Why Bother? Understanding the Impact of Financial Obligations on Wage Selectivity

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Abstract

Approximately 80 percent of Americans have a significant financial obligation. A substantial fraction of these individuals rely almost solely on labor income to meet these needs. Using a two-period model we demonstrate that when agents are risk averse, increasing the level of financial obligation will have a differential effect on the likelihood a wage offer is accepted depending on the initial size of the obligation. Increasing financial obligations from low levels is found to reduce wage selectivity, while increasing it beyond a certain threshold reverses this effect. We test our theory using online experiments. We confirm our theoretical results in the form of a statistically significant "dip" in wage selectivity for risk averse subjects assigned moderate financial obligations. This non-monotonic effect suggests that heterogeneity in financial obligations may exacerbate income and wealth inequality through individuals' labor market decisions. Policy makers interested in distributional effects should consider this feedback mechanism when designing policies related to loan forgiveness or debt discharge.

JEL classification: C9, J31, E24

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1 Introduction

Approximately 80 percent of Americans have some form of large debt or financial obligation (Pew Charitable Trust, 2015a).[1] Due to insufficient savings, these financial obligations are often paid using labor income. For example, Pew Charitable Trust (2015b) reports that 41 percent of households in America do not have enough savings to cover a $2,000 expense, and 1 in 3 Americans lack any savings. Therefore, unanticipated unemployment spells can lead to economic hardships as individuals struggle to meet existing financial obligations.[2]

In this paper, we use both theory and experiments to investigate the extent to which differences in existing financial obligations (which we refer to as "debt" for narrative purposes hereafter) influence individuals' willingness to accept wage offers (wage selectivity).[3] Our experimental evidence is consistent with the theoretical predictions of our model, indicating that increases in low levels of debt cause wage selectivity to decrease while further increases in debt past a certain threshold reverse this effect. In our model, this non-monotonic effect is observed in the reservation wage profile of risk averse agents, with the extent of this effect depending on the agent's degree of risk aversion. Similarly, in our experiments we observe a statistically significant "dip" in the likelihood of rejecting a wage offer, implying a drop in the reservation wage, for subjects assigned a moderate level of debt. This observed non-monotonic effect of debt on wage selectivity suggests a possible linkage through which variations in debt may feedback on income and wealth inequality. Individuals with moderate debt will more readily accept low paying jobs, while individuals with high levels of debt may face long unemployment spells and higher default risk as they hold out for higher paying jobs. Policy makers interested in distributional effects should take such responses into consideration when drafting policies related to debt servicing and debt forgiveness.

We motivate our experimental work by modifying the standard reservation wage model proposed by McCall (1970). Our model demonstrates a plausible reason why unemployed agents assigned moderate levels of debt will be less selective than their counterparts with lower or higher assigned debt levels. This theoretical result can be explained as follows: when there is no debt, an agent behaves just as they would under standard theory where debt is not included in the model. When given the option between accepting a certain wage today versus a risky wage (or payoff) tomorrow, the agent accepts the certain wage today if the utility derived from the

[1] Respondents were asked about money owed on mortgages, school loans, automobiles, and outstanding credit card balances.

[2] While 1 in 10 Americans with incomes greater than $100,000 a year report having no savings, the compounding problems of financial obligations and unemployment are more likely suffered by low income workers who are more likely to become unemployed (see Desmond and Gershenson, 2016).

[3] While we will focus on wage selectivity throughout the paper, this concept is directly related to the duration of unemployment in both our theoretical model and our experimental designs. Therefore, our results may also be interpreted as the effect of debt on duration of unemployment.

wage offered today is greater than the expected utility from waiting. However, the presence of debt, and the assumed fixed penalty of default, alters both the payoff structure and the individual's option value of waiting.[4] While increases in assigned debt reduce both the agent's current and expected utility, we find that changes in debt affect these utility values differentially depending on the agent's initial debt level and degree of risk aversion. These differential effects are what drive the non-monotonic result described above (see Section 2.1 for a detailed discussion of this mechanism.)

To provide a direct test of our theory, we first present the results from a stylized online experiment that is consistent with our model (Experiment 1). Once the theoretical and experimental results have been compared, we check the robustness of our findings using an extended online experiment where subjects have the possibility of observing a large number of wage draws and are paid based on their performance in a real effort task (Experiment 2). By utilizing experiments, we are able to exogenously assign subjects a specific debt and wage level, thereby avoiding the endogeneity concerns often present in empirical studies focused on the effects of debt and wealth on labor market outcomes. Online experiments also provide the added benefit that the demographics of the subject pool match well with our population of interest. Specifically, participants tend to be middle-aged, and have large financial obligations and limited savings.

Experiment 1, which serves as a direct test of our theory, is a simple two period design where all subjects receive the same initial wage offer but differ in terms of their assigned debt levels. Each subject must decide if they will accept or reject this initial wage. By accepting the initial wage offer, the subject will earn a total payout of twice the offered wage (earn wage in both periods of experiment), less their debt level. If a subject rejects the initial wage offer, they have a 50 percent chance of receiving a wage at the start of the second period that will increase their payout and a 50 percent chance that the new wage will result in a lower, potentially zero, payout. The results of this experiment are consistent with the predictions of our theoretical model of a non-monotonic relationship between debt and wage selectivity. Specifically, we observe a statistically significant (at conventional levels) "dip" in the likelihood of rejecting the initial wage offer for subjects assigned a moderate debt level in this experiment.

It is possible that the non-monotonic effect of debt on wage selectivity observed in Experiment 1 is simply an artifact of the simplicity of the experimental design. To this end, we consider an alternative experimental environment, Experiment 2, that we propose is closer to what individuals actually encounter in the labor market. Subjects are still randomly assigned a debt, but now the experiment lasts for many

[4] In our experiments, subjects earn a payout of zero if they default on their debt. This can be interpreted as a type of bankruptcy protection which mitigates the loss a subject faces in the event of a default. Our theoretical predictions are robust to more severe fixed penalties of default (results available upon request).

periods and subjects must budget their time between searching for a higher wage and completing a real effort task for money. Specifically, subjects have two minutes to both accept a wage and code words for money. Subjects are paid their wage rate for each code they complete, less their debt level. In other words, there is a tension between searching for a higher wage and allocating more time to coding words to earn a payout. We find subjects assigned a moderate level of debt take significantly fewer wage draws than their counterparts who were assigned higher or lower levels of debt. Therefore, the non-monotonicity observed in Experiment 1 remains under Experiment 2. This suggests that the observed "dip" in wage selectivity was not simply a product of the simple design of Experiment 1.

The connection between an individual's financial condition and their labor market outcomes has been well studied in the literature. For instance, there is a rich line of research exploring the effects of wealth on job acceptance and labor market transitions. The general consensus within this literature is that an individual's wealth is positively related to job selectivity. That is, as wealth decreases (increases), workers become less (more) selective in terms of wages. For instance, under standard assumptions Danforth (1979) demonstrates a positive correlation between asset holdings and accepted wages, while Blundell et al. (1997) show an inverse relationship between employment and initial wealth (savings).[5]

The empirical literature on the effects of wealth on labor market outcomes echo the theoretical findings. While statistical significance of the effect of wealth on wage selectivity is susceptible to the specification, Bloemen (2002) finds evidence in support of an inverse relationship between savings and the likelihood of accepting a job. However, Bloemen (2002), suggests that estimating relationships between wealth and job acceptance through labor market transitions is difficult. This is due to the possibility that the likelihood of transition is a function of unobserved individual preferences/characteristics as well as factors from the demand side of the labor market. In particular, individual borrowing constraints may have a significant effect on transitions in the labor market. Indeed, Rendon (2007) demonstrates this using a dynamic model and data from the National Longitudinal Survey. Results from the model, though, do suggest that initial wealth influences job search outcomes. This is because individuals with more wealth can be more selective. Thus, while these individuals have a higher probability of being unemployed, they also have a higher probability of earning higher wages. Bloemen and Stancanelli (2001) report similar results, showing that wealth has both a positive effect on an individual's wage selectivity and a negative (albeit small) effect on employment.

Under the assumption that debt or financial obligations function as negative

[5]There is a large literature on the presence of debt aversion, or the tendency of individuals to make choices in order to avoid the accumulation of debt. Debt aversion has been demonstrated to influence an individual's likelihood to attend college, their career choice upon graduation (Field, 2009) and even lead to sub-optimal consumption (Meissner, 2014). The primary difference between our work and this strand of literature is that we treat debt as exogenous in order to isolate the effect of variations in debt on wage selectivity.

wealth, our paper contributes to the previously discussed literature by demonstrating that the positive relationship between wealth and wage selectivity remains for low to moderate levels of negative wealth.[6] However, the non-monotonic effect introduced earlier and detailed shortly indicates that once debt becomes sufficiently large, this relationship may break down and the effect of wealth on wage selectivity becomes negative. Such a relationship is consistent with the housing literature which reports a positive relationship between homeownership and increased wage selectivity (Oswald, 1996; Blanchflower and Oswald, 2013).[7] While issues regarding housing and labor market decisions necessarily introduce further questions regarding endogeneity, we simply present this as an empirical example of our mechanism. Furthermore, our experimental design provides us with control over the environment thus allowing us to avoid the potential endogeneity issues mentioned in the empirical literature.

