The Impact of Payroll Tax Subsidies: Theory and Evidence

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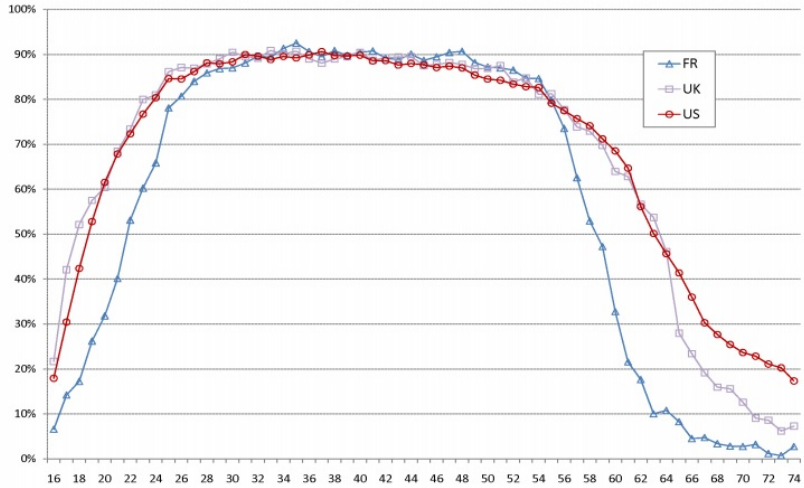
Motivation

Increasing employment of younger and older workers priority for policy

- Vulnerable groups with potentially lower productivity
- Potentially substantial fiscal externality

Employment Rate By Age



Source: Blundell, Bozio and Laroque (2011)

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Potential policy tool: targeted payroll tax cuts

- Encourage firms to hire more workers from these groups
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Important concerns about targeted payroll tax cuts

- Effectiveness: do they work?
- Incidence: do firms or workers get the money?
- Potential substitution: do firms substitute other workers for targeted workers?

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Empirical evidence is mixed, mostly focused on younger workers

- Non-negligible positive effects on employment: Egebark and Kaunitz (2018), Kramarz and Philippon (2001), Saez, Schoefer and Seim (2019)
- No clear evidence on employment effects: Boockmann, Zwick, Ammermüller and Maier (2012), Huttunen, Pirttilä and Uusitalo (2013)
- Little evidence for wage effects

This Paper

Study impact of payroll tax subsidies in an equilibrium job search model

- Add tax subsdidy to canonical search and matching model (Bagger and Lentz, 2019)
- Analyze heterogeneous impacts on wages and hiring by productivity
- Show variation with worker age (new entrants vs experienced workers)

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Study the impact on employment and wages

- Heterogeneity by firm productivity and worker type

Preview

Model predictions

- Tax subsidy increases hiring intensity
- More productive firms raise wages and the incidence more likely to fall on workers
- Less productive firms raise hiring intensity and incidence falls on firms
- Non-experienced workers (young) mainly respond on the employment margin

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Impacts were heterogeneous by firm and worker types for older workers

- Employment increase at less productive firms
- Wage increase at more productive firms
- Effects more consistent for younger workers

Model

Setup

Follow search and matching model of Bagger and Lentz (2019)

- Firms are characterized by their productivity
- Workers are characterized by their skill level
- Workers generate job offers through search
- Workers choose search intensity
- Firms choose hiring intensity
- Workers can use a contact with one employer as a threat point in bargaining with another

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Add a payroll tax subsidy

- Increases the value of matches
- Increases hiring intensity
- Increases search effort of the unemployed

Basic Features of this Model

1. Hiring intensity is increasing in firm productivity
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   - "Poaching index" ranks firms by revealed preference on firm "quality"
3. Sorting between high skilled and high productivity firms if the production function features some complementarities

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   - *Intuition: When worker comes from unemployment, she is in a weaker bargaining position; when worker comes from another job, she is in a stronger bargaining position*
3. The tax subsidy increases hiring intensity
   - *Intuition: Profit from hiring worker is higher*

Impact of Tax Subsidy

4. The increase in hiring intensity is lower for high productivity/high poaching firms
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   - *Intuition: More poaching and wage renegotiation happens at more productive firms, leading to workers getting more of the subsidy*
6. If workers bargaining power is low, the employment subsidy will have limited wage effects on new entrants (young), and substantial effect on hiring intensity
   - *Intuition: Hiring more workers becomes more attractive to firms and if workers have weak bargaining positions, firms can keep most of the subsidy*

Background

Job Protection Act in Hungary

Labor market context

- Overall employment rate in Hungary: 64% (vs OECD average: 66%)
- Employment rate of older people: 46% (vs OECD average: 58%)
- NEET (neither in education nor employment or training) rate of youth: 16.5% (same as OECD average)

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Labor income is taxed heavily

- 16% (flat-rate) personal income tax;
- 18.5% social security contributions (SSC) paid by the employee;
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Job Protection Act, in effect from 2013

- Workers aged below 25 or above 55: employer SSC reduced to 14.5%
- Other subsidized groups: e.g. elementary occupations, long-term unemployed

▸ Subsidy Interaction

Data and Sample

Administrative data

- Use employer-employee administrative data from Hungary between 2011-2017
- 50% random sample
- Links employment, tax, pension, health, labor, etc.

