

HEC MONTRÉAL
École affiliée à l'Université de Montréal

Essays on Household Finance and Expectations

par
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Cette thèse intitulée :

Essays on Household Finance and Expectations

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Résumé

Cette thèse de doctorat s'organise en trois chapitres indépendants portant sur le thème des finances et des anticipations des ménages. Chaque essai présente des données empiriques inédites en combinant des microdonnées à des méthodes d'identification rigoureuses. Les essais un et deux exploitent les données d'une enquête menée auprès des ménages américains par la Réserve fédérale de New York (Survey of Consumer Finances). Le troisième essai fusionne les données du registre du crédit de la Banque centrale du Brésil et les données administratives relatives aux employeurs et aux employés.

Le premier chapitre, *Discouraged Borrowers in U.S. Consumer Credit Markets*, examine la décision des ménages de ne pas solliciter de crédit par crainte d'un refus. Les résultats montrent qu'une grande partie des emprunteurs découragés auraient obtenu une carte de crédit s'ils en avaient fait la demande. L'explication principale réside dans le fait que ces emprunteurs sont confrontés à des difficultés d'accès à l'information plus importantes et, par conséquent, utilisent des informations obsolètes concernant leur solvabilité lorsqu'ils décident de solliciter ou non un crédit.

Le deuxième chapitre, *Political pressure on the Fed and inflation expectations de-anchoring* examine si les anticipations d'inflation des ménages se sont désancrées suite aux tweets du président Trump critiquant la Réserve fédérale et réclamant une baisse des taux d'intérêt. Les résultats montrent que, malgré l'indépendance juridique de la Réserve fédérale, les ménages qui ont probablement suivi ces tweets sont devenus plus incertains quant à leurs prévisions d'inflation.

Le troisième chapitre, *Labor market shocks and consumer finance - evidence from*

Brazil, analyse la dynamique des revenus du travail, de la consommation et de l'endettement suite à une perte d'emploi.¹ Il constate que les travailleurs confrontés à une baisse de revenus transitoire maintiennent leur consommation, car ils empruntent en prévision de la perte d'emploi et se retrouvent souvent en défaut de paiement. À l'inverse, les travailleurs touchés par une baisse de revenus durable s'endettent davantage et font défaut après avoir perdu leur emploi.

Mots-clés

Marchés du crédit, découragement, frictions informationnelles, Réserve fédérale, pression politique, prévisions du taux d'inflation, tweets, déplacement d'emploi, emprunt, défaut

Méthodes de recherche

Données d'enquête, différences dans les différences, validation croisée, ROC, haute fréquence

¹Les données confidentielles ont été traitées exclusivement par le personnel de BCB.

Abstract

This doctoral thesis consists of three independent essays related to the topic of household finance and expectations. Each essay documents novel empirical facts by combining micro-data with clean identification strategies. Essays one and two utilize U.S. household survey data from the NY Fed’s Survey of Consumer Finances. The third essay merges credit registry data from the Central Bank of Brazil and administrative employer-employee data.

The first essay, *Discouraged Borrowers in U.S. Consumer Credit Markets*, investigates households’ decision not to apply for credit as they anticipate a rejection. The results show that a large fraction of discouraged borrowers would have been approved for a credit card had they applied. The key explanation is that discouraged borrowers face larger information frictions and, as a result, use outdated information about their creditworthiness when deciding whether to apply for credit.

The second essay, *Political pressure on the Fed and inflation expectations de-anchoring*, studies whether households’ inflation expectations de-anchored in response to President Trump’s tweets criticizing the Fed and demanding lower interest rates. The results show that, despite Fed’s legal independence, households who were likely attentive to the tweets became more uncertain about their inflation forecast.

The third essay, *Labor market shocks and consumer finance – evidence from Brazil*, coauthored with Gabriel Garber (Central Bank of Brazil) studies the dynamics of labor income, consumption, and borrowing over a 36-month period around job loss.² It finds

²Confidential data were handled exclusively by BCB staff.

that workers who experience a transitory income decline maintain their consumption, as they borrow in anticipation of the upcoming job loss while also defaulting on their debt. In contrast, workers who are hit by a permanent income decline delever and default following job loss.

Keywords

Credit markets, discouragement, information frictions, Federal Reserve, political pressure, inflation expectations, tweets, job loss, borrowing, default

Research Methods

Survey data, difference-in-differences, cross-validation, ROC, high-frequency identification

Contents

Résumé	iii
Abstract	v
List of Tables	xi
List of Figures	xiii
Acknowledgements	xvii
General Introduction	1
1 Discouraged Borrowers in U.S. Consumer Credit Markets	3
Abstract	3
1.1 Introduction	4
1.2 Related literature	9
1.3 Conceptual framework	11
1.4 Data	13
1.4.1 Analysis sample	14
1.4.2 Identifying discouraged borrowers	14
1.5 The Determinants of discouragement	16
1.5.1 Heterogeneity	18
1.6 Would discouraged borrowers be approved for credit?	21
1.6.1 Discouraged borrowers and counterfactual outcomes	21

1.6.2	Back-of-the-envelope calculation	24
1.6.3	Inspecting the mechanism: information frictions	25
1.7	Credit reporting policy and information frictions	32
1.7.1	The policy change	32
1.7.2	Empirical strategy	33
1.7.3	The impact of the policy on information demand	35
1.7.4	COVID-19 as a threat to identification	36
1.8	Conclusion	39
	References	41
2	Political pressure on the Fed and inflation expectations de-anchoring	47
	Abstract	47
2.1	Introduction	47
2.2	Related literature	50
2.3	Institutional background and data	53
2.3.1	Federal Reserve System	53
2.3.2	Presidential tweets	54
2.3.3	Survey of consumer expectations	55
2.4	Empirical investigation	57
2.4.1	The average effect of tweets on inflation beliefs	57
2.4.2	The heterogeneous effect of tweets on inflation beliefs: the role of information frictions	60
2.4.3	Robustness	64
2.4.4	Additional results	66
2.5	Pressure escalates during Trump second term	69
2.6	Conclusion	70
	References	72
3	Labor market shocks and consumer finance – evidence from Brazil	75
	Abstract	75

3.1	Introduction	75
3.2	Related literature	78
3.3	Theoretical considerations	80
3.4	Institutional background and data	81
3.4.1	Consumer Credit Markets	81
3.4.2	Labor Markets	82
3.4.3	Data	84
3.5	Empirical framework	85
3.5.1	Matched samples	86
3.6	Effects of job displacement	88
3.6.1	Main results	88
3.6.2	Additional Results	92
3.7	Conclusion	95
	References	96
	General Conclusion	101
	Appendix A – Chapter 1	i
	Variables definitions	i
	Summary statistics	iii
	Determinants of credit approval and model validation	iv
	Soft and hard credit inquiries	v
	Compositional changes before and after February 2020	vi
	Appendix B – Chapter 2	vii
	Tweets	vii
	Robustness	xiii
	Appendix C – Chapter 3	xv
	Additional results	xv

List of Tables

1.1	Selected Sample characteristics	15
1.2	Determinants of household discouragement	19
1.3	Discouragement: heterogeneity by sophistication	20
1.4	Correlates of information acquisition	27
1.5	Explaining information frictions	30
1.6	Effect of credit bureaus' policy on information demand	37
2.1	Effect of tweets on inflation uncertainty	59
2.2	Effect of tweets on the sensitivity of long-run inflation expectations	61
2.3	Effect of tweets on inflation uncertainty : heterogeneity by financial decision-making	62
2.4	Effect of tweets on the sensitivity of long-run inflation expectations: heterogeneity by financial decision-making	63
2.5	Effect of tweets on expectations of informed households using a 3-day window	65
2.6	Effect of tweets on informed households controlling for education and numeracy using a 5-day window	66
2.7	Effect of tweets on the probability of higher interest rates	68
2.8	Effect of tweets on expectations of uninformed households using a 7-day window	69
3.1	Statistics of 25% Matched Sample	88
A1	Description of Variables in the SCE	i

A2	Summary characteristics of discouraged and non-discouraged	iii
A3	The determinants of credit approval	iv
A4	Probability of being unsophisticated	vi
B1	Description of Tweets	vii
B2	Balance tests - mean differences in characteristics	xiv

List of Figures

1.1	Discouragement and rejection rates in the U.S. obtained from the Survey of Consumer Finances (SCF), New York Fed’s Survey of Consumer Expectations (SCE), and Survey of Household Economics and Decision-making (SHED).	4
1.2	Discouragement and rejection rates in the 12 months prior to each survey wave. Student loans are not included.	16
1.3	Effect of credit bureaus’ policy on information demand	36
2.1	Federal funds rate (midpoint) and number of tweets over time	55
2.2	Dynamics effect of tweets on inflation uncertainty of informed households . .	67
3.1	Wages and credit card spending around job displacement	89
3.2	Total loan balances and delinquency around job displacement	91
3.3	Unsecured and secured debt around job displacement	94
A1	ROC Curve	v
A2	Soft credit inquiry, TransUnion	v
A3	Soft credit inquiry, Equifax	vi
C1	Credit limits around job displacement	xv
C2	Likelihood of having a payroll loan around job displacement	xvi

To my beloved mother, Rosemary.

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General Introduction

This doctoral project consists of three essays on household finance and expectations. They leverage household survey data and administrative datasets which, combined with clean identification strategies, allow to investigate the questions of interest. Each essay was written with the purpose of being published as a separate article in an academic journal.

The first essay studies discouragement in consumer credit markets, defined as households not applying for credit as they anticipate a rejection. Using household survey data from the NY Fed's Survey of Consumer Expectations, I show that information frictions are a plausible explanation for household discouragement. In particular, I find that discouraged borrowers use outdated information about their creditworthiness when deciding whether to apply for credit, as they are financially unsophisticated and hence more likely to face larger costs of information acquisition and processing. Additionally, I show that a large fraction of discouraged borrowers would most likely be approved for a credit card, suggesting a novel explanation for credit rationing. Consistent with information frictions driving discouragement, I find a significant decline in the degree of information rigidity due to a new credit reporting policy that facilitated information acquisition by non-sophisticated households.

The second essay examines whether political pressure on the U.S. Federal Reserve (Fed) de-anchor inflation expectations by undermining the perceived credibility of a central bank with legal independence. I use tweets from President Trump during his first mandate that advocate for lower interest rates as episodes of political pressure on the Fed. Using a high-frequency approach compares households' expectations in the days

surrounding a tweet, I find that Inflation expectations of attentive/informed households de-anchor in response to tweets. Specifically, I show that uncertainty about future inflation increases, while long-term inflation expectations become more sensitive to their short-term counterpart. Moreover, the effect on inflation uncertainty is relatively persistent (i.e., about 3 months).

The third essay – coauthored with Gabriel Garber – investigates we investigate the dynamics of household labor income, consumption, and borrowing over a 36-month period around job loss using newly linked administrative employment and credit registry data from Brazil. We implement a difference-in-differences strategy that compares changes in labor income, consumption, and credit variables for displaced workers to changes in the same outcomes for a control group of employed workers before and after layoff. We show that job displacement has a striking heterogeneous effect on labor income, echoing the evidence from the extant literature. Mirroring the persistent wage loss, we then show that consumption of workers dismissed from large firms remains persistently lower. On the other hand, the consumption of workers whose wages essentially recover does not decrease at the month of layoff and is it lower than the no-displacement counterfactual only shortly during the unemployment spell. Third, we show that workers dismissed from large firms delever and default in the months following job loss, as one would expect given the permanent hit to their income. Workers displaced by small firms, on the other hand, increase their loan balances in the months prior to unemployment, when they may gradually become aware of the upcoming job loss. This increase is driven by credit card debt and it is not accompanied by higher credit card spending, consistent with a precautionary borrowing motive: individuals who expect tighter credit constraints due to unemployment borrow for a rainy day while credit is still available.

Chapter 1

Discouraged Borrowers in U.S. Consumer Credit Markets

Abstract

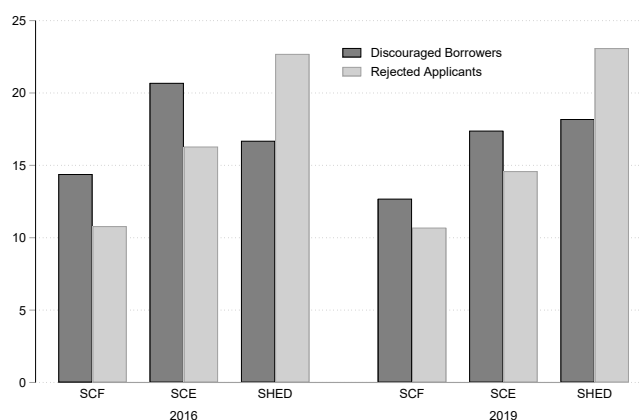
This paper uses survey data from the U.S. to study discouragement in consumer credit markets, defined as households abstaining from applying for credit because they expect a rejection. Discouragement is mainly explained by creditworthiness as perceived by households. Low-credit-score individuals are significantly more likely to expect a credit denial. However, my estimates indicate that about 44 percent of discouraged borrowers would have been approved for a credit card had they applied. A back-of-the-envelope calculation that builds on this counterfactual estimate shows that discouragement leads to a shortage in aggregate credit demand of about 2.7 percent of total U.S. credit card debt. This outcome is explained by the fact that discouraged borrowers, who lack financial sophistication and face larger information frictions, use outdated information about their credit risk when forming beliefs about their prospects in the credit markets. Using a difference-in-differences design, I find a significant decline in the degree of information rigidity due to a new credit reporting policy that facilitated information acquisition by non-sophisticated households.

1.1 Introduction

Differences in access to credit markets are often highlighted as a primary driver of the heterogeneous consumption behavior across households (e.g., J. X. Sullivan 2008; Baker and Yannelis 2017; Braxton, K. Herkenhoff, and M. Phillips 2024). The sources of the unequal access to credit have been heavily studied and debated, with proposed explanations ranging from credit rationing due to information asymmetries (e.g., Stiglitz and Weiss 1981; Agarwal et al. 2018) or imperfect competition (Parlour and Rajan 2001) to discrimination against minorities (e.g., Berkovec et al. 1998; Bhutta and Hizmo 2021).

Research, however, has largely overlooked that many consumers self-select out of the loan application process despite their demand for credit. These potential borrowers decide not to apply for a loan because they expect a rejection and hence are defined as discouraged. Discouraged borrowers account for an important share of actual credit-constrained households in the U.S. (Figure 1.1). For example, 13 to 18 percent of U.S. households were discouraged in 2019, while 11 to 23 percent were rejected in the same year. Which factors drive households into discouragement? Would discouraged borrowers have been approved for credit had they applied? If yes, what does explain their failure to obtain otherwise available credit?

