

The Response of Wages to Rejected Offers

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December 23, 2023

Abstract

Using the Survey of Consumer Expectations, which asks employed workers to report their salaries and job offers every four months, we find that rejecting an outside offer does not have a significant effect on a worker's salary with the current employer, the expected probability that the current employer will match a job offer with a higher salary from another firm, and the employed worker's reservation salary for another job. The results suggest that wage renegotiation in response to changes in an employed worker's outside option does not play a significant role for individual wages.

Keywords: Job search, outside options, wage renegotiation, wage growth

JEL codes: J31, J64

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1 Introduction

Are wages set by firms or negotiated between firms and workers? Do firms renegotiate wages with workers in response to changes in their outside options? These questions are central to understanding wage growth, wage inequality, worker mobility, and the causes of unemployment, as pointed out by Hall and Krueger (2010), among others.¹

To shed some light on these questions, we estimate the response of individual wages to rejected offers. Theoretically, if wages are posted by firms without considering the outside option of each worker, e.g., Burdett and Mortensen (1998), rejecting an outside offer should have no impact on a worker's wage with the current employer. On the other hand, if firms do take the outside option of each worker into consideration, as in sequential-auction models of the labor market pioneered by Postel-Vinay and Robin (2002),² they would raise the wage of a worker if it is necessary for the worker to reject an outside offer. This leads to a positive effect of rejected offers on individual wages. Both the likelihood and the size of a positive effect depend on the gap between the value that a worker currently receives from his/her employer and the maximum value affordable by the employer. A small gap means there is little room for renegotiation, so that the average effect of a rejected offer is small. On the other hand, a significant effect of rejected offers would be evidence that wage renegotiation on the job plays a significant role for individual wages.

We use the Survey of Consumer Expectations (SCE) to estimate the effect of rejected offers on within-job wage growth for employed workers. The survey has two unique features. First, it is a short panel that asks each worker to report his/her employment status every month, and the salary and job offers every four months. In particular, every month after the first survey, an employed worker is asked whether he/she is still working in the same job reported in the previous month/survey. Moreover, for every four months, an employed worker is asked to report both the annual salary of the current job and the number of job offers received in the last four months, including rejected offers, and whether each of the three best offers was accepted or rejected.

We focus on employed workers who did not change their jobs in the four months between two consecutive salary reports, and divide them into two groups. The first group includes workers who received zero offer in the four months between the two salary reports, and the second group includes workers who rejected all offers received in the four months between the two salary reports.

We find the difference between the two reported salaries is not significantly different between the two groups of workers. Conditional on the current salary and other observables,

¹See Card (2022) for a review of the literature on how wages are determined.

²Related studies include Dey and Flinn (2005), Cahuc et al. (2006), Bagger et al. (2014), Bagger and Lentz (2019) and Taber and Vejlín (2020), among others.

e.g., age, gender, education and the month and year when the current salary was reported, the new salary observed four months later is not significantly different between workers who rejected all offers and workers who received zero offer in the four months between the current salary and the new salary. This suggests that rejecting an outside offer does not have a significant impact on a worker’s wage with the current employer.

The concern for this interpretation is that, conditional on the current salary and other observables, the new salary observed four months later may still be different between the two groups of workers even in the absence of the rejected offers, so that the observed differences in the new salary between the two groups of workers are not causal impacts of the rejected offers. For example, consider two workers with the same current salary and other observables, but one worker (the first) expects a larger increase in his/her salary with the current employer in the next four months than the other (the second), which could happen if the two workers are under different wage-tenure contracts (Burdett and Coles, 2003) or face different training opportunities (Fu, 2011). Assume the expectations are informative, so that the new salary would be higher for the first worker than it is for the second if neither of them receive an outside offer in the next four months. In this case, if we observe (1) the first worker receives zero offer while the second receives and rejects an offer,³ and (2) the new salary is the same between the two workers, it would still be evidence that the rejected offer has a positive impact on the second worker’s new salary.

To address this concern, we take advantage of the second feature of the SCE, and proceed in four steps. First, as its name suggests, the survey contains rich information on worker beliefs and expectations. For example, each time the survey asks a worker to report the current salary, it also asks the worker to report the belief about the new salary in four months. Empirically, we find that, conditional on the current salary and other observables mentioned above, a worker’s belief about the new salary is predictive of the (actual) new salary observed four months later. Assuming that, in the absence of rejected offers, the new salary observed four months later is on average the same between two workers with the same belief about the new salary,⁴ we could identify the causal impact of rejected offers on the new salary by controlling the belief about the new salary in addition to the current salary and other observables mentioned above. Empirically, when the belief about the new salary is

³Other things equal, the difference in expectations means the first worker is less likely to search for another job and end up with an offer than the second worker.

⁴This is weaker than the assumption of rational expectations. Let $y_{i,t+4}$ be the new salary for worker i at time $t + 4$, $y_{i,t}^b$ be the (subjective) belief of worker i at time t about $y_{i,t+4}$, and $E(y_{i,t+4})$ be the (objective) expected value of $y_{i,t+4}$, where E is the expectation operator that accounts for potential randomness of $y_{i,t+4}$ due to shocks. Rational expectations require $E(y_{i,t+4}) = y_{i,t}^b$ for every worker i . In contrast, we assume $E(y_{i,t+4}) = E(y_{j,t+4})$ for any $i \neq j$ and $y_{i,t}^b = y_{j,t}^b$, which allows for biases in a worker’s beliefs, i.e., $E(y_{i,t+4}) \neq y_{i,t}^b$, but the bias must on average be the same for workers with the same beliefs. The same assumption applies to a worker’s belief about the offer probability mentioned below.

included as an additional control variable, the new salary observed four months later is still not significantly different between workers who rejected all offers and workers who received zero offer in the four months between the current salary and the new salary.

Second, each time the SCE asks a worker to report the current salary, it also asks the worker to report (1) the expected offer probability, defined as the self-reported probability of receiving at least one job offer from another firm in the next four months, and (2) the reservation salary, defined as the lowest salary of a job offer that the employed worker is willing to accept. Empirically, we find a worker's belief about the offer probability is predictive of whether the worker reports a job offer four months later. Assuming the actual probability of receiving a job offer in the next four months is the same between two workers with the same expected offer probability, whether a worker ends up receiving an offer or not is completely random conditional on the expected offer probability. Consequently, controlling for the expected offer probability addresses the potential selection associated with receiving an offer. Moreover, if (1) a job offer is rejected if its value is less than the value of a worker's current job proxied by the reservation salary, and (2) the value of each offer to a worker is random conditional on the worker's ability proxied by the current salary and other observables mentioned above, then whether a job offer is rejected or not is random conditional on the reservation salary, the current salary and other observables mentioned above. That is, conditional on receiving an offer, controlling for the reservation salary addresses the potential selection associated with rejecting the offer. Together, the assumptions imply that, conditional on the expected offer probability, the reservation salary, the current salary and other observables mentioned above, workers who rejected all offers received in the four months between the current salary and the new salary are not systematically different from workers who received zero offer in the four months, and the difference in the new salary between the two groups of workers reflects the causal impact of the rejected offers. Empirically, when the expected offer probability and the reservation salary are included as additional controls, the new salary observed four months after the current salary is still not significantly different between workers who rejected all offers and workers who received zero offer in the four months between the current salary and the new salary.

Third, each time the SCE asks a worker to report the current salary, it also asks the worker to report the expected offer matching probability, defined as the self-reported probability that a worker's current employer will match a job offer with a higher salary from another firm. As discussed in more detail in the next section, because a higher wage reduces a firm's ability to raise it even further, a positive (zero) effect of rejected offers on a worker's wage with the current employer is associated with a negative (zero) effect of rejected offers on the offer matching probability. Empirically, consistent with the insensitivity of wages to rejected offers, we find rejected offers do not have a significant impact on the expected

offer matching probability either. Conditional on the expected offer matching probability reported at the same time as the current salary, the new expected offer matching probability reported four months later (at the same time as the new salary discussed above) is not significantly different between workers who rejected all offers and workers who received zero offer in the four months. The results are robust when the expected new salary, the expected offer probability and the reservation salary are included as additional controls.