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- Private sector employees

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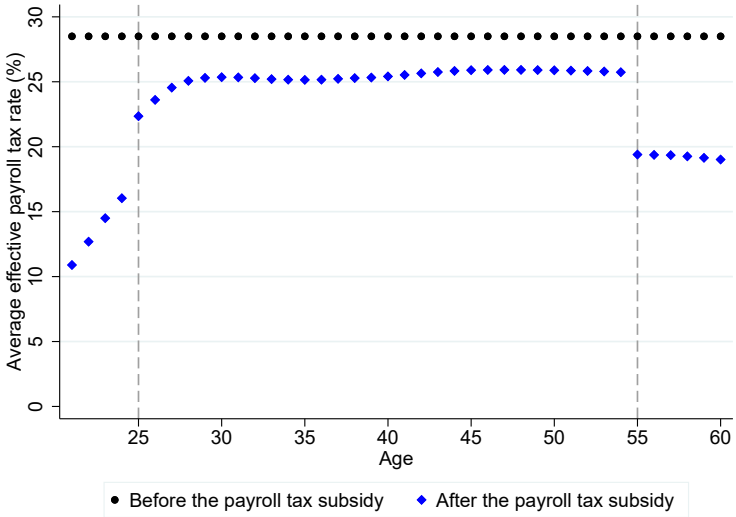
Additional indicators

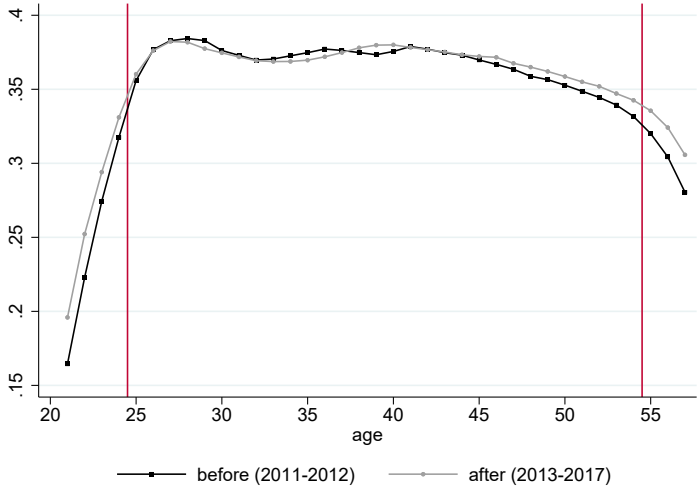
- Blue collar (ISCO 6-9) vs. white collar occupations (ISCO 1-5)
- Generated firm-level indicators: TFP, AKM wage premiums, poaching index

Results

Average Payroll Tax Rate by Age

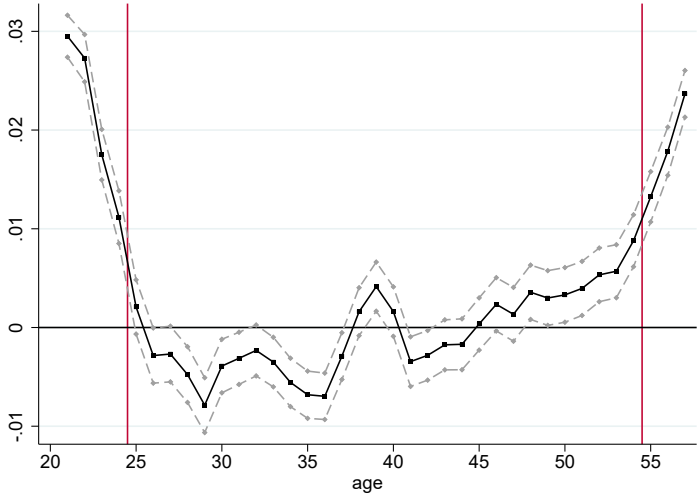


Private Sector Employment Rate By Age



▸ Figure: All Years

Employment Change By Age



▸ Figure: All Years

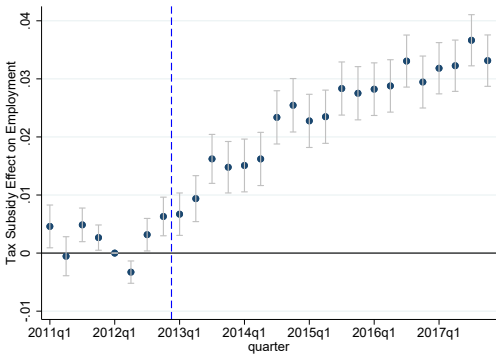
Estimation: Employment

$$y_{it} = \alpha_a + \beta_q + \sum_q \delta_q \mathit{Treated}_{it} + \varepsilon_{it}$$

