

The Daily Grind: Cash Needs, Labor Supply and Self-Control*

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Abstract

Using detailed data on labor supply and daily shocks among 257 bicycle taxi drivers in Western Kenya, we show that labor supply responds to both unexpected and expected demands on income on the day money is needed, but does not adjust in days prior to expected needs. We find that the quitting hazard within a given work day increases discontinuously once earned income reaches the day's cash need. We conjecture that workers set a personal rule of "earning enough for the day's need" as an internal commitment device to provide effort. Since demands on income are empirically uncorrelated with the wage rate, this rule generates a negative wage elasticity for hours worked. The inability to better arbitrage intertemporally has substantial welfare costs: greater variance in hours worked is associated with worse health, and we estimate lower bounds on lost income of 5-8%.

JEL Codes: C93, D12, J22

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1 Introduction

The majority of people in developing countries do not have employment contracts. They are self-employed, on their farms or in a small business, or they engage in daily casual labor. Thus they can set their own work hours. Such flexibility has the advantage that households can adjust their labor supply to the circumstances. In particular, in the absence of other smoothing mechanisms, they can increase their labor supply to cope with idiosyncratic shocks to their farm (Kochar, 1995, 1999), or to cope with negative productivity shocks (Frankenberg, Smith and Thomas, 2003; Jayachandran, 2006). But the freedom to choose one's own hours also has the fundamental disadvantage of being susceptible to self-control issues: without a fixed hours schedule, it may be tempting for a worker to quit earlier in the day than he had planned (especially in a physically demanding occupation). As shown in recent work with Indian data processors (Kaur, Kremer and Mullainathan, 2010, 2013) and Berkeley undergraduates (Augenblick, Niederle and Sprenger, 2013), individuals with time-inconsistent preferences over effort demand external constraints to help them meet work targets.¹ However, such external commitment devices are not typically available outside of formal work arrangements or a laboratory setting. How do self-employed or casual workers in low-skill, repetitive occupations motivate themselves to work hard day after day?

This paper studies the labor supply decisions of one specific group of workers in a physically challenging occupation: Kenyan bicycle taxi drivers. These workers (all of whom are men) carry passengers or goods on the back of their bicycles, and many report being in poor health, so quitting early may be tempting. Using a novel dataset collected from daily passenger-level logbooks kept by 257 drivers over approximately 2 months on average we start by establishing some facts about their daily labor supply decisions.

First, and consistent with the prior literature, daily hours are positively correlated with unexpected shocks (e.g. a sick family member needing medical treatment). This suggests that labor supply is used as a coping mechanism, a result which is typically attributed to the absence of alternative risk-coping mechanisms like savings, credit, and formal insurance.

The second and more surprising finding is that daily hours also increase on days with an *expected* cash need (e.g. school fees or a savings club payment coming due), but not in the days leading to the expected cash need. This second finding is difficult to reconcile with a neoclassical lifetime labor supply model, unless one makes the implausible assumption that individuals lack the ability to save money over as little as one day.

Third, since these shocks, whether expected or not, are empirically uncorrelated with

¹In particular, Kaur et al. (2010, 2013) shows that data entry operators voluntarily enter into employment contracts which penalize them for not meeting daily work targets.

the wage rate, workers in our sample display a negative wage elasticity for hours worked, as previously found in Camerer et al. (1997) and others. This means that workers could earn more by reallocating labor supply intertemporally from low wage days to high wage days. We conservatively estimate how much extra income workers would make under (1) a fixed hours rule and (2) assuming a 0.15 elasticity as in Chetty (2012), and estimate mean income increases of 5-8%.²

Fourth, because their labor supply elasticity is negative, workers in our sample work some very long hours on days they have a large cash need but the wage rate is low. If work effort has a negative impact on health and daily effort costs are convex, then workers will be in worse health by working long days. We find some speculative evidence consistent with this: workers with greater variance in hours worked over our study period are in worse health at endline (conditional on baseline health status).

Given these income and health costs, why can't Kenyan bicycle taxi drivers better smooth their labor supply, working past their cash needs on low-need days and dissaving on high-need days? A possible explanation is that they are "target earners", as first proposed by Camerer et al. (1997) with respect to New York City cab drivers and investigated in a number of subsequent studies with various types of daily income earners.³ Target earners anchor around a daily income target; once this target is set, workers are loss averse over it, such that marginal utility of income earned just below the target is very high and workers are therefore more likely to quit after reaching it. Camerer et al. (1997) discuss how income targets could be an internal commitment device to provide effort: setting a target before starting work in the morning may be a way to avoid succumbing to the temptation of quitting early. How, though, are the targets set? This is a fundamental issue when thinking about the potential for income-targeting to mitigate the tendency to put off effort. If workers can endogenously choose a high target for themselves every day, then self-control problems can easily be overcome. But if, as formalized by Köszegi and Rabin (2006), targets need to be based on rational expectations of effort and earnings to be binding, then self-control issues may remain important.

Our evidence is consistent with bicycle-taxi drivers in Kenya having targets that are based in part on rational forecasts of expected earnings (in accord with the discussion in Köszegi and Rabin 2006 and empirical work by Crawford and Meng 2011 and Abeler et

²The size of this effect is in line with the literature. For example, Camerer et al. (1997) estimate that a fixed hours rule would increase income by 5% among New York City cabdrivers. Kaur et al. (2013) estimate a treatment on the treated effect of a 6% increase in productivity from providing workers with commitment devices.

³See Chou 2002, Farber 2005, 2008, Crawford and Meng 2011 and Doran 2012 on taxi drivers; Fehr and Goette 2007 on bicycle messengers; and Chang and Gross 2012 on fruit packers.

al. 2011), but also on exogenous cash needs. Our logbooks include a question on whether respondents had a particular cash need on a given day and, if so, how much money is required to deal with this need. Using within-day, within-driver passenger-level data, we find that the quitting hazard increases discontinuously once workers earn enough to meet what they report as their cash need for the day. Only the current day's needs seem to affect the target, however, suggesting that bike-taxi drivers are *not* able to set and commit to a high target in expectation of a large cash need coming up in the future.

Overall, our conjecture is that workers in our sample procrastinate on earning enough to cope with cash needs until they can no longer put the need off. To overcome the temptation to put off work forever, they treat earning enough for the immediate needs as a kind of personal rule – an internal commitment device. Their success in following this rule may come from reference-dependent preferences, as in Köszegi and Rabin (2006), or because deviating from the rule would create a precedent for future days, as in Ainslie (1992) and Benabou and Tirole (2004). We also conjecture that this rule is over income, rather than hours, for two possible reasons. First, working a set number of hours does not prevent shirking on the job – e.g. not making enough effort to find customers or taking long breaks. Second, cash targets are more easily enforceable by someone else, for example the spouse. Bike drivers that leave their house in the morning and tell their wife: “I won’t come home until I have the 100 Ksh we need to pay the school fees” are committing more strongly than those who say “I will work for 8 hours,” since some of the 8 hours could be spent idling.

However, our results are not consistent with the simplest variety of a target earning model. Over the course of the study period, we provided respondents with random, unexpected cash payments on randomly selected days, and we use this experimental variation to estimate the responsiveness of labor supply to positive non-labor income shocks. Surprisingly, we find no effect of the payments on daily labor supply. If income were fungible across sources, this result is inconsistent with our previous findings, so it must be that the lottery payments are treated differently than labor income. While there are several possible explanations for this non-fungibility, we view it as most likely that people keep separate mental accounts over earned and unearned income. Whatever the underlying mechanism, the evidence in our paper is not wholly consistent with either the neoclassical model nor the simplest model of reference-dependent labor supply.

In addition, while the effect of reaching the need is clear, it is important to note that the model of reference-dependent labor supply of Köszegi and Rabin (2006) does not imply a marginal utility of zero for income over the target, only that marginal utility diminishes with income earned over the target but increases below it. Empirically, we do not find that people quit immediately at the target. In fact, workers reach the target only 38% of the

time and quit within 20 Ksh of the target only 8% of the time. Thus, while these effects are large enough to be meaningful, they are not deterministic (a result which is consistent with the other behavioral work listed above).

We provide evidence against some alternative explanations for our pattern of results, in particular models of labor supply under subsistence constraints; i.e. that people use bike taxiing to generate cash to meet immediate subsistence needs but then quit immediately after reaching the need. This could be because (1) the returns to another occupation have higher returns but delayed payouts; (2) people are unable to save money past their immediate consumption needs; or (3) effort costs are so high that it is optimal to quit immediately at the need. However, we find no evidence of heterogeneity by baseline measures of these characteristics.

The layout of the paper is as follows. Section 2 presents the sample and data. Section 3 establishes some empirical facts about the labor supply of workers in our sample. Section 4 discusses interpretations of the pattern of results. Section 5 concludes.

2 Sample and Data

2.1 Sampling Frame

The project took place in the Busia district of Western Kenya in Summer and Fall 2009. The sample was drawn in August, and the logs were collected between September and December. To draw the sample, enumerators conducted a census of all bicycle-taxi drivers (locally known as “bodas”) in 14 market places scattered around the district. Individuals were included in the sample only if their primary occupation was as a bicycle taxi driver.

The only sample restriction was that the respondent had to be able to read and fill out the logs. We therefore excluded individuals who could neither read nor write or who had fewer than three years of schooling (24% of those in the census), leaving 303 eligible individuals. We were able to successfully enroll 257 (85%) of these in the study. The remainder could not be enrolled for one of three reasons: they had moved out of the area, had quit boda work, or did not consent to the relatively heavy data collection requirements.

2.2 Data

The data collection took place over a 3 month interval, from September to December 2009. Individuals were enrolled on a rolling basis (the last round of individuals were enrolled in

late November).⁴ There are two primary data sources we use for the analysis.

2.2.1 Baseline Survey

Each individual who was enrolled in the study was administered a baseline survey.⁵ In addition to basic household demographic information, the survey included a number of measures to inform the subgroup analysis. These include a financial module, a health module, and a module to construct measures of time preferences, risk preferences, and loss aversion.⁶

2.2.2 Logs

Building on the successful use of logs in previous studies in the same area of Kenya (see Robinson and Yeh 2011 and Dupas and Robinson 2013a for data from self-filled daily logs collected among sex workers and market vendors / bicycle-taxi drivers, respectively), we asked each study participant to keep a daily labor supply log for up to three months. The logs were pre-printed in a two-page questionnaire form with 7 rows per page (corresponding to 7 days, with pre-printed dates) with blanks for study participants to fill in the relevant information. To incentivize participants to fill the logs well, respondents were given in-kind gifts (either soap or cooking oil) worth around 75 Kenyan shillings (\$1) for each week in which they filled the log competently.⁷ This amount is similar to what was paid in Dupas and Robinson (2013a).

Respondents were instructed to fill in the log throughout the day, indicating the precise time at which they started working, the timing of each client pickup and dropoff, the fare, and the time they stopped working.⁸ The logs also included questions on daily needs. The first question on the log was: “Is there something in particular that you need money for today?” and included codes for a variety of common options such as bicycle repairs, medical expenditures, ROSCA contributions, food, and school fees. If the respondent reported a need, the next question asked the respondent to record the amount necessary to meet this need. The logs also included a few questions on health shocks experienced that day by the individual and other family members.

While the daily logs contain rich information on labor supply, needs, and health shocks, it was not possible to include other questions without making the logs too onerous to complete.

⁴The sample was drawn on a rolling basis because the fixed cost of training a respondent to keep the log was large so it took some time to train respondents.

⁵This survey, as well as the daily and weekly logs described below, can be found on the authors’ websites.

⁶The baseline was conducted in parallel with the beginning of the data collection process. Baseline data is missing for 12 of the 257 workers in our sample.

⁷The exchange rate was approximately 75 Kenyan shillings (Ksh) to \$1 US during this time period.

⁸Respondents were given watches to record the time.

Thus, to supplement the daily logs and to regularly check data quality, enumerators visited study participants on a weekly basis. During this visit, the enumerator checked that the logs were filled correctly and collected the completed pages. The enumerator then administered a recall survey to the respondent. For each day in the given week, the enumerator asked about a variety of other outcomes, including labor supply in other jobs (e.g., farming, casual work, selling produce, etc.). The weekly survey also includes more details on health shocks (including symptoms), making it possible to cross-validate the health shock information recorded in the daily logs.⁹

As mentioned above, bodas were enrolled into the study on a rolling basis. There is therefore variation in how long bodas were asked to keep logs. Of the bodas in the final sample, logs were kept for between 1 week and 3 months. The median boda kept the log for 49 days (the mean is 52 days). We have an accompanying 1-week recall survey for 72% of the days.¹⁰ The median boda has full data for 35 days (the mean is 38 days).

2.3 Experimental Income Shocks

To introduce random variation in non-labor income across days for a given individual, we invited respondents to participate in a free lottery a few times over the course of the study. On a randomly announced day, field officers were instructed to find the respondents in the given market center and give them a voucher to allow them to play the lottery. The lotteries were not announced in advance. Respondents then brought their voucher to the local market center on the same day and picked a prize from a bag. Lottery participants had a 50% chance to win only 20 Ksh (the small prize), and a 50% chance to win a large prize (namely, a 25% chance to win 200 Ksh, a 12.5% chance to win 250 Ksh, and a 12.5% to win 300 Ksh).¹¹ The odds and prize sizes were not disclosed to participants. Given that average daily income (conditional on working) is approximately 150 Ksh, the lottery prizes were substantial. The prizes are also large relative to daily cash needs, which (conditional on having a need) average around 200 Ksh (see Table 2).

Each boda was sampled to participate in at least one and up to four lotteries over the course of two months.¹² If a participant could not be located on a given lottery day, he was

⁹In the interest of time, expenditures were not recorded.

¹⁰The reason why the 1-week recall survey is missing for some days is that enumerators sometimes were not able to find the respondent to collect the daily log (e.g., if the respondent had traveled). In that case, the enumerator would attempt to find the respondent the following week, but then only administered the 1-week recall survey for that week.

¹¹To ensure payments were made correctly, the survey team implemented audit and backchecking procedures.

