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

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Wages rise more often than they fall

Notes: Biennial wage growth distribution in Switzerland 2012-2016. The base wage excludes irregular payments (e.g. bonuses)
Our contribution and main finding

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

**Contribution:** Causal effect of *base wage* rigidity on real outcomes at the *worker level*, in a *deflationary environment*, after an *unexpected deflationary shock* on the *aggregate economy*

**Identification strategy:** Define treatment (workers with wage freezes) and a control group (workers with small wage cuts) and compare employment outcomes after the unexpected removal of exchange rate floor policy in 2015

**Main finding:** After a 1% deflationary shock, base wage rigidities cause a decline of aggregate income (−0.3%) and employment income (−0.9%), as well as an increase of the number of unemployed individuals (1.3%).
1. Data

2. Identification and estimation

3. Main results

4. 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>
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<th><strong>Swiss Earnings Structure Survey (SESS)</strong></th>
<th><strong>Old Age and Survivors’ Insurance (OASI)</strong></th>
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<tr>
<td><strong>Purpose</strong></td>
<td>Measure wage rigidities (zero wage changes - treatment), worker and firm characteristics</td>
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<tr>
<td><strong>Population</strong></td>
<td>Swiss employees (1.6 mio each wave)</td>
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<tr>
<td><strong>Content</strong></td>
<td>Socio-economic, firm and contract characteristics, activity rate and income (base, irregular and 13th month income)</td>
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<td><strong>Definitions</strong></td>
<td>We <strong>normalize</strong> income to the <strong>activity rate</strong> in 2014 to measure the contractual wage</td>
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<td><strong>Weights</strong></td>
<td><strong>Non-random sample</strong>: Stratified firm-survey, wage freeze indicator requires two consecutive observations</td>
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<td></td>
<td>Track income and employment history (outcome variables), construct sampling weights</td>
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<td></td>
<td>2008 - 2016</td>
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<td></td>
<td>Working age population (5 mio each year)</td>
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<td></td>
<td>Income from social security insurance (especially unemployment benefits and zero employment income)</td>
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<td></td>
<td>Total, employment, unemployment income and unemployment indicator</td>
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<td></td>
<td>Construct <strong>own sampling weights</strong> using a Probit model</td>
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</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
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

\[ y_{i,t} = \sum_{j \not\in 2014} 1 \{ t = j \} \times \left[ \alpha_j 1 \{ \Delta w_{i,2014} = 0 \} + \delta_j 1 \{ \Delta w_{i,2014} < -c \} + \gamma_j 1 \{ \Delta w_{i,2014} > 0 \} \right] \\
+ \sum_{j \not\in 2014} 1 \{ t = j \} \times \left[ X_{i,2014} \beta + Z_{i,2014} \theta \right] + \theta_i + \varepsilon_{i,t}. \]

- \( y_{i,t} \): 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.
Control variables

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

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.
We use Swiss wage data matched with social security data to measure nominal wage rigidity and identify its causal effect on income, employment, and unemployment after a deflationary shock:

- Downward nominal wage rigidity is a **pervasive feature** of the Swiss labor market, even during deflation.

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

- Results are robust to i.e. a misclassification bias, placebo test, other outcomes and samples, different control variables, different definitions of control/treatment group, export/import intensity.

- Implications for **monetary policy**: Nominal rigidities are an important factor to determine inflation target.
Why analyze Switzerland?

Inflation and nominal wage growth (in %)

Average inflation 2012-2018 (in %)

- CPI inflation
- Nominal wage growth
## Existing literature on (downward) nominal wage rigidities

<table>
<thead>
<tr>
<th>Monetary Policy</th>
<th>Allocative effects</th>
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</table>
| **Justification for** *positive inflation target*  
(Tobin, 1972, Bernanke, 2003, Issing et al., 2003) | **Inefficient distortions remain debated**  
| **Key friction in** *macro models*  
*regions or firms*  
(Fehr and Goette, 2005, Bauer et al., 2007, Kurmann and McEntarfer, 2019) |
| **Uneven staggering of wage settings**  
explain different *monetary policy transmission*  
(Olivei and Tenreyro, 2010, 2007) | **Impact depends on the** *nature of the economic shock*  
(Eichengreen and Sachs, 1985, Sumner and Silver, 1989, Basu and Taylor, 1999) |
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.


