



University of Pennsylvania
ScholarlyCommons

Penn Wharton Public Policy Initiative


4-2014

Perverse Nudges: Minimum Payments and Debt Paydown in Consumer Credit Cards

Jialan Wang
University of Pennsylvania

Benjamin J. Keys
University of Pennsylvania, benkeys@wharton.upenn.edu

Follow this and additional works at: <http://repository.upenn.edu/pennwhartonppi>

 Part of the [Economic Policy Commons](#), [Macroeconomics Commons](#), and the [Public Policy Commons](#)

Recommended Citation

Wang, Jialan and Keys, Benjamin J., "Perverse Nudges: Minimum Payments and Debt Paydown in Consumer Credit Cards" (2014).
Penn Wharton Public Policy Initiative. Book 25.
<http://repository.upenn.edu/pennwhartonppi/25>

This paper is posted at ScholarlyCommons. <http://repository.upenn.edu/pennwhartonppi/25>
For more information, please contact repository@pobox.upenn.edu.

Perverse Nudges: Minimum Payments and Debt Paydown in Consumer Credit Cards

Summary

Credit card minimum payments can act as an “anchor” that causes consumers to pay less of their debt than they otherwise would, leading to higher balances and interest costs, lower credit card scores, increased bankruptcy risks, and in the aggregate, suboptimally high levels of debt in the macro-economy. Policy “nudges,” which aim to increase the monthly amount that individuals pay on their credit card debt, have had mixed results.

Keywords

Credit Card, debt, interest rate, score, behavioral economics

Disciplines

Economic Policy | Macroeconomics | Public Policy

License



This work is licensed under a [Creative Commons Attribution-Noncommercial 4.0 License](https://creativecommons.org/licenses/by-nc/4.0/)



ISSUE BRIEF

APRIL 2014

PUBLICPOLICY.WHARTON.UPENN.EDU

VOLUME 2, NUMBER 4

PERVERSE NUDGES: MINIMUM PAYMENTS AND DEBT PAYDOWN IN CONSUMER CREDIT CARDS

JIALAN WANG AND BENJAMIN J. KEYS

In their 2008 book *Nudge*, Richard Thaler and Cass Sunstein lay out a framework for “libertarian paternalism,” a policy approach that seeks to improve consumers’ decisions without restricting their freedom to choose.

Smart choice architectures have been shown to yield remarkable improvements in retirement savings, organ donation, and health and environmental decisions. But nudges don’t always work, and sometimes well-intended policies can have perverse effects. Our recent research uncovers evidence of perverse nudges in the context of consumer credit cards.¹

With about \$700 billion in total outstanding balances and 400 million open accounts, credit cards are the fourth largest source of household borrowing in the United States after mortgages, student loans, and auto loans.² In the aftermath of the financial crisis, the industry underwent the most expansive regulatory change in its history with the Credit Card Accountability

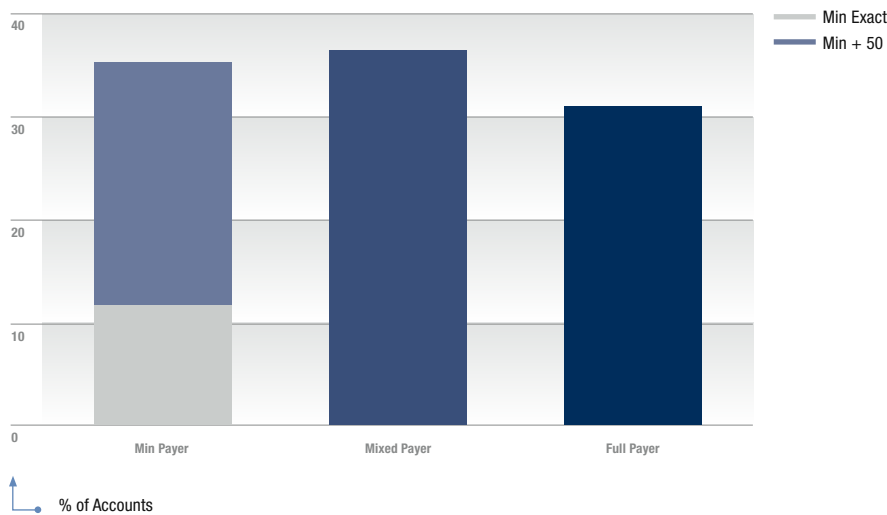
Responsibility and Disclosure Act of 2009 (“CARD Act”). And in 2011, the industry received a new regulator with the creation of the Consumer Financial Protection Bureau (CFPB) following the Dodd-Frank Wall Street Reform and Financial Protection Act of 2010. But despite the prevalence of credit card debt and recent regulatory attention, there is surprisingly little systematic evidence about how consumers choose to pay down their credit card debt and what factors promote versus hinder debt reduction.

