Reservation Wages and Labor Supply*

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Abstract

Survey measures of the reservation wage may reflect both the consumption-leisure trade-off and job market prospects (the arrival rate of job offers and the wage distribution). We examine what a survey measure of the reservation wage reveals about an individual's willingness to trade leisure for consumption. To this end, we combine the reservation wage measure from a large labor market survey with the reservation wage for a one-hour job that we elicit in an online experiment. The two measures show a strong positive association. For unemployed individuals, the experimental reservation wage increases on average by around one Euro for every Euro increase in the survey measure. For employed individuals, the association between the two measures is weaker and depends on their occupation-specific risk of unemployment. We show that these results are robust to selection into the experiment, and that demographic variables have a similar influence on both reservation wage measures.

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1 Introduction

The reservation wage is defined as the smallest wage at which a worker is willing to accept a job. It determines individual labor market behavior and is a core concept in labor economics. Obtaining measures of the reservation wage is thus a central issue for empirical research. Table 1 below offers an overview of labor market surveys and administrative data that contain measures of the reservation wage. They typically use a variant of the question: "What is the lowest wage you would be willing to work for?" Such measures are used to study a variety of important public policy questions, for example, the impact of unemployment insurance benefits on labor supply (e.g., Feldstein and Poterba 1984, DellaVigna and Paserman 2005, Arni 2017, Le Barbanchon et al. 2019), the influence of personal characteristics on reservation wages (e.g., Pannenberg 2010, Caliendo et al. 2017), the evolution of reservation wages with the duration of an unemployment spell (Krueger and Mueller 2016), or the dispersion of nonwage job values (Hall and Mueller 2018).

[Insert Table 1 about here]

An important aspect of the reservation wage, which received limited attention so far, is that it captures two different trade-offs: one in the context of labor supply and one in the context of job search. To illustrate, consider the following example: A young professional has little regard for leisure, but skills that are in high demand. If she searches for a job, she gets many job offers that all pay around 30 Euros per hour. When asked the reservation wage question from above – What is the lowest wage you would be willing to work for? – and she indicates 30 Euros, this answer reflects her good job market prospects. Rejecting an offer of, say 20 Euros per hour, has little consequences for her as she will get a better offer quickly. Next, consider the same person with different job market prospects. She still has little regard for leisure, but gets job offers only very infrequently. When now asked the reservation wage question, she may indicate only a low value, say 10 Euros. Rejecting any offer implies for her an extended period of unemployment. A low reservation wage now reflects her low valuation of leisure. Therefore, the reservation wage may capture different aspects of an individual's decision to accept a job, depending on the job context.

The dual role of the reservation wage is part of the standard models in labor economics. Indeed, in their labor economics textbook, Cahuc et al. (2014) introduce the concept of the reservation wage twice. In the section on labor supply (Chapter 1), the reservation wage indicates how an individual chooses optimally between consumption and leisure. It then equals the marginal rate of substitution between leisure and consumption. In the section on job search (Chapter 5), the reservation wage captures how a worker decides between accepting a certain

job immediately, or waiting a little longer until (hopefully) a better offer arrives. It then also depends on the distribution of wages and the arrival rate of job offers.

In this paper, we examine what a standard, non-incentivized survey measure of the reservation wage reveals about an individual's willingness to trade leisure for consumption. To isolate labor supply from job market considerations, we elicit the reservation wage for a one-hour job in an experiment, and correlate this experimental reservation wage with a reservation wage measure from a large, representative panel survey. Our results will help us to better understand which behavioral motivations survey reservation wage measures capture, and how we can interpret fluctuations in such measures.

To formalize our intuition from the example above, we first examine a simple job search model. In this model, an individual's reservation wage w^* depends both on her preferences regarding the leisure-consumption trade-off and on her job market prospects as captured by the arrival rate of job offers and the wage distribution. We consider a heterogeneous population of workers who differ in their preferences and job market prospects. If the arrival rate of job offers is small, w^* mostly reflects the consumption-leisure trade-off so that it is closely associated with a hypothetical "no-search reservation wage" w^{ns} that abstracts from job market prospects (as our experimental reservation wage measure). The job acceptance decision is then mostly about working versus remaining unemployed. In contrast, if the arrival rate of job offers is large, differences in w^* reflect differences in the distribution of wage offers, so that the link between w^* and w^{ns} is weak. That is, if an individual gets many offers, the job acceptance decision is about choosing a given offer or some future offer.

The survey reservation wage that we use in our analysis originates from the survey "Panel Study of Labour Market and Social Security" (henceforth PASS) conducted by the research institute of the German Federal Employment Agency. This survey contains both a random draw from the German population and a random draw of unemployed individuals from the unemployment register. Survey participants from the second sample are long-term unemployed and receive "type II" unemployment benefits.[1] PASS elicits reservation wages for both employed and unemployed individuals through a series of survey questions that are asked in the context of job search.

To obtain an experimental reservation wage that abstracts from job market prospects, we invited PASS participants to take part in an online experiment in which we offer a one-hour job. The job is to digitalize research documents. It can conveniently be completed from home within seven days after accepting it. To elicit subjects' reservation wage for this job in an incentive-compatible manner, we applied the Becker-DeGroot-Marschak (BDM) mechanism,

[1]These benefits are a means-tested welfare payments for individuals capable of working. They are paid out when the non-means-tested wage-related "type I" unemployment benefits expire after 6 to 12 months.

a standard tool in experimental economics to elicit reservation values. Since this job was short-term and a one-time opportunity, an individual's job market prospects do not matter for our experimental measure of the reservation wage.

We begin our empirical analysis with an estimation of the correlation between the survey and experimental reservation wage without controlling for demographics and job context. On average, there is a strong and positive association between the two measures: The experimental reservation wage increases by about 0.49 Euros if the survey reservation wage increases by one Euro. The association of the two reservation wage measures differs significantly between employed and unemployed individuals. For unemployed individuals, there is roughly a one-to-one relationship between survey and experimental reservation wage. In our main specification, a one Euro increase in the survey reservation wage increases the experimental reservation wage by 1.16 Euros. Thus, for long-term unemployed individuals, the survey reservation wage is indeed a good measure for the consumption-leisure trade-off. For employed individuals the association of the two measures is weaker. In our main specification, the experimental reservation wage increases only by 0.37 Euros for every Euro increase in the survey reservation wage.

Next, we analyze the association between the two reservation wage measures when controlling for demographics as well as employment-related information, i.e., the number of working hours and net income. This allows us to examine what we learn *additionally* from a survey reservation wage about one's willingness to give up leisure for consumption if we already have basic demographic and employment-related information about this individual. For unemployed individuals, including controls hardly changes the association between the two reservation wage measures. For employed individuals, the association becomes small and statistically insignificant. However, this again changes if we take unemployment risk into account. In line with our predictions, we find that for employed individuals with high unemployment risk the association between the two reservation wage measures is strong and significant. Their experimental reservation wage increases by 0.40 Euros for every Euro increase in the survey reservation wage. In contrast, for employed individuals with low unemployment risk this association is insignificant.

Our results suggest that a survey reservation wage measure is informative about an individual's consumption-leisure trade-off, depending on her job market situation. For long-term unemployed individuals, it reflects this trade-off quite well. For employed individuals with high unemployment risk, it is also informative, while for employed individuals with low unemployment risk it does not contain information about labor supply that goes beyond what is captured in demographics and employment-related variables. These results imply that the interpretation of a reservation wage for a certain individual changes when the job market prospects of this

individual change over time.

Importantly, our data allow us to test whether our estimates are robust to different layers of selection into the experiment. We apply the Heckman selection model and inverse probability weighting to show that selection is unlikely to bias our results. Moreover, we show that correlations of both reservation wage measures with observable characteristics have the same direction and are similar in magnitude.

The rest of the paper is organized as follows. In Section 2, we relate our contribution to the previous literature. In Section 3, we analyze a simple model of job search and derive testable predictions about the relationship of different types of reservation wages. Section 4 describes the survey and experiment in detail. In Section 5, we present our main results and examine selection into the experiment. Section 6 concludes. The appendix contains the experimental instructions as well as additional robustness checks.

2 Related Literature

Our paper contributes to several strands of experimental and labor economics. In the following, we briefly describe its relation to the literatures on the evaluation of reservation wages, experimental elicitation of reservation wages, as well as on the association between survey and experimental measures of behavior.

Evaluation of reservation wages. This paper is to the best of our knowledge the first that correlates a survey reservation wage and an incentivized measure of the reservation wage. The only other paper that validates a survey reservation wage is Krueger and Mueller (2016). For a sample of unemployed individuals, they show that the job acceptance rate is larger when the offered wage is above the reservation wage than when it is below. Our paper differs in two important aspects. First, the incentivized variable in our study is not job acceptance, but a reservation wage. This allows for a comparison of two very similar measures. Second, our data set contains both employed and unemployed individuals, so that we can test how the employment status affects the association between the two reservation wage measures.

Experimental elicitation of reservation wages. We also contribute to the literature that experimentally elicits reservation wages. Several papers derive reservation wages from (repeated) job acceptance decisions in experiments or quasi-natural experiments. Falk et al. (2006) study to what extent fairness concerns shape the reservation wages derived from job acceptance decisions. Ariely et al. (2008) vary the meaning of an experimental task and elicit the reservation wage for this task by measuring output and lowering the piece rate at each produced unit. Chen

et al. (2020) exploit exogenous variation in expected wages in a natural field experiment to estimate the reservation wages of Uber drivers at varying times of the day.

An alternative method to elicit reservation wages is the Becker-deGroot-Marschak mechanism. In contrast to the repeated offer of wages, this method elicits incentive-compatible reservation wages in one step by creating random wage offers and explicitly asking individuals to indicate their reservation wage before they know the randomly drawn wage. Brown et al. (2011a) use the BDM mechanism to elicit dynamic reservation wages in an experimental search environment. Burbano (2016) applies the BDM mechanism and shows that an employer's corporate social responsibility activities significantly reduce reservation wages. Haushofer and Fehr (2019) use the BDM mechanism in an experiment to study the impact of income shocks on discounting. Our paper is the first that combines the experimental reservation wage from a BDM mechanism with a standard, non-incentivized survey reservation wage.

Survey and experimental measures of behavior. We also contribute to a growing literature that links survey to experimental data. Dohmen et al. (2011) validate a survey item that measures subjects' willingness to take risks (which is an item of the GSOEP) using paid lotteries. This allows them to study the link between risk preferences and gender, age, height, and parental background. Vischer et al. (2013) show that responses to a survey item that measures patience predicts choice behavior in an incentivized task that involves intertemporal trade-offs. Falk et al. (2016) validate survey items for risk-, time-, and social preferences using incentivized experiments, and Falk et al. (2018) apply these survey items to examine variation in economic preferences between countries. Moreover, a large literature on social preferences demonstrates that behavior in experimental games is correlated with behavior in the field (e.g., Rustagi et al. 2010). Our paper is the first that establishes such a link in the domain of labor supply.

3 Conceptual Framework

We consider a simple job-search model to study what we can infer from the reservation wage about how workers resolve the consumption-leisure trade-off. This model will generate predictions on how our different reservation wage measures are linked to each other. For convenience, we treat the demand side of the labor market as exogenously given and only examine the supply side. Let the worker's utility function be given by $U(C, \theta L)$, where C is consumption, L leisure, and θ a preference parameter that captures how important leisure is relative to consumption. This function is twice continuously differentiable and strictly increasing in both arguments. Denote by $U_C(C, \theta L)$ and $U_L(C, \theta L)$ the derivative of the utility function with respect to the first and second argument, respectively.