Therefore, our paper contributes to several strands of literature exploring the effects of wealth, savings, and financial security on individuals' labor supply decisions. We focus on an often overlooked question, the impact of debt on wage selectivity, and offer an explanation that is testable with our experimental design. We propose that there is a non-monotonic relationship between debt and wage selectivity. Consistent with previous work, we show that for low to moderate debt levels, an increase in debt reduces workers' wage selectivity. However, at some point the debt becomes so large that unless the worker lands a high paying job, the debt will go unpaid. Thus at some level of debt, the worker keeps searching for a higher wage, while workers with less debt would have already accepted employment.

The remainder of the paper is organized as follows. Section 2 presents our theoretical model. Section 3 outlines the experimental design used to test our theoretical predictions. Section 4 presents the results of our experiments, and Section 5 concludes.

[6] While the interpretation of debt as negative wealth is reasonable, it potentially ignores the severe limitations high debt balances and financial obligations place on individuals with limited means. It is well-known that individuals with limited means and experience, such as new labor market entrants, experience higher rates of job turnover than their more seasoned counterparts (e.g., Topel and Ward, 1992; Neal, 1999). Furthermore, individuals who experience repeated job losses often move into positions that offer lower wages (Farber, 1999; Böheim and Taylor, 2002). Browning and Crossley (2009) explore this regularity and find evidence that workers are, in a way, using these low wage positions (which are plentiful) as a substitute for credit. In other words, workers who lack sufficient savings (or who have accumulated debt) accept low wage positions to finance consumption and service debt obligations in the short-run, which is consistent with our findings.

[7] As an intuitive example, consider an individual who has locked into a mortgage with a large monthly payment. Accepting a low paying job will not be sufficient to cover expenses and consequently, the individual has an incentive to holdout for a higher wage because taking a low wage will not change the final outcome: loss of home or mortgage restructure.

2 Theory

To provide theoretic predictions regarding the effect of debt on wage selectivity we consider a two-period reservation wage model in the spirit of McCall (1970). We modify this standard model to allow for a finite time horizon and agents who differ in terms of their debt levels. In the next section, we setup and solve this simple model for the reservation wage of our agents as a function of their assigned debt levels. This reservation wage is taken as a measure of wage selectivity and will be used as our basis of comparison with experimental results that will be discussed in subsequent sections.

2.1 Model Setup and Solution

All agents live for two periods and start life unemployed with exogenously assigned debt, D^i, in the interval $[0, 50]$.[8] In the first period, agents are presented with a wage offer, w_1, that they can either accept or reject. If they accept this offer they will earn w_1 in both periods. This labor income must be first used to service their debt. Any residual income remaining after paying their debt in full becomes a payout, π_1, that the agent receives at the end of the second period.

$$\pi_1 = 2w_1 - D^i \tag{1}$$

The agent values this payout according to the following utility function:

$$U(\pi_1) = \pi_1^\alpha \tag{2}$$

where $\alpha \in (0, 1]$ provides a measure of risk aversion. Note that the assumed range of risk aversion parameters are consistent with preferences that are observed in laboratory studies (c.f., Holt and Laury, 2002).

If an agent rejects w_1 they will receive a new wage offer, w_2, at the start of the second period. This wage will be either 25 or 75 (with equal probability). Regardless of which value is realized, the agent will only receive the payment once, as she chose to remain unemployed during the first period. However, she is still required to pay her debt in full before earning a payout. If the agent should receive a wage draw in the second period that is insufficient to cover her debt, she will simply choose to reject the wage offer, "walk-away" from the debt, and earn a zero payoff. Stated differently, we assume that agents always have the outside option of never accepting a wage and earning a zero payout, regardless of their assigned debt level.[9] Therefore,

[8] One may also interpret these agents as individuals who recently lost their job or, possibly, newly minted college graduates who enter the labor market with both degrees and debt in hand.

[9] This zero minimum payout condition for unpaid debt balances can be viewed as bankruptcy protection that limits the burden placed on agents in the event of a default. We have considered more severe bankruptcy penalties (possible negative values) and find that our theoretical predictions are robust to moderate variations in this burden. These results are available upon request.

the value of waiting is given by:

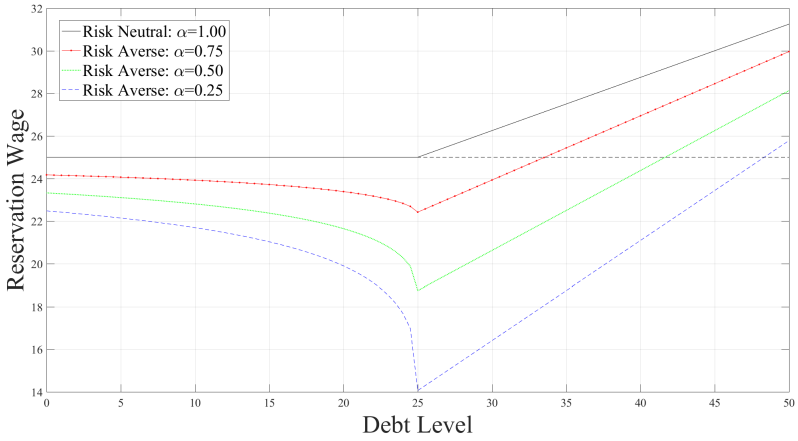
$$E[U(\pi_2)] = \frac{1}{2}\max\{[25 - D^i]^\alpha, 0\} + \frac{1}{2}[75 - D^i]^\alpha \tag{3}$$

We solve for the agents' first-period reservation wage, $\bar{w_1}$, as the value of w_1 that equates equations (2) and (3):

$$\bar{w_1} = \begin{cases} \frac{D^i}{2} + \left(\frac{1}{2}\right)^{\frac{1+\alpha}{\alpha}} \left[(25 - D^i)^\alpha + (75 - D^i)^\alpha\right]^{\frac{1}{\alpha}} & D^i < 25 \\ \frac{D^i}{2} + \left(\frac{1}{2}\right)^{\frac{1+\alpha}{\alpha}} [75 - D^i] & 25 \leq D^i \leq 50 \end{cases} \tag{4}$$

Figure 1 presents plots of the reservation wage, $\bar{w_1}$, by debt levels for four values of risk aversion ($\alpha = [1.00, 0.75, 0.50, 0.25]$). Inspection of Figure 1 indicates that when agents are risk neutral ($\alpha = 1.00$), increases in debt in the range of 0 to 25 have no effect on the reservation wage (constant at 25). However, for debts greater than 25, further increases in debt result in a higher reservation wage. We interpret this increase in the reservation wage as an increase in wage selectivity among agents with debt levels in excess of 25. Our more interesting results are found when agents are risk averse ($\alpha \in (0, 1)$). Inspection of Figure 1 also indicates that when agents are risk averse, increases in debt in the range of 0 and 25 lead to a reduction in the reservation wage while increases in debt in the range of 25 to 50 lead to an increase in the reservation wage. Thus, when agents are risk averse, increases in debt have a non-monotonic effect on agents' reservation wage and wage selectivity.

Figure 1: Reservation Wage Across Debt Levels



The previous results can be explained using a simple variational argument. Assume an agent is assigned a debt D^i and receives an initial wage offer of $\bar{w_1}$ as given in equation (4). By construction, $\bar{w_1}$ equates the agent's current utility from accepting the wage offer today (equation 2) with her expected utility from waiting

and drawing a new wage next period (equation 3).

$$U(\pi_1) = E[U(\pi_2)] \tag{5}$$

Now, consider an infinitesimal increase in D^i. This change will reduce both the agent's utility from accepting the offer today and their expected utility from waiting. Expressions for these loss measures are:

$$\frac{\partial U(\pi_1)}{\partial D^i} = -\alpha[2\bar{w}_1 - D^i]^{\alpha-1} \tag{6}$$

$$\frac{\partial E[U(\pi_2)]}{\partial D^i} = \begin{cases} -\frac{\alpha}{2}\left[(25 - D^i)^{\alpha-1} + (75 - D^i)^{\alpha-1}\right] & D^i < 25 \\ -\frac{\alpha}{2}\left[75 - D^i\right]^{\alpha-1} & 25 \leq D^i \leq 50 \end{cases} \tag{7}$$

When agents are risk neutral ($\alpha = 1$) equation (6) collapses to -1. Furthermore, equation (7) will collapse to -1 for debts less than 25 and $-\frac{1}{2}$ for debts greater than 25. Therefore, for risk neutral agents, the loss to current utility will be the same as the loss to expected utility for agents with debt in the range of $(0, 25)$, allowing the reservation wage to remain constant. However, once debt exceeds 25, the loss to expected utility is less than the loss to current utility. This increases the agent's option value from waiting, and as such, the reservation wage, $\bar{w}_1$, must increase for equation (5) to continue to hold with equality. When agents are risk averse ($\alpha \in (0, 1)$) we find that the loss to current utility is less (more) severe than the loss to expected utility when debt is less (more) than 25, thus explaining the shape of the reservation wage plot presented in Figure 1.