¹²Overall, 2% of study participants participated in four lotteries, 47% participated in three lotteries, 38% participated in two lotteries, 6% participated in only one lottery, and 7% did not participate in any lotteries.

never told about the lottery he missed.¹³

2.4 Sample Characteristics

Table 1 presents baseline characteristics for our study sample. All study participants are male, since bicycle-taxi driving is an exclusively male occupation. 75% of respondents participate in Rotating Savings and Credit Associations (ROSCAs). While 32% have bank accounts, few use them regularly (see Table 2), possibly owing to the fact that banks in this area tend to have substantial withdrawal fees, limited opening hours, and few rural branches.

As a way to estimate levels of current savings, the baseline asked respondents the following open-ended question: “If you absolutely needed 1,000 Ksh, how would you get the money?” (answers were coded after the respondent has answered). While 1,000 Ksh is a substantial sum (equivalent to about a week’s worth of income), it is not very large relative to lifetime income and is the type of shock that people do encounter in reality (for example, for a serious medical problem which requires hospitalization). Although respondents could list as many responses as they wanted, only 10% of people reported being able to use savings for even part of the amount. Most people reported that they would have to rely on friends or family for help (47%) or would have to resort to selling assets (34%).

Health status appears relatively poor among bodas in the sample. Even though the average boda is only 32 years old, 39% missed at least 1 day of work in the month prior to the baseline due to sickness. The baseline also collected information on a number of physical symptoms, coded as 1 for none, 2 for mild, 3 for moderate, 4 for severe, and 5 for extreme. We then aggregate these into a “health problems” index. The average of this is just 1.97, corresponding to mild on average. However, a quarter of respondents report moderate health problems / pain.

Reference-dependence requires that individuals be loss averse around a target. Consistent with this, Fehr and Goette (2007) find that lab experimental measures of loss aversion predict behavior in their experiment among bicycle messengers in Switzerland. Following them, we collected measures both of loss aversion and of small-stakes risk aversion. We measure loss aversion by asking respondents whether they would accept a gamble in which there is a 50% chance that they would win some amount and a 50% chance they would lose a smaller amount. Overall, 28% refuse a 50/50 chance of winning 30 Ksh or losing 10 Ksh, while 58% refuse a 50/50 chance of winning 120 Ksh or losing 50 Ksh. To measure small-stakes risk aversion, respondents were asked to divide 100 Ksh between a safe asset in which they kept the amount invested for certain and a risky asset in which the amount invested would

¹³As would be expected, almost all respondents who were invited played the lottery that day – only 4% of respondents who were invited chose not to play the lottery.

be multiplied by 2.5 with 50% probability and would be lost with 50% probability. Note that because the stakes are so low, an expected utility maximizer should be close to risk averse over this sort of gamble and so should invest close to the full amount (Rabin 2000). Loss averse respondents, by contrast, may invest less. Indeed, the average respondent in our sample invested just over half (56.2 Ksh) in the asset, further suggesting that a significant fraction of respondents may be loss averse.

2.5 Summary Statistics from Logs

Table 2 presents summary statistics from the logs. From Panel A, respondents work on 74% of the days in our sample. Conditional on working, average income is around \$2 per day. Consistent with Table 1, bike taxiing is the primary source of income – respondents received other income on only 24% of days. Panel B shows that needs are very common: respondents report daily needs on 88% of days. Conditional on having a need, the average amount needed is quite substantial: at around 200 Ksh, it exceeds average income. There is also substantial variation in needs: needs range from a minimum of 5 Ksh to over 1,500 Ksh, and the standard deviation is 340 Ksh. Much of this variation is within individual across days: the within-individual standard deviation (296 Ksh) is larger than the inter-individual standard deviation (168 Ksh).

As can be seen from Panel C, shocks are quite common. For example, respondents report that they are sick on 18% of days and report that another family member is sick on 10% of days. Respondents also commonly need money for other expenses. Individuals report needing cash to pay school fees on 2% of days, needing to contribute to a funeral on 5% of days, needing to make bicycle repairs on 21% of days, and needing money for ROSCA contributions on 15% of days.¹⁴ Finally, Panel E shows two other individual-level variables of interest: 24% of respondents receive lumpy, irregular payments from regular customers (typically payment for taking a child to and from school) and 17% of respondents rent their bikes from someone else.

¹⁴ROSCA contributions are so frequent because many people report participating in ROSCAs which meet frequently.

3 The stylized facts of interest

3.1 Reduced form analysis: Daily Demands on income and Labor supply

In this section we exploit within-driver variation in shocks and payment dues across days. In particular, we estimate the following:

$$L_{it} = \beta w_{it} + S_{it}^u \gamma^u + S_{it}^e \gamma^e + X_{it} \delta + \eta_{it} + \mu_i + \epsilon_{it} \quad (1)$$

where the dependent variable is a measure of daily labor supply for individual i at date t , and S_{it}^u represent unexpected shocks (such as sickness or funeral expenses), and S_{it}^e represent expected events which require cash (such as ROSCA payments or school fees coming due). The vector X_{it} includes a measure of the realized wage rate (w_{it}). Since an individual's wage is, of course, endogenous, we follow Camerer et al. (1997) and construct a realized wage that is exogenous to the individual by taking the average wage of all of the other bodas in that market center. Though the coefficients are not reported, we also include controls for whether it rained, and whether the driver was sick that day. Finally, we include fixed effects for the day of the week and the week of the year (η_{it}) in the specification, since these are predictable determinants of the wage.¹⁵ The regressions include individual fixed effects, and errors are clustered at the individual level.

Results are reported in Table 3. On days in which they have demands on their income, individuals are more likely to work and work longer hours (and therefore earn more money). And conditional on working, workers work longer hours and spend more of the work day carrying passengers if they face demands.¹⁶ The effect sizes are substantial: workers are 19 percentage points more likely to work on days they have needs. Conditional on having a need, a 100% increase in the need amount increases income by just over 10%.

¹⁵As some of the variation in wages is across days of the week (for example, wages are higher on market days when people buy and sell items in the town), this regression could be run without day of the week controls. However, the overall pattern of results is similar with or without day controls (in part because market days vary across locations).

¹⁶Potentially there could be adjustment on the fare as well (i.e. the driver gives a discount) – see Keniston 2011 for evidence of significant bargaining between rickshaw drivers and passengers in India. This is unlikely for short rides (since the norm is of a minimum fare of 10 or 20 Kenyan shilling), but could be relevant for longer rides. While it is difficult for us to check this (since we do not know how long a particular ride is, in distance), we can provide some evidence by looking at the average fare per minute of a given ride. We do not observe any relationship between this measure and cash needs.

3.2 Income and Health implications of intertemporal substitution patterns

Since idiosyncratic demands on income (whether unexpected shocks or expected payments) are uncorrelated in our data with the local wage rate, these results imply that the average worker will work more on days when the wage is lower than he otherwise would have. That is, a worker will earn less income for a given number of hours than he would have if he substituted intertemporally as in the standard neoclassical model. How much income are workers in our sample losing?

It is difficult to quantify this empirically, since an optimizing worker would want to work more on days in which the wage is high. We therefore estimate lost income in two, conservative, ways: (1) a lower bound in which the worker supplies equal hours every day; (2) and an estimate based on a labor supply elasticity of 0.15 (the mean micro labor supply elasticity reported by Chetty 2012).¹⁷ Underlying this calculation is an assumption that workers are not too tired to work longer hours on days in which there are more passengers. We present a CDF of the percentage increase in income that adopting such rules would yield in Figure 1.

The fixed hour rule yields mean and median increases in income of 5.0% and 2.5%, while the estimate based on a 0.15 elasticity gives mean and median estimates of 8.0% and 5.0%.¹⁸ These estimates are of comparable magnitude to Camerer et al. (1997), who estimate approximately a 5% increase in wages from a fixed hours rule for the average taxi driver, and Kaur et al. (2013) who estimate a treatment on the treated productivity effect of 6% to giving external commitment devices to data workers.

For very poor households such as those in our sample, 5% of yearly income is more than what it takes to invest in life-saving products that many struggle to find money for, such as antimalarial bednets or water filters. Another benchmark might be the increase in profits due to a random injection of capital among small businesses. For example, de Mel et al. (2008) give random cash grants to Sri Lankan businesses and estimate returns to capital of 4.6-5.3% per month. Given baseline profits and inventories in their sample, and assuming the grant is not reinvested, increasing profits by 5% would require a 14-16% increase in the capital stock.¹⁹

There may also be health costs of failing to smooth hours. If strenuous effort has convex

¹⁷Note that this calculation is equivalent to calculating the percentage reduction in hours that a worker could realize while earning the same income.

¹⁸Lost income is large for at least a minority of workers. It is also interesting that only about 10% of people in our sample would reduce income if they worked a fixed number of hours per day.

¹⁹Baseline profits in their sample are 3,841 Sri Lankan rupees (LKR) while baseline inventories are 26,530 LKR. Thus, increasing profits by 5% would require an increase in capital of 3,600-4,200 LKR.

health costs, such that health capital is depleted by working long hours, expending great effort on days in which needs are high may have deleterious effects on long-term health. To provide some evidence on this, we can look at health towards the end of our study period and test whether workers who work more very-long-hours-days are in worse health towards the end of the study period (even conditional on total hours). In Table 4, we perform a descriptive cross-sectional regression, in which we regress endline health on the (log of) total hours worked and the (log of) the standard deviation of hours worked across days. There is thus one observation per worker. The results in Columns 1 and 3 show that workers with higher variance in hours worked across days over the study period are in worse health at the end of the period, though interestingly total hours is not predictive. Since people in poor health may be the ones to experience the most shocks (particularly health shocks), we control for baseline health measures as well, in Columns 2 and 4. The results are unaffected by the addition of these controls.

4 Mechanism: Daily needs as Income targets?

Given the potential income and health costs estimated above, why can't Kenyan bicycle taxi drivers better smooth their labor supply, working past their cash needs on low-need days and dissaving on high-need days? A possible explanation is that they are "target earners", as first proposed by Camerer et al. (1997) with respect to New York City cab drivers and investigated in a number of subsequent studies with various types of daily income earners.²⁰ Target earners anchor around a daily income target; once this target is set, workers are loss averse over it and are therefore more likely to quit after reaching it. Camerer et al. (1997) discuss how income targets could be an internal commitment device to provide effort: setting a target before starting work in the morning may be a way to avoid succumbing to the temptation of quitting early. In this section, we provide evidence that bicycle-taxi drivers in Kenya tend to behave like target earners, with targets that are based in part on cash needs. We do so using both day-level analysis (in particular, regressions with hours as the dependent variable) as in Camerer et al. (1997) and a within-day hazard rate analysis as in Farber (2005).

One of the novelties of our dataset is that it contains a direct measure of what we hypothesize is the potential target: the respondent's perceived cash need for the day. As discussed in section 2.2, the logs that respondents were asked to fill every day included the following question on the first row: "Is there something in particular that you need money

²⁰See Chou 2002, Farber 2005, 2008, Crawford and Meng 2011 and Doran 2012 on taxi drivers; Fehr and Goette 2007 on bicycle messengers; and Chang and Gross 2012 on fruit packers.

for today?” and included codes for a variety of common options such as bicycle repairs, medical expenditures, ROSCA contributions, food, and school fees. Respondents could check multiple options. There was also a code for “nothing special.”²¹ If the respondent reported at least one need, the next question asked the respondent to record the total amount necessary to meet the day’s needs.

Unsurprisingly, the reported cash need is very highly correlated with the exogenous shocks that respondents reported in the weekly recap survey. We show this in Table A1, in which we run regressions analog to those shown in Table 3 but with the dependent variables concerning the reported cash need for the day, rather than labor supply.

We find that several of the shock measures (whether expected or unexpected) are correlated with needs. In contrast, needs are not strongly correlated with the local wage rate (if anything, the correlation is negative). This result, coupled with the result that the needs are highly correlated with the exogenous shocks, helps to rule out the concern that workers may endogenously “choose” to consider a need (e.g., choose to pay pending school fees) on days when they know they can earn more.²² Needs are also largely uncorrelated with the day of the week, with one exception: people are less likely to report needs on Sundays and are more likely to report them on Monday. There are two potential explanations for this. First, people may actually have less needs on Sundays (for example, school fees and other bills are unlikely to be due on a Sunday). Second, people may choose to “put off” some needs on Sunday. We lack the ability to parse these out. This exception aside, the evidence on the whole suggests that the needs are largely exogenous to labor market conditions.

²¹This code was reported on 8.4% of days. Results look very similar when these days are removed from analysis.

²²In Table A2, we cross-check the needs reported on the daily logs with the actual expenditures for that day as reported in the weekly recall survey. Specifically, we regress whether a specific type of need was recorded on the daily log (e.g. for ROSCAs, school fees, funeral expenses, bike repairs, and loan repayment) on whether the respondent reported expenditures of that same type on that same day, as per the weekly survey. There are several comforting results. First, reported needs and actual expenditures are strongly correlated for all types of spending, providing some assurance of data quality. Second, since ROSCA payments and school fees are due on specific days outside of individuals’ control, this helps to rule out endogenous reporting of needs (an issue to which we return to in section 5.2.2). Another important result comes from the even-numbered columns, which include controls for whether the respondent will have that expenditure in the next few days. For example, Column 2 shows whether the respondent reports needing money for a ROSCA in the 2 days before the ROSCA payment is actually due. Interestingly, the coefficients are negative and significant, suggesting that people delay considering these pending expenses as things they need to raise cash for until the last possible moment. The other categories show no evidence of anticipating needs in advance. These results suggest that people procrastinate on their needs until they actually need the cash. Tables A3 and A4 replicate these specifications for labor supply and find a very similar pattern.

4.1 Cash Needs and Daily Labor Supply

4.1.1 Cross-Sectional Evidence

We start by showing simple correlations between the cash need and labor supply intensity (at the day level). We pool all individuals together for this exercise, so that comparisons are both across days and across individuals. Results are shown in Figure 2 for average hours (top panel) and average income earned (bottom panel). We limit the sample to cash need amounts with at least 50 observations (that is, 50 individual-days), and observations are weighted by the frequency of that need amount (represented by the size of the circle). The figure shows a very clear positive relationship between the cash need for the day and the labor supply that day.