Initially, the worker is unemployed. She potentially gets job offers in periods $t = 1, 2, ...$; in a given period t, she gets one job offer with probability p, and no job offer with probability $1 - p$. The job offer in period t (if there is one) specifies a wage w_t. If the agent accepts the job, she leaves the job market and earns w_t in period t and all subsequent periods $t + 1, t + 2, ...$; if she rejects, she remains unemployed and the situation recurs in period $t + 1$; the same happens if in period t she does not get a job offer. As long as the agent is unemployed, she consumes her unemployment benefits $b > 0$ and enjoys leisure $\bar{L}$ in each period, so that her flow utility equals $U(b, \theta\bar{L})$. After accepting an offer with wage w, she consumes w and enjoys leisure $\bar{L} - L^*$, so that her flow utility is $U(w, \theta(\bar{L} - L^*))$. Each job requires the same number L^* of working hours.[2] When the worker receives a job offer, the wage is drawn from a distribution $G_\xi(w)$. The parameter ξ denotes the worker's subgroup that determines her offer distribution (we will elaborate on this below). The support of this distribution is an interval $[w_L(\xi), w_H(\xi)]$ where $b < w_L(\xi) < w_H(\xi) < \infty$. $G_\xi(w)$ has a continuous density $g_\xi(w)$ that is strictly positive on this interval. Finally, the worker discounts future utilities with the discount factor δ.

We do not explicitly model the worker's search behavior. For the interpretation of our framework, the parameters δ and p are important as they capture the worker's labor market prospects. A worker with $\delta \approx 1$ and $p \approx 1$ gets job offers quickly, e.g., because her skills are in high demand. A worker with $p \approx 0$ gets job offers only infrequently, e.g., because there is little demand for her skills. For such a worker, declining a job offer implies in expectation a period of unemployment. In the following analysis, we contrast these two cases.

The reservation wage with and without search concerns. Consider any period t where the worker gets a job offer with wage w_t. The worker's total discounted utility from accepting the offer strictly increases in w_t, while the worker's total discounted utility from rejecting the offer is independent of w_t. Therefore, the worker's optimal strategy in period t is a cut-off strategy where for some value w^* the worker accepts the offer if and only if $w_t \geq w^*$, and rejects it if $w_t < w^*$. As long as the worker has not accepted any offer yet, the decision problem is the same in each period. Thus, the cut-off value w^* is time-independent and unique. This value is the worker's reservation wage.

We now derive the reservation wage. The total discounted utility from accepting wage w_t equals

$$U^{ac} = \frac{1}{1-\delta} U(w_t, \theta(\bar{L} - L^*)), \tag{1}$$

[2]Thus, we abstract from the intensive margin of labor supply. The assumption here is that jobs come with a certain required number of working hours that cannot be adjusted by the employee.

while the total utility from rejecting it when the reservation wage equals w^* is

$$U^r = U(b, \theta\bar{L}) + \delta[1 - p + pG_\xi(w^*)]U^r + \frac{\delta}{1-\delta}p(1 - G_\xi(w^*))\mathbb{E}_{G_\xi}[U(w, \theta(\bar{L} - L^*)) \mid w \geq w^*]. \quad (2)$$

The reservation wage w^* is implicitly defined by the indifference condition $U^{ac} = U^r$ when $w_t = w^*$. This indifference condition equals

$$U(w^*, \theta(\bar{L} - L^*)) = \frac{1-\delta}{1 - \delta + \delta p(1 - G_\xi(w^*))}U(b, \theta\bar{L}) + \frac{\delta p(1 - G_\xi(w^*))}{1 - \delta + \delta p(1 - G_\xi(w^*))}\mathbb{E}_{G_\xi}[U(w, \theta(\bar{L} - L^*)) \mid w \geq w^*]. \quad (3)$$

Note that the reservation wage depends both on the agent's utility when she remains unemployed, $U(b, \theta\bar{L})$, and on her expected utility from accepting a job when she continues searching and only accepts wages weakly above w^*, $\mathbb{E}_{G_\xi}[U(w, \theta(\bar{L} - L^*)) \mid w \geq w^*]$. These two terms are weighted by a factor that depends on the discount factor δ and the probability of getting an offer above the reservation wage, $p(1 - G_\xi(w^*))$.

Suppose that the worker rarely gets a job offer so that $p \approx 0$. Her reservation wage is then largely determined by the comparison between her flow utility when working and her flow utility when remaining unemployed. We denote by $w^{ns}(\theta)$ the worker's (hypothetical) reservation wage when $p = 0$ so that search concerns are absent. In the following, we call it the "no-search reservation wage." It is implicitly defined by

$$U(w^{ns}(\theta), \theta(\bar{L} - L^*)) = U(b, \theta\bar{L}). \quad (4)$$

Next, consider a worker who gets many job offers so that $\delta \approx 1$ and $p \approx 1$. The first-order condition in (3) then implies that the worker's reservation wage is largely determined by the offers that she could get in the labor market (that is, the term in the second line of this equation). Specifically, we have $w^* \to w_H(\xi)$ for $\delta \to 1$ and $p \to 1$, i.e., the agent waits until she gets an offer that is close to the maximum wage of her subgroup. Note that the flow utility when unemployed and the preference parameter θ then have little influence on the agent's reservation wage.

Heterogeneity. We examine what we can infer from the reservation wage w^* about labor supply in a setting where job market prospects do not matter, as captured by the no-search reservation wage w^{ns}. To this end, we consider a heterogeneous population where workers exhibit varying preference parameters θ and subgroups ξ. Subgroups capture the wage distribution for different occupations or productivity levels. Let $w^*(\theta, \xi)$ be the reservation wage of a worker with

preference parameter θ and subgroup ξ. The preference parameter is distributed on the interval $[\theta_L, \theta_H]$ with $0 < \theta_L < \theta_H < \infty$. The subgroup is distributed on the interval $[\xi_L, \xi_H]$ with $0 < \xi_L < \xi_H < \infty$. Let $F(\theta, \xi)$ be the joint distribution function where the density $f(\theta, \xi)$ is strictly positive on its support. The subgroup parametrizes the distribution over wage offers: we have $w'_L(\xi) = w'_H(\xi) = 1$ and $g_{\xi'}(w) = g_\xi(w + \xi' - \xi)$ for all ξ, ξ' with $\xi < \xi'$. In words, an increase in ξ shifts the density over wage offers to the right. We assume that second- and cross-derivatives in the utility function $U(C, \theta L)$ are small relative to the first derivatives, such that $w^{ns}(\theta)$ strictly increases in θ on the interval $[\theta_L, \theta_H]$. From implicit differentiation on (4) we then get[3]

$$\frac{dw^{ns}(\theta)}{d\theta} \approx \frac{U_L(w^{ns}(\theta), \theta(\bar{L} - L^*))L^*}{U_C(w^{ns}(\theta), \theta(\bar{L} - L^*))} > 0. \tag{5}$$

Thus, a higher preference for leisure leads to a higher no-search reservation wage. Consider first a group of workers that rarely gets job offers, $p \approx 0$. For these workers, the subgroup ξ has a negligible effect on the reservation wage $w^*(\theta, \xi)$. Hence, we obtain a close association between the reservation wages with and without search concerns, so that

$$\frac{d\mathbb{E}_F[w^{ns}(\theta) \mid w^*(\theta, \xi) = w^*]}{dw^*} \approx 1. \tag{6}$$

In Figure 1 below, this relationship is represented by the solid gray line. Next, we examine two extreme cases for workers who get many job offers so that $\delta \approx 1$ and $p \approx 1$. First, consider the case with no heterogeneity in the subgroup dimension; all workers have subgroup $\tilde{\xi}$. From the first-order condition in (3) we then get that the association between preference parameter θ and the reservation wage $w^*(\theta, \xi)$ is given by

$$\frac{dw^*(\theta, \tilde{\xi})}{d\theta} \approx \frac{1 - \delta}{1 - \delta + \delta p(1 - G_{\tilde{\xi}}(w^*))} \frac{U_L(w^{ns}(\theta), \theta(\bar{L} - L^*))L^*}{U_C(w^{ns}(\theta), \theta(\bar{L} - L^*))}. \tag{7}$$

In combination with (5), we obtain

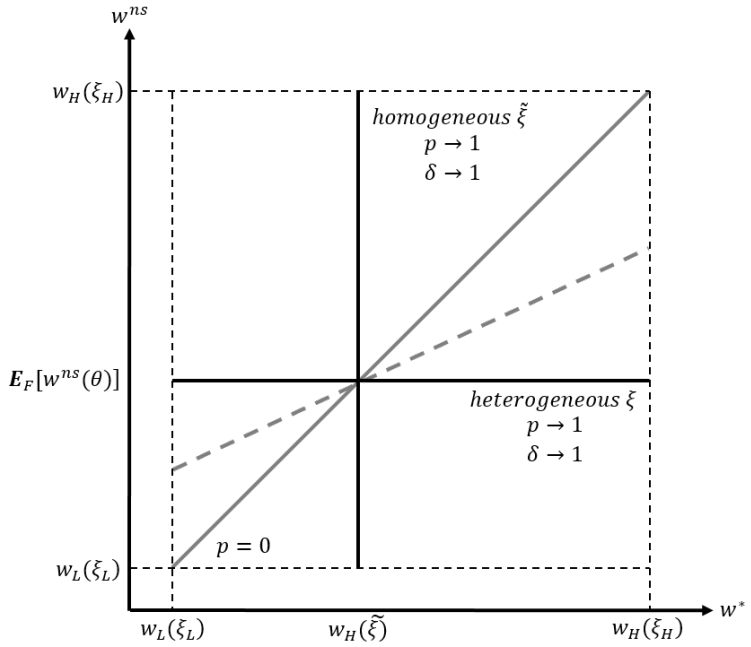
$$\frac{dw^{ns}(\theta)}{dw^*(\theta, \tilde{\xi})} \approx \left[\frac{1 - \delta}{1 - \delta + \delta p(1 - G_{\tilde{\xi}}(w^*))}\right]^{-1}. \tag{8}$$

When workers get many offers, $\delta \approx 1$ and $p \approx 1$, they all have roughly the same reservation wage $w^*(\theta, \tilde{\xi}) = w_H(\tilde{\xi})$, but differing no-search reservation wages $w^{ns}(\theta)$; see the black vertical line in Figure 1. Intuitively, when all workers are in the same subgroup, a small variation in the reservation wage w^* then indicates a large variation in the preference parameter θ and hence in labor supply as measured by the no-search reservation wage.

Second, consider the case where there is some heterogeneity in the subgroup dimension. If

[3] In Appendix A.1, we provide all formal details and derive the equations (5) and (7).

Figure 1: Association between reservation wages and labor supply



workers get many offers, $\delta \approx 1$ and $p \approx 1$, differences in the reservation wage $w^*(\theta, \xi)$ largely reflect income differences since $w^*(\theta, \xi) \approx w_H(\xi)$ for each θ, ξ. If there is no correlation between subgroup ξ and preference parameter θ, the reservation wage is uninformative about how workers resolve the consumption-leisure trade-off; the average no-search reservation wage is then constant among subgroups, see the horizontal black line in Figure 1.