Given the above derivations, the intuition behind the non-monotonic response of wage selectivity is straightforward. At low levels of debt, the concavity of u implies that initial increases in debt will reduce the expected utility from waiting more than the current utility from accepting a given wage today. However, as losses are bounded from below, due to the assumption of a zero minimum payout condition, increasing debt past the level an agent could repay given the low wage offer in the next period creates a kink. Further increases in debt result in higher losses to current utility relative to expected utility due to the limit on the worst possible outcome. While the presence of a threshold punishment for unpaid debt balances (default) is central to this finding, our results do not hinge on the specific level of this threshold. We have considered cases where agents face a fixed negative utility value in the event of default, and our results are robust to moderate variations in this level of punishment (results available from the authors upon request).

3 Experimental Design and Hypotheses

Before discussing hypotheses we first describe our experimental design. Both of our experiments are conducted using Amazon Mechanical Turk (AMT). AMT is an online labor market made up of workers (subjects in our experiment) and requesters (in this case, the authors). Workers complete "Human Intelligence Tasks" (HITs) that requesters post in exchange for a monetary payoff. Workers are anonymous and are paid through Paypal accounts that are linked to a randomly generated worker ID. Each of our subjects is paid a flat participation fee of $0.25 and have the opportunity to earn a bonus payout that depends on their choices/performance in the experiments. These payments are made about one day after the experiment - typical for AMT. We post our HITs in large "batches" (50 to 100). Batches are qualitatively similar to a session in the lab as the number of HITs included in a "batch" can be thought of as the number of subjects participating in a session. However, unlike in the lab, a subject can return a HIT at any time if they no longer wish to participate, and this HIT will be reopened and assigned to a different subject who is willing to participate. Subjects only participate in Experiment 1 or 2. Subjects' participation in either Experiment 1 or 2 is limited by using a qualification that is set equal to 1 once the subject participates in either experiment. Once this qualification is assigned, the subject can no longer accept the HIT and is therefore unable to participate in the experiment.

Given our use of AMT, subjects in our experiments are not supervised and participate at their own personal computers. Therefore one may reasonably question if our subjects are actually paying attention to the instructions, or if they are simply entering random inputs in an effort to bilk the experimenter. Recent work suggests this is not the case. Hauser and Schwarz (2016) finds evidence that workers participating in AMT experiments pay just as much (if not more) attention to instructions than college students participating in experiments in the laboratory. Consequently, we can be relatively sure that workers in our experiment understand the rules of the experiment and how their payoffs are determined. AMT also offers the added benefit that the subject pool closely matches our population of interest (i.e., individuals with low income, low savings, and high rates of unemployment). For example, it is well documented that American workers on AMT have a lower reported income than the overall population in the US (c.f., Paolacci et al., 2010; Berinsky et al., 2012; Levay et al., 2016) and are more likely to report to be unemployed (e.g., Ipeirotis, 2010; Goodman et al., 2016). Evidence from a post-experiment survey (OBS=128) suggests that subjects in our experiments are no different.[10] 55 percent of subjects report to have less than 2,000 dollars available in savings that would be available in the event of an emergency; 59 percent of subjects report to have a significant

[10] After running the experiments, we posted a new HIT (or post-experiment survey) that was only open to subjects who completed Experiment 1 or 2. This HIT is a short survey that asked subjects 6 questions relating to savings, debt, income and unemployment.

financial obligation (e.g., mortgage, student/vehicle loans, and unpaid credit card balance); 53 percent of subjects report to have household incomes less than 40,000 US dollars; and only 65 percent of subjects report being employed full-time.

3.1 Experiment 1

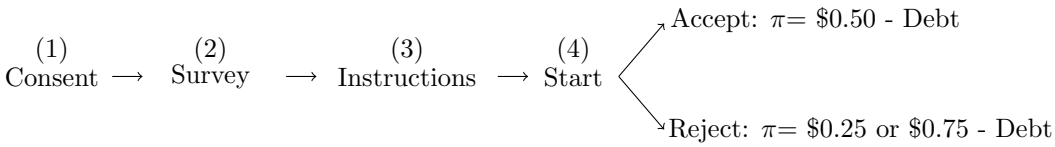
Experiment 1 is designed to provide a direct test of the theoretical model outlined in Section 2, and it consists of 4 stages (See Figure 2 for a diagram). In the first stage subjects read a consent form and accept the HIT (meaning they agree to participate in the experiment and have their data included in the research). After accepting the HIT and indicating their consent, subjects move to the second stage where they complete a short survey (see appendix for survey). We use this survey primarily to gauge the risk attitudes of our subjects. For this purpose, we use the general risk attitudes question from the German Socio-Economic Panel Survey. The question's English translation is worded as follows:

> *How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?*

Subjects answer this question on an 11 point scale ranging from 0 to 10 - with 0 corresponding to "I avoid risk" and 10 corresponding to "Fully prepared to take risks." Dohmen et al. (2011) demonstrates that subjects who report a higher score are also more willing to take risks in conventional lottery experiments.[11] On average, our subjects report a score within the risk averse range identified by Dohmen et al. (2011).

In the third stage subjects are presented with the instructions for the experiment, and in the fourth stage subjects complete the experiment. After completing the experiment, subjects are instructed to submit the HIT. All earnings for participating in the experiment are paid about a day after completion via the subjects' Paypal account that is linked to their AMT worker ID number. Subjects only participate once and this is verified by their unique AMT worker ID number and assigned qualification.

Figure 2: Experiment 1 Design



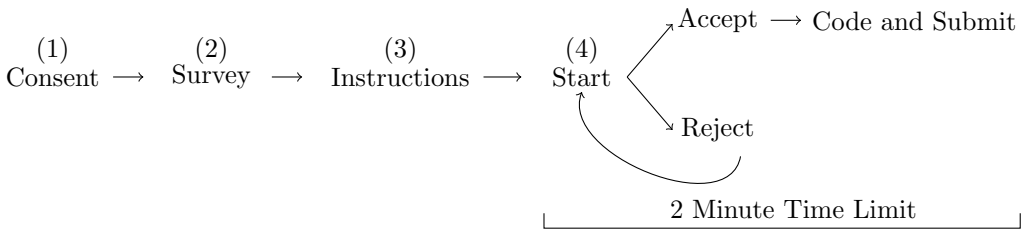
[11] We purposefully did not include a standard risk aversion test (e.g., Holt and Laury, 2002) because we did not want subjects' risk preferences to be influenced by their earnings or the other way around.

Experiment 1 lasts for two periods and subjects make a single decision: to accept or reject an initial wage offer. The treatments in Experiment 1 are the levels of debt, D, assigned to subjects. We consider the following four debt levels, $D = \{\$0, \$0.25, \$0.35, \$0.47\}$, as these values cover the range of debt considered in our model.[12] All subjects are assigned the same initial wage and are told that if they reject this initial offer they will be offered a wage of either \$0.25 or \$0.75 with equal probability next period, where the levels and probabilities are chosen to be consistent with our model. Similarly, we set the initial wage offer to \$0.25 as this was the reservation wage for low debt, risk neutral agents in our model.[13] The payoff a subject earns in Experiment 1 is determined as follows: if the subject accepts the initial wage offer, they earn \$0.25 in both periods of the experiment less their assigned debt. If they reject this wage, they receive no payment in period 1 and their second period wage offer in period 2. Therefore, the total payoff from waiting (or rejecting the initial wage) is simply the subject's second period wage draw less their debt. Subjects are truthfully told that there is a possibility that their payout will be negative. If this happens they will only receive their participation fee. Given the structure of Experiment 1, we will measure wage selectivity by the fraction of subjects who reject the initial wage offer at each assigned debt level.

3.2 Experiment 2

While Experiment 1 provides a direct test of our model, it is highly stylized. To test whether the observed relationship between debt and wage selectivity holds in an environment that more closely resembles what people encounter in their personal lives, we run a second experiment, Experiment 2 (see Figure 3 for a diagram).

Figure 3: Experimental Design



The general procedures of Experiment 2 echo that of Experiment 1. Subjects first indicate their consent, complete the survey, read instructions and then participate in the experiment. As in Experiment 1, after completing the experiment, subjects are

[12] We chose \$0.47 as our upper limit as we want to ensure that all subjects could still receive a positive payout from accepting the initial wage offer.

