Wages and the Value of Nonemployment*

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Abstract

Nonemployment is often posited as the outside option in macroeconomic models with wage bargaining and in models of labor market monopsony. The value of this state is therefore a fundamental determinant of wages, and in turn labor supply and job creation. We measure the effect of the value of the nonemployment option on employed workers' wages. Our variation in nonemployment values arises from four large reforms of UI benefit levels in Austria, which we study quasi-experimentally by measuring wage responses in existing and new jobs using administrative data. Our analysis reveals a precisely estimated, low sensitivity of wages to UI benefit levels ranging between 0 and 5 cents on the dollar. This insensitivity holds even among workers with a priori low bargaining power and for workers with low labor force attachment, in areas of high unemployment, with high predicted unemployment duration, and among recently unemployed workers, and despite high take-up and eligibility – factors that either eliminate confounders or ought to render wages even more sensitive to nonemployment values. The insensitivity holds for job stayers and job switchers and persists when we zoom out to the firm or industry as the bargaining unit. This insensitivity of wages to the nonemployment option presents a puzzle to widely used bargaining protocols in macroeconomics and implies that nonemployment scenarios may not constitute a relevant threat point in bargaining. Our evidence supports wage setting mechanisms that largely insulate wages from the value of nonemployment.

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1 Introduction

How does the worker's value of nonemployment affect wage setting? A prominent view in macroeconomics and labor economics is that the nonemployment value, which includes unemployment insurance benefits, stigma, and potential utility from leisure, constitutes workers' outside option in wage bargaining. The value of nonemployment is thus a core determinant of equilibrium employment levels.[1] The view that nonemployment values affect wages also help explain aggregate wage fluctuations such as the cross-sectional wage curve and the aggregate Phillips curve, since high unemployment weakens workers' threat point, nonemployment.[2] This framework has shaped policy debates such as the wage pressure channel of unemployment insurance.[3] The value of nonemployment is also a cornerstone scaling the equilibrium wage distribution in modern wage posting models.[4] The theoretical sensitivity of wages to fluctuations in the value of unemployment also determines the capacity of macroeconomic models to generate realistic employment fluctuations.[5] Yet, there exists no direct empirical estimate of the sensitivity of wages to the value of nonemployment.

We provide a causally identified micro-estimate of the dollar-for-dollar sensitivity of wages to the value of nonemployment. To obtain money-metric variation in the non-employment value, we exploit quasi-experimental reforms in unemployment insurance benefit (UIB) levels. Our natural benchmark is canonical Nash bargaining, where, in the simplest static or myopic version, wages are the average of the job's inside value (e.g. productivity) and the worker's outside option (nonemployment, i.e. UIBs plus any other component), weighted by worker bargaining power ϕ:

$$\text{Wage} = \phi \times \text{Productivity} + (1-\phi) \times \underbrace{\text{Nonemployment Value}}_{\text{UIBenefits} \ + \ \text{Other}}$$

Shifts in the outside option such as from UIBs should pass through into wages by one minus worker's bargaining power, such that wages move one to one for workers with low bargaining power. This prediction holds across a broad set of model refinements of bargaining models. While our benchmark model is bargaining, the prediction extends to alternative models such as wage posting, where the value of nonemployment shifts employed and unemployed workers' wages also to the right, due to workers' increase in reservation wages.

[1] Wage bargaining with nonemployment outside options is e.g. featured in Pissarides (2000), Shimer (2010), Hagedorn and Manovskii (2008), Chodorow-Reich and Karabarbounis (2016), and Ljungqvist and Sargent (2017).

[2] Ravenna and Walsh (2008) and Christiano et al. (2016) integrate wage bargaining with nonemployment outside options into New Keynesian models. Empirical work linking wages with aggregate or local unemployment or nonemployment values includes Beaudry and DiNardo (1991), Blanchflower and Oswald (1994), Hagedorn and Manovskii (2013), or Chodorow-Reich and Karabarbounis (2016).

[3] Pissarides (2000), Krusell et al. (2010), Hagedorn et al. (2013) and Chodorow-Reich et al. (2018) examine the wage pressure channel of UI.

[4] See, e.g., Manning (2011) or Burdett and Mortensen (1998) for the effect of the nonemployment flow value on wages in waste posting models.

[5] See, e.g., Shimer (2005), Hall and Milgrom (2008), and Hall (2017).

We document that real-world wages appear *insensitive* to sharp increases in workers' nonemployment values. Specifically, our estimates for the sensitivity of wages to the value on nonemployment range from 0.00 to 0.05, such that a \$1 increase in workers' nonemployment value increases wages by at most \$0.05. This insensitivity of wages to the nonemployment value presents a puzzle to leading bargaining models, unless one is willing to believe that workers have close to *full* bargaining power ($\phi = 0.95$ or higher, in a static or myopic bargaining setting), an interpretation empirically rejected by existing small estimates of inside value effects on wages (0.1-0.2). We juxtapose these estimates with our implied bargaining power estimates in Figure 1. Instead of full worker bargaining power, our interpretation is that nonemployment is not the relevant outside option in wage bargaining.