4.1.2 Within-Driver Variation Across Days

First, we examine how labor supply responds to needs at the day level. Table 5 presents specifications with two measures of the need: the odd numbered columns include a dummy for having a need, while the even numbered columns include the log of the cash need for those that have one. As before, the observation is a worker-day, and the regressions include individual fixed effects, control for the local wage rate, the day of the week, and the standard errors are clustered at the individual level. Unsurprisingly, the results are consistent with the reduced form results: On days in which they have needs, individuals are more likely to work (and therefore earn more money). And conditional on having a need, individuals with a higher need have more passengers, work longer hours, and spend more of the work day carrying passengers. The effect sizes are substantial: individuals are 18.9 percentage points more likely to work when they have a need and, conditional on having a need, a 100% increase in the need amount translates into approximately a 10% increase in earned income.

Another interesting result is that as in Camerer et al. (1997) and subsequent papers, we observe what appears to be a negative wage-elasticity on the intensive margin – conditional on working, bicycle-taxi drivers appear to work fewer hours on higher-wage days. On the other hand, on the extensive margin, people are more likely to work when the wage is higher, as in for example Oettinger (1999).

4.1.3 Within-Driver, Within-Day Hazard Analysis

In this section, we test for targeting more specifically by estimating the hazard of quitting around the daily need amount. Note that under income targeting, since the cash need is potentially only one component of the (unmeasured) target, the estimated effect of reaching the target will be downwardly biased.

We estimate the hazard with the following non-parametric regression

$$q_{ipt} = \sum_{b=-10}^{10} \gamma_b D_{ibt} + \delta H_{ipt} + \psi H_{ipt}^2 + \eta N_{it} + \mu_i + \eta_t + \epsilon_{ipt} \quad (2)$$

where q_{ipt} is a dummy for quitting after passenger p on date t , H_{ipt} is hours worked up to that passenger, and N_{it} is the need amount for that date.²³ The key parameters of interest are the γ_b coefficients, which are dummies for being in income bin b , relative to the need amount (these bins are of width 20 Ksh).²⁴

If the needs serve as targets, we would expect the coefficients γ_b to be larger after the threshold has been reached ($b \geq 0$), compared to those before the threshold ($b < 0$).

We plot these coefficients, and associated 95% confidence intervals, in Figure 3. As can be seen, there is a clear increase in the probability of quitting at the need amount.²⁵ The probability of quitting continues to rise after that point, as well (note that this graph is the conditional probability of quitting, so that the cumulative probability is larger).²⁶

Lastly, we run a parametric regression to formally test whether reaching the target affects quitting behavior:

$$q_{ipt} = \alpha + \gamma_1 O_{ipt} + \beta_1 D_{ipt} + \theta_1 D_{ipt} * O_{ipt} + \delta H_{ipt} + \psi H_{ipt}^2 + \eta N_{it} + \mu_i + \eta_t + \epsilon_{ipt} \quad (3)$$

where D_{ipt} is the difference between the daily need and income earned until passenger p and O_{ipt} is a dummy equal to 1 if total income has exceeded the daily need. From the figures, we anticipate that both γ_1 and θ_1 should be positive. This analysis is presented in column 1 of Table 6. The coefficient on the dummy for exceeding the target is positive and

²³Results look identical when controlling for hours spent riding rather than total hours spent working (which includes waiting time).

²⁴The overall pattern looks similar with other bin sizes (results available on request). Using a smaller bin is problematic in that very few fares are less than 20 Ksh, while using a larger bin attenuates effects.

²⁵Note that while the graph appears to show a flat hazard below the threshold, the hazard is *conditional on total hours worked* (and the square of total hours). Without a control for hours worked, there is a small increase in the hazard below the threshold. We present the results with the hours controls because inference is crisper when controlling for a smooth function of hours.

²⁶A potential complication in estimating the hazard is that need amounts vary across day so there is a (mechanical) potential sample composition issue in comparing coefficients (for example, observations in bins far over the threshold mostly involve days in which the need amount is very low). Note, however, that this issue is much less severe right around the threshold than at points further away (since on average sample composition shouldn't change discontinuously at that point). To further confirm that this sample composition is not affecting our results, we perform two sets of tests. First, we run regressions restricting the need size to a fairly narrow range. This, of course, greatly reduces power but yields a qualitatively similar overall pattern (see the bottom panel of Figure 3). Second, we run specifications with fixed effects at the individual-day level. These regressions, which by definition control for the need amount, yield a similar pattern. However, since they greatly restrict variation and consequently reduce power, we do not include them in the main tables.

significant at the 1% level.

4.2 Targeting and Earned vs. Unearned Income

As discussed previously, we invited respondents to participate in a free (unannounced) lottery a few times over the course of the study. Individuals were invited to come to their local market center on that same day and pick a prize from a bag. Lottery participants had a 50% chance to win only 20 Ksh (the small prize), and a 50% chance to win a large prize (namely, a 25% chance to win 200 Ksh, a 12.5% chance to win 250 Ksh, and a 12.5% to win 300 Ksh). These are substantial sums relative to average daily income.²⁷

Under the most straightforward model of reference-dependent labor supply, these shocks should induce workers to quit. To test this directly, we regress various measures of labor supply on whether the respondent won one of the large amounts (an amount greater than 200 Ksh) in Table 7 (the regressions include boda fixed effects).²⁸ Surprisingly, we find no effect of the lottery on any measure of labor supply. A hazard analysis (not shown) finds no evidence whatsoever of a change in the quitting hazard right after the payment. These experimental results are in fact completely consistent with a standard lifetime neoclassical labor supply model.

Our overall set of results therefore reject both a neoclassical model and the most straightforward variant of a model of reference-dependent labor supply. These can only be reconciled if there is some constraint on the fungibility between earned income and the experimental income shocks. While there are several possible explanations for this, the one which we believe is most likely is that people have different mental accounts for earned and unearned income, so that unearned income fluctuations cannot undo the earned income target. One reason that may be plausible is that people do receive income flows fairly regularly: for example, many of the ROSCAs people in our sample participate in have very short schedules (for example, 49% of those people who are in ROSCAs receive payments in cycles less than 2 weeks). Quitting early on these days would significantly lessen the value of being in such a high-frequency ROSCA. However, there are other possible explanations as well. For example, the relatively large amount of the transfer may be treated differently than small deviations around a target. Another possibility is that even though work transactions are conducted privately, the lottery income is still less observable than market income and therefore less

²⁷The timing of payouts in the day was random – some people were selected to receive payments in the morning and others in the afternoon, though typically the payments were made after respondents had started work for the day. We do not observe any heterogeneity in behavior based on the timing of the payment.

²⁸The regressions include all days, including those in which no lottery was played. This is because the disruption of the lottery was minimal, taking only a few minutes, so that results look very similar even when restricting to lottery days alone (results on request).

likely to be taxed by others. In any case, whatever the ultimate explanation, our results suggest that both the neoclassical model and the simplest reference-dependent model do not fully fit the observed pattern of results.

4.3 Discussion

4.3.1 Mental targets as commitment devices

As discussed in Camerer et al. (1997), mental income targets could be a way for daily income earners to solve self-control problems: present-biased workers who can set their own hours may be tempted to quit too early, and setting a target before starting work in the morning may be a way to avoid succumbing to that temptation. Koch and Nafziger (2009) formalize this intuition, showing that under present-bias and loss aversion, goal setting can be used for self-regulation: setting a goal for future performance increases future effort because the goal becomes a reference point and falling short of it would be experienced as loss. This explanation is plausible for workers in our sample: bike-taxiing in the hot sun is strenuous and unpleasant, and given the relatively poor health of drivers in our sample, possibly painful as well.²⁹

But how can a mental target be strong enough to work as a commitment device? If all one needs to motivate oneself is to set a target, then everyone should pick an optimal target which maximizes intertemporal utility (i.e. behave exactly as in a neoclassical labor supply model).

Clearly that is asking too much from mental targets, and that is not what we observe in the data. Instead, it seems that people need some external device to help make the target binding. For example, recent work by Kaur et al. (2010, 2013) shows that data entry clerks in India willingly accept wage contracts which penalize them, in terms of pay, if they fail to reach a self-chosen target, suggesting demand for an external commitment to help them overcome present-bias. Among US undergraduates, Augenblick et al. (2013) find a strong demand for commitment devices to not put off tedious effort tasks.

Absent such external devices, our data suggests that workers use a heuristic to earning enough to meet a binding mental target. That the target cannot be undone by an unexpected income shock such as our lottery payment is important: if it were, then targeting would be a very weak internal commitment device to provide effort.³⁰ The flip side of this simple

²⁹Those in worse health at baseline appear no more likely to respond to reaching the target, but individuals in worse health are more likely to quit at all income levels, and work less overall.

³⁰We also find no effect of a “real world” cash payout – receiving the cash pot – on labor supply. Note however that the ROSCA payout is expected in advance. On the intensive margin, we also check whether hours are affected by receiving the in-kind gift of soap or cooking oil on the weekly survey days, and find no

heuristic is that people quit earlier on days in which they do not have a pressing need.

This heuristic raises another question: how does current day’s income affect tomorrow’s target? We examine this in Table A5, in which we regress having a need and the need amount on (1) winning the lottery the day before, (2) earning more than the need amount the day before, and (3) receiving the in-kind gift of soap or cooking oil the day before. Consistent with the lottery wins being treated in a separate account, we find no effect of the lottery payment on the next day’s need. However, people report smaller cash needs on days following a day in which their bike-taxi income (endogenously) reached their need amount. Receiving the in-kind payment from the research team as compensation for the work filling the daily logs also reduces the following days’ reported need.

4.3.2 Targets and Expected Earnings

If the effect of the need on labor supply indeed takes effect through a mental income targeting mechanism, then as discussed in Köszegi and Rabin (2006) and Crawford and Meng (2011), the income target would likely be determined by expectations over earnings. Our results further suggest that the exogenous need will also affect the target. To examine both together, we integrate our results with those of Crawford and Meng (2011). In that study, the authors use average daily income or hours (by driver and day of the week) in previous days as a proxy for the target. We replicate that analysis in Table 8. The odd numbered columns replicate Crawford and Meng, while the even numbered columns include a dummy for being over the need amount. We replicate the finding that reaching either the income or hours target increases the likelihood of quitting in all specifications. When we add in our need measure, we find that all three coefficients are significant, suggesting that both earning expectations and the daily need matter and affect the target.³¹

One final point of comparison can be seen when we graph the Crawford and Meng results in Appendix Figure A1. As would be expected if wage rates or targets vary across days, the discontinuity at the target proxy is less sharp using this approach (especially for hours). This underscores the value of having an explicit measure of the daily need in our dataset.

effect.

³¹Table A6 appears to offer an explanation for why income expectations matter while there is such a clear discontinuity at the need: earning expectations based on previous earning history are uncorrelated with the need amounts.

5 Heterogeneity, Robustness, and Alternative Explanations

5.1 Heterogeneity

One important question is whether certain workers are better able to take advantage of neoclassical intertemporal substitution. One such group might be more educated workers, for example because recent evidence suggests that cognitive ability is correlated with preferences over risk and time.³² Indeed, a Mincer equation yields a coefficient on years of education of 3.7-4% in our sample (Appendix Table A7, columns 1 and 2), even conditional on a host of covariates. A decomposition of this effect in the other columns of Table A6 and Figure A2 shows that more educated workers do not work longer or take on more passengers, nor do they better optimize on the extensive margin, but their effective wage rate is higher. Is it possible that such workers are less prone to income targeting?

We examine this in Panel A of Figure 4, in which we examine quitting behavior for more and less educated workers. Education varies from 0 to 12 years, and is bunched around 7 (the 25th percentile is 6, the median is 7, and the 75th percentile is 8). For this analysis, we split the sample at 6 years of education (the 25th percentile of the education distribution). From the figure, it indeed does appear that more educated workers are less sensitive to reaching the daily need (even though the patterns of daily needs does not systematically vary by education level). In contrast to other papers, we find little correlation between education and measures of preferences, however (educated workers are slightly more patient, but do not differ in terms of loss aversion, small-stakes risk aversion, of time consistency – results available upon request). What’s more, we do not observe significant heterogeneity in quitting at the daily need amount by our measure of loss aversion (Panel B of Figure 4).³³

The right-hand columns in Table 7 formally tests for heterogeneity. Each row repeats the parametric regression above, but also includes interactions with the background characteristic of interest. We focus on several measures of education (being in the top 75% of the education distribution, being in the top 50%, and years of education), as well as a measure of loss aversion (refusing a 50/50 gamble to win 30 Ksh or lose 10 Ksh). The interaction between these variables and the dummy for reaching the target is significant for 2 of our 3 education measures, but not for our measure of loss aversion. While speculative, these

³²See, for example, Frederick (2005); Dohmen, Falk, Huffman, and Sunde (2010); Burks, Carpenter, Goette, and Rustichini (2009); and Benjamin, Brown, and Shapiro (2013). Similarly, Kremer et al. (2013a) show that small-stakes risk aversion is correlated with inventory and profit levels among Kenyan retail shops.

³³One possible reason we do not find a correlation whereas Fehr and Goette (2007) do is that the stakes in our gambles were relatively larger (around 2/3 daily income, compared to less than 5% in Fehr and Goette 2007). They are still an insignificant fraction of lifetime income, however.

results suggest a potential role for education, even in a setting which otherwise would seem to require little human capital.

5.2 Robustness

This section discusses two potential threats to the analysis above. First, there may exist experimenter effects, given the high frequency and nature of the data collected. Second, it might be possible that the timing of cash needs is endogenous.

5.2.1 Experimenter effects

The log asked individuals to record their cash need at the beginning of every day. One may worry that simply asking this question made that specific amount salient in respondents' minds, especially those with a lower level of education. It is also possible that respondents felt an experimenter demand effect, i.e. that respondents believed that the researchers expected them to work up to the need, and then quit thereafter. In this section we argue that these two types of experimenter effects are unlikely to be driving our results.