For intermediate values of p and δ, the association between the reservation wage and the consumption-leisure trade-off lies between these two extreme cases. A higher reservation wage may indicate both a higher subgroup ξ and a higher preference for leisure θ. In Figure 1, this association would generate an upward-sloping curve such as the dotted gray line. The slope and location of this line is essentially an empirical question. Therefore, we next consider a data set that allows us to test the relationship between reservation wages and labor supply.

4 Survey and Experiment

Survey. Our survey data originate from the "Panel Study of Labour Market and Social Security" (PASS).[4] PASS provides a database to study the demographics and labor market behavior

[4]Specifically, we use Wave 12 of PASS. These data are factually anonymous. Data access was provided via a Scientific Use File supplied by the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB). DOI: 10.5164/ IAB.PASS-SUF0618.de.en.v1. For further details, see Berg et al. (2020).

of a representative sample of the German population with an over-representation of long-term unemployed welfare recipients (Trappmann et al. 2019). The latter sample is drawn from the unemployment register of the Federal Employment Agency. These individuals are typically long-term unemployed. Their mean unemployment duration is 4.9 years (sd = 4.9), and 30 percent of individuals in this sample have been unemployed for more than 5 years. PASS is conducted annually by the IAB.

The survey elicits reservation wages in several steps. In the first step, individuals are asked about their wage expectations when searching for a job. For current job-seekers, this question reads as follows.

> [Item 1] *Now let us talk about the wage you expect to get when looking for a job. What is realistic: What do you expect to earn as a monthly net wage?* [Answer is *X* Euros]

For individuals who currently do not search for a job, the first sentence in this question ends with "[...] if you were looking for a job." The next question then indirectly elicits the expected hourly wage.

> [Item 2] *Let us talk a bit longer about such a job, where you would earn X Euros. How many hours a week would you have to work for this amount of money, do you think?* [Answer is hours per week]

After this, two more questions are asked. They elicit the reservation wage.

> [Item 3] *Would you also be willing to work for a monthly net wage less than X Euros?* [Answer is yes/no]

> [Item 4] *How much would this lower monthly net wage have to be as a minimum, in order for you to be willing to take the job?* [Answer is *Y* Euros]

When the answer to Item 3 is "no", the reservation wage equals the expected wage X. When the answer is "yes", the reservation wage is given by the answer Y to Item 4. This procedure ensures that participants do not confuse the concepts of an expected wage and a reservation wage. In both cases, the hourly reservation wage is obtained by dividing X and Y, respectively, by the monthly number of working hours derived from the answer to Item 2.

Experimental Design. We invite PASS subjects to participate in an experiment, in which we offer them a job that takes one hour to complete.[5] Their task in the job is to digitize scanned PDF

[5] A pre-analysis plan for this study was part of the contract with the IAB. It is available upon request from the authors.

documents from the medical faculty of the Ludwig-Maximilians University Munich. Subjects can work from home using their own computer. No particular skills or equipment are needed to perform the job. Subjects receive their salary after working on the job for one hour.

We elicit subjects' reservation wage for the job as part of the experiment. To this end, we apply the Becker-DeGroot-Marschak mechanism, which is a standard tool in experimental economics to elicit reservation values (e.g., Bohm et al. 1997). After describing the job, subjects are asked at which wage between 9 and 35 Euros they are willing to work for one hour. The computer then randomly draws a number x between 9 and 35. If this number x is (weakly) above the subject's reservation wage, she is admitted to the job and is paid a wage of x. Otherwise, the experiment ends. This procedure ensures that each subject has an incentive to indicate the true reservation wage. We also included the option to state that a subject does not want to accept the job even if the wage is 35 Euros.[6]

The experiment contains a treatment variation where we vary the description of the job, i.e., as having either "high" or "low" meaning. We exploit this treatment variation in a companion paper (Kesternich et al. 2021). In the empirical analysis below, we always control for the meaning variation in our experiment.

Research Hypotheses. According to our conceptual framework, the survey reservation wage is a measure for the reservation wage w^*, while the experimental reservation wage reflects the no-search reservation wage w^{ns} for a one-hour job. The association between these two reservation wage measures depends on an individual's job market prospects. We derive three predictions from the discussion in Section 3. First, for long-term unemployed individuals – who get job offers very infrequently so that $p \approx 0$ – the reservation wage mostly reflects the trade-off between consumption and leisure. Our hypothesis for these individuals thus equals

$$\left.\frac{dw^{ns}}{dw^*}\right|_{\text{unemployed}} \approx 1. \tag{9}$$

Second, employed individuals typically expect that they would get job offers with some positive frequency $p > 0$ if they were searching. Thus, the survey reservation wage may reflect both job market prospects and the consumption leisure trade-off for these individuals. Therefore, we expect

$$\left.\frac{dw^{ns}}{dw^*}\right|_{\text{unemployed}} > \left.\frac{dw^{ns}}{dw^*}\right|_{\text{employed}}. \tag{10}$$

Recall from our model that for a population with heterogeneous subgroups the association

[6]There are two reasons why we chose an upper bound of 35 Euros for the experimental wage. First, our research funds were limited, so we needed to provide some upper limit. Second, we did not want to tell subjects that we would also pay an unreasonably high wage for such a job. The net hourly wage for full-time jobs in Germany is 13.23 Euros, and for part-time jobs like ours it is only 11.87 Euros (Federal Statistical Office 2020).

between w^* and w^{ns} should become small when individuals expect to get many job offers so that $\delta \to 1$ and $p \to 1$.

Our data will allow us to distinguish between employed individuals with high and low unemployment risk, respectively. The former group potentially expects many offers so that rejecting an offer only implies a very short period of unemployment. In contrast, the latter group expects fewer offers so that rejecting an offer implies a longer period of unemployment in expectation. Our third hypothesis is therefore as follows:

$$\left.\frac{dw^{ns}}{dw^*}\right|_{\text{unemployed}} > \left.\frac{dw^{ns}}{dw^*}\right|_{\text{e. high-risk}} > \left.\frac{dw^{ns}}{dw^*}\right|_{\text{e. low-risk}}. \tag{11}$$

It is important to note that we are not primarily interested in the distribution over reservation wages, or whether and why the reservation wages of employed and unemployed differ from each other. Clearly, these are different subject pools who most likely exhibit quite different reservation wages. Our main focus is on the association between survey and reservation wage as captured by the slope $\frac{dw^{ns}}{dw^*}$ and its interpretation.

Procedures. The reservation wage from Wave 11 of PASS was elicited between February 2017 and October 2017.[7] The experiment took place between July 2017 and August 2017. It was conducted over the internet and administered by CentERdata, Tilburg University. In the invitation letter, we announced that participants could earn between 9 and 35 Euros. Additionally, all participants would take part in a lottery for 50 gift-vouchers of value 25 Euros each. The invitation letter as well as screen-shots from the experiment are presented in the Appendix.

Upon clicking on the link to our study, subjects first participate in a survey on perseverance and risk preferences before we introduce the job and elicit the reservation wage. When they are admitted to the job, subjects can complete it immediately or at a later stage within seven days (by again clicking on the link to our study).

We sent out invitations to 3,731 randomly selected PASS participants. We only invited PASS participants with at least one employment or unemployment spell, whose survey language is German, and who agreed to being contacted for research.[8] In total, we recruited 707 PASS subjects who consented to the linkage with the PASS data; 547 of them entered a reservation wage between 9 and 35 Euros, 160 individuals indicated that they would not do the job even if the wage was 35 Euros. For 631 of our 707 observations, we also have the PASS survey reservation wage. They are our analytic sample. Among them, 518 individuals (82 percent) are employed and 113 (18 percent) are unemployed. The average earnings in our study were

[7] Wave 11 is our main sample. We impute missing information on reservation wages in Wave 11 with those from Wave 10.

[8] We also excluded 703 PASS participants who we contacted before to participate in a pre-test.

25.40 Euros for subjects who completed the job, and 4 Euros for those who could not do the job as their reservation wage was above the random number draw (we did not communicate the payment of the 4 Euros beforehand). All payments were made in September 2017.

5 Results

Column (1) in Table 2 contains the descriptive statistics of our analytic sample: 46 percent are male and the average age is about 44 years; 43 percent have obtained a German high school diploma (abitur) or higher education; 39 percent of our subjects are married, the average number of children per respondent is 1.17. They work on average about 27 contracted hours per week and earn around 1,500 Euros net per month.[9] The average reservation wage is 11.00 Euros per hour in the PASS survey, and 17.73 Euros for the one-hour job in the experiment (for those who inserted a reservation wage between 9 and 35 Euros).[10] There are significant differences between the reservation wages of employed and unemployed individuals. The average survey reservation wage is 11.50 Euros (sd = 5.13) for employed, and 8.93 Euros (sd = 4.34) for unemployed individuals (two-sided t-test, p-value = 0.000). The average experimental reservation wage is 18.26 Euros (sd = 7.11) for employed, and 15.79 Euros (sd = 7.08) for unemployed individuals (two-sided t-test, p-value=0.001).

[Insert Table 2 about here]

Column (2) in Table 2 shows the characteristics of the invited PASS participants. Our experimental sample has a slightly higher share of women and is slightly younger. Moreover, individuals in the experimental sample are less often unemployed and thus have somewhat higher contracted working hours and net incomes. Also the number of children per respondent is lower in our experimental sample. The largest difference between the experimental sample and the invited sample is the level of education. The share of high school graduates is almost twice as large in the experimental sample. We will therefore examine whether selection into the experiment biases our results.

The rest of this section is organized as follows. In Subsection 5.1, we analyze the relationship between the two reservation wage measures without controls. In Subsection 5.2, we

[9] We compute the monthly net income and the working hours per week as follows. For employed individuals, we use monthly net income and contracted working hours per week of the main job. For unemployed individuals, we use unemployment benefits and zero hours worked if they do not work in a "mini job." For unemployed individuals with a mini job, we make use of deducted benefits plus (net) income and contracted working hours per week. Since we do not observe contracted hours for self-employed individuals, we lose 43 observations in all analyses in which we control for an individual's working hours.

[10] For our full PASS sample, the net market wage rate is 14.86 Euros for part-time jobs, and 13.00 Euros for full-time jobs. Overall, the average gross hourly wage in Germany for 2018 was 19.66 Euros, which amounts to around 13 Euros net, according to the Federal Statistical Office.

analyze this relationship taking standard controls into account. In Subsection 5.3, we conduct a number of robustness checks and present further results. In Subsection 5.4, we consider the selection into the experiment. Finally, in Subsection 5.5, we study which demographic factors influence the two reservation wage measures.

