The Impact of Payroll Tax Subsidies: Theory and Evidence

Anikó Bíró (KRTK)
Réka Branyiczki (CEU and Tárki)
Attila Lindner (UCL)
Lili Márk (CEU)
Dániel Prinz (IFS)

Motivation

Large component of labor tax wedges comes from payroll taxes

▶ Longstanding discussion how these taxes affect employment and wages

Motivation

Large component of labor tax wedges comes from payroll taxes

▶ Longstanding discussion how these taxes affect employment and wages

Standard view in public economics

▶ Apply the standard competitive framework of labor markets

▶ Relative elasticity of labor supply and demand what matters

▶ Firms play no role

Motivation

Large component of labor tax wedges comes from payroll taxes

▶ Longstanding discussion how these taxes affect employment and wages

Standard view in public economics

▶ Apply the standard competitive framework of labor markets

▶ Relative elasticity of labor supply and demand what matters

▶ Firms play no role

Still firms play a key role in wage determination

▶ Mostly theoretical discussion on the impact of public policies (e.g. UI)

▶ Key result: heterogeneous impact across firm and worker types

This Paper

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

► Add tax subsidy to a standard search and matching model
► Analyze heterogeneous impacts on wages and hiring by productivity

This Paper

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

▶ Add tax subsidy to a standard search and matching model

▶ Analyze heterogeneous impacts on wages and hiring by productivity

Exploit a large decrease in payroll tax below 25 and above 55 in Hungary

▶ Between 2013 and 2017, social security contributions were halved

This Paper

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

▶ Add tax subsidy to a standard search and matching model

▶ Analyze heterogeneous impacts on wages and hiring by productivity

Exploit a large decrease in payroll tax below 25 and above 55 in Hungary

▶ Between 2013 and 2017, social security contributions were halved

Apply a DiD empirical strategy

▶ Compare treated workers to untreated workers who are slightly older or younger

This Paper

Study impact of payroll tax subsidies in an equilibrium job search model
- ▶ Add tax subsidy to a standard search and matching model
- ▶ Analyze heterogeneous impacts on wages and hiring by productivity

Exploit a large decrease in payroll tax below 25 and above 55 in Hungary
- ▶ Between 2013 and 2017, social security contributions were halved

Apply a DiD empirical strategy
- ▶ Compare treated workers to untreated workers who are slightly older or younger

Study the impact on employment and wages
- ▶ Heterogeneity by firm productivity and worker type

Policy Relevance of Age Specific Payroll Taxes

Increasing employment of younger and older workers priority for policy

▶ Vulnerable groups that might be more responsive to tax changes

Policy Relevance of Age Specific Payroll Taxes

Increasing employment of younger and older workers priority for policy

▶ Vulnerable groups that might be more responsive to tax changes

Concerns about targeted payroll tax cuts

▶ Effectiveness: do they work?

▶ Incidence: do firms or workers get the money?

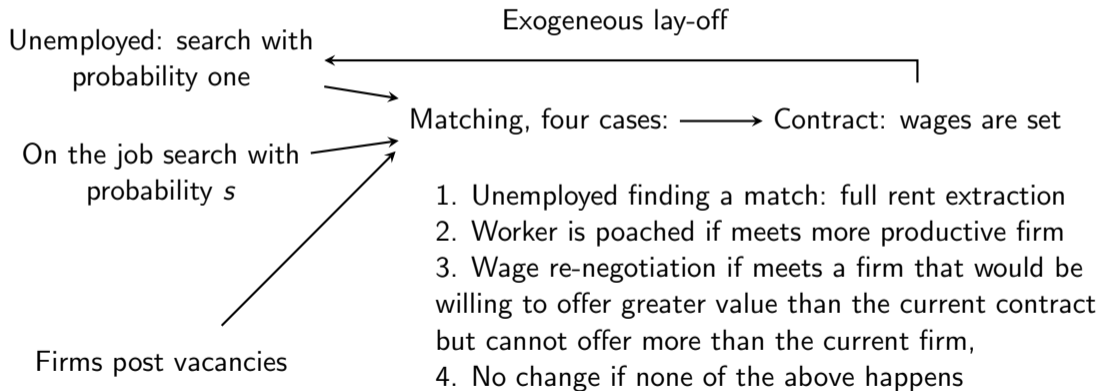▶ Heterogenity: which workers and firms benefit from the policy?