Minimum payments are present on all monthly credit card statements, and represent the minimum amount a consumer must pay in order to stay current on her account and avoid late fees and other penalties. The median minimum payment is 3 percent of a

BRIEF IN BRIEF

- Credit card minimum payments can act as an “anchor” that causes consumers to pay less of their debt than they otherwise would, leading to higher balances and interest costs, lower credit card scores, increased bankruptcy risks, and in the aggregate, suboptimally high levels of debt in the macro-economy.
- Policy “nudges,” which aim to increase the monthly amount that individuals pay on their credit card debt, have had mixed results.
- While raising required minimum payment levels encouraged consumers with low credit card balances to pay a larger fraction of their debt, it also nudged some high-balance borrowers to pay less than they previously did.
- Similarly, new disclosure requirements, including late payment and minimum payment warnings, in some cases caused borrowers who had been paying their monthly balances in full, to pay less.
- While policy nudges can work, policymakers must take into account their potentially disparate impacts in order to achieve the results they are seeking.

FIGURE 1: COMPOSITION OF CREDIT CARD ACCOUNTS BY PAYER TYPE



consumer's total balance. Despite a median APR of 17 percent, one third of credit card accounts are regularly paid with just the minimum amount, and minimum payers carry typical balances of nearly \$3000. Over five years, a minimum payer with a typical balance and purchases would see her balance more than triple and pay over \$2300 in interest charges.³

Previous research suggests that consumer impatience may contribute to high levels of credit card borrowing,⁴ and that high levels of household leverage are associated with the more severe impacts of the Great Recession.⁵ Experimental research also suggests that minimum payments may act as an “anchor” that causes consumers to pay less of their debt than they otherwise would in the absence of the suggested payment amount. If anchoring is an important factor in practice, it could cause individual consumers to carry too much debt and pay too much in interest costs given their economic circumstances, leading to lower credit scores and increased bankruptcy risk.⁶ In the aggregate, anchoring could also cause the level of debt in the macro-economy to be suboptimally high.

Amid growing concern about America's national credit card bill, which peaked at

nearly \$900 billion in 2008, policy changes implemented by the CARD Act and by individual issuers have sought to increase consumer payments. But are they effective? What factors contribute to why so many consumers pay only the minimum payment, and what can be done to help consumers reduce their debt burdens? In this issue brief, we describe the details of our research on the patterns of consumer credit card payments and the impacts of policy changes on payment behavior.

THE BEHAVIORAL ECONOMICS OF ANCHORING

In their landmark study, Amos Tversky and Daniel Kahneman proposed that “anchoring” can cause an individual's decisions to be significantly influenced by irrelevant starting values.⁷ In their original experiment and subsequent studies, subjects latch onto an initial uninformative value (such as the last four digits of their phone number or social security number) as a decision-making heuristic. As a result, experimenters find that subjects' responses to general knowledge questions such as the percentage of African countries in the United Nations are significantly biased in the direction of that

initial, irrelevant starting value.

In the context of credit cards, the minimum payment may be a particularly potent anchor because failing to pay at least that amount may trigger a late fee and penalty interest rate. Thus, a borrower may perceive being in good standing with the lender—and on track for future financial well-being—as long as she pays at least that amount. Along with the full balance, the minimum payment is the most prominent payment option shown on monthly statements. The contrast between the full balance, which is typically thousands of dollars, and the minimum, which is often as low as \$15 or \$20, can make the minimum seem like an attractive option for cash-strapped consumers. All of these factors could make the minimum payment an especially salient and influential anchor for consumer choices.

HOW DO CONSUMERS REPAY CREDIT CARD DEBT?