5.1 The relationship between survey and experimental reservation wage without controls

Our first goal is to analyze what a standard, non-incentivized survey reservation wage reveals about an individual's willingness to trade-off consumption against leisure. To do this, we analyze the association between the survey and experimental reservation wage without controls.[11] Since we only offered wages between 9 and 35 Euros, we have to take into account that the experimental reservation wage is censored from above and below. The survey reservation wage is not censored, but answers are later checked for highly unrealistic values by the interviewer. Because of implausibly low values, we excluded the lowest percentile of the survey reservation wage.[12]

The raw correlation between survey and experimental reservation wage is 0.31 (significant at the one percent-level), suggesting that individuals with higher survey reservation wages are also indicating higher reservation wages in the experiment. To further investigate the relationship between the two measures, we regress the experimental reservation wage for individual i on her (hourly) survey reservation wage,

$$(\text{rw exp})_i = \beta_0 + \beta_1(\text{rw svy})_i + \varepsilon_i, \tag{12}$$

where $(\text{rw exp})_i$ is the experimental reservation wage, $(\text{rw svy})_i$ is the survey reservation wage, and ε_i is the error term. The parameter of interest is β_1. It quantifies the association between the two reservation wage measures. In our main specification, we use Ordinary Least Squares (OLS) to estimate equation (12). In other specifications, we estimate Tobit models to take into account that the dependent variable is censored.

[Insert Table 3 about here]

Table 3 presents the results from these regressions. In Column (1), we show the results for the OLS estimation of equation (12) without controls. We observe a highly significant positive

[11] Since the description of our experimental job varies between treatments, we always control for the meaning variation by adding an indicator variable which indicates whether a subject is assigned to the "high" or "low" meaning treatment.

[12] This does not exclude any of our experimental subjects and is thus only relevant for the comparisons of the experimental sample to the full PASS sample.

association between the experimental and the survey reservation wage. The regression results suggest that, on average, an individual with a survey reservation wage of 9 Euros (around the legal minimum wage in Germany) would indicate an experimental reservation wage of about 16.88 Euros. From that point, the experimental reservation wage increases on average by 0.49 Euros when the survey reservation wage increases by one Euro.

In Column (2), we show the results for the Tobit estimation of equation (12). Here we take into account that the experimental reservation wage is censored from above at 35 Euros as well as from below at 9 Euros. In this regression, the association with the latent (thus uncensored) experimental reservation wage is 0.74. In a log-log specification, Column (3), we find that the experimental reservation wage increases by 0.37 percent when the survey wage increases by one percent. Thus, our first main result is that the survey reservation wage is informative about labor supply for our one-hour job.

Next, we investigate whether the association between the survey and the experimental reservation wage is stronger for unemployed individuals than for employed individuals. We hypothesize that when answering to the reservation wage question, the trade-off between leisure and consumption is more relevant for unemployed than for employed individuals. Hence, the association between the two reservation wage measures is expected to be stronger for the former group. We include employment status and an interaction between employment status and survey reservation wage as additional control variables in our baseline regression,

$$(\text{rw exp})_i = \beta_0 + \beta_1(\text{rw svy})_i + \beta_2 \text{unemployed}_i + \beta_3((\text{rw svy}) \times \text{unemployed})_i + \varepsilon_i. \quad (13)$$

Column (4) in Table 3 shows the results of this regression. We observe substantial differences between employed and unemployed individuals. An employed individual with a survey reservation wage of 9 Euros would indicate an experimental reservation wage of about 17.42 Euros. From there, a one Euro increase in the survey reservation wage increases the experimental reservation wage by 0.37 Euros. By contrast, an unemployed individual with a survey reservation wage of 9 Euros would indicate an experimental reservation wage of about 16.04 Euros; a one Euro increase in the survey reservation wage then increases the experimental reservation wage by 1.16 Euros. Hence, our second main result is that the association between the two reservation wage measures is indeed stronger for unemployed individuals.

Column (5) in Table 3 presents the estimated coefficients of the main and interaction terms obtained from a Tobit regression. As in Column (2), the coefficients are larger when censoring in the experimental reservation wage is taken into account. Besides, these estimates corroborate the results in Column (4), showing that the association between both reservation wage measures is significantly stronger for unemployed than for employed individuals.

Figure 2: Predicted experimental reservation wage, by employment status

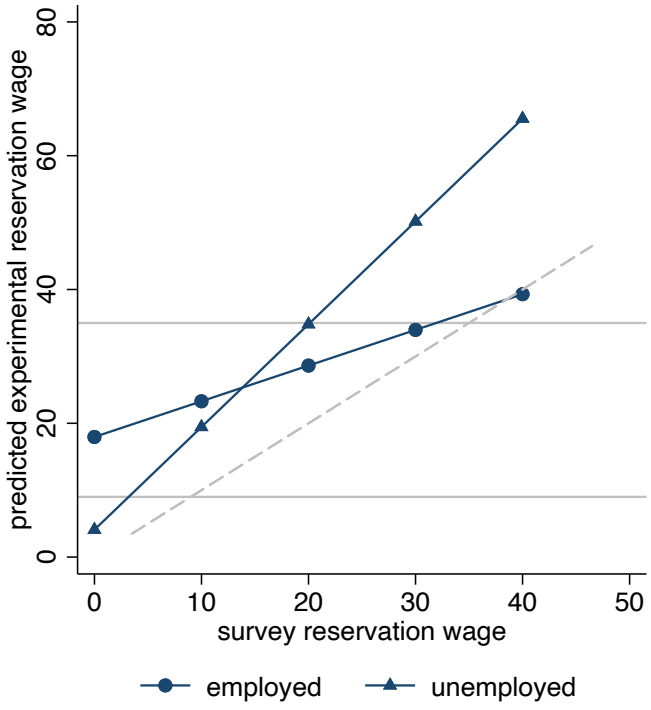
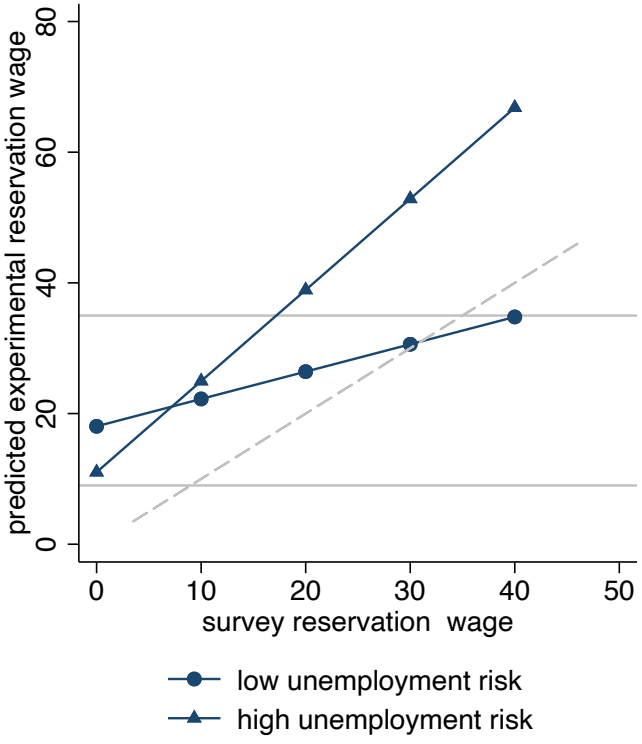


Figure 3: Predicted experimental reservation wage, by unemployment risk



To illustrate this result, Figure 2 presents the predicted experimental reservation wage obtained from the survey reservation wage for employed and unemployed individuals (the prediction originates from the Tobit regression). Observe that the predicted experimental reservation wage for unemployed individuals is approximately parallel to the 45–degree line, suggesting that the survey reservation wage for these subjects on average reflects the same consumption-leisure trade-off as for our one-hour job.

[Insert Table 4 about here]

Finally, we test the implication of our model that the association between the two reservation wage measures increases in unemployment risk. To obtain a measure for an employed individual's unemployment risk, we use the information on the respondent's occupation as indicated in the PASS survey, and combine it with occupation-specific unemployment rates. These unemployment rates are provided by the German Federal Employment Agency in the report Statistik der Bundesagentur für Arbeit (2019). The definition of occupational groups is based on the German classification of occupations.[13] We perform a median split for 1–digit occupation groups to classify our employed subjects as having either high or low unemployment risk. We then define a dummy variable that equals one if the occupation-specific unemployment rate exceeds the median value of all occupations. Next, we consider our baseline regression with the unemployment risk dummy and an interaction between the unemployment risk dummy and the survey reservation wage:

$$(\text{rw exp})_i = \beta_0 + \beta_1(\text{rw svy})_i + \beta_2(\text{high risk})_i + \beta_3((\text{rw svy}) \times (\text{high risk}))_i + \varepsilon_i. \tag{14}$$

Table 4 shows the results from OLS in Column (1), and the results from the Tobit model in Column (2); the other two columns will be discussed in the next subsection. In Column (1), we see that an individual working in a low unemployment risk occupation with a survey reservation wage of 9 Euros would indicate an experimental reservation wage of about 16.81 Euros. From there, a one Euro increase in the survey reservation wage increases the experimental reservation wage by 0.33 Euros. By contrast, an individual working in a high unemployment risk occupation with a survey reservation wage of 9 Euros would indicate an experimental reservation wage of about 17.34 Euros. A one Euro increase in the survey reservation wage then increases the experimental reservation wage by 0.82 Euros. Figure 3 illustrates these results. Thus, our third main result is that, as predicted by our model, there is a stronger association between the two reservation wage measures among individuals working in occupations with high unemployment risk.

[13] "Klassifikation der Berufe 2010" (Bundesagentur für Arbeit 2010).

5.2 The relationship between survey and experimental reservation wage with controls

So far, we learned that the survey reservation wage is informative about individuals' willingness to sacrifice leisure for consumption. This is true in for both employed and unemployed individuals. We now study to what extent this conclusion remains valid if we take into account demographic factors and employment-related information. In other words: What do we learn *additionally* from a survey reservation wage about one's willingness to give up leisure for consumption if we already have basic demographic and employment-related information about this individual? To answer this question, we re-estimate our main models including a standard set of controls that is usually included in reservation wage regressions: gender, age, marital status, education, and number of children. In addition, we include net income and hours worked to control for the fact that the consumption-leisure trade-off may depend on these two variables.

[Insert Table 5 about here]

Table 5 shows the results. As long as we do not distinguish between employed and unemployed individuals, we again obtain a significant positive relationship between the two reservation wage measures, see Columns (1) to (3). When we differentiate between employed and unemployed individuals, we find that the differences between these two groups become even more pronounced compared to the case without controls, see Columns (4) and (5), and Figure 4. For an unemployed individual the experimental reservation wage increases on average by around one Euro for every Euro survey reservation wage. So even with controls, the survey reservation wage of unemployed individuals is informative about their willingness to exchange leisure for consumption. In contrast, the relationship between survey and experiment reservation wage becomes small and insignificant for employed individuals.

If we further distinguish between employed individuals of high and low unemployment risk, we again obtain differential results for these two subgroups, see Columns (3) and (4) of Table 4, and Figure 5. For individuals with high unemployment risk, the survey reservation wage is informative about the experimental reservation wage, even when controls are included. In particular, their experimental reservation wage increases on average by 0.52 Euros for every Euro survey reservation wage, see Column (3). By contrast, for individuals with low unemployment risk, the survey reservation wage does not contain information beyond what is in the controls.

