Do Sticky Wages Matter? New Evidence from Matched Firm-Survey and Register Data

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**Notes:** Biennial wage growth distribution in Switzerland 2012-2016. The base wage excludes irregular payments (e.g. bonuses)
Main questions:

- Do rigid base wages have a negative **causal impact** on income and employment after a contractionary monetary policy shock?

- Do **bonus payments** mitigate the adverse allocative effects of downward rigid base wages?

Identification strategy:

- **Diff-in-Diff**: Compare employment outcomes for treatment (workers with wage freezes) and control group (workers with small wage cuts) after the unexpected removal of exchange rate floor policy in 2015
Contribution:
– Causal effect of **base wage rigidity** and **bonus payments** on income and employment at the **worker level**, in a **deflationary environment**, after an **unexpected deflationary shock**

Main finding:
– After a 1% deflationary shock, base wage rigidities cause a decline of income (−4.4%) and employment income (−11%), as well as an increase in the likelihood of becoming unemployed (0.7 ppt), compared to the treatment group
– Bonus payments **mitigate**, but do not completely offset these adverse effects
1. Data

2. Identification and estimation

3. Allocative effects of rigid base wages

4. Mitigating effects of bonus payments

5. Concluding Remarks
Population and coverage

**Active**
- Self-employed
- Employed
- Unemployed

**Inactive**
- Other
- Retirees, children

**SESS**
- Biennial firm survey
- ~40% of population

**OASI**
- Annual register data
- ~100% of population

*Notes:* The braces indicate the population of the firm survey (SESS) and the social security register data (OASI), respectively. Source: Swiss Federal Statistical Office and Central Compensation Office.
Data overview

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Swiss Earnings Structure Survey (SESS)</th>
<th>Old Age and Survivors’ Insurance (OASI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measure wage rigidities (zero wage changes</td>
<td>Track income and employment history treatment), worker and firm characteristics)</td>
</tr>
<tr>
<td></td>
<td>- treatment), worker and firm characteristics</td>
<td>weights</td>
</tr>
<tr>
<td>Population</td>
<td>Swiss employees (1.6 mio each wave)</td>
<td>Working age population (5 mio each year)</td>
</tr>
<tr>
<td>Content</td>
<td>Socio-economic, firm and contract characteristics, activity rate and income (base, irregular and 13th month income)</td>
<td>Income from social security insurance (especially unemployment benefits and zero employment income)</td>
</tr>
<tr>
<td>Definitions</td>
<td>We <strong>normalize</strong> income to the <strong>activity rate</strong> in 2014 to measure the contractual wage</td>
<td>Total, employment, unemployment income and unemployment indicator</td>
</tr>
<tr>
<td>Weights</td>
<td><strong>Non-random sample</strong>: Stratified firm-survey, wage freeze indicator requires two consecutive observations</td>
<td>Construct <strong>own sampling weights</strong> using a Probit model</td>
</tr>
</tbody>
</table>
Identification strategy

Removal

Exchange rate floor

-0.15
-0.1
-0.05
0
0.05
0.1
-0.03
-0.02
-0.01
0
0.01
0.02
In log, Dec 2014 = 0

2010
2012
2013
2015
2016

CPI (seasonally adjusted), left-hand scale
Exchange rate CHF/EUR, right-hand scale

Fraction

-0.1
-0.08
-0.06
-0.04
-0.02
0
0.02
0.04
0.06
0.08
0.1

Treatment
Control
Placebo treatment
Placebo control
Wage growth

Observed wage growth distribution 2014
Estimation

\[ y_{i,t} = \sum_{j \notin 2014} 1\{t = j\} \times \left[ \alpha_j 1\{\Delta w_{i,2014} = 0\} + \delta_j 1\{\Delta w_{i,2014} < -c\} + \gamma_j 1\{\Delta w_{i,2014} > 0\} \right] \\
+ \sum_{j \notin 2014} 1\{t = j\} \times \left[ X_{i,2014} \beta + Z_{i,2014} \theta \right] + \theta_i + \varepsilon_{i,t}. \]

- \( y_{i,t} \): total income, employment income, unemployment income, unemployment dummy (OASI data)
- \( 1\{A\} \): Indicator variable that equals 1 if the condition \( A \) is true and 0 otherwise
- We interact time dummies with a wage freeze dummy (\( 1\{\Delta w_{i,2014} = 0\} \)), dummies for large wage cuts (\( 1\{\Delta w_{i,2014} < -c\} \)), dummies for wage increases (\( 1\{\Delta w_{i,2014} > 0\} \))
- \( \theta_i \): Individual fixed effects, capture time constant unobserved characteristics
- \( \varepsilon_{i,t} \): denotes an i.i.d. error term, standard errors are clustered at unique values of the base wage growth distribution.
Two matrices of control variables capture observed differences that may affect selection into treatment at the individual and firm-level ($X_{i,2014}, Z_{f,2014}$).