Using a new dataset from the CFPB covering a large share of credit card accounts in the United States, we find evidence that minimum payments play a significant role in consumer debt payments.⁸ To understand consumer payment behavior, we classified accounts based on whether the account holders consistently paid in full or paid the minimum at least 50 percent of the time. As shown in Figure 1, consumers exhibit consistent patterns when paying down a given credit card account. About one third of account holders are “full payers,” and they pay their balances in full 90 percent of the time.⁹ For full payers, credit cards are used more as a convenience vehicle than a credit product.¹⁰ Another third are “minimum payers,” and pay close to the minimum 77 percent of the time. One third of these minimum payers pay exactly the minimum payment, and the remainder pays within \$50 of the minimum.¹¹ The final group of “mixed payers” variably pays a combination of minimum, full, and intermediate

¹ This brief draws heavily on a working paper by Benjamin J. Keys and Jialan Wang: “Perverse Nudges: Minimum Payments and Debt Paydown” (2014).

² Federal Reserve Bank of New York, “Quarterly Report on Household Debt and Credit,” February 2014.

³ Author's calculations based on the sample from Keys and Wang (2014).

⁴ David Laibson, Andrea Repetto, and Jeremy Tobacman, “A Debt Puzzle,” NBER Working Paper No. 7879 (2010).

⁵ Atif Mian and Amir Sufi, “Household Leverage and the Recession of 2007–09,” IMF Economic Review 58.1 (2010): 74–117.

⁶ Daniel Navarro-Martinez, et al, “Minimum Required Payment and Supplemental Information Disclosure Effects

on Consumer Debt Repayment Decisions,” Journal of Marketing Research 48.SPL (2011): S60–S77. Neil Stewart, “The Cost of Anchoring on Credit-Card Minimum Repayments,” Psychological Science 20.1 (2009): 39–41.

⁷ Amos Tversky and Daniel Kahneman, “Judgment Under Uncertainty: Heuristics and Biases,” Science 185.4157 (1974): 1124–1131.

⁸ Our data come from the CFPB credit card database (CCDB), which contains credit card accounts from large U.S. credit card issuers, covering a large fraction of total outstanding balances in the market between 2008 and 2012. The statistics presented in this brief are derived from a subsample of issuers. The CCDB is confidential supervisory information, and the statistics presented in

amounts, and constitutes 35 percent of credit card accounts.

Despite the mix of payment patterns, the vast majority of payments consist of either the full balance or an amount close to the minimum. As shown in Figure 2, all three groups display strongly bimodal payment patterns. Even mixed payers typically pay close to the minimum, which is generally less than 10 percent of the balance. Strikingly, fewer than 10 percent of all payments fall between 20 and 99 percent of the balance. Even high-income borrowers do not always pay off their credit card balances in full, choosing instead to revolve debt at substantial annual interest rates.¹²

Low repayments contribute to consumers carrying significant levels of debt compared to their income. The median ratio of total balance to monthly income is 64 percent for minimum payers and 42 percent for mixed payers.¹³ Since minimum payments and monthly interest charges are only a small fraction of the total balance, most households can afford the costs of debt servicing. But as the calculation above shows, paying only the minimum while continuing to finance purchases leads to growing debt balances that can become difficult to repay in the long run. The one percent of U.S. households that file for bankruptcy each year typically have tens of thousands in credit card debt accumulated through a combination of high purchases and low payments.

Standard economic models would suggest that borrowers who accumulate large debt balances would choose to gradually pay down their debt over time as a share of their income, rather than paying only the minimum for a period of time and then paying off the entire balance as a lump sum.¹⁴ The bimodal pattern is consistent with borrowers anchoring on the minimum payment when faced with a large credit card bill, so that consumers who would otherwise have paid an intermediate proportion, such as 30 percent or 50 percent of their