Figure 1.1: Discouragement and rejection rates in the U.S. obtained from the Survey of Consumer Finances (SCF), New York Fed’s Survey of Consumer Expectations (SCE), and Survey of Household Economics and Decision-making (SHED).



These questions are relevant for various reasons. Households' misbeliefs about their borrowing ability might distort their consumption and savings decisions. For example, if households are overly-pessimistic about their credit access, they may over-accumulate precautionary assets and consume less on average.¹ Unjustified discouragement can also have self-fulfilling effects on consumers' ability to access credit in the future, as a borrower's short credit history makes it harder for banks to verify their type. Furthermore, consumers' over-pessimism about their prospects in credit markets is likely to play an important role in the transmission of monetary policy, as these consumers may believe that changes in monetary policy do not extrapolate to their credit terms.

To investigate these issues, I use the New York Fed's Survey of Consumer Expectations (SCE), a nationally representative survey of about 1,300 U.S. household heads. The SCE elicits respondents' reasons for not applying for credit, the most common being – among potential borrowers – the expectation of credit denial. The SCE also collects a rich array of demographic and financial information about the respondents, such as their perceived credit scores and when they last checked/learned about their credit scores or requested a copy of their credit reports. My sample consists of roughly 12,000 household heads and spans from 2014 to 2021, which allows me to investigate the incidence of discouragement over several years, including during the economic crisis in the early stage of the COVID-19 pandemic.

The paper starts out by studying the determinants of discouragement in the cross-section. The results show that households' perceived creditworthiness – measured by the guess about their credit scores – is the primary driver of discouragement. Individuals who believe they have low credit scores are, all else equal, about 27% more likely to expect a credit rejection and opt out of the loan application process. After controlling for perceived credit scores, other determinants of discouragement are less precisely estimated and, more importantly, smaller in magnitude. For instance, I no longer find differences in discouragement by gender or race once I include perceived credit scores. My results

¹Fulford (2015) shows that households became more precautionary after the financial crisis of 2008, partly because credit conditions became significantly tighter afterwards.

also indicate that households with higher debt-to-income ratios are more likely to expect a credit denial and abstain from applying. Exploiting cross-sectional and within-household variation, I find that both sophisticated and non-sophisticated consumers – defined as those with higher numeracy skills and with at least a college degree – believe that their prospects in credit markets improve on their credit scores. This result suggests that credit scores are, perhaps because of their salience, a piece of information whose effects on credit access are relatively easy to grasp.

Next, I ask whether discouraged borrowers would have been approved for a credit card had they applied. I find that this is the case for 44% of discouraged borrowers. I focus on credit cards because of its importance for consumption smoothing (e.g., J. X. Sullivan 2008; K. F. Herkenhoff 2019). I also restrict my sample to between February 2014 and February 2020, that is, prior to the COVID-19 outbreak and the adoption of a new policy that facilitated the acquisition of information by households. I then estimate a model of credit access using the sample of applying households. The model includes various demographic characteristics and strong predictors of binding borrowing constraints such as debt-to-income ratio and loan delinquency. After the out-of-sample validation of the model, I use its estimated parameters to obtain discouraged borrowers’ predicted approval likelihood. I classify discouraged borrowers as unconstrained when their predicted probability of approval is above that of the “marginally” approved consumer. Since the unconditional probability of rejection in my sample is 20%, the marginally approved consumer is at the 20th percentile of the predicted probability of approval distribution.

This finding has two important implications. First, it indicates that differences in access to unsecured revolving credit across households – e.g., for consumption smoothing purposes – are partly due to a misjudgment that some households have about their borrowing ability rather than actual constraints from lenders. Second, it suggests a novel mechanism through which the pass-through of credit expansion policies to household borrowing and aggregate demand might be incomplete – in addition to, for example, the rigidity of mortgage contracts (e.g., Di Maggio et al. 2017) and employment documentation requirements to mortgage refinancing (e.g., DeFusco and Mondragon 2020). A

simple back-of-the-envelope calculation that builds on the counterfactual estimate that 44% of discouraged borrowers are unconstrained suggests that discouragement leads to a shortage in aggregate credit demand of about 2.7% of total U.S. credit card debt.

I investigate the potential reasons behind discouraged borrowers' failure to obtain otherwise available credit. In my sample, a significant portion of households have outdated information about their creditworthiness. Specifically, 17% of respondents checked their credit scores or requested a copy of their credit reports more than two years before the survey interview or never. This means that discouraged borrowers, who thought about applying for credit in the previous twelve months, used information outdated by at least a year when forming beliefs about their prospects in the credit markets. Discouraged borrowers' outdated information about their "type" is thus a candidate to explain their financial mistake.

To formally test this explanation, I study the correlates of information acquisition in a regression framework. My first set of results show that discouraged borrowers are, on average and all else being equal, significantly more likely to have outdated information about their credit scores or reports than applicants. I then show that even unconstrained discouraged borrowers, who would benefit from accessing new information, tend to have older/inaccurate information about their credit scores compared to similar approved applicants. The differences are economically large. According to my estimates, discouraged borrowers are about 6 percentage points more likely to have checked their scores/reports more than two years before the survey interview or never. This finding supports my hypothesis that unconstrained discouraged borrowers fail to obtain credit because they use outdated information about their credit risk.

Next, I investigate the potential reasons for the infrequent updating of information by potential borrowers – discouraged or not. I start by arguing that *real* monetary costs associated with acquiring a credit report and an "unchanged financial conditions" story are unlikely to rationalize potential borrowers' infrequent updating. These considerations, combined with the result that unsophisticated households' information sets are more likely to be outdated than those of their sophisticated peers, hint at a role for information

frictions in explaining discouraged borrowers' outdated information. Indeed, models of endogenous information acquisition (e.g., rational inattention) predict that an economic agent's demand for a piece of information decreases in the *perceived* cognitive costs of obtaining and processing that information. Consistent with this view, my results show that even creditworthy discouraged borrowers are less sophisticated than similar approved applicants.

Because discouraged borrowers do not expect to be approved for credit, their beliefs, not information frictions, could explain their outdated information. Indeed, their net benefit of acquiring a credit score/report is less likely to be positive, even if they do not face information frictions. However, the quantitative expectations of approval reported by a subset of discouraged borrowers show that many of them are not fully convinced that they would be rejected for credit. This indicates that information frictions likely play a role in explaining their outdated information. I propose the following scenario for a negative net benefit associated with information acquisition. Because of their low levels of sophistication, discouraged borrowers are more likely to mistakenly believe that checking their credit scores or requesting a copy of their credit reports reduces their current and future ability to borrow. Since they self-evaluate as low-credit-score individuals, this misperceived non-monetary cost can bind. As a result, discouraged borrowers are slower in updating their information sets and learning about their type. I provide some anecdotal evidence from credit bureaus supporting this interpretation.

Next, I study the effect of a policy change implemented by credit bureaus in early 2020 on information demand. In April 2020, Equifax, TransUnion and Experian announced a significant change to their credit reporting policy. People could now request up to three free credit reports every week rather than every twelve months. Using difference-in-differences and event study designs, I show that unsophisticated households (the treated group) were significantly more likely than their sophisticated peers (the control group) to update their information set for the first time after years. My estimates indicate an average reduction in the degree of information rigidity of 10 percentage points, or 54.2% relative to the unconditional mean of the pre-policy period. Since sophisticated house-

holds’ outdated information cannot be explained by information frictions, I interpret this result as the policy mitigating unsophisticated households’ misperceptions about the costs of obtaining credit scores/reports.

I show that this result holds after taking into account non-sophisticated households’ differential exposure to the unemployment/income risk associated with the COVID-19 shock. I also compare the updating behavior of sophisticated households who were more or less exposed to the pandemic shock to assess whether a change in the value of information can explain my findings. Specifically, households that perceive their financial conditions to be more uncertain should track their finances more frequently – e.g., by checking their credit scores or reports. However, my regression results do not support this prediction of models of endogenous information acquisition. Collectively, my results suggest that the new credit reporting policy facilitated the acquisition of information by non-sophisticated households. Nevertheless, they should be interpreted with caution, as the measure of exposure to unemployment/income risk – gender, race, and age – might not capture all relevant risk dimensions.

The remainder of the paper is organized as follows. Section 1.2 highlights the main contributions of this paper to the literature. Section 1.3 presents a simple conceptual framework that guides my empirical analysis. Section 1.4 describes the data. Section 1.5 studies the determinants of discouragement and the extent to which they vary by household sophistication. Section 1.6 quantifies the share of likely approved discouraged borrowers and investigates the role of information frictions in explaining discouragement. In Section 1.7, I present and discuss the effect of the credit bureaus’ new reporting policy on information demand. Section 1.8 concludes.

1.2 Related literature

My findings contribute, first and foremost, to the empirical literature on discouragement in credit markets. Most of this literature identifies key determinants of discouragement among firms, whereas my work investigates discouragement among consumers. The for-

mer finds that firms are more likely to be discouraged when their *actual* credit quality is poor (e.g., Han, Fraser, and Storey 2009), loan *actual* application costs are large (e.g., Ferrando and Mulier 2022), and economic uncertainty is high (e.g., Anastasiou, Kallandranis, and Drakos 2022). Relative to these studies, I show that borrowers’ *perceptions* of their creditworthiness largely explain their discouragement. Furthermore, my results indicate that discouraged borrowers’ misperceptions about application costs (e.g., the impact of soft credit inquiries on credit scores) impede them from acquiring relevant information. The infrequent updating of their creditworthiness results in some discouraged borrowers missing otherwise available credit. Similar to Cole and Sokolyk (2016) and Ferrando and Mulier (2022), I also quantify that a considerable fraction of discouraged borrowers would have been approved for credit had they applied. Closer to my paper is the work of Jappelli (1990). Using data from the 1983 SCF, he documents that discouraged borrowers account for a large share of credit-constrained households. However, he finds that most discouraged borrowers would be rejected for credit.

My paper also adds to a large body of research on the importance of financial literacy or sophistication for households’ economic outcomes. The extant literature finds that financially sophisticated individuals are more likely to be aware of – and thus prepared for – the interest rate risk embedded in their adjustable-rate mortgages (e.g., Bucks and Pence 2008), avoid overpayment for their mortgage (e.g., Bhutta, Fuster, and Hizmo 2021), and plan for retirement (e.g., Lusardi and Mitchell 2007). I find that less financially savvy households are more likely to make financial mistakes – e.g., failure to obtain consumer credit – because they use outdated information about their creditworthiness when thinking about applying for credit. In addition, my result that many discouraged borrowers fail to obtain consumer credit contributes to a growing literature that studies the implications of households’ financial mistakes for the effectiveness of macroeconomic policies (e.g., Keys, D. G. Pope, and J. C. Pope 2016; D’Acunto, Hoang, and M. Weber 2022).

Finally, this article contributes to a research agenda that uses survey data to understand how households form expectations and the effect of expectations on economic behaviors. These studies often find substantial heterogeneity in expectations by socioeconomic sta-

tus (e.g., Das, Kuhnen, and Nagel 2020). Heterogeneous expectations across households might be explained by differences in their information set – e.g., due to variation in the updating of information (e.g., Coibion and Gorodnichenko 2012). Another reason might be that different persons process the same pieces of information differently (e.g., Andre et al. 2022). My results are consistent with the first explanation. While non-sophisticated borrowers are more likely to have outdated information about their credit risk than sophisticated borrowers, both types of borrowers think similarly about the effect of credit risk on their ability to borrow.

1.3 Conceptual framework

Following most empirical research on discouragement in credit markets (e.g., Han, Fraser, and Storey 2009; Cole and Sokolyk 2016; Ferrando and Mulier 2022), I structure my empirical analysis on the theoretical framework of Kon and Storey (2003). In their model, discouraged borrowers would be approved for a bank loan, but they do not apply because they expect a rejection. Two arguments rationalize discouragement in their baseline framework. First, as banks are only partially informed about borrowers’ types, their screening device is imperfect. Second, potential borrowers face positive sunk application costs. Applications costs can be in-kind (e.g., time spent in the application process), financial (e.g., money spent in acquiring information required by banks), and psychological (e.g., discomfort experienced in sharing personal information). Banks’ screening errors, combined with positive sunk application costs, result in creditworthy borrowers – assumed to be perfectly informed about their type – being discouraged from applying for credit.

Two testable predictions arise from Kon and Storey (2003). First, given banks’ screening errors, a reduction in the application costs encourages potential borrowers to apply. When deciding whether to apply for credit, they trade off the benefits and costs of applying. By improving the terms of the trade off, a decline in the application costs leads to a higher number of applications from all borrowers, reducing discouragement. Second,

given the application costs, creditworthy potential borrowers are more likely to apply when banks' screening device improves, implying less discouragement. The empirical evidence in Han, Fraser, and Storey (2009) and Ferrando and Mulier (2022) supports these two theoretical predictions. Using households' perceived rather than actual application costs, I also find support for the first prediction in Kon and Storey (2003) – although my definition of discouraged borrowers encompasses risky borrowers.

I closely follow Kon and Storey (2003) extended model, where borrowers are imperfectly informed about themselves, while banks' screening errors are assumed to be null. I follow their modified model for two reasons. First, in my sample, many discouraged borrowers have outdated information about their credit scores/reports. Second, my empirical analysis abstracts from supply-side frictions. In their model, truly creditworthy borrowers believe they are creditworthy with an exogenous probability $1 - fb_G$. Since this is their best information available *ex ante*, they assume that banks will consider them creditworthy with the same probability. Therefore, in this setup, potential borrowers self-screen into the loan application process, rather than banks. Borrowers' effective application costs are given by $K/(1 - fb_G)$, with $K > 0$ being paid regardless of the loan request outcome.

In this modified framework, if $K = 0$, then even pessimistic borrowers (i.e., *ex post* approved) would apply for credit. However, with $K > 0$, creditworthy borrowers might be discouraged if they perceive K to be too high and/or they are fully convinced that they would be rejected for credit (i.e., $1 - fb_G$ is too low). What is more, they would not have incentives to acquire information about their credit risk.

In consumer credit markets, K also includes a “hard” credit inquiry, defined as a lender's request to review the applicant's credit reports when making a lending decision. This inquiry often results in a marginal decline in the applicant's credit scores and may stay on her credit reports for up to 36 months. In contrast, a “soft” credit inquiry – i.e., checking scores/reports before applying for credit – has no such effects on scores or reports. However, if potential borrowers believe that a soft inquiry also negatively affects their scores and perceive themselves as low-credit-score individuals, they will have less incentive to apply and update their information. In contrast to Kon and Storey (2003),

K might be perceived (by consumers) to be endogenous, not exogenous, with respect to $1 - fb_g$.

