		9.156**		0.307**		0.533**
		(1.664)		(3.142)		(0.107)		(0.204)
Constant	87.88***	87.08***	91.99***	92.30***	5.743***	5.700***	5.819***	5.837***
	(4.048)	(4.152)	(6.450)	(6.235)	(0.280)	(0.285)	(0.403)	(0.386)
N	48125	48125	48125	48125	48125	48125	48125	48125
R^2	.1329619	.1332778	.1327335	.1327231	.1656305	.1658405	.1656126	.1656383

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Sample is restricted to native workers aged 20-50 years old in 2007,cumulative variables are computed between 2007 and 2012. Cumulative days measures the number of days with non-zero earnings between 2007 and 2012. Every regression controls by: gender, age, education, skill group, and foreign status. Bartik is computed without considering the construction sector, and predicted values for the outside option are from a first stage **probit model**. The shock is instrumented by the cumulative employment growth of the construction sector between 2000 and 2007

Source: CSWL, 2006-2017

Falsification test

Table: Falsification test of the impact of the employment contraction in the construction sector on cumulative days worked from 2003-2007

	(1) Cumulative earnings	(2) Employment	(3) Average earnings
Shock	0.0737	-0.108	0.00188
	(0.206)	(0.147)	(0.00257)
Observations	25455	25455	25455
R^2	.0667	.1162	.0626
Controls	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

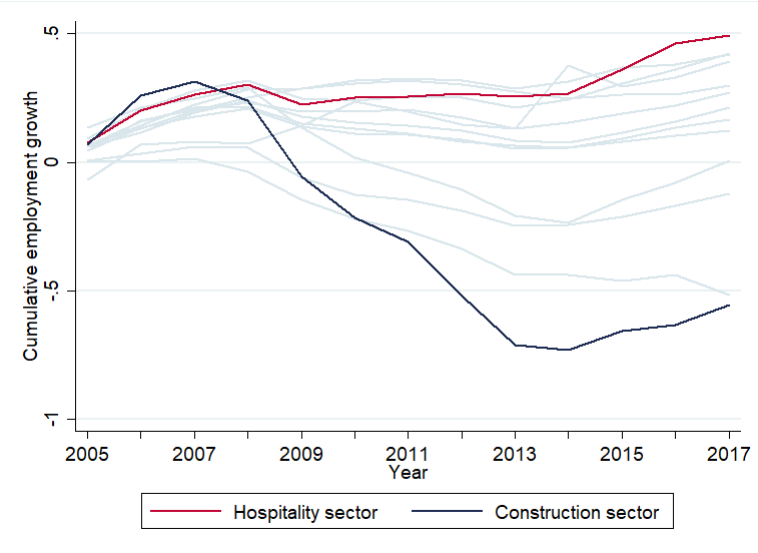
Additional outside option measure

$$oo^{occs}_{o,k,t} = \sum_{p}^{N} \underbrace{\text{Prob(move to job in occ } p \text{ if leave job)}_{o,k,t}}_{\pi_{o \to p}} \cdot \text{wage}_{p,k,t}$$

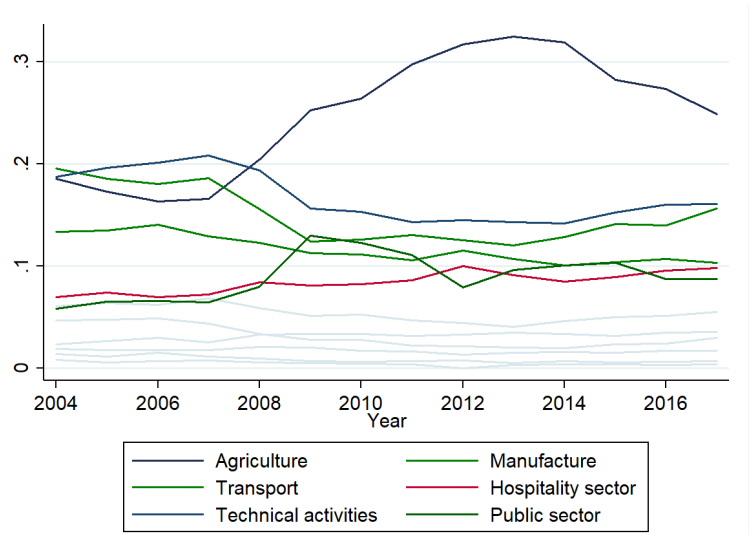
In particular:

$$\pi_{o \to p} = \frac{\#\text{ in occ } o \text{ in year } t \text{ observed in occ } p \text{ in year } t+1}{\#\text{ in occ } o \text{ in year } t \text{ observed in a new job in year } t+1}$$
$$\approx \text{Prob(move from occ } o \text{ to occ } p \mid \text{ leave job)}$$

Where did they go?



(a) Cumulative employment growth

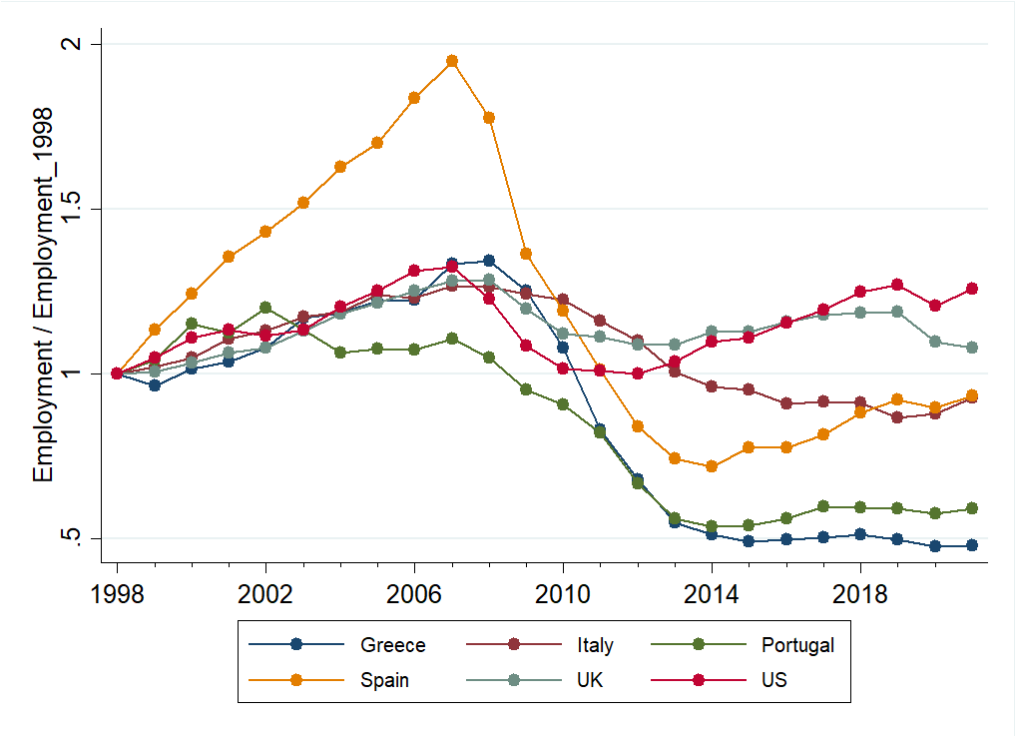


(b) Movers by sector

Notes: Panel (a) Cumulative employment growth by sector. Panel (b) Movers by destination sector as a proportion of sectoral employment share.

Plot

Construction sector employment by country



Notes: Construction sector workers in year t as a proportion of construction workers in 1998. Data from OECD indicators.

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