balance, instead choose lower amounts close to the minimum.¹⁵

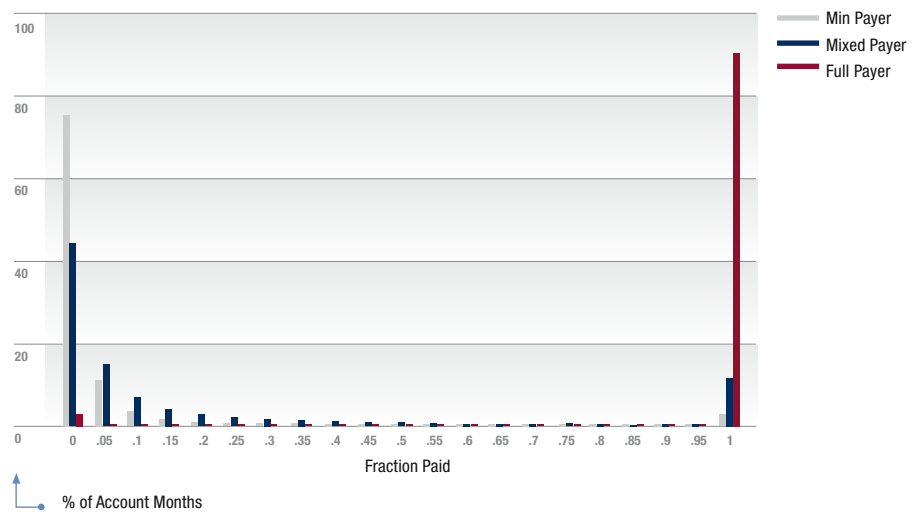
WHAT HAPPENS WHEN ISSUERS RAISE THE REQUIRED MINIMUM PAYMENT?

The first set of policies we examine is a series of changes in issuers' minimum payment formulas. In the time period we examine between 2008 and 2012, all of the changes in issuer formulas resulted

average effect. As shown in the remaining columns, this effect is mechanically driven by minimum payers who move to the new, higher minimum amounts to avoid late fees.

More surprisingly, we find that consumers with balances over \$3000 reduced the average fraction of the balance they paid by roughly 2 percent. For this latter group, the change in the minimum represented a negligible fraction of their balances, and they reacted in the opposite direction of the policy change. Furthermore, the response of these high-balance accounts is entirely

FIGURE 2: DISTRIBUTION OF PAYMENTS AS FRACTION OF BALANCE



in increases in the required minimums. For affected issuers, minimum payments increased by an average of \$18, or about 5 percent of the balance, for account months with positive balances.

We find that raising the required minimum payments had no net impact on overall consumer payments, resulting from a combination of two offsetting effects. The policy changes had very different impacts for borrowers with different balance amounts. As shown in Figure 3, raising the minimum payment increased the average fraction of the balance paid by 1 percent for accounts with less than \$1000 outstanding. The leftmost set of columns shows this

driven by borrowers shifting from paying off their cards in full to paying only the minimum.¹⁶ Our results suggest that the new, higher minimum payments anchored low-balance consumers at a slightly higher default payment amount, but in the process nudged some high-balance borrowers in the wrong direction toward lower payments.

DID THE CARD ACT HELP CONSUMERS PAY DOWN DEBT?

In addition to looking at changes in credit card issuers' minimum payment formulas, our research examines changes initiated

this brief are aggregated to maintain the confidentiality of the underlying data.

⁹ These consumers are often termed "transactors" in the credit card industry. Minimum payers and mixed payers are often jointly termed "revolvers" in industry parlance.

¹⁰ Consumers who routinely pay their balances in full often receive the benefits of convenience with no annual fee,

and often also receive rewards and other benefits. Thus, credit card issuers often make negative profits on full payers. See Sumit Agarwal, et al., "Regulating Consumer Financial Products: Evidence from Credit Cards," NBER Working Paper, No. 19484 (2013).

¹¹ Rounding behavior is very prevalent in credit card payments. Borrowers often pay in \$50, \$100, \$1000, and

other round increments, suggesting that they may use rounding heuristics as a budgeting mechanism or a way to increase their debt payments above the required minimum.

¹² Forty percent of payments made by borrowers reporting more than \$200,000 per year in income are less than 10 percent of the balance. Our measure of income is

individual annual income reported by the borrower at the time of their credit card application.

¹³ In our current analysis, we are only able to observe individual accounts, and cannot link multiple accounts issued to the same consumer. Since most consumers with at least one credit card have multiple accounts, debt levels at the individual level are likely to be at least double

by the CARD Act of 2009. The CARD Act included a broad range of provisions designed to make credit card pricing fairer and more transparent to consumers, including limitations on interest rate changes, fee restrictions for late payments and overlimit transactions, and changes in billing and payment allocation practices. One study shows that these provisions have saved U.S. consumers \$12.6 billion per year, and the 2013 CARD Act Report also estimates a decline in the total cost of credit charged to consumers.¹⁷

In addition to directly changing the way credit card fees are assessed, the CARD Act also mandated four distinct new disclosure requirements to help consumers better understand the impacts of their payment choices on the costs of borrowing. The CARD Act disclosures comprise the second set of policies we look at in our study of credit card payments.