The most convincing test of the presence of such experimenter effects would be if we had a comparable group of bicycle taxi drivers who were asked to fill logs similar to those we used, except for the question on the daily cash need. We could then check whether workers who were asked to state their cash need exhibit more variance in hours than workers who were not. Though we cannot test this directly since all of the workers in our study were asked about the need, we can compare the variance in hours we observe in our sample to that of bicycle taxi drivers followed in Dupas and Robinson (2013a). While that data was collected between 2006 and 2008 (i.e. 1 to 3 years earlier than the present study), it was collected using almost identical logbooks except that they did not include the question on the day's needs. Interestingly, we find comparable (and if anything, *larger*) within-worker variance in hours worked across days in that earlier sample: 2.74 compared to 2.16 in the sample considered in the present paper. This at least suggests that the large within-individual variance in daily labor supply is not an artifact of our data collection protocol.

A second way to test whether the data collection made needs particularly salient and therefore accentuated income-targeting is to check how persistent the effects are. If people were not income targeting at all before the study, but then began to do so after keeping the logs since the cash needs became salient, then such respondents should eventually have switched back to their previous behavior after some time, since income targeting reduces total income on average. Thus, if this were the explanation, then one would expect the evidence of targeting to fade over time. When we run the hazard analysis separately for the

first and last month during which individuals were keeping the logs, however, we find the exact same pattern of results, with the same magnitude, for both time periods. This further suggests that experimenter effects are unlikely explanations for our results.

5.2.2 Endogenous timing of needs

While many of the determinants of the cash needs reported by our study participants are almost certainly exogenous and unexpected (e.g. health shocks, funerals), some can be anticipated (e.g. food for the household). For such anticipated needs, workers may choose the days in which they decide to “deal” with those – for example, they may decide to purchase food on the day they expect to make more money, or they may decide to pay school fees on the day they wake up feeling in particularly good health. If that is the case, workers would mechanically report higher needs on days in which they expect to make more money, explaining the positive correlation we observe between needs and labor supply. While this may be the case on the extensive margin – on Sundays, which is much less likely to be a work day than other days, respondents typically report smaller cash needs – this does not appear to be the case on the intensive margin. Indeed, as was mentioned earlier and shown in column 2 of Table A1, reported needs in our data are not positively correlated with the wage rate. All the main results are also very similar when Sundays are excluded from the regressions. What’s more, as shown in Table A2, people report needs such as savings club payments exactly on the days in which these are paid (and these savings club payments are on fixed schedule that workers cannot unilaterally decide on). Finally, if we restrict the sample to individual-days with only unexpected needs, we see the same pattern of results.

5.2.3 Ex-post rationalization of labor supply

Another concern is that people may have felt that they were “supposed to” make at least as much as the need, and therefore filled in the needs at the end of the day to match whatever they made that day. There are several pieces of evidence against this. First, respondents were of course instructed to fill the log in order. While there is no way of checking they did this, there is no obvious reason not to – it is not clear why people would feel that earning enough for a need was socially desirable. Second, reported needs are highly correlated with shocks reported in the weekly survey. Third, the reduced form relationship between shocks and labor supply exists without any reliance on the needs, on both the intensive and extensive margins. Fourth and most important, while the amount that people earn is correlated with the need, it is not the case that people often report earning just barely enough to cover the need. In fact, people only make enough for the need on 38% of days, and only make 20 Ksh

or less over the need 8% of the time. This is because needs can be very large or very small on some days, and because the change in marginal utility from working around the slope need not be dramatic – if the expected wage is sufficiently high, people will continue to work beyond their target (and in fact, this is why the increase in income from smoothing hours isn't larger).

5.3 Alternative explanations

5.3.1 Subsistence Constraints

Our preferred explanation for these results is that workers in our sample have income targets which serve either as reference points or personal rules. One could however think of alternative explanations, notably that observed behavior can be explained by a model of labor supply under subsistence constraints (for a recent example, see Halliday 2012). In our context, the daily need may represent the subsistence constraint, after which workers quit for various reasons. A first alternative could be that workers switch to an activity with higher returns but delayed payoffs after reaching the subsistence constraint, such as cash crop farming. This is unlikely to be the sole explanation, however, since only 15% of respondents have another source of regular income and only 20% have seasonal income (Table 1). In any case, as can be seen in Figure A3, which show the results of heterogeneity analyses similar to those performed earlier, we do not observe statistically significant differences between people who have other sources of income and people who don't.

A second alternative could be that people are almost completely unable to save, such that any money beyond the immediate cash need is close to valueless. While people in the study area lack access to reliable cash savings instruments and have been shown to have trouble saving money (Dupas et al., 2012; Dupas and Robinson, 2013b), it is hard to imagine that savings difficulties could be so extreme as to prevent people from transferring resources across a single day – in Dupas and Robinson (2013b) we find that people in the study area are able to accumulate money over at least a few days before depositing money into bank accounts.

A third possibility is that effort costs are so high that it is optimal to stop work immediately after reaching the need. Note, however, that this is unlikely to be an explanation unless it interacts with savings problems or present-bias in effort, since over the course of even a few days a worker will end up working more by quitting at the need than if he worked similar hours every day. A final possibility is that people have a limited attention constraint and so don't pay attention to their needs until the day that they are due. This, however, seems somewhat unlikely in that people do report wanting to save for non-immediate goals.

Finally, any of these models (on their own) are inconsistent with the lottery results, so it must be the case that lottery and labor income are not fungible. Such behavior seems relatively unlikely if the underlying reason to target is subsistence.

5.3.2 Risk Sharing

Another potential explanation is related to the fact that the bicycle taxi drivers in our sample work in a specified area (or “stage”). In that context, it’s possible that workers have developed a risk-sharing institution in which customers are funneled towards those workers who most need the money. If a particular worker has a need, he is more likely to get a customer until he reaches that need, after which competition goes back to normal. While such a situation would produce a pattern of results similar to what we find here, we view it as unlikely for several reasons. First, this type of cooperation seems to be fairly rare in these sorts of labor markets. For example, Kremer et al. (2013b) find that shops often fail to buy enough to qualify for bulk discounts, yet shopkeepers almost never report splitting orders with another shop. Second, needs are so common that there would be relatively few days in which people could insure each other (from Table 2, respondents report needs on 88% of days and the average need amount exceeds total daily income). Third, to the extent that working very long hours on some days reduces health capital (see Section 6 for some evidence that it does), such a scheme is dominated by simply providing cash payments to each other. Fourth, such a scheme is only sustainable if both income and needs are observable to other people, yet the specific value of various needs seems hard to value, and it might be hard to monitor income given that some fares are taken away from the stage (for example, a return trip from town).

Nevertheless, we can check this more formally by constructing measures of the proportion of other workers in that stage with a need on that day, and the average need amount (this is the same approach used to construct the realized market wage rate), and then checking whether the total income of a worker on particular day is lower when more of the other workers in the area have needs. We find no evidence for this – the coefficients on either the share of workers with a need or the total need value of other workers are insignificant in nearly all specifications, suggesting that the form of risk sharing we describe above is not the explanation.

5.3.3 Peak Demand

A potential explanation for the negative wage elasticity is that aggregating the wage over a day misses fluctuations in the wage over the day. In particular, many of the high wage days

are market days in which people come to town to buy and sell goods. On such days, is it possible that the wage is high in the morning when people are at the market but then drops dramatically in the afternoon? We examine this in Figure A4, in which we plot hour-by-hour average imputed wages, by quartile of the wage distribution (these are averaged at the stage level). We see no discernible differential patterns by the wage level.

6 Conclusion

We have presented evidence that bicycle-taxi drivers in rural Kenya tend to behave as target earners, increasing the probability of quitting after making enough money to meet their daily cash need. To explain these patterns, we conjecture that, likely owing to the strenuous and tedious nature of their job, bike-taxi drivers procrastinate on earning enough to cope with cash needs until they can no longer put them off. To overcome the temptation to put off work forever, they treat earning enough for the immediate need as a kind of personal rule – an internal commitment device. Their success in following this rule may come from the fact that they are loss averse over an income target, or that the costs of deviating from the rule are too large, because it would create a precedent for future days. While such a rule is useful for motivating workers, the fact that workers are not able to fully optimize their intertemporal labor allocation implies reduced income and frailer health for a given number of hours worked.

However, we also find that providing people with unexpected and large cash payouts has no effect on labor supply. In light of our other results, this finding rejects a model of reference-dependent labor supply which does not include some non-fungibility of income between earned income and other sources. While we cannot precisely say what constraint prevents this income from being fungible, we speculate that people may have different mental accounts for labor and non-labor income.

That people work harder on days when they need money for an expected expense like a ROSCA payment or a school fees bill suggests that workers may be able to smooth labor supply by taking on outlay commitments, for example by taking out loans with high-frequency repayment schedules or joining ROSCAs that meet daily.

An alternative way of increasing productivity could be the introduction of more formal employer-employee work arrangements (as discussed in Kaur et al. 2010, 2013). The finding that a movement to wage work could be beneficial relates to recent work suggesting that many self-employed individuals in poor countries are much more similar (in terms of preferences, attitudes, cognitive ability, motivation, etc.) to wage workers than to large firm owners (i.e. de Mel et al. 2010).

Finally, we find evidence that having more years of education reduces the tendency for income targeting and therefore improves intertemporal arbitrage and thus the average hourly wage, another pathway through which education may matter for productivity.

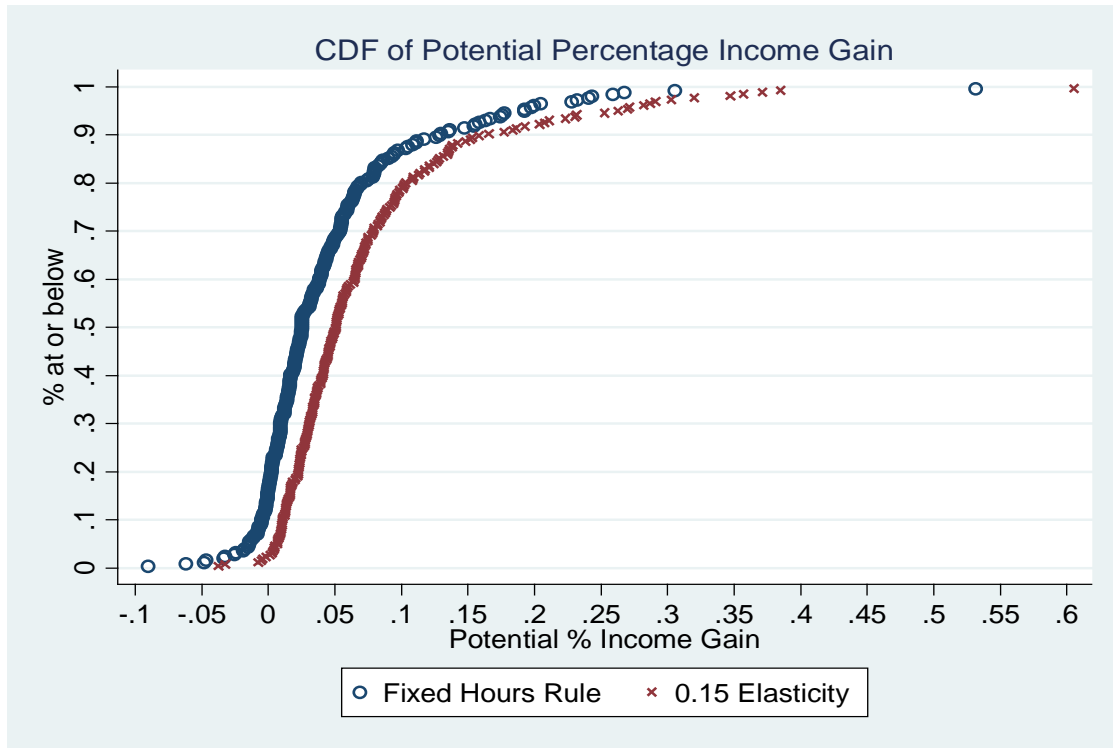
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Figure 1. Potential Income Gain from Alternative Labor Supply Behaviors



This graph shows the cumulative distribution function, across all 257 individuals in our sample, of the variable "potential % income gain", which was constructed as follows. For each individual, we divided their total hours worked over the study period by the number of days worked and call this the "fixed hours target". We then compute how much they would have earned on each day worked, if they had worked exactly as many hours as the fixed hours target, at the average wage rate observed that day among other individuals working in the same market. We then sum up the total earnings under that fixed hours target rule, and compare it to the total actually earned.