[13] This restriction is needed to get consistent levels between our model and Experiment 1. See Section 3.3 for a further discussion of this result.

instructed to submit the HIT and earnings are paid about a day after completion. While subjects in Experiment 1 make a single decision, to either accept or reject an offered wage, subjects in Experiment 2 play the role of workers who complete codes for money.[14] We chose to use a real effort task because we want subjects to be able to exert effort and face heterogenous effort costs. A coding task is a natural choice because it is tedious and there will be variance in subjects' ability to complete the codes. While a chosen effort task (i.e., subjects are endowed a budget and choose an effort that is costly) might have also worked, previous research provides evidence that the two effort schemes (i.e., real and chosen) are equivalent (Brüggen and Strobel, 2007; Dutcher et al., 2015) in terms of subjects' decision making.

After accepting the HIT, each subject is assigned a randomly generated debt (D_i) that is distributed uniformly on the interval [\$0, \$0.30). At this time, each subject is also assigned a vector of 40 wages that are drawn from a uniform distribution on the interval [\$0, \$0.10).[15] While each of these 40 wage draws are known to the experimenter, the subject is only able to see the first element in their generated wage vector. After observing their debt and initial wage offer each subject decides whether to accept or reject the initial offer. This decision is important as the subjects' accepted wage will define their piece-rate wage they are paid for each successfully completed code (i.e., a subject's revenue is their wage times the number of codes completed). Subjects are told how their revenue will be calculated, and that they only have 2 minutes to both accept a wage and code words. If a subject chooses to reject the current wage offer, the computer waits 3 seconds (analogous to time spent looking for a new job) and then presents the subject with their next wage offer (reveals the next element in the subject's wage vector). Therefore, there is a tradeoff between searching for a higher wage and allocating more time to coding. Subjects earn a bonus equal to their revenue less their debt or zero, whichever is larger. Given this setup, our measure of wage selectivity under Experiment 2 is the number of wage offers a subject chooses to observe, and our primary interest will be determining how this number varies with agents' assigned level of debt.[16]

[14] Subjects know that they are in an experiment. The coding task is a real effort task that follows Ku and Salmon (2012). Specifically, subjects are given a chart that assigns each letter of the alphabet a number. Below the chart, the computer randomly generates a four letter code. In an input box below, subjects input the corresponding number of each letter and click the "submit" button. After clicking "submit", the computer randomly generates a new code.

[15] Subjects are told that their debt and wage offers are randomly generated by the computer, but they are not told the distribution that they are drawn from.

[16] While there are advantages to using a Becker - DeGroot -Marschak method (Becker et al., 1964), or strategy method to elicit reservation wages, we felt it was more natural to have the computer make "take it or leave it" offers as this is more common in actual labor markets, particularly for entry level positions. Additionally, strategy methods are more difficult to explain than the "take it or leave it" offers and prone to inconsistent choices and misconceptions (c.f., Jacobson and Petrie, 2009; Cason and Plott, 2014). Given the realism of the "take it or leave it" offer and the fact that we could not respond to subjects' questions quickly (as in the lab), we thought it best to use our chosen design.

The design of Experiment 2 allows us to explore the impact of debt on wage selectivity in an environment that more closely resembles, relative to Experiment 1, what subjects encounter in the real world, while also limiting the effect of "other regarding preferences". The employer in our experiment is a computer who offers wages that are randomly generated and subjects are not told about the earnings/debt/wages of other subjects.[17] Thus, subjects' decisions should not be motivated by a preference for fairness in terms of payoffs relating to other subjects (c.f., Vant Wout et al., 2006). This design has the added advantage in that we can cleanly identify the effect of debt on wage selectivity because we are exogenously assigning debt and allowing for randomly generated wage offers. The random assignment of debt and wage offers presents both benefits and costs. The primary cost of this design is that identifying an effect will be difficult as there is a large degree of randomness. However, with enough observations, we will be able to identify a treatment effect.[18] The primary benefit of this design is that the observed effects will not be due to the specific sequence of wage draws observed in the experiment. Thus, given the characteristics described above, we have effectively biased ourselves away from observing a treatment effect due to the random generation of wages.

3.3 Hypotheses

The predictions derived from our model and the experimental designs suggest two hypotheses that we state below in terms of the alternative:

Hypothesis 1 *At low levels of debt, wage selectivity (i.e., probability of rejecting initial wage in Experiment 1 or number of wage draws observed in Experiment 2) is decreasing in assigned debt.*

Hypothesis 2 *At moderate levels of debt and greater, wage selectivity (i.e., probability of rejecting initial wage in Experiment 1 or number of wage draws observed in Experiment 2) is increasing in assigned debt.*

For both experiments, our hypotheses suggest that we should observe a statistically significant reduction in wage selectivity, measured in their respective way, as debt initially increases from zero. However, this effect should reverse after a certain point, with further increases in debt increasing subjects' wage selectivity. While we are unable to predict the location of this "dip" for Experiment 2, the connection

[17] We also checked several online forums devoted to AMT to be sure subjects did not provide any details from the experiment. While some subjects reported their bonuses from the experiments, no information was given about how bonuses were assigned (i.e., debt and wage information). Consequently, we have no reason to believe post-experiment communication influenced selection into the experiment.

[18] A secondary benefit of AMT is that subjects may be paid significantly less than laboratory subjects. Therefore, it is possible to gather a large number of observations using AMT when it would be prohibitively costly to gather a similar number in the lab

between Experiment 1 and our theoretical model allows us to make such a prediction for Experiment 1. Specifically, by calibrating the parameters of Experiment 1 to be consistent with our theoretical model and presenting our subjects with an initial wage offer equal to the theoretical reservation wage for low debt, risk neutral agents, we are able to make predictions regarding the outcome of our experiment. Given that our subject pool is moderately risk averse on average, subjects assigned a debt of \$0 should be close to indifferent between accepting or rejecting the initial wage offer. As debt increases to \$0.25, our theory suggests that the average reservation wage in our subject pool will be significantly below the initial wage offer of \$0.25. Therefore, we expect that significantly fewer subjects will reject the initial wage offer when debt is \$0.25 relative to when debt is \$0. Furthermore, our model suggests that by a debt of \$0.35, the average reservation wage in our sample should return to a level similar to that found when debt is \$0. So we should see a similar fraction of subjects rejecting the initial wage offer at debts of \$0 and \$0.35. And lastly, the reservation wage in our sample at \$0.47 should be larger than at any of the other debt levels considered, and as such, we should find that the probability of rejecting the initial wage offer is substantially higher for subjects assigned a debt level of \$0.47.

In both experiments, the stakes are small. The most a subject can make in Experiment 1 is \$0.75 and the maximum amount possible in Experiment 2 is not much higher. Thus, one may question whether the results of our experiments will generalize to environments with higher stakes. Research investigating the effect of stake-size on risk preferences suggests that a subject's level of risk aversion increases with stakes (c.f., Prelec and Loewenstein, 1991; Holt and Laury, 2002; Bombardini and Trebbi, 2012). Likewise, at smaller stakes, individuals show preferences that are more in the direction of risk neutrality. Therefore, given our theoretical result that the "dip" in wage selectivity becomes more prominent as agents become more risk averse, it is likely that we have biased ourselves away from identifying a significant effect through our choice of low stakes. Therefore, any significant effect that we do find can be interpreted as a lower bound of the effect under higher stakes, where individuals will likely be more risk averse.[19]

[19]Regardless, subjects in both experiments indicate subjective risk preferences that are consistent with risk aversion. The average reported level of subjective risk aversion in Experiments 1 and 2 are 5.07 and 5.04, respectively. The average reported level of subjective risk aversion in Dohmen et al. (2011) is 4.76. Given that our average reported subjective risk aversion is not much different than what is observed in Dohmen et al. (2011) and that 78 percent of subjects in Dohmen et al. (2011) indicate risk averse preferences in a lottery experiment with real stakes and the fact that in the same study (Dohmen et al., 2011) subjective risk preferences significantly correlate with incentivized lottery choices, we can be relatively assured that subjects in our experiment are risk averse.

4 Results

We present our experimental results in steps. First, we provide a direct test of our two-period model by comparing our theoretical predictions to the results of Experiment 1. Second, we test the robustness of our finding by comparing the results of Experiment 1 to that found under Experiment 2. While identifying the effect of debt on wage selectivity is the primary focus of this paper, we also present supporting evidence that subjects respond to the financial incentives of the experiment in economically meaningful ways.[20]

4.1 Experiment 1

476 subjects participate in Experiment 1, and they earn, on average, \$0.26 (not including the \$0.25 participation fee). On average, subjects spend about 7.6 minutes on the experiment. Table 1 gives a breakdown of the number of observations, OBS, for each debt level, and the average earnings of subjects assigned each debt level, AVG. EARNINGS. [21]

Table 1: Average Earnings by Debt

	DEBT=\$0	DEBT=\$0.25	DEBT=\$0.35	DEBT=\$0.47
AVG. EARNINGS	\$0.50	\$0.26	\$0.19	\$0.13
OBS	114	114	115	133

Notes: Earnings by amount of debt.