The four disclosures took effect in February of 2010. A late payment warning was required on all statements, such as: **“Late Payment Warning:** If we do not receive your minimum payment by the date listed above, you may have to pay a \$35 late fee and your APRs may be increased up to the Penalty APR of 28.99 percent.” Most statements were also required to include a general minimum payment warning, stating: **“Minimum Payment Warning:** If you make more than the minimum payment each period, you will pay less in interest and pay off your balance sooner.” Instead of this standard minimum payment warning, consumers whose stated minimum payments did not amortize their balance received a more drastic warning: **“Minimum Payment Warning:** Even if you make no more charges using this card, if you make only the minimum payment each month we estimate you will never pay off the balance shown on this statement because your payment will be less than the interest charged each month.” Finally, the majority of statements also were required to include a comparison between

the payment duration and interest costs of paying only the minimum versus paying an amount that would amortize the loan amount, without additional purchases, in three years. An example of this disclosure is

that was already present in or could be calculated from credit card contracts, monthly statements, and pre-existing disclosures mandated by the Federal Truth in Lending Act (TILA). Thus, their impacts represent

FIGURE 3: THE EFFECT OF ISSUER INCREASES IN THE MINIMUM PAYMENT

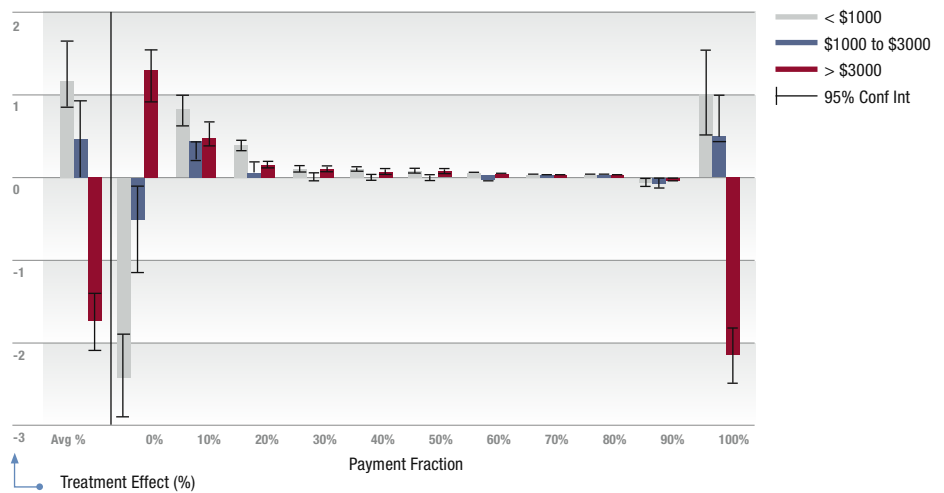


FIGURE 4: EXAMPLE OF THREE-YEAR CALCULATION DISCLOSURE MANDATED BY THE CARD ACT

If you make no additional charges using this card and each month you pay...	You will pay off the balance shown on this statement in about...	And you will end up paying an estimated total of...
Only the minimum	11 Years	\$4,745
\$103	3 Years	\$3,712
		(Savings = \$1,033)

Source: Federal Reserve Board: http://www.federalreserve.gov/consumerinfo/wyntk_creditcardrules.htm.

shown in Figure 4.

Since different combinations of disclosures were shown to different sets of consumers based on specific eligibility rules, we were able to disentangle their individual effects. In contrast to the minimum formula changes discussed above, the disclosures did not change the economic incentives around credit card payments. Instead, the new disclosures simply presented information

a distinct test of the potential anchoring effects of minimum payments and of consumer understanding.

We find that overall, the disclosures increased payments by \$19 per account-month, resulting from consumers changing their payment behavior in at least 2-4 percent of accounts per month. The results confirm that purely informational nudges have impacts on consumer choices.¹⁸ The

those that we report.

