THE IMPACT OF BILL RECEIPT TIMING AMONG LOW-INCOME AND AGED HOUSEHOLDS: NEW EVIDENCE FROM ADMINISTRATIVE ELECTRICITY BILL DATA

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1 Introduction

Many low income households are dependent on government programs to make ends meet each month. Nearly half of all Americans live paycheck to paycheck, with little savings to smooth unexpected expenditure shocks (Lusardi, Schneider, and Tufano, 2011; Federal Reserve, 2016). Because of this, seemingly inconsequential differences in how and when government benefits are distributed and how and when bills are received may have real impacts on economic and physical health among low income households.

The prior literature has demonstrated that consumption is overly-sensitive to predictable timing of government benefits payments. For example, the Supplemental Nutrition Assistance Program (SNAP) serves one in seven households and one in four children (United States Department of Agriculture; 2016 and US Census Bureau, 2016) with once-a-month electronic payments for expenditure on food. Research has documented a monthly cycle of expenditures where households increase consumption and expenditures when benefits are received, but may exhaust income and benefits towards the end of the monthly receipt cycle (Stephens, 2003; Shapiro, 2005; Hastings and Shapiro, 2018). This cycle has been associated with a measured drop in survey-reported caloric intake and higher reported food insecurity and anxiety at the end of the month (Thompson et al., 1988; Wilde and Ranney, 2000; Shapiro, 2005). These findings are seen as evidence that households may be short-run-impatient (hyperbolic discounters) who overly-value present consumption relative to future consumption, causing a cycle of consumption that may lead to increased hunger and household stress toward the end of the month.

If these findings of monthly cycles in consumption are substantial, we may expect to find consequences for and impacts on measures of family financial and/or physical health.

Current findings in the literature about impacts on physical health are mixed. Seligman et al. (2014) documents that hospital admissions for hypoglycemia for people living in low-income zip codes rise at the end of the month relative to those for patients living in high-income zip-codes. Gambria et al. (2017) used linked administrative data from SNAP and Medicaid claims records do not find a health cycle for low income families regardless of benefit and income payment timing.

In personal finance, Baugh et al. (2017) use quasi-random variation in the disbursement of benefits by the Social Security Administration and account-level bill and expenditure data and show that households are more likely to face financial shortfalls if their bill and income timing display greater mismatch or if their income for the month must last longer (i.e. during 35-day versus 28-day pay periods). Their results suggest that better aligning the timing of income and expenditures could improve financial health through lower missed payments or payday borrowing.

In this paper, we add to this literature by utilizing a new data resource: account-level data for electricity billing, payment, and collections efforts from an anonymous electricity provider serving a state in New England. The data allow us to measure when in the month electricity bills are received and when they are due. The data report when payment is made, outstanding balances, collection efforts, and eventual disconnection for failure to make sufficient payments towards outstanding balances owed. We use these data to examine if receiving a bill closer to timing of government benefits receipts has an impact on whether the bill is paid in full, an impact on experiencing collections and eventual electricity disconnection.

We focus on low-income individuals as we have proxies for the timing of major sources of income due to government benefits distribution rules. In the state covered by our data, payments for the Supplemental Nutrition Assistance Program (SNAP) are given on the first of the month. For households living below 135% of the federal poverty line receiving any type of government assistance, these payments represent 10-25% of income across age groups (Angell et al., 2018). For those of retirement age, Social Security benefits are distributed on different days of the month depending on the month and birth date, leading to greater variance in timing of income receipt throughout the month among low-income elderly populations.[1]

We find the following. Accounts which receive their electricity bill within 1 day on either side of the first of the month are significantly less likely to have a late payment, have significantly lower outstanding balances, and are much less likely to have a notice of electricity disconnection or an actual electricity disconnection. These effects are concentrated among accounts associated with residences in high-poverty neighborhoods. Among those living in block groups with below median income levels, we find that receiving a bill on or within a day of the first of the month benefits receipt timing causes a 36% reduction in the probability that a bill is not paid on time (of a base level of 55.9%), a 67% reduction in outstanding unpaid balances (off a base level of $206.90), a 43% reduction in the probability of being eligible for electricity disconnection (off a base level of 33.8%), and a 64% reduction in the probability of having electricity disconnected (off a base level of 10.9%). For accounts located in high-median-income block groups, measures of late payment and disconnection are substantially lower, and the relationship between timing of bill receipt and the first of the month nearly vanishes.

[1] https://www.ssa.gov/pubs/EN-05-10031.pdf.

We look for similar patterns among those living in neighborhoods with high concentration of elderly residents, where cash income from social security is more likely to arrive at a different point in the month than benefits such as SNAP due to payments rules governing social security benefits. We find similar, but less extreme results. Overall, accounts associated with high-poverty and high-elderly have slightly lower rates of late payment, and a lower impact of timing of bill receipt. Among accounts in high-elderly neighborhoods with below-median income, receiving a bill at the first of the month reduces the probability of having an unpaid bill by 31% (of a base level of 45.5%), reduces the overdue amount outstanding by 50% (of a base level of $155.10), and reduces the probability of having electricity disconnected by 45% (of a base level of 7.68%).

These results suggest that, for low income households, the timing of bills due relative to the timing of government income may have long-run consequences. If bills are not received when income is received, households are more likely to miss payments. Missed payments can spiral into disconnections which may further impact family and health outcomes. Among populations where income is sufficiently high to allow for smoothing shocks, or where government benefits income from different programs are dispersed at different times in the month, as with Social Security benefits versus SNAP benefits, households appear to have higher on-time bill payments, lower overdue balances, and lower electricity disruption rates. Our results add to a growing literature suggesting that government benefits programs and/or private industry could innovate in ways to help low income households balance budgets throughout the month and avoid potential poverty traps. In the case of electricity bills, moving bill receipt to coincide with SNAP benefits receipt could improve on-time payments. This could help low income families avoid poverty traps, but also lower electricity rates for all rate payers in regulated

markets, since collection and electricity service disruption are costly and must be covered by regulated electricity rates.