- **$X_{i,2014}$**
  - Contract (e.g. temporary contract) and job type (e.g. management function)
  - Education (e.g. tertiary education)
  - Gender
  - Unemployed (2012-2014)
  - Job mover (2012-2014)

- **$Z_{f,2014}$**
  - Firm dummies (firm-level time effects)
Effect on unemployment

Notes: 90% and 95% confidence intervals based on standard errors clustered according to the wage growth distribution in 2014 (Lee and Card, 2008).
Notes: 90% and 95% confidence intervals based on standard errors clustered according to the wage growth distribution in 2014 (Lee and Card, 2008).
The role of flexible wage components

<table>
<thead>
<tr>
<th></th>
<th>(1) Share zero wage change</th>
<th>(2) Share negative wage change</th>
<th>(3) Share non-zero wage level</th>
<th>(4) Avg. share in total wage</th>
<th>(5) Avg. share in firms’ payroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>0.08</td>
<td>0.21</td>
<td>1.00</td>
<td>0.91</td>
<td>0.90</td>
</tr>
<tr>
<td>13th month</td>
<td>0.06</td>
<td>0.35</td>
<td>0.78</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Bonus</td>
<td>0.03</td>
<td>0.59</td>
<td>0.32</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Overtime</td>
<td>0.01</td>
<td>0.77</td>
<td>0.10</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Sunday/night</td>
<td>0.04</td>
<td>0.63</td>
<td>0.18</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Observations</td>
<td>836,736</td>
<td>836,736</td>
<td>1,454,879</td>
<td>1,454,879</td>
<td>31,405</td>
</tr>
</tbody>
</table>

Notes: (1) Share of zero wage changes between 2014 and 2012; (2) Share of negative wage changes between 2014 and 2012; (3) Share of employees receiving a non-zero payment; (4), (5) Average share in the employee’s wage, and firm’s payroll, respectively.
Effect of bonus payments on employment

Main effects

Interaction effects

Base category

Bonus share 1-10%

Bonus share 11-20%

Bonus share >20%

13th month

Overtime

Sunday/night

Unemployed (0/1) in 2016

Baseline model

Interaction model

Notes: Average difference in the probability of working and being unemployed, between employees with wage freezes and small wage cuts in 2014. The interaction effects measure the difference to the base category.
Effect of bonus payments on income

Main effects
- Base category
- Bonus share 1-10%
- Bonus share 11-20%
- Bonus share > 20%
- 13th month
- Overtime
- Sunday/night

Interaction effects

Baseline model
Interaction model

Notes: Average difference in the (employment) income, between employees with wage freezes and small wage cuts in 2014. The interaction effects measure the difference to the base category.
Concluding remarks

– Downward nominal wage rigidity is a **pervasive feature** of the Swiss labor market and has **adverse effects** on employment outcomes after a deflationary shock.

– Even though rigidities bind only for a modest share of workers, effects on income and unemployment are **economically relevant**.

– **Flexible wage components** (i.e. bonus payments) mitigate the negative allocative effects on employment, but do not completely offset them.

– Not only timing of wage setting (Olivei and Tenreyro, 2010, 2007), but **worker heterogeneity** (share of bonus payment) matter for **monetary non-neutrality**.

– Implications for **monetary policy**: Nominal rigidities are an important factor to determine **inflation target**, especially for economies with less flexible labour markets.
Appendix
Why analyze Switzerland?
<table>
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<tr>
<th>Monetary Policy</th>
<th>Allocative effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Justification for positive inflation target</strong></td>
<td>Inefficient distortions remain debated</td>
</tr>
<tr>
<td><strong>Key friction in macro models</strong></td>
<td>Correlated with unemployment across regions or firms</td>
</tr>
<tr>
<td><strong>Uneven staggering of wage settings explain different monetary policy transmission</strong></td>
<td>Impact depends on the nature of the economic shock</td>
</tr>
</tbody>
</table>
Notes: The graph shows the aggregate effects of wage rigidity on median income, employment income, and registered unemployment. The predictions are evaluated at the actual model coefficients (Prediction). The counterfactual predictions set the treatment dummies to 0 (Counterfactual). All statistics are computed at the individual level and then aggregated using own sampling weights.
Placebo tests: wage growth distribution

Notes: Placebo treatments in different bins of the base wage growth distribution in 2014. The bin including wage freezes is highlighted in red. The bars represent 95% confidence intervals.