Figure 4: Predicted experimental reservation wage, by employment status, with controls

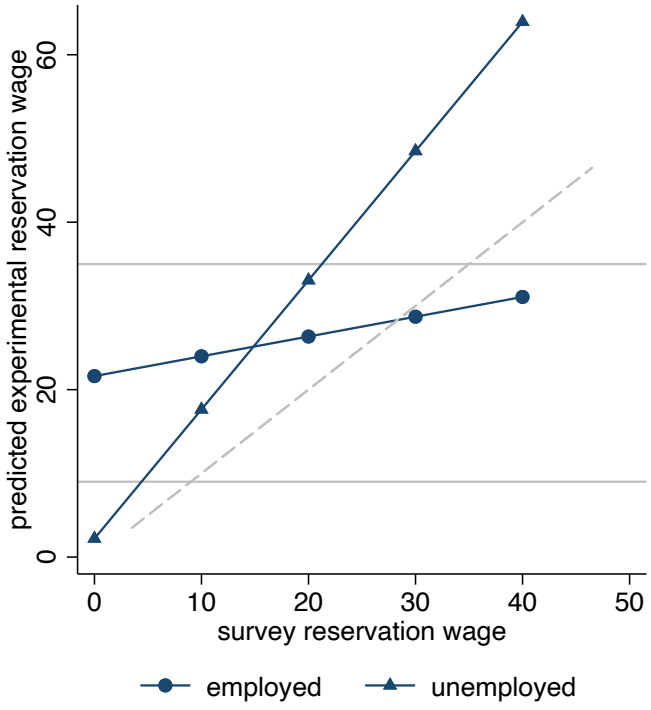
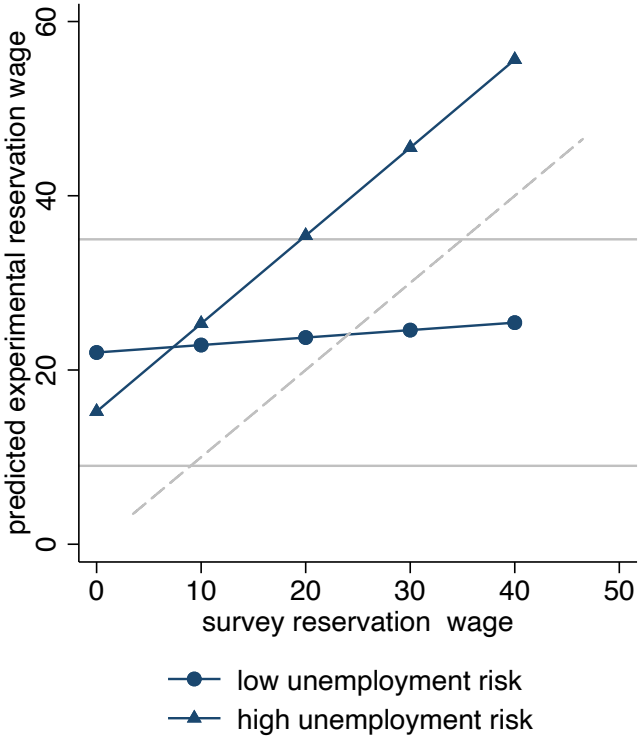


Figure 5: Predicted experimental reservation wage, by unemployment risk, with controls



Overall, this is our fourth main result: The survey reservation wage can be informative about one's consumption-leisure trade-off, even if we take into account demographic and job-related information. Specifically, this is true for unemployed individuals and employed individuals with high-unemployment risk. For employed individuals with low unemployment risk the survey reservation wage contains no information about the consumption-leisure trade-off that is not already included in the standard controls and employment-related information.

Tables 4 and 5 also show which variables are informative about how people trade-off consumption versus leisure. The experimental reservation increases in net income, but decreases in the number of hours worked. The first effect is intuitive: Those with higher income have higher opportunity costs and therefore request a higher wage. The second effect is less intuitive. It seems to be the case that individuals who work fewer hours have a higher valuation for leisure and thus request a higher experimental reservation wage.

5.3 Robustness checks and further results

In the following, we discuss a number of factors that may influence the association between our two reservation wage measures: the time gap between survey and experiment, job search effort, and part-time versus full-time employment. Moreover, we briefly discuss subjects' productivity in our experimental job.[14]

Time Gaps. One potential concern for the validity of our results could be that there is a time gap between the survey and the experiment. If the two reservation wages are measured at different points in time, changes in the actual reservation wage may confound the correlation between our two reservation wage measures. On average, 4.68 months (sd = 3.14) elapsed after the survey until subjects participated in the experiment. This means that the true survey reservation wage may be different when the experiment takes place. To test whether the length of the time gap has an effect on the estimated association between the two reservation wages, we re-run our main regressions from Tables 3 to 5 and include the time gap, the interaction variable "time gap × reservation wage", and the interaction variable "time gap × reservation wage × unemployed". All of our main results remain valid in these regressions. The coefficients for the time gap variables are mostly insignificant. We conclude that the time gap between survey and experiment does not systematically affect our results.

Job Search Effort. The unemployed subjects in our sample may face a trade-off between doing the one-hour job and searching for a permanent job. This could potentially influence our experimental reservation wage. To check whether this is the case, we consider subjects'

[14]For the sake of brevity, we do not show the regression results of this subsection. They are available upon request from the authors.

search intensity. The PASS survey contains information on how often participants search for a job. Among unemployed individuals, 13 percent search on a daily basis, 24 percent search multiple times per week, 14 percent once per week, 3 percent less than once per week, and 46 percent do not search at all. Among employed individuals, 3 percent search on a daily basis, 3 percent search multiple times per week, 4 once per week, 2 percent less than once per week, and 88 percent do not search at all. When we include search intensity into our main regressions with and without controls, our results remain the same and the coefficient for search intensity is insignificant. It does not seem to be the case that subjects who search more indicate higher reservation wages for the experimental job. Therefore, we do not think that there is a trade-off between doing the job and searching for permanent employment that affects our results.

Part-time versus Full-time Employment. A further question is whether the association between the two reservation wages is different for individuals with part-time jobs and individuals with full-time jobs. Around 25 percent of our experimental sample of employed individuals works in part-time jobs. The experimental reservation wage is not significantly different in the two samples (two-sided t-test, p-value = 0.729). The survey reservation wages are also quite similar in the two subgroups, 11.59 Euros for individuals with part-time jobs and 11.47 Euros for individuals with full-time jobs (t-test, p-value = 0.826). We run our main regressions from Tables 3 and 5 with employed subjects only and differentiate between individuals with part- and full-time jobs. It turns out that the association between the two reservation wage measures is not systematically different between these two subgroups.

Productivity. When subjects were admitted to the job, they had to work on a digitization task for one hour to get paid. The wage payment is independent of their productivity. In general, subjects could start the job and then do nothing until time runs out. Indeed, one subject acted in this way. Dropping this subject from our analysis does not affect our results on the association between the two reservation wage measures. All other subjects who started the job worked on it as told. We measure productivity by the sum of correctly typed characters. Overall, subjects produced 5,844 correctly typed characters (sd = 2,762). Employed subjects correctly typed on average 6,158 characters (sd = 2,749), while unemployed subjects correctly typed on average 4,556 characters (sd = 2,446); the difference is significant (t-test, p-value = 0.000).

5.4 Selection into the experiment

One possible concern for the generalizability of our results is the extent to which we can draw inference about the population from an experiment with a selected sample of participants. Since subjects can choose whether to participate in the experiment or not, it may be the case that participants are behaviorally distinct from non-participants, and that this difference biases

the estimated association between survey and experimental reservation wage. Several authors therefore elicit preferences from a representative pool of subjects (e.g., Harrison et al. 2002, von Gaudecker et al. 2011), or compare the preferences and behaviors of participants and non-participants (e.g., Cleave et al. 2013, Falk et al. 2013, Slonim at al. 2013, Snowberg and Yariv 2021). Indeed, Slonim at al. (2013) and Snowberg and Yariv (2021) find some behavioral differences between the two groups, though they tend to be small.

A significant advantage of our data is that the PASS survey is conducted with a representative sample of employed and unemployed individuals, and that we have detailed data on both participants in our experiment and non-participants. This allows us to study whether non-random participation into the experiment is a concern for our main results.

Our basic sample consists of 7,577 PASS participants. As outlined in Section 4, we randomly sent out invitations to 3,731 PASS participants. After dropping missing observations, our full PASS sample comprises 4,659 observations, see Column (3) in Table 2. As shown in Column (1) of Table 2, our experimental subjects report the highest reservation wage (11.12 Euros).[15] The sample of invited respondents has a lower reservation wage (10.08 Euros), see Column (2). The reservation wage is lowest in the full sample (9.96 Euros), see Column (3). These numbers suggest that subjects with higher reservation wages are more likely to select into the invited sample as well as into the sample of experimental subjects. This implies that our sampling procedure induces two potential layers of selection. First, selection between our full sample and our experimental subjects, and second, selection between the sample of invited subjects and experimental subjects. To investigate potential non-random selection, we compare the survey reservation wages for all three samples.

[Insert Table 6 about here]

To account for potential non-random selection in these two layers, we estimate our main equations (12) and (13) using a Heckman two-stage selection model. The first stage estimates the decision to participate in the experiment; the second stage estimates the reservation wage equation taking potential sample selection into account. To avoid identification via functional form, we use the availability of a subject's e-mail address and their postal address as an exclusion restriction. In both stages of the Heckman model, we condition on the same set of controls as in Table 5.

The lower panel of Table 6 shows the estimated coefficients for the selection equation. The estimated coefficient for the survey reservation wage is insignificant in all specifications. This indicates that there is no notable selection into the experiment based on the survey reservation

[15] The average survey reservation wage among experimental subjects who also indicated an experimental reservation wage is 10.76 Euros.

wage. As shown in Columns (2) and (4) of Table 6, an individual's labor force status does not play a significant role for participation in the experiment.

The upper panel of Table 6 displays the estimated coefficients from the outcome equation. The estimated coefficients of the survey reservation wage in Columns (1) and (3) differ only slightly and are similar to the estimated OLS coefficient in Column (1) of Table 5. This also holds for specifications with interaction terms: The coefficients for main and interaction terms differ only slightly across columns; they are close to the estimated coefficients obtained from OLS, see Column (4) in Table 5. In all specifications, we obtain a positive but statistically insignificant inverse Mills ratio. We thus conclude that selection into the experiment due to the sampling procedure does not bias our main results.

The results in Table 6 suggest that our main specification is robust to selection. However, a disadvantage of the Heckman model is that it relies on strong parametric assumptions which makes it prone to misspecification. To strengthen the robustness of our results, we apply an inverse probability weighting approach (IPW).[16] For both, the full sample and the invited sample, we estimate the individual probability of being selected into the experiment, using unemployment indicator, the survey reservation wage (and its interactions) and all covariates as predictors. We then weight each individual by the inverse of these probabilities and estimate our main specification (equation 12 and controls) on the selected sample. The results of the IPW analysis can be found in Table A1 in the Appendix. As for the results obtained from the Heckman model, the estimated coefficients only slightly differ across the two samples. We also find only small differences between the estimated main and interaction effects in Table A1 and our main results in Table 5. This suggests that our results are robust to potential sample selection.