2 Data

We use anonymized administrative data from a major public utility service provider in a New England state. The administrative data covers billing, payment, and collections activity for residential electricity accounts from July 2015 to July 2018.

2.1 Sample Construction

We restrict the data in two ways. First, we keep records for bill, payment, and collections activity of electricity accounts that were created in July 2015 onwards and that we observe for at least a full year (12 months) of billing activity. Restricting to accounts created after July 2015 allows us to observe the full life of an account up until the end of our sample period. Observing the account for at least 12 months allows time for meaningful late payments to occur. Second, we remove accounts that have set up automatic payments through direct deposit. This is approximately 5% of accounts.

We construct two samples. First, we construct a sample of each individual in each month and keep individuals for whom we see at least one full year of data. This gives us one year of bill payment and account activity data for individuals for whom we also see the start date of their account within our sample. We assign to each individual in each year the mean day of the month on which their bill was due in each year (bill due dates can vary slightly from month to month), and we calculate outcome variable such as their average balance due, days their bill is overdue,

and collections notices during the year. Second, we construct a subsample of customers that we observe in the data for at least two consecutive, full years. We use this restricted sample to examine collections activity related to events, such as connections, that can take several months of late payments before occurring.

Our bill account data do not contain data on age or demographics, only the residential location associated with the electricity meter linked to the bill. They do contain measures of poverty from qualification for government-sponsored energy subsidy programs, though the take-up rate of these programs may be low and thus the data were not deemed sufficiently reliable to proxy for poverty.[2] To examine impacts of bill timing on outcomes of interest by income and age, we use geocoded billing account address information to merge Census Block Group data on neighborhood poverty rates and elderly rates onto our account payment data. Using Census Block Group level data from the American Community Survey, we define a Block Group to have high elderly concentration if the Block Group is in the upper quartile of our sample in terms of the fraction of Block Group households with a member aged 65 years or older. In our sample, the fraction corresponding to the upper quartile is 0.34 and above.

2.2 Construction of Bill Timing Variable

We explore how timing of bill receipt within the month—particularly whether bill receipt is near the start of the month—impacts bill payment outcomes. We compute the absolute number of days from the nearest first of the month that a bill is received (bills received on the 1st of a month have an absolute number of 0; bills received on the 2nd of a month have an absolute number of 1;

[2] We are in the process of working with the energy company to explore which combination of variables from the payments data may provide reliable individual-level of poverty in comparison externally validated measures, for example from social insurance programs.

and so on). Bills received on the 30th of the month have an absolute number of 1 during 30-day months and an absolute number of 2 during 31-day months.

We then compute the mean of the absolute bill receipt dates over the relevant horizon for each sample, and round the mean value to the nearest integer as the exact day in which a bill is received each month can vary slightly from month to month. We define a bill to be received near the start of the month if it is received within a day of the first of the month (absolute number of 0 and 1). Therefore, accounts with a rounded mean absolute value of 0 or 1 are defined to typically receive its bills within a day of the start of the month.

2.3 Construction of Outcome Variables

We construct several measures to analyze the on-time bill payment rates of accounts. First, we define a bill to be overdue if the balance on the bill is not paid off by over a month after the due date (thus we allow for mistakes of missing one payment, and do not count those as being overdue bills). We also observe the unpaid balance on a bill.[3] Over the course of each account's first year of activity, we analyze whether the account was overdue on any bill; the fraction of bills the account was overdue on; the accumulated amount of outstanding unpaid balance at the end of the year; and, the average fraction of each bill amount paid. We also study outcomes related to disconnection that follow as a result of late/non-payment of bills. We create indicators for whether an account, over the course of the first two years, received a warning notice of possible disconnection, became eligible for disconnection, or was disconnected.

2.4 Descriptive Statistics

[3] A given bill incorporates any outstanding amounts from previous bills.

Table 1 presents summary statistics of bill payment and other outcomes of electricity accounts. Across the full sample (column 1), accounts are on average behind a bill by over a month 23% of the time and, in any given bill, an account is over a month behind payment and has an average outstanding balance due of $102. Conditional on falling behind on a bill by over a month, an account first falls behind between its third and fourth bill, and almost half of all accounts are late on a bill at least once over the course of a year. Over the course of the first two years of activity, a significant portion of accounts experience activities leading to disconnection as a result of late/non-payment of bills. Almost half of all accounts receive a notice warning of possible disconnection. A smaller but still significant fraction, 27%, of accounts become eligible for disconnection. However, 8% of all accounts experience at least one disconnection over their first two years.

Columns 2-5 show that neighborhood income is positively correlated with positive bill payment outcomes. For example, Column 2 shows that accounts belonging to residences in areas where the median block group income is below the poverty level are nearly twice as likely to be late on a bill than accounts associated with residences in block groups with median income between 200% and 300% of the poverty level in Column 4 (38% versus 22%). Those in the highest poverty neighborhoods and who have overdue bills (Column 2) owe approximately three times as much on their electricity bill ($187.63) on their electricity bills than those who have overdue bills in the higher income neighborhoods in Column 4 ($96.21).

Columns 6 through 8 provide summary statistics for accounts associated with residences in with a high concentration of elderly residents according to census bureau statistics. On average, those in high-concentration elderly block groups are less likely to be late on payments than the average account (18% versus 23%). Among accounts for residences located in high

poverty and high elderly block groups (Column 7), the likelihood of being late on a bill is similar to the rate across all high-poverty block groups (39% versus 38%). Within high-elderly block groups, both the fraction of individuals with a late payment and the average amount of outstanding bills unpaid decrease as the block group median income increases.