In my sample, a significant portion of discouraged borrowers had outdated information about their credit scores when they were thinking about applying for credit. I show that this result is consistent with information frictions, defined as misperceptions of the costs of information acquisition. To further investigate this interpretation, I study the impact of a policy that made it easier for people to acquire information about their credit scores and reports.

1.4 Data

The empirical analysis uses data from the New York Fed’s Survey of Consumer Expectations (SCE). The SCE is a monthly, nationally representative survey of about 1,300 household heads with a rotating panel structure.² Demographic and financial characteristics of survey participants align well with corresponding characteristics of the U.S. population of household heads. The survey contains a core monthly module and various supplementary modules on specific topics. This paper uses data from the core and credit access modules. The credit access module is fielded in February, June, and October.

I identify discouraged borrowers using questions in the credit access module, as discussed below. From this module, I also obtain information on consumer debt and the outcome of credit and loan applications. Specifically, households report their best guesses of the current amount/balances of their: (a) credit card debt, (b) mortgage debt, (c) student loan debt, (d) home-based loans, (e) auto loans, and (f) other personal loans. Households also inform the outcome of previous applications for these loans and lines of credit. I consider a partly granted request as rejected, as only a small number of these requests list the amount granted. About 80 percent of the credit requests in my sample are approved. The survey elicits households’ beliefs about their credit scores and what was the last time they

²Respondents participate in the survey for up to twelve months.

checked/learned about their credit score or requested a copy of their credit report.³ The answers to the first of these two questions report households' perceptions of their creditworthiness, while those to the second question indicate to what extent their perceptions are updated.

I gather detailed demographic characteristics for each respondent from the core module. Demographic information includes gender, marital status, age, race, labor force status, education, numeracy skills, willingness to take financial risk, homeownership status, and nominal pre-tax income. I also obtain households' subjective expectations of credit conditions for people in general.

1.4.1 Analysis sample

Combining the core and the credit access modules results in 25,752 observations spanning from February 2014 to June 2021. The analysis sample thus consists of 23 survey waves and contains roughly 12,000 household heads. I report selected demographic and financial characteristics of my sample in Table 1.1, along with their population counterparts (column (4)). Most of the reported characteristics are stable over time, as shown by columns (2) and (4). Table A1 in the Appendix provides the definitions of all variables.

1.4.2 Identifying discouraged borrowers

Each wave of the credit access module asks households why they (1) did not apply for new loans or credit over the past 12 months and (2) do not expect to apply for new loans or credit over the next 12 months. To these questions there are multiple possible answers: (a) the household does not need a loan, (b) application procedures are too time-consuming, (c) borrowing rates are too high, (d) the household does not know how to apply, or (e) the household believes the application would be rejected.

³In the U.S., FICO and three credit bureaus (Equifax, Transunion, and Experian) issue credit scores: FICO Score and VantageScore, respectively. To sort households by their creditworthiness, I closely follow credit bureaus' classification.

Table 1.1: Selected Sample characteristics

	SCE(All)	SCE(2014)	SCE(2020)	U.S. Pop.
Demographics				
Female	49.8%	50.2%	52.5%	50.8%
Age	51.11	50.67	51.50	51.06
White/non-Hispanic	78.4%	78.2%	78.5%	69.0%
College +	34.1%	32.2%	35.9%	31.0%
Homeowner	70.4%	70.1%	71.4%	59.0%
Financial characteristics				
Credit score	680-760	680-760	680-760	682
Household income $\leq$ 50k	35.5%	38.1%	32.5%	37.0%
Household income 50k-100k	35.9%	35.6%	36.9%	30.0%
Household income $>$ 100k	28.6%	26.4%	30.6%	31.0%
Sample size	25752	3389	3225	

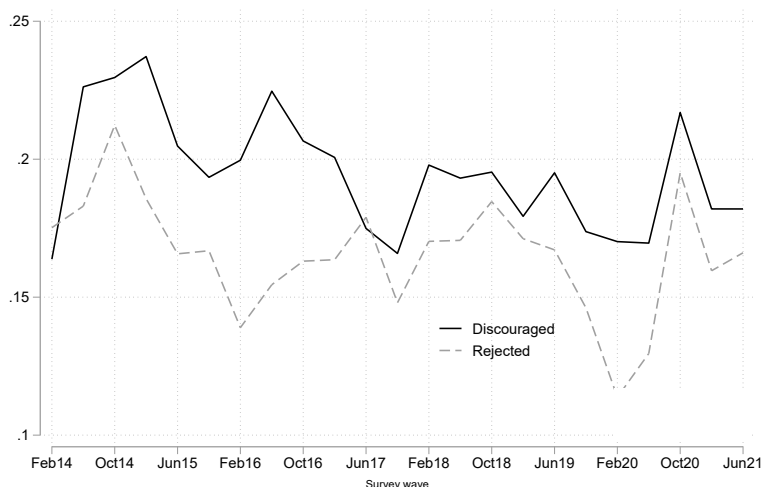
Notes: For the SCE sample, all statistics use survey weights. Comparison is with the 2015 ACS (demographics) and Experian's 2019 State of Credit Report (credit score).

Discouraged borrowers are consumers who do not apply for (at least one type of) credit because they expect a rejection. They account for most non-applicants who have a demand for credit. Note that the first and second questions identify past and currently (as in the current survey wave) discouraged borrowers, respectively. I use both definitions in my empirical analysis. Consumers also do not apply for credit because they expect adverse credit terms, that is, "borrowing rates are too high". While these consumers can also be characterized as discouraged, they are excluded from the analysis since I can not quantify their misperceptions.⁴ Non-discouraged borrowers apply for at least one type of credit and when they do not apply for one type, it is because they do not need it.

⁴These consumers account for about 25% of non-applicants who have a demand for credit. Since the SCE does not ask respondents about actual and expected borrowing rates, one can not quantify their misperceptions.

Figure 1.2 plots the evolution of discouragement and rejection rates over the sample period. It shows that discouragement is consistently higher than actual credit constraints, especially in the first half of the sample. We also note an increase in discouragement and rejection rates after the COVID-19 outbreak followed by a decline in both. Finally, discouragement and rejection rates are highly correlated over time.

Figure 1.2: Discouragement and rejection rates in the 12 months prior to each survey wave. Student loans are not included.



1.5 The Determinants of discouragement

In this section, I investigate what drives consumers who need credit to either apply for a loan or to be discouraged from applying. My choice of explanatory variables falls into four broad categories.

First, I include a wide range of demographic regressors. My analysis focuses on gender and racial differences in discouragement. Previous studies document pronounced gaps in access to business credit along those dimensions, either due to actual (e.g., Blanchflower, Levine, and Zimmerman 2003; Morazzoni and Sy 2022) or self-imposed credit constraints (e.g., Ongena and Popov (2016)). I ask whether those (self-imposed) gaps are also present in consumer credit markets. Second, I add households' assessment of

application costs – for example, whether they think the application process is too time-consuming. In theory, a reduction in application costs increases the likelihood that potential borrowers apply, as long as their subjective expectations of approval are not zero.⁵ Third, I account for households’ debt positions since previous research (e.g., Johnson and Li (2010)) underscores their relevance as a predictor of actual borrowing constraints. Finally, to investigate whether households extrapolate from macroeconomic to personal expectations (e.g., Roth and Wohlfart 2020), I consider their expectations of credit conditions for people in general. The likelihood of being discouraged is thus estimated by running the probit regression:

$$\begin{aligned} \Pr(\text{DB}_{t,t+12}^i = 1) = & F(\beta' \text{SES}_{i,t} + \theta \text{AppCosts}_{i,t} + \delta' \text{BS}_{i,t} + \gamma' \text{Scores}_{i,t} \\ & + \phi \text{EasierCredit}_{t,t+12}^i + \lambda_t + \lambda_{s(i)}) \end{aligned} \quad (1.1)$$

where $\text{DB}_{t,t+12}^i$ is a dummy variable equal to 1 if household i reports, in survey wave t , that she is discouraged from applying for credit over the next twelve months. The vector $\text{SES}_{i,t}$ contains socioeconomic characteristics, including dummy variables for being female and non-Hispanic white.⁶ $\text{AppCosts}_{i,t}$ is a dummy variable equal to 1 when the household reports that the application process is too burdensome – either too time-consuming or too difficult to understand. The vector $\text{BS}_{i,t}$ includes a measure of household debt position (debt-to-income) and a dummy variable equal to 1 if the household is a homeowner. Perceived credit scores are included in $\text{Scores}_{i,t}$. $\text{EasierCredit}_{t,t+12}^i$ is a dummy variable equal to 1 if the household expects easier credit conditions for people in general over the next twelve months. The regression includes survey-wave (λ_t) and state ($\lambda_{s(i)}$) fixed effects. Standard errors are clustered at the household level.

Table 1.2 reports the empirical results. Women and non-white/Hispanic have a higher probability of being discouraged even after controlling for other demographic characteristics, application costs, and debt-to-income ratio (columns (2) and (3)). Specifically,

⁵Differently from Han, Fraser, and Storey (2009) and Ferrando and Mulier (2022), I rely on households’ reported perceptions of their costs, rather than proxies for application costs (e.g., firm size and distance from their primary lender).

⁶Demographic covariates also include income and age bins, dummy variables for being employed, married or living as a partner with someone, and having children in the household.

women are 3% more likely to be discouraged and non-white/Hispanic are 2% more likely. However, when I account for households' perceived creditworthiness (columns (4) and (5)), the estimated effects of gender and race are smaller and statistically indistinguishable from zero. This finding does not necessarily imply the absence of gender and race disparities, as it is conceivable that perceived credit scores are a mediator rather than a confounder – in the former case, perceived scores are the mechanism through which being a woman translates into being more discouraged.

Consumers who self-perceive as risky borrowers and report higher debt levels are significantly more likely to opt out of the loan application process. For instance, low-credit-score individuals are roughly 28% more likely (column (4)) to be discouraged than those with “fair” credit scores. These findings indicate that households' perceptions about their creditworthiness are the most important determinant of discouragement.

My results also indicate that households' assessment of application costs is significantly and positively associated with discouragement. Therefore, policies aiming at reducing these costs would likely contribute to a decrease in discouragement. Interestingly, this conclusion is in the spirit of Ferrando and Mulier (2022). They find a decline in the proportion of discouraged firms after the introduction of a law (in Belgium) that reduced firms' loan application costs.⁷ Finally, households are less likely to be discouraged when they expect easier credit conditions for people in general (column (5)).

1.5.1 Heterogeneity

Do the determinants of discouragement vary with household sophistication, as measured by their numeracy skills? Recent empirical research documents that sophistication on economic matters is a relevant source of households' heterogeneous expectations and economic outcomes, with implications for the transmission of economic policy (e.g., D'Acunto, Hoang, Paloviita, et al. 2019; D'Acunto, Hoang, and M. Weber 2022; Bachmann et al. 2021). I examine this question in Table 1.3.

⁷For example, by requiring banks to provide the main details of loan contracts clearly and concisely, in-kind application costs became significantly lower.

Table 1.2: Determinants of household discouragement

	(1)	(2)	(3)	(4)	(5)
Female	0.029*** (0.007)	0.030*** (0.007)	0.027*** (0.007)	0.005 (0.006)	0.003 (0.006)
White/Non-Hispanic	-0.023*** (0.009)	-0.021** (0.009)	-0.019** (0.009)	0.007 (0.007)	0.007 (0.007)
High application costs		0.070*** (0.013)	0.065*** (0.013)	0.046*** (0.012)	0.045*** (0.012)
Debt-to-income (rank)			0.143*** (0.014)	0.090*** (0.011)	0.088*** (0.011)
High credit scores (> 760)				-0.222*** (0.013)	-0.220*** (0.013)
Good credit scores (680-760)				-0.176*** (0.014)	-0.173*** (0.013)
Low credit scores (< 620)				0.280*** (0.022)	0.274*** (0.022)
Expect easier credit					-0.037*** (0.007)
Individual controls	✓	✓	✓	✓	✓
State FEs	✓	✓	✓	✓	✓
Survey-Wave FEs	✓	✓	✓	✓	✓
Observations	19724	19724	19724	19724	19724
Pseudo- R^2	0.153	0.157	0.176	0.378	0.381

Notes: Estimates are average marginal effects. Survey weights are used. The dependent variable is a binary indicator equal to 1 if the household is discouraged from applying for credit over the next twelve months, and 0 if the household is an applicant. Individual controls are dummy variables for being female, married, homeowner, college educated (or more), and for having children in the household. They also include household nominal income and age categories. Omitted category for credit scores is *Fair credit scores* (620-679). Standard errors clustered at the household level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 1.3: Discouragement: heterogeneity by sophistication

	High Numeracy		Low Numeracy	
	(1)	(2)	(3)	(4)
High application costs	0.055*** (0.008)	0.032 (0.021)	0.045** (0.022)	-0.004 (0.004)
Debt-to-income (rank)	0.096*** (0.009)	0.056*** (0.017)	0.125*** (0.023)	0.007 (0.045)
Good/High credit scores (> 720)	-0.139*** (0.005)	-0.039*** (0.011)	-0.280*** (0.013)	-0.061*** (0.020)
Expect easier credit	-0.034*** (0.006)	0.003 (0.005)	-0.085*** (0.015)	-0.026* (0.015)
Individual Controls	✓	✓	✓	✓
State FEs	✓		✓	
Survey-Wave FEs	✓	✓	✓	✓
Household FEs		✓		✓
Observations	14618	12310	5034	4099
(Pseudo-)R ²	0.343	0.770	0.282	0.745

Notes: This table reports average marginal estimates (columns (1) and (3)) and OLS estimates (columns (2) and (4)). The dependent variable is a binary indicator equal to 1 if the household is discouraged from applying for credit over the next twelve months, and 0 if the household is an applicant. Individual controls are dummy variables for being female, married, homeowner, college educated (or more), and for having children in the household. They also include household nominal income and age categories. In columns (2) and (4) only time-varying individual controls are estimated. Standard errors clustered at the household level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Exploiting cross-sectional variation and accounting for various households' characteristics (columns (1) and (3)), I find that high-and low-numeracy households form beliefs about their ability to borrow remarkably similarly. For example, both types of households appear to think that they are more likely to obtain a loan when the overall credit supply is larger. One possibility is that they expect easier lending standards from banks following an expansionary (conventional) monetary policy.

