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
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- 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
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  ▶ 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
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  ▶ Compare treated workers to untreated workers who are slightly older or younger
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**Apply a DiD empirical strategy**
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**Study the impact on employment and wages**
- Heterogeneity by firm productivity and worker type
Increasing employment of younger and older workers priority for policy

- Vulnerable groups that might be more responsive to tax changes
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?
  ▶ Heterogeneity: which workers and firms benefit from the policy?

Empirical evidence is mixed, mostly focused on younger workers
  ▶ Non-negligible positive effects on employment:
  ▶ No clear evidence on employment effects:
    Boockmann, Zwick, Ammermüller and Maier (2012), Huttunen, Pirttilä and Uusitalo (2013)
  ▶ Little evidence for wage effects
Policy Relevance of Age Specific Payroll Taxes

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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)

- Unemployed: search with probability one
- On the job search with probability \( s \)
- Firms post vacancies
- Exogeneous lay-off
- Matching, four cases:
  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

Contract: wages are set
Impact of Tax Subsidy

1. The tax subsidy increases amount of vacancies
   ▶ Intuition: Profit from hiring worker is higher
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   - 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
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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.
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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.
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Employment and wages
- Monthly employment data
- For wages we use representative month
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**Employment and wages**
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**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

![Graph showing average effective payroll tax rate by age. The graph compares the tax rate before and after the payroll tax subsidy.](image-url)
Change in Employment in Private Sector Companies By Age (Males)

[Graph showing change in employment by age with specific data points and trend lines for males over the years 2013-2017.]
Estimation: Employment

\[ y_{it} = \alpha_a + \beta_q + \sum_{q} \delta_q \text{Treated}_{it} + \varepsilon_{it} \]

where

- \( y_{it} \) indicator of private sector employment of individual \( i \) in month \( t \)
- \( \alpha_a \) 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
- \( \delta_q \) 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
No Evidence of Substitution
No Evidence of Substitution

Two-year relative change, non-subsidised ages

Two-year relative change, subsidised ages

2010 to 2012
2012 to 2014 (counterfactual)
2012 to 2014

2010 to 2012
2012 to 2014 (counterfactual)
2012 to 2014
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

- Above median wage
- Below median wage
- Above median FE
- Below median FE
- Above median TFP
- Below median TFP
- Above median PI
- Below median PI
Heterogeneity: Employment — Old

- Below median PI
- Above median PI
- Below median TFP
- Above median TFP
- Below median FE
- Above median FE
- Below median wage
- Above median wage

Graph showing the distribution of employment metrics.
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)
- \( \xi_a \): age effects
- \( \eta_t \): calendar year effects
- \( \phi_a, \zeta_t \): 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

<table>
<thead>
<tr>
<th></th>
<th>Log Wage of Young</th>
<th>Log Wage of Old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age 22-27</td>
<td>Age 52-57</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>0.0023</td>
<td>0.0038</td>
</tr>
<tr>
<td></td>
<td>[0.0043]</td>
<td>[0.0028]</td>
</tr>
</tbody>
</table>
Employment vs Wage Effects — Age Groups + Quality

Tax Subsidy Effect on Wages

-old,low

Tax Subsidy Effect on Employment

young,low

young,high

old,low

-old,high
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
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Small positive wage effects

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

![Graph showing different age-dependent vs other subsidies categories: Long-term unemployed, Career starter, Returning from maternity, Elementary occupation.](image)
Private Sector Employment Rate By Age
Private Sector Employment Rate By Age—Placebo: Elementary Occupations
Private Sector Employment Rate By Age—Placebo: Public Sector