

Budgeting for Bills: The Impact on Daily Spending

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CIPHER, 2/26/2025

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Introduction

Bills are a commitment: difference between expenditure (X) and consumption (C). Can be a challenge to budget around income and bills

- Bill payments not accounted for in standard consumption models

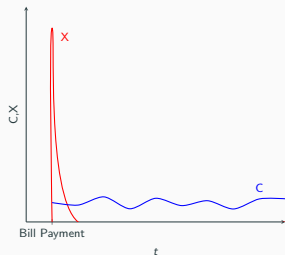
Study consumer budgeting around bill payments with representative data

-Quantify bill payment patterns

-Consumers reduce non-bill spending

before the payment, and increase spending thereafter

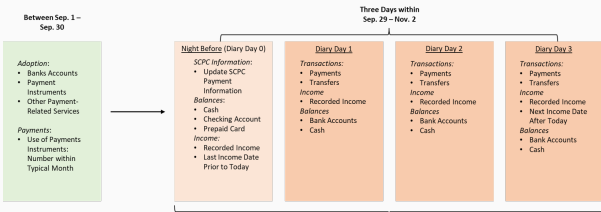
- Conditional on liquidity, **consumers increase spending by 41 - 51% two days after** relative to spending before the payment
 - More liquidity = smaller increase. High-value bills (Chetty and Szeidl 2007; Telyukova 2013)
 - Higher over longer pay cycles (Baugh and Wang 2018), lower for automatic bills
- \neq High-frequency nondurables: postponing payments (Browning and Crossley 2009)



• Annual Survey/Diary of Consumer Payment Choice

- SCPC (2008-present): Sep, 30-minute online, recall
- DCPC (2012, 2015-present): Oct 1-31, 3-days paper/online, recorded
- Samples = 1,500-3,000; Frames = ALP, UAS (RAND, USC)
- Gilyard and Schuh (2025)*: 83% of PCE consumption, 76% of BEA income

Figure 1: Survey/Diary Instruments*



Survey of Consumer Payment Choice

Diary of Consumer Payment Choice

Figure 2: Diary Wave Implementation*

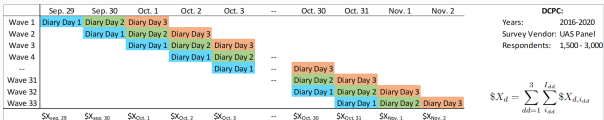


Figure 3: 2019 Paper Memory Aid (1 of 8 pages)

Day 1: Daily Payments

Please go online to complete the survey, even if you did not make any payments on Day 1.

Payments for (date): _____

What payment method did you carry or have available to make payments on Diary Day 1?	F1 Cash	F2 Check	F3 Credit card	F4 Debit card	F5 Prepaid/GU/EBT card	F6 Bank account number payment	F7 Online banking bill payment	F8 Money order	F9 Traveler's check	F10 Mobile payment apps, such as PayPal, Zelle, or Venmo	F11 Account-to-account transfer	F12 Other
Time	Amount Spent	Payment Method	Did you give in person?	Device	Type	Business, organization, or person you paid						
am	\$	P	Y/N	D	T	Name						
pm	\$	P	Y/N	D	T							
am	\$	P	Y/N	D	T							
pm	\$	P	Y/N	D	T							
am	\$	P	Y/N	D	T							
pm	\$	P	Y/N	D	T							
am	\$	P	Y/N	D	T							
pm	\$	P	Y/N	D	T							

Reminders

- Record all payments, no matter how small or large
- Record all payments, including bills
- Record all deposits and withdrawals
- Count your cash at the end of every day

Identifying Bill Payments

Bill Payments

- A bill payment is a payment for goods or services that you received in the past or that you will receive in the future.
- Record all bills you paid. Do not record bills paid by other members of your household.

When is a bill paid?

- Automatically or electronically: paid on the day the payment is specified to be made.
- By mail: paid on the day you mail the payment.
- In person: paid on the day you hand over the payment.
- By phone: paid on the day you call to make the payment.

Types of bills

Household or utility payments

- Rent
- Mortgage
- Home equity loan
- Home Equity Line of Credit (HELOC) (do not include any payment made as part of your mortgage payment)
- Yard maintenance (Landscaping, tree service, or snow removal, etc.)
- Housing maintenance (Maid, cleaning, laundry service, plumber, handyman, etc.)
- Electricity
- Water/sewer
- Natural gas, propane, heating fuel, other energy
- Homeowner's association or condo fees
- Trash collection

Phone, cable, or internet payments

- Telephone (landline and mobile)
- Cable
- Internet

Credit card or loan payments

- Credit card bill
- Car, truck, motorcycle, boat, or other vehicle loan payments
- Student loan, other loans

Insurance payments

- Health insurance
- Vehicle insurance
- Homeowner's or renter's insurance
- Life insurance
- Umbrella insurance

Miscellaneous

- Tuition, daycare, babysitting
- Medical or dental payments not covered by insurance
- Parking (buying a weekly, monthly, or annual pass)
- Public transportation (buying a weekly or monthly pass for bus, subway, ferry, etc.)
- Memberships or subscriptions (Gym, Netflix, social or professional club dues, magazines, etc.)
- Religious contributions
- Alimony/child support

Tax payments (not including payroll deductions from income)

- Federal taxes
- State taxes
- Local taxes
- Property taxes
- Car/vehicle taxes

DCPC: "Is this payment a bill payment"?