When I include household fixed effects to absorb unobserved time-invariant heterogeneity across households (columns (2) and (4)), one result remains consistent: both high-

and low-numeracy consumers believe that their likelihood of obtaining credit improves on their (perceived) credit scores. This finding suggests that credit scores are, perhaps because of their salience, a piece of information whose effect on credit access are somewhat easier to understand.

1.6 Would discouraged borrowers be approved for credit?

This section shows that a significant portion of discouraged borrowers would have (most likely) obtained credit had they applied. A simple back-of-the-envelope calculation then quantifies the aggregate effect of discouragement. Next, I delve into the potential reasons for discouraged borrowers' failure to obtain otherwise available credit.

1.6.1 Discouraged borrowers and counterfactual outcomes

To study whether discouraged borrowers would have obtained credit had they applied, I proceed as follows. I start by restricting my sample in two ways. First, I only consider unsecured revolving (non-mortgage) credit: applications for a new credit card or an increase in the credit limit of an existing credit card. The credit card market is of particular interest because credit cards are the marginal source of credit for many U.S. households.⁸ Second, I focus on the period before the COVID-19 outbreak and adoption of a new policy (by credit bureaus) that facilitated acquiring credit reports/scores – i.e., from 2014 to February 2020.

Next, I use a probit specification to estimate the likelihood of applying borrowers to obtain credit. The specification is similar to equation (1.1). It thus includes various demographic and financial characteristics such as household nominal annual income, age, loan delinquency, and home-ownership status. Differently from equation (1.1), however,

⁸In my sample, slightly more than half of households apply for a new credit card and higher limit of an existing credit card.

the credit access regression equation excludes households’ perceived credit scores, application costs, and expectations of credit conditions for people in general. Since actual credit scores are often regarded as key determinants of loan approval, I approximate them using a borrower’s age and payment history as measured by having a 30-day (or more) loan delinquency within the past twelve months. A borrower’s age serves as a proxy for the length of her credit history.

Table A3 and Figure A1 in the Appendix report the regression results and the model in-sample discriminatory power, respectively. To formally test the overall classification ability of my model, I plot (Figure A1) the receiver operating characteristics curve (ROC curve) and compute the area under this curve (AUC).⁹ Let $A_i \in \{0, 1\}$ denote the actual loan outcome of borrower i , with 1 denoting a credit approval and 0 a rejection. Let Y_i denote the probability prediction about A_i , computed by the loan approval model. Y_i and the threshold c define a binary prediction approval whenever $Y_i \geq c$, and a rejection whenever $Y_i < c$. We can define the following conditional probabilities:

$$TPR(c) = Pr[Y_i \geq c | A_i = 1]$$

$$FPR(c) = Pr[Y_i \geq c | A_i = 0]$$

If we set c close to 1, we predict credit approval for relatively few borrowers. Conversely, as c decreases, we obtain a higher number of correctly predicted approvals – i.e., a high true positive rate (TPR). By reducing the threshold, however, the proportion of incorrectly predicted approvals also increases – i.e., a higher false positive rate (FPR). The ROC curve illustrates this trade-off by plotting the TPR on the y axis against the FPR in the x axis. The AUC ranges from 50% (pure random prediction) to 100% (perfect prediction) and summarizes the model’s overall classification ability. As reported in Figure A1, I obtain an AUC of 76.5%, above the targets of 60% and 70% in information-scarce or information-rich environments, respectively (e.g., Iyer et al. 2016; Berg et al. 2020).¹⁰

⁹Berge and Jordà (2011) use this method to evaluate the NBER’s Business Cycle Dating Committee accuracy in classifying economic activity into expansions and recessions.

¹⁰Table A3 reports the AUC’s 95% confidence interval in the range [74.9 , 78.1].

Third, I conduct an out-of-sample validation of the loan approval model. Since the results reported in Table A3 are estimated in-sample, one concern is that we overstate the model discriminatory power due to overfitting. For the out-of-sample test, I closely follow Berg et al. (2020). Specifically, I also use $N \times 2$ -fold cross-validation, a standard method to evaluate an estimator's out-of-sample performance. The algorithm initiates by randomly dividing the sample into half samples, A and B. Next, it estimates a predictive probit regression using sample A, whose coefficients are used to create predictive values for the observations in sample B. Similarly, it estimates a predictive probit regression using sample B, whose coefficients are used to create predictive values for the observations in sample A. It then determines the AUC for the full sample of observations, using all predictive values estimated out-of-sample. I repeat this procedure $N = 100$ times and report the mean and confidence interval out-of-sample AUCs. I obtain an average AUC of 72.9%, and a 95% confidence interval of [71.2 , 74.6]. These results strongly support the high discriminatory power of my loan approval model.

Having validated the model, I can use it to answer the counterfactual question of whether discouraged borrowers would have been approved for credit had they applied. In my sample, about 20% of the credit card applications were rejected. Using the estimated parameters of the model, I search for the approved consumer at the 20th percentile of the predicted probability of approval. The probability of this “marginally” approved borrower (71%) defines the threshold above which discouraged borrowers would have obtained credit had they applied. I find that 44% of discouraged borrowers have predicted probabilities of approval above that threshold.

This result suggests that many discouraged households fail to obtain consumer credit, which can have important implications for their financial well-being. Using similar approved consumers as a benchmark, unconstrained discouraged borrowers would have obtained credit corresponding to about 10% of their annual income. To put this foregone credit amount into context, J. X. Sullivan (2008)) shows that low-asset households replace 11% of their earnings lost due to unemployment through unsecured debt.

My result differs from Jappelli (1990), who finds that most discouraged consumers in

the U.S. are credit-constrained. Interestingly, Cole and Sokolyk (2016) and Ferrando and Mulier (2022) also quantify that a large share of discouraged borrowers (firms) are most likely unconstrained, while Keys, D. G. Pope, and J. C. Pope (2016) find that about 20% of U.S. households fail to refinance their mortgages.

Since I do not observe financial institutions’ actual screening model(s), one concern is that my loan approval model is misspecified. To some extent, the focus on the market for credit cards mitigates this problem. Because credit cards are unsecured and do not require contemporaneous underwriting, it is conceivable that banks’ use simpler and more homogeneous screening models when evaluating the demand for a credit card. An omitted variable bias is a related concern. Even if I knew a bank’s model, it could be unfeasible to estimate it because of unobserved inputs. In particular, a borrower’s age and loan delinquency may not perfectly predict her actual credit scores. While these caveats apply when interpreting my findings, my empirical model includes strong predictors of credit scores and binding borrowing constraints. For example, Keys, D. G. Pope, and J. C. Pope (2016) find that mortgage payment history – which I add to my model – is a high-quality proxy for creditworthiness in the absence of credit score data.¹¹

1.6.2 Back-of-the-envelope calculation

To gauge of the aggregate effect of discouragement, I perform a simple back-of-the-envelope calculation. I use the SCE’s February 2019 wave to estimate the aggregate effect of discouragement in 2018. In that wave, about 11% of households with a demand for a credit card did not apply for it in the previous 12 months because they expected a rejection. According to the Consumer Financial Protection Bureau’s Consumer Credit Panel (CFPB CCP), there were about 67.7 million credit card origination in 2018.¹² Thus, in

¹¹Similarly, Kowalik, Liu, and Wang (2021) show that variation in credit card utilization since the onset of the pandemic is the main driver of the differences in credit scores across households. Adding an indicator for whether a household has reached the limit on her credit card does not alter the results of the paper. In particular, roughly 40% of discouraged borrowers would be classified as unconstrained. I leave this indicator out of my model because I would have a much smaller sample.

¹²The CFPB CCP is an anonymized 1-in-48 sample of credit records from one of the three national credit reporting agencies. The sample is statistically representative of the population of consumers with

the aggregate, about 8.4 million applications were not carried through because potential borrowers expected a rejection. In my sample, approved borrowers obtained \$6,240 on average. Together, this means approximately \$52.4 billion in that year. The \$52.4 billion represents 6.0% of total U.S. credit card debt as estimated by the New York Fed/Equifax Consumer Credit Panel (FRBNY/Equifax CCP) in the fourth quarter of 2018.¹³ Under the assumption that 44% of the discouraged borrowers are unconstrained, households' failure to obtain credit amounts to roughly 2.7% of total U.S. credit card debt. Thus, my back-of-the-envelope calculation suggests that discouragement leads to a particularly large shortage in aggregate credit demand.

1.6.3 Inspecting the mechanism: information frictions

Previously, I documented the relevance of households' perceived creditworthiness in explaining discouragement. In my sample, however, a sizable portion of households have outdated information about their credit scores or credit reports.¹⁴ Specifically, 28% of respondents learned about their scores and/or requested a copy of their reports more than a year before the survey interview, and 17% did so more than two years before the survey or never. Discouraged borrowers using outdated information about their "type" is thus a candidate to explain their financial mistake.

To test this hypothesis, Table 1.4 studies the correlates of information acquisition. I use two indicators that measure the degree to which households have outdated information about their credit quality, *Info (more than a year ago)* and *Info (more than two years ago)*. The former is a dummy variable which equals one if the household obtained information about her credit score or report more than a year before the survey interview, and the latter is a dummy for having acquired that information more than two years before the interview,

credit records.

¹³The FRBNY/Equifax CCP panel contains quarterly observations of a nationally representative, randomly drawn sample of 5% of all U.S. individuals with a credit report.

¹⁴Credit bureaus advise consumers to check their credit scores/reports at least once a year. A credit report is a summary of a consumer's credit history. It includes information about her existing credit (e.g., outstanding debt), public records (e.g., whether the consumer has filed for bankruptcy), and credit inquiries (e.g., from an employer). Credit bureaus use these characteristics to calculate credit scores.

or never. Furthermore, I restrict the sample to between 2014 and February 2020.

The results reported in columns (1) and (5) show that discouraged borrowers are significantly more likely to have outdated information about their credit scores/reports than applicants. The estimated effects are economically large. According to my estimates, discouraged borrowers are about 11 and 7 percentage points more likely to have outdated information than applicants, all else being equal. This result is sensible because discouraged borrowers, in line with their beliefs of being approved for credit, may perceive smaller benefits in acquiring information. Non-applicants' information set being more outdated relative to those of applicants and discouraged borrowers appears plausible because non-applicants report no need for additional credit. My findings then show (columns (2) and (6)) that even creditworthy/unconstrained discouraged borrowers are much more likely to use outdated information than similar approved applicants when assessing their prospects in the credit markets.¹⁵ The fact that unconstrained discouraged borrowers have outdated information, not only their constrained peers, about their credit scores supports my explanation for discouraged borrowers' financial mistake.

¹⁵Creditworthy or unconstrained discouraged borrowers would have been approved for a credit card had they applied, as previously discussed. By including approval likelihood fixed effects, identification comes from comparing unconstrained discouraged borrowers to similar approved applicants.

Table 1.4: Correlates of information acquisition

	Info (more than a year ago)			Info (more than two years ago)			
	(1)	(2)	(3)	(4)	(5)	(6)	(8)
Discouraged	0.114*** (0.016)	0.101*** (0.027)			0.066*** (0.015)	0.059*** (0.022)	
Non-applicant	0.245*** (0.010)				0.158*** (0.009)		
Sophisticated			-0.038*** (0.016)				-0.052*** (0.014)
Make fin decisions				-0.070*** (0.014)			-0.055*** (0.012)
Individual Controls	✓	✓	✓	✓	✓	✓	✓
State FEs	✓	✓	✓	✓	✓	✓	✓
Survey-Wave FEs	✓	✓	✓	✓	✓	✓	✓
Approval Likelihood FEs		✓				✓	
Observations	19299	3464	19299	14855	19299	3464	14855
R ²	0.117	0.017	0.059	0.063	0.100	0.018	0.062

Notes: This table reports OLS estimates. Estimating sample is restricted to between 2014 and February 2020. Survey weights are used. The dependent variables are binary indicators for whether the household's information is older than a year (columns (1) to (4)) or two years (columns (5) to (8)). *Discouraged* is a dummy equal to one if the respondent did not apply for credit in the past 12 months because she expected a rejection. In columns (2) and (6), discouraged borrowers are only those who would have been approved for credit had they applied. *Non-applicant* is a dummy equal to one if the respondent did not apply for credit in the past 12 months because she did not need it. The omitted group for *Discouraged* and *Non-applicant* is *Applicant*, a binary indicator equal to one if the respondent applied for credit in the past 12 months. *Sophisticated* is a dummy variable equal to one if the respondent has either a college degree (or more) or high numeracy. *Make fin decisions* is a binary variable equal to one if the respondent is the person in charge of financial decisions in the household. Individual controls include dummy variables for being female, employed, homeowner, white/non-Hispanic, married, and household nominal income, and age bins. Approval likelihood fixed effects consists of deciles of the approval likelihood. Standard errors clustered at the household level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Next, I investigate the potential reasons for the infrequent updating of information by potential borrowers – discouraged or not. My analysis starts by ruling out two explanations. First, *real* monetary costs associated with acquiring a credit report might exceed the benefits, especially for those who have low expectations of being approved for credit. During my sample period, however, people could obtain up to three free credit reports every twelve months from the three U.S. credit bureaus: Equifax, TransUnion, and Experian. This fact, combined with the definitions of both dependent variables, implies that *real* monetary costs cannot explain potential borrowers infrequent updating. Second, using *Info (more than two years ago)* as the main outcome variable likely excludes the “unchanged financial conditions” story as a reason for not updating information. The definition of this variable means that discouraged borrowers, who thought about applying for credit in the previous twelve months, used information outdated by at least a year when forming their beliefs of credit approval. It is conceivable that their financial circumstances have changed in meaningful ways after a year or more.

After ruling out the *real* monetary cost and “unchanged financial conditions” reasons, I examine the relationship between information acquisition and proxies for cognitive ability. Models of endogenous information acquisition (e.g., Reis 2006; Mackowiak and Wiederholt 2009; Maćkowiak and Wiederholt 2015) predict that an economic agent’s demand for a piece of information decreases in the *perceived* cognitive costs of obtaining and processing that information. Columns (3) and (7) include a dummy variable for whether the respondent is financially sophisticated, and columns (4) and (8) add a dummy which equals one if the respondent is in charge of the financial decisions in the household.¹⁶ There are two possible interpretations of the latter variable. First, respondents are in charge of financial decisions because they are financially sophisticated and/or exposed to financial information. Second, respondents make financial decisions because they are sophisticated and/or exposed to financial information compared only to the other members of the household. For this reason, the sophistication dummy appears to be a

¹⁶A respondent is in charge of the financial decisions in the household if she makes all financial decisions herself, as reported by the answers to question Q46 in the SCE’s core module.

cleaner indicator of literacy and/or exposure to financial matters.