Finally, if rejected offers have a positive effect on a worker's wage and/or non-wage benefits with the current employer, it should also raise the worker's reservation salary for another job. Empirically, we find rejecting an offer has no significant effect on a worker's reservation salary. Conditional on the reservation salary reported at the same time as the current salary, the new reservation salary reported four months later (at the same time as the new salary discussed above) is not significantly different between workers who rejected all offers and workers who received zero offer in the four months. The results are robust when we control for the current salary and other variables mentioned above.

We show that the insensitivity of a worker's salary, the expected offer matching probability and the reservation salary to rejected offers are robust to different sub-samples by education and the current salary, and to the inclusion of additional controls, such as the salary that a worker expects to receive from an outside offer, which serves as another proxy for the worker's ability. Moreover, we find the new salary, the new expected offer matching probability and the new reservation salary observed eight months after the current salary are also insensitive to the offers rejected within four months after the current salary. This addresses the potential concern that the impact of rejected offers may not be observed within four months. Because subjective measures such as the expected offer matching probability and the reservation salary should adjust relatively quickly once an employer agrees to raise a worker's wage and/or non-wage benefits in response to a rejected offer, the fact that we find no significant effect of rejected offers on either of them suggests that our results are not driven by the infrequent adjustments of wages in the real world (Grigsby et al., 2021).

We end our analysis with evidence suggesting that the insignificant effect of rejected offers estimated in this paper is not a result of the relatively small number of workers who rejected all offers. Assuming workers are more likely to report relatively good offers, if anything, the potential error in classifying a worker into one of the two groups should make it easier for us to detect a positive effect of rejected offers. Because we find no significant effect of rejected offers, this potential error is not important for our conclusion. Finally, we show that rejecting a high-wage offer, e.g., those with a higher salary than a worker's current job or the reservation salary, has no significant effect on an employed worker either.

Together, the evidence suggests that rejecting an outside offer does not have a significant impact on an employed worker's wage with the current employer. This could happen either

because most firms do not renegotiate wages with their current workers, or because most workers are already paid the maximum value affordable by their employers in the first place, so that there is little room for renegotiation.⁵ Irrespective of the reason, the insignificant effect of rejected offers on within-job wage growth, which is substantial even for workers who have been with the same firm for years (Topel, 1991; Bagger et al., 2014), suggests that wage renegotiation in response to changes in an employed worker’s outside option does not play a significant role for individual wages. This does not mean that there is no wage renegotiation at all, just that the effect is insignificant in the aggregate.

Hall and Krueger (2012) provide some of the first evidence on the relative importance of bargaining vs posting in wage determination. Using self-reported incidence of bargaining at the time a worker was hired into his/her current or most recent job, they find both wage-setting protocols are used widely in practice. Caldwell and Harmon (2019) find individual wage growth is affected by a worker’s outside options determined through coworker networks. They show that the evidence is consistent with the importance of bargaining in wage determination, even though most firms do not renegotiate wages with their workers. Jäger et al. (2020) find wages are insensitive to changes in the value of non-employment measured by unemployment insurance benefits. They show that this insensitivity presents a puzzle to the widely used Nash bargaining model. Using a sample of dual jobholders, Lachowska et al. (2022) estimate the sensitivity of wages and separation rates to wage shocks in a secondary job. They find that, consistent with wage posting, improvements in the outside option lead to higher separation rates but not to higher wages in lower parts of the wage distribution. In contrast, and consistent with bargaining, improved outside options translate to higher wages but not higher separation rates in the highest wage quartile. In the aggregate, they find bargaining appears to be a limited determinant of wage setting.⁶

This paper contributes to the literature by using rejected offers to measure changes in a worker’s outside options, which is at the core of search-theoretic models of the labor market (Rogerson et al., 2005). Instead of the starting wage, we focus on wage growth within a job, and how it responds to rejected offers, which is a key distinction between wage posting and

⁵Theoretically, if firms in the sequential-auction framework are homogeneous, an employed worker will be paid the maximum value affordable by a firm after receiving the first outside offer, so that future offers have no effect. The same is true for unemployed workers who received multiple offers before starting a job (Albrecht et al., 2006). Empirically, Guo (2022) finds that around one third of new hires from non-employment had multiple offers before starting a job. This suggests that the starting wage is already high for many workers, so that there is little room for renegotiation on the job.

⁶Examples of other related studies include Flinn and Mullins (2021), Di Addario et al. (2023), Doniger (2023) and Guo (2023). Flinn and Mullins (2021) and Doniger (2023) use structural models to estimate the share of firms using different wage protocols (e.g., posting vs bargaining). Di Addario et al. (2023) show that, in contrast to the sequential-auction framework pioneered by Postel-Vinay and Robin (2002), where a worker is hired from tends to be relatively inconsequential for their wages in comparison to where they are currently employed. Guo (2023) proposes a test of wage posting using simultaneous offers received by the same worker, and finds evidence consistent with the assumption of wage posting.

sequential-auction models of the labor market.

Flinn and Mullins (2021) use the level of the self-reported offer matching probability to measure the prevalence of wage renegotiation. Instead, we focus on the change in the self-reported offer matching probability over time, and how the change responds to rejected offers. As discussed in more detail in the Conclusion, our results suggest that either workers tend to over-estimate the true likelihood of wage renegotiation, or the self-reported offer matching probability is not updated according to the prediction of sequential-auction models of the labor market. Accounting for worker beliefs about wage renegotiation and how the beliefs are updated is an important direction for future work.

2 Rejected Offers and Wage-Setting Protocols

Consider an employed worker who rejects a job offer from another firm. This section shows how the effect of the rejected offer on the worker's wage with the current employer depends on the wage-setting protocol. We focus on two most commonly used wage-setting protocols: wage posting as in Burdett and Mortensen (1998), and the sequential-auction framework pioneered by Postel-Vinay and Robin (2002).

In Burdett and Mortensen (1998), wages are posted by firms without considering the outside option of each worker. As a result, whether to reject an outside offer or not is a decision made purely by the worker. Because firms do not respond to outside offers received by their employees, rejecting an outside offer has no impact on a worker's wage with the current employer. It also has no effect on the probability that the current employer will match a better offer from another firm in the future.

In contrast, sequential-auction models of the labor market posit that, when poached by another firm, the wage of an employed worker is determined through an auction process involving the worker, the worker's current employer, and the poaching firm. During the auction, the current employer and the poaching firm keep raising the values of their offers to the worker. The auction stops when one of the two firms can no longer raise the value of its offer, because doing so would result in a loss for the firm. The value at which the auction stops will be the value received by the worker, who will work for the firm that wins the auction.

Let p be the productivity of a worker's current employer, p' be the productivity of the poaching firm, and \hat{p} be the maximum productivity of all other firms which have attempted but failed to poach the worker away from the current employer previously. Assuming (1) the maximal value that a firm could offer a worker without suffering a loss is strictly increasing in the firm's productivity, (2) the current employer cannot reduce the value it promised to the worker previously, and (3) the worker stays with the current employer in the case of a

tie, there are three possible outcomes for the competition between the current employer and the poaching firm:

1. The poaching firm wins the auction, which happens if and only if $p' > p$.
2. The current employer wins the auction by matching the maximal value offered by the poaching firm, which happens if and only if $p' \in (\hat{p}, p]$.
3. The current employer wins the auction without having to match the maximal value offered by the poaching firm, which happens if and only if $p' \leq \hat{p}$.

If the worker ends up rejecting the offer from the poaching firm, we must be in one of the last two cases. If it is the last case where $p' \leq \hat{p}$, rejecting the offer has no impact on either the worker or the current employer. On the other hand, if $p' \in (\hat{p}, p]$ so that the current employer has to raise the value it offers to the worker, rejecting the offer will be associated with an increase in the worker's wage, assuming the value that the worker receives from the current employer is strictly increasing in the wage.