¹⁴ However, the bimodal pattern we observe could result from consumers paying down multiple cards at a time with different interest rates, and we will explore this possibility in future work. The bimodal pattern could also be rationalized if consumers pay the minimum because of 0% APR promotional offers. However, we find that the

same pattern remains even after excluding those with promotional offers.

¹⁵ We also find that the most significant correlate of payment behavior is a consumer's credit score, which a measure of past payment behavior. While economic fundamentals such as income and interest rate are not strongly correlated with payment behavior, the

importance of credit score and consistency of payment patterns for a given consumer over time provides further evidence that behavioral factors may drive payment choices.

¹⁶ The results described in this paragraph are based on regression analysis that controls for characteristics of cards, issuers, consumers, and account usage to isolate

the impacts of the minimum payment changes. See Keys and Wang (2014) for more details.

¹⁷ Agarwal, et al. (2014).

¹⁸ According to the CARD Act Study (2014), between 25-38 percent of consumers make credit card payment online. The majority of these consumers do not access their electronic statements before making payments, and

three different combinations of disclosures that consumers received had very different impacts. Accounts receiving the non-amortization warning and 3-year calculation saw payments increase by \$24 per month, and had a small but insignificant increase in the average fraction paid. In contrast, those receiving the minimum payment warning and 3-year payment calculation increased payments by only \$4 per month.

In the absence of a strongly-worded warning against non-amortizing payments, the 3-year payment calculation amount appeared to cause borrowers who were paying in full to pay less, possibly as a result of a new anchoring effect. In addition, the 3-year calculation slightly raised the payments of those who were previously paying low amounts and moved them towards the higher anchor. Because the perverse nudge effect dominates, accounts receiving the 3-year calculation and standard minimum payment warning saw a 0.6 percent overall reduction in the fraction of balances paid and a 1.4 percent decline in the account-months paid in full.

POLICY IMPLICATIONS

Our work is part of a growing body of research documenting the mixed consequences of nudges in a diverse set of policy domains. In a well-known example, late pickups by parents actually increased at an Israeli preschool after fines were imposed.¹⁹ Automatic enrollment in 401(k) plans is one of the most successful examples of nudges at work. Nonetheless, while automatic enrollment helps most consumers save more, it may decrease savings among some consumers who would have enrolled on their own.²⁰ Research has also found that “break-even”

framing may lead to early claiming of Social Security benefits,²¹ that peer-based nudges decrease energy consumption among liberal households, but increase consumption among conservatives,²² and that calorie information may cause dieters to eat more.²³

Similarly, we find that introducing higher suggested payment amounts leads to two countervailing effects on consumer credit card payments. Issuers that raised the required minimum payment saw small increases in payment amounts among

“Amid growing concern about America’s national credit card bill, which peaked at nearly \$900 billion in 2008, policy changes have sought to increase consumer payments. But are they effective?”

low-balance accounts paying the minimum. But the changes also nudged high-balance consumers in the wrong direction, decreasing the fraction of accounts paid in full. A disclosure mandated by the CARD Act resulted in similar offsetting effects for different groups of accounts. Although the CARD Act had positive overall impacts on consumers, the payment amount suggested on the three-year payment amount disclosure may have been too low to effectively increase consumer payments.

Our results suggest that in order to be effective, future credit card nudges should encourage payment amounts high enough such that any offsetting effects lead to greater payments overall. Our current

research shows that suggested payment amounts should be greater than the \$20 average minimum payment increases and the 3-year suggested payment amounts in the policies we studied. Furthermore, since increasing *required* minimums forces some consumers to become delinquent and suffer late fees and potential default, making the suggested payment amount an option rather than a requirement can help preserve flexibility while encouraging repayment. In future work, we hope to evaluate the impact of higher repayment options through randomized control trials. While our current work only explores the impacts of low suggested payment amounts that we find to be ineffective, the results of these future trials could yield evidence of successful payment disclosures.

Our results also offer broader lessons for policymakers. One lesson is that purely informational nudges do work, consistent with prior research. Of equal importance, our results emphasize that changes in choice architecture affect not only the intended recipients of a nudge, but everyone who is subject to the change. A beneficial choice for one consumer may be detrimental for another, depending on what their choices would have been in the absence of the nudge. These disparate impacts should be taken into account when weighing the overall welfare implications of any policy change.