Figure 1 shows the distribution of the days of the month on which electricity bills were issued to customers during our sample period. The day on which electricity bills are issued is a function of when the account was initiated and the block on which they are located. We can see that there is a relatively smooth distribution of bill due dates. Individuals located in block groups of all income levels have bills due on each of the days of the month, allowing us to compare how payment behavior changes with the day on which the bill is due within block group income levels, and compare the impact of bill receipt timing on outcomes of interest as neighborhood income changes.

Figure 2 displays the empirical probability of a bill being overdue by over a month past the due date for each day of the month. The x-axis plots the number of days from the nearest start/end of the month that bills are received, ranging from 0 to 15 days. The y axis reports the mean fraction of accounts in the sample year with at least one overdue bill. Thus the scatter plot in Figure 2 reveals the raw relationship between the number of days between when a bill is received and the first-of-the month, and the probability that account has at least one late payment. While there does not appear to be a clear linear relationship between on-time payment rates and the number of days away from the first of a month, we clearly see that accounts with bills received on and one day from (before or after) the start of the month have substantially lower rates (0.15-0.17) of not being paid on time compared to bills received on any other days in

the month (0.2-0.25). The probability of having an overdue bill falls by nearly fifty percent if the bill is due within one day of the first of the month, relative to all other days.

Figure 3 breaks up Figure 2 by median block group income level relative to the poverty line. The graphs reflect the statistics in Table 1, showing that accounts located in lower income areas tend to have higher late/non-payment rates. Interestingly, we also see that, regardless of neighborhood median income, bills received within a day of the start of the month tend to have lower overdue rates compared to other days of the month. That said, the percentage decrease in the probability of having an overdue bill is higher in high-poverty, lower-income block groups. For example, the first-of-the-month drop in overdue bill probability is nearly 10 percentage points in the second panel of Figure 4, and approximately 2.5 percentage points in the fourth panel.

Higher overdue rates are associated with a higher amount of outstanding balance among those with overdue bills. Figure 4 displays the average dollar amount of a bill not paid off by over a month past its due date. Bills received within a day of the start of the month have substantially lower amounts (approximately $60) overdue compared to other days of the month ($90-120).

3 Empirical Model

To statistically measure and quantify the impact of typically receiving bills within a day of the start of the month, we employ the following model:

$$y_a = \alpha + \beta_1 \mathbf{1}(S)_a + \beta_2 Income_b + \beta_3 \mathbf{1}(S)_a * Income_b + \varepsilon_a \quad (1)$$

where *y* is the outcome measured over the time period of interest for account *a*; *S* is an indicator for whether the account typically receives its bills within a day of the start of the month; and *Income* is a continuous variable representing the demeaned median household income of the Census Block Group, *b*, that the residence associated with the account is located in.

The model in Equation (1) allows us to estimate the impact of timing on bill receipt as a linear function of median block group income level. We also estimate the model using indicators for whether an account is located in an area with lower/higher than average income levels:

$$y_a = \sigma + \gamma_1 \mathbf{1}(S)_a + \gamma_2 1(Above\_Avg\_Income_b) + \gamma_3 \mathbf{1}(S)_a * (Above\_Avg\_Income_b) + \epsilon_a \quad (2)$$

where *Above_Avg_Income* is an indicator for whether the median household income of the Census Block Group that an account is located in is greater than the average Census Block Group median household income of the sample.

4 Results

4.1 Impact of Bill Receipt Timing Across All Electricity accounts

We first present results from estimating the relationship between receiving bills within a day of the 1st of the month and relevant payment and disconnection outcomes for a pooled sample

(among all electricity accounts in our sample). We present the results graphically as well as in a regression framework. The panels in Figure 5 display these mean outcomes as the household income level of account Block Groups vary and by whether an account typically receives its bill within a day of the start of the month. Table 2 displays regression estimates from Equations (1) and (2) in Panels A and B, respectively.

Panel (a) of Figure 5 shows that accounts that typically receive bills within a day of the start of the month tend to have more timely payments: the red line is much lower than the blue line for all block group income levels. For the lowest-income block groups, the difference in late bill payment is largest, with the blue line nearly three times as high as the red line, indicating a near tripling of late payment rates. At the highest block group income levels, the difference between the blue and red lines is non-existent, indicating no difference in overdue bill rates as a function of the day of the month. Column (3) of Table 2 shows for accounts in block groups with the average median income, accounts are 11.5 percentage points less likely to be overdue on a bill if they typically receive bills at the start of the month, representing a 43% reduction compared to accounts that do not. The estimates confirm that this relationship is even larger in magnitude in lower income areas. Column 3 of Table 2 shows that block group income lowers the probability of an overdue bill. For every $10,000 increase in block group income, an account has a 3.12 percentage point reduction in the fraction of bills which are overdue. Reflecting Figure 5, the income gradient in overdue rates nearly disappears for those receiving bills at the first of the month. The coefficient on the interaction between block group median income and receiving a bill at the first of the month is 2.27 percentage points, nearly the size of the coefficient on median income itself.

Panel (b) of Figure 5 and Column 1 of Table 2 show that this relationship between bill receipt timing and overdue rates translates into higher overdue amounts after the course of the first year of an account. Accounts located in block groups with median income are $101 less in debt after a year of service if the account typically receives bills at the start of the month (Column 1 of Panel A). This relationship is more pronounced for lower-income accounts. Among below-average income areas, accounts that receive bills outside the start of the month on average find themselves $206.9 (Panel B) in debt after a year; accounts that receive bills at the start of the month have $140, or 68%, less in debt comparatively (Column 1 of Panel B). Column 4 of Table 2 shows that in addition to having larger dollar accumulations of debt, accounts that receive bills at the start of the month have lower proportions of the due amount in each bill that are not paid on time.