5.5 Determinants of reservation wages

The literature has identified a number of demographic variables that have a robust effect on survey measures of the reservation wage. Men typically have higher reservation wages than women, and reservation wages increase in age as well as education; see, for example, Koenig et al. (2016) or Le Barbanchon et al. (2019). The same correlations can be found in our PASS sample. In this subsection, we investigate to what extent they also hold for our experimental reservation wage, and whether demographic variables affect the experimental and the survey reservation wage in similar manner. We specify a seemingly unrelated regression (SUR) model comprising two individual equations, one for the survey reservation wage and one for the ex-

[16]The IPW is based on the assumption that individual information that can predict the probability of inclusion (non-missingness) are available for the entire study population, so that, after taking account of them, we can make inferences about the entire target population starting from the non-missing observations alone.

perimental reservation wage. They are linked through the correlation of their errors. The error correlation could be caused by unobserved factors that influence both measures of reservation wages.

$$(\text{rw exp})_i = \beta_0 + \mathbf{x}_{i1}'\boldsymbol{\beta} + \varepsilon_{i1} \quad (15)$$

$$(\text{rw svy})_i = \gamma_0 + \mathbf{x}_{i2}'\boldsymbol{\gamma} + \varepsilon_{i2}, \quad (16)$$

where $\mathbf{x}_{i1}$ and $\mathbf{x}_{i2}$ are $(k \times 1)$ vectors containing the same set of covariates. The $(k \times 1)$ parameter vectors $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$ represent the coefficients of these covariates in equations (15) and (16), respectively. For a given individual i, the error terms may be correlated across equations, with $\mathbb{E}(\varepsilon_{i1}\varepsilon_{i2}|\boldsymbol{x}_i) = \sigma_{12}$.

While separate equation-by-equation estimation by OLS provides consistent estimates for $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$, estimating equations (15) and (16) jointly has a number of advantages. First, a non-zero error correlation between these two equations, $\sigma_{12} \neq 0$, informs us about similar underlying determinants of our reservation wage measures. The Breusch-Pagan Lagrange multiplier test is then used to test the null hypothesis of zero cross-equation error correlation. If the correlation is significantly different from zero, the SUR estimation yields efficiency gains over OLS. Second, the SUR estimation allows testing cross-equation constraints, e.g., $\beta_j = \gamma_j$. This is particularly useful, since we would like to understand whether observed determinants have the same impact on both reservation wage measures.

[Insert Table 7 about here]

Table 7 contains the results from the SUR framework. We largely follow Le Barbanchon et al. (2019) in the choice of our explanatory variables. Most factors affect the two measures in the same direction and with similar intensity. Male subjects and subjects with high school degree (abitur) ask for a higher wage both in the survey and in the experiment; unemployed individuals ask for a lower wage in both domains. Age and marital status are positively associated with the survey measure, but not with the experimental measure. Nevertheless, the effects go in the same direction for both measures. Column (3) shows the results of Wald tests of cross-equation coefficient testing, which test the null hypothesis of equal coefficients. We cannot reject equality of coefficients for gender, age, unemployment status and the number of children at reasonable levels of significance. We can reject the equality of coefficients for high school degree and marital status. Yet, the difference in coefficients is due to different magnitudes of estimated coefficients, not due to different directions.

We find a positive correlation of about 0.26 between the unobserved factors in the two regressions. The Breusch-Pagan Lagrange multiplier test rejects the null hypothesis of zero

error correlation on the one percent significance level. This suggests that the two reservation wage measures have similar unobserved determinants.

6 Conclusion

In this paper, we examined what a standard, non-incentivized survey reservation wage reveals about a subjects' willingness to trade leisure for consumption. For this, we correlated a survey reservation wage with an experimental reservation wage for a one-hour job. The survey reservation wage is potentially shaped by an individual's job market prospects, i.e., the arrival rate of job offers and the distribution over offered wages in the (hypothetical) case of job search. In contrast, the experimental job is a one-time opportunity so that job market prospects should not matter for the experimental reservation wage.

Our results show that a survey reservation wage is informative about individual labor supply. For unemployed individuals, we roughly obtain a one Euro increase in the experimental reservation wage for every Euro increase in the survey reservation wage. For employed individuals, the association between the two reservation wage measures is weaker. If we control for demographics and employment-related information, then this association is positive and significant only for employed individuals with high unemployment risk. By comparing participants and non-participants, we show that these results are not affected by selection into our experiment. Moreover, we demonstrate that demographic variables, such as gender, age, and education, influence the two reservation wage measures in a similar manner.

Our results may help to interpret changes in reservation wages under continuing unemployment spells. Krueger and Mueller (2016) examine panel data on reservation wages and find that, in the context of a job search model, reservation wages decline very slowly. Their explanation for this finding is that a share of unemployed workers remains too optimistic about their job market prospects. An alternative explanation may look as follows: Unemployed individuals may learn the wage offer distribution over time, and adjust their expectations when realizing that they do not get the wage offers they once anticipated to get. At the same time, they may also adjust their lifestyle to unemployment. As a consequence, they may become less willing to trade-off leisure for consumption, which in turn increases their reservation wage. As the unemployment spell continues, the reservation wage may no longer reflect search concerns, but mostly the updated consumption-leisure trade-off.

Tables

Table 1: Measures of Reservation Wages in Surveys and Administrative Data

Dataset Period, Country (N)	Reservation Wage Item	Studies
CPS Job Search Supplement 1976, US ($2,228 - 3,200$)	What is the lowest wage or salary you would accept (before deductions) for this type of work?	Feldstein and Poterba (1984)
PSID 1980–1987, US ($6,500 - 7,000$)	What is the lowest wage you would be willing to take home as pay?	Haurin and Shridar (2010)
NLS Youth 1979–1994, US ($12,000$)	What would the wage or salary have to be for you to be willing to take it?	Holzer (1987), Holzer (1986), DellaVigna and Paserman (2005)
Political and Economic Planning 1972, UK (627)	What is the lowest wage you would accept in a new full time job? Would you tell me the lowest amount you would prepared to accept after stoppages?	Lancaster and Chesher (1983), Lancaster and Chesher
GSOEP 1987–1998, Germany ($20,000$)	How high would your net income or salary [per month] have to be for you to take a position offered to you?	Pannenberg (2010), Koenig et al. (2016)
British Household Panel Survey 1991-2009, UK ($9,000$)	What is the lowest weekly take home pay you would consider accepting for a job? About how many hours in a week would you expect to have to work for that pay?	Brown et al. (2011b), Koenig et al. (2016)
French public employment service 2006–2012, France ($320,000$)	What minimum gross wage do you accept to work for?	Le Barbanchon et al. (2019), Le Barbanchon et al. (2021)
Survey of Unemployed Workers New Jersey 2009–2010, US ($6,025$)	Suppose someone offered you a job today. What is the lowest wage or salary you would accept (before deductions) for the type of work you are looking for?	Krueger and Mueller (2016), Hall and Mueller (2018)

Table 2: Descriptive Statistics

	experimental sample mean [sd]	invited sample mean [sd]	full sample mean [sd]
experimental reservation wage [9, 35]	17.73		
	[7.17]		
survey reservation wage	11.00	10.08	9.96
	[5.09]	[4.63]	[4.29]
male	0.46	0.49	0.48
	[0.50]	[0.50]	[0.50]
age in years	43.65	44.36	44.37
	[11.37]	[11.66]	[11.99]
unemployed	0.19	0.27	0.27
	[0.39]	[0.44]	[0.44]
abitur	0.43	0.25	0.26
	[0.50]	[0.43]	[0.44]
married	0.39	0.40	0.39
	[0.49]	[0.49]	[0.49]
number children	1.17	1.31	1.34
	[1.16]	[1.27]	[1.29]
hours worked	27.14	24.88	23.41
	[15.00]	[16.36]	[16.50]
net income	1562.28	1321.41	1257.10
	[1070.17]	[992.85]	[1412.13]
observations	631	3,007	4,659

Notes: Due to missing values for some individual characteristics, the sample sizes provided in this table are somewhat higher than in the analytic samples used in some regressions.

Table 3: Estimated correlation between experimental and survey reservation wage

	OLS	Tobit	OLS logs	OLS	Tobit
	(1)	(2)	(3)	(4)	(5)
survey reservation wage	0.490***	0.737***		0.372***	0.534***
	[0.077]	[0.123]		[0.080]	[0.128]
log survey reservation wage			0.372***		
			[0.046]		
unemployed				-8.450***	-13.871***
				[2.321]	[3.611]
unemployed ×				0.786***	1.003***
survey reservation wage				[0.285]	[0.385]
constant	12.470***	14.607***	1.941***	14.068***	17.657***
	[0.902]	[1.533]	[0.108]	[0.985]	[1.673]
observations	494	631	494	494	631
R-squared	0.096		0.119	0.125	

Notes: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$; robust standard errors in brackets. In all specifications, we control for the meaning treatment variation. Column (3): log-log-specification. Columns (1), (3), (4): OLS regressions based on an experimental sample of subjects with a non-missing survey reservation wage and an experimental reservation wage that is between 9 and 35 Euros. Columns (2), (5): Tobit regressions based on an experimental sample of subjects with non-missing survey reservation wage. The experimental reservation wage is set to 35 Euros for subjects who would not do the job even if the wage was 35 Euros.

Table 4: Estimated correlation between experimental and survey reservation wage, for employed respondents only, controlling for risk of unemployment

	OLS	Tobit	OLS	Tobit
	(1)	(2)	(3)	(4)
survey reservation wage	0.330***	0.418**	0.115	0.086
	[0.086]	[0.141]	[0.118]	[0.187]
high unemployment risk	-3.831*	-7.028*	-3.133	-6.778*
	[2.269]	[3.694]	[2.181]	[3.600]
high unemployment risk ×	0.485**	0.976***	0.402*	0.924***
survey reservation wage	[0.228]	[0.336]	[0.218]	[0.326]
male			1.651*	0.791
			[0.917]	[1.465]
age in years			0.017	0.163***
			[0.037]	[0.063]
abitur			0.686	-2.205*
			[0.775]	[1.337]
married			0.292	1.588
			[0.776]	[1.325]
number children			-0.517	-1.140**
			[0.329]	[0.578]
net income			0.001**	0.003**
			[0.001]	[0.001]
hours worked			-0.126***	-0.147*
			[0.047]	[0.083]
constant	13.839***	17.801***	16.968***	16.358***
	[1.173]	[2.049]	[2.443]	[4.175]
observations	356	469	356	469
R-squared	0.094		0.132	

Notes: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$; robust standard errors in brackets. In all specifications, we control for the meaning treatment variation. Columns (1), (3): OLS regressions based on an experimental sample of subjects with a non-missing survey reservation wage and an experimental reservation wage that is between 9 and 35 Euros. Columns (2), (4): Tobit regressions based on an experimental sample of subjects with non-missing survey reservation wage. The experimental reservation wage is set to 35 Euros for subjects who would not do the job even if the wage was 35 Euros. Risk of unemployment is calculated from a median-split on unemployment rates for different occupational groups based on the German classification of occupations (Bundesagentur für Arbeit 2010) and publicly available data on occupation-specific unemployment rates from the Federal Employment Agency. All specifications use a sample of employed subjects with non-missing occupation information.