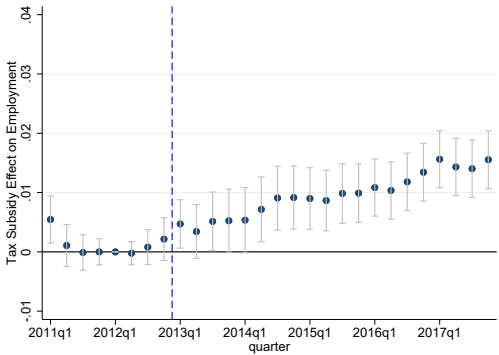
where

- y_{it} indicator of private sector employment of individual i in month t
- α_a are age fixed effects
- q quarterly date index runs between $2011 - 2017$
- *Treated* is one for ages under 25 (younger treated) or for ages at and above 55 (older treated)
- Restrict the sample to 21-26 for the younger workers and 53-56 for the older workers
- δ_q terms are quarter-specific dummies

Results: Employment



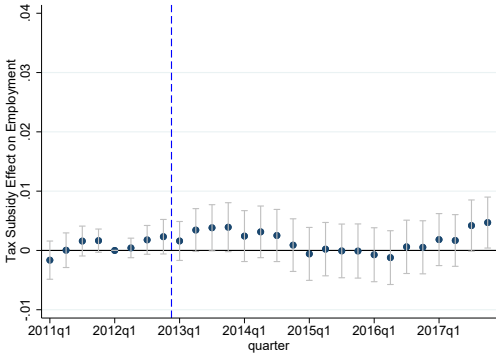
Young, age 21-26



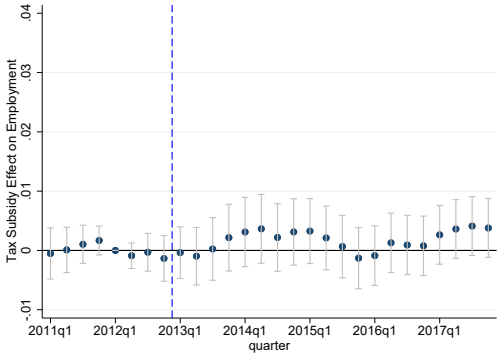
Old, age 53-56

▸ Transitions: Young ▸ Transitions: Old

Placebo: Employment

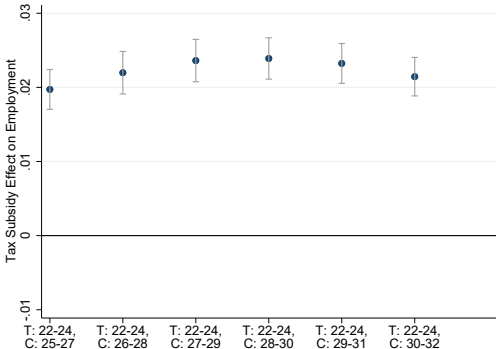


Young, age 29-34

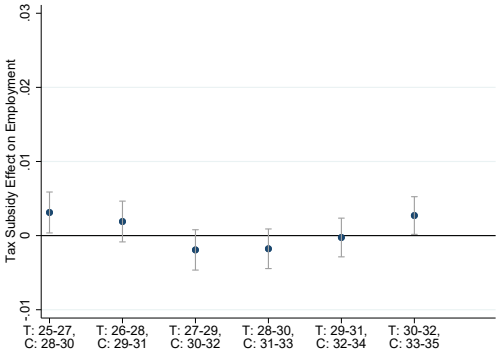


Old, age 51-54

Alternative Control Ages and Placebo Analyses: Employment



Controls: Young



Placebos: Young

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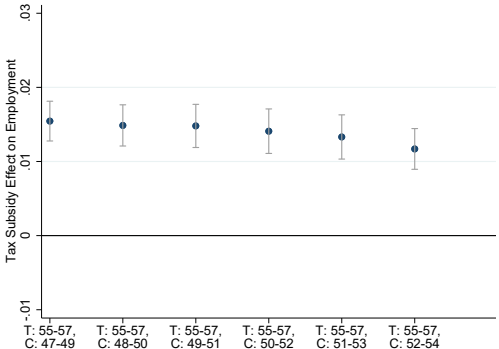
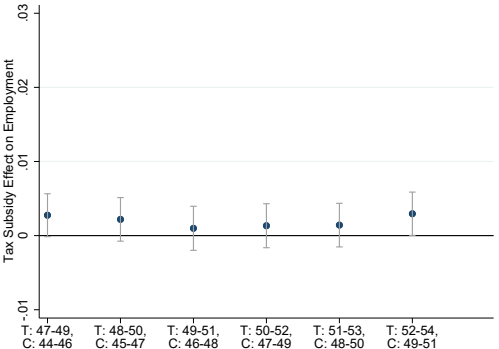