- Due Date
- Frequency
- Automatic
- Variable payment

Bill Expenditures: Identified through these categories

Non-bill expenditures: Expenditures which aren't bills (payment for current goods/services)

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Bill Characteristics

Figure 4: Aggregate Number and Values of Bills

Income and Expenditure Frequency

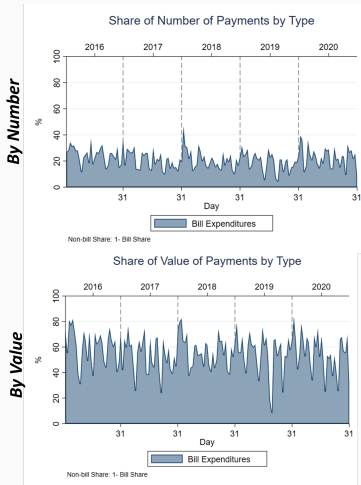


Table 1: # Transactions

	Transactions	Demographics		
Bill Payments		Household Income	Liquidity	Net Worth
Number of Bill Transactions	11,682	78,723	4,109	56,846
By Regularity of Bill (%)				
One-time	11%	83,342	5,510	87,716
Less than once per month	4%	89,131	5,103	134,495
Monthly Bills	72%	77,006	3,983	50,158
More than Monthly Bills	5%	84,677	2,854	43,858
Missing Regularity	7%	88,777	4,631	73,205
By Payment Timing of Bill (%)				
Early Payment	43%	78,226	4,176	58,518
Paid on Due Date	28%	86,028	4,722	65,324
Late Bill	10%	61,958	2,434	12,540
Missing Timing	20%	79,817	3,861	59,479
By Type of Payment (%)				
Fixed Payment	41%	78,831	3,695	47,919
Variable Payment	31%	79,374	4,377	66,084
Missing Payment Type	29%	82,936	4,786	69,544
By Automatic Status (%)				
Automatic Payment	29%	89,186	5,111	73,164
Manual Payment	70%	75,856	3,814	50,328
Missing Automatic Status	1%	76,557	2,984	64,969

¹ Reports the number of bill transactions in the DCPC between 2016 - 2020. Number of transactions are separated into four categories. Also reported are average and median values of demographics. Net worth is reported as median, while the rest are reported averages. 2012 USD.

Due Date and Payment Date Distribution

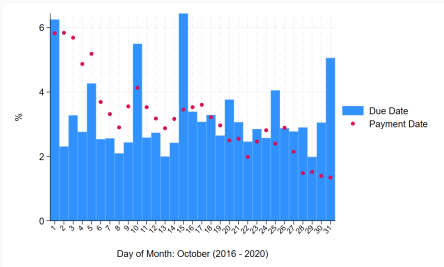
Bill Frequency: #

Bill Frequency: Value

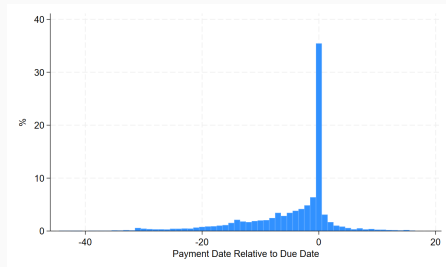
Payment Date vs. Due Date: Day of Week

Figure 5: Timing of Bill Payment

(a) Payment vs. Due Date



(b) Date of Payment - Due Date



Panel A reports the percentage of bills which are due on a day of the month in October (histogram) and the percentage of bills actually paid on that day (scatter). Panel B reports the differences between the day the bill was paid vs. when it was due. Negative values correspond to early payments, while positive values are late payments. 99th percentile values excluded from histogram.

High-Frequency Consumption: Bills

High-frequency data: new opportunities (Baker and Kueng 2022), **Standard consumption models at low-frequencies** (Carroll 1997):

$$\max \mathbb{E}_t \sum_{i=t}^T \beta^{i-t} u(C_i)$$

$$W_{t+1} = (1+r) [W_t - X_t^C] + Y_{t+1}$$

At high frequencies: Expenditures (X)

$$X_t = \underbrace{\overbrace{I_t^D}^{\text{Durable}} + \overbrace{X_t^{ND}}^{\text{Nondurable}}}_{X^C} - \overbrace{\Delta Debt_t^-}^{\text{Debt Reductions}} + \overbrace{P2P_t}^{\text{Transfers}} + \overbrace{T_t}^{\text{Taxes}}$$

Short-run: many goods durable (Baker, Johnson, and Kueng 2020). Durability = prioritization (Browning and Crossley 2009)

What about bills?