Policy Relevance of Age Specific Payroll Taxes

Increasing employment of younger and older workers priority for policy

▶ Vulnerable groups that might be more responsive to tax changes

Concerns about targeted payroll tax cuts

▶ Effectiveness: do they work?

▶ Incidence: do firms or workers get the money?

▶ Heterogenity: which workers and firms benefit from the policy?

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), Svraka (2019)

▶ No clear evidence on employment effects: Boockmann, Zwick, Ammermüller and Maier (2012), Huttunen, Pirttilä and Uusitalo (2013)

▶ Little evidence for wage effects

Model

Main features of the model – Setup

Standard search and matching model (Bagger and Lentz, 2019; Lise, Meghir and Robin, 2016; Moscarini and Postel-Vinay, 2018; among others)

Exogeneous lay-off

Unemployed: search with probability one

On the job search with probability *s*

Firms post vacancies

Matching, four cases: ⟶ Contract: wages are set

1. Unemployed finding a match: full rent extraction
2. Worker is poached if meets more productive firm
3. Wage re-negotiation if meets a firm that would be willing to offer greater value than the current contract but cannot offer more than the current firm,
4. No change if none of the above happens

Impact of Tax Subsidy

1. The tax subsidy increases amount of vacancies
    - *Intuition: Profit from hiring worker is higher*

Impact of Tax Subsidy

1. The tax subsidy increases amount of vacancies
   - *Intuition: Profit from hiring worker is higher*
2. The increase in wages for those coming from unemployment is small, while almost full pass-through for workers coming from another firm
   - *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*

Impact of Tax Subsidy

1. The tax subsidy increases amount of vacancies
   - ▶ *Intuition: Profit from hiring worker is higher*
2. The increase in wages for those coming from unemployment is small, while almost full pass-through for workers coming from another firm
   - ▶ *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 increase in vacancies is lower for high productivity/high poaching firms
   - ▶ *Intuition: On the margin, more productive firms care less about an extra dollar of subsidy for hiring*

Impact of Tax Subsidy

1. The tax subsidy increases amount of vacancies
   - *Intuition: Profit from hiring worker is higher*
2. The increase in wages for those coming from unemployment is small, while almost full pass-through for workers coming from another firm
   - *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 increase in vacancies is lower for high productivity/high poaching firms
   - *Intuition: On the margin, more productive firms care less about an extra dollar of subsidy for hiring*
4. The increase in wages is larger for high productivity/high poaching firms
   - *Intuition: More poaching and wage renegotiation happens at more productive firms, leading to workers getting more of the subsidy*

Background

Job Protection Act in Hungary

Labor income is taxed heavily

- ▶ 16% (flat-rate) personal income tax;
- ▶ 18.5% social security contributions (SSC) paid by the employee;
- ▶ 28.5% social security contributions (SSC) paid by the employer.

Job Protection Act in Hungary

Labor income is taxed heavily

- ▶ 16% (flat-rate) personal income tax;
- ▶ 18.5% social security contributions (SSC) paid by the employee;
- ▶ 28.5% social security contributions (SSC) paid by the employer.

Job Protection Act, in effect from 2013

- ▶ Workers aged below 25 or above 55: employer SSC reduced to 14%
- ▶ Other subsidized groups: e.g. elementary occupations, long-term unemployed
  ▸ Subsidy Interaction
- ▶ For a previous policy evaluation see Svraka (2019)

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.

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.

Employment and wages

▶ Monthly employment data

▶ For wages we use representative month

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.