Consistent with models of endogenous information acquisition (e.g., rational inattention), I find that unsophisticated/unexposed respondents' information sets are significantly more likely to be outdated than those of their peers. The estimated effects are economically large. For example, all else being equal and compared to a sophisticated peer, a non-sophisticated respondent is about 5 percentage points (column (7)) more likely to have acquired information about her score/report more than two years before the survey interview or never.

Collectively, these results indicate that information frictions might play a role in explaining discouraged borrowers' outdated information sets. I define information frictions as *misperceptions* of the net benefit of acquiring a credit score or report before applying for credit, i.e., the net benefit of a "soft" credit inquiry. Table 1.5 provides evidence that even unconstrained discouraged borrowers are more likely to face larger information frictions. The first column shows that they are less likely to be sophisticated than similar approved applicants. The insignificant association between discouragement and college degree (column (2)) reflects the inclusion of formal education in the loan approval model. Discouraged borrowers are roughly 9 percentage points less likely to have high numeracy skills (column (3)) compared to approved applicants.¹⁷

I propose the following scenarios of misperceptions that could rationalize discouraged borrowers' use of outdated information when assessing their chances of being approved for credit. First, they may have misperceptions about the monetary cost of acquiring a credit report. Second, discouraged borrowers might confuse the non-monetary costs of a soft credit inquiry with those of a "hard" credit inquiry. A hard credit inquiry occurs when a lender requests to review the applicant's credit reports when making the lending decision, and it is visible to other prospective creditors. In contrast to a soft inquiry, a hard credit inquiry can stay on the applicant's credit reports for up to 36 months and might

¹⁷This result suggests that financial literacy is to a large extent unexplained by formal education. Interestingly, Lusardi and Mitchell (2007) and Behrman et al. (2012) find that financial literacy is more important than schooling for explaining differences in wealth and pension contributions across households.

Table 1.5: Explaining information frictions

	Sophisticated (1)	College (2)	High numeracy (3)
Discouraged	-0.050** (0.025)	-0.028 (0.030)	-0.087*** (0.029)
Individual Controls	✓	✓	✓
State FEs	✓	✓	✓
Survey-Wave FEs	✓	✓	✓
Approval Likelihood FEs	✓	✓	✓
Observations	3464	3464	3464
R^2	0.060	0.074	0.048

Notes: This table reports OLS estimates. Estimating sample excludes 2020-2021. The dependent variables are binary indicators for whether the household is sophisticated (column (1)), has a college degree or more (column (2)), and high numeracy skills (column (3)). Discouraged borrowers includes only those who would have been approved for a credit card had they applied. Approval likelihood fixed effects consists of deciles of the approval likelihood. Robust standard errors in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

negatively impact her credit scores, regardless of the application outcome.¹⁸ It is thus conceivable that discouraged borrowers believe that a soft credit inquiry has a negative and persistent impact on their credit scores. Figures A2 and A3 provide some anecdotal plausibility to my interpretation. The figures suggest that a lack of understanding of the differences between a soft and hard credit inquiry is a common friction among potential borrowers. Since discouraged borrowers, by definition, see themselves as low-credit-score individuals, the (mis)perceived costs of a soft credit inquiry are more likely to bind for them, adding to the actual costs of a hard credit inquiry to hinder the updating of their credit scores.

Because discouraged borrowers do not expect to be approved for credit, one might argue that their beliefs, not information frictions, explain their outdated information. If

¹⁸According to Equifax, “the hard inquiry may be the leading indicator, the first sign of financial distress that appears on the credit file.” Furthermore, the number of inquiries into a credit file may account to about 10% of credit scores. See <https://www.consumer.equifax.ca/personal/education/credit-score/how-are-credit-scores-calculated>.

a discouraged borrower is fully convinced that she would be rejected for credit, then she will perceive no net benefit in updating her information set, even if she has no misperception about a soft credit inquiry.¹⁹ In a second scenario, if her subjective beliefs of approval are low but non-negligible, and if she understands what a soft credit inquiry means, then it is more likely that she perceives positive net benefit – justifying the update of information. Lastly, if a discouraged borrower’s beliefs of approval are non-negligible but she misperceives the cost of a soft inquiry, then it is more likely that the net benefit is negative .

A subset of discouraged borrowers provide their quantitative (percent chance) subjective beliefs of approval, which I use to investigate my interpretation. At the 10th percentile of the distribution, individuals report a subjective chance of approval of 0 percent, while at the median, they report 10 percent. For these discouraged borrowers, their beliefs alone could rationalize their outdated information – although it is conceivable that information frictions also play a role for the borrowers at the median of the distribution. However, at the 75th and 90th percentiles, discouraged borrowers report chances of approval of 25 and 50 percent, respectively. For these borrowers, information frictions – i.e., misperceptions about a soft credit inquiry – are a more probable reason for their decision not to update their information sets.

My proposed explanation for information frictions in consumer credit markets – lack of financial sophistication – aligns well with existing evidence that government assistance programs may not benefit the individuals and firms who would take most advantage of them. Allen et al. (2022) find limited enrollment in debt-relief programs (credit card and mortgage deferrals) implemented in Canada in response to the COVID-19 crisis. Their results show a higher enrollment in the credit card debt-relief program at neighborhoods with higher levels of education. As a potential explanation for the low take-up rates, they suggest that households may have perceived that a deferral would damage their credit scores and thus their ability to borrow in the future.²⁰ Building on a field experiment

¹⁹This is because there might be other non-monetary costs involved (e.g, time).

²⁰Their paper does not find evidence that customers’ credit scores – or credit limits – declined following

in the U.S., Bhargava and Manoli (2015) show that a lack of understanding of earned income tax credit benefits helps explain the puzzle of its low take-up. Similarly, Humphries, Neilson, and Ulyssea (2020) attribute part of the differential access to the Paycheck Protection Program resources across smaller and larger firms in the U.S. to the fact that the former are less sophisticated and thus have more difficulty with obtaining and processing information.

1.7 Credit reporting policy and information frictions

Next, I study the effect of a new policy that facilitated the acquisition of information by households. If information frictions explain their outdated information sets, we expect the policy to reduce the degree of information rigidity. To estimate its effect on information demand, we need to consider that the policy was implemented in response to the economic hardship and uncertainty caused by the COVID-19 pandemic. The unprecedented nature of the crisis might have prompted households to seek information. Failing to account for this shock may bias the estimates of the effect of the policy.

1.7.1 The policy change

In the U.S., until March 2020, individuals could request – by law – one free credit report every twelve months from each of the three credit reporting agencies: Equifax, Experian, and TransUnion. A credit report is a summary of a consumer’s credit history. It includes information about a consumer’s existing credit (e.g., outstanding debt), public records (e.g., bankruptcy), and credit inquiries (e.g., from a lender or employer). Credit bureaus use these types of information to compute credit scores.²¹

In April 2020, the credit bureaus announced/implemented a significant change to their credit reporting policy. People could now request up to three credit reports every week

enrollment, at least not compared to those of non-deferrers.

²¹Credit reports from the credit bureaus do not usually contain credit scores. Individuals can obtain their credit scores in different ways, for example, by purchasing them directly from credit bureaus.

rather than every twelve months. Initially set to expire in one year, the new policy was first extended until April 2022 and then December 2022.²² In a joint statement, the credit bureaus' CEOs justified the adoption/extension of the policy: "The combined pressures of job changes, inflation, market uncertainty and health anxiety continue to present consumers with enormous challenges. Our industry's hope is to support consumers as they make decisions – big and small – by making it easier to regularly track their financial health." The credit bureaus also facilitated the acquisition of credit scores, but in a less coordinated manner.

The policy might have reduced the degree of information frictions if sufficiently publicized. First, non-sophisticated individuals might have learned – or remembered – they could obtain a free copy of their credit reports. Second, they might also have learned that a soft credit inquiry does not affect their credit scores. Unfortunately, I cannot isolate or quantify a precise mechanism for how the policy might have affected households' misperceptions.

1.7.2 Empirical strategy

I use an event study design to assess the effect of the policy on information demand. To construct the treatment and control groups, I leverage a central prediction of models of endogenous information acquisition: an economic agent's demand for a specific piece of information decreases in the *perceived* cognitive costs of collecting and processing information.

The treatment group thus consists of non-sophisticated households who have checked their credit scores/reports more than two years ago or never. Sophisticated households who also lack such information form the control group. Intuitively, a policy facilitating information acquisition should not affect financially sophisticated households who have not recently (or never) checked that information. I estimate the following event study specification:

²²The first extension was announced in March 2021, and the second in June 2021.

$$y_{i,t} = \alpha + \sum_{\substack{\tau=-7 \\ \tau \neq -1}}^2 \delta_{\tau} 1(t - t^* = \tau) \times \text{Unsoph}_i + \lambda_t + \lambda_{s(i)} + \varepsilon_{i,t} \quad (1.2)$$

where $y_{i,t}$ is an indicator variable that equals 1 if individual i , in survey wave t , reports that either she has never checked her credit scores/reports or done so more than two years ago, and 0 if she has checked them within the past six months. Unsoph_i is a dummy for being unsophisticated.²³ Indicator variables $1(t - t^* = \tau)$ measure the time relative to the implementation of the policy, t^* . Since the new policy was in place in April 2020, I set t^* to June 2020, the first wave after the policy adoption. The omitted category is $\tau = -1$, the wave prior to the policy change (i.e., February 2020). The δ_{τ} are the coefficients of interest. Each estimate of δ_{τ} measures the change in the outcome of interest for non-sophisticated households compared to their sophisticated peers in wave τ relative to the period immediately prior to the policy change. In this equation, λ_t is a vector of fixed effects for each survey wave and $\lambda_{s(i)}$ is a vector of fixed effects for each state. I estimate equation (1.2) with a linear probability model and report standard errors clustered at the household level.

The estimation of equation (1.2) requires three key assumptions. The first assumption is that unsophisticated individuals did not anticipate the policy change and hence did not time their demand for information.²⁴ This is plausible for two reasons. Unsophisticated individuals are arguably unlikely to anticipate the adoption of policies in general. In addition, the enactment of the policy occurred immediately after the unexpected COVID-19 outbreak in the second half of March 2020. The second assumption states that, absent the treatment, the outcome variable would have evolved similarly in treated and control groups. The coefficients $(\delta_{-7}, \dots, \delta_{-2})$ test the plausibility of this parallel trends assumption. The third assumption posits that the composition of treated and control groups is stable over time. This is required because of the (mostly) cross-sectional nature of the data.

²³The results are the same if I define unsophisticated households as those with low numeracy skills.

²⁴Intuitively, if an unsophisticated household learns that she will be able to request up to three free credit reports every week rather than every twelve months, it is probable that she will also learn that she can request one for free immediately, before the new policy is in place. This reasoning does not apply for sophisticated households.

Table A4 in the Appendix suggests that while unsophisticated households are significantly more likely to be female, non-white/Hispanic, renters, and below-median-income individuals, these differential probabilities hold both before and after February 2020, when $Post_t$ equals one.

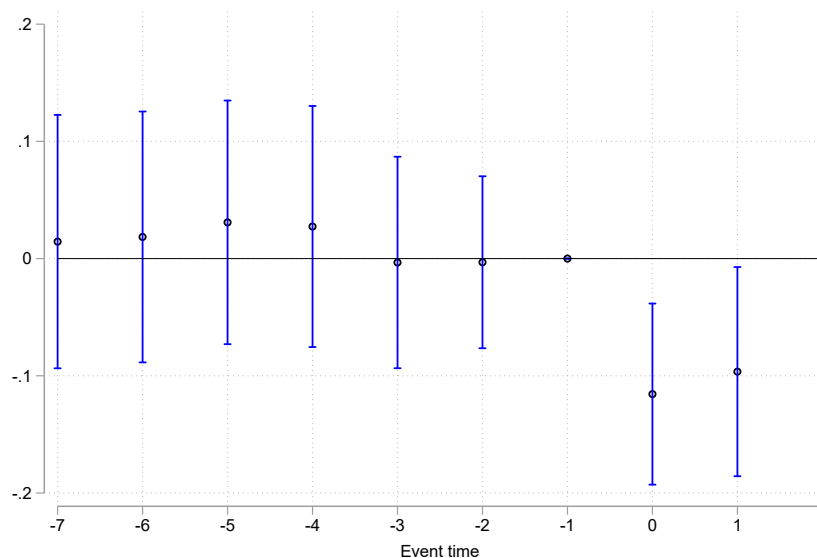
In addition to the event study analysis, I present a standard difference-in-differences (DD) estimates as a summary of the effect across all post-policy period. These are estimated using the same equation except that the event study indicators are replaced with $Post_t$. This indicator turns on starting in June 2020 for all households.

1.7.3 The impact of the policy on information demand

The results are presented in Figure 1.3 and in the first column of Table 1.6. The figure shows that trends in the probability of being uninformed between non-sophisticated and sophisticated households evolved in parallel prior to the policy change. The graphical evidence thus supports the credibility of the parallel trends assumption.

Immediately after the policy change, non-sophisticated households were 11.6 percentage points more likely than their sophisticated peers to have obtained information about their scores/reports for the first time in years. This represents a reduction in the degree of information rigidity of about 61.1% relative to the unconditional mean of the pre-policy period. In addition, I observe a gradual decline in the effect of the policy on information acquisition. As of February 2021, however, the point estimate remains economically large. The top panel of Table 1.6 reports, in column (1), the DD estimate that pools all post-policy periods together. This model estimates an average reduction in the degree of information rigidity of 10 percentage points, or 54.2% relative to the unconditional pre-policy mean.

Figure 1.3: Effect of credit bureaus' policy on information demand



Note: The figure reports coefficients from the estimation of equation (1.2). Error bars represent 95 percent confidence intervals from standard errors clustered at the household level.

Taken together, my findings suggest that the policy change was largely effective in facilitating information acquisition by non-sophisticated households. The results speak to previous papers that study the role of information disclosure in altering various types of behavior. For instance, Bertrand and Morse (2011) show that consumers reduce payday borrowing after receiving additional information disclosure about the product, which suggests that a subset of payday borrowers do not make an informed, utility-maximizing choice.