Let $w(p, \hat{p})$ be the worker's wage with the current employer before rejecting the offer from the firm whose productivity is p' . The expected effect of the rejected offer is

$$\frac{\int_{\hat{p}}^p [w(p, p') - w(p, \hat{p})] dF(p')}{F(p)} \quad (1)$$

where F is the cumulative distribution function of productivity across firms. The integration in the numerator runs between \hat{p} and p , which is the region where the rejected offer has a positive effect. For each $p' \in (\hat{p}, p]$, the effect is given by the difference $w(p, p') - w(p, \hat{p})$, where $w(p, p')$ is the wage that the worker's current employer has to offer the worker in order for him/her to reject the offer from p' . The denominator accounts for the fact that the offer from p' is rejected, so that $p' \leq p$, the probability of which is $F(p)$.

Other things equal, the effect is increasing in the gap between \hat{p} and p . A small gap means there is little room for renegotiation, so that the average effect of a rejected offer is small. On the other hand, a significant effect of rejected offers would be evidence that wage renegotiation plays a significant role for individual wages.

The probability that the poaching firm is able to offer the worker more than the value promised by the current employer is $1 - F(\hat{p})$, which happens if and only if $p' > \hat{p}$. Conditional on meeting such a poaching firm, the probability that the current employer is able to match the (maximal) offer from the poaching firm is

$$M(p, \hat{p}) = \frac{F(p) - F(\hat{p})}{1 - F(\hat{p})} \quad (2)$$

which is increasing in p and decreasing in \hat{p} .

If $p' \leq \hat{p}$ so that we are in the last of the three cases mentioned above, then rejecting the offer has no impact on either \hat{p} or the offer matching probability $M(p, \hat{p})$. On the other hand, if $p' \in (\hat{p}, p]$ so that we are in the second case, by definition, we have to update \hat{p} so that it equals p' after the worker rejects the offer. This increase in \hat{p} reduces the offer matching probability $M(p, \hat{p})$. Together, the expected effect of rejecting an offer on the offer matching probability is

$$\frac{\int_{\hat{p}}^p [M(p, p') - M(p, \hat{p})] dF(p')}{F(p)} \quad (3)$$

which is similar to the effect on wages but negative in sign.

In summary, different from wage-posting models where rejecting an outside offer has no effect on either a worker's wage with the current employer or the probability that the worker's current employer will match a better offer from another firm, sequential-auction models of the labor market predict that rejecting an outside offer could have a positive effect on a worker's wage with the current employer and a negative effect on the offer matching probability, both of which are associated with the case where $p' \in (\hat{p}, p]$.

Consequently, a positive effect of rejected offers on individual wages and/or a negative effect of rejected offers on the offer matching probability $M(p, \hat{p})$ would be evidence consistent with wage renegotiation and the sequential-auction models. On the other hand, a zero effect of rejected offers on both individual wages and the offer matching probability would suggest that wage renegotiation in response to changes in a worker's outside option does not play a significant role for individual wages. This could happen either because most firms do not renegotiate wages with their workers, or because most workers are already paid the maximum affordable by their employers, i.e., $\hat{p} = p$, so that there is little room for renegotiation.

Four comments are necessary before we move on to the empirical analysis. First, while the standard wage-posting model by Burdett and Mortensen (1998) implies there is no wage growth within a job, this could be relaxed by allowing firms to post either a wage-tenure contract (Burdett and Coles, 2003) or a combination of a piece rate (human capital rental rate) and training opportunities (Fu, 2011). Similarly, while the standard model by Postel-Vinay and Robin (2002), where firms compete in terms of the wage level, implies there is no wage growth within a job in the absence of an outside offer, this could be relaxed by allowing firms to compete in terms of the piece rate in the presence of human capital accumulation (Bagger et al., 2014; Taber and Vejlin, 2020). Consequently, whether there is wage growth within a job or not is not what separates the two types of wage-setting protocols. What matters is whether part of the wage growth within a job is a direct effect of rejected offers.

Second, instead of the wage, it is possible that a firm may respond to a worker's outside offer by adjusting some non-wage benefits of the job for the worker, e.g., a more flexible

work schedule and/or a bigger office. This would make it difficult to detect a significant wage effect, but not impossible, as long as some firms respond to outside offers by raising wages. Moreover, whether the adjustment works through wages or non-wage benefits, we should find a significant effect on a worker's reservation wage.

To see this, we follow Hall and Mueller (2018) by assuming that the value of a job to a worker, v , is the sum of its wage (w) and non-wage benefits (n), i.e., $v = w + n$, and the reservation wage of the worker is $r_w = v - r_n$, where r_n is the worker's reference point for non-wage benefits when answering the question about the reservation wage. Hall and Mueller (2018) assume $r_n = 0$ for everyone, which is not necessary for our purpose. Instead, we assume r_n is fixed for a worker, but it could be any value and could also vary across workers. In this case, a positive effect of rejected offers on the value v of a job to a worker, whether it works through the wage w or non-wage benefits n , should lead to a similar effect on the reservation wage r_w . This is true even if rejected offers also have an effect on the reference point r_n , but the effect is smaller than the corresponding effect on v . Consequently, in addition to the wage w and the offer matching probability $M(p, \hat{p})$, we also estimate the effect of rejected offers on the reservation wage r_w .

Third, even if an employer is willing to renegotiate wages with a worker, the first step is for the worker to receive an outside offer. Consequently, the expected effect of wage renegotiation is smaller than our estimates presented below, which are conditional on observing a rejected offer. The difference between the two is related to the offer arrival rate. Because we find no significant effect for workers who actually rejected an offer, the expected effect that accounts for the offer arrival rate is unlikely to be significant.

Finally, it is worth noting that, strictly speaking, a zero effect of rejected offers is not conclusive evidence against wage renegotiation and sequential-auction models of the labor market. This could happen if all rejected offers in the data are from firms with productivity $p' \leq \hat{p}$. In fact, if all firms have the same productivity, we would have $\hat{p} = p$ for all workers who have received at least one outside offer, so that $p' \leq \hat{p}$ for all rejected offers. However, because offers with $p' \in (\hat{p}, p]$ are a key distinction between the two wage-setting protocols, if these offers almost never exist, it still suggests that wage renegotiation does not play a significant role for continued wage growth within a job. Given the significant wage growth within a job observed in practice (Topel, 1991; Bagger et al., 2014), the evidence presented below still suggests that wage renegotiation in response to changes in a worker's outside option does not play a significant role for individual wages.

3 Data

We use data from the Survey of Consumer Expectations (SCE). Fielded by the Federal Reserve Bank of New York, the SCE is an internet-based monthly survey of a rotating panel of approximately 1,300 household heads from across the U.S. Respondents participate in the panel for up to 12 months, with a roughly equal number rotating in and out of the panel each month.

In each monthly survey, a respondent is asked about his/her employment status. If a respondent who reports to be employed in one survey also reported to be employed in the previous survey, the respondent is asked directly whether he/she is still working in the same job reported in the previous survey.

Every four months (in March, July and November), active members who had participated in a SCE monthly survey in the prior three months are asked some additional questions through a rotating module called the Labor Market Survey. Because respondents are in the SCE for up to 12 months, they may end up taking up to 3 Labor Market Surveys.

Information that we use from the Labor Market Survey includes

- job offers received in the last 4 months, including rejected offers. Specifically, the survey asks each worker “*How many job offers did you receive in the last 4 months? Remember a job offer is not necessarily a job that you accepted*”. After noting that “*the best offer is the offer you would be most likely to accept*”, the survey also asks the following questions about each of the (up to) 3 best offers: *What was the annual salary? Did you accept this job offer?*
- the current salary, defined as the worker’s response to “*How much do you make before taxes and other deductions at your [main/current] job, on an annual basis? Please include any bonuses, overtime pay, tips or commissions*”.
- the reservation salary, defined as the worker’s response to “*Suppose someone offered you a job today in a line of work that you would consider. What is the lowest wage or salary you would accept (BEFORE taxes and other deductions) for this job*”. We convert the answer to an annual salary if it is reported at other frequencies, e.g., hourly, weekly, bi-weekly or monthly.
- the expected offer probability, defined as the worker’s response to “*What do you think is the percent chance that within the coming four months, you will receive at least one job offer from another employer? Remember that a job offer is not necessarily a job you will accept*”.