- $C \neq X$: consumption or debt repayment $X_{F_B}^B = \sum_{j=0}^{F_B-1} C_{t \pm j}$
- **Large costs to missing bill!** Lost good/service, fee, credit score
- **Leads to another prioritization**, empirical literature treats bills as consumption commitments (Chetty and Szeidl 2007).

Literature: Vellekoop 2018; Baugh and Wang 2018, among others

How do consumers spend around bill payments?

Regression Framework:

$$\tilde{X}_{idt} = \alpha + \sum_{s=0}^2 \beta_s I_{k=b}(Bill_{i,d+s,t}) + \sum_{s=0}^2 \gamma_s I_{k=b}(Bill_{i,d+s,t}) \times \tilde{L}_{i,d=b-1,t} + \tilde{L}_{i,d=b-1,t} + \psi_0 I(Payday_{idt}) + \eta_i + \lambda_{dd} + \lambda_{dow} + \lambda_t + \varepsilon_{idt}$$

- \tilde{X} : Non-bill spending divided by average non-bill spending
 - (Gelman et al. 2014, Olafsson and Pagel 2018)
- $I(Bill_{i,d+s,t})$: Indicator variable for days after a bill payment, $s = 0$ is day of bill
 - $I(Payday_{idt}) = 1$ if respondent received income on day d
- $\tilde{L}_{i,d=b-1,t}$: Liquidity before the bill divided by average liquidity.
 - Primary checking account balances and cash stored in wallet/elsewhere
- η_i : Respondent fixed effects. $\lambda_{dd,dow,t}$: diary day, day-of-week, and year fixed effects

Spending After Bill Payments

Table 2: Bill Payment Analysis (Dependent Variable: \tilde{X}_{idt})

	Benchmark			\tilde{X}^{ND}	Payment Timing		Type of Payment		Automatic Bill Payers	
	Base	w/ \tilde{L}	High Value	ND	No Early Bills	Early Bills	Fixed	Variable	Manual	Automatic
Bill Day	0.16*** (0.06)	0.41** (0.18)	0.85*** (0.28)	0.33 (0.22)	0.59** (0.27)	0.39 (0.33)	0.22 (0.20)	0.83*** (0.24)	0.50** (0.23)	0.22 (0.33)
Bill Day + 1	0.05 (0.08)	0.49** (0.21)	0.56* (0.32)	0.34 (0.27)	0.72** (0.34)	0.45 (0.38)	0.43* (0.26)	0.93*** (0.28)	0.61** (0.26)	0.14 (0.44)
Bill Day + 2	0.03 (0.11)	0.51** (0.25)	0.71* (0.42)	0.47 (0.29)	0.91** (0.43)	0.32 (0.45)	0.30 (0.33)	0.91*** (0.35)	0.60** (0.30)	0.24 (0.56)
Payday	0.30*** (0.08)	0.25*** (0.08)	0.19 (0.13)	0.17 (0.10)	0.23 (0.16)	0.29*** (0.10)	0.27*** (0.10)	0.05 (0.12)	0.36*** (0.10)	-0.03 (0.17)
$\tilde{L}_{i,d=b-1,t}$		0.15 (0.16)	0.30 (0.25)	-0.00 (0.18)	0.35 (0.25)	0.05 (0.35)	0.01 (0.17)	0.60*** (0.19)	0.23 (0.22)	0.10 (0.29)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$		-0.23 (0.17)	-0.47** (0.24)	-0.35* (0.19)	-0.44* (0.24)	-0.14 (0.33)	-0.09 (0.18)	-0.56*** (0.20)	-0.23 (0.22)	-0.28 (0.30)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$		-0.40** (0.18)	-0.47* (0.27)	-0.30 (0.22)	-0.55** (0.28)	-0.32 (0.35)	-0.31 (0.20)	-0.76*** (0.21)	-0.46** (0.23)	-0.36 (0.35)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$		-0.41** (0.20)	-0.55* (0.32)	-0.34 (0.23)	-0.74** (0.30)	-0.17 (0.40)	-0.29 (0.24)	-0.65*** (0.25)	-0.46* (0.25)	-0.47 (0.43)
Observations	15499	15089	5009	15089	5020	7870	8137	6497	9373	4276