1.7.4 COVID-19 as a threat to identification

Models of endogenous information acquisition also predict that an agent's demand for a piece of information increases in response to a higher uncertainty about this variable. Several papers provide causal evidence for this prediction using experimental designs (e.g., Link et al. 2021; Roth, Settele, and Wohlfart 2022) and natural experiments (e.g., Baker, McElroy, and Sheng 2020).

Table 1.6: Effect of credit bureaus' policy on information demand

	(1)	(2)	(3)
<i>DD estimates</i>			
Unsoph _i × Post _t	-0.103*** (0.030)	-0.117** (0.030)	
HighExposure _i × Post _t			0.003 (0.026)
<i>Event study estimates</i>			
Wave 2	-0.066 (0.049)		
Wave 1	-0.096** (0.046)		
Wave 0	-0.116*** (0.039)		
Wave -2	-0.003 (0.037)		
Wave -3	-0.003 (0.046)		
Wave -4	0.027 (0.052)		
Wave -5	0.031 (0.053)		
Wave -6	0.018 (0.055)		
Wave -7	0.014 (0.055)		
Survey-wave FEs	✓	✓	✓
State FEs	✓	✓	✓
Post _t × X _i		✓	
Observations	8885	8885	7293

Notes: The first column displays the event study estimates of equation (1.2) and the corresponding DD estimate in the first row. The second column reports, in the first row, the DD estimate with additional controls, interacted with $Post_t$. The last column reports the DD estimate for equation (1.3). Standard errors clustered at the household level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Given the large effect of the COVID-19 shock on income risk as perceived by U.S. households (e.g., Dietrich et al. 2022), it is thus conceivable that they adjusted the resources devoted to collecting information about their finances – e.g., by checking their credit reports or scores. The increased value associated with learning or tracking their finances more regularly could by itself rationalize a higher information demand by households. What is more, the value of this information might have increased disproportionately for non-sophisticated households compared to their sophisticated peers. These considerations suggest that the COVID-19 shock threatens the identification of the effect of the policy on information acquisition through a resolution to misperceptions.

I first examine whether differential exposure to the pandemic could be an important confounding factor. I explore this possibility by adding time-invariant individual controls (e.g., for race, gender, and aversion to financial risk) and their interactions with the $Post_t$ dummy. This allows for each borrower characteristic to have a separate and time-varying effect on the likelihood of information updating. I continue to find that non-sophisticated households were significantly more likely to have updated their information set compared to their sophisticated counterparts. This result is reported in the second column (in the first row) of Table 1.6.

Next, I compare changes in updating behavior before and after the policy change across sophisticated households that were more or less likely to be unemployed during the COVID-19 crisis – especially early in the crisis. Since sophisticated households do not face information frictions, this comparison informs us of the effect of the change in information value on information acquisition. More formally, I estimate the following linear specification:

$$y_{i,t} = \alpha + \beta Post_t + \theta HighExposure_i + \delta (HighExposure_i \times Post_t) + \gamma X_i + \lambda_t + \lambda_{s(i)} + \varepsilon_{i,t} \quad (1.3)$$

where $HighExposure_i$ is a dummy denoting whether household i was more exposed to unemployment risk during the pandemic. Several studies document disproportionate

impacts of the pandemic on the labor market outcomes of women, minority groups, and young workers (e.g., Alon et al. 2020; Kenneth A Couch, Fairlie, and Xu 2020; Albanesi and J. Kim 2021).²⁵ Therefore, HighExposure_i equals one for non-white/Hispanic women, women ages 18 to 40, and non-white/Hispanic households ages 18 to 40; and 0 for white men, men ages 40 or older, and white households ages 40 or older. In this specification, X_i includes dummy variables for marital status, having children in the household, housing tenure status, and financial risk aversion. The coefficient of interest is δ . In line with models of endogenous information acquisition, I expect to find $\delta < 0$. Furthermore, λ_t is a vector of fixed effects for the month of the survey and $\lambda_{s(i)}$ for the state of residence.

The third column of Table 1.6 reports, in the second row, the result of this test. I do not find evidence on the importance of the exposure to unemployment/income risk for the updating behavior of sophisticated households. Under the assumption that HighExposure_i is a high-quality proxy for risk exposure, then it is conceivable to expect a similar result for non-sophisticated households. Although it is difficult to establish causality, my findings, taken together, support the interpretation that the new credit reporting policy played an important role in explaining the higher information acquisition by non-sophisticated households.

1.8 Conclusion

This paper uses survey data from the U.S. and quantifies that 44% of discouraged borrowers who appeared unconstrained to meet their demand for a credit card failed to do so. A simple back-of-the-envelope calculation based on this counterfactual estimate shows that discouragement leads to a particularly large shortage in aggregate credit demand. This result thus indicates that discouragement might have implications for the power of the credit channel of monetary policy transmission.

²⁵Many factors explain the pandemic's larger impacts on the labor market outcomes those groups. For instance, women were more likely to carry a higher childcare burden when schools were closed, and Latinx tended to work in contact-intensive sectors.

My empirical findings provide evidence that discouraged borrowers use of outdated information about their creditworthiness when forming beliefs about their ability to borrow is a sensible explanation for their mistake. Because these borrowers are financially unsophisticated, they are more likely to face information frictions, which makes them slower in updating their information set. One possibility is that non-sophisticated discouraged borrowers mistakenly believe that checking their credit scores/reports negatively affects their current and future ability to borrow. Consistent with non-sophisticated households facing larger information frictions, I show, in a difference-in-differences framework, that a change in credit bureaus' credit reporting policy in early 2020 contributed to a significant decline in the degree of information rigidity by facilitating information acquisition.

While I find that discouraged borrowers would have obtained credit amounting to 10% of their annual income had they applied, I remain agnostic as to rendering judgment on the welfare consequences of discouragement or desirability of credit for those borrowers. Credit access can exacerbate financial distress among financially illiterate/unsophisticated individuals, as they might also have self-control problems (e.g., Gathergood 2012; Benjamin, Brown, and Shapiro 2013). However, it is also possible that unjustified discouragement exacerbates financial hardship. If households are pessimistic about their access to bank credit, they might turn to financial services outside the banking system (e.g., payday loans), which are readily available but are higher-cost products. In such a scenario, access to a bankcard is arguably a better alternative to discouraged borrowers, even if the desirability of credit itself is ambiguous. Interestingly, data from the National Survey of Unbanked and Underbanked Households maintained by the Federal Deposit Insurance Corporation provide suggestive evidence on a substitution toward higher-cost, alternative financial products because of discouragement. For example, part of the decline in the share of households with unmet demand for mainstream credit in 2017 relative to 2015 is followed by a reduction in the proportion of borrowers that were discouraged about applying for bank credit or used alternative sources of credit. I leave for future research the examination of the real cost of discouragement through this substitution channel.

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Chapter 2

Political pressure on the Fed and inflation expectations de-anchoring

Abstract

This paper studies the effects of President Trump’s tweets criticizing the Fed on households’ inflation expectations. Using survey data from the New York Fed’s Survey of Consumer Expectations, I isolate the effects of tweets by comparing consumers’ responses to the survey filed in a narrow window around the tweets. Political pressure on the Fed causes the de-anchoring of expectations, as both uncertainty about future inflation and the sensitivity of longer-term inflation expectations to their short-term counterpart increase. These results apply only to informed households, while information frictions are a plausible explanation for the muted response of uninformed households.

2.1 Introduction

Central banks in advanced economies broadly agree that anchoring private sector long-term inflation expectations is crucial to the conduct of monetary policy. When expectations are anchored, the conventional wisdom is that monetary policymakers can “look

through” temporary shocks to inflation, as these shocks do not filter into the mechanisms of wage and price formation.¹ As a result, temporary shocks would not pose a threat to central banks’ goal of maintaining inflation low and stable over the longer term. At the same time, central banks have long recognized the importance of public trust in their commitment and ability to keep inflation – and inflation expectations – stable or disinflation less costly (e.g., Blinder 2000).

Concerns about inflation expectations de-anchoring have resurfaced in the aftermath of the Covid-19 pandemic, when the world economy experienced supply shocks and inflation levels not seen in 40 years (e.g., Reis 2022). More recently, policymakers have been debating whether higher U.S. tariffs will lead to a one-time increase in the price level or to a more persistent impact on inflation. During a speech in April 2025 on the economic outlook, Chairman Jay Powell emphasized that tariffs would most likely lead to a temporary rise in inflation and that “avoiding that outcome [of a more persistent increase in inflation] would depend on keeping longer-term inflation expectations well anchored [...]”

While much of the extant literature focuses on the effects of supply/demand shocks or policy changes on inflation expectations, the political dimension of U.S. monetary policy and its economic implications are attracting renewed attention. This paper studies whether political pressure de-anchor inflation expectations by undermining the *perceived* credibility of a central bank with high legal independence. Specifically, I investigate whether President Donald Trump’s tweets openly criticizing the Federal Reserve for allegedly keeping monetary conditions too tight caused households to become more uncertain about their longer-term inflation expectations and/or increased the sensitivity of longer-term inflation expectations to their short-term counterpart.

U.S. presidents may attempt to influence Fed’s policy by appointing members of the Board of Governors who are aligned with their partisan preferences. The members participate in the Federal Open Market Committee (FOMC), the body responsible for imple-

¹The negligible co-movement between long- and short-term inflation expectations is one of the several possible characterizations of anchored inflation expectations (e.g., Kumar et al. 2015).

menting monetary policy by targeting the federal funds rate. Career concerns within the FOMC, on the other hand, may limit political influence of a president. Such concerns can arise because of a “revolving door” between the Fed and private financial sector.

The empirical analysis combines Trump’s tweets during his first presidential mandate with household-level survey data from the New York Fed’s Survey of Consumer expectations (SCE). The SCE elicits households’ expectations for several economic outcomes and collects a rich array of demographic characteristics for each respondent. The sample consists of 40 tweets and covers the period from April 2018 to May 2020. Over this period, the Fed continued to increase the target range for the federal funds rate before gradually cutting it in the months preceding the COVID-19 pandemic, when rates were set to the zero lower bound. During the short-lived easing cycle, Trump intensified his criticism towards the Fed, tweeting 20 times in just 3 months.

To identify the causal effect of tweets on households’ inflation beliefs, I use a high-frequency identification strategy that compares respondents’ expectations in a 7- and 5-day window around a tweet. The key identifying assumption is that in a tight window respondents’ information sets differ only by the content of the tweet. To strengthen identification, I exclude tweets whose effects are potentially confounded by other economic events. In addition, identification relies on the close-to-random SCE surveying scheme, which allots new panelists to three batches randomly in their first month of participation.

My analysis yields the following main findings. I start by showing the average effect of tweets on inflation beliefs. Consistent with the de-anchoring of expectations, households become more uncertain about their (long-term) inflation forecast as both the standard deviation and interquartile range of their subjective probability distribution rise significantly after a tweet. The estimated effect is about 12% of the inflation target and holds for the 7- and 5-day event windows. By contrast, tweets have no impact on the co-movement between the three-year and one-year ahead inflation expectations.

Second, I find that the average effect on inflation uncertainty is driven by informed survey respondents, defined as those who are in charge of financial decisions in their household. Similar to professional forecasters and financial market participants, house-

holds in charge of financial decisions arguably have more incentives to pay attention to economic news. In addition, they may also find it easier to process economic information because of their relative high numeracy skills. I also find evidence, albeit weaker, that their longer-term inflation expectations become more sensitive to their short-term counterpart. Consistent with models of rational inattention, the expectations of uninformed households on the other hand do not respond to Trump’s tweets.

Third, additional results show that inflation expectations of informed households remain de-anchored – as indicated by measures of inflation uncertainty – for about four months. I also find that tighter monetary policy is considered less likely by informed households. Uninformed households, by contrast, do not adjust their inflation expectations even after “newsworthy” tweets from Trump.

My baseline findings are not driven by systematic differences across households who fill the survey in days around the tweets and are not confounded by macroeconomic data releases – i.e., CPI and nonfarm payrolls – nor interest rate decisions by the Fed.

The study is organized as follows. Section 2.2 discusses the related literature and my main contributions. Section 2.3 details the institutional setting and describes the data, while section 2.4 presents the empirical approach and the results. Section 2.5 discusses attacks made by Trump during his second term, while Section 2.6 concludes.

2.2 Related literature

This paper connects to three strands of research. The first is a large theoretical and empirical literature on the relationship between central bank independence and economic outcomes.² The chief theoretical argument for central bank independence relies on the inflationary bias that otherwise would be present in monetary policy due to dynamic inconsistency problems (e.g., Kydland and Prescott 1977). To the extent that high and volatile inflation have economic costs, one would expect central bank independence to

²The empirical literature also documents that central banks, even those with high legal independence, frequently face political pressure for looser monetary policy (e.g. C. C. Binder 2021b; Ehrmann and Fratzscher 2011)

improve economic performance. Seminal work by Cukierman, Web, and Neyapti (1992) and Alesina and Summers (1993) find that inflation is on average lower and less volatile in countries where central banks are more insulated from political interference. More recently, Drechsel (2024) finds that political pressure shocks on the Fed increase inflation strongly and persistently. Jácome and Pienknagura (2022) explore the link between central bank independence and inflation for 17 Latin American countries. Their results indicate that episodes of high inflation become less likely with improvement in central bank independence. Using a representative survey of the Dutch-speaking population in the Netherlands, Christelis et al. (2020) show that increased perceptions about the credibility of the European Central Bank significantly reduces uncertainty about future inflation.

Closer to my paper, C. Binder (2021) analyzes the effect of Trump’s tweets that criticize the Fed on consumers’ long-run inflation expectations. Her paper uses a survey-based experiment wherein a subset of respondents are exposed either to a single tweet or to that tweet plus a news article discussing the President as a threat to the Fed’s independence. While her empirical approach differs from mine, she also finds evidence on expectations de-anchoring, as long-run inflation expectations of “treated” respondents become farther from the Fed’s target. I add to her work by studying the effect of *all* tweets pressuring the Fed on additional gauges of expectations de-anchoring – i.e., uncertainty and co-movement between longer and shorter-term expectations – using *observational* data. Bianchi et al. (2023) investigate the effect of tweets on market expectations about future monetary policy. Using a high-frequency identification approach, they show that Trump tweets reduce market expectations of the future federal funds.³ Moreover, the evidence from a VAR shows the tweets had an important impact on *actual* monetary policy. My work contributes to this paper by documenting that informed/attentive households too do not perceive the Fed as a fully independent institution immune from political pressure from the president.⁴ While they study the effect of tweets on short-term interest rates, I

³They also find a positive stock market reaction to the tweets. A negative stock market reaction to the tweets would pose a challenge to their interpretation since one could argue that expectations of lower future interest rates would be instead explained by bad news about the state of the economy.