Controls: Old



Placebos: Old

Elasticity Calculation

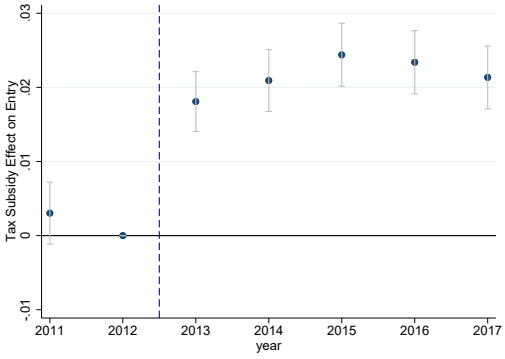
	Short run		Long run	
	Young	Old	Young	Old
Average tax rate				
—Without subsidy	0.24	0.26	0.24	0.26
—With subsidy	0.15	0.19	0.15	0.19
—Percent change in labor cost	-7.26%	-5.10%	-7.26%	-5.10%
Employment rate				
—Without subsidy	0.317	0.324	0.317	0.324
—With subsidy	0.326	0.329	0.339	0.335
—Percent change in employment	2.97%	1.55%	6.91%	3.62%
Implied elasticity	0.41	0.30	0.95	0.71

Additional Results on Employment

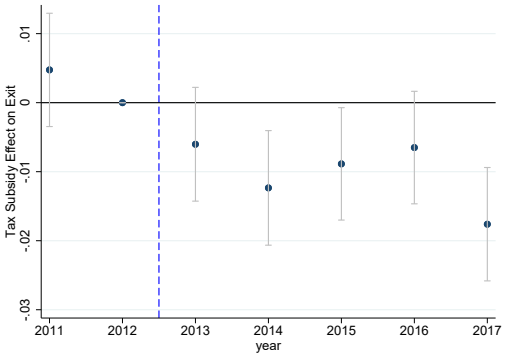
Results are mainly driven by increased entry

- Especially for younger workers
- Saez et al. (2019) find similar results in Sweden for younger workers

Transitions — Young



Entry



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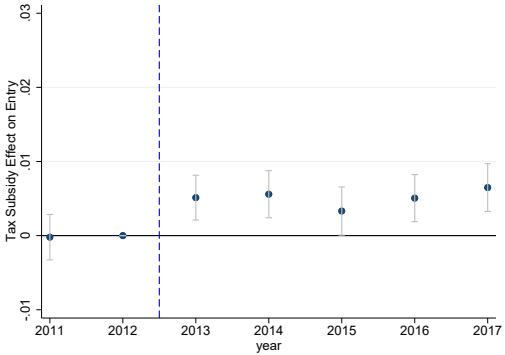

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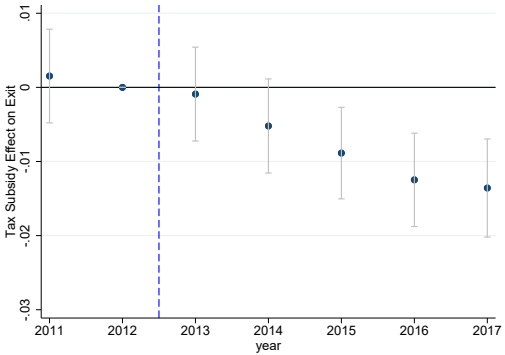

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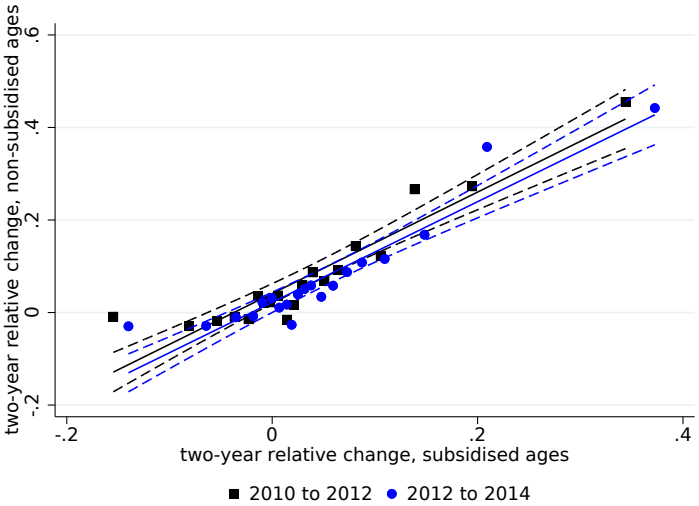
Firms hiring more subsidized workers do not hire fewer non-subsidized ones

- Compare within-firm relationship between growth in subsidized and non-subsidized ages pre and post reform
- Suggests that substitution does not explain our findings
- Points towards positive welfare effect of policy

No Evidence of Substitution



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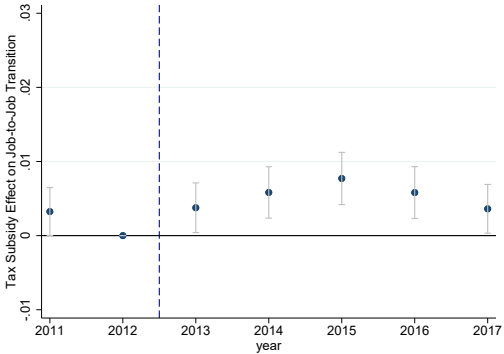
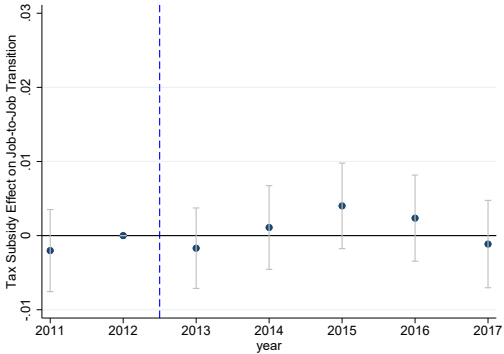
Job-to-job mobility is unaffected by the tax subsidy