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Columns are grouped by different analyses. The first column reports results without liquidity. The second column onward includes the day-before bill payment relative liquidity, \tilde{L} . The third column is only the subsample of consumers with a bill payment in the third tercile of highest bill payments values (mean \$936). The fourth column uses nondurables expenditures as the dependent variable. Columns 5 and 6 runs the analysis by those who did not and did have early bills. Columns 7 and 8 run the analysis over fixed and variable bill payments. The remaining columns report the results for manually paid and automatically paid bills. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Apparent Across Multiple Bills

Alternative Dependent Variables

Non-bill payers as control

Automatic Liquidity

Income Leads/Lags

Income Interaction

Across Paycycles

Conclusion

Findings suggest consumers adjust spending around bill payments

- Mainly those with less liquidity, suggesting a budgeting decision

Consumers face uncertainty to liquid accounts throughout cycles, creates precautionary demand for liquidity (Telyukova 2013)

- Bills have high costs to missing payment, creates a commitment and priority (Chetty and Szeidl 2007)
- I find this behavior not as strong for non-durable spending, suggests priority of payments as in (Browning and Crossley 2009)

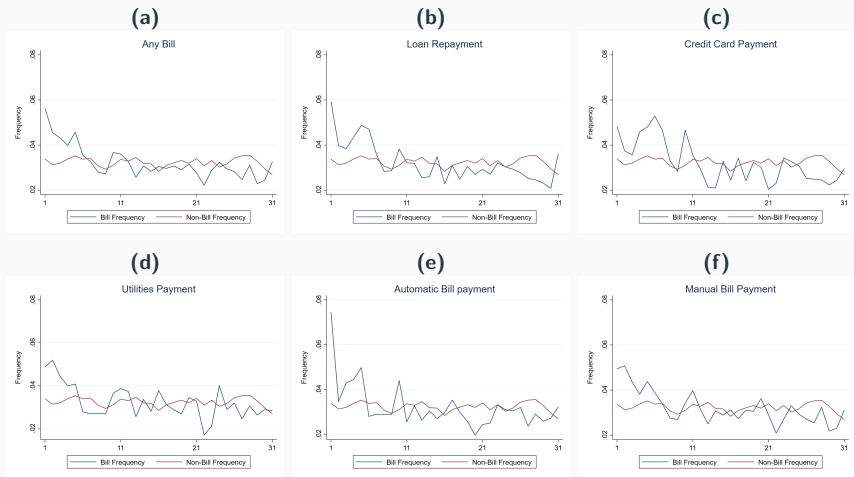
Implications:

- Align income and bill payments
- Shorter pay frequencies may help budgeting (Parsons and Van Wesep 2013)
- Low-cost policy improvement: align stimulus with bills (first of month)

