

## LABOR MARKETS AND THE TRANSMISSION OF MACROECONOMIC SHOCKS

### Do Bonuses Offset the Allocative Effects of Downward Rigid Base Wages?<sup>†</sup>

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On January 15, 2015, the Swiss National Bank surprisingly removed a floor policy for the CHF/EUR exchange rate, which caused a strong appreciation of the Swiss franc and a 1 percent decline in the consumer price level. Meanwhile, aggregate nominal wages continued to rise.<sup>1</sup> This policy change is a rare natural experiment, which allows us to investigate the allocative labor market effects of downward nominal wage rigidities in the wake of an unexpected deflationary shock.<sup>2</sup>

In Funk and Kaufmann (forthcoming), we study the impact of downward rigid base wages on employees' income and labor market outcomes before and after the Swiss franc shock in 2015. We exploit the discontinuity around the origin of the base wage growth distribution in a difference-in-differences model, comparing employees with base wage freezes in 2014 (treatment group) with employees with small wage cuts (control group). The key assumption is that employees with small wage cuts are similar to employees with rigid base wages, except for the fact that the control group's base wages are downward flexible. We find that employees with base wage freezes experienced a larger decline in income, a higher probability of becoming unemployed, and a lower probability of working.

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<sup>1</sup>The online Appendix contains figures of the exchange rate, as well as CPI and wage inflation during this episode.

<sup>2</sup>See, e.g., Auer, Burstein, and Lein (2021) for a similar approach.

It is well documented, however, that total wages, including alternative compensation schemes such as bonuses, are more downward flexible than base wages (see Altonji and Devereux 2000; Grigsby, Hurst, and Yildirmaz 2021). Therefore, base wage rigidities may have smaller allocative consequences because downward flexible components allow employers to cut the total wage in an economic downturn. Babecký et al. (2019) indeed provide survey evidence that European firms use bonuses as an adjustment mechanism when base wages are rigid. There is little quantitative evidence, however, whether bonuses mitigate or even offset the allocative effects of rigid base wages in response to a deflationary shock.

In this paper, we provide descriptive statistics on the relevance of downward flexible compensation schemes. We then extend the model by Funk and Kaufmann (forthcoming) to measure the allocative labor market effects of rigid base wages for employees with and without downward flexible compensation schemes. In line with the existing literature, we find that the base wage is more downward rigid than other compensation components, such as bonuses. In addition, downward flexible compensation schemes mitigate the allocative labor market effects of downward rigid base wages. However, we also find that downward flexible compensation accounts only for a relatively small share of the total wage. Therefore, downward flexible compensation does not suffice to offset the overall allocative labor market effects of downward rigid base wages.

#### I. Data

We use a biennial firm survey (2012, 2014, 2016) on employees' compensation matched

TABLE 1—DESCRIPTIVE STATISTICS 2014

	Share zero wage change (1)	Share negative wage change (2)	Share nonzero wage level (3)	Avg. share in total wage (4)	Avg. share in firms' payroll (5)
Base	0.08	0.21	1.00	0.91	0.90
Thirteenth month	0.06	0.35	0.78	0.06	0.06
Bonus	0.03	0.59	0.32	0.02	0.03
Overtime	0.01	0.77	0.10	0.00	0.00
Sunday/night	0.04	0.63	0.18	0.01	0.01
Observations	836,736	836,736	1,454,879	1,454,879	31,405

*Notes:* This table displays descriptive statistics according to compensation component for all employees (job-stayers and job-movers). Weighted using sampling weights from Funk and Kaufmann (forthcoming). Column 1 shows the share of zero wage changes between 2012 and 2014; column 2 shows the share of negative wage changes between 2014 and 2012; column 3 shows the share of employees receiving a nonzero payment; columns 4 and 5 show the average share in the employee's wage, and firm's payroll, respectively.

to annual Social Security register data (2012–2016) on income and labor market status. While the firm survey covers about 40 percent of all Swiss employees, the Social Security data cover the universe of the Swiss working age population. We match the datasets with an anonymized Social Security number.<sup>3</sup>

We use the firm survey to compute base wage changes between 2012 and 2014 and the share of various components in total compensation. We can compute a measure of the contractual wage because the survey comprises information on income, as well as the activity rate and working hours. In addition, we have information on various compensation components: bonuses, compensation for overtime work, compensation for Sunday/night work, and thirteenth-month payments. The latter is an additional payment equivalent to a monthly salary usually paid at the end of the calendar year. By definition, the size of this component corresponds to 1/12 of the base wage.<sup>4</sup>

To measure the allocative effects of base wage rigidities, we use income and information on labor market outcomes from Social Security data. The data include all sources of income of all occupations subject to Social Security charges. In addition, we observe individuals

even if they are not working. We can therefore construct an indicator variable that equals unity if the individual is working (that is, receives an income from employment or self-employment). In addition, we can construct an indicator variable that equals unity if the individual is unemployed (that is, receives a payment from the unemployment insurance). Also, we can construct the individuals' annual total and employment income.<sup>5</sup>