⁴In a related contribution, Matveev and Ruge-Murcia (2024) employ a high-frequency empirical ap-

focus on whether inflation expectations de-anchor in response to those tweets.

Second, this paper relates to the literature on the role of attentiveness and understanding of economic concepts to channeling monetary and fiscal policy announcements to the general public. Much of this work has focused on whether and how central banks can communicate to consumers and firms. Consistent with models of rational inattention, this literature documents that both consumers' economic/financial literacy and exposure to relevant macroeconomic variables help explain their response to policy announcements (e.g., C. Binder 2017). My findings resemble those in De Fiore, M. J. Lombardi, and Schuffels (2022) and De Fiore, M. Lombardi, and Pierres-Tejada (2024), who study households' expectations in the context of monetary and fiscal policy announcements, respectively. Both papers show that expectations of individuals more exposed to financial-decision making react more strongly to policy news.

Third, this paper also speaks to the literature that investigates the interplay between inflation expectations and the transmission of monetary policy (e.g. Diegel and Nautz 2021; Dong et al. 2024; Ciccarelli, Garcia, and Montes-Galdón 2017). Using a local projection approach, Dong et al. (2024) show that households' inflation disagreement attenuates the responses of macroeconomic variables to conventional interest rate policy shocks. Their model rationalizes this finding by predicting a rising share of credit-constrained household as inflation disagreement increases, which in turn causes aggregate consumption to adjust less than one-for-one to changes in the real interest rate.⁵ My findings contribute to this body of research by showing that political pressure on the central bank might affect monetary policy transmission indirectly by changing (or de-anchoring) inflation expectations of the private-sector.

proach to study the reaction of the exchange rate market to tweets by President Trump regarding possible tariffs increases on Canadian and Mexican goods. The results show that the anticipation of trade restrictions leads to an immediate and persistent appreciation of the U.S. dollar with respect to the Canadian dollar and Mexican peso.

⁵The New Keynesian model incorporates heterogeneous beliefs about the inflation target and borrowing constraints.

2.3 Institutional background and data

This section describes the institutional background and the data used in the paper. The empirical analysis combines tweets by President Trump that pose a threat on Fed independence and household expectations from the the New York Fed's Survey of Consumer Expectations (SCE).

2.3.1 Federal Reserve System

U.S. Congress established the Fed in 1913 through the Federal Reserve Act. The current structure of the Fed consists of the Board of Governors, twelve Federal Reserve Banks, and the Federal Open Market Committee (FOMC) – the body responsible for setting monetary policy. Fed's independence traces back to the Banking Act of 1935 and, since then, it aims to indicate the independence of monetary policy from presidential control (Richardson and Wilcox (2025)). The Act removed the Secretary of Treasury and Comptroller of Currency from the Board of Governors, while changes to governors' mandate to at least 14 years meant U.S. presidents would no longer be able to appoint a majority of the FOMC. Since 1977, the Fed has been charged with the dual mandate of promoting maximum employment and price stability.

A U.S. president can still attempt to influence policy through the nomination of members of the Board of Governors, as one would expect partisan preferences to affect the appointments process.⁶ The Board is run by seven governors, including a Chair who receives a four-year term separate from his term as a governor. The members of the Board serve staggered 14-year terms, and their appointments are subject to confirmation by the Senate. The governors participate at the FOMC'S meetings that set the target range for the federal funds rate, while also overseeing the activities of the Reserve Banks.⁷ Tradi-

⁶In their seminal paper, Chappell Jr, Havrilesky, and McGregor (1993) find that the power to make appointments provides an important channel of systematic partisan influence on FOMC voting behavior.

⁷The FOMC's voting participants include the seven members of the Board of Governors, the president of the Federal Reserve Bank of New York, and four of the remaining eleven Reserve Bank presidents – who serve one-year terms on a rotating basis.

tionally, the FOMC elects the chair of the Fed Board as the chair of the committee, and president of the New York Fed as its vice chair.

While the U.S. president nominates the members of the Board, these can not be removed at-will before their term expires. The Banking Act of 1935 wrote into law the provision that members of the Board of Governors can only be removed for “cause”, generally interpreted to mean malfeasance or misconduct, not policy disagreement.

2.3.2 Presidential tweets

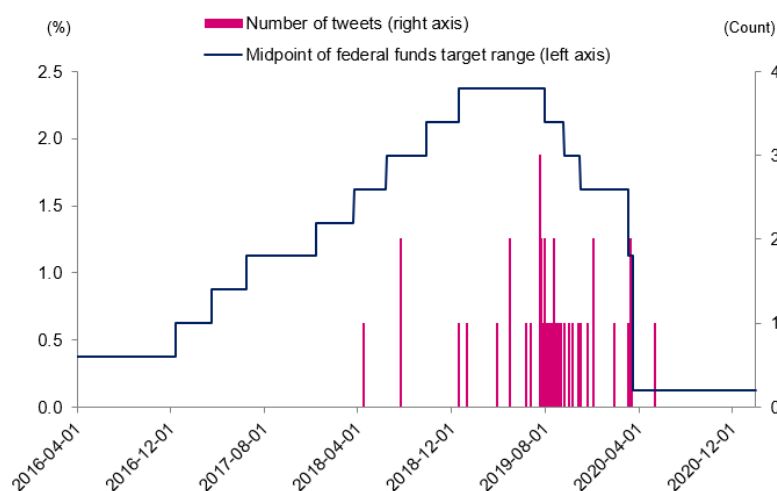
Political pressure from the executive branch on Fed decision making is pervasive in the U.S. modern history. Former U.S. presidents interference frequently aimed for loser monetary/credit conditions, as these were viewed to deliver (fast) economic growth. The attempts to influence monetary policy in the past were more likely to occur behind closed doors. Trump’s pressure on the Fed, by contrast, are characterized by being widespread and publicly observable.

Data on tweets by President Trump criticizing the Fed and advocating lower interest rates come from Bianchi et al. (2023). They collect the entire set of tweets from the personal Twitter account of President Trump from the announcement of his presidential campaign in June 2015 till the end of his presidency in January 2021 and select those that pose a clear threat to central bank independence. In addition, tweets which occur within the narrow event window of other related news are excluded to isolate the impact of political pressure on the Fed. Retweets by Trump – of someone’s else tweet retiring his view – and tweets that occur right after an initial tweet are also dropped as they do not contain new information.

Their final sample consists of 49 tweets. Since I aggregate tweets to a daily frequency, my sample contains 40 tweet-day events. The first tweet criticizing the Fed was on April 16, 2018 and the last tweet on May 12, 2020. As Figure 2.1 shows, the initial tweets criticizing the Fed occurred during a tightening cycle that lifted the (midpoint of) policy

rate to 2.375% in December 2018 from 0.625% in the first month of Trump’s term.⁸ Trump continued to criticize the Fed when the policy rate was held constant and even more frequently – 20 tweets – during the brief easing cycle from August 2019 to October 2019. Table B1 in the Appendix reports the text and date of all tweets used in the empirical analysis.

Figure 2.1: Federal funds rate (midpoint) and number of tweets over time



2.3.3 Survey of consumer expectations

The SCE is a monthly, internet-based, and nationally representative survey of about 1,300 household heads with a rotating panel structure. New respondents are drawn each month to match various demographic targets from the American Community Survey (ACS), and they can stay on the panel for up to twelve months before rotating out.

The main objective of the survey is to collect expectations for a wide range of economic outcomes such as inflation, unemployment, income, and spending. To do so, the survey is sent to respondents in three batches throughout the month. New respondents are randomly allocated to one of the three equal-sized batches. Respondents then stay in their initial batch throughout their maximum 12-month tenure to ensure they receive

⁸The tightening cycle began in December 2015, when the target for the federal funds increased for the first time in almost ten years.

survey invitations roughly 30 days apart, thereby implicitly preserving the initial random assignment to batches.

The SCE runs on a monthly basis since June 2013. The timing of the sample is mostly determined by the dates where Trump criticized the Fed on social media. The sample spans from April 2018 to November 2020, thus allowing to study the dynamic effects of tweets on inflation beliefs on the short-run.

Measures of inflation expectations and uncertainty The SCE elicits different measures of inflation beliefs. I focus on the short- and medium-term inflation density forecasts. The short-term horizon corresponds to the year-ahead rate of inflation (“Over the next 12 months”), while the medium-term horizon corresponds to the three-year ahead one-year rate of inflation (“Over the 12-month period between $M + 24$ and $M + 36$ ”, where M is the month in which the respondent takes the survey). For each horizon, a respondent is asked to assign the percent chance that the rate of inflation at the specified horizon will be within each of the following intervals: (-12% or less], [-12%, -8%], [-8%, -4%], [-4%, -2%], [-2%, 0%], [0%, 2%], [2%, 4%], [4%, 8%], [8%, 12%], [12% or more).

These probabilistic forecasts provide valuable information about the extremes of respondents’ inflation expectations and convey a measure of their uncertainty regarding future inflation. Formally, these are obtained by fitting a generalized beta distribution to each respondent’s density forecast and calculating the corresponding mean, interquartile range, and standard deviation (Armantier, Topa, et al. (2017)).

Other households’ macroeconomic expectations The SCE also elicits expectations of other aggregate economic outcomes. In particular, survey participants provide their views on the unemployment rate, stock market prices, and interest rates. Specifically, each respondent is asked what are the percent chances that over the next 12 months the national unemployment rate, stock prices in the U.S. stock market, and the average interest rate on savings accounts will be higher than they are now.

Demographics and other individual characteristics Furthermore, the SCE collects a rich array of demographic characteristics for each respondent. These include gender, income, marital status, housing tenure status, education, among others. The survey also elicits attitudes towards risk, numeracy/financial literacy, and exposure to financial decision-making. Households are said to have high numeracy/financial literacy when they correctly answer at least four of seven questions that measure their understanding of compounding interest, probability, risk and numerical reasoning. Respondents' exposure to financial decision-making is elicited by asking whether they are in charge of financial decisions in their household.

2.4 Empirical investigation

This section investigates the impact, if any, of Trump tweets criticizing the Fed and advocating lower interest rates on households' inflation beliefs.

2.4.1 The average effect of tweets on inflation beliefs

The main objective of the paper is to study whether Trump's tweets contributed to de-anchor inflation expectations of U.S. households. I use a high-frequency identification strategy that compares households' expectations in the days surrounding a tweet. The key identifying assumption is that in a narrow window around a tweet the only difference between the information sets of respondents in the "treatment" group (i.e., after a tweet) and "control" group (i.e., before a tweet) is the content of the tweet. While a wider window increases the number of observations surrounding each tweet and allows for the possibility that expectations respond with a delay, a tighter window enhances the identification strategy by minimizing the impact of other macroeconomic data release that may fall within the window.

My baseline specifications use five- and seven-day windows around each tweet, which is in line with recent work by De Fiore, M. Lombardi, and Pierres-Tejada (2024), Lamla

and Vinogradov (2019), C. C. Binder (2021a), and Di Pace, Mangiante, and Masolo (2025) in the context of households and firms expectations. These windows are notably wider than those used to identify the effects of announcements on the expectations of financial market participants (e.g., Bianchi et al. 2023; Matveev and Ruge-Murcia 2024), likely because they respond faster to economic-related announcements or events than households. To strengthen the validity of my identification strategy, I collect data on the release of two main macroeconomic indicators (CPI and Nonfarm Employment Report) and FOMC rate decisions, and exclude the tweets if those releases/announcements fall within my identification window. Specifically, I consider “eventful” releases, as these are more likely to receive greater-than-usual amount of news coverage and/or change households expectations. Eventful macroeconomic releases consist of stronger-than-anticipated inflation and employment as well as cuts in the federal funds rate.⁹

I begin by testing the effect of tweets on inflation uncertainty. I use the interquartile range and the standard deviation of the estimated density function as measures of each individual’s uncertainty about their inflation expectations.¹⁰ When expectations are anchored, households should be fairly confident of their forecast, especially over the longer-run (e.g., Kumar et al. 2015). Hence, finding an increase in individual inflation uncertainty after a tweet would suggest a de-anchoring of inflation expectations. Formally, I estimate the following regression:

$$Y_{it}^{3y} = \alpha + \beta \text{PostTweet} + \theta X_{it} + \varepsilon_{it}, \quad (2.1)$$

where Y_{it}^{3y} is respondent i ’s 3-year-ahead inflation uncertainty at time t from the SCE, which I use as proxy for long-term expectations¹¹; PostTweet is a dummy for whether individual i was interviewed after any tweet (up to five or seven days), and X_{it} controls

⁹Following C. C. Binder, J. R. Campbell, and Ryngaert (2024), I use Bloomberg consensus forecast to characterize the releases as positive or negative surprises.

¹⁰Kostyshyna and Petersen (2024) and Armantier, Koşar, et al. (2021) also use the interquartile range to measure uncertainty, while Kumar et al. (2015) and Goldfayn-Frank and Wohlfart (2020) use the standard deviation.

¹¹The SCE started to elicit five-year ahead inflation expectations in May 2022 – i.e., after the last tweet in our sample.

for the respondent's characteristics which include gender, education, marital status, age, income, survey tenure, attitude toward risk, state and time fixed effects. The inclusion of these characteristics helps control for systematic differences in expectations across demographic groups – e.g., women and households from lower socioeconomic background tend to have higher inflation expectations than others (e.g., Bruine de Bruin et al. (2010)).

The coefficient of interest, β , tests whether Trumps' tweets cause adjustments in households' inflation uncertainty. I report the results of this test in Table 2.1.

Across the board, I find that households become more uncertain about their inflation forecast following a tweet from President Trump. The effects are economically large. For instance, the estimates in columns 2 and 4 are about 6% of the unconditional mean (and when *PostTweet* equals zero) and 12% of the inflation target.