Figure 2. Cross-sectional Correlation between Cash Need for the Day and Labor Supply that Day

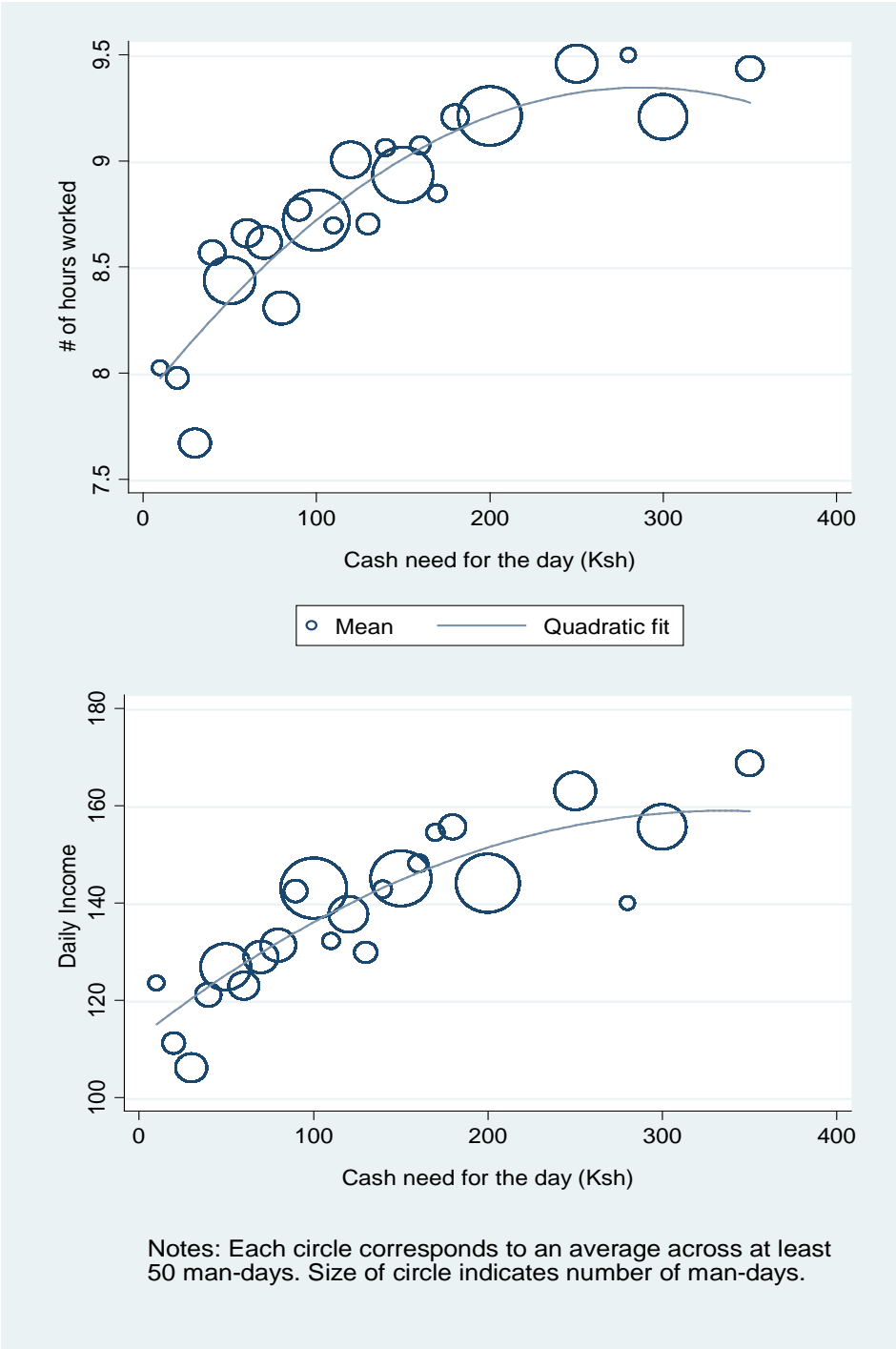
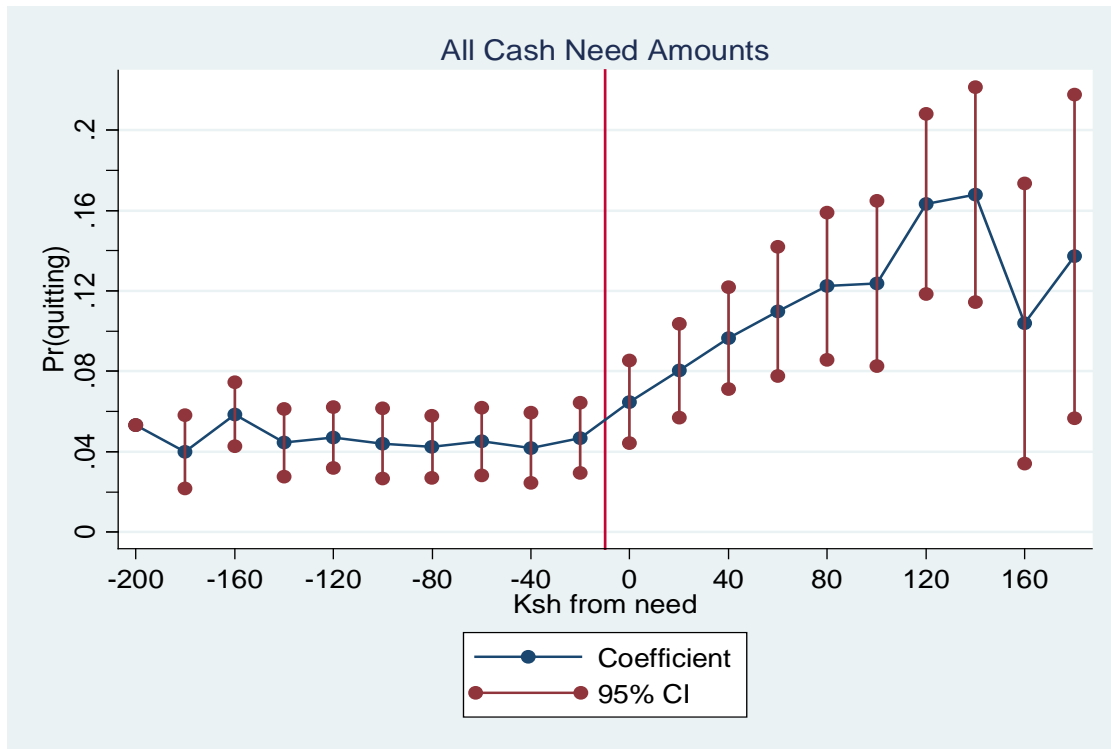


Figure 3. Coefficients from Hazard Regressions

Panel A. All Cash Need Amounts



Panel B. By Need Size

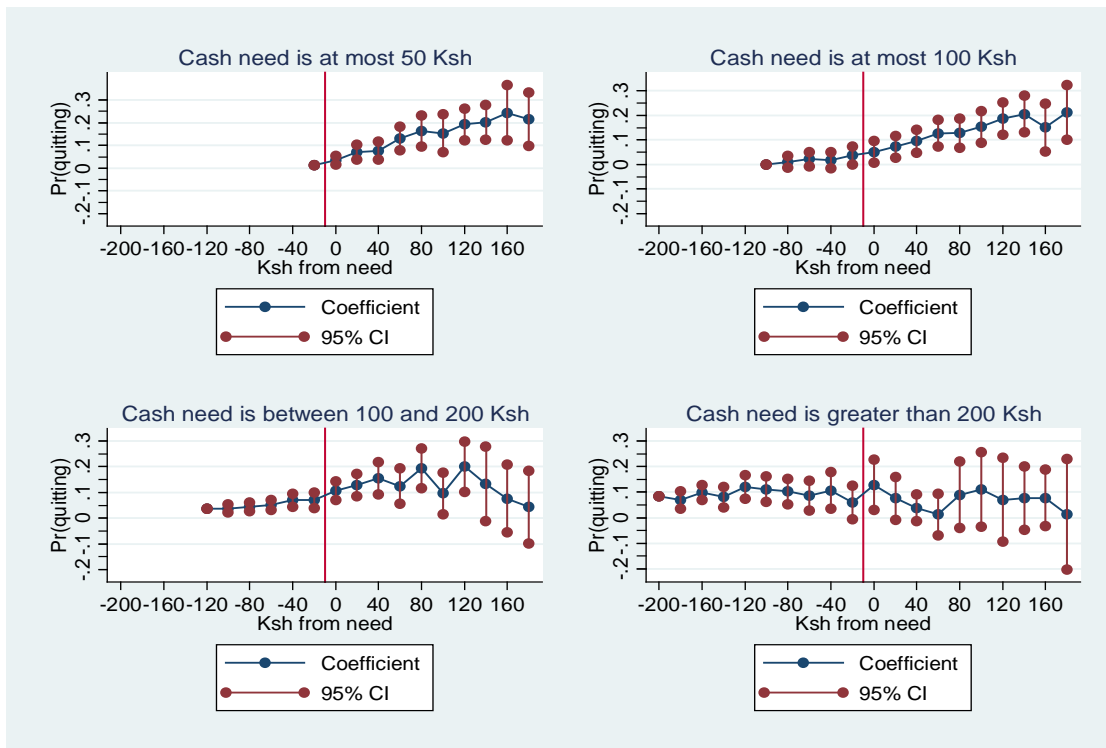


Figure 4. Hazard Regressions: Heterogeneity

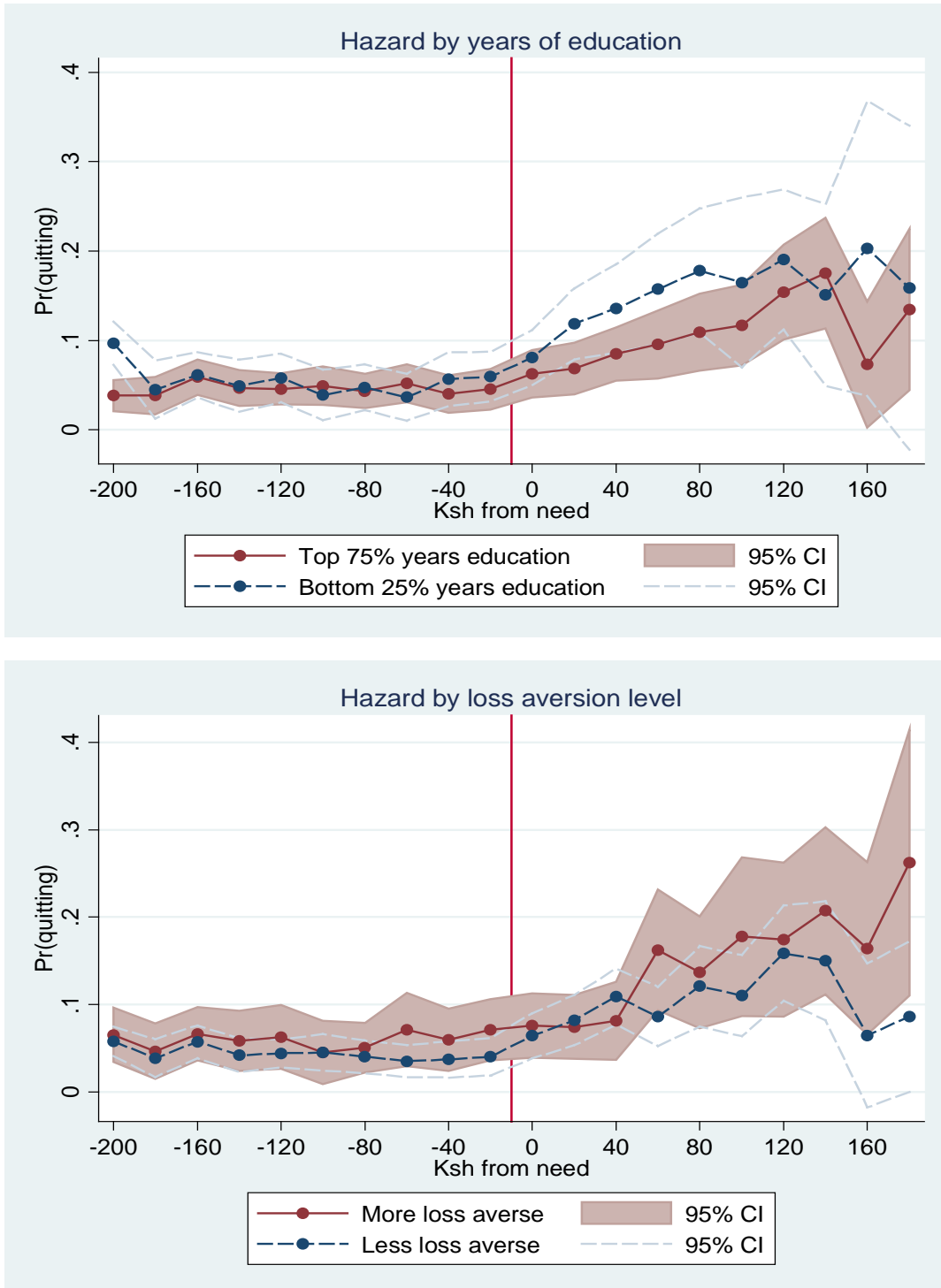


Table 1. Sample Characteristics: Summary Statistics from Background Survey

	(1) Mean	(2) Std. Dev.
Panel A. Demographic Information		
Age	33.06	8.11
Married	0.96	0.19
Number of Children	3.40	2.27
Education	6.78	2.22
Owns Cell Phone	0.57	0.50
Value of Durable Goods Owned (in Ksh)	11098	8382
Value of Animals Owned (in Ksh)	6933	9859
Acres of land owned	1.42	1.44
Total Bike-Taxi Income in Week Prior to Survey (in Ksh)	574	340
Has another regular source of income	0.15	0.36
If yes, income in average week from other income	576	525
Has seasonal income	0.20	0.40
If yes, income in normal season	6632	10702
Panel B. Financial Access		
Participates in ROSCA	0.75	0.43
If yes, number of ROSCAs	1.06	0.84
If yes, ROSCA contributions in last year (in Ksh)	5972	7881
Owns Bank Account	0.32	0.47
Received gift/loan in past 3 months	0.24	0.43
If yes, amount	2204	2348
Gave gift/loan in past 3 months	0.29	0.45
If yes, amount	1196	1877
<i>If needed 1,000 Ksh right away, would:</i>		
Use savings	0.10	0.30
Sell asset(s)	0.34	0.48
Work more	0.12	0.32
Get gift/loan from friends/ relatives	0.47	0.50
Get loan from ROSCA	0.21	0.41
Panel C. Health		
Health Problems Index (scale 1-5) ¹	1.97	0.68
Average Score on Activities of Daily Living (scale 1-5) ²	1.51	0.39
Overall, how would you rate your health (scale 1-5)? ³	2.59	0.73
Missed work due to illness in past month	0.39	0.49
If yes, number of days missed	2.20	1.80
Panel D. Small-Stakes Risk Aversion and Loss Aversion		
Amount invested (out of 100 Ksh) in Risky Asset ⁴	56	26
More loss averse: Refuses the 50-50 gamble (win 30 or lose 10)	0.28	0.45
More loss averse: Refuses the 50-50 gamble (win 120 or lose 50)	0.58	0.50

Notes: All variables are from the baseline surveys. There are 245 observations in the baseline.

Exchange rate was roughly 70 Ksh to US \$1 during the study period.