- the expected salary offer, defined as the worker’s response to “*Think about the job offers that you may receive within the coming four months. Roughly speaking, what do you think the average annual salary for these offers will be for the first year*”.
- the expected offer matching probability, defined as the worker’s response to “*If you were to receive a job offer from another employer at a higher salary, what do you believe is the percent chance your current employer will match the salary offer*”.
- the expected new salary, defined as the worker’s response to “*What do you believe your annual earnings will be in 4 months*”.

We focus on employed workers who did not change their jobs in the four months between two consecutive Labor Market Surveys, and divide them into two groups. The first group includes those who received zero offer in the four months between the two Labor Market Surveys, and the second group includes those who rejected all offers received in the four months between the two Labor Market Surveys.

Table 1 reports the summary statistics of the two groups of workers. Each observation is a combination of two consecutive Labor Market Surveys of the same worker. Because an individual could take up to 3 Labor Market Surveys, by combining two consecutive Labor Market Surveys of a worker into one observation, we may end up with two observations for the same worker. In the empirical analysis, we cluster all standard errors to the worker level, and show that the results are robust when we use one observation for each worker.

All but four variables reported in table 1 are obtained from the first of the two consecutive Labor Market Surveys of each worker. The four exceptions are

- a dummy indicating whether the worker received zero offer or rejected all offers received in the four months between the two Labor Market Surveys. This is based on the job offers reported in the second of the two Labor Market Surveys, which cover the four months between the two Labor Market Surveys. Among workers who rejected all offers, 58% rejected one offer, 25% rejected two offers, and the rest rejected three or more offers received in the four months.
- the new salary, defined as the salary reported in the second of the two Labor Market Surveys.
- the new reservation salary, defined as the reservation salary reported in the second of the two Labor Market Surveys.
- the new expected offer matching probability, defined as the expected offer matching probability reported in the second of the two Labor Market Surveys.

Table 1: Summary Statistics

	Received zero offer	Rejected all offers
Age	44.107 (11.429)	42.360 (11.505)
Female	0.425 (0.494)	0.445 (0.498)
Bachelor's degree	0.476 (0.499)	0.490 (0.501)
Job tenure (years)	9.484 (8.898)	6.267 (7.171)
Expected offer probability	0.171 (0.231)	0.412 (0.333)
Expected offer matching probability	0.265 (0.281)	0.359 (0.316)
Current Salary	72,286.628 (50,655.922)	69,423.645 (48,250.931)
Reservation salary	80,191.899 (57,844.897)	78,370.917 (56,772.349)
Expected salary offer	69,755.527 (47,752.994)	71,419.366 (51,091.493)
Expected new salary	73,517.877 (51,511.265)	72,395.421 (50,807.997)
New salary	73,396.191 (51,971.919)	70,286.388 (49,936.274)
New reservation salary	80,966.033 (57,042.579)	80,985.384 (59,936.695)
New expected offer matching probability	0.254 (0.279)	0.334 (0.289)
Observations	4,205	327

Notes: Standard deviations are in the parentheses. New salaries, new reservation salaries and new expected offer matching probabilities are observed 4 months after other variables. The first (second) column includes workers who received zero job offer (rejected all job offers received) in the 4 months between the current salary and the new salary. Only workers who were employed by the same firm during the period between the current salary and the new salary are included. Expected offer probability is the self-reported probability of receiving at least one job offer from another firm in the 4 months between the current salary and the new salary. Expected salary offer is the self-reported average annual salary of the offers that a worker may receive in the 4 months. Expected offer matching probability is the self-reported probability that the current employer will match a job offer with a higher salary from another firm. Expected new salary is a worker's belief of his/her salary in 4 months.

The goal of this paper is to estimate the impact of the first variable on the last three variables, controlling for all other variables obtained from the first of the two Labor Market Surveys of each observation.

Compared to workers who received zero offer in the four months between the two Labor Market Surveys, workers who rejected all offers received in the four months are younger and have shorter job tenures, higher expected offer probabilities and higher (current and new) expected offer matching probabilities. On the other hand, the two groups are not significantly different in other characteristics listed in the table, including gender, education, the current salary, the reservation salary, the expected salary offer, the expected new salary, the (actual) new salary, and the new reservation salary.⁷

Because job offers are not very common, the number of observations where the worker rejected all offers is small relative to the number of observations where the worker received zero offer. This could be a concern for estimating the correlation between different variables *within* the relatively small number of workers who rejected all offers, e.g., the relationship between the salary of a rejected offer and the worker’s new salary. It is less of a concern for comparing the average difference *between* the two groups of workers, which is what we do in this paper. The next section provides some direct evidence consistent with this claim.

For our purpose, a more relevant concern is the potential error in classifying a worker into one group versus the other. If a significant amount of workers who received zero offer are mis-classified as workers who rejected all offers, or a significant amount of workers who rejected all offers after their current employers raised their wages are mis-classified as workers who received zero offer, we could obtain an insignificant difference between the two groups of workers even if rejecting an outside offer does have a significant effect on a worker’s wage with the current employer. This is unlikely to be the case, for two reasons. First, because workers who reported that they had rejected all offers were also asked about the salaries of those offers, it is unlikely that a significant amount of these workers actually received zero offer. Second, because the survey asks about job offers received in the last 4 months, as opposed to, say, years ago, and workers are reminded throughout the survey that “*a job offer is not necessarily a job that you accepted*”, it is unlikely that a significant amount of workers who rejected all offers would report that they received zero offer.

Even if some workers who rejected all offers forgot to report them, it is likely that the rejected offers were not important to the workers in the first place, in the sense that the offers were not good enough to trigger wage renegotiation even if the current employer is willing to do so, and thus the offers had no effect on either the workers or their current employers.⁸

⁷All salaries are annual, converted to 2019 dollars using the Consumer Price Index, and restricted to be between \$10,000 and \$500,000.

⁸For example, Faberman et al. (2022) designed a different supplement to the SCE that asks a sample of respondents in each October whether a potential employer was willing to make an offer but the respondent

In this case, workers classified as having rejected all offers are more likely to have rejected relatively good offers, which would make it easier for us to find a positive effect of rejected offers on individual wages because, as shown in the previous section, rejected offers that are good are more likely to trigger wage renegotiation. Because we find no significant effect of rejected offers on individual wages, this type of mis-classification is not important for our conclusion.

It is worth noting that rejected offers are much more common than accepted offers. Across the (up to) 3 best offers reported by all workers, including those not employed or not employed in the same job reported four months ago, only 25.6% were accepted, and the rest (74.4%) were rejected. Among workers who reported to be employed in two consecutive Labor Market Surveys (but not necessarily in the same job), 3.2% accepted an offer received in the four months between the two Labor Market Surveys, 7.7% rejected all offers received in the four months, and the rest received zero offer in the four months. These statistics are not available from standard surveys that only ask about accepted offers, and they suggest that it is important to study the impact of rejected offers on individual wages.

As mentioned above, the Labor Market Survey also asks a worker to report the salary of each of the (up to) 3 best offers. Let the rejected salary be the maximum salary of the (up to) 3 best offers for a worker who rejected all offers received in the four months between the current salary and the new salary. Figure 1 plots the difference between the rejected salary and the current salary (the solid line), and the difference between the rejected salary and the reservation salary (the dashed line).

Not surprisingly, the rejected salary is on average smaller than both the current salary and the reservation salary. More importantly, the rejected salary is larger than both the current salary and the reservation salary for a significant fraction of observations. The 75th percentile of the difference between the log rejected salary and the log current (reservation) salary is 0.095 (0). When jobs are different in both wages and non-wage benefits, an employed worker may reject an outside offer even if the rejected salary is higher than both the current salary and the reservation salary, e.g., Hall and Mueller (2018) and Taber and Vejlín (2020). Nevertheless, the evidence suggests that, for a significant fraction of workers, at least one of the rejected offers is more lucrative than the worker’s current job. Other things equal, these workers are more likely to benefit from the rejected offers if their current employers are willing to renegotiate their wages. In addition to the average effect of all rejected offers, the next section also provides some estimates using these high-salary offers.⁹

indicated that he or she was not interested. They label these offers as unrealized rejected offers, because respondents rejected these offers even before a formal offer was made, and find these offers do exist among some employed (and unemployed) workers. Using notations about sequential-auction models from the previous section, these are part of the offers from firms with productivity below \hat{p} .