Panels (c) and (d) of Figure 5 and Columns 5-7 of Table 2 present results from disconnection-related outcomes of electricity accounts over the course of an account's first two years, including receiving a warning notice of potential disconnection, becoming eligible for disconnection, and being disconnected. As is the case with bill payment outcomes described above, receiving bills at the start of the month is significantly associated with lower rates of each of these disconnection-related outcomes and is especially significant among lower-income areas. Among below-average income areas, there is a statistically significant 20 percentage point (or 35%) reduction for accounts with bill receipt at the start of the month in the likelihood of falling behind payments to the point of receiving a disconnection warning (Column 5 of Panel B); likewise, there is a 7-percentage point (or 64%) reduction in the probability of being disconnected.

The findings presented in Figure 5 and Table 2 suggest that timing of bill receipt at the start of the month has positive and significant impacts on timely payment rates, reduced debt, and reduced risk of electricity shutoffs, and that this effect is especially pronounced for lower income account owners. One potential factor driving this finding is the timing of government benefits for low-income households. In the state our sample is located in, all SNAP recipients (who are therefore under poverty) receive SNAP income at the start of each month. If low-income households are more likely to pay their utility bill when their disposable income is at their highest, then bill receipt coinciding in timing with receipt of SNAP income may lead to more timely payment rates.

4.2 Impact of Bill Receipt Timing Across Elderly-Population Accounts

Figure 6 and Table 3 present analogous results to Figure 5 and Table 2 for the subsample of accounts located in Census Block Groups defined to have relatively high concentrations of elderly population.

Panel (a) of Figure 6 shows that although bill receipt within a day of the start of the month is associated with comparatively lower late payment rates across low to middle income areas, the effect of the bill receipt timing is smaller compared to the full sample of accounts shown in Panel (a) of Figure 5. Specifically, while accounts in elderly-populated areas tend to have better payment rates than the average account (as seen in Table 1), low-to-middle income accounts in elderly-populated areas that typically receive bills outside the start of the month tend to be driving the reduced difference. The regression estimates in Table 3 confirm these findings. Column 3 of Table 3(B) show that an account in a below-average income area is on average 8.8

percentage points (or 39%) less likely to be overdue on a bill if the account receives bills at the start of the month (compared to a 53% reduction in the full sample).

The other bill payment outcomes for the elderly-population sample have similar relationships between income and payment outcomes of interest. Accounts located in below-average income, older-population areas that receive bills at the start of the month tend to have $78 (or 50%) less in debt after a year compared to accounts that receive bills at other times of the month—in the full sample, the analogous reduction was 68%. There is a similar reduction (but less so compared to the full sample) in outcomes related to disconnections if accounts in older-population areas receive bills at the start of the month. Below-average income accounts in the elderly sample are 13.5 percentage points (or 29%) and 3.45 percent points (or 45%), respectively, less likely to receive a disconnection warning notice and be disconnected over the course of two years.

The results in Figure 6 and Table 3 suggest that although bill receipt at the beginning of the month is still associated with positive payment outcomes, the effect is comparatively smaller for elderly households, particularly for those located in lower-income areas. One possible reason is related to timing of income from government benefits among elderly households. Whereas the timing of SNAP payments for all low-income households in the state of our sample is at the beginning of the month, the timing of government benefits for elderly households varies in timing across the month. By having additional forms of income come in at various times over the course of a month, any "first of the month" income effect will be reduced. This would work to equalize the rate of timely payments across the days of the month.

5 Conclusion

We use a new and never-before available data set on electricity bill payments, late payments, collection efforts, and electricity disruption to examine the relationship between the timing of bill receipt relative to government benefits receipt on late payments, overdue balances, and eventual disruption in electricity services. We find that among households likely receiving SNAP benefits, receiving an electricity bill with a day of SNAP benefits receipt has a substantial impact on family's ability to pay their bills and avoid costly electricity service disruption. We find that for accounts more likely associated with Social Security benefits receipt, which has an average distribution spread throughout the month, late payment rates are lower, as are outstanding balances and likelihood of electricity service disruption. Moreover, the relationship between electricity bill receipt timing and the first-of-the-month is weaker.

Our results suggest that, for low income households, timing of income from government benefits and the timing of bills due may have long-run consequences. If bills are not received when income is received, households are more likely to miss payments, which may compound into disconnections which may further impact family financial and health outcomes.

These results add to a growing literature suggesting that government benefits programs and/or private industry innovate in ways to help low income households balance budgets throughout the month and avoid potential poverty traps. In the case of electricity bills, moving bill receipt to coincide with SNAP benefits receipt could improve repayment rates. This could help low income families avoid poverty traps, but also lower electricity rates for all rate payers in regulated markets, since collection and electricity service disruption are costly and must be covered by regulated electricity rates. Further research is needed to implement and measure the

impact of changes in timing of bill receipt through, for example, a randomized controlled trial, and to expand the outcome measures of impact to include measures of financial wellbeing such as credit scores.