The specific setting of our study is a unique set of four large reforms that generated quasi-experimental variation in UI benefit levels in Austria, where UI eligibility and take-up are uniquely high.[6] The reforms occurred in 1976, 1985, 1989 and 2001 and increased benefits for subsets of workers, e.g., by as much as 28% in 1985.[7] The impact of the reforms were sharply differentiated by workers' *previous* salary (the UI reference wage that determines UIBs in the event of a UI claim), permitting a difference-in-differences design comparing wage growth of workers affected by the reform (treatment group) to those of their unaffected peers (control group). We use administrative data on workers and firms covering 1972 through today, leveraging the full set of UI reforms and tracing workers through various labor force statuses and transitions, with daily information on UI claims and benefit receipts, as well as wages.

Besides the unique set of UIB reforms, the Austrian UI system is a particularly suitable setting to obtain variation in nonemployment values for institutional reasons. First, Austrian unemployment insurance shifts the nonemployment value for most workers. Conditional on a separation, we document that around 60% of workers receive UI due to broad eligibility and high take-up, likely due to mandatory registration (for continuity of health insurance coverage) and because of long unemployment spells. Second, Austrian workers who *quit* are eligible for benefits – crucial for UI to indeed shift workers' threat points.[8] Third, Austrian UI does not feature experience rating.

[6] Potential UI benefit duration is more commonly studied but would not provide a clear money metric and moreover vastly heterogeneous in workers' expected duration of unemployment. Hagedorn et al. (2013) include an analysis of group-level aggregates of wages to investigate the effects of duration extensions on wages in the United States. They do not quantitatively interpret this effect in a bargaining framework.

[7] Reforms were large shifts in the real maximum benefit level (1985) or sharply increased the replacement rates in low parts of the earnings distribution. Replacement rates refer to the ratio of unemployment benefits to gross earnings before unemployment. To our knowledge, only the 1989 reform has been studied, with a focus on unemployment duration (Lalive et al. (2006)).

[8] The only differentiation between quits and layoffs in the UI system is a 28-day wait period with subsequently *full* benefit duration and levels. In other OECD countries wait periods are considerably longer, such as three months in Germany. Quitters in the United States are never eligible for UI benefits. Rothstein (2011) exploits the ineligibility of U.S. quitters for unemployment insurance to estimate the effect of potential benefit duration extensions on unemployment spell durations. Hagedorn et al. (2013) discuss potential de-facto UI eligibility of quitters in U.S.

We analyze the reforms nonparametrically and in a regression framework. First, we present transparent scatter plots for various cross sections of *employed* workers differentially treated by each respective reform. On the x-axis, we sort those workers by their UI reference wage, a pre-determined lagged wage that assigns the benefit changes to workers. On the first y-axis, we plot the reform-induced change in UIBs, which exhibits the sharp between-worker variation we exploit. On the second y-axis, we present wage growth before and after the reform. As a benchmark, we also plot the *predicted* effect on wage growth (UIB growth times one minus worker bargaining power calibrated to 0.05–0.2 implied by rent sharing estimates).[9] *If indeed nonemployment is workers' outside option in wage bargaining*, the large UIB treatments would predict clearly visible wage effects of multiple percentage points, tightly scaling the shape of the reform-induced benefit changes. A visual inspection of the raw data does not reveal any such large wage increases, in any of the reforms we examine. Even after two full years, the wage gradients remain parallel to pre-reform years.

Next, we formally provide a quantitative estimate of the sensitivity of wages to UI-induced shifts in the nonemployment value in a regression-based difference-in-differences analysis. The regression-based estimates confirm a tight range for the sensitivity between \$0.00 and at most \$0.05. Here, we also formally test our identification assumptions with placebo tests and can additionally include a rich set control variables. By including firm-by-year effects, for instance, we can leverage sharp variation in nonemployment value shifts between workers within the same firm. While our main specification features treatment and control workers that are currently employed, the insensitivity extends not only to stayers, but also to workers switching employers with and without intervening nonemployment spells, implying that wages even of new hires and in new employment relationships are insensitive to the nonemployment value.

We also conduct robustness checks and subsample analyses motivated by theory and potential identification concerns and extend the analysis to alternative models. The insensitivity extends across worker and firm subgroups, and states of the business cycle. It cannot be explained by wage stickiness, limited salience, limited eligibility, works council or union bargaining, or most workers using outside job offers as a threat point. Our robustness checks also rule out offsetting composition or productivity effects from attrition (turnover) or efficiency wage mechanisms.

First, standard wage stickiness cannot explain the findings because wages remain unresponsive even after two or three years, and because as our reforms increase generosity and should entail wage *increases*.[10] When we split the firm sample by revealed dispersion in worker-level wage

[9] Empirical examples include Abowd and Lemieux (1993) who find an elasticity of around 0.2; Card et al. (2018) provide a meta study of evidence from a variety of settings and propose 0.05–0.15 as a reduced-form elasticity that we scale into a bargaining power upper bound in Appendix E and visualize in Figure 1.