Appendix

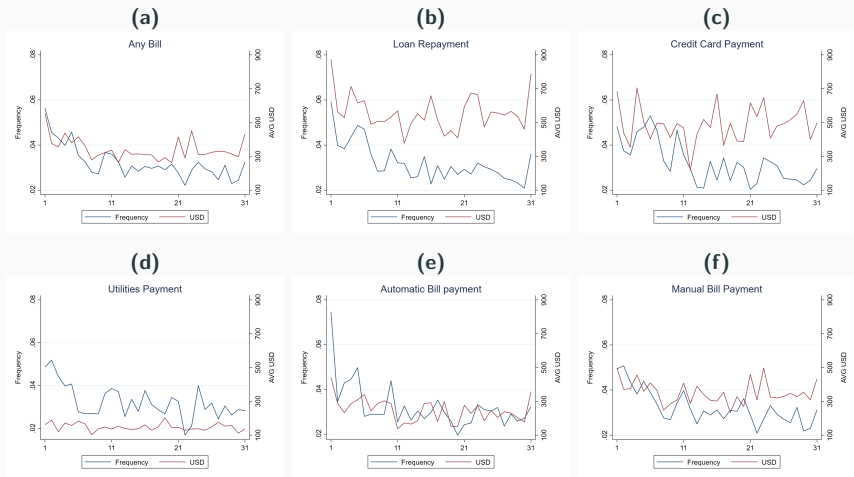
Bill Frequencies: By Number

Figure 6: Bill Frequencies Over October



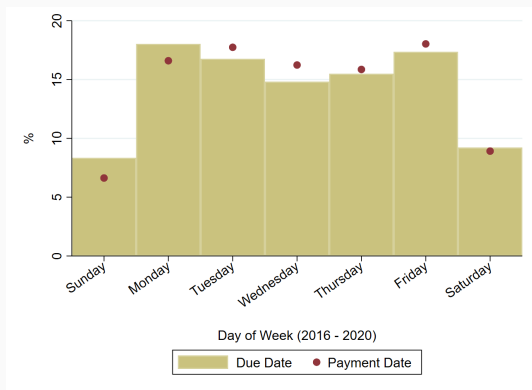
Bill Frequencies: By Value

Figure 7: Bill Frequencies Over October



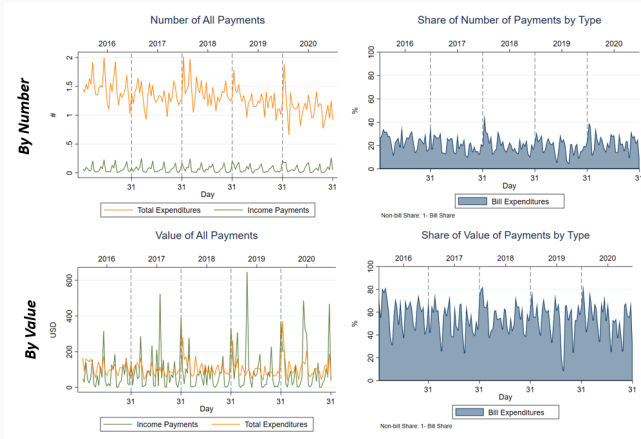
Payment & Due Date: Day of Week

Figure 8: Payment Date vs. Due Date: Day of Month



Aggregated Number and Value

Figure 9: Aggregate Number and Values of Bills



Results: Non-bill payer as control

Return

Table 3: Non-bill Payer as Control: With Liquidity and Bill Size (\tilde{X}_{idt})

	(1) Base	(2) With Relative Liquidity
Bill Day - 2	0.00 (0.07)	-0.23 (0.19)
Bill Day - 1	0.01 (0.05)	-0.17 (0.19)
Bill Day	0.15*** (0.04)	0.24** (0.10)
Bill Day + 1	0.06 (0.05)	0.29** (0.12)
Bill Day + 2	-0.01 (0.07)	0.25 (0.17)
Payday	0.27*** (0.06)	0.23*** (0.06)
Observations	36745	35564
R ²	.005	.005

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Results: Alternative Dependent Variable, x

Return

Dependent Variable: $\$$ **Table 4:** With Liquidity and Bill Size (Dependent Variable: x_{idt})

	(1) Base	(2) With Relative Liquidity	(3) Only Highest Value Bills
Bill Day	0.31** (0.13)	0.90*** (0.34)	1.30** (0.56)
Bill Day + 1	0.17 (0.17)	1.11*** (0.41)	0.83 (0.68)
Bill Day + 2	0.24 (0.24)	1.27*** (0.49)	1.52* (0.88)
Payday	0.41*** (0.16)	0.30* (0.16)	0.01 (0.26)
$\tilde{L}_{i,d=b-1,t}$		0.10 (0.28)	-0.07 (0.51)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$		-0.53* (0.30)	-0.99** (0.46)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$		-0.83** (0.35)	-0.73 (0.56)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$		-0.84** (0.38)	-1.24* (0.64)
Observations	15499	15089	5009
R^2	.006	.008	.004

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. First column uses does not include liquidity. Second column uses day before bill liquidity divided by average liquidity (equation 8). Third column is only the subsample of consumer with a bill payment in the third tercile of highest bill payment values (936 USD). Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Results: Alternative Dependent Variable, X

Return

Table 5: With Liquidity and Bill Size (Dependent Variable: X_{idt})

	(1) Base	(2) With Relative Liquidity	(3) Only Highest Value Bills
Bill Day	14.23*** (4.08)	12.10 (9.20)	29.61 (23.59)
Bill Day + 1	7.74 (5.22)	18.83* (10.24)	17.84 (24.10)
Bill Day + 2	11.10 (7.51)	18.50 (13.18)	20.38 (28.01)
Payday	21.78*** (6.53)	20.59*** (6.90)	16.02 (14.63)
$\bar{L}_{i,d=b-1,t}$		3.98 (6.87)	7.80 (17.25)
Bill Day $\times \bar{L}_{i,d=b-1,t}$		1.47 (8.01)	-1.96 (19.17)
Bill Day + 1 $\times \bar{L}_{i,d=b-1,t}$		-10.04 (7.96)	-13.34 (18.11)
Bill Day + 2 $\times \bar{L}_{i,d=b-1,t}$		-6.90 (9.73)	-11.94 (19.06)
Observations	15499	15089	5009
R^2	.006	.006	.011

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Spending by Bill Type

Return

Table 6: By Bill Type (\tilde{X}_{idt})