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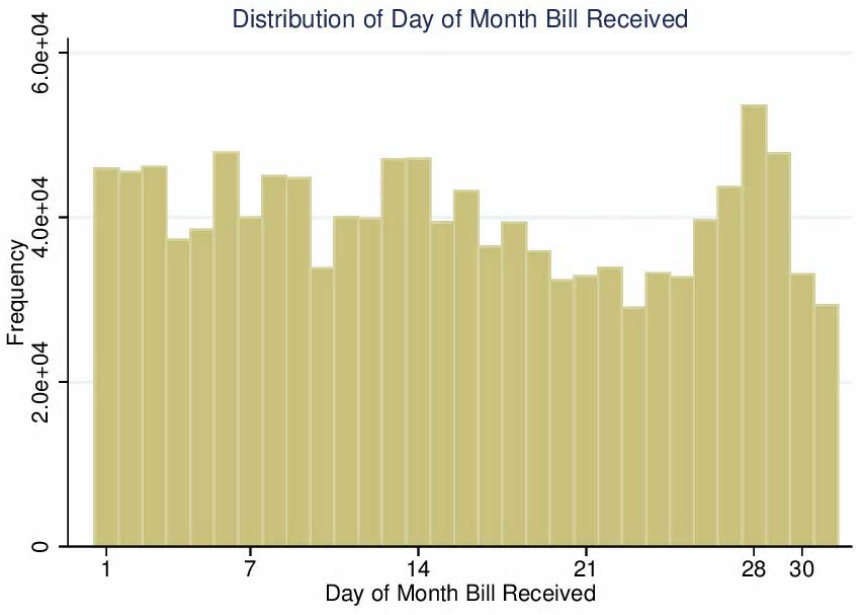
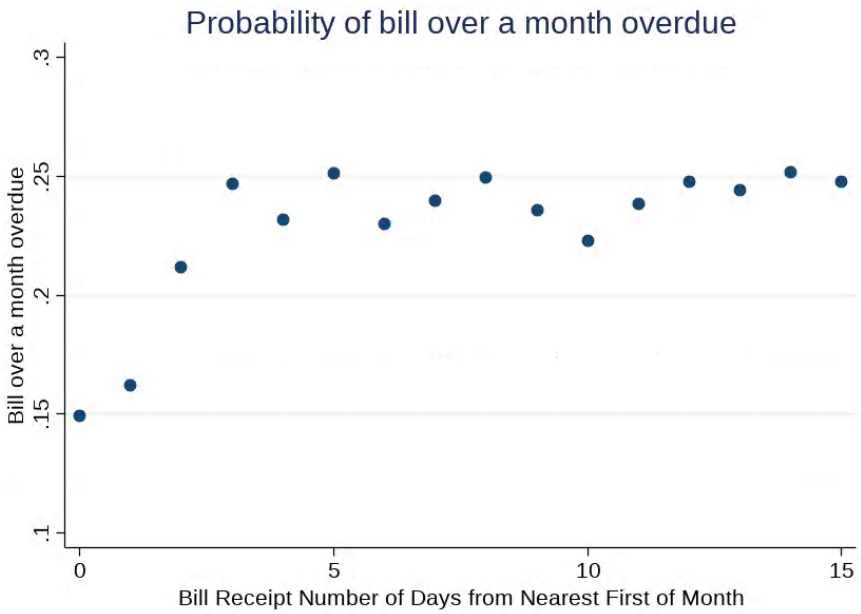
Figure 1



Note: Sample includes residential electricity accounts opened after July 2015 with at least one year of activity.

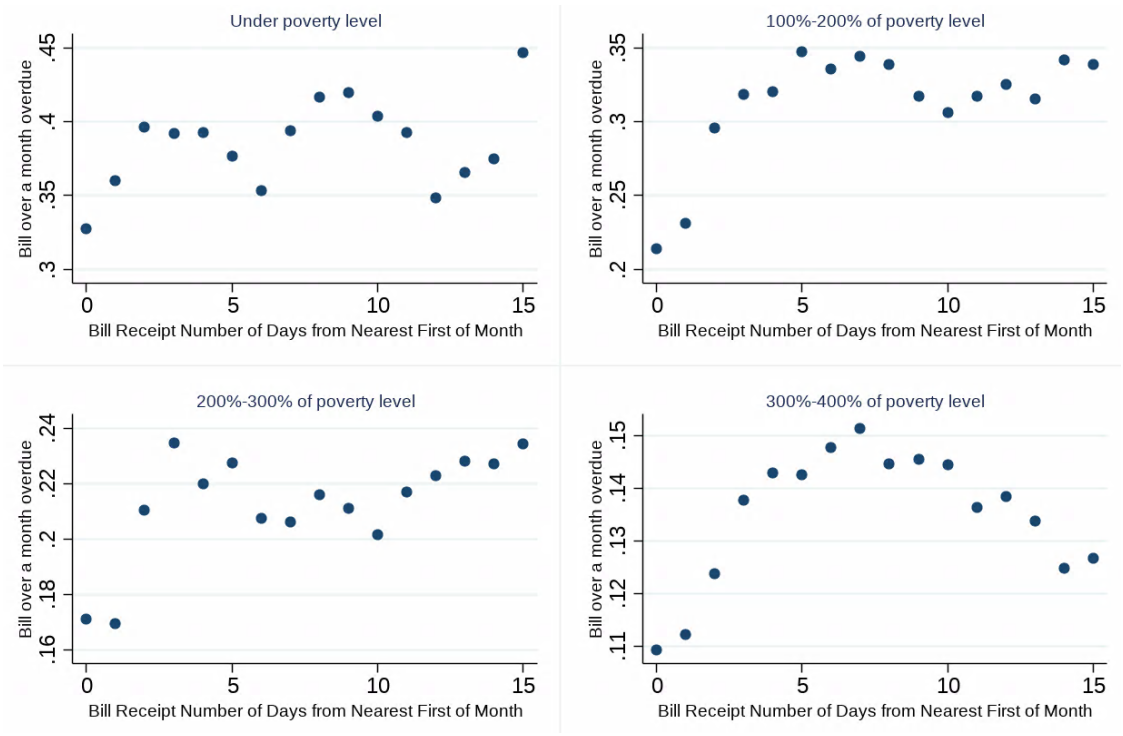
Figure 2



Note: Scatters display means for each day of the month. Sample includes the first full year of monthly bills of residential electricity accounts opened after July 2015.