¹The index refers to severity of pain and difficulty in performing activities of daily living. The index ranges between 1 and 5, where 1=none, 2=mild, 3=moderate, 4=severe and 5=extreme. It is composed of 4 self-assessed measures shown in Table A1.

²Average score across all activities shown in Table A1. Codes are the same as above.

³Codes: 1-excellent, 2-good, 3-OK, 4-poor, 5-very poor.

⁴The risky asset paid off 4 times the amount invested with probability 0.5, and 0 with probability 0.5.

Table 2. Day-Level Summary Statistics from Diaries

	(1)	(2)
	Mean	Std. Dev.
A. Labor Supply		
Worked today	0.74	0.44
If yes, total income (Ksh)	145	94
If yes, total hours	8.95	2.77
If yes, hours spent riding	2.43	1.60
Received income from some other source	0.24	0.43
If yes, amount earned (Ksh)	80	485
If yes, hours	3.32	2.26
B. Is there something in particular that you need money for today?		
Yes	0.88	0.32
If yes, amount (Ksh)	204	340
If yes, day's income exceeds need amount	0.38	0.49
If yes, day's income exceeds need amount by 20 Ksh or less	0.08	0.27
C. Cash outflows		
Respondent Sick	0.18	0.38
Somebody in household sick	0.10	0.29
School fees due	0.02	0.13
If yes, amount spent on fees (Ksh)	240	303
Funeral	0.05	0.21
If yes, amount spent (Ksh)	166	728
Had to make repairs to bike	0.21	0.41
If yes, amount spent on repairs (Ksh)	78	93
Made a ROSCA contribution	0.15	0.36
If yes, amount contributed (Ksh)	105	121
D. Other Cash Flows		
Somebody outside household asked for money	0.02	0.14
Got money from somebody outside household	0.02	0.14
Got money from spouse	0.01	0.10
Gave money to spouse	0.12	0.32
Made withdrawal from home savings	0.04	0.20
Made withdrawal from bank savings	0.01	0.09
Received lump sum payment from regular customer	0.01	0.11
Received a ROSCA payout	0.01	0.11

Notes: There are 257 respondents and 10,835 respondent-days in the sample, though the exact number for each question varies due to reporting errors. Exchange rate was roughly 75 Ksh to \$1 US during the sample period.

Table 3. Unexpected Shocks, Expected payments, Wage rate and Daily Labor Supply

	(1)	(2)	(3)
	Worked	Total Income	Total Hours
<i>Expected payments</i>			
School fees due	0.05 (0.03)	4.57 (8.36)	0.57 (0.32)*
ROSCA contribution due	0.05 (0.02)***	10.65 (4.00)***	0.56 (0.16)***
<i>Unexpected shocks</i>			
Somebody asked respondent for money	0.06 (0.03)**	11.81 (7.42)	0.47 (0.29)
Funeral to attend and contribute to	-0.10 (0.03)***	-11.79 (5.51)**	-0.82 (0.24)***
Somebody in household is sick	-0.02 (0.01)	-1.47 (2.75)	-0.18 (0.13)
Respondent sick	-0.36 (0.02)***	-54.88 (4.56)***	-3.32 (0.24)***
Bike needs repair	0.09 (0.01)***	14.26 (2.69)***	0.91 (0.12)***
<i>Wage</i>			
Realized log local wage rate ¹	0.14 (0.03)***	61.50 (6.96)***	1.01 (0.29)***
<i>Day of Week</i>			
Monday	0.03 (0.01)**	11.02 (3.14)***	0.47 (0.15)***
Tuesday	0.02 (0.01)	3.65 (2.50)	0.25 (0.13)*
Thursday	0.00 (0.01)	4.25 (2.73)	0.11 (0.14)
Friday	0.00 (0.01)	0.55 (2.88)	-0.04 (0.14)
Saturday	0.00 (0.01)	13.93 (4.17)***	0.26 (0.18)
Sunday	-0.41 (0.02)***	-62.72 (4.43)***	-3.96 (0.22)***
Observations (individual-days)	10838	10838	10359
Number of IDs	257	257	256
R-squared	0.21	0.13	0.21
Mean of Dep. Var.	0.74	107.14	6.46
Std. Dev. of Dep. Var	0.44	103.85	4.63

Notes: Monetary values are in 1,000 Kenyan shillings. Standard errors are in parentheses, clustered at the individual level. Regressions include individual fixed effects, and controls for the week and the day of the week. ***, **, * indicates significance at 1, 5 and 10%.

¹The wage rate is the realized average wage across all the other respondents in the same market on that day.

Table 4. Relationship between hours worked and endline health

	(1)	(2)	(3)	(4)
	Sick in last week of logs		Missed work due to sickness in last week of logs	
Log (total hours over sample period)	0.03 (0.03)	0.03 (0.03)	0.01 (0.03)	0.01 (0.02)
Log (std. deviation daily hours over sample period)	0.18 (0.083)**	0.14 (0.084)*	0.12 (0.069)*	0.08 (0.07)
Health is worse than average at baseline		0.06 (0.06)		0.12 (0.049)**
Missed work at least once due to sickness in month prior to baseline		0.09 (0.06)		0.02 (0.05)
Observations (one per individual)	252	252	252	252
R-squared	0.03	0.06	0.02	0.05
Mean of Dep. Var.	0.25	0.25	0.15	0.15
Std. Dev. of Dep. Var	0.43	0.43	0.36	0.36

Notes: Regressions include controls for the total number of days covered in the logbooks. Standard errors are in parentheses, clustered at the individual level. ***, **, * indicates significance at 1, 5 and 10%.

Table 5. Effect of Daily Cash Need on Daily Labor Supply

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(13)	(14)
	If worked:															
	Worked Today	Total Income		Total income		Number of passengers		Total hours		Passengers per hour		Percent of day spent riding		Average fare		
Has a need	0.19 (0.02)***		22.79 (4.14)***		-5.79 (4.32)		0.01 (0.09)		-0.10 (0.11)		0.01 (0.01)		0.00 (0.01)		-2.30 (1.73)	
If has a need: log (cash need)		-0.01 (0.01)		11.67 (1.98)***		17.03 (1.99)***		0.23 (0.04)***		0.27 (0.05)***		0.00 (0.01)		0.01 (0.00)***		3.11 (1.10)***
Realized log (local wage rate)	0.11 (0.03)***	0.11 (0.03)***	57.80 (6.47)***	59.63 (7.29)***	57.29 (6.90)***	57.07 (7.01)***	0.91 (0.14)***	0.97 (0.14)***	-0.60 (0.25)**	-0.54 (0.21)**	0.15 (0.02)***	0.15 (0.03)***	0.10 (0.01)***	0.09 (0.01)***	6.63 (1.47)***	5.95 (1.55)***
Observations (individual-days)	12429	10531	12429	10531	9163	8134	9163	8134	8563	7635	8563	7635	8541	7615	9159	8130
Number of IDs	257	257	257	257	257	257	257	257	256	256	256	256	256	256	257	257
R-squared	0.21	0.17	0.12	0.11	0.03	0.06	0.04	0.05	0.03	0.04	0.03	0.03	0.02	0.03	0.01	0.01
Mean of Dep. Var.	0.74	0.77	106.68	111.18	144.71	143.95	4.41	4.41	8.95	8.94	0.54	0.54	0.29	0.28	36.50	36.14
Std. Dev. of Dep. Var	0.44	0.42	102.65	100.70	93.75	91.72	2.15	2.15	2.77	2.76	0.31	0.31	0.16	0.16	31.65	30.22

Notes: Regressions are at the individual-day level. All regressions include individual fixed effects and controls for the week the day of week. Regressions also control for whether it rained that day and whether the respondent reports being sick that day. We have fewer observations for the hour variables since the data was misrecorded in some cases. Standard errors are in parentheses, clustered at the individual level. ***, **, * indicates significance at 1, 5 and 10%.

Table 6. Parametric Hazard Regressions

	(1)	(2)	(3)	(4)	(5)
	Dependent variable: quit after dropping off passenger				
	Including interactions with:				
	Baseline Specification	Top 75% years of education	Top 50% years of education	Years of Education	Loss Averse
Level Effects					
Cumulative Hours Worked	-0.08 (0.04)**	-0.08 (0.04)**	-0.08 (0.04)**	-0.16 (0.12)	-0.08 (0.04)**
Cumulative Hours Worked Squared	0.36 (0.04)***	0.36 (0.04)***	0.36 (0.04)***	0.50 (0.12)***	0.36 (0.04)***
Distance from need	0.11 (0.09)	0.11 (0.09)	0.11 (0.09)	0.12 (0.09)	0.12 (0.09)
Over need	0.04 (0.01)***	0.07 (0.02)***	0.05 (0.01)***	0.08 (0.04)**	0.09 (0.04)**
Distance from need * over need	0.02 (0.12)	-0.03 (0.27)	-0.02 (0.19)	-0.09 (0.56)	0.05 (0.59)
Interaction Effects					
Distance from need * Interacted Variable		-0.01 (0.01)	-0.01 (0.02)	0.00 0.00	0.00 0.00
Over need * Interacted Variable		-0.03 (0.02)*	-0.03 (0.02)*	-0.01 0.00	-0.01 0.00
Distance from need * over need * Interacted Variable		0.07 (0.33)	0.09 (0.28)	0.02 (0.07)	0.00 (0.08)
Observations (individual-days)	34984	34311	34311	34311	34311
Number of IDs	257	244	244	244	244
R-squared	0.15	0.16	0.16	0.16	0.16
Mean of Dep. Var.	0.09	0.09	0.09	0.09	0.09

Notes: All regressions include individual fixed effects and controls for the week the day of week. Standard errors in parentheses. We do not include interactions between hours worked and education because when we do so we cannot reject equality. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Table 7. Effect of Unexpected Cash Windfall on Labor Supply

	(1)	(2)	(3)	(4)
			If worked:	
	Worked Today	Total income	Total hours	Time ended work
Won big lottery prize today	0.01 (0.02)	5.46 (4.98)	0.09 (0.15)	-0.06 (0.11)
Won big lottery prize yesterday	0.03 (0.02)	2.06 (3.39)	0.04 (0.15)	0.11 (0.10)
Observations (individual-days)	10703	7924	7485	7538
Number of IDs	256	256	256	256
R-squared	0.24	0.21	0.04	0.01
Mean of Dep. Var.	0.74	145.72	8.92	17.43
Std. Dev. of Dep. Var	0.44	95.31	2.76	1.88

Notes: Regressions are at the individual-day level. Standard errors are in parentheses, clustered at the individual level. Regressions include individual fixed effects, all the variables shown in Table 3, and controls for the week the day of week.. ***, **, * indicates significance at 1, 5 and 10%.

Table 8. Daily Needs, Income Targets, and Hours Targets

	(1)	(2)	(3)	(4)
<i>Dependent variable = 1 if quit work for the day</i>				
Cumulative Hours Worked (Units = Hours / 10)	-0.03 (0.04)	-0.07 (0.04)*	-0.10 (0.04)***	-0.12 (0.04)***
Cumulative Hours Worked Squared			0.32 (0.04)***	0.35 (0.04)***
Cumulative Income Earned (Units = Ksh / 1000)	0.16 (0.10)	0.06 (0.10)	0.63 (0.11)***	0.46 (0.11)***
Cumulative Income Earned Squared			-0.78 (0.19)***	-0.65 (0.19)***
Cumulative Hours > Estimated Target	0.08 (0.01)***	0.07 (0.01)***	0.08 (0.01)***	0.07 (0.01)***
Cumulative Income > Estimated Target	0.03 (0.01)***	0.03 (0.01)***	0.02 (0.01)***	0.02 (0.01)***
Over need		0.04 (0.01)***		0.03 (0.01)***
Observations	40670	36070	40670	36070
Number of bodas	257	257	257	257
R-squared	0.15	0.16	0.15	0.16
Mean of dependent variable	0.09	0.09	0.09	0.09

Notes: These estimates follow Table 3 Crawford and Meng (2011). Targets are estimated as average daily income or hours on days up to but not including the day in question. Targets are estimated by day of the week. All regressions include individual fixed effects and controls for the week the day of week. Standard errors clustered at the individual level in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Table A1. Unexpected shocks, expected payments, wage rate, and self-reported cash need for the day

	(1)	(2)	(3)
	Amount of cash need (0 if none reported)	Reports cash need for the day	If reports need: Cash amount
<i>Expected payments</i>			
School fees due	37.04 (25.49)	0.11 (0.02)***	14.94 (27.24)
ROSCA contribution due	11.70 (12.56)	0.09 (0.01)***	-5.48 (13.96)
<i>Unexpected shocks</i>			
Somebody asked respondent for money	22.15 (39.75)	0.02 (0.02)	20.56 (43.52)
Funeral to attend	102.94 (48.95)**	0.06 (0.02)***	97.67 (51.00)*
Somebody in household is sick	58.76 (14.31)***	0.04 (0.01)***	57.89 (15.39)***
Respondent sick	19.10 (12.45)	0.01 (0.01)	19.26 (13.77)
Bike needs repair	13.38 (7.14)*	0.10 (0.01)***	-3.86 (8.27)
<i>Wage</i>			
Realized log local wage rate ¹	-33.88 (19.69)*	0.04 (0.02)*	-45.20 (23.14)*
<i>Prior Cash Needs</i>			
Daily cash need of previous day	0.12 (0.06)**		0.13 (0.07)*
Had cash need previous day		-0.10 (0.02)***	
<i>Day of Week</i>			
Monday	17.20 (12.57)	0.06 (0.01)***	10.98 (14.14)
Tuesday	-4.26 (12.29)	0.01 (0.01)	-7.54 (13.59)
Thursday	-17.86 (12.95)	0.01 (0.01)	-22.26 (14.83)
Friday	-2.96 (13.13)	0.02 (0.01)*	-6.79 (14.93)
Saturday	-0.02 (12.02)	0.00 (0.01)	2.69 (13.42)
Sunday	-20.23 (13.76)	-0.10 (0.02)***	-3.77 (16.43)
Observations (individual-days)	10838	10838	9497
Number of IDs	257	257	257
R-squared	0.03	0.08	0.03
Mean of Dep. Var.	177.39	0.88	202.44
Std. Dev. of Dep. Var	331.26	0.33	346.64

Notes: Monetary values are in 1,000 Kenyan shillings. Standard errors are in parentheses, clustered at the individual level. Regressions include individual fixed effects, and controls for the week and the day of the week. ***, **, * indicates significance at 1, 5 and 10%.