	All Bills	Purpose				Regularity
	(1)	(2)	(3)	(4)	(5)	(6)
	Any Bill	Utilities	Insurance	Loan	Other	Monthly Bills
Bill Day	0.41** (0.18)	0.49** (0.25)	0.46 (0.33)	0.91*** (0.33)	0.31 (0.23)	0.36* (0.19)
Bill Day + 1	0.49** (0.21)	0.88*** (0.29)	-0.05 (0.44)	0.48 (0.38)	0.46* (0.26)	0.55** (0.23)
Bill Day + 2	0.51** (0.25)	0.82** (0.36)	0.40 (0.59)	0.71 (0.47)	0.37 (0.32)	0.47* (0.28)
Bill Day $\times \bar{I}_{i,d=b-1,t}$	-0.23 (0.17)	-0.46** (0.22)	-0.16 (0.24)	-0.48 (0.30)	-0.08 (0.20)	-0.21 (0.18)
Bill Day + 1 $\times \bar{I}_{i,d=b-1,t}$	-0.40** (0.18)	-0.82*** (0.25)	0.07 (0.33)	-0.29 (0.32)	-0.47** (0.20)	-0.43** (0.20)
Bill Day + 2 $\times \bar{I}_{i,d=b-1,t}$	-0.41** (0.20)	-0.83*** (0.27)	-0.18 (0.40)	-0.41 (0.36)	-0.46* (0.24)	-0.39* (0.22)
Payday	0.25*** (0.08)	0.31*** (0.12)	0.30 (0.20)	0.08 (0.12)	0.21* (0.11)	0.27*** (0.08)
Observations	15089	6749	2031	5357	6991	11902

¹* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column reports a separate regression. Column (1) is for any type of bill, while column (2) - (3) are for identified consumption and investment bills. Columns (4) - (7) are for specific bill types, and column (8) are for monthly recurring bills. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

– *Apparent across multiple bills*

Non-Bill Payers as Control

Results: By Type (Non-Bill Payer as Control)

Return

Table 7: Non-bill Payer as Control: (\tilde{X}_{idt})

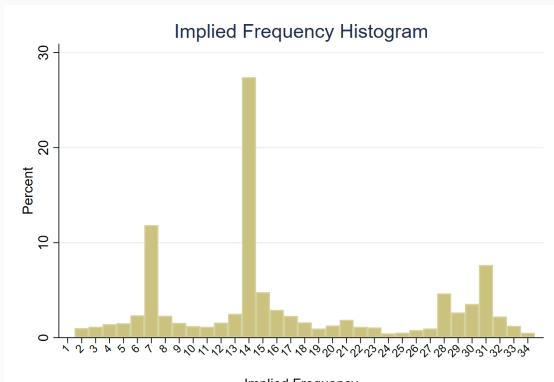
	All Bills		Purpose			Regularity
	(1) Any Bill	(2) Utilities	(3) Insurance	(4) Loan	(5) Other	(6) Monthly Bills
Bill Day - 2	-0.23 (0.19)	-0.47 (0.31)	0.21 (0.36)	0.11 (0.24)	-0.34 (0.22)	-0.25 (0.17)
Bill Day - 1	-0.17 (0.19)	-0.19 (0.24)	-0.28 (0.29)	-0.41 (0.28)	0.02 (0.24)	-0.16 (0.20)
Bill Day	0.24** (0.10)	0.16 (0.13)	0.23 (0.25)	0.33* (0.18)	0.26* (0.15)	0.12 (0.11)
Bill Day + 1	0.29** (0.12)	0.57*** (0.18)	-0.43 (0.27)	-0.07 (0.17)	0.40*** (0.14)	0.27* (0.14)
Bill Day + 2	0.25 (0.17)	0.42* (0.24)	-0.16 (0.30)	0.01 (0.25)	0.30 (0.21)	0.12 (0.18)
Bill Day - 2 $\times \bar{L}_{i,did=0,t}$	0.23 (0.18)	0.40 (0.30)	-0.07 (0.29)	-0.10 (0.21)	0.29 (0.22)	0.19 (0.16)
Bill Day - 1 $\times \bar{L}_{i,did=0,t}$	0.17 (0.17)	0.22 (0.21)	0.35 (0.25)	0.36 (0.26)	-0.04 (0.22)	0.16 (0.18)
Bill Day $\times \bar{L}_{i,did=0,t}$	-0.08 (0.08)	-0.13 (0.11)	-0.01 (0.19)	-0.12 (0.14)	-0.02 (0.13)	-0.02 (0.09)
Bill Day + 1 $\times \bar{L}_{i,did=0,t}$	-0.21** (0.10)	-0.42*** (0.15)	0.37 (0.24)	0.04 (0.15)	-0.35*** (0.10)	-0.19* (0.11)
Bill Day + 2 $\times \bar{L}_{i,did=0,t}$	-0.21 (0.13)	-0.36** (0.16)	0.15 (0.25)	-0.06 (0.20)	-0.28* (0.15)	-0.14 (0.14)
Payday	0.23*** (0.06)	0.24*** (0.06)	0.24*** (0.06)	0.23*** (0.06)	0.23*** (0.06)	0.24*** (0.06)
Observations	35564	35564	35564	35564	35564	35564
R^2	.005	.005	.005	.005	.006	.005