Employment and wages
- ▶ Monthly employment data
- ▶ For wages we use representative month

Sample
- ▶ Focus on men in main analyses (women retire early at high rates)
- ▶ Focus on ages 22-27 and 52-57
- ▶ Private sector employees

Results

Average Payroll Tax Rate by Age

- Before the payroll tax subsidy   ■ After the payroll tax subsidy
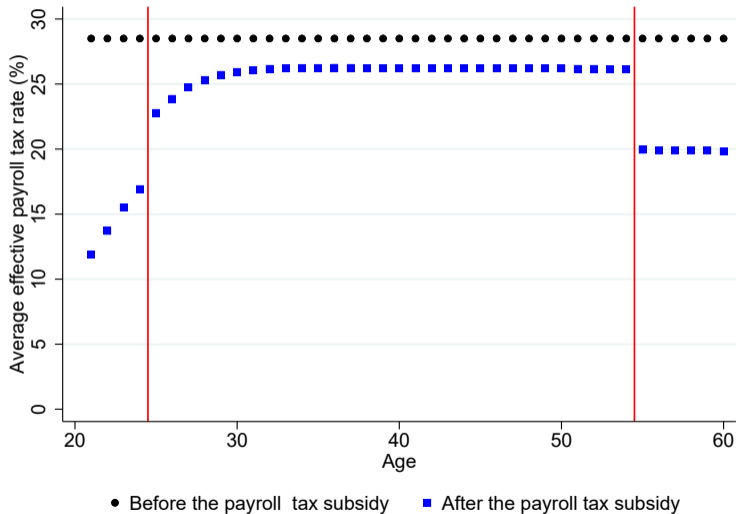
Employment in Private Sector Companies By Age (Males)
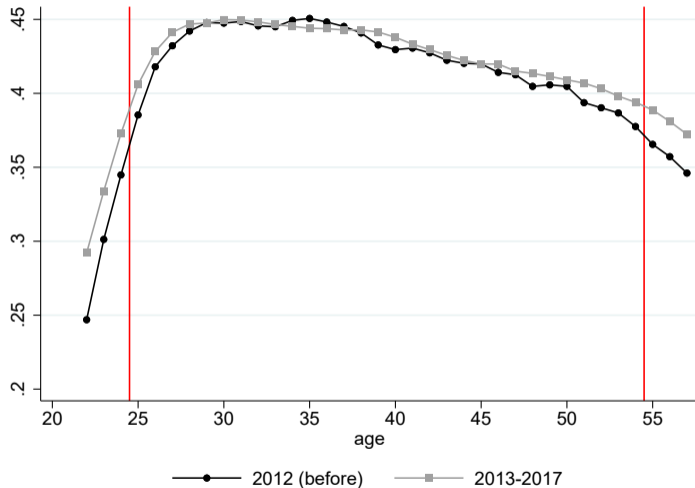
Change in Employment in Private Sector Companies By Age (Males)
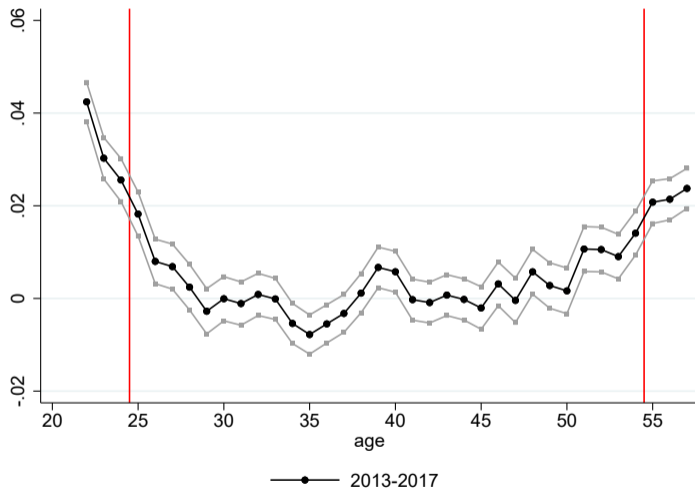
Estimation: Employment

$$y_{it} = \alpha_a + \beta_q + \sum_q \delta_q Treated_{it} + \varepsilon_{it}$$

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 $2010 - 2017$
- Treated is one for ages under 25 (younger treated) or for ages at and above 55 (older treated)
- Restrict the sample to 22-27 for the younger workers and 52-57 for the older workers
- δ_q terms are quarter-specific dummies