⁹Because the dashed line is to the left of the solid line, figure 1 also implies that, for most workers, the

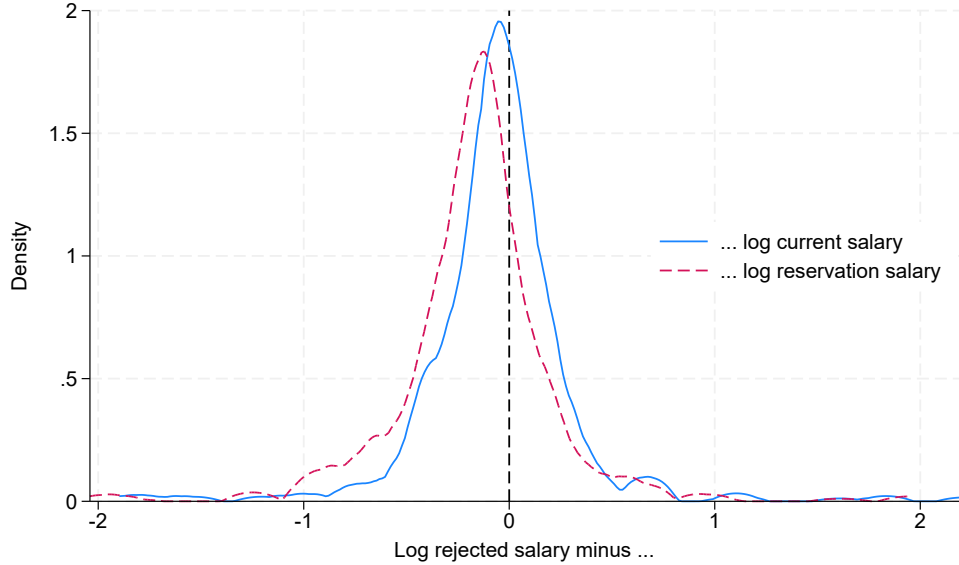


Figure 1: Salaries of Rejected Offers

Notes: This graph uses workers who rejected all offers received in the four months after the current salary. The rejected salary is the maximum salary of the (up to) 3 best offers received and rejected by the worker. The reservation salary, which is reported at the same time as the current salary, is the lowest salary of a job offer that a worker would accept.

Figure 2 shows that the expected/self-reported offer probability is informative of the actual/true probability of receiving an offer in the next four months. The horizontal axis divides workers into 10 groups based on the expected offer probability reported in the first of the two consecutive Labor Market Surveys of each worker. For each group, the vertical axis reports the fraction of workers who reported receiving at least one job offer in the second of the two consecutive Labor Market Surveys. As mentioned above, both the expected offer probability from the first Labor Market Survey and the actual number of job offers from the second Labor Market Survey cover the same four months between the two Labor Market Surveys, so that they are consistent with each other. Clearly, the expected offer probability is predictive of the actual probability of receiving an offer, although the prediction is not perfect, especially at the upper end of the distribution.

Assuming the actual probability of receiving an offer is the same among workers with the same expected offer probability, whether a worker receives an offer or not is random conditional on the expected offer probability. As mentioned previously in the introduction,

reservation salary is larger than the current salary. This is consistent with the relevant statistics in table 1. Using notations from the previous section, this implies $n > r_n$, i.e., the non-wage benefits of the current job is larger than the reference point for most workers. Assuming $r_n = 0$, Hall and Mueller (2018) find that the non-wage benefits are on average positive across job offers. As employed workers move up the job ladder, it is likely that the non-wage benefits are on average larger among the employed than job offers, so that $n > r_n$ for most (employed) workers.

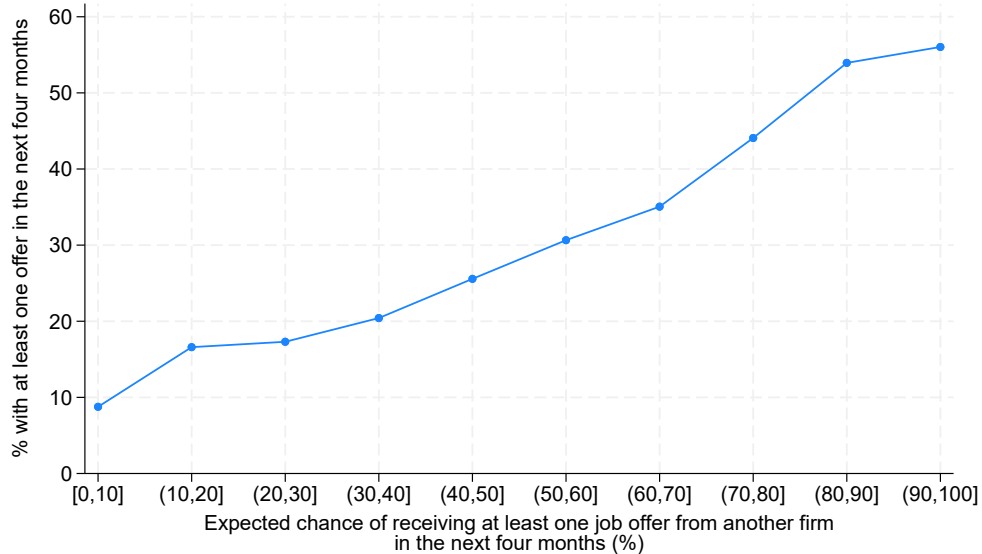


Figure 2: Expected vs Actual Chance of Receiving At Least One Job Offer in Four Months

Notes: Every four months, workers are asked to report both the actual number of job offers received in the last four months and the expected chance of receiving at least one job offer in the coming four months. Using consecutive surveys of the same worker that are four months apart, the figure plots the expected chance of job offers from the first survey (horizontal axis) against the actual chance of job offers from the second survey (vertical axis).

we are not assuming rational expectations, where a worker's expectations must be correct on average. Consistent with figure 2, we allow for biases in expectations, and only require the biases to be the same for workers with the same expectations. We use this to address the potential selection associated with receiving an offer, as discussed in more detail in the next section.

4 Empirical Analysis

Let $y_{i,t}$ be the log current salary of worker i reported in the first of the two Labor Market Surveys in month t , and $y_{i,t+4}$ be the log new salary of the same worker reported in the second of the two Labor Market Surveys in month $t+4$. We estimate the following equation

$$y_{i,t+4} = \alpha R_{i,t,t+4} + \beta y_{i,t} + X_{i,t} \gamma + \theta_t + \epsilon_{i,t+4} \quad (4)$$

where $R_{i,t,t+4}$ is a dummy that equals zero (one) if the worker received zero offer (rejected all offers received) between t and $t+4$, $X_{i,t}$ is a vector of controls observed at the same time as $y_{i,t}$, θ_t is a fixed effect for the month and year when $y_{i,t}$ is observed, and $\epsilon_{i,t+4}$ is the error

term.

The parameter of interest is α , which measures the difference in the new salary, $y_{i,t+4}$, between workers who rejected all offers, $R_{i,t,t+1} = 1$, and workers who received zero offer, $R_{i,t,t+4} = 0$, conditional the current salary, $y_{i,t}$, the time fixed effect, θ_t , and other controls in the vector $X_{i,t}$.