¹* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Table 6 reports the results for \tilde{X}_{idit} , nonbill expenditures. Each column reports a separate regression. Column (1) is for any type of bill, while column (2) - (3) are for identified consumption and investment bills. Columns (4) - (7) are for specific bill types, and column (8) are for monthly recurring bills. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Figure 10: $F = 7$



Implied Frequency = Days Next Income + Days Last Income



Reported Income Frequencies

Table 8: Across Pay Cycles (Dependent Variable: \tilde{X}_{idt})

	Reported Income Frequency		
	(1) Weekly	(2) Bi-Weekly	(3) Monthly
Bill Day	-0.12 (0.53)	0.28 (0.24)	0.57** (0.25)
Bill Day + 1	-0.21 (0.58)	0.35 (0.28)	0.80*** (0.31)
Bill Day + 2	-0.09 (0.86)	0.22 (0.33)	1.09*** (0.40)
$\tilde{L}_{i,d=b-1,t}$	-0.70 (0.47)	0.26 (0.21)	0.45** (0.19)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$	0.39 (0.42)	-0.22 (0.22)	-0.35 (0.23)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$	0.42 (0.43)	-0.39* (0.24)	-0.73*** (0.25)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$	0.15 (0.59)	-0.24 (0.26)	-0.95*** (0.32)
Payday	0.19 (0.15)	0.40*** (0.13)	0.13 (0.13)
Observations	1972	6092	5464
R^2	.032	.016	.01

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Reports the results across paycycles. Uses the minimum reported income frequencies for each consumer instead of implied income frequency. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Table 9: Financial Distress (Dependent Variable: \tilde{X}_{idt})

	No Distress: Across Pay Frequency				
	(1) Had Distress	(2) No Distress	(3) Within One Week	(4) Within 14 Days	(5) Within 31 Days
Bill Day	0.53 (0.42)	0.42** (0.19)	0.17 (0.38)	0.07 (0.29)	1.32*** (0.51)
Bill Day + 1	0.34 (0.49)	0.56** (0.22)	0.30 (0.48)	0.25 (0.37)	1.41*** (0.53)
Bill Day + 2	0.28 (0.64)	0.58** (0.27)	0.77 (0.68)	0.08 (0.43)	1.65*** (0.60)
$\tilde{L}_{i,d=b-1,t}$	0.20 (0.33)	0.21 (0.18)	-0.33 (0.31)	0.18 (0.24)	1.03** (0.49)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$	-0.50 (0.32)	-0.23 (0.18)	0.35 (0.31)	-0.05 (0.25)	-1.15** (0.51)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$	-0.37 (0.34)	-0.46** (0.20)	0.01 (0.36)	-0.27 (0.30)	-1.36*** (0.53)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$	-0.29 (0.42)	-0.49** (0.22)	-0.43 (0.46)	-0.18 (0.31)	-1.55*** (0.56)
Payday	0.49** (0.20)	0.22*** (0.08)	0.09 (0.13)	0.47*** (0.16)	0.26 (0.19)
Observations	1620	13468	2245	4328	4279
R ²	.011	.009	.038	.016	.01

¹⁺ $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

- **Negative Shocks** or Spending Throughout Paycycle?
 - **lost job, bankruptcy, foreclosure, c.c closed/frozen**
- **Negative Shocks**: Suggests time inconsistent preferences

Spending Through the Pay Cycle

Return

Table 10: Across Pay Cycles (\tilde{X}_{idt})

	Implied Income Frequency			
	(1) Within One Week	(2) Within 14 Days	(3) Within 31 Days	(4) Within 31 Days: End of Cycle
Bill Day	0.06 (0.41)	0.15 (0.26)	1.10** (0.46)	2.61** (1.02)
Bill Day + 1	0.02 (0.50)	0.34 (0.32)	1.18** (0.49)	3.42*** (1.07)
Bill Day + 2	0.31 (0.67)	0.31 (0.38)	1.34** (0.55)	3.50*** (1.15)
$\tilde{L}_{i,d=b-1,t}$	-0.59 (0.39)	0.30 (0.21)	0.67 (0.43)	1.78** (0.88)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$	0.35 (0.33)	-0.14 (0.22)	-0.94** (0.45)	-2.46** (0.96)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$	0.18 (0.37)	-0.38 (0.25)	-1.10** (0.46)	-2.86*** (0.96)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$	-0.08 (0.46)	-0.37 (0.27)	-1.22** (0.50)	-2.83*** (0.98)
Payday	0.17 (0.12)	0.55*** (0.15)	0.19 (0.18)	
Observations	2600	4823	4680	1750