Results: Employment
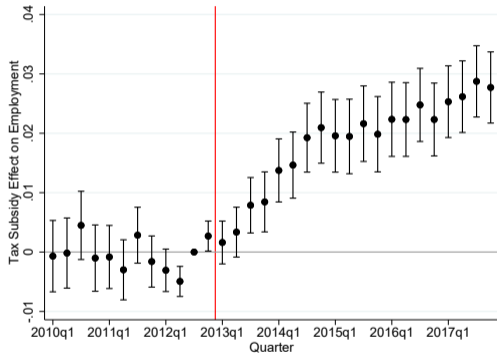
Young, age 22-27
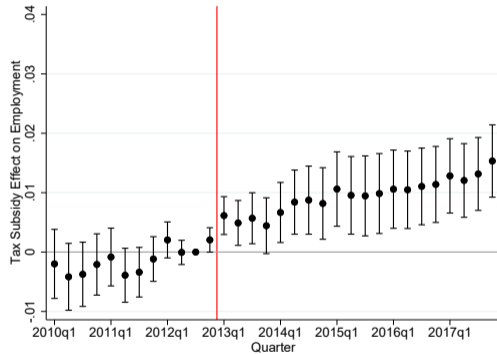
Old, age 52-57

Alternative Control Ages and Placebo Analyses: Employment
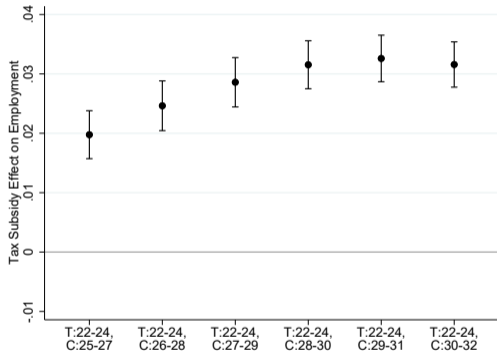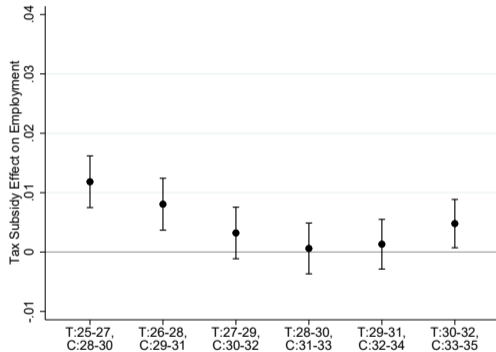
Controls: Young   Placebos: Young

Alternative Control Ages and Placebo Analyses: Employment
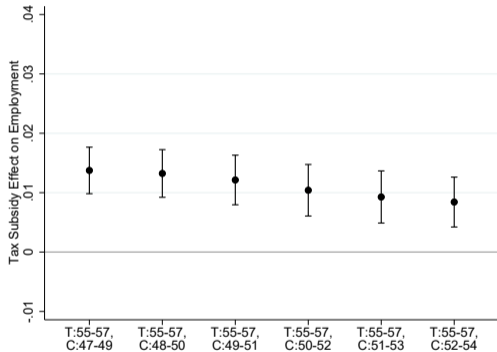
Controls: Old
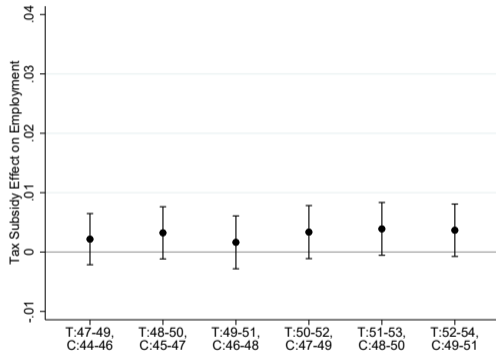
Placebos: Old