The views expressed are those of the authors and do not necessarily reflect the opinions of the Consumer Financial Protection Bureau, its director, or its staff.

therefore do not see the disclosures. Thus, our results under-estimate the impact of disclosures if all consumers saw the disclosures before choosing their payments.

¹⁹ Uri Gneezy and Aldo Rustichini, “A Fine Is a Price,” *Journal of Legal Studies* 29 (2000): 1.

²⁰ Brigitte C. Madrian, and Dennis F. Shea, “The Power of Suggestion: Inertia in 401 (k) Participation and Savings

Behavior.” *Quarterly Journal of Economics* 116.4 (2001): 1149-1187.

²¹ Jeffrey R. Brown, Arie Kapteyn, and Olivia S. Mitchell, “Framing Effects and Expected Social Security Claiming Behavior,” NBER Working Paper No. 17018 (2011).

²² Dora L. Costa and Matthew E. Kahn, “Energy Conservation “Nudges” and Environmentalist Ideology: Evidence

from a Randomized Residential Electricity Field Experiment,” *Journal of the European Economic Association* 11.3 (2013): 680-702.

²³ Julie S. Downs, George Loewenstein, and Jessica Wisdom, “Strategies for Promoting Healthier Food Choices,” *American Economic Review* (2009): 159-164.

ABOUT THE AUTHORS

Jialan Wang, PhD

Visiting Assistant Professor of Business Economics and Public Policy, The Wharton School

Jialan Wang is an economist in the Office of Research at the Consumer Financial Protection Bureau (CFPB), a Visiting Assistant Professor at the Wharton School, and a Visiting Faculty Affiliate of the Penn Wharton Public Policy Initiative. She holds a BS in Mathematics from Caltech and a PhD in Financial Economics from MIT. Prior to joining the CFPB, she was an Assistant Professor of Finance at the Olin School of Business at Washington University in St Louis. Her research focuses on small dollar credit products, credit cards, and consumer bankruptcy. Her research has been published in the *Quarterly Journal of Economics*, *Review of Economics and Statistics*, and *Journal of Economic Perspectives*.

Benjamin J. Keys, PhD

Assistant Professor, Harris School of Public Policy Studies at the University of Chicago

Ben Keys is an Assistant Professor at the Harris School of Public Policy Studies at the University of Chicago. His research focuses on issues related to consumer finance, labor economics, and urban economics, with an emphasis on the mortgage and credit card markets. Prior to joining the faculty of the Harris School, Keys was a staff economist at the Board of Governors of the Federal Reserve System. Keys holds a PhD in Economics from the University of Michigan and a BA in Economics and Political Science from Swarthmore College. His work has been published in journals such as the *Quarterly Journal of Economics*, *Review of Financial Studies*, and *Review of Economics and Statistics*.

ABOUT THE PENN WHARTON PUBLIC POLICY INITIATIVE


The Penn Wharton Public Policy Initiative (PPI) is a hub for research and education, engaging faculty and students across University of Pennsylvania and reaching government decision-makers through independent, practical, timely, and nonpartisan policy briefs. With offices both at Penn and in Washington, DC, the initiative provides comprehensive research, coverage, and analysis, anticipating key policy issues on the horizon. Penn

Wharton PPI is led by Faculty Director Mark Duggan, the Rowan Family Foundation Professor and Chair of Business Economics and Public Policy, and Professor of Health Care Management at Wharton.

ABOUT PENN WHARTON PPI ISSUE BRIEFS

Penn Wharton PPI publishes issue briefs at least once a month, tackling issues that are varied but share one common thread: they are central to the economic health of the nation and the American people. These Issue Briefs are nonpartisan, knowledge-driven documents written by Wharton and Penn faculty in their specific areas of expertise.

For additional copies, please visit the Penn Wharton PPI website at publicpolicy.wharton.upenn.edu.

 Follow us on Twitter:
[@PennWhartonPPI](https://twitter.com/PennWhartonPPI)



Penn Wharton Public Policy Initiative
The Wharton School
University of Pennsylvania

Founded in 1881 as the first collegiate business school, the Wharton School of the University of Pennsylvania is recognized globally for intellectual leadership and ongoing innovation across every major discipline of business education. With a broad global community and one of the most published business school faculties, Wharton creates economic and social value around the world.

////////////////////////////////////
KNOWLEDGE FOR POLICY IMPACT
////////////////////////////////////