Table 2: Rejected Offers and Salaries

	(1)	(2)	(3)	(4)
Rejected all offers	-0.006 (0.013)	-0.001 (0.013)	-0.012 (0.013)	-0.007 (0.013)
Log current salary	0.939 (0.012)	0.919 (0.017)	0.656 (0.082)	0.566 (0.091)
Age/10		-0.005 (0.004)	-0.003 (0.004)	-0.004 (0.004)
Female		-0.017 (0.008)	-0.015 (0.008)	-0.011 (0.007)
Bachelor's degree		0.037 (0.014)	0.023 (0.009)	0.013 (0.008)
Tenure/10		0.017 (0.006)	0.018 (0.006)	0.019 (0.005)
Log expected new salary			0.284 (0.076)	0.228 (0.067)
Expected offer probability				-0.005 (0.014)
Log reservation salary				0.168 (0.034)
Constant	0.685 (0.130)	0.899 (0.180)	0.665 (0.113)	0.422 (0.085)
Time fixed effects	Yes	Yes	Yes	Yes
Observations	4532	4523	4052	4005

Notes: Standard errors are in the parentheses. The dependent variable is the log new salary observed four months after the current salary. *Rejected all offers* is a dummy that equals zero (one) if a worker received zero job offer (rejected all job offers received) in the four months between the current salary and the new salary. All other variables are observed at the same time as the current salary. Time fixed effects are a set of dummies for the month and year when the current salary was reported.

Table 2 reports the results, where the columns are different due to the control variables included in the vector $X_{i,t}$. In the first column, $X_{i,t}$ only includes a constant. In the second column, $X_{i,t}$ also includes the worker's age, gender, education, and tenure with the current employer at time t . The third column adds the log expected new salary as an additional control. Finally, the last column adds two more controls: the expected offer probability

and the log reservation salary. Due to missing values, the number of observations becomes smaller as we add more controls. This has almost no effect on the estimates. In particular, the estimates of α in the first three columns are almost the same if the three specifications are estimated using the sample from the last column.

Not surprisingly, a worker's current salary is highly predictive of the new salary four months later. Conditional on the current salary and the time fixed effects, the new salary observed four months later is lower for female, higher for workers with a Bachelor's degree or more, and also higher for workers with longer tenures. Conditional on all these variables, the last two columns show that the expected new salary is still very predictive of the actual new salary observed four months later, and the last column shows that the reservation salary is also significantly correlated with the new salary observed four months later.

In all cases, α is estimated to be small and not statistically different from zero. That is, conditional on the current salary and other observables, the new salary observed four months later is not significantly different between workers who received zero offer and workers who rejected all offers received in the four months between the current salary and the new salary. Moreover, in contrast to the positive effect of rejected offers on individual wages predicted by sequential-auction models, α is estimated to be negative in all cases.

If, in the absence of rejected offers, the new salary would still be the same between the two groups of workers, the insignificant estimates of α would imply that rejecting an outside offer does not have a significant impact on individual wages. This is very likely to be the case, for two reasons.

First, we control for the expected new salary, and it is natural to assume that, in the absence of systematic shocks such as the rejected offers, workers with the same expected new salary would on average end up with the same actual new salary. Second, we control for the expected offer probability and the reservation salary. The former helps make sure that whether a worker receives an offer or not is random. This would be the case if the actual/true probability of receiving an offer is the same among workers with the same expected/self-reported offer probability, which is likely to be the case given the evidence presented in figure 2. The reservation salary helps make sure that, conditional on receiving an offer, whether the offer is accepted or rejected is random. This would be the case if (1) the reservation salary is a good proxy for the value of a worker's current job, and (2) the value of each outside offer for a worker is random conditional on the worker's ability proxied by the current salary and other observables in the vector $X_{i,t}$. Under the two assumptions, whether an offer is rejected, which happens if the value of the offer is lower than the value of a worker's current job, is random conditional on the reservation salary, the current salary, and other observables in the vector $X_{i,t}$. Together, the expected offer probability and the reservation salary help make sure that receiving and rejecting an offer is random, so that the

new salary is the same between workers who received zero offer and workers who rejected all offers in the absence of the rejected offers.

4.1 Impact on the Offer Matching Probability

We now estimate the impact of rejected offers on the offer matching probability. As discussed in section 2, there is a tight connection between the impact of rejected offers on individual wages and the impact of rejected offers on the offer matching probability.

Table 3: Rejected Offers and Expected Offer Matching Probabilities

	(1)	(2)	(3)	(4)
Rejected all offers	0.031 (0.018)	0.026 (0.018)	0.026 (0.018)	0.015 (0.020)
Expected offer matching probability	0.595 (0.020)	0.580 (0.021)	0.569 (0.021)	0.559 (0.022)
Age/10		-0.017 (0.004)	-0.018 (0.004)	-0.018 (0.004)
Female		-0.009 (0.008)	0.001 (0.009)	0.002 (0.010)
Bachelor's degree		0.015 (0.008)	-0.007 (0.010)	-0.009 (0.010)
Tenure/10		-0.012 (0.005)	-0.016 (0.006)	-0.014 (0.006)
Log expected new salary			0.038 (0.010)	0.035 (0.017)
Expected offer probability				0.061 (0.022)
Log reservation salary				0.005 (0.018)
Constant	0.097 (0.006)	0.183 (0.021)	-0.219 (0.108)	-0.251 (0.116)
Time fixed effects	Yes	Yes	Yes	Yes
Observations	3874	3866	3818	3778

Notes: Standard errors are in the parentheses. The dependent variable is the new expected offer matching probability, which is observed 4 months after the current expected offer matching probability. *Rejected all offers* is a dummy that equals zero (one) if a worker received zero job offer (rejected all job offers received) in the 4 months between the current and the new expected offer matching probabilities. All other variables are observed at the same time as the current expected offer matching probability. Time fixed effects are a set of dummies for the month and year when the current expected offer matching probability was reported.

Table 3 reports the estimates of equation (4) where $y_{i,t}$ is redefined as the expected offer

matching probability reported in month t , and $y_{i,t+4}$ is redefined as the new expected offer matching probability reported in month $t + 4$. Otherwise, the specifications are the same as those in table 2.

The difference between workers who rejected all offers and workers who received zero offer is not statistically different from zero in any of the specifications. If anything, more controls lead to slightly smaller differences between the two groups of workers. Moreover, in contrast to the negative impact of rejected offers on the offer matching probability predicted by sequential-auction models, the difference is estimated to be positive in all cases. Together, the estimates suggest that rejecting an outside offer does not have a significant impact on the probability that a worker’s current employer will match a better offer from another employer.

4.2 Impact on the Reservation Salary

We now estimate the impact of rejected offers on the reservation salary. As discussed in section 2, rejecting an outside offer should have a positive impact on a worker’s reservation wage as long as the current employer responds to the rejected offer by raising either the worker’s wage or non-wage benefits.

Table 4 reports the estimates of equation (4) where $y_{i,t}$ is redefined as the log reservation salary reported in month t , $y_{i,t+4}$ is redefined as the log new reservation salary reported in month $t + 4$, and the last column uses the log current salary as an additional control, as opposed to the log reservation salary which is already included in this case. Otherwise, the specifications are the same as those in table 2.

While positive, the difference between workers who rejected all offers and workers who received zero offer is not statistically different from zero in any of the specifications. If anything, more controls lead to smaller differences between the two groups of workers. This suggests that rejecting an outside offer does not have a significant impact on a worker’s reservation salary, and employers do not respond to outside offers by adjusting either wages or non-wage benefits.