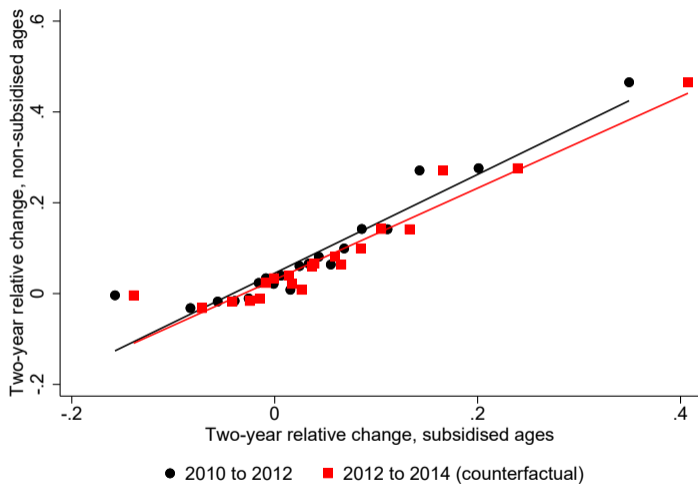# Spillover — Young
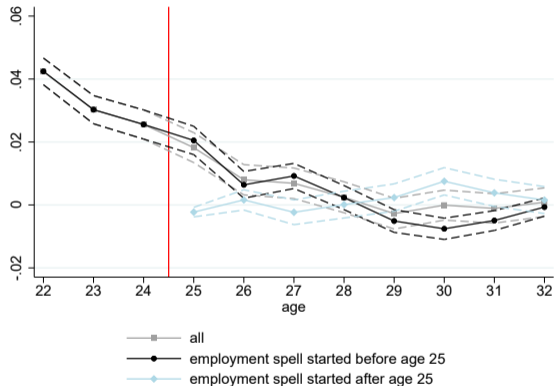
Employment spells starting before 25
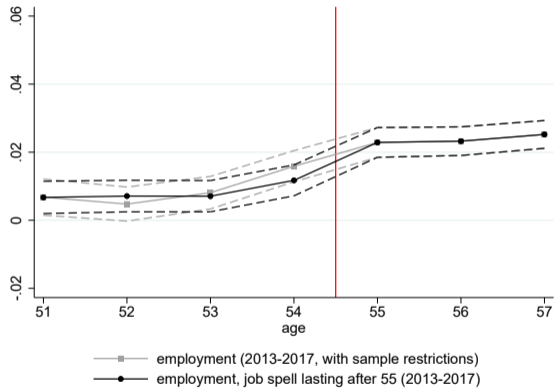
Employment spells lasting after 55

No Evidence of Substitution

2010 to 2012
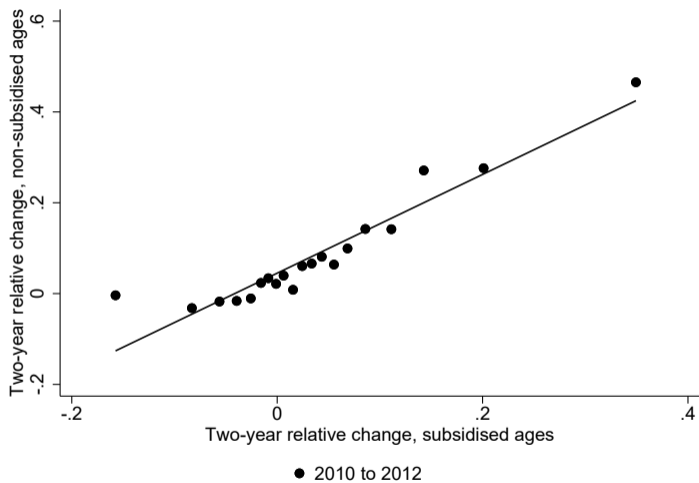
No Evidence of Substitution