- While hiring intensity increases, effect is on extensive margin on the labor market
- Applies across moves to higher-wage and lower-wage jobs

Job-to-job mobility, Young

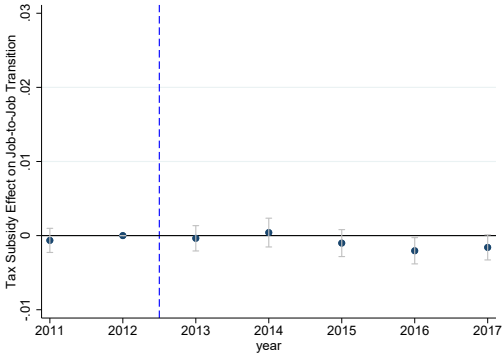


Transition to lower wage job



Transition to higher wage job

Job-to-job mobility, Old



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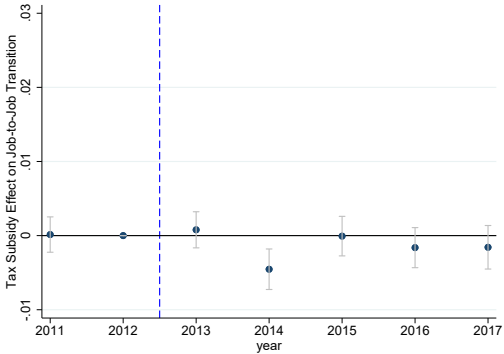


Transition to higher wage job

Heterogeneity: Employment

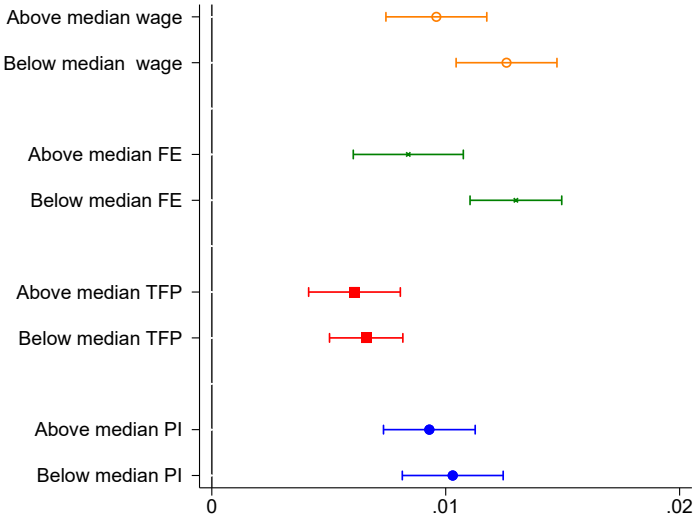
Estimate pooled version of difference-in-differences equation:

$$y_{it} = \alpha_a + \beta_q + \delta \mathit{After}_t \mathit{Treated}_{it} + \varepsilon_{it}.$$

To assess heterogeneity: replace outcome variable y_{it} with binary indicator for employment in given type of job

- e.g., in above median poaching index firm, in above median TFP firm

Heterogeneity: Employment — Young



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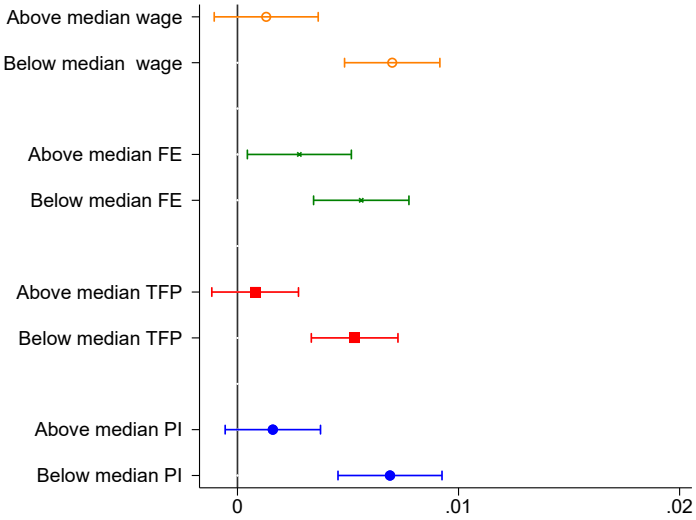