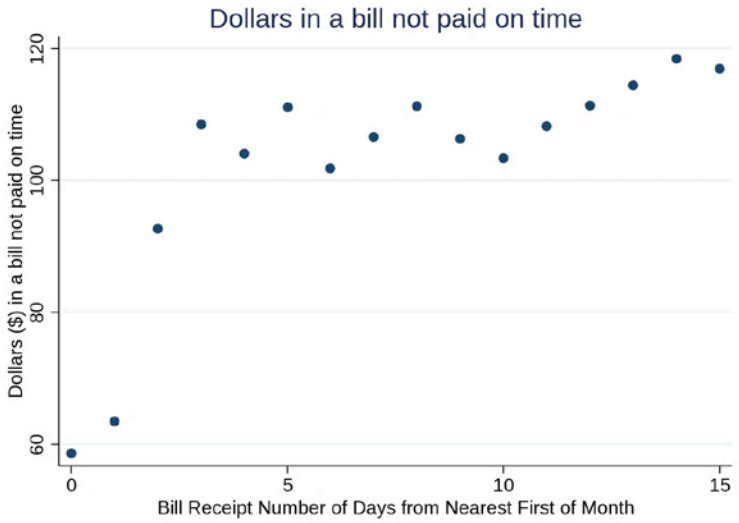
Figure 3

Probability of bill over a month overdue
(by median household income of account Block Groups)



Notes: Scatters display means for each day of the month. Sample includes the first year of monthly bills of residential electricity accounts that were opened after July 2015.

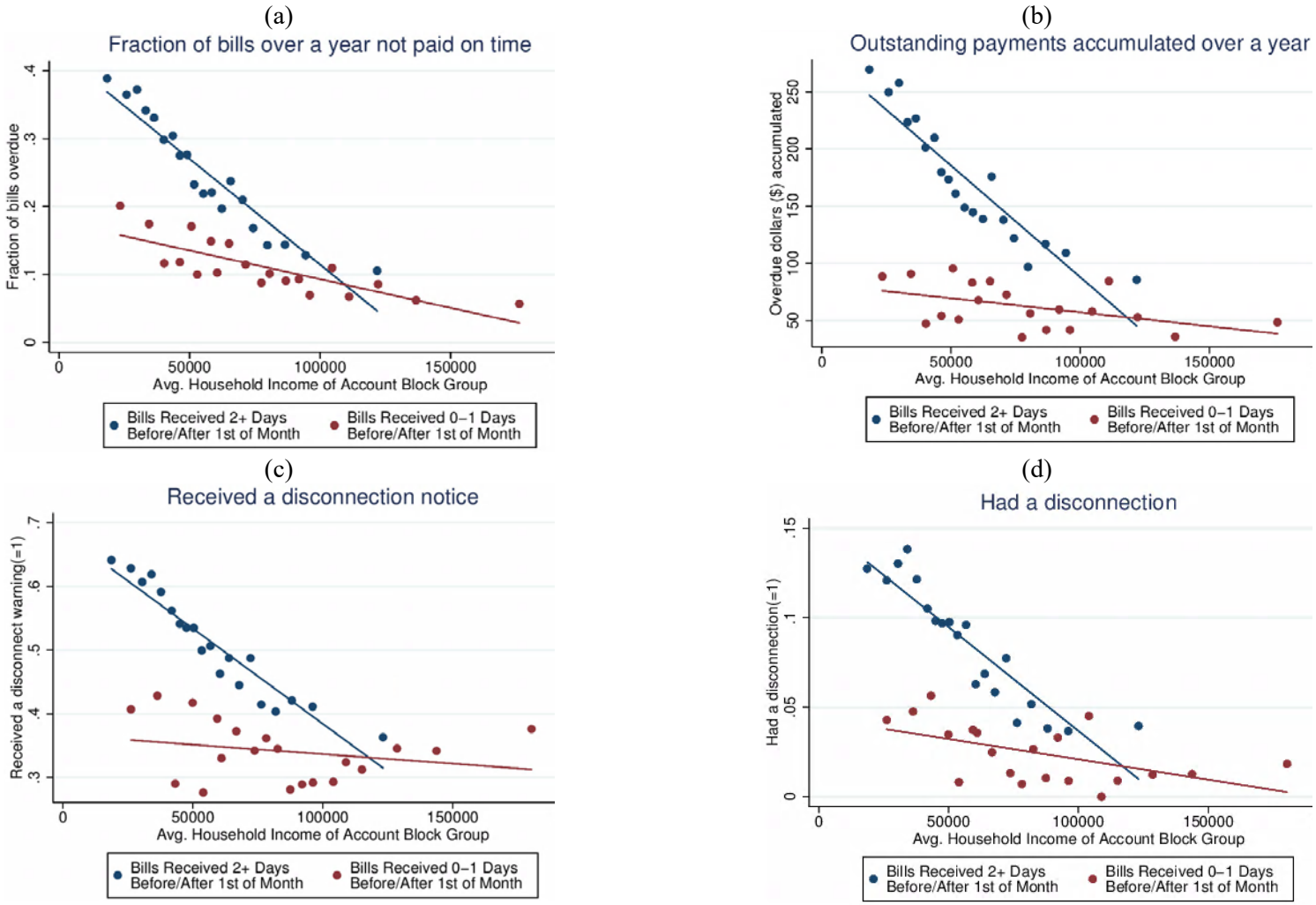
Figure 4



Notes: Scatters display means for each day of the month. Sample includes the first full year of monthly bills of residential electricity accounts opened after July 2015. Unpaid amount includes bills not paid by over a month after the due date.