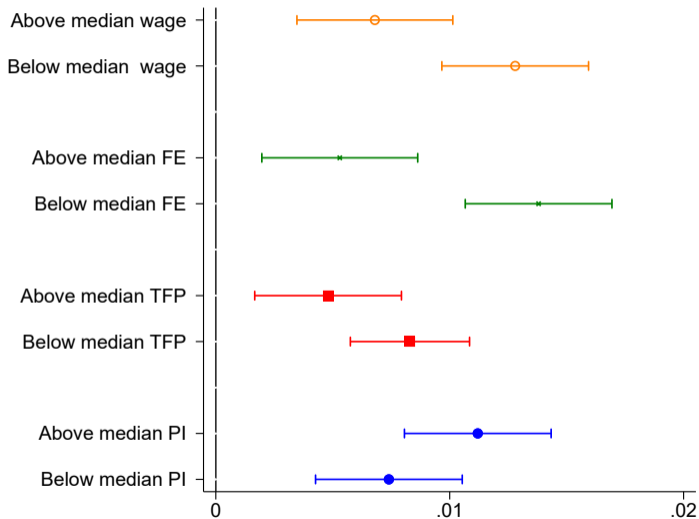# No Evidence of Substitution
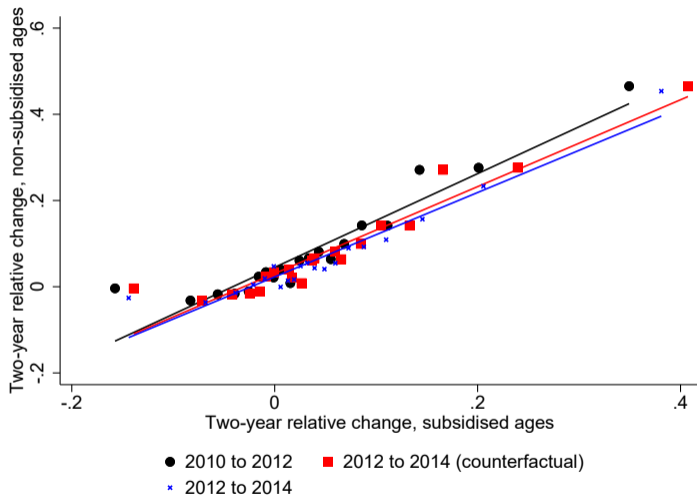
Heterogeneity: Employment

Estimate pooled version of difference-in-differences equation:

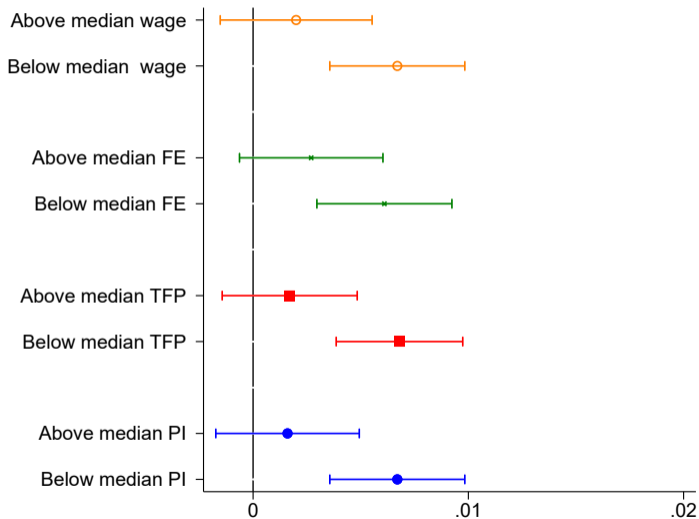$$y_{it} = \alpha_a + \beta_q + \delta After_t\, Treated_{it} + \varepsilon_{it}.$$

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

Heterogeneity: Employment — Old

Estimation: Wages

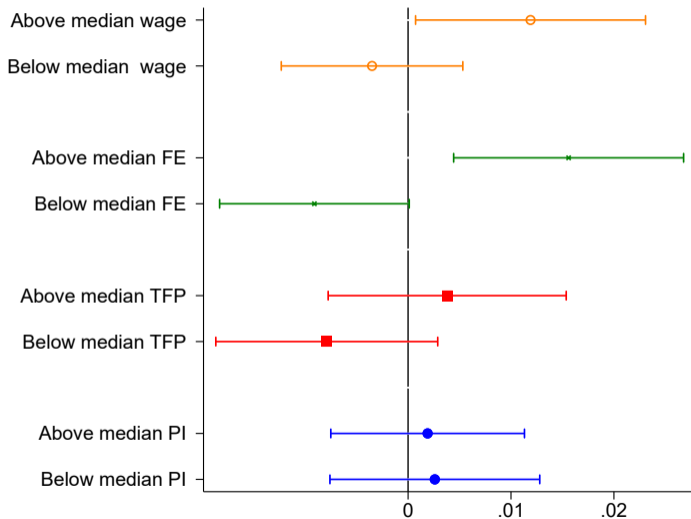$$ln(w_{it}) = \xi_a + \eta_t + (\phi_a + \zeta_t)ln(w_{it-1}) + \psi X_{it} + \theta_t Treated_{it} + \nu_{it},$$