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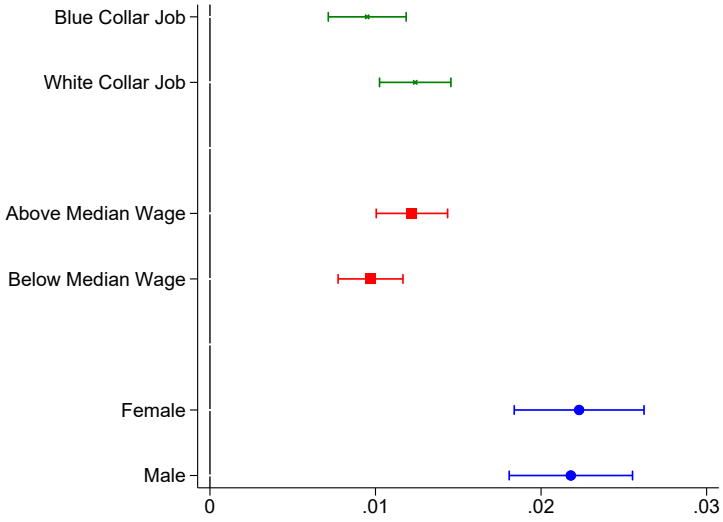

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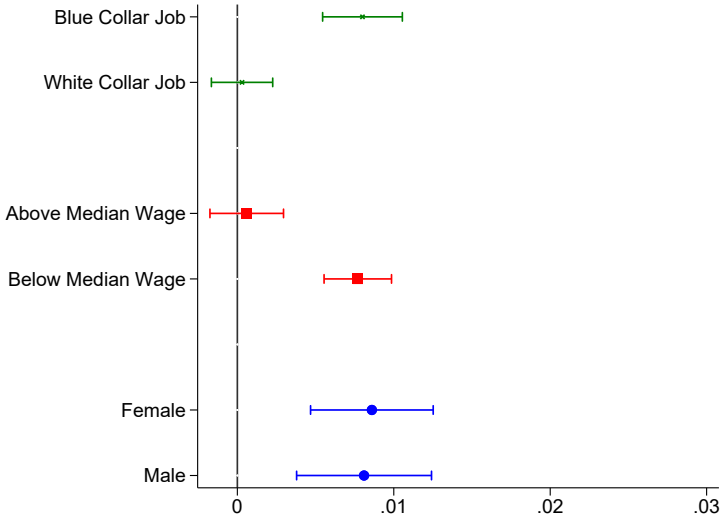


Estimation: Wages

$$ln(w_{it}) = \xi_a + \eta_t + O_{it}\gamma + f(ln(w_{it-1})) + \theta After_t Treated_{it} + \nu_{it},$$

where

- w_{it}: annual average monthly wage adjusted for working hours of individual i at time t (May of years 2012-2013)
- ξ_a: age effects
- η_t: calendar year effects
- O_{it}: occupation categories (professional, other white collar, skilled blue collar, assembler/machine operator, and unskilled jobs)
- We control for past wages as follows

$$f(ln(w_{it-1})) = 1[w_{it-1} < w_{t-1}^{med}]ln(w_{it-1})\zeta_t^l + 1[w_{it-1} \geq w_{t-1}^{med}]ln(w_{it-1})\zeta_t^h$$

- Focus on years 2012-2013

Results: Wages

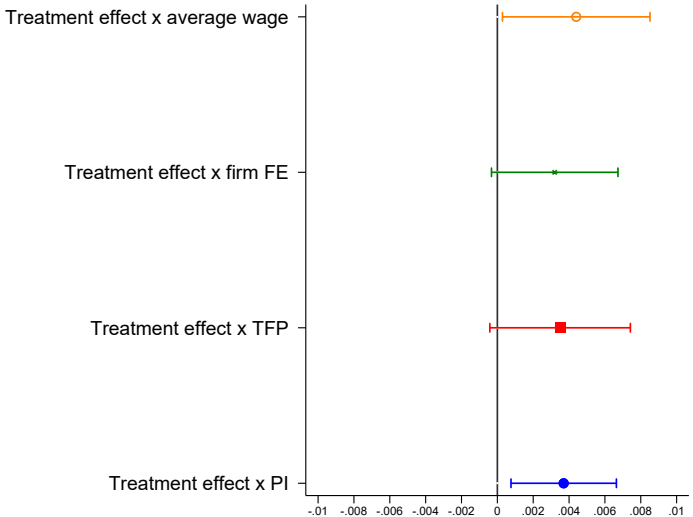
	Log Wage of Young Age 22-27	Log Wage of Old Age 52-57
Average treatment effect	0.0007	0.0032**
	[0.0022]	[0.0016]

Heterogeneity: Wages

$$ln(w_{it}) = \xi_a + \eta_t + O_{it}\gamma + f(ln(w_{it-1})) + \theta After_t Treated_{it} + \kappa \mathbf{After_t Treated_{it} Quality_{it}} + \nu_{it},$$

where we allow the impact to vary with measures $Quality_{it}$ of firm quality (TFP, Poaching Index, etc.)