## II. Descriptive Statistics

Base wages are the most downward rigid compensation component (see columns 1 and 2 in Table 1). Of the five elements of compensation listed in the left-most column, base wages are the most likely to exhibit zero change and the least likely to exhibit negative change. The thirteenth-month payment is slightly less downward rigid. This is what we would expect because a base wage reduction automatically leads to a reduction in the thirteenth-month payment. Apparently this component may be cut even if the base wage remains unchanged.<sup>6</sup> Other wage components are more downward flexible. Bonuses, overtime payments, and compensation for Sunday/night work fall for more

<sup>3</sup>The data stem from the Swiss Federal Statistical Office and the Central Compensation Office (see SFSO 2020; CCO 2021). The data is confidential and the matching requires formal consent of the SFSO and CCO. We describe in the online Appendix how it can be obtained.

<sup>4</sup>Rarely, Swiss employees get an additional fourteenth-month payment.

<sup>5</sup>This is not possible using the firm survey for four reasons: we only have biennial data; the survey only covers employees; the survey may miss multiple occupations of the same individual; the survey comprises only employment income.

<sup>6</sup>For example, a firm may remove the thirteenth-month pay from the employment contract.

than 50 percent of the employees. In addition, the share of zero changes is smaller than for the base wage.

The base wage is the most relevant compensation component. Most employees receive a base wage and a thirteenth-month payment (column 3). Downward flexible components are less frequent. Only 32 percent of employees receive a bonus payment. Compensation for overtime and Sunday/night work is even less common. In addition, the base wage is economically more important than downward flexible components. The base wage accounts, on average, for 91 percent of the total wage (column 4). Bonuses and other irregular payments account only for 2 percent or less of the total wage. The results remain unchanged if we compute the average share in firms' total payroll (column 5).<sup>7</sup>

### III. Allocative Effects

Do downward flexible compensation components serve as a margin of adjustment to mitigate the allocative effects of downward rigid base wages?<sup>8</sup> We answer this question using a difference-in-differences approach, comparing employees with base wage freezes in 2014 (treatment group) to those with small wage cuts (control group). The treatment group comprises employees with base wage growth rates smaller than 0.02 percent in absolute size. The control group comprises employees with base wage growth rates between -0.5 percent and -0.02 percent. The baseline model reads:<sup>9</sup>

$$(1) \quad y_{i,t} = \alpha_j \sum_{j \neq 2014} \mathbf{1}\{t = j\} \times \text{Freeze}_i \\ + \text{Controls} + \varepsilon_{i,t}.$$

We saturate the model with time dummies for every year except 2014 ( $\mathbf{1}\{t = j\}$ ), where the dummy equals unity if  $j = t$ . Then, we interact

<sup>7</sup>In the online Appendix, we show that the results hold qualitatively for 2016 as well.

<sup>8</sup>In the online Appendix, we show that after the Swiss franc shock the share of zero changes increases for the base wage, while it falls for downward flexible wage components. This suggests that these components were indeed more flexible when an adverse shock hit the economy.

<sup>9</sup>The online Appendix comprises a full description of the model.

these time dummies with the base wage freeze dummy. The control variables include dummies for wage cuts larger than 0.5 percent in absolute size, dummies for wage increases, firm dummies, and dummies for a range of employee characteristics; all these dummies are interacted with time dummies. We also include employee fixed effects. Finally,  $\varepsilon_{i,t}$  denotes an error term.

In the baseline model,  $\alpha_j$  measures the average difference between employees with downward rigid (treatment group) and downward flexible (control group) base wages in period  $j$  relative to 2014. We then extend the model by interacting the wage freeze dummy with compensation-type dummies in 2014. In the interaction model, the main effects measure the average difference between the treatment and control groups for employees with 100 percent base wage payments; meanwhile, the interaction coefficients measure whether alternative compensation schemes change the outcomes compared to employees with 100 percent base wages.

The upper panels of Figure 1 show the impact on the probability of working and unemployment in 2016.<sup>10</sup> Overall, downward rigid base wages lead to a 1 percentage point decline in the probability of working (main effects, square). In the interaction model, the probability of working falls more strongly by 2 percentage points (main effects, circle). Recall that in the interaction model the base category corresponds to employees with 100 percent base wage payments. Therefore, the estimates suggest that alternative compensation schemes mitigate the allocative labor market effects of base wage rigidities. The interaction effects for bonuses are indeed significantly positive. The larger the bonus, the larger the mitigation. The other compensation components, except overtime payments, show a similar mitigating effect. Similarly, the probability of being unemployed increases by 1 percentage point in the baseline model. For employees with 100 percent base wage the probability increases by 2 percentage points. Also, for the interaction effects a similar pattern emerges as for the probability of working.

The lower panels of Figure 1 show the estimates for income and employment income (in

<sup>10</sup>The online Appendix shows the effects for 2015, as well as tables with the coefficients and standard errors.