Table 5: Estimated correlation between experimental and survey reservation wage, with controls

	OLS (1)	Tobit (2)	OLS logs (3)	OLS (4)	Tobit (5)
survey reservation wage	0.365***	0.549***		0.147	0.236
	[0.115]	[0.169]		[0.114]	[0.186]
log survey reservation wage			0.290***		
			[0.069]		
unemployed	-4.074**	-7.090***	-0.209**	-13.296***	-19.411***
	[1.662]	[2.686]	[0.086]	[2.829]	[4.365]
unemployed ×				1.011***	1.307***
survey reservation wage				[0.291]	[0.389]
male	2.075***	2.145*	0.123***	2.007***	2.193*
	[0.738]	[1.231]	[0.039]	[0.725]	[1.212]
age in years	0.000	0.135**	-0.000	-0.007	0.133**
	[0.032]	[0.055]	[0.002]	[0.031]	[0.054]
abitur	0.637	-2.147*	0.034	0.562	-2.110*
	[0.702]	[1.197]	[0.039]	[0.688]	[1.174]
married	0.068	1.547	-0.007	0.068	1.436
	[0.703]	[1.221]	[0.038]	[0.685]	[1.198]
number children	-0.276	-0.724	-0.015	-0.334	-0.786
	[0.296]	[0.534]	[0.016]	[0.282]	[0.516]
net income	0.001	0.001	0.000	0.002**	0.002**
	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]
hours worked	-0.102**	-0.080	-0.005**	-0.142***	-0.139*
	[0.049]	[0.081]	[0.002]	[0.048]	[0.082]
constant	15.475***	12.651***	2.222***	18.026***	12.492***
	[2.213]	[0.516]	[0.176]	[2.212]	[0.512]
observations	461	588	461	461	588
R-squared	0.139		0.158	0.175	

Notes: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$; robust standard errors in brackets. In all specifications, we control for the meaning treatment variation. Column (3): log-log-specification. Columns (1), (3), (4): OLS regressions based on an experimental sample of subjects with a non-missing survey reservation wage and an experimental reservation wage that is between 9 and 35 Euros. Columns (2), (5): Tobit regressions based on an experimental sample of subjects with non-missing survey reservation wage. The experimental reservation wage is set to 35 Euros for subjects who would not do the job even if the wage was 35 Euros. All specifications use a sample of subjects with non-missing information on covariates.

Table 6: Estimated correlation of survey reservation wage and experimental reservation wage, Heckman selection model

	experimental reservation wage			
	invited sample		75% PASS sample	
	(1)	(2)	(3)	(4)
outcome equation: experimental reservation wage				
survey reservation wage	0.406***	0.145	0.410***	0.149
	[0.097]	[0.107]	[0.097]	[0.108]
unemployed		-13.345***		-13.197***
		[2.532]		[2.598]
unemployed ×		1.014***		1.010***
survey reservation wage		[0.225]		[0.225]
constant	11.084***	17.542***	10.762**	17.250***
	[3.494]	[3.522]	[5.139]	[5.504]
selection equation: participation in experiment				
survey reservation wage	-0.002	-0.006	0.006	0.008
	[0.008]	[0.010]	[0.007]	[0.007]
unemployed		-0.230		0.296
		[0.218]		[0.180]
unemployed ×		0.009		-0.004
survey reservation wage		[0.018]		[0.016]
constant	-1.395***	-1.236***	-1.782***	-1.987***
	[0.156]	[0.210]	[0.135]	[0.163]
inverse Mill's ratio	0.590	0.339	0.638	0.370
	[2.020]	[1.972]	[2.543]	[2.426]
observations	2,880	2,880	4,532	4,532

Notes: *** p<0.01, ** p<0.05, * p<0.1; standard errors in brackets. Columns (1), (2): two-step Heckman model based on a sample of invited PASS respondents with non-missing information on survey reservations wages and controls. Columns (3), (4): two-step Heckman model based on the full sample of PASS respondents with non-missing information on survey reservation wages and controls. The information on whether individuals were invited via email serves as exclusion restriction in the participation equation. Additional controls in both stages: male, age, abitur, married, number of children, net income, contracted working hours per week.

Table 7: Estimated coefficients of joint estimation of log experimental reservation wage and log survey reservation wage

	log experimental reservation wage (1)	log survey reservation wage (2)	Wald statistic [p-value] (3)
male	0.131***	0.072**	2.24
	[0.035]	[0.030]	[0.135]
age in years	0.002	0.004***	0.84
	[0.002]	[0.001]	[0.360]
unemployed	-0.157***	-0.209***	1.06
	[0.045]	[0.038]	[0.303]
abitur	0.128***	0.233***	6.69***
	[0.036]	[0.030]	[0.010]
married	0.016	0.093***	3.11*
	[0.039]	[0.033]	[0.078]
number children	-0.009	0.012	1.15
	[0.017]	[0.014]	[0.284]
constant	2.623***	2.006***	
	[0.074]	[0.063]	
observations	494	494	
R-squared	0.089	0.239	
residual correlation, ρ	0.258		
Breusch-Pagan statistic	32.77 (0.000)		

Notes: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$, standard errors in brackets in Columns (1) and (2). In all specifications, we additionally control for the meaning treatment variation. Column (3) provides the results from a Wald test on the equality of estimated coefficients in Columns (1) and (2). The Breusch-Pagan test tests the null hypothesis of zero error correlation between equation (15) and equation (16).

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A Appendix

A.1 Mathematical Details

In the following, we derive the equations (5) and (7) from Section 3. First, we derive equation (5). We can write the first-order condition in (4) as

$$H^{[1]} \equiv U(w^{ns}(\theta), \theta(\bar{L} - L^*)) - U(b, \theta\bar{L}) = 0. \tag{17}$$

Using implicit differentiation, we get

$$\frac{dw^{ns}(\theta)}{d\theta} = -\frac{\partial H^{[1]}}{\partial \theta}\left[\frac{\partial H^{[1]}}{\partial w^{ns}(\theta)}\right]^{-1} = -\frac{U_L(w^{ns}(\theta), \theta(\bar{L} - L^*))(\bar{L} - L^*) - U_L(b, \theta\bar{L})\bar{L}}{U_C(w^{ns}(\theta), \theta(\bar{L} - L^*))}. \tag{18}$$

The second- and cross-derivatives of the utility function $U(C, \theta L)$ are, by assumption, small relative to the first derivatives. We therefore have $U_L(w^{ns}(\theta), \theta(\bar{L} - L^*)) \approx U_L(b, \theta\bar{L})$, so that equation (5) follows from equation (18). Next, we derive equation (7). To this end, we write the indifference condition in (3) as

$$\begin{aligned} H^{[2]} \equiv U(w^*, \theta(\bar{L} - L^*)) &- \frac{1-\delta}{1-\delta+\delta p(1-G_{\tilde{\xi}}(w^*))} U(b, \theta\bar{L}) \\ &- \frac{\delta p(1-G_{\tilde{\xi}}(w^*))}{1-\delta+\delta p(1-G_{\tilde{\xi}}(w^*))} \mathbb{E}_{G_{\tilde{\xi}}}[U(w, \theta(\bar{L} - L^*)) \mid w \geq w^*] = 0. \end{aligned} \tag{19}$$

We set $\xi = \tilde{\xi}$ and $w^* = w^*(\theta, \tilde{\xi})$. Using implicit differentiation, we then get

$$\frac{dw^*(\theta, \tilde{\xi})}{d\theta} = -\frac{\partial H^{[2]}}{\partial \theta}\left[\frac{\partial H^{[2]}}{\partial w^*(\theta, \tilde{\xi})}\right]^{-1}. \tag{20}$$

From our assumption on the second- and cross-derivatives of the utility function $U(C, \theta L)$ we obtain

$$\frac{\partial H^{[2]}}{\partial \theta} \approx -\frac{1-\delta}{1-\delta+\delta p(1-G_{\tilde{\xi}}(w^*))} U_L(w^*(\theta, \tilde{\xi}), \theta(\bar{L} - L^*))L^*. \tag{21}$$

Next, observe that w^* maximizes the right-hand side of the first-order condition in (3), so that its derivative with respect to w^* equals zero. Therefore, we obtain

$$\frac{\partial H^{[2]}}{\partial w^*(\theta, \tilde{\xi})} = U_C(w^*(\theta, \tilde{\xi}), \theta(\bar{L} - L^*)). \tag{22}$$

Taking these results together we obtain equation (7). The assumption on the second- and cross-derivatives of the utility function then leads to equation (8).

A.2 Additional Results

Table A1: Estimated correlation of the experimental reservation wage and survey reservation wage, inverse probability weighting (IPW)

	experimental reservation wage			
	invited sample		75% PASS sample	
	(1)	(2)	(3)	(4)
survey reservation wage	0.574***	0.192	0.607***	0.210
	[0.136]	[0.133]	[0.136]	[0.130]
unemployed		-12.993***		-13.379***
		[2.964]		[2.953]
unemployed ×		1.028***		1.026***
survey reservation wage		[0.300]		[0.295]
Constant	10.552***	17.514***	10.272***	17.680***
	[1.711]	[2.385]	[1.686]	[2.360]
Observations	461	461	461	461
R-squared	0.123	0.177	0.135	0.187

Notes: $^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$; standard errors in brackets. Probability weights are obtained from predicted probabilities of probit regressions on being selected into the experiment. Additional predictors are: high meaning treatment (in outcome stage), male, age, abitur, married, number of children, net income, contracted working hours per week.

A.3 Invitation Letter (English Translation)

Dear [name],

Thank you very much for participating once more in the study "Life quality and social security" this year. You have contributed to the success of the study, which since 10 years has provided scientists and politicians with important information about the life circumstances of the German population.

Since life in Germany is changing, we too want to pursue new paths in research. In cooperation with the universities of Mannheim and Leuven, we implement the internet-based study "Personality and employment", in addition to "Life quality and social security." The study consists of a short survey, after which we ask the participants to take part in a small case study. In the case study, it is possible to earn some money.

From the participants in the study "Life quality and social security" we randomly selected candidates for participation in the additional case study – you are among them. We kindly invite you to participate. Of course, participation in this additional study is voluntarily, and there will not be any negative consequences if you decline to participate. It is, however, crucial for the validity of the study that possibly all selected individuals participate. Among those who participate both in the survey and the case study, we raffle 50 amazon vouchers with a value of 25 Euros each (for at most 1000 participants). In addition, you have the possibility to earn something in the case study (between 9 and 35 Euros). Participating in the study is for technical reasons only possible until August 20, 2017. Unfortunately, since the study has limited financial means, only the first 1000 individuals that register can participate. You can participate in the study using the following link:

www.pass-arbeitswelt.de

Your personal access code is: [code]