Heterogeneity: Wages — Old, Age 53-56

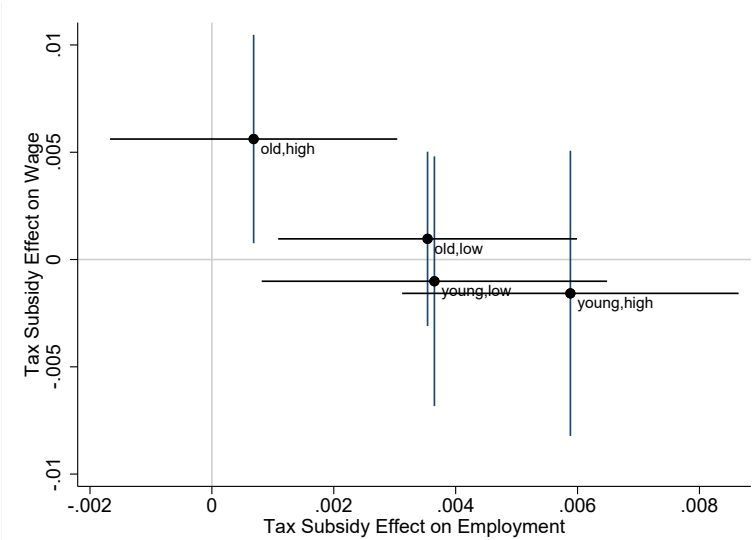


Employment vs Wage Effects

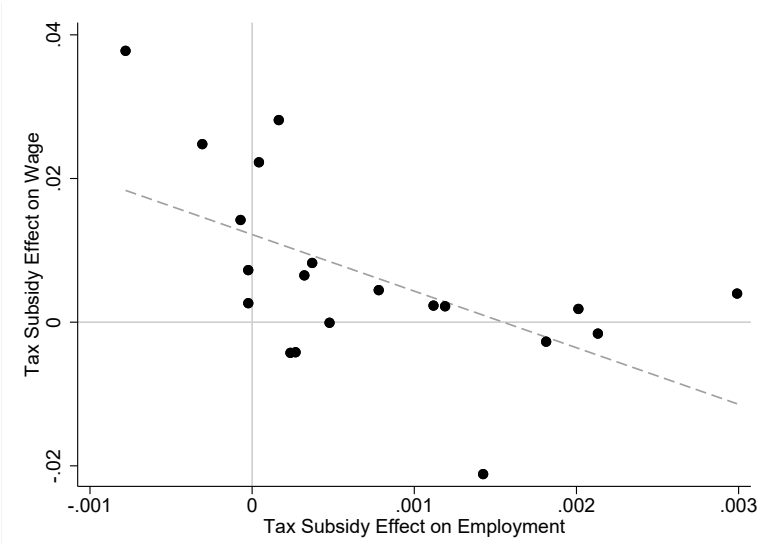
How do employment and wage impacts relate to each other?

- Bring together employment and wage estimates for subgroups
- Young vs old
- High-quality vs low-quality
- Different industries

Employment vs Wage Effects — Age Groups + Quality



Employment vs Wage Effects — Industries



Discussion

Model + empirical evidence on heterogeneities in the impact of payroll tax subsidies on employment and wages

- Model adds tax subsidy to canonical search and matching framework
- Empirical evidence based on policy experiment in Hungary allowing for diff-in-diff estimation

Discussion

Model + empirical evidence on heterogeneities in the impact of payroll tax subsidies on employment and wages

- Model adds tax subsidy to canonical search and matching framework
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Empirically, we find positive employment effects on both younger and older workers

- Driven by entry with some exit reduction for older workers
- No evidence of substitution
- Among older workers, employment effects are much larger in lower-quality firms and jobs

Discussion

Small positive wage effect only for older workers

- No effect for younger workers
- Larger effect in higher-quality firms

Discussion

Small positive wage effect only for older workers

- No effect for younger workers
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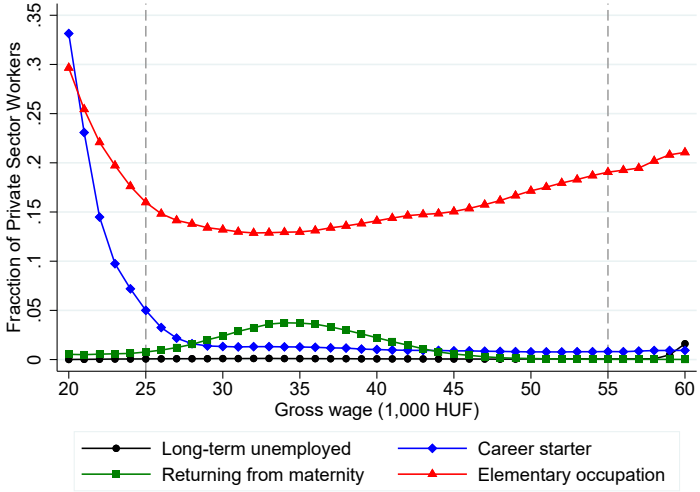
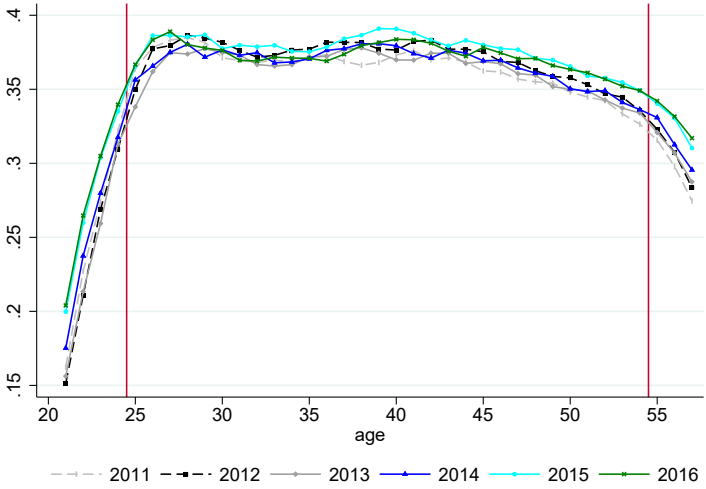
Suggests that in lower-quality firms and jobs, incidence is on firms, in higher-quality firms and jobs, incidence is on workers