Figure 5

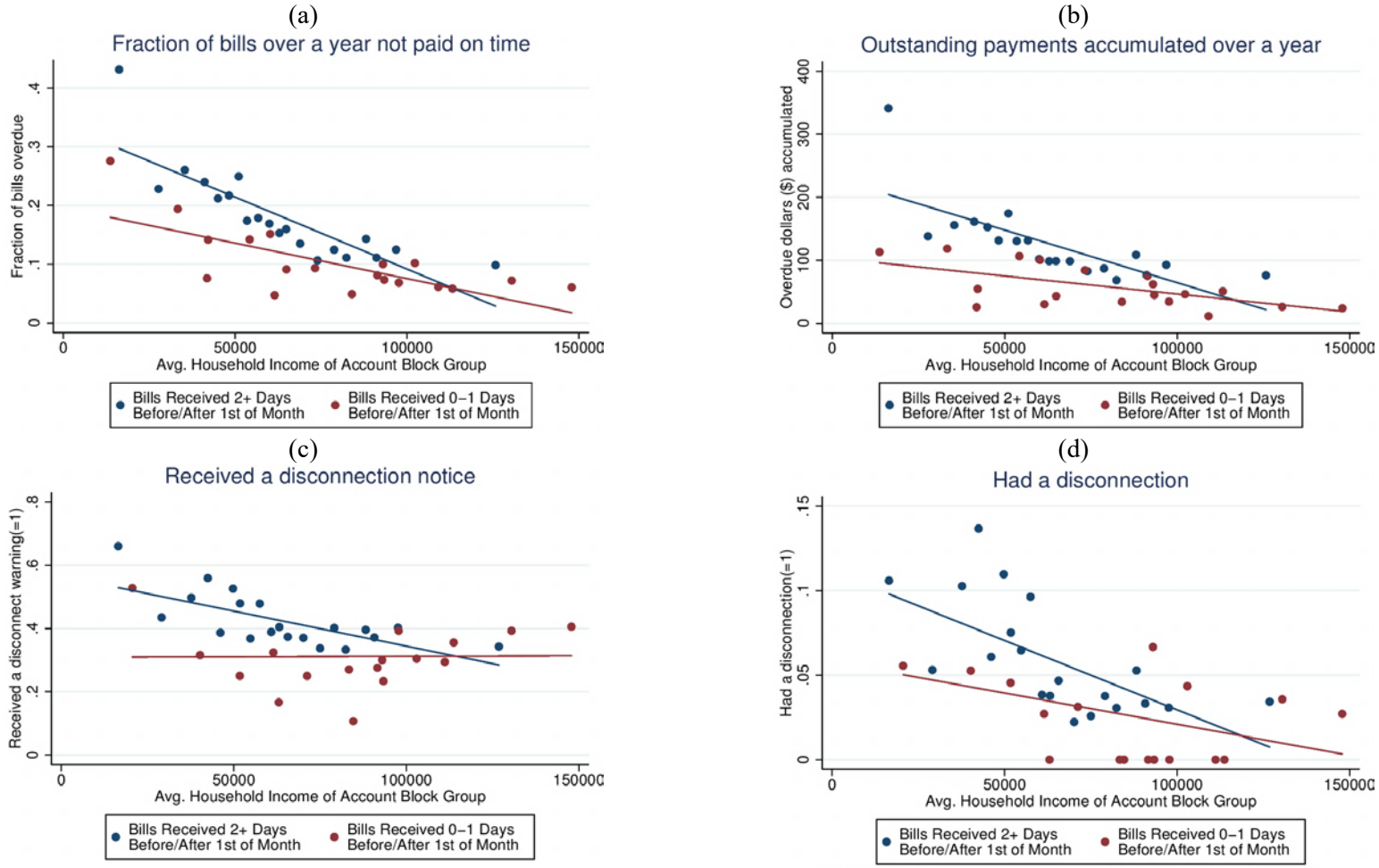
Difference in Outcomes by Tendency to Receive Bill at the Start of the Month (All Electricity Accounts)



Notes: Sample includes electricity accounts opened after July. Panels (a) and (b) measure over the first twelve bills of each account; panels (c) and (d) measure over the first twenty-four bills of each account. Outstanding payments accumulated over a year is defined as the amount of outstanding payments after the twelfth bill.

Figure 6

Difference in Outcomes by Tendency to Receive Bill at the Start of the Month (Older-Population Block Groups)



Notes: Sample includes electricity accounts opened after July 2015 and that are located in Census Block Groups in the top quartile in terms of the fraction of households with a member(s) aged 65 or older. Panels (a) and (b) measure over the first twelve bills of each account; panels (c) and (d) measure over the first twenty-four bills of each account. Outstanding payments accumulated over a year is defined as the amount of outstanding payments after the twelfth bill.

Table 1: Summary Statistics of Electricity Accounts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Full Sample	Block Group Income below poverty level	Block Group Income 100-200% poverty level	Block Group Income 200-300% poverty level	Block Group Income 300-400% poverty level	Block Group with high elderly concentration (age)	Block Group Income below poverty level; high elderly concentration	Block Group Income below 200% poverty level; high elderly concentration
Measured over first year of account								
Fraction of bills not paid on time	0.23	0.38	0.32	0.22	0.14	0.18	0.39	0.26
Dollars ($) in a bill not paid on time	102.88	187.63	146.5	96.21	59.88	77.72	206.41	121.21
Number of bills until first overdue bill	3.45	3.03	3.19	3.58	3.85	3.61	3.15	3.28
Had an overdue bill	0.47	0.65	0.57	0.45	0.35	0.39	0.65	0.49
Measured over first two years of account								
Received a disconnect warning	0.49	0.63	0.58	0.48	0.4	0.42	0.64	0.49
Was eligible for disconnection	0.27	0.41	0.36	0.25	0.18	0.21	0.39	0.29
Had a disconnection	0.08	0.13	0.11	0.08	0.04	0.06	0.11	0.09
N								
Number of accounts with one year of activity	102865	4027	29414	28331	14993	20198	1284	5531
Number of accounts with two years of activity	37783	1409	10404	10710	6135	7965	423	2016

Samples include electric accounts created after July 2015. Census Block Group incomes indicate median household income. Poverty level household income is measured for a household of four ($24,600 in 2017). High elderly concentration defined as Block Groups in the top quartile among accounts in terms of fraction of households with member(s) aged 65 years or older (0.34+).