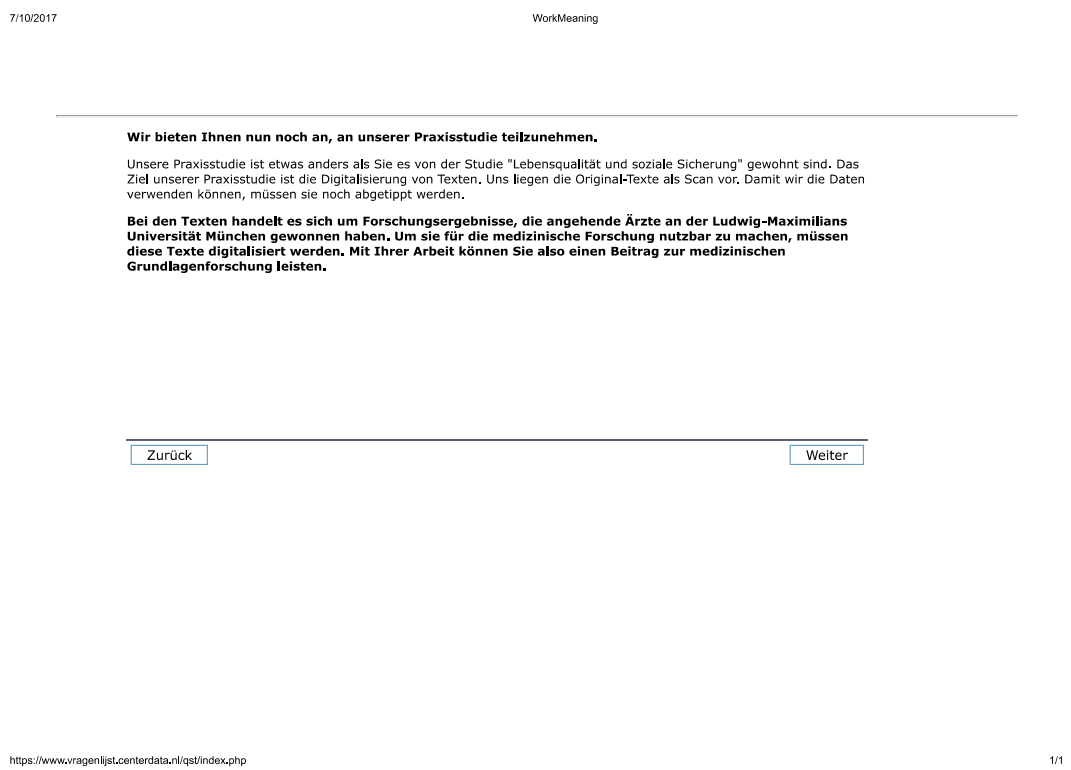
This code ensures that only those invited can participate in the study. Your data are saved anonymously. The collected data are stored separately from your name and email address. To evaluate the data from the additional study "Personality and employment" together with the survey "Life quality and social security" we merge the data using a unique respondent number. By participating in the survey you agree to the data being merged. You may revoke your consent at any time. All information can be found in the data protection statement.

Independently of your participation, we will ask you again the coming year to participate as usual in the survey "Life quality and social security."

We are looking forward to your participation. Thank you very much and kind regards,

A.4 Experimental Instructions

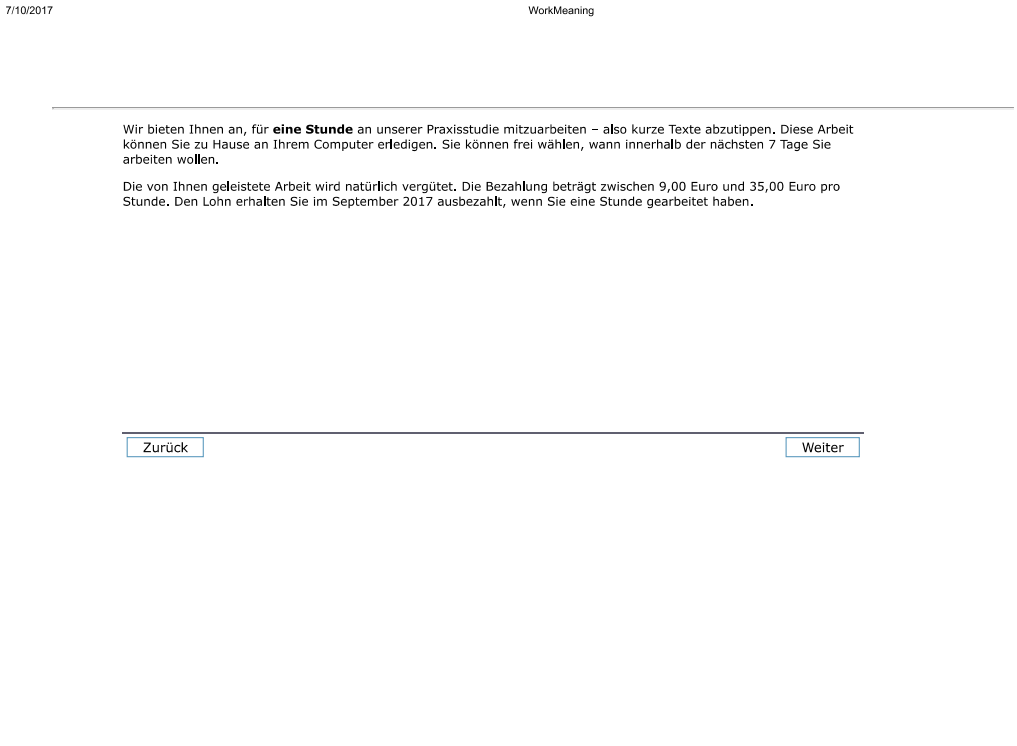
The following screenshots show the instructions for the experiment with the English translation below.



We now offer you the opportunity to take part in our case study.

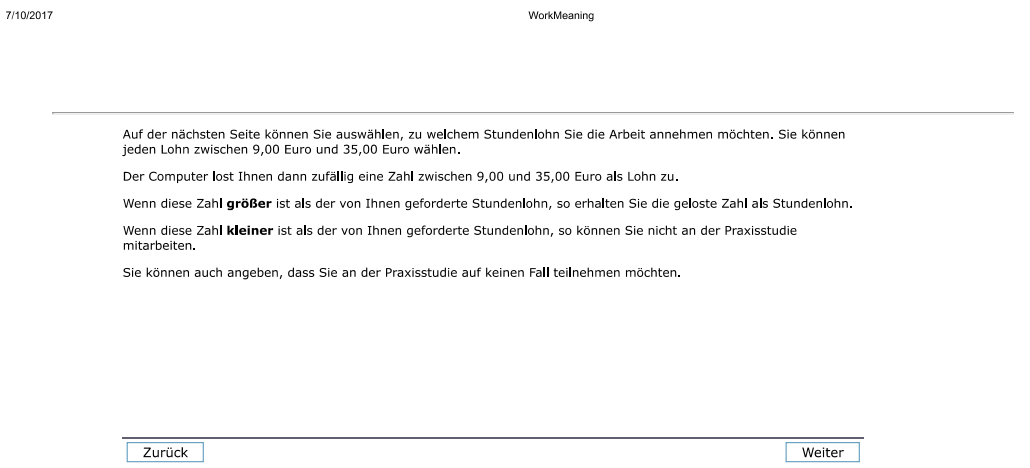
Our study is somewhat different from what you are used to in the study “Life quality and social security.” The goal of our study is to digitalize texts. We have scans of the original texts. In order to use these texts, they have to be type-written.

The texts feature results of research conducted by prospective medical doctors at the Ludwig-Maximilians University in Munich. They have to be digitalized to make them accessible to future medical research. Hence, with your efforts, you can contribute to medical research.



We offer you to work – that means to type short texts – for our study for **one hour**. You can do this at home on your computer. You can choose freely when you would like to work during the next 7 days.

Of course, you will be reimbursed for your efforts. The hourly wage is between 9,00 and 35,00 Euros. You will receive the payment in September 2017 if you have worked for an hour.


7/10/2017 WorkMeaning

Auf der nächsten Seite können Sie auswählen, zu welchem Stundenlohn Sie die Arbeit annehmen möchten. Sie können jeden Lohn zwischen 9,00 Euro und 35,00 Euro wählen.

Der Computer lost Ihnen dann zufällig eine Zahl zwischen 9,00 und 35,00 Euro als Lohn zu.

Wenn diese Zahl **größer** ist als der von Ihnen geforderte Stundenlohn, so erhalten Sie die geloste Zahl als Stundenlohn.

Wenn diese Zahl **kleiner** ist als der von Ihnen geforderte Stundenlohn, so können Sie nicht an der Praxisstudie mitarbeiten.

Sie können auch angeben, dass Sie an der Praxisstudie auf keinen Fall teilnehmen möchten.

Zurück Weiter

https://www.vragenlijst.centerdata.nl/qst/index.php 1/1

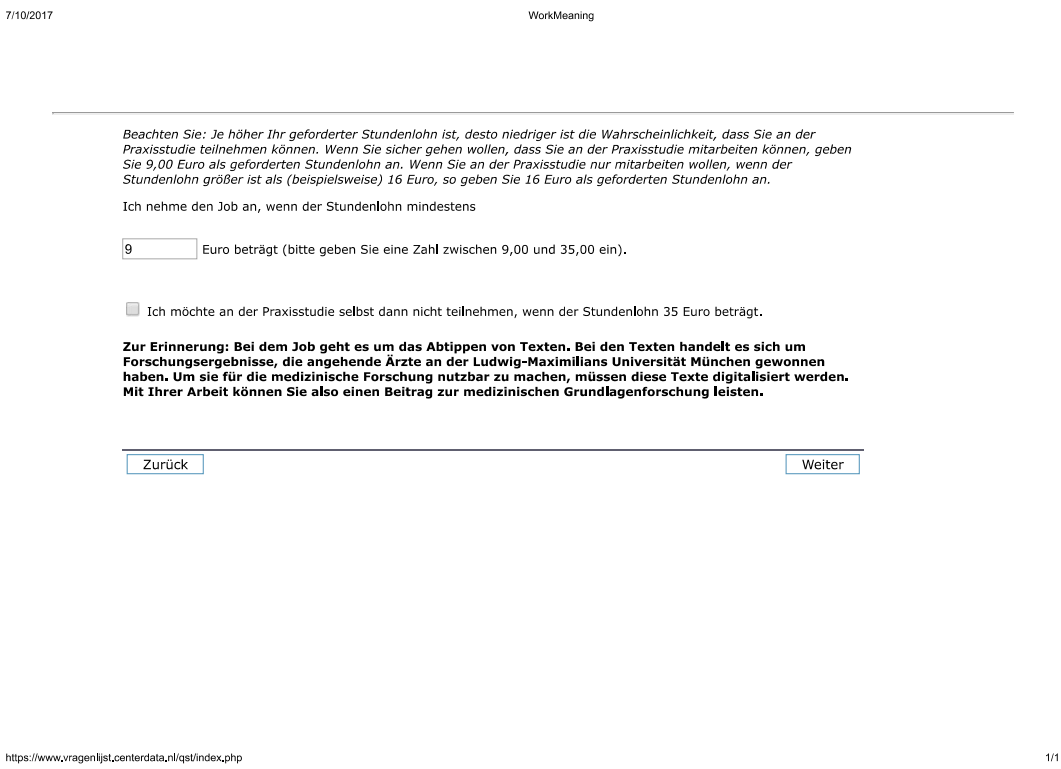
On the next page, you can choose the hourly wage at which you would be willing to accept the job. You can choose a wage between 9 and 35 Euros.

The computer then randomly chooses a number between 9 and 35 as your wage.

If this number is **higher** than the hourly wage you asked for, you will receive the number as your hourly wage.

If this number is **lower** than the hourly wage you asked for, you cannot take part in our study.

You can also state that you do not want to take part in our study at all.



Please keep in mind: The higher the hourly payment is that you request, the lower is the probability that you can participate in the study. If you want to make sure you can work in the study, indicate 9 Euros as a requested hourly payment. If you only want to work in the study if the hourly payment is bigger than (for example) 16 Euros, then you indicate 16 Euro as a requested hourly wage.

I will accept the job if the hourly payment is at least

X Euros (please enter a number between 9,000 and 35,00).

I do not want to participate in the study, even if the hourly payment is 35,00 Euros.

Reminder: This job is about the typing of texts. The texts are research results gained by prospective physicians at the University of Munich. In order to make them usable for medical research, they have to be digitalized. With your work you can contribute to fundamental medical research.