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
- ϕ_a, ζ_t: age-specific and year-specific effects of lagged wage
- X_{it}: vector of controls, including occupation, log firm size, poaching index, ownership
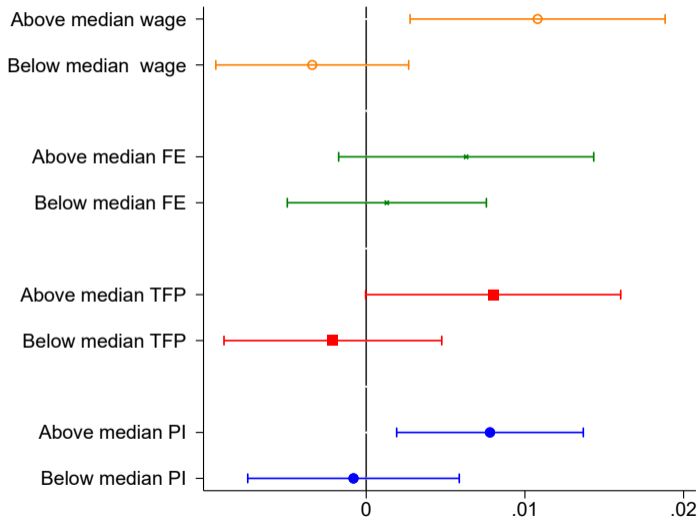- Focus on years 2012-2013

Results: Wages

	Log Wage of Young Age 22-27	Log Wage of Old Age 52-57
Average treatment effect	0.0023	0.0038
	[0.0043]	[0.0028]

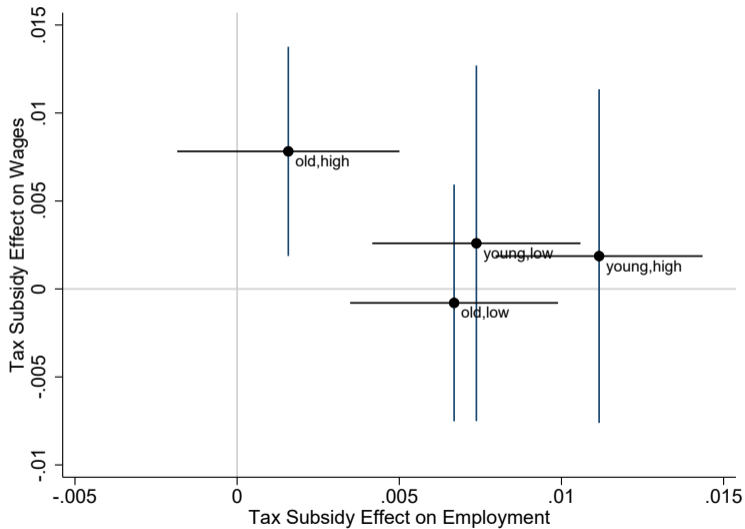# Heterogeneity: Wages — Young

Employment vs Wage Effects — Age Groups + Quality

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

▶ Empirical evidence based on policy experiment in Hungary allowing for diff-in-diff estimation