¹The wage rate is the realized average wage across all the other respondents in the same market on that day.

Table A2. Relationship Between Reported Cash Needs and Actual Expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Reported need of:									
	ROSCA payment	School Fees	Funeral Expenses	Repaired bike	Repaid a Loan					
Made ROSCA deposit	0.55 (0.026)***	0.55 (0.027)***								
Will make ROSCA deposit tomorrow		-0.04 (0.018)**								
Will make ROSCA deposit in 2 days		-0.05 (0.014)***								
Paid school fees			0.56 (0.044)***	0.59 (0.043)***						
Will pay school fees tomorrow				0.03 (0.03)						
Will pay school fees in 2 days				0.02 (0.02)						
Contributed to funeral					0.49 (0.033)***	0.50 (0.034)***				
Will contribute to funeral tomorrow						0.02 (0.02)				
Will contribute to funeral in 2 days						0.01 (0.02)				
Made repairs to bicycle							0.70 (0.014)***	0.70 (0.016)***		
Will make repairs to bicycle tomorrow								-0.01 (0.01)		
Will make repairs to bicycle in 2 days								0.00 (0.01)		
Repaid loan									0.26 (0.072)***	0.25 (0.068)***
Will repay loan tomorrow										0.07 (0.05)
Will repay loan in 2 days										0.04 (0.04)
Observations	8773	7473	8802	7504	8839	7549	8739	7394	7821	6692
Number of IDs	253	252	253	252	253	252	253	252	243	242
R-squared	0.26	0.25	0.19	0.21	0.20	0.21	0.47	0.47	0.07	0.07
Mean of dependent variable	0.19	0.19	0.03	0.03	0.06	0.06	0.25	0.25	0.01	0.01

Notes: Regressions include individual fixed effects, as well as controls for the day of the week and the week of the year. Standard errors, clustered at the individual level, in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Table A3. Reduced form between working and actual expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dependent variable: worked today									
Made ROSCA deposit	0.07 (0.017)***	0.07 (0.018)***								
Will make ROSCA deposit tomorrow		0.00 (0.02)								
Will make ROSCA deposit in 2 days		0.00 (0.01)								
Paid school fees			0.05 (0.03)	0.05 (0.032)*						
Will pay school fees tomorrow				0.00 (0.03)						
Will pay school fees in 2 days				0.01 (0.04)						
Contributed to funeral					-0.11 (0.028)***	-0.12 (0.030)***				
Will contribute to funeral tomorrow						0.01 (0.03)				
Will contribute to funeral in 2 days						0.00 (0.02)				
Made repairs to bicycle						0.09 (0.012)***	0.09 (0.013)***			
Will make repairs to bicycle tomorrow							0.01 (0.01)			
Will make repairs to bicycle in 2 days							0.03 (0.011)***			
Repaid loan									-0.04 (0.05)	-0.03 (0.05)
Will repay loan tomorrow										-0.01 (0.04)
Will repay loan in 2 days										0.03 (0.05)
Observations	8773	7473	8802	7504	8839	7549	8739	7394	7821	6692
Number of IDs	253	252	253	252	253	252	253	252	243	242
R-squared	0.14	0.11	0.14	0.11	0.14	0.11	0.15	0.12	0.15	0.12
Mean of dependent variable	0.19	0.19	0.03	0.03	0.06	0.06	0.25	0.25	0.01	0.01

Notes: Regressions include individual fixed effects, as well as controls for the day of the week and the week of the year. Standard errors, clustered at the individual level, in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Table A4. Reduced form between hours and actual expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dependent variable: hours worked									
Made ROSCA deposit	0.61 (0.161)***	0.62 (0.172)***								
Will make ROSCA deposit tomorrow		0.07 (0.16)								
Will make ROSCA deposit in 2 days		-0.01 (0.15)								
Paid school fees			0.50 (0.31)	0.55 (0.34)						
Will pay school fees tomorrow				-0.03 (0.36)						
Will pay school fees in 2 days				0.27 (0.39)						
Contributed to funeral					-0.93 (0.254)***	-1.12 (0.287)***				
Will contribute to funeral tomorrow						0.17 (0.24)				
Will contribute to funeral in 2 days						0.01 (0.23)				
Made repairs to bicycle							0.90 (0.121)***	0.90 (0.129)***		
Will make repairs to bicycle tomorrow								0.22 (0.132)*		
Will make repairs to bicycle in 2 days								0.32 (0.116)***		
Repaid loan									-0.38 (0.54)	-0.25 (0.53)
Will repay loan tomorrow										-0.36 (0.46)
Will repay loan in 2 days										-0.01 (0.50)
Observations	8403	7173	8425	7199	8468	7248	8378	7109	7500	6436
Number of IDs	253	252	253	252	253	252	253	252	243	242
R-squared	0.14	0.12	0.14	0.11	0.14	0.12	0.15	0.13	0.15	0.12
Mean of dependent variable	0.19	0.19	0.03	0.03	0.06	0.06	0.25	0.25	0.01	0.01

Notes: Regressions include individual fixed effects, as well as controls for the day of the week and the week of the year. Standard errors, clustered at the individual level, in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

Table A5. Reaching the need, winning the lottery, getting the weekly payout, and the next day's need amount

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Has need			Unconditional Need Amount				Conditional Need Amount				
Won lottery yesterday	0.01 (0.01)				23.25 (19.30)				23.04 (20.38)			
Reached need yesterday		0.00 (0.01)				-17.78 (6.52)***				-21.16 (7.05)***		
Had need yesterday		0.10 (0.03)***	0.10 (0.03)***			22.06 (12.61)*	7.61 (13.28)			0.86 (15.04)	-15.30 (15.90)	
Gap between yesterday's earned income and yesterday's need amount (in 1,000 Ksh)			0.00 (0.01)				-110.77 (55.82)**				-122.02 (62.89)*	
Got in-kind payment from research team yesterday				0.00 (0.01)				-14.18 (6.81)**				-14.97 (7.39)**
Observations (individual-days)	12429	11061	11061	11738	12007	10810	10810	11344	10531	9473	9473	9938
Number of respondents	257	257	257	257	257	257	257	257	257	257	257	257
Mean of Dep. Var.	0.88	0.88	0.88	0.88	178.77	177.48	177.48	176.63	203.82	202.53	202.53	201.62
Std. Dev. of Dep. Var	0.32	0.33	0.33	0.32	326.17	331.64	331.64	326.08	340.87	347.04	347.04	341.08

Notes: Regressions are at the individual-day level. All regressions include individual fixed effects and controls for the week the day of week. Monetary values in Kenyan shillings. Standard errors are in parentheses, clustered at the individual level. ***, **, * indicates significance at 1, 5 and 10%.

Table A6. Relationship between Proxy Income / Hours Targets and Need Amounts

	(1)	(2)	(3)	(4)
	Proxy Income Target		Proxy Hours Target	
Need amount (conditional on need)	0.003 (0.003)		0.000 (0.009)	
Need amount (imputing as 0 days without a need)		0.003 (0.003)		0.003 (0.009)
Observations	31266	34556	30650	33879
Number of bodas	257	257	256	256
R-squared	0.04	0.04	0.03	0.03
Mean of dependent variable	0.15	0.15	0.92	0.92

Notes: These estimates follow Table 3 Crawford and Meng (2011). Targets are estimated as average daily income or hours on days up to but not including the day in question. Targets are estimated by day of the week. All regressions include individual fixed effects and controls for the week the day of week. Standard errors clustered at the individual level in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% respectively.

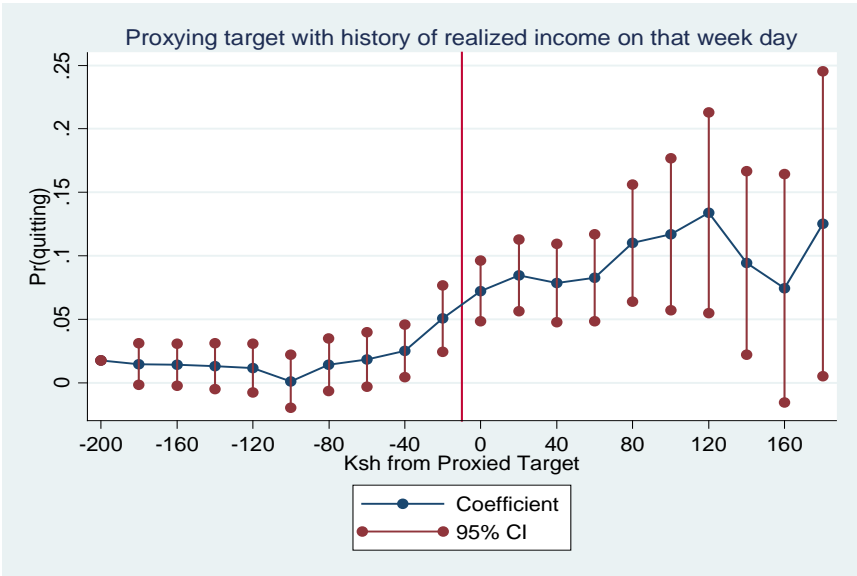
Table A7. Cross-Sectional Returns to Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Log average daily income		Probability of Working		Average Total Hours		Average Number of Passengers		Average Fare		Average own wage rate		Average local wage rate	
Years of Education	0.037 (0.010)***	0.04 (0.013)***	0.011 (0.009)	0.007 (0.012)	-0.001 (0.053)	-0.076 (0.068)	0.063 (0.034)*	0.048 (0.039)	0.761 (0.400)*	1.012 (0.462)**	0.451 (0.159)***	0.603 (0.201)***	0.018 (0.049)	-0.008 (0.017)
Age		-0.006 (0.005)		0.002 (0.005)		-0.020 (0.027)		-0.009 (0.015)		0.052 (0.180)		-0.113 (0.078)		-0.004 (0.006)
Years of Experience		0.009 (0.007)		-0.003 (0.007)		-0.014 (0.037)		-0.035 (0.022)		0.734 (0.253)***		0.139 (0.109)		-0.004 (0.009)
Married		0.140 (0.161)		-0.068 (0.139)		0.171 (0.857)		0.387 (0.494)		-8.545 (5.821)		0.717 (2.510)		-0.031 (0.210)
Number of children		0.001 (0.017)		-0.005 (0.015)		0.116 (0.089)		0.054 (0.052)		-0.579 (0.607)		-0.082 (0.262)		0.001 (0.022)
Log value of durable goods and animals owned		0.036 (0.043)		-0.009 (0.039)		-0.192 (0.231)		-0.067 (0.133)		2.236 (1.567)		1.242 (0.681)*		-0.011 (0.056)
Acres of land owned		0.005 (0.024)		0.007 (0.022)		0.050 (0.129)		0.083 (0.074)		-1.065 (0.876)		0.075 (0.378)		0.050 (0.032)
Self-reported health		-0.029 (0.040)		0.047 (0.035)		-0.056 (0.213)		0.012 (0.123)		-0.891 (1.446)		-0.184 (0.623)		-0.025 (0.052)
Missed work at least once in month prior to baseline		-0.169 (0.063)***		-0.019 (0.058)		-0.254 (0.338)		-0.147 (0.195)		-5.121 (2.297)**		-2.161 (0.991)**		-0.081 (0.083)
Has a bank account		0.004 (0.064)		-0.024 (0.059)		-0.226 (0.341)		-0.223 (0.197)		5.119 (2.317)**		0.806 (1.001)		0.127 (0.083)
Observations (individual-days)	257	256	232	231	257	256	257	256	257	256	256	255	257	256
R-squared	0.05	0.21	0.01	0.23	0.00	0.20	0.01	0.37	0.01	0.36	0.03	0.25	0.00	0.94
Mean of Dep. Var.	-2.33	-2.33	0.85	0.85	6.55	6.55	3.27	3.26	35.63	35.64	17.34	17.33	17.20	17.19
Std. Dev. of Dep. Var.	0.42	0.42	0.36	0.36	2.22	2.23	1.44	1.44	16.87	16.90	6.70	6.71	2.04	2.03

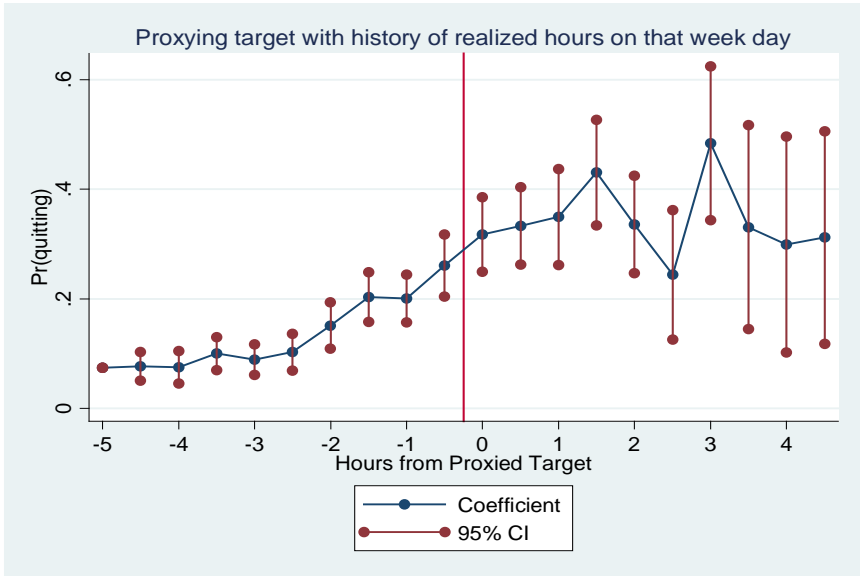
Notes: Standard errors are in parentheses, clustered at the individual level. ***, **, * indicates significance at 1, 5 and 10%.