[10] Adjusting for wage stickiness would have only halved the observed response in year one because half of wage contracts appear to reset each year (see, e.g., Barattieri et al. (2014) for the United States, and Sigurdsson and Sigurdardottir (2016) for Iceland, or a meta study of new and incumbent workers Pissarides (2009)). Relatedly, Schmieder et al. (2016) and Nekoei and Weber (2017) document zero or small reemployment wages among the unemployed from potential benefit duration changes, likely due to selection rather than bargaining. Finally,

growth, even firms with flexible wage policies do not adjust wages for the workers with improved nonemployment options. Second, perhaps nonemployment is workers' threat point in bargaining, but actors do not perceive UI to be as part of that value, due to limited knowledge, attention or salience. However, our result extends even to workers at higher future risk of becoming unemployed or UI take-up or with recent UI receipt, who are thus plausibly more aware of the UIB schedule (see Lemieux et al. (1995) and Lemieux and MacLeod (2000)). Third, the finding of a low sensitivity extends to various worker subgroups with a priori lower bargaining power and thus higher wage–outside option sensitivity. While we find evidence consistent with slightly larger wage effects for women compared to men, in line with evidence on lower bargaining power among women (see Card et al. (2015)), the effect size remains small relative to a theoretical benchmark with nonemployment as bargaining outside option. Fourth, we document that reform-induced increases in benefit duration rather than levels do not increase wages among incumbents either.

Fifth, perhaps real-world wage setting follows the bargaining benchmark at a higher level, such as the *firm or industry level*, due to formal collective bargaining, or firm-level wage policies.[11] We therefore consider wage responses to firm or industry averages of the benefit changes, but these estimates do not yield larger effects than the individual levels. Finally, while Austria is heavily unionized, it leaves substantial room for idiosyncratic deviation from the collective wage floors: actual wages are more than a third higher than the wage floors set by central bargaining agreements (Leoni and Pollan (2011)). And, our latest reform, 2001, occurred in a time period with substantially more scope for firm-level or idiosyncratic negotiations.

Sixth, perhaps most employed workers wield other job offers as their outside options, rather than nonemployment, a mechanism featured in model extensions to on-the-job search and job ladders (e.g. Postel-Vinay and Robin (2002), Cahuc et al. (2006), Altonji et al. (2013), and Bagger et al. (2014)). Still, in those models, *recently reemployed* workers – for lack of other job offers – resort to nonemployment as the (only) outside option – and therefore renegotiate wages upwards when UI benefits increase, just as in our benchmark model. In the data, we do not find clear support for larger wage sensitivity among recently unemployed workers and workers transitioning through unemployment during the reform periods, suggesting that nonemployment does not appear to serve as the outside options even among those workers.

In conclusion, the insensitivity of wages to UI-induced shifts in the nonemployment value indicates that the nonemployment scenario is not the relevant outside option in wage bargaining.

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the empirical literature on inside-option rent sharing documents contemporaneous wage effects for incumbent workers, in one instance *only* for incumbent workers (Kline et al. (2017)).

[11] Saez et al. (2017) find that incidence of targeted payroll tax cuts does not pass through into treated worker's wages idiosyncratically, but show up as broad-based firm-level rent sharing. By contrast, worker-level wages *can* reflect some idiosyncratic factors, such as group-specific marginal product shifts due to worker exits (Jäger (2016)). A long literature has documented cross-sectional wage differentiation between observationally similar workers even within the same firm (Abowd et al. (1999)). Carneiro et al. (2012) documents cyclical within-firm wage differentiation between new and incumbent workers in the same jobs.

The evidence therefore favors models of wage setting where wages are insulated from the nonemployment value. Alternative candidates consistent with our evidence include alternative bargaining protocols (e.g. Hall and Milgrom (2008)).

Alternatively, the evidence may be consistent with non-bargaining wage setting mechanisms that feature attenuated effects. However, survey evidence as well as rent sharing evidence suggests at least some scope for bargaining in real-world wage setting. Accordingly, we finally sort workers by proxies for the perceived prevalence of wage bargaining suggested by surveys (Hall and Krueger (2012) and Brenzel et al. (2014)), such as local unemployment and labor market tightness, or worker skill levels. Even in pockets of the Austrian labor market where actors are more likely to perceive wage bargaining to occur, wages still remain insensitive to the nonemployment value.

Moreover, while a calibration of the baseline wage posting model with pure wage dispersion (Burdett and Mortensen (1998)) features smaller wage sensitivity to UI, larger sensitivities emerge with richer models that match empirical wage distributions (e.g. with firm heterogeneity). And since we do not find evidence for workers undergoing unemployment spells to feature stronger sensitivity of wages to UI benefits, the insensitivity the nonemployment scenario for wage setting may constitute a puzzle to a broader set of wage setting models.

Outline. In Section 2, we discuss the role of nonemployment values in variants of wage bargaining models. We describe institutional details, the reforms, and the data in Section 3. In Section 4 presents our empirical design and main results. Section 5 adds a series of extensions such as subsample analyses and tests for group-level bargaining. In Section 6 we discuss implications of our findings for models of wage setting. We conclude in Section 7.