Result 1 *Debt has a non-monotonic affect on subjects' willingness to accept the initial wage offer. Subjects assigned low and high debt levels are significantly more likely to reject the initial wage of \$0.25 than subjects assigned moderate debt levels.*

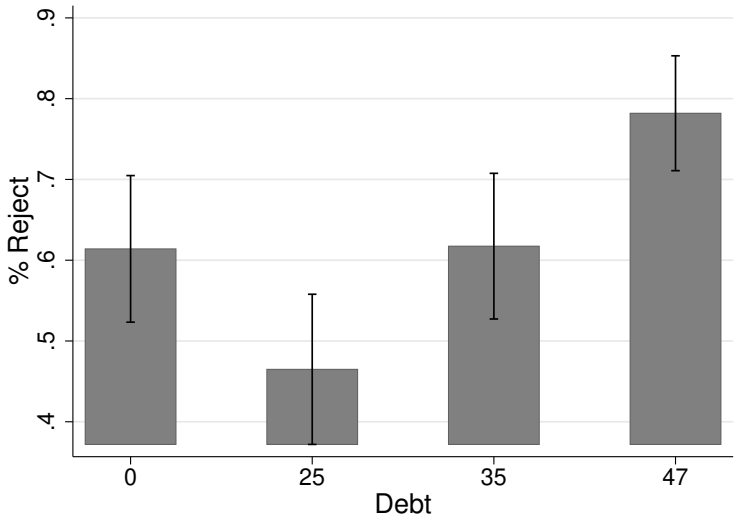
We find evidence in support of Hypotheses 1 and 2. Inspection of Figure 4 indicates that 61, 46, 62, and 78 percent of subjects reject the initial wage offer

[20] To maintain a sharp focus, we restrict our attention to our primary variables of interest (e.g., debt, wages, and number of wage draws taken). However, regressions including additional controls for various subject characteristics, interaction terms between subjects' assigned debt and their self-reported risk preferences, and higher-order terms of debt (e.g., DEBT+DEBT^2+DEBT^3+$\cdots$) are consistent with the results presented in this paper. Expanded results are available upon request.

[21] Note that the number of subjects in treatment blocks are slightly different. This is for two reasons: (1) debt was randomly assigned (i.e., generated by a random number generator) and (2) despite the safe guards (i.e., the qualification) some subjects managed to participate twice due to an unforeseen lag in assigning qualifications. While we were careful to not post a new batch before qualifications were assigned from our end, on a few occasions it turned out that there was a significant time lag between when we uploaded the qualification scores and when they were actually assigned to the subjects. We drop the second observation from subjects who participated twice. However, these subjects were paid for both observations because their participation a second time was not their fault.

of \$0.25 at debts of \$0, \$0.25, \$0.35, and \$0.47, respectively.[22] While the overall relationship between debt and willingness to reject the initial wage offer is found to be positive and statistically significant (probit with robust standard errors *coef* = .009: $p = 0.007$), such an analysis ignores the clear non-monotonic effect displayed in Figure 4. The basic pattern outlined in Figure 4 matches well with our model's results displayed in Figure 1. We clearly identify a statistically significant "dip" in wage selectivity at a debt level of \$0.25. Subjects assigned to the \$0.25 debt treatment are statistically significantly less likely to reject the initial wage offer than subjects assigned to either the \$0 or \$0.35 debt treatments (two-sample test of proportions: $p = 0.024$ and $p = 0.038$, respectively). Furthermore, increasing debt beyond this level is found to increase wage selectivity. Specifically, subjects assigned to the \$0.47 debt treatment are statistically significantly more likely to reject the initial offer than subjects assigned any other debt treatment (Two-sample test of proportions: $p = 0.005$, $p < 0.001$, and $p = 0.003$, respectively).

Figure 4: Probability of Rejection by Debt (Experiment 1)



Notes: Percentage of subjects who rejected the first wage of 25 cents by debt level. Gray bars correspond to primary treatments. Error bars indicate 95% confidence intervals.

In Table 2, we present a series of probits estimating the probability a subject will reject the first wage offer conditional on their assigned debt (i.e., the treatment). Variable descriptions are as follows: DEBT = X (where X =25, 35, or 47) is a dummy variable equal to one if a subject is assigned a debt of \$0.25, \$0.35, or \$0.47; DEBT is the subject's assigned debt; and DEBT^2 is the subject's assigned debt squared. Results shown in Table 2 correspond with the proportion tests discussed

[22] Error bars correspond to 95% confidence intervals.

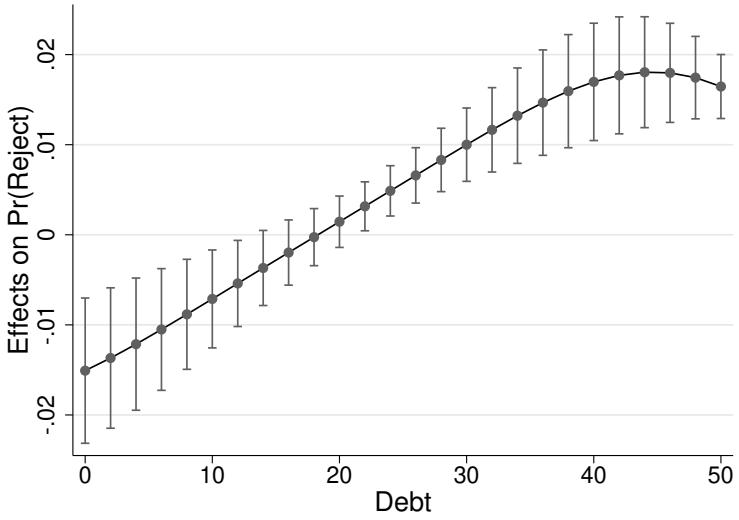
Table 2: Probit Model of Probability of Rejection

	Model 1	Model 2	Model 3
DEBT=25[a]	-0.378**		
	(0.168)		
DEBT=35[b]	-0.009		
	(0.168)		
DEBT=47[c]	0.489***		
	(0.170)		
DEBT		0.009***	-0.039***
		(0.003)	(0.011)
$DEBT^2$			0.001***
			(0.0002)
CONSTANT	0.290***	0.080	0.282**
	(0.119)	(0.106)	(0.119)
OBS	476	476	476
R^2	0.0433	0.011	0.0421
a=b	0.0208		
a=c	<0.0001		
b=c	0.0048		

Notes: Probit regression results estimating the likelihood of rejection. Robust standard errors in parentheses. ***: $p < .01$, **: $p < .05$, and *: $p < .10$. Bottom row presents p-values from f-tests testing the equality of coefficients.

above. Subjects assigned a debt of \$0.47 are statistically significantly more likely to reject the initial wage offer. Additionally, the treatment dummies suggest that subjects assigned a debt of \$0.25 are statistically significantly less likely to reject the initial wage offer than those assigned either lower or higher debts. We also find evidence that debt has a non-monotonic impact on the probability of rejecting the initial wage offer when we treat debt as a continuous variable. Here we do not focus on the coefficient estimates but rather the marginal effect of debt (i.e., taking into account DEBT and DEBT^2) on the probability of rejection. The marginal effect of debt on the probability of rejecting the initial wage is shown in Figure 5. This plot is derived from Model 3 in Table 2 and suggests that the marginal effect of debt on the subjects' willingness to reject the initial wage offer changes depending on the level of debt. At very low debts, the marginal effect of debt on probability of rejection is negative - meaning that subjects with larger debts (relative to those with no debt) will be less likely to reject the wage. However, as debt increases further, the direction of this effect reverses.

Figure 5: Marginal Effect of Debt on Probability of Rejecting the First Wage



Notes: Marginal effect of debt on probability of rejecting the first wage. Effects are derived from Model 3 in Table 2 using robust standard errors.

4.2 Experiment 2

408 subjects participate in the Experiment 2.[23] Summary statistics are found in Table 3. Variable descriptions are as follows: AVG. EARNINGS is the same as discussed in Subsection 4.1; DEBT is the randomly assigned debt; DRAWS is the number of wage draws taken; AVG. ACCEPTED WAGE is the average accepted wage; and % ACCEPTED FIRST is the percentage of subjects who accepted their first wage draw. Not including the $0.25 participation fee, subjects earn on average $0.31. Earnings is statistically significantly decreasing in the number of wage draws a subject takes (OLS with robust standard errors *coef* = -0.9511: $p = 0.070$) and statistically significantly increasing in the accepted wage (OLS with robust standard errors *coef* = 6.117: $p < 0.001$). Accepted wages are statistically significantly increasing in the number wage draws taken (OLS with robust standard errors *coef* = 0.336: $p < 0.001$). Taken together these observations suggest there is a trade-off between rejecting and accepting wage offers.