Appendix Figure A1. Proxying Target with Average Past Realized Income/Hours on same Week Day

Panel A. Income

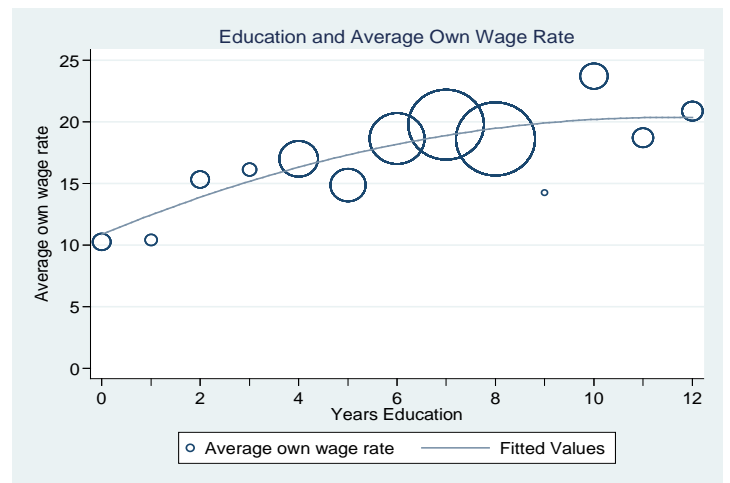
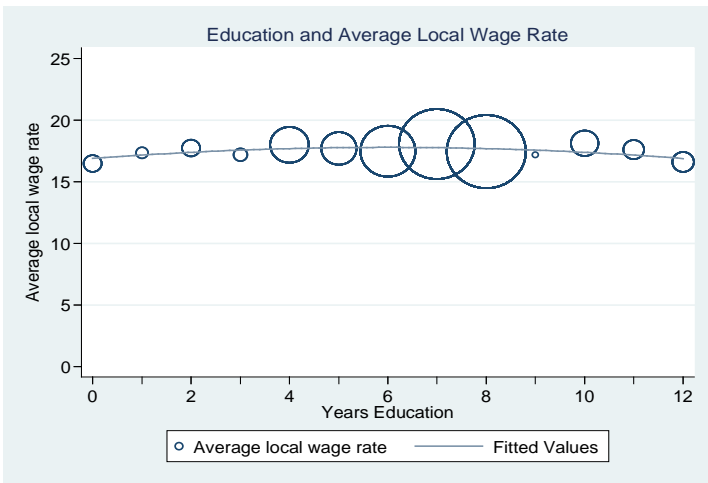
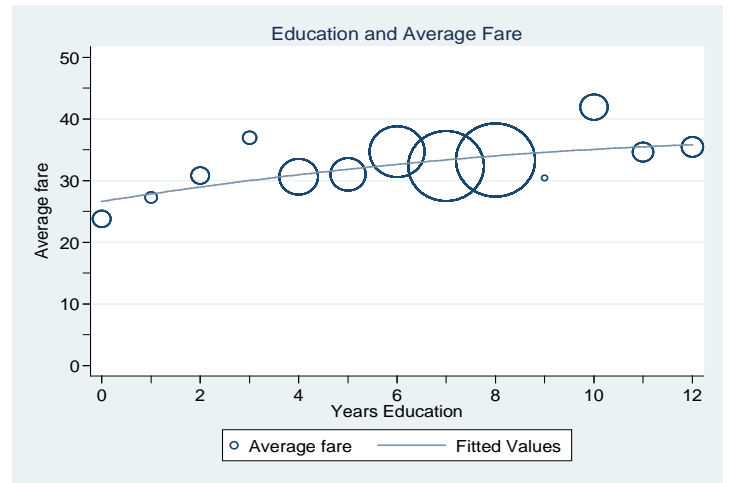
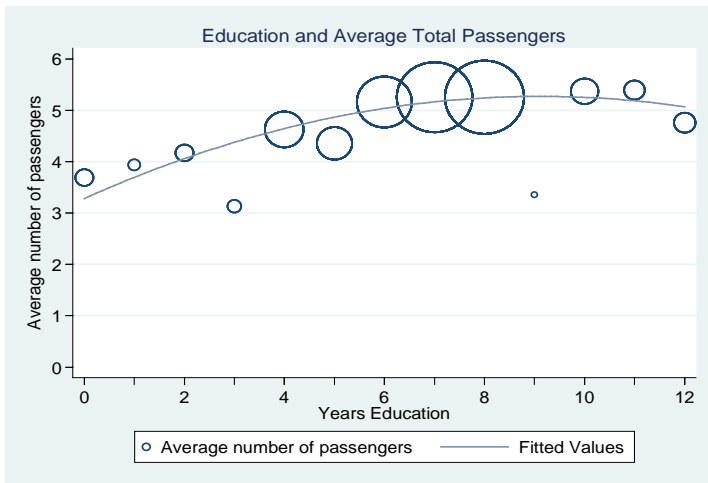
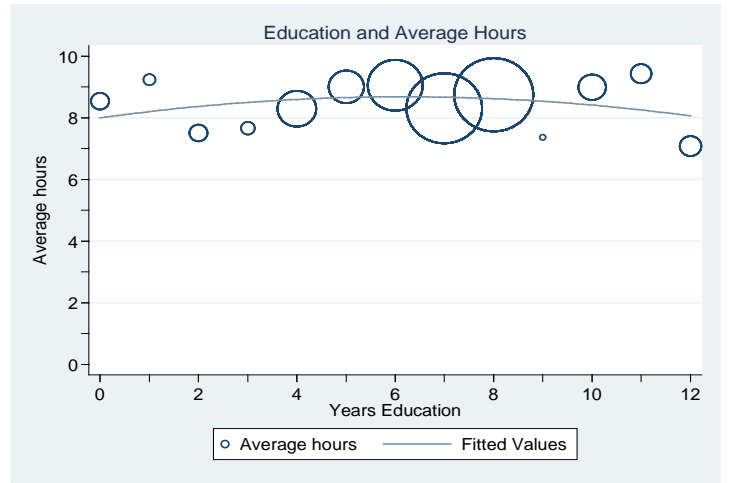
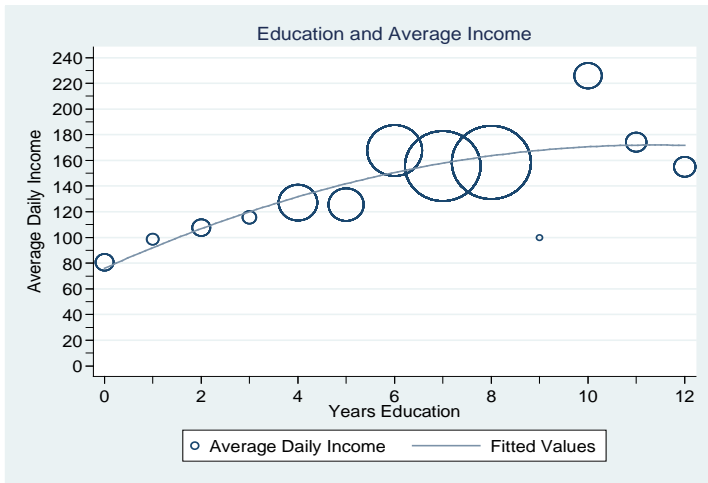


Panel B. Hours



Notes: These estimates follow Crawford and Meng (2011). Proxy targets are estimated as average daily income or hours on days up to but not including the day in question. Proxy targets are estimated by day of the week.

Appendix Figure A2. Education, Income, and Work Intensity



Appendix Figure A3. Hazard Regressions: Further Heterogeneity Analyses

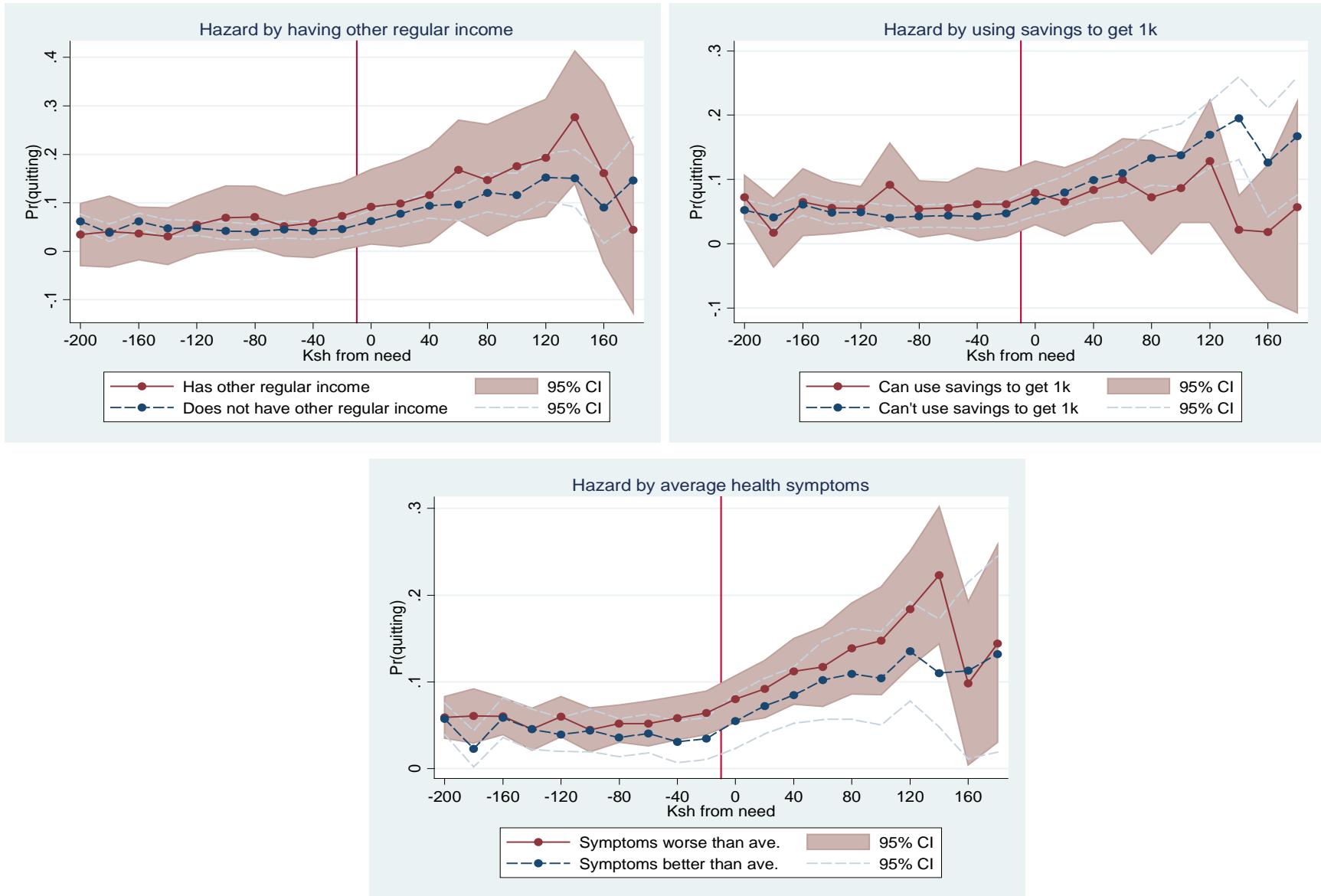
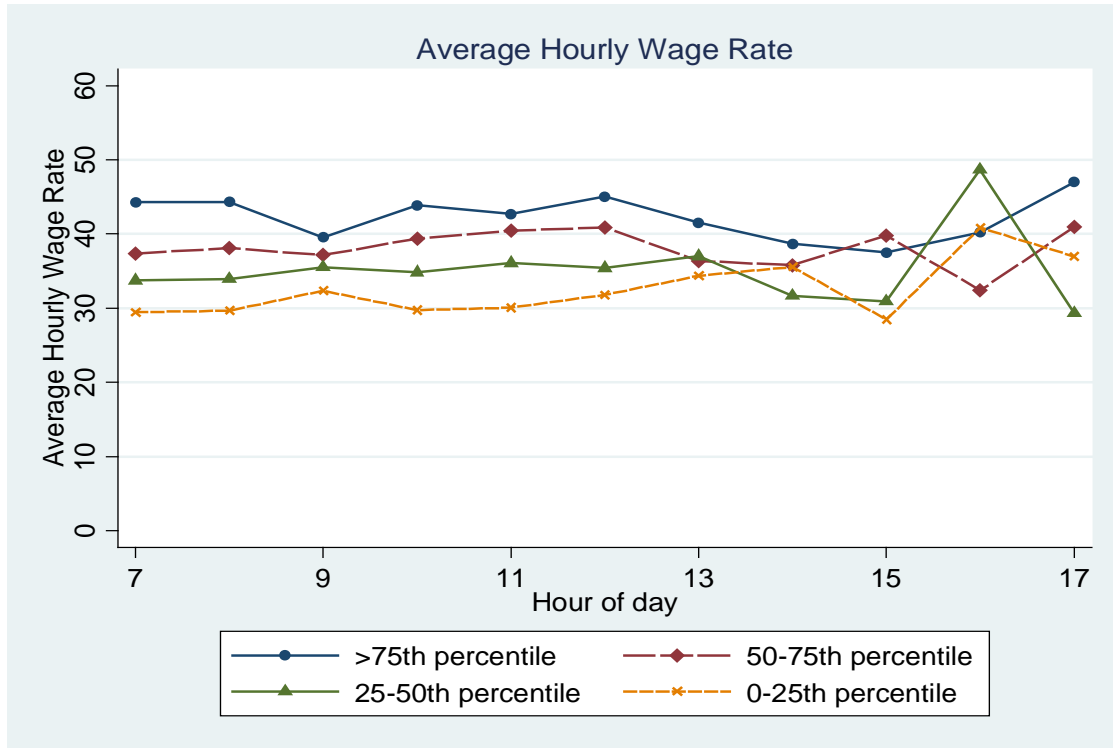


Figure A4. Variations in the Hourly Wage Rate



Notes: Figure presents average hourly wage rates at the stage level. Results are presented for quartiles of the average wage rate for the full day.