4.3 Robustness

Table 5 shows that the results reported above are robust to alternative samples and specifications. Each row reports the results from three versions of equation (4). The first three columns report the estimated impact of rejected offers on the new salary, as in table 2, the next three columns report the estimated impact of rejected offers on the new expected offer matching probability, as in table 3, and the last three columns report the estimated impact of rejected offers on the new reservation salary, as in table 4. In all cases, est and std are the estimate and standard error of α , respectively, and rej is the number of observations where

Table 4: Rejected Offers and Reservation Salaries

	(1)	(2)	(3)	(4)
Rejected all offers	0.022 (0.017)	0.021 (0.017)	0.006 (0.018)	0.006 (0.019)
Log reservation salary	0.909 (0.010)	0.875 (0.013)	0.683 (0.042)	0.623 (0.044)
Age/10		-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)
Female		-0.043 (0.008)	-0.032 (0.008)	-0.029 (0.008)
Bachelor's degree		0.062 (0.010)	0.029 (0.010)	0.025 (0.010)
Tenure/10		0.006 (0.005)	-0.001 (0.006)	-0.003 (0.006)
Log expected new salary			0.235 (0.040)	0.103 (0.041)
Expected offer probability				0.019 (0.019)
Log current salary				0.199 (0.043)
Constant	1.023 (0.115)	1.400 (0.141)	0.963 (0.119)	0.898 (0.117)
Time fixed effects	Yes	Yes	Yes	Yes
Observations	4438	4430	3976	3971

Notes: Standard errors are in the parentheses. The dependent variable is the log new reservation salary, which is observed 4 months after the current reservation salary. *Rejected all offers* is a dummy that equals zero (one) if a worker received zero job offer (rejected all job offers received) in the 4 months between the current and the new reservation salaries. All other variables are observed at the same time as the current reservation salary. Time fixed effects are a set of dummies for the month and year when the current reservation salary was reported.

the worker rejected all offers received in the four months between the two Labor Market Surveys. The number of observations where the worker received zero offer in the four months is much larger. In all cases, we use the full vector of $X_{i,t}$, as in the last columns of tables 2, 3 and 4, respectively.

As mentioned above, a worker could have up to two observations in our sample, and we clustered all standard errors to the worker level. As an alternative, the first row uses only the first observation of each worker.

At the time of each Labor Market Survey, an employed worker is also asked to report the month and year when he/she first started working at the current job. The second row restricts to observations where the reported month and year are the same between the two Labor Market Surveys. This further makes sure that the worker did not change his/her job between the two Labor Market Surveys.

The third row restricts to observations where the worker reported receiving zero offer in (the four months before) the first Labor Market Survey. This further makes sure that the offers reported in the second Labor Market Survey were received in the four months between the two Labor Market Surveys.

The fourth row uses observations before 2020 to avoid the impact of the COVID-19 pandemic. The fifth row uses only workers without a Bachelor's degree, and the sixth row uses only workers with a Bachelor's degree or more. The seventh, eighth, and ninth row uses only workers in the first, second, and third tercile of the current salary distribution, respectively.

The tenth row uses the log expected salary offer as an additional control variable. Assuming the average salary that a worker expects to receive from a job offer is a function of the worker's ability, this additional control further makes sure that workers who rejected all offers are comparable with workers who received zero offer.

Finally, the last row replaces $y_{i,t+4}$ with $y_{i,t+8}$. That is, instead of 4 months, we use the new salary, the new expected offer matching probability and the new reservation salary observed 8 months after the current salary, the current expected offer matching probability and the current reservation salary as the dependent variables. We do so by combining the three Labor Market Surveys of each worker into one observation. This addresses the potential concern that the impact of rejected offers may not be observed within four months. As mentioned in the introduction, as long as subjective measures such as the expected offer matching probability and the reservation salary adjust relatively quickly once an employer agrees to raise a worker's wage and/or non-wage benefits in response to a rejected offer, the fact that we find no significant effect of rejected offers on either of them suggests that our results are not driven by the infrequent adjustments of wages in the real world.

While the samples are relatively small, in all cases, we find the rejected offers have

Table 5: The Effects of Rejected Offers: Robustness

	Salaries			Matching probabilities			Reservation salaries		
	est	std	rej	est	std	rej	est	std	rej
First observation of each worker	-0.010	0.017	202	0.023	0.024	183	0.013	0.025	199
Same job starting month and year	0.013	0.013	192	0.019	0.022	169	0.002	0.021	191
No offer in the last 4 months	0.015	0.015	122	0.020	0.027	110	-0.026	0.024	119
Before COVID	-0.009	0.014	244	0.012	0.020	217	0.012	0.020	241
Bachelor's degree: No	-0.023	0.021	87	0.025	0.032	80	-0.008	0.028	85
Bachelor's degree: Yes	0.012	0.016	184	0.009	0.021	164	0.022	0.026	183
Current salary: 1st tercile	-0.001	0.023	79	0.053	0.036	72	-0.012	0.035	77
Current salary: 2nd tercile	-0.009	0.023	83	-0.027	0.034	76	0.042	0.036	83
Current salary: 3rd tercile	0.000	0.019	109	0.014	0.026	96	-0.008	0.031	108
Log expected salary offer	0.006	0.014	242	0.013	0.020	219	0.003	0.019	240
8 months	0.000	0.030	88	0.022	0.038	80	-0.029	0.037	93

Notes: Using slightly different samples and/or specifications, each row reports the results from three different regressions, where the first three columns are about salaries, the next three columns are about the probability that a worker's current employer will match a better offer from another firm, and the last three columns are about the reservation salary. The key independent variable is a dummy that equals zero (one) if a worker received zero job offer (rejected all job offers received) in the four months between two consecutive reports of salaries, offer matching probabilities and reservation salaries. The estimate and standard error of the coefficient for this variable are reported in columns est and std, respectively. Column rej reports the number of workers who rejected all offers received in the four months. See the main text for the list of control variables and other details.

no significant impact on either a worker’s salary with the current employer, or the expected probability that the current employer will match a job offer with a higher salary from another firm, or the worker’s reservation salary for another job. In many cases, the estimate is either close to zero or has a sign that is different from the prediction of sequential-auction models of the labor market. This suggests that the insignificant estimates are not driven by large standard errors from the relatively small number of workers who rejected all offers received in the four months between the two Labor Market Surveys. As mentioned in the previous section and discussed in more detail below, the relatively small sample of workers who rejected all offers is less of a concern for estimating the average differences between the two groups of workers, especially for the main analysis using the full sample, and the potential classification error due to unrealized rejected offers should make it easier for us to find a significant effect of rejected offers if the effect is not zero.

4.4 High-Salary Offers

While we focus on the average differences between workers who rejected all offers and workers who received zero offer, it is tempting to restrict the first group to those who rejected a relatively good offer, e.g., workers who rejected an offer with a higher salary than their current job, because sequential-auction models predict that only relatively good offers, i.e., those with $p' \in (\hat{p}, p]$, have an impact.

We make no restrictions for three reasons. First, our goal is to estimate the average effect of rejecting an outside offer, rather than identifying a few cases where rejected offers might have an effect. Even if some rejected offers do have an impact, the contribution of wage renegotiation is still small if those cases are rare and the relevant effects are small, which would be the case if \hat{p} is close to p for most workers. Second, in the presence of non-wage benefits, offers with higher salaries are not necessarily more valuable to a worker, neither are they more likely to come from firms with higher productivity, e.g., those with $p' \in (\hat{p}, p]$ as opposed to $p' \leq \hat{p}$. Finally, with measurement error, the observed/reported wage growth for the subset of workers who rejected an offer with a higher salary than the current job could be larger than the wage growth among workers who received zero offer, even if the true wage growth is not significantly different between the two groups of workers. This arises because a negative measurement error for the current salary raises both the difference between the rejected salary and the current salary, which makes the rejected offer look better, and the difference between the new salary and the current salary, which makes the wage growth look larger. Consequently, observations where the rejected salary is larger than the current salary is more likely to have a negative measurement error on the current salary, so that the observed wage growth is spuriously large.

To see this empirically, we re-estimate equation 4 by excluding the subset of workers who rejected all offers received in the four months between t and $t+4$ and for whom the maximum salary of the rejected offers is lower than the worker's current salary $y_{i,t}$. Consequently, $R_{i,t,t+4}$ is now a dummy that equals zero if worker i received zero offer in the four months between t and $t+4$, and equals one if (1) the worker rejected all offers received in the four months and (2) at least one of the rejected offer has a higher salary than the worker's current job. We will refer to a worker with $R_{i,t,t+4} = 1$ as someone who rejected a high-salary offer.

Using the same specification as the last column of table 2, where the number of workers who rejected all offers is 271, the first column of table 6 reports the estimates from the smaller sample, where the number of workers who rejected a high-salary offer is 95. Even with such a small sample size, the estimates suggest a marginally significant difference between workers who rejected a high-salary offer and workers who received zero offer: the p -value for the difference is 0.063. In comparison, in the last column of table 2, the p -value for the difference between workers rejected all offers and worker who received zero offer is 0.594. This suggests that the insignificant effect of rejected offers reported above is not a result of the relatively small number of workers who rejected all offers.