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 effects

▶ Larger effect in higher-quality firms – more so for older workers

Discussion

Small positive wage effects

▶ Larger effect in higher-quality firms – more so for older workers

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
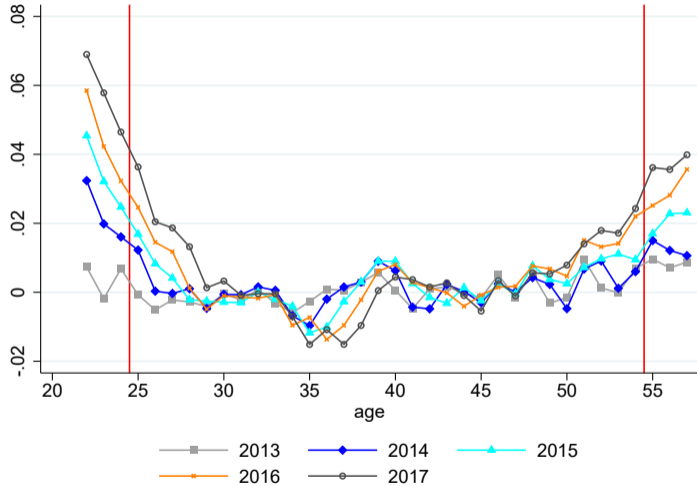
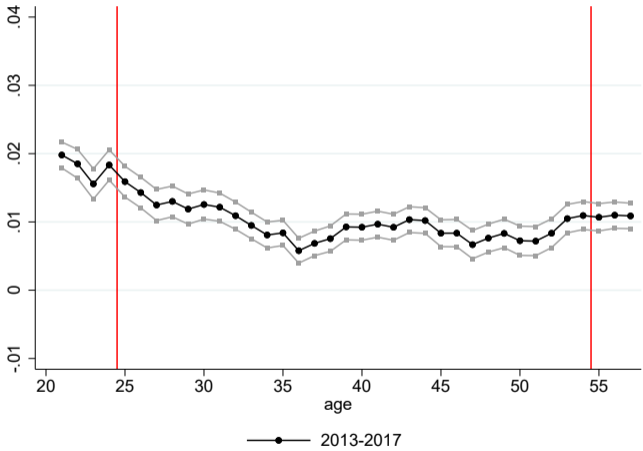▶ Broadly consistent with model

Age-dependent vs Other Subsidies
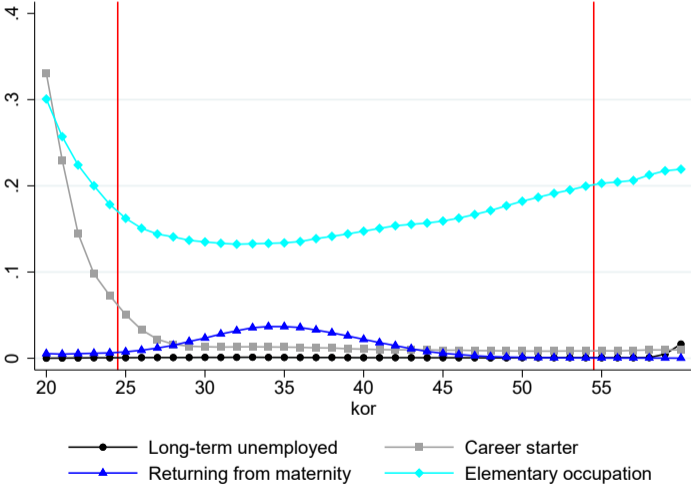
Private Sector Employment Rate By Age
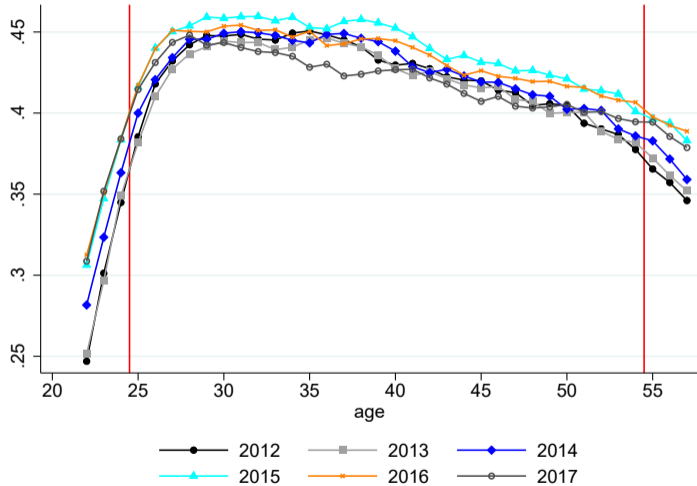
Private Sector Employment Rate By Age

Private Sector Employment Rate By Age—Placebo: Elementary Occupations

Private Sector Employment Rate By Age—Placebo: Public Sector