- Wage and employment effects are negatively related
- Highlights importance of heterogeneity in the impacts of payroll tax subsidies
- Broadly consistent with model

Age-dependent vs Other Subsidies



Private Sector Employment Rate By Age



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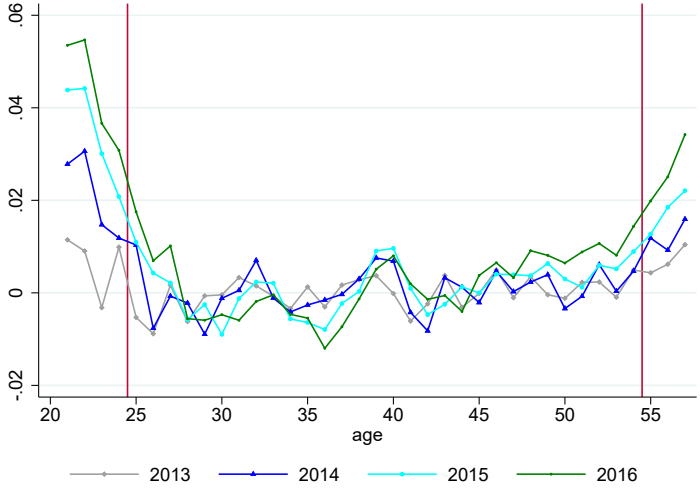
Private Sector Employment Rate By Age



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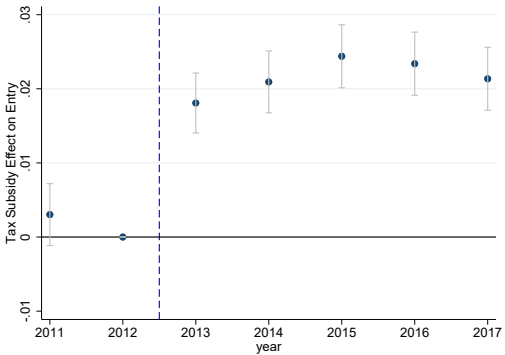
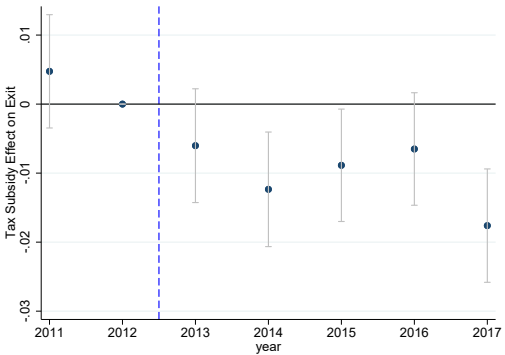
Transitions — Young, Age 21-26



Entry



Exit

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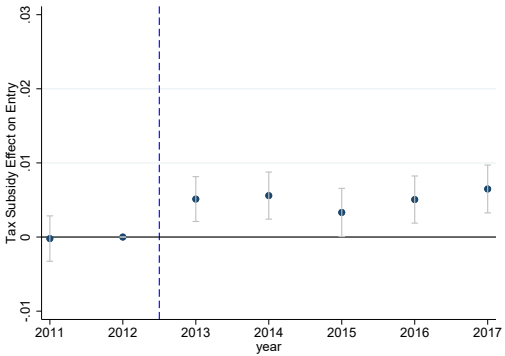
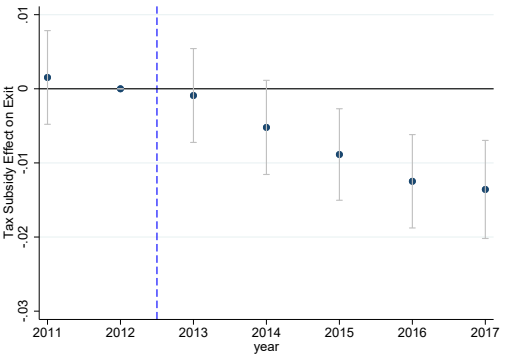
Transitions — Old, Age 53-56



Entry



Exit

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