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. First column is for the subsample with 7 or less days of paycycle. Second column is for the subsample between 7 and 14 days of paycycle. Third column is for the subsample between 15 and 31 days of paycycle. Column 4 looks at only those at the last half of their paycycle. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

- Larger spending patterns over lower pay frequencies (Baugh and Correia 2022)
 - Highest at end of longest pay cycle
 - Overspending throughout pay cycle or financial distress? Apparent for those without distress

Calculating Pay Cycle

Reported Income Frequencies

Liquidity Around Bill Payments

Return

Table 11: Liquidity Buildup of Before Bill

	(1)	(2)
	L_{idt}	\tilde{L}_{idt}
Day Before Bill Payment	85.03 (100.04)	0.04*** (0.01)
Automatic Bills	647.02*** (222.65)	-0.01 (0.02)
Payday	308.06** (130.37)	0.25*** (0.03)
Day Before Bill Payment \times Automatic Bills	38.38 (219.07)	0.02 (0.02)
Day Before Bill Payment \times Payday	-434.26* (223.05)	-0.14** (0.06)
Observations	14035	13909
R^2	.017	.039

¹ * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Column (1) examines the level of daily liquidity as the dependent variable, while column (2) looks at the relative liquidity. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

– Bills using automatic payments have higher level of liquidity

Table 12: With Days Until/Since Income Payment (\tilde{X}_{idt})

	(1) Only Income	(2) Income and Bills	(3) Income, Bills, Liquidity	(4) Highest Bills
Days Relative to Income				
-2	-0.06 (0.09)	-0.06 (0.09)	-0.02 (0.09)	0.08 (0.19)
-1	0.09 (0.10)	0.10 (0.10)	0.13 (0.10)	0.23 (0.18)
0	0.40*** (0.11)	0.37*** (0.11)	0.32*** (0.11)	0.34 (0.22)
1	0.13 (0.09)	0.11 (0.09)	0.08 (0.10)	-0.03 (0.19)
2	0.13 (0.10)	0.13 (0.10)	0.08 (0.10)	-0.02 (0.20)
Bill Day		0.15** (0.07)	0.32* (0.17)	0.71** (0.32)
Bill Day + 1		0.02 (0.09)	0.40* (0.21)	0.48 (0.36)
Bill Day + 2		-0.01 (0.12)	0.42* (0.25)	0.65 (0.46)
$\tilde{L}_{i,d=b-1,t}$			0.14 (0.15)	0.34 (0.29)
Bill Day $\times \tilde{L}_{i,d=b-1,t}$			-0.16 (0.15)	-0.38 (0.29)
Bill Day + 1 $\times \tilde{L}_{i,d=b-1,t}$			-0.34** (0.17)	-0.43 (0.32)
Bill Day + 2 $\times \tilde{L}_{i,d=b-1,t}$			-0.38* (0.20)	-0.55 (0.36)
Observations	13551	13551	13248	4498
R ²	.01	.011	.011	.017

^{*} $p < 0.10$, ^{**} $p < 0.05$, ^{***} $p < 0.01$. Table 12 Days Relative to Income report indicator variables for days around payday. Seven days before, after, and the payday (day 0) are included in the regression. For display purposes, certain days are excluded from the table. For a full list of coefficients, see appendix. Uses robust standard errors. Includes diary day, day-of-week, year, and respondent fixed effects.

Bill Day Spending on Income Leads/Lags: Regression

Return

I include an interaction with the day surrounding bill payments and indicators for days surrounding paydays:

$$\begin{aligned} \tilde{X}_{idt} = & \alpha + \sum_{s=0}^2 \beta_s I(\text{Bill}_{i,d+s,t}) + \sum_{s=0}^2 \gamma_s I(\text{Bill}_{i,d+s,t}) \times \tilde{L}_{i,d=b-1,t} + \tilde{L}_{i,d=b-1,t} \\ & + \sum_{p=0}^7 \psi_p I(\text{Payday}_{i,d\pm p,t}) + \sum_{s=0}^2 \sum_{p=0}^7 \Phi_{s,p} [I(\text{Bill}_{i,d+s,t}) \times I(\text{Payday}_{i,d\pm p,t})] \\ & + \eta_i + \lambda_{dd} + \lambda_{dow} + \lambda_t + \varepsilon_{idt} \end{aligned} \quad (1)$$

Where Φ measures the interaction of the day surrounding the bill payment s relative to day surrounding the income payment p .

Many interactions: run this equation for days after and before an income payment separately (hence $d \pm p$)

Report $\beta_0 \forall p$ in next slide

Bill Day Spending on Income Leads/Lags

Return

Row 1: $p \in (0, 1, \dots, 7)$

Row 2: $p \in (0, -1, \dots, -7)$

Column 1: Low liquidity agents

Column 2: High liquidity agents

Figure 11: Comparative Analysis of income days and bill day spending