Table 2: Regression Results (All Electricity Accounts)

	Measured over first year of acccount				Measured over first two years of acccount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overdue dollars ($) accumulated	Had an overdue bill(=1)	Fraction of bills overdue	Average percent of bill not paid on time	Received a disconnect warning(=1)	Eligible for disconnect(=1)	Had a disconnection(=1)
A: Continuous Income Specification							
Bill receipt within a day of the first of month = 1	-101.2***	-0.154***	-0.115***	-0.0955***	-0.154***	-0.106***	-0.0528***
	(4.2500)	(0.0071)	(0.0039)	(0.0035)	(0.0119)	(0.0096)	(0.0046)
Demeaned household income ($10000's)	-19.50***	-0.0390***	-0.0312***	-0.0265***	-0.0299***	-0.0284***	-0.0116***
	(0.7149)	(0.0007)	(0.0004)	(0.0004)	(0.0011)	(0.0010)	(0.0006)
Bill receipt within a day of the first of month = 1 X Demeaned household income ($10000's)	17.04***	0.0271***	0.0227***	0.0191***	0.0269***	0.0189***	0.00933***
	(1.1998)	(0.0017)	(0.0009)	(0.0008)	(0.0029)	(0.0021)	(0.0011)
Constant	168.6***	0.482***	0.243***	0.206***	0.503***	0.278***	0.0827***
	(1.8848)	(0.0018)	(0.0012)	(0.0011)	(0.0029)	(0.0026)	(0.0016)
B: Discrete Income Specification							
Bill receipt within a day of the first of month = 1	-137.9***	-0.203***	-0.163***	-0.133***	-0.199***	-0.147***	-0.0702***
	(6.6001)	(0.0108)	(0.0061)	(0.0055)	(0.0178)	(0.0146)	(0.0074)
Above mean household income = 1	-84.10***	-0.168***	-0.137***	-0.116***	-0.134***	-0.130***	-0.0573***
	(3.7901)	(0.0036)	(0.0024)	(0.0021)	(0.0059)	(0.0052)	(0.0031)
Bill receipt within a day of the first of month = 1 X Above mean household income = 1	74.30***	0.0909***	0.0889***	0.0719***	0.0978***	0.0687***	0.0363***
	(8.4268)	(0.0132)	(0.0072)	(0.0064)	(0.0218)	(0.0173)	(0.0083)
Constant	206.9***	0.559***	0.306***	0.258***	0.565***	0.338***	0.109***
	(2.6019)	(0.0024)	(0.0018)	(0.0015)	(0.0038)	(0.0037)	(0.0024)
N: Number of Accounts	82384	82384	82384	82384	31052	31052	31052

Notes: Panels A and B display regression estimates following Equations (1) and (2), respectively. Standard errors are displayed in parentheses. Within each panel, each column displays results from a single regression. Significance reported as *** p<0.001; ** p<0.01; * p<0.05. Outstanding payments accumulated over a year is defined as the amount of outstanding payments after the twelfth bill. Sample includes electricity accounts opened after July 2015.

Table 3: Regression Results for Electricity Accounts in Older-Population Block Groups

	Measured over first year of acccount				Measured over first two years of acccount		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overdue dollars ($) accumulated	Had an overdue bill(=1)	Fraction of bills overdue	Average percent of bill not paid on time	Received a disconnect warning(=1)	Eligible for disconnect(=1)	Had a disconnection(=1)
A: Continuous Income Specification							
Bill receipt within a day of the first of month = 1	-57.26***	-0.102***	-0.0608***	-0.0496***	-0.110***	-0.0518**	-0.0241*
	(7.0701)	(0.0126)	(0.0073)	(0.0065)	(0.0229)	(0.0184)	(0.0097)
Demeaned household income ($10000's)	-16.69***	-0.0314***	-0.0245***	-0.0208***	-0.0221***	-0.0210***	-0.00821***
	(1.3807)	(0.0014)	(0.0009)	(0.0008)	(0.0023)	(0.0019)	(0.0011)
Bill receipt within a day of the first of month = 1 X Demeaned household income ($10000's)	10.97***	0.0190***	0.0124***	0.0106***	0.0225***	0.0115*	0.00452
	(1.9823)	(0.0038)	(0.0021)	(0.0019)	(0.0066)	(0.0053)	(0.0028)
Constant	124.2***	0.395***	0.180***	0.152***	0.421***	0.205***	0.0578***
	(3.0770)	(0.0035)	(0.0021)	(0.0019)	(0.0058)	(0.0047)	(0.0027)
B: Discrete Income Specification							
Bill receipt within a day of the first of month = 1	-77.92***	-0.141***	-0.0883***	-0.0731***	-0.135***	-0.0793**	-0.0345*
	(10.7563)	(0.0179)	(0.0107)	(0.0094)	(0.0350)	(0.0281)	(0.0152)
Above mean household income = 1	-68.08***	-0.132***	-0.103***	-0.0871***	-0.0927***	-0.0957***	-0.0423***
	(6.0138)	(0.0070)	(0.0042)	(0.0037)	(0.0117)	(0.0094)	(0.0053)
Bill receipt within a day of the first of month = 1 X Above mean household income = 1	36.72**	0.0649**	0.0413**	0.0354**	0.0686	0.0464	0.0196
	(12.8449)	(0.0235)	(0.0127)	(0.0112)	(0.0427)	(0.0330)	(0.0170)
Constant	155.1***	0.455***	0.226***	0.191***	0.463***	0.249***	0.0768***
	(4.7323)	(0.0048)	(0.0032)	(0.0028)	(0.0077)	(0.0067)	(0.0041)
N: Number of Accounts	20703	20703	20703	20703	7762	7762	7762

Notes: Within each panel, each column displays results from a single regression. Panels A and B displays regression estimates following Equation (1); the bottom panel follows Equations (2). Standard errors are displayed in parentheses. Significance reported as *** p<0.001; ** p<0.01; * p<0.05. Sample includes electricity accounts opened after July 2015 and that are located in Census Block Groups in the top quartile in terms of the fraction of households with a member(s) aged 65 or older.