Table 3: Summary Statistics

Variable	OBS	Mean	Std. Dev.	Min	Max
DRAWS	406	2.357	2.222	1	14
DEBT	406	14.387	9.027	0	29
% ACCEPTED FIRST	406	0.525	0.500	0	1
AVG. ACCEPTED WAGE	406	6.804	2.526	0.300	9.9
AVG. EARNINGS	406	30.714	28.902	0	135.8

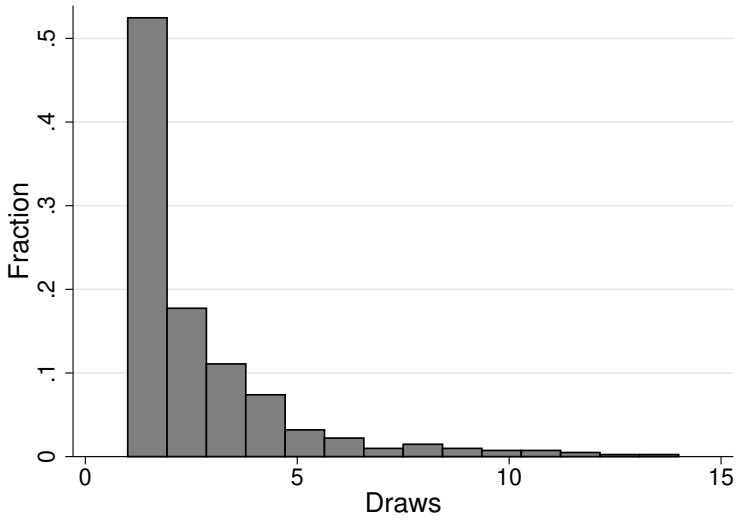
Notes: Summary statistics of the main variables of interest. OBS is the number of observations, Std. Dev is the standard deviation, Min is the minimum and Max is the maximum.

Result 2 *Subjects respond to incentives. Subjects offered a higher first wage are more likely to accept the first wage that they are offered.*

The distributions for number of wage draws taken and assigned debt levels are found found in Figures 6 and 7, respectably. We find no evidence of selection into or out of our experiment based on assigned debt levels or realized wage draws (see Appendix A for details). 52 percent of subjects accept the first wage they are offered. The likelihood a subject will accept the first wage they are offered increases in the amount of their first wage offer (probit with robust standard errors *coef = 0.211*:

[23] We drop 2 outliers. These outliers are dropped because of a large gap between the number of wage draws that they took relative to other subjects. Specifically, these outliers drew 18 and 20 wages while the subject with the third highest number of wage draws only drew 14. Results including these outliers are available upon request. Results are qualitatively similar, but standard errors increase slightly.

Figure 6: Distribution of Wage Draws Taken

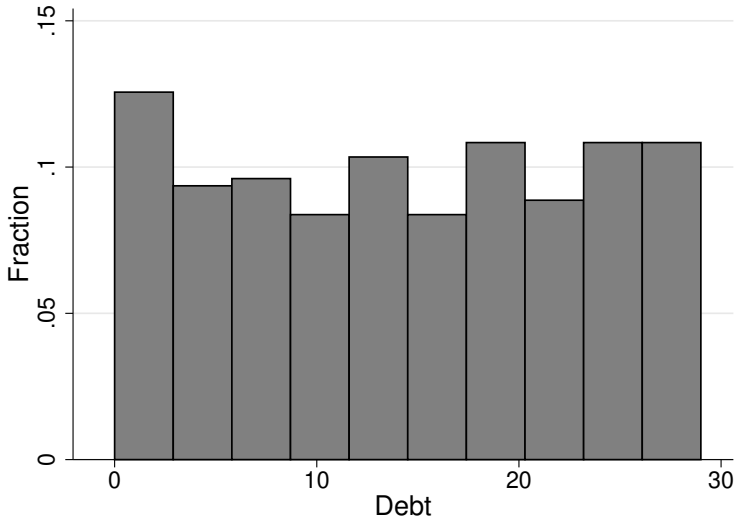


p <0.001). While the amount of the first wage observed significantly increases the probability a subject will accept the first wage they are offered, debt does not influence the probability a subject will accept their first wage (probit with robust standard errors *coef = -0.007*: $p = 0.339$). The number of codes a subject completes however, is not statistically significantly affected by their accepted wage (OLS with robust standard errors *coef* = 0.076: $p = 0.199$) or debt (OLS with robust standard errors *coef* = -0.016: $p = 0.377$). The latter two findings likely reflect the fact subjects who have higher accepted wages take more wage draws. Thus those with higher wages tend to have less time available to work.

We now move to our primary analysis. Our variable of interest is the number of wage draws a subject chooses to observe, which we interpret as a measure of subject's wage selectivity. The logic behind this interpretation is that, ceteris paribus, a less selective worker will take fewer wage draws. In the outside world, this translates to a worker spending less time unemployed because she takes a job even if it pays a low wage. Figure 6 presents the distribution of wage draws taken by subjects in Experiment 2. Consistent with the summary statistics presented in Table 3, the majority of subjects accept the first or second wage they are offered. However, the number of wage draws taken is positively skewed due to a substantial number of subjects rejecting more than four wages.

Result 3 *In Experiment 2, debt has a non-monotonic effect on the number of wage draws a subject takes. Specifically, subjects assigned a moderate debt take significantly fewer wage draws than subjects assigned a low or high debt.*

Figure 7: Distribution of Debt



We find evidence in support of Hypotheses 1 and 2. Specifically, we do not observe a significant linear relationship between the number of wage draws a subject takes and their assigned debt (OLS with robust standard errors $coef = 0.0113$: $p = 0.391$). Similar results are observed when estimating the number of wage draws a subject takes as a function of their assigned debt using a Tobit or Poisson (results upon request). In Table 4, we estimate the number wage draws taken by subject i conditional on their assigned debt and its square (DEBT and DEBT^2, respectively). To demonstrate that our results are robust to other specifications, we present OLS, Poisson, and Tobit results. Model 3 is our preferred specification due to censoring in the data and the observation that a significant number of subjects select the first wage they are offered. However, the marginal effect of debt on the number of wage draws (which we will discuss shortly) is similar across the 3 models.

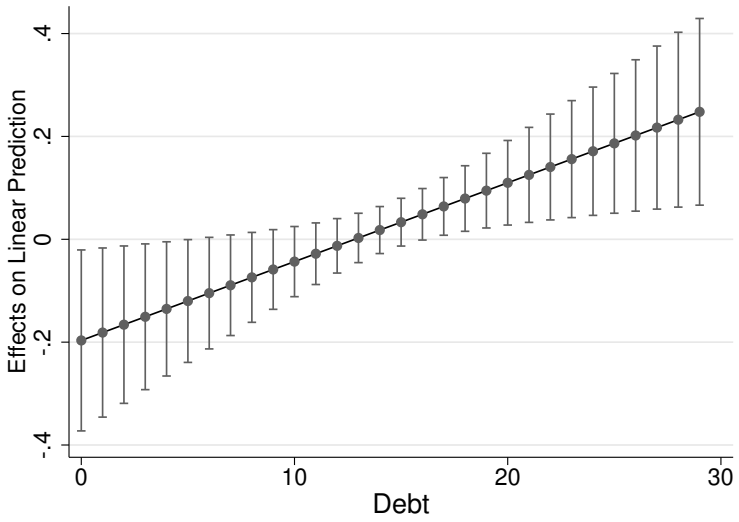
As in the analysis of Experiment 1, we do not rely on coefficient estimates alone because DEBT and DEBT^2 are both right hand side variables. Thus, in even OLS estimates the marginal effect of debt on the number of wage draws taken is not constant but changes as the size of debt increases. A plot of the marginal effect of various amounts of debt on the number of wage draws a subject takes is found in Figure 8. This figure is derived from Model 3 in Table 4. Figure 8 is consistent with Figure 5. The marginal effect of debt on the number of wage draws taken is initially negative, but at around a debt of 15 cents becomes positive. This demonstrates that subjects with relatively low levels of debt are more selective than subjects with moderate levels of debt. However, once debt becomes sufficiently large, subjects become significantly more selective.

Table 4: Wage Draws Taken

	Model 1	Model 2	Model 3
DEBT	-0.094*	-0.039**	-0.197**
	(0.048)	(0.02)	(0.09)
$DEBT^2$	0.004**	0.002**	0.008**
	(0.002)	(0.001)	(0.003)
CONSTANT	2.65***	0.975***	1.277**
	(0.293)	(0.116)	(0.546)
SPECIFICATION	OLS	Poisson	Tobit
R^2	0.0155	0.0601	0.0056
OBS	406	406	406
LOWER LIMIT			213

Notes: Dependent variable is the number of wage draws taken. Model 1 is OLS, 2 is Poisson, and 3 is Tobit. Robust standard errors in parentheses. ***: $p < .01$, **: $p < .05$, and *: $p < .10$.

Figure 8: Marginal Effect of Debt on Wage Selectivity



Notes: Marginal effect of debt on the number of wage draws taken using Model 6 in Table 4. Error bars correspond to 95% confidence intervals using robust standard errors.