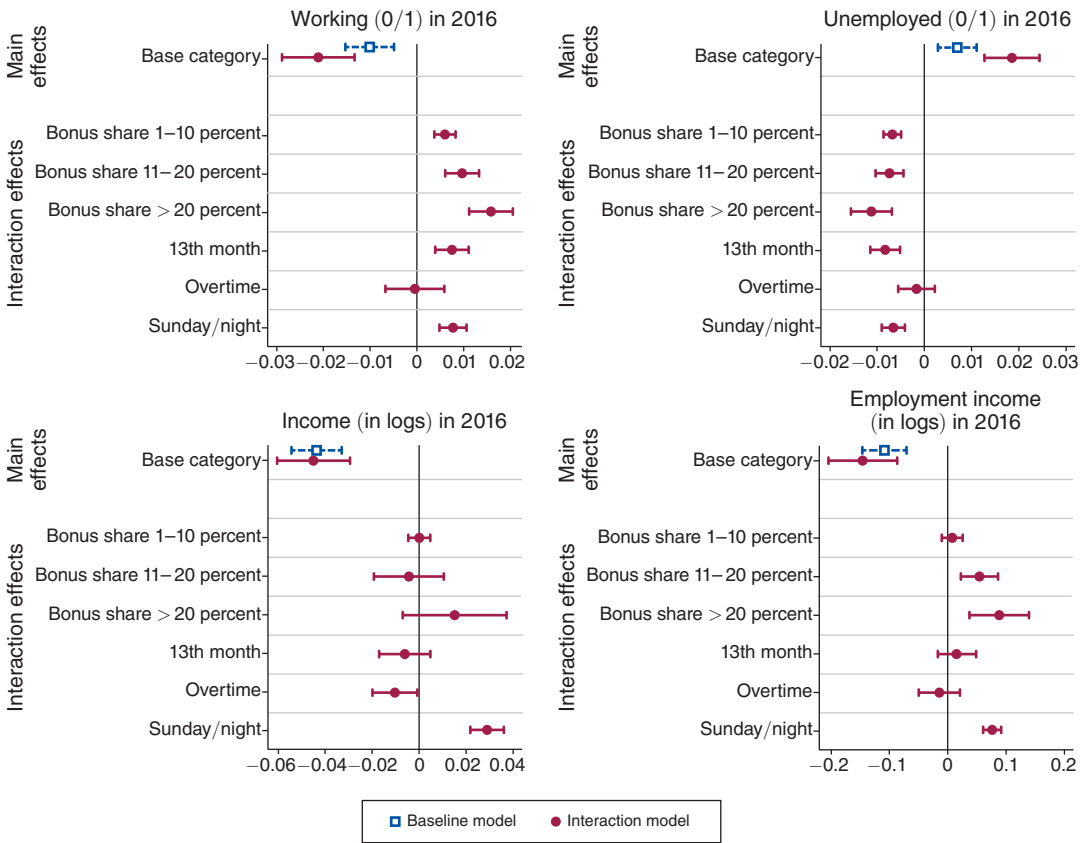


FIGURE 1. EFFECTS OF RIGID BASE WAGES IN 2016

Notes: This figure displays the average difference in the probability of working (employed and self-employed), being unemployed, as well as income and employment income between employees with wage freezes and small wage cuts in 2014. The first row gives the effects on the base category (main effects). In the baseline model, this corresponds to all employees with wage freezes (squares, dashed lines). In the interaction model, this corresponds to employees with wage freezes and 100 percent base wage payments (circles, solid lines). The interaction effects measure the difference to the base category. Ninety-five percent confidence intervals shown as horizontal lines (standard errors clustered according to unique values in the base wage growth distribution in 2014).

logs). The main effects on income are virtually identical in the two models (around -4 percent). This suggests that alternative compensation schemes do not mitigate the allocative effect on income. This interpretation is supported by the observation that, for most compensation schemes, the interaction effects are not statistically significantly different from zero. The effects are larger in absolute size when using employment income (around -10 percent). In addition, large bonus payments have a significantly mitigating effect. The main difference between income and employment income are that some individuals receive unemployment

benefits. The larger differences for employment income therefore likely reflect that individuals with rigid base wages and no downward flexible wage components are more likely to lose their job. For total income, this effect is not visible because unemployment benefits partly offset the decline in employment income.

#### IV. Conclusions

Although base wages are downward rigid, the literature has documented that alternative compensation schemes allow for cuts of the total wage in economic downturns. We find

that bonuses and other downward flexible compensation schemes indeed mitigate the allocative labor market effects of downward rigid base wages. However, these compensation schemes are not sufficient to fully offset the allocative effects of downward rigid base wages.

Our findings are relevant when calibrating monetary macroeconomic models for policy analysis. The data suggest that employees' total wages are downward flexible. This does not imply, however, that downward nominal wage rigidities are irrelevant. Rather, if downward flexible compensation accounts only for a small fraction of total compensation, base wage rigidities still have relevant allocative effects on labor market outcomes although total wages often decline.

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