On the other hand, the (marginally) significant difference between workers who rejected a high-salary offer and workers who received zero offer is most likely a result of the measurement error for the current salary. To see this, the second column of table 6 drops the current salary from the regression. The difference between the two groups is now essentially zero. In contrast, when we drop the reservation salary from the regression, the third column shows that the difference is significantly larger. Presumably, the reservation salary is correlated with the true current salary but not the measurement error, so that dropping the reservation salary eliminates part of the information about the true current salary, but not the measurement error. If the true current salary is what drives the difference between the first two columns, we should see a similar decline in the estimate of α in the third column. This is not the case. Instead, the estimate becomes larger, probably because some useful information is lost when the reservation salary is dropped. Together, the difference between the second column and the other two suggests that measurement error for the current salary is the reason for the significant estimates of α in columns 1 and 3, and the difference between columns 1 and 3 suggests that the the reservation salary is an informative control.

For more evidence, we re-define a high-salary offer using the reservation salary instead of the current salary. Specifically, we re-define $R_{i,t,t+4}$ as a dummy that equals zero if worker i received zero offer in the four months between t and $t+4$, and equals one if (1) the worker rejected all offers received in the four months and (2) at least one of the rejected offer has a higher salary than the worker's reservation salary. This excludes the subset of workers who rejected all offers received in the four months between t and $t+4$ and for whom the

Table 6: Rejecting a High-Salary Offer and Salaries

	(1)	(2)	(3)	(4)	(5)	(6)
Rejected a high-salary offer	0.037 (0.020)	-0.004 (0.017)	0.049 (0.021)	0.044 (0.018)	0.021 (0.019)	0.067 (0.023)
Log current salary	0.563 (0.092)		0.662 (0.089)	0.586 (0.096)	0.685 (0.092)	
Age/10	-0.005 (0.004)	-0.003 (0.005)	-0.005 (0.004)	-0.006 (0.004)	-0.005 (0.004)	-0.003 (0.005)
Female	-0.012 (0.007)	-0.022 (0.009)	-0.017 (0.008)	-0.011 (0.007)	-0.016 (0.008)	-0.021 (0.009)
Bachelor's degree	0.011 (0.008)	0.023 (0.009)	0.019 (0.009)	0.011 (0.008)	0.018 (0.010)	0.024 (0.009)
Tenure/10	0.019 (0.006)	0.027 (0.005)	0.018 (0.006)	0.019 (0.006)	0.018 (0.006)	0.027 (0.005)
Log expected new salary	0.227 (0.068)	0.595 (0.042)	0.278 (0.083)	0.210 (0.070)	0.255 (0.086)	0.595 (0.042)
Expected offer probability	-0.011 (0.016)	-0.026 (0.019)	-0.013 (0.016)	-0.008 (0.016)	-0.009 (0.016)	-0.027 (0.019)
Log reservation salary	0.170 (0.035)	0.344 (0.040)		0.164 (0.035)		0.344 (0.040)
Constant	0.436 (0.089)	0.632 (0.101)	0.676 (0.118)	0.443 (0.090)	0.673 (0.120)	0.639 (0.102)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3829	3829	3829	3794	3794	3794

Notes: Standard errors are in the parentheses. The dependent variable is the log new salary observed 4 months after the current salary. *Rejected a high-salary offer* is a dummy that equals zero if a worker received zero job offer in the 4 months between the current salary and the new salary. In the first three columns, the dummy is equal to one if a worker rejected all offers received in the 4 months and at least one of the rejected offer has a higher salary than the worker's current salary. In the last three columns, the dummy is equal to one if a worker rejected all offers received in the 4 months and at least one of the rejected offer has a higher salary than the worker's reservation salary. All other variables are observed at the same time as the current salary. Time fixed effects are a set of dummies for the month and year when the current salary was reported.

maximum salary of the rejected offers is lower than the worker's reservation salary. As a result, we are left with only 60 observations where $R_{i,t,t+4} = 1$. We will refer to these workers as having rejected a high-salary offer.

The fourth column reports the estimates using this definition of $R_{i,t,t+4}$ and the same specification as the first column. We find a significant difference between workers who rejected a high-salary offer and workers who received zero offer, even though the first group has only 60 observations. Again, this suggests that the insignificant effect of rejected offers reported above is not a result of the relatively small number of workers who rejected all offers. On the other hand, the significant difference between workers who rejected a high-salary offer and workers who received zero offer is most likely a result of the measurement error for the reservation salary, which is what we use to define a high-salary offer in this case. Consistent with this conjecture, column 5 shows that the difference between the two groups becomes smaller and insignificant when we drop the reservation salary from the regression. In contrast, column 6 shows that the difference becomes larger when we drop the current salary from the regression, because measurement error for the current salary is not contributing to the bias in this case, while ignoring the true current salary amplifies the bias.

In summary, the estimates in table 6 suggests that, (1) the insignificant effect of rejected offers reported above is not a result of the relatively small number of workers who rejected all offers, (2) restricting to offers with a higher salary than a worker's current job or the reservation salary could lead to a spurious effect due to measurement error, and (3) if anything, the estimates in columns 2 and 5 suggest that rejecting a high-salary offer does not have a significant effect on an employed worker either.

5 Conclusion

Wage renegotiation allows a worker to benefit from outside offers and other improvements in the outside option without switching jobs. It provides an important incentive for employed workers to search on the job. While important for some labor markets, e.g., academia, the evidence presented in this paper suggests that, on average, wage renegotiation in response to changes in a worker's outside option does not play a significant role for individual wages.

Theoretically, this could happen for two reasons. First, most firms do not renegotiate wages with their workers. Second, in firms that do renegotiate wages, most workers are paid the maximum wages/values affordable by the firm, so that there is little room for renegotiation. While the second reason means that our estimates are not conclusive evidence against wage renegotiation and sequential-auction models of the labor market, it also implies that wage renegotiation is not a significant contributor to the continued wage growth within a job observed in the real world (Topel, 1991; Bagger et al., 2014).

Data on the self-reported offer matching probability suggest that many firms do renegotiate wages with their workers. As shown in table 1, on average, the self-reported probability that a worker’s current employer will match a job offer with a higher salary from another employer is 26.5% among workers who received zero offer and 35.9% among workers who rejected all offers. Using the same data, Flinn and Mullins (2021) find that over 50% of workers in most demographic groups reported a positive probability that their current employer will match a job offer with a higher salary from another employer.

However, workers may have biased beliefs about the likelihood that their current employer will match a better offer from another firm, so that the self-reported offer matching probability does not reflect the true probability of wage renegotiation. For example, in the absence of any shock such as an outside offer, there should be no change in the true offer matching probability. In contrast, among workers in our data who received zero offer between two consecutive Labor Market Surveys, the four-month change in the self-reported offer matching probability is on average negative (-0.011 with a standard error of 0.004). One explanation is that workers learned in the four months that they over-estimated their employer’s willingness and/or ability to match an outside offer in the first Labor Market Survey. In this case, the decline in the self-reported offer matching probability should be larger among workers who are more likely to learn about their employer’s willingness and/or ability to match an outside offer. This may explain some of the patterns documented in table 3, e.g., the decline in the self-reported offer matching probability is larger among older workers and workers who have been with their current employer for a longer period of time.

An important direction for future work is to account for worker beliefs about wage renegotiation, e.g., whether the beliefs are biased, how the beliefs are updated, and the impact of the beliefs on job search and other labor market outcomes. Related to this, Jäger et al. (2023) find workers wrongly anchor their beliefs about outside options on their current wage, and, in response to information about wages of similar workers, they correct their beliefs about outside options and change their job search and wage negotiation intentions. Theoretically, they show that anchored beliefs keep overly pessimistic workers stuck in low-wage jobs, which gives rise to monopsony power and labor market segmentation.

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