5 Conclusions

Using a theoretical model, we demonstrate that when agents are risk averse, the likelihood an agent rejects a wage offer is initially decreasing and then increasing in the size of the agent's financial obligation. The intuition behind this relationship is that as financial obligations increase, rejecting a wage becomes increasingly less attractive as the agent's expected utility from rejecting the initial offer falls faster than the sure utility from accepting the offer. As the financial obligation increases further, the agent is incentivized to reject the offer due to a payoff floor (minimum payout restriction) that limits the losses individuals face in the event of a default (obligation not met). We find evidence that this non-monotonic effect is present under two different experiments. The first, Experiment 1, is designed as a direct test of our theoretical model, while the second, Experiment 2, is intended to more accurately reflect our subjects' labor market experience outside of the experiment.

Our finding that debt impacts wage selectivity in a non-monotonic way is relevant for policy makers as it suggests a channel through which variations in debt or financial obligations may further amplify wealth and income inequality. Specifically, individuals with moderate debt will be more likely to accept lower paying jobs than they would have otherwise. Furthermore, individuals with very high levels of debt will be prone to hold out for extremely unlikely, high paying job offers. By holding out for such unlikely offers, this group will often experience long unemployment spells and higher rates of default. As a result, policy makers may find it beneficial to provide assistance to individuals with moderate or high debts in order to increase their wage selectivity and participation in the labor market respectively.

While our current paper clearly demonstrates a non-monotonic relationship between debt and wage selectivity, further research is needed to understand the determinants of this relationship. Specifically, future research in this area should explore the role played by beliefs, perceptions of luck, overconfidence, regret, and variations in the punishment of default (failing to pay debt) in determining this relationship.

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Supplemental Appendix: Why Bother? Understanding the Impact of Financial Obligations on Wage Selectivity

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April 8, 2017

A Selection

Experiments conducted through Amazon Mechanical Turk (AMT) suffer from a greater risk of subject selection issues than those conducted in a lab. While subjects in both AMT and lab-based experiments can (and do) quit experiments early, quits among lab subjects are extremely rare. Furthermore, when an AMT subject quits, the system seeks to fill the vacant spot with a new subject. While this feature is useful in general it may cause issues with our Experiment 2 as subjects are randomly assigned a debt and face random wage draws (see main text for experimental design). One may be concerned that subjects select out of the experiment based on their observed debt level, realized wage offers, or ability to complete the effort task. In the next two subsections we present evidence that subjects are NOT selecting out of the experiment in such a procedural way.[1]

A.1 Selection on Debt or Wages

It is possible that subjects who observe a high assigned debt level or who draw low initial wage offers select out of the experiment and are replaced by subjects who receive more favorable random draws. To check if this is occurring, we first compare

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[1]It is also important to note that when subjects on AMT quit an experiment all data for the subject is lost, so it is not possible to look at their characteristics. Consequently, selection can only be inferred by examining the characteristics of the subjects who actually complete the experiment.

the average assigned debt in Experiment 2 to the expected value of debt based on the underlying distribution. We find no statistically significant difference in these average values (t-test: $p = 0.2094$). Furthermore, the distribution of assigned debt is consistent with the underlying uniform distribution in which the debts were drawn (see main text). Therefore, we find no evidence that subjects are selecting out of the experiment based on their observed level of debt.

Next, we consider whether subjects select out of the experiment based on their observed wage draws. When subjects enter the experiment we create a vector of 40 possible wage offers that are drawn randomly from an underlying distribution. While these wages are only revealed to subjects sequentially following a decision to reject a current wage offer, having information regarding the entire distribution of potential wage offers allows us to determine if subjects are selecting out of the experiment based on particular draws. Table A.1 contains the average of the first five wages in our subjects' wage vector along with p-values from a statistical test comparing these means to the expected value of wages.[2] Inspection of A.1 indicates that none of the averages are statistically significantly different than the expected value of wages, suggesting that agents are not selecting out of the experiment due to their observed wage offers.

Table A.1: First 5 Average Wages in Wage Vector

	Wage 1	Wage 2	Wage 3	Wage 4	Wage 5
AVERAGE	4.826	4.926	4.971	5.189	4.937
	(0.145)	(0.142)	(0.143)	(0.145)	(0.147)
p-value	0.3904	0.8647	0.8851	0.1006	0.9307

Our previous analysis has established that subjects are not selecting out of the experiment based on observed debt and wages. However, this analysis did not consider the possibility that an interaction between debt and wages may be driving the selection (e.g., subjects who are assigned high debt and draw low wages may select out). If such a connection exists, we would expect debt to have a positive and statistically significant relationship with observed wages. Table A.2 presents OLS results from regressing debt on the first five wages, conditional on the wage being ob-

[2] A majority of subjects only observe two wage offers, and 91.87 percent take less than six wage draws. Therefore, focusing on the first five offers is not restrictive.

served. Inspection of this table indicates that a statistically significant relationship between debt and observed wages does not exist. This finding is important because it suggests that subjects with higher debt did not select out of the experiment after observing a low wage.

Table A.2: The Effect of Debt on Observed Wages

	Draws >1 Wage 1	Draws>2 Wage 2	Draws>3 Wage 3	Draws>4 Wage 4	Draws>5 Wage 5
DEBT	-0.02	0.012	0.037	0	0.016
	(0.016)	(0.023)	(0.027)	(0.031)	(0.041)
CONSTANT	5.113***	4.747***	4.183***	5.614***	4.841***
	(0.277)	(0.422)	(0.482)	(0.563)	(0.798)
R^2	0.0038	0.0014	0.0146	0	0.0031
OBS	406	193	121	76	46

Notes: Dependent variable is the jth ($j \in \{1, 2, 3, 4, 5\}$) wage offered. Robust standard errors in parentheses. ***: $p < .01$, **: $p < .05$, and *: $p < .10$.

A.2 Selection on Ability

We now explore whether or not subjects' perceived proficiency at the coding task and observed debt and wages influenced their selection out of the experiment. We estimate subject proficiency by calculating the rate at which subjects complete codes (RATE). To calculate RATE, we first compute the (approximate) amount of time a subject spends searching for a wage by multiplying the number of times a subject rejects a wage offer by three.[3] The amount of time a subject spends working is simply the difference between the total time of the experiment and our estimate of the time they spent searching for a wage. Once we have the subjects' time spent working, RATE is computed as the ratio of the number of codes a subject successfully completed to the time they spent working. If we observe a positive (negative) and statistically significant relationship between a subject's RATE and their exogenously assigned debt, then it would suggest that subjects with low (high) ability selected out of the experiment after observing a high debt.[4] There is no

[3]Each time a subject rejects a wage offer, the computer waits three seconds before providing them with a new offer. This simple calculation provides an estimate of the time subjects spend searching for wages.

[4]It is also possible to interpret this relationship as an individual adjustment in effort in response to observed debt.

evidence that debt influenced the rate at which subjects completed codes (OLS with robust standard errors *coef* = -0.0002: p =0.360). Stated differently, we find no evidence that subjects select out of the experiment based on their skill level after observing their assigned debt.

It is also possible that selection operates through an interaction between the subjects' ability and their observed wage. Specifically, low ability subjects who observe a low wage may select out of the experiment with greater frequency than subjects with high ability. If subjects are behaving this way, we would expect there to be a positive and statistically significant relationship between observed wage and the rate at which subjects complete codes.[5] Table A.3 presents OLS results from regressing RATE on each of the first five wage draws. Inspection of Table A.3 indicates that RATE is only significant for subjects who observe more than five wage draws. As only 8.13% of subjects observe this many offers, there is little worry about selection operating through this channel.

Table A.3: The Effect of Proficiency on Observed Wages

	Draws>1 Wage 1	Draws>2 Wage 2	Draws>3 Wage 3	Draws>4 Wage 4	Draws>5 Wage 5
RATE	3.754	7.018	15.171	3.776	30.976**
	(5.251)	(8.323)	(10.256)	(11.435)	(14.582)
CONSTANT	4.625***	4.551***	3.943***	5.424***	3.697***
	(0.312)	(0.482)	(0.595)	(0.619)	(0.813)
R^2	0.0013	0.0042	0.0197	0.0013	0.0798
OBS	406	193	121	76	46

Notes: Dependent variable is the jth ($j \in \{1, 2, 3, 4, 5\}$) wage offered. Robust standard errors in parentheses. ***: $p < .01$, **: $p < .05$, and *: $p < .10$.

[5] Again, this can also be interpreted as an individual adjusting their effort in response to our random assignment.

B Experiment 1 Instructions

Informed Consent

This research is being conducted by Dr. David Johnson and Dr. John Gibson who are professors at the University of Central Missouri and Georgia State University, respectively.

I chose to voluntarily participate in this research study. I have been recruited for this study through Amazon Mechanical Turk. Only persons 18 years of age or older may participate. I affirm that I am 18 years of age or older. Only individuals who read and write English may participate. I affirm that I can read and write in English. This study has been approved by the University of Central Missouri Research Ethics Board.

This study involves completing a demographic survey in the first stage and a short task in the second stage. The survey will take less than 5 minutes. The task will take less than 2 minutes. I will be paid 25 cents for completing the survey and a bonus. The amount of my bonus will be based on my decisions and the outcome of a randomly generated number.

I am free to withdraw from the study at any time without incurring the ill will of the researchers. If I withdraw, my data will not be used and will be deleted by the researchers as early as possible. If I wish to withdraw, I must do so within 20 days of completing the study. There are no known risks or benefits from this study beyond those from any typical activity I might do in an online environment. This study will benefit society by helping researchers better understand how individuals respond to incentives in labor markets. The confidentiality of any personal information will be protected to the extent allowed by law.

My name or AMT account number will not be reported with any results related to this research. I can obtain further information from Dr. David Johnson (djohnson@ucmo.edu). If I have any questions about this study, I can contact Dr. Johnson at djohnson@ucmo.edu. If I have any questions about my rights as a participant, I should contact the Human Subjects Protection Program at (660) 543-4624. I may

ask questions at any time via email (djohnson@ucmo.edu).

Should new information become available during the course of this study, about risks or benefits that might affect my willingness to continue in this research project, it will be given to me as soon as possible.

By clicking on the start button below, I am indicating my consent to participate in this study.

If you do not wish to participate, please return the HIT.

B.1 Survey

Please complete the survey below. Doing so you will earn your 25 cents participation fee in addition to your bonus that will be determined by your decisions in the second stage.

What is your gender?

How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means: "risk averse" and the value 10 means: "fully prepared to take risks". You can use the values in between to make your estimate.

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and click on the appropriate circle on the right side of this page. Do not spend too much time on any statement. Answer quickly and honestly.

I plan tasks carefully.
I do things without thinking.
I make-up my mind quickly.
I am happy-go-lucky.
I don't "pay attention".
I have "racing" thoughts.
I plan trips well ahead of time.

I am self controlled.
I concentrate easily.
I save regularly.
I "squirm" at plays or lectures.
I am a careful thinker.
I plan for job security.
I say things without thinking.
I like to think about complex problems.
I change jobs.
I act "on impulse".
I get easily bored when solving thought problems.
I act on the spur of the moment.
I am a steady thinker.
I change residences.
I buy things on impulse.
I can only think about one thing at a time.
I change hobbies.
I spend or charge more than I earn.
I often have extraneous thoughts when thinking.
I am more interested in the present than the future.
I am restless at the theatre or lectures.
I like puzzles.
I am future oriented.

B.2 Stage 2:

The second stage of the experiment has 2 parts. In the first part, you will be offered a wage of 25 cents. During the first part, you will also be assigned a debt of XX cents.

You can either accept or reject the wage you are offered. If you accept your first wage you will "work" for two periods and will earn two times your wage (because you worked two periods) minus your assigned debt. Consequently, if you accept, your earnings will be cents (i.e., 2*25) minus XX cents (plus your 25 cents participation fee).

Please click the "Next" button to continue.

B.3 Stage 2 (continued):

You also have the option to reject the wage of 25 cents. If you reject, you will draw another wage. There is a fifty percent chance you will be offered a wage of 25 cents and a fifty percent chance you will be offered a wage of 75 cents. Your debt of XX cents will be the same as what you were assigned in the first part.

If you reject the first wage, you only work 1 period. Therefore, if you reject the first wage you are offered, your earnings will be either 25 or 75 cents minus XX cents (plus your 25 cents participation fee).

Under certain circumstances it is possible for you to have negative earnings. If this happens, you will earn a bonus of 0 cents but will still be paid your participation fee of 25 cents.

Please click the "Next" button to continue.

B.4 Decision screen

You have been assigned a debt of XX cents.

You have been offered a wage rate of 25 cents. If you accept, you will earn a bonus of XX cents.

If you reject, there is a fifty percent chance you will earn a bonus of XX cents and a fifty percent chance you will earn a bonus of XX cents.

Do you accept your wage of cents?

C Experiment 2 Instructions

Informed Consent

This research is being conducted by Dr. David Johnson and Dr. John Gibson who are professors at the University of Central Missouri and Georgia State University, respectively.

I chose to voluntarily participate in this research study. I have been recruited for this study through Amazon Mechanical Turk. Only persons 18 years of age or older may participate. I affirm that I am 18 years of age or older. Only individuals who read and write English may participate. I affirm that I can read and write in English. This study has been approved by the University of Central Missouri Research Ethics Board.

This study involves completing a demographic survey in the first stage and an optional effort task in the second stage. The survey will take less than 5 minutes. The effort task will take exactly 2 minutes in addition to the time it takes you to read the instructions. I will be paid 25 cents for completing the survey and a bonus that depends on my decisions and performance in the effort task. The amount of my bonus will be based on my decisions and performance.

I am free to withdraw from the study at any time without incurring the ill will of the researchers. If I withdraw, my data will not be used and will be deleted by the researchers as early as possible. If I wish to withdraw, I must do so within 20 days of completing the study. There are no known risks or benefits from this study beyond those from any typical activity I might do in an online environment.This study will benefit society by helping researchers better understand how individuals respond to incentives in labor markets. The confidentiality of any personal information will be protected to the extent allowed by law.

My name or AMT account number will not be reported with any results related to this research. I can obtain further information from Dr. David Johnson (djohnson@ucmo.edu). If I have any questions about this study, I can contact Dr. Johnson at djohnson@ucmo.edu. If I have any questions about my rights as a participant, I

should contact the Human Subjects Protection Program at (660) 543-4624. I may ask questions at any time via email (djohnson@ucmo.edu).

Should new information become available during the course of this study, about risks or benefits that might affect my willingness to continue in this research project, it will be given to me as soon as possible.

By clicking on the start button below, I am indicating my consent to participate in this study.

If you do not wish to participate, please return the HIT.

C.1 Survey

Please complete the survey below. Doing so you will earn your 25 cents participation fee in addition to your bonus that will be determined by your decisions in the second stage.

What is your gender?

How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means: "risk averse" and the value 10 means: "fully prepared to take risks". You can use the values in between to make your estimate.

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I don't "pay attention."
I have "racing" thoughts.

I plan trips well ahead of time.
I am self controlled.
I concentrate easily.
I save regularly.
I "squirm" at plays or lectures.
I am a careful thinker.
I plan for job security.
I say things without thinking.
I like to think about complex problems.
I change jobs.
I act "on impulse".
I get easily bored when solving thought problems.
I act on the spur of the moment.
I am a steady thinker.
I change residences.
I buy things on impulse.
I can only think about one thing at a time.
I change hobbies.
I spend or charge more than I earn.
I often have extraneous thoughts when thinking.
I am more interested in the present than the future.
I am restless at the theatre or lectures.
I like puzzles.
I am future oriented.

C.2 Stage 2:

Welcome to the second stage of the experiment. This stage will take 2 minutes and you must complete the full 2 minutes to be paid your bonus. We will first walk you through the experiment while providing instructions. The instructions are simple, and if you follow them carefully, you can earn a considerable amount of money. All the money you earn is yours to keep, and will be paid to you, by bonus, after the experiment ends. The bonus (based off of your performance on the task) will be paid to you using the AMT bonus mechanism.

Please click the "Next" button to continue.

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
16	7	25	8	26	12	4	23	18	9	14	5	17	19	6	22	21	2	11	3	10	1	20	13	24	15

											a	b	c	d											

The task will involve encoding sequences of letters into a numerical code. There will be a table at the top of the screen (like the one shown above) with all the letters in the alphabet and a number below each one. This table will represent a code. Below the table you will find a four letter word which is a randomly generated set of four letters and underneath this word four number input boxes. You will be asked to enter the corresponding number below each letter in the word and then press OK to submit and move on to the next word. There are many words.

So for example (see above) if you are given the word "ABCD", you will get credit for coding the word correctly if you put "16" in the first box, "7" in the second box, "25" in the third box, and "8" in the fourth box.

Please click the "Next" button to continue.

Stage 2 (continued):

Prior to starting the coding task, the computer will offer you a piece rate wage that will pay you some number of cents (or fraction of a cent) for each code you correctly complete. If you do not like the wage, you can reject it. If you reject a wage, the computer will wait 3 seconds and then offer you another wage that you will also have the option of accepting or rejecting. There are many wages. The wages have been randomly generated and are pulled from the range 0 cents to 10 cents. You will be given 2 minutes to accept your wage AND code words. Once you accept a wage, you will begin coding words. If you do not accept a wage within the 2 minute time limit, you will earn a bonus of zero cents.

In addition, no matter what your accepted wage is, you will have a minimum earnings requirement that is randomly assigned. If you do not reach this minimum earnings requirement, you will earn only your participation fee (e.g., 25 cents). However, once you reach your minimum earnings requirement, you will be paid a bonus that

is equal to your wage times the number of codes you complete minus your minimum earnings requirement. So, for example, if you have a minimum earnings requirement of 10 cents and you accept a wage rate of 1 cent and you code 20 words, you will earn a bonus of 10 cents (i.e., 20*.01- .10). More generally, in this example, you would have to code at least 10 words in order to meet your minimum earnings requirement.