Table 2.1: Effect of tweets on inflation uncertainty

	Standard deviation		Interquartile range	
	7 days	5 days	7 days	5 days
PostTweet	0.140* (0.075)	0.155* (0.082)	0.232** (0.118)	0.246* (0.130)
Respondents	All	All	All	All
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	6,937	6,139	6,937	6,139
R^2	0.147	0.140	0.140	0.134

Notes: This table reports OLS estimates of equation 2.1. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The second specification tests whether the sensitivity of longer-run inflation expectations with respect to their short-term counterpart increases following a presidential tweet criticizing the Fed. When expectations are anchored, one should expect a negligible co-movement between the short- and longer-term inflation expectations as the latter should

be pinned down by the inflation target and less so by shocks that affect the short-run outlook (e.g., Kumar et al. 2015; Bonomo et al. 2024). I thus estimate the following regression:

$$\pi_{it}^{e,3y} = \gamma + \lambda \pi_{it}^{e,1y} + \delta(\text{PostTweet} \times \pi_{it}^{e,1y}) + \eta X_{it} + \mu_{it}. \quad (2.2)$$

Here, $\pi_{it}^{e,3y}$ and $\pi_{it}^{e,1y}$ are respondent i 's three- and one-year-ahead inflation expectation, respectively. All other variables are as before. The coefficient of interest, δ , tests whether the sensitivity of longer-term inflation expectations to short-term expectations increases in response to tweets criticizing the Fed.

Table 2.2 reports the results of this specification. Across the board, I find that short- and longer-term inflation expectations are highly correlated. For instance, column 1 shows that a one-percentage point increase in one-year ahead inflation expectations is associated to a 0.64 percentage point increase in three-year ahead inflation expectations. This result suggests that, on average, households' inflation expectations are de-anchored, in line with findings from Coibion and Gorodnichenko (2025). In addition, Trump's tweets have no effect on the average pass-through of short-run beliefs into longer-run expectations.

2.4.2 The heterogeneous effect of tweets on inflation beliefs: the role of information frictions

My baseline results show an increase in uncertainty about future inflation in response to political pressures on the Fed. This outcome is somewhat surprising, as many other studies find a muted impact of macroeconomic data releases or announcements – including FOMC rate decisions – on households' inflation expectations.

A prominent explanation for the virtually null effect of macroeconomic data releases on expectations is that households face large information frictions, particularly compared to financial market participants. According to theories of rational inattention, households may not be attentive to news about the Fed and the macro-economy more broadly as the

Table 2.2: Effect of tweets on the sensitivity of long-run inflation expectations

	7-day window		5-day window	
	(1)	(2)	(3)	(4)
$\pi^{e,1y}$	0.637*** (0.006)	0.659*** (0.037)	0.637*** (0.006)	0.653*** (0.040)
PostTweet $\times \pi^{e,1y}$		0.037 (0.041)		0.044 (0.047)
Respondents	All	All	All	All
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	102,742	6,885	102,742	6,092
R^2	0.397	0.466	0.397	0.454

Notes: This table reports OLS estimates of equation 2.2. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

costs to acquire and process information may exceed the benefits (e.g., Reis 2006; Roth, Settele, and Wohlfart 2022; Maćkowiak, Matějka, and Wiederholt 2023).

To further investigate the role of information frictions in shaping the relationship between political pressure on the Fed and inflation expectations, I split the sample between households who are more and less likely to be informed about and interpret Trump’s tweets advocating interest rates. Specifically, I divide the sample between households who are in charge of financial decisions in their households and those who are not. The underlying reasoning is that households who are responsible for financial decisions have greater incentives to be attentive to economic news and may find it easier to collect and process information because of their superior financial literacy skills. This approach follows that of De Fiore, M. J. Lombardi, and Schuffels (2022) and De Fiore, M. Lombardi, and Pierres-Tejada (2024). Similarly, C. Binder (2017) defines as informed consumer a survey respondent who has investments in the stock market and holds a college degree.

Table 2.3 reports the first piece of evidence on the role of information frictions. Con-

Table 2.3: Effect of tweets on inflation uncertainty : heterogeneity by financial decision-making

	Standard deviation		Interquartile range	
	Informed	Uninformed	Informed	Uninformed
Panel A. 7-day window				
PostTweet	0.211*	-0.043	0.362*	-0.047
	(0.127)	(0.111)	(0.201)	(0.175)
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	2,232	3,047	2,232	3,047
R^2	0.224	0.161	0.218	0.153
Panel B. 5-day window				
PostTweet	0.297**	-0.066	0.452**	-0.058
	(0.145)	(0.120)	(0.230)	(0.191)
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	1,981	2,714	1,981	2,714
R^2	0.233	0.152	0.227	0.144

Notes: This table reports OLS estimates of equation 2.1 for different types of respondents according to their participation in financial decision process in their households. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

sistent with models of rational inattention, informed households become more uncertain about their inflation forecast in response to tweets from Trump, while the expectations of uninformed households do not react in any meaningful way. It should be noted that previous work (e.g., C. Binder 2017) find that informed households typically have more anchored inflation expectations.

In addition, Table 2.4 provides some evidence that the average null effect of tweets on the co-movement between the 3- and 1-year ahead inflation expectations is masking the fact that attentive households adjust their longer-term expectations. As in the case for uncertainty, tweets have no effect on the expectations of uninformed households.

Table 2.4: Effect of tweets on the sensitivity of long-run inflation expectations: heterogeneity by financial decision-making

	Informed		Uninformed	
	(1)	(2)	(3)	(4)
Panel A. 7-day window				
PostTweet	0.616*** (0.009)	0.657*** (0.067)	0.642*** (0.009)	0.675*** (0.056)
PostTweet $\times \pi^{e,1y}$		0.083* (0.034)		0.024 (0.060)
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	44,733	2,217	45,016	3,021
R^2	0.373	0.495	0.416	0.476
Panel B. 5-day window				
PostTweet	0.616*** (0.009)	0.644*** (0.072)	0.642*** (0.009)	0.675*** (0.059)
PostTweet $\times \pi^{e,1y}$		0.014 (0.087)		0.098 (0.081)
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	44,733	1,972	45,016	2,686
R^2	0.373	0.447	0.416	0.520

Notes: This table reports OLS estimates of equation 2.2 for different types of respondents according to their participation in financial decision process in their households. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis.. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Taken together, my results reveal a stark asymmetry between informed and uninformed households. Survey respondents in charge of financial decisions, who are arguably more attentive and knowledgeable about Fed policy and mandate, react to Trump’s tweets. In particular, they become significantly less confident about their inflation forecasts, indicating that political pressures can de-anchor expectations. By contrast, tweets have no effect on uninformed households, arguably because these households did not read/heard about the tweets. It is also conceivable that they heard about the tweets but are not so sophisticated enough to grasp their implications.

2.4.3 Robustness

Balance tests My identification strategy also relies on the similarity between households in the treatment and control group. This requirement is particularly important in the case of the SCE, where survey participation may affect future responses. This panel conditioning effect is well documented for inflation expectations, with consumer inflation expectations and uncertainty decreasing notably with survey tenure (e.g., G. Kim and C. Binder 2023).

While the surveying scheme allots new panelists to three batches randomly, experienced participants are assigned non-randomly to the batches with the goal of increasing the time between responses.¹² This raises the possibility that households responding to the survey in days around a tweet are fundamentally different.

To statistically test whether that is the case, I compare the sample means of observable characteristics between households in the treatment (i.e., post-tweet period) and the control group. Reassuringly, the results from the balanced tests reported in Table B2 provide no evidence for systematic differences between households across demographic characteristics and survey participation.

¹²The assignment of experienced panelists is subject to the constraint of the three batches having roughly equal numbers of respondents.

Shorter event window I examine whether my baseline results survive to an ever shorter event window of three days. I restrict the analysis to informed households, as I found no effect on expectations of uninformed survey respondents. Across the board, the results in Table 2.5 show null effects of tweets on expectations. While this finding represents a caveat to my main conclusions, it does not necessarily invalidate them. First, it is possible that households take more time (than three days) to hear and interpret a tweet. Second, the cost of a shorter event window is the significant smaller sample size, which may interfere with the results.

Table 2.5: Effect of tweets on expectations of informed households using a 3-day window

	Inflation uncertainty		Sensitivity
	Standard deviation	IQR	3y-1y
PostTweet	0.024 (0.173)	0.006 (0.274)	0.592*** (0.100)
PostTweet $\times \pi^{e,1y}$			0.075 (0.105)
Individual Controls	✓	✓	✓
State Fixed Effects	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓
Observations	1,398	1,398	1,391
R^2	0.230	0.219	0.437

Notes: This table reports OLS estimates of equation 2.1 in the first two columns and of equation 2.2 in the last column. The sample is restricted to respondents who take financial decisions in their household. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Alternative proxies for attentiveness My baseline findings do not hold under alternative proxies for attentiveness, namely a dummy for high numeracy skills and a dummy for a college degree or high numeracy skills. These results, which are available upon request, suggest that possessing high numeracy skills and/or a college degree might not be a sufficient condition for being attentive to news about the economy. By contrast, being in

charge of financial decision making appears to translate into higher exposure to economic news, even after controlling for education and numeracy skills (Table 2.6)

Table 2.6: Effect of tweets on informed households controlling for education and numeracy using a 5-day window

	Inflation uncertainty (3-years ahead)		Sensitivity
	Standard deviation	IQR	3y-1y
PostTweet	0.304** (0.140)	0.463** (0.222)	0.643** (0.073)
PostTweet $\times \pi^{e,1y}$			0.015 (0.087)
Individual Controls	✓	✓	✓
State Fixed Effects	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓
Observations	1,981	1,981	1,972
R^2	0.272	0.255	0.448

Notes: This table reports OLS estimates of equation 2.1 in the first two columns and of equation 2.2 in the last column. The sample is restricted to respondents who take financial decisions in their household. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

2.4.4 Additional results

Having established the immediate effects of Trump tweets on inflation uncertainty, this section asks whether those effects persist. This section also estimates the effects of the tweets on interest rate expectations, and whether uninformed households respond to more visible tweets.

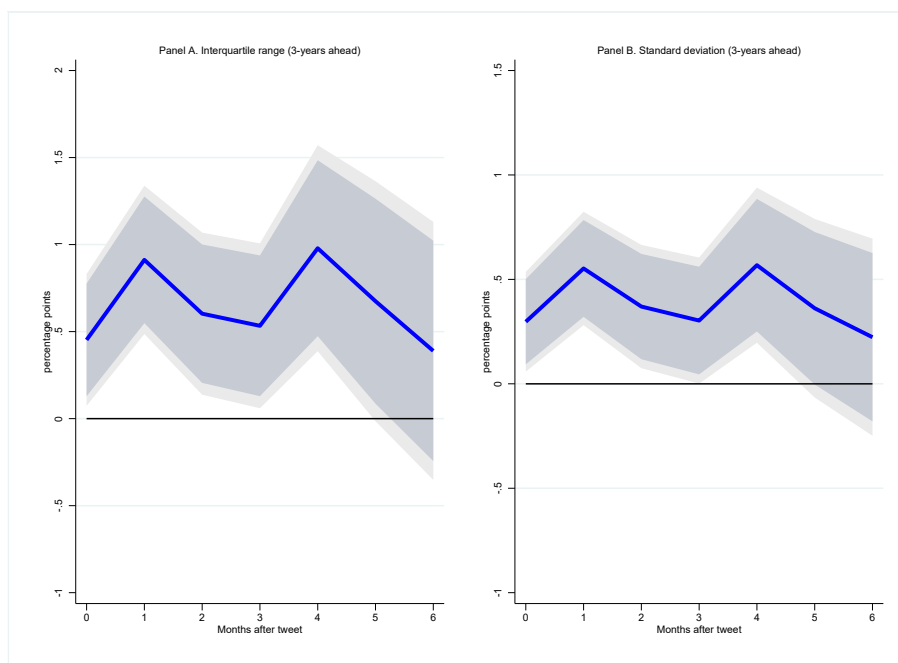
Dynamics I estimate the medium-term effect of tweets on inflation uncertainty of attentive households by local projections building on Jordà (2005):

$$y_{i,t+h} = \alpha_h + \delta_{t,h} + \beta_h PostTweet_t + \theta_h X_{i,t} + \varepsilon_{i,t+h}, \quad (2.3)$$

where $y_{i,t+h}$ is a measure of inflation uncertainty for individual i in month $t+h$ and $PostTweet_t$, our main variable of interest, is a dummy for whether individual i filled the survey after a tweet. The vector $X_{c,t}$ includes individual characteristics, while common time-varying shocks are controlled for through survey wave fixed effects ($\delta_{t,h}$).

Figure 2.2 shows the dynamic effects of tweets on inflation uncertainty. The results indicate that political pressure may deteriorate the trade-off faced by the Fed when conducting monetary policy, as the increase in uncertainty – measured by the IQR or standard deviation – persists for about four months after a tweet.

Figure 2.2: Dynamics effect of tweets on inflation uncertainty of informed households



Note: This figure plots the impulse responses of inflation uncertainty to a tweet using a 5-day window.

The effect of tweets on other expectations I also estimate the impact of tweets on interest rate expectations. Specifically, the SCE asks respondents to inform the percent chance that the average interest rate on savings account will be higher over the next 12 months.¹³ Informed households find it less likely that interest rates will be higher fol-

¹³De Fiore, M. J. Lombardi, and Schuffels (2022) use this variable when evaluating households' response to monetary policy announcements.

lowing a tweet, while the expectations of uninformed households remain unchanged – see Table 2.7. This result resembles that of Bianchi et al. (2023). Focusing on financial markets, they also find that tweets have a negative effect on interest rate expectations – measured by the expected federal funds rate implied by federal funds futures prices. Interestingly, my results indicate that informed households and financial market participants hold similar views about the implications of political pressure on the Fed for monetary policy.

Table 2.7: Effect of tweets on the probability of higher interest rates

	7-day window		5-day window	
	Informed	Uninformed	Informed	Uninformed
PostTweet	-2.391** (1.155)	-1.212 (0.992)	-2.867** (1.285)	-0.621 (1.074)
Individual Controls	✓	✓	✓	✓
State Fixed Effects	✓	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓	✓
Observations	2,266	3,095	2,007	2,758
R^2	0.142	0.106	0.135	0.102

Notes: This table reports OLS estimates for the effect of tweets on interest rates. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Newsworthy tweets To delve deeper into the role of information frictions, I study the effect of “newsworthy tweets” on the expectations of uninformed households. Since these tweets – ten in total – are above the median with respect to the number of replies, it is possible that they were more visible to the general public and to less attentive households in particular. Focusing on “relevant” does not change my conclusion that tweets have no effect on inflation expectations of uninformed households, as shown in Table 2.8.¹⁴

¹⁴For brevity, I only report results using a less stringent window of seven days. In addition, I use the inter-quartile range as measure of uncertainty. My results do not depend on these choices.

Table 2.8: Effect of tweets on expectations of uninformed households using a 7-day window

	IQR	Prob higher rates	Sensitivity
PostTweet	0.038 (0.189)	-0.491 (1.093)	0.692*** (0.100)
PostTweet $\times \pi^{e,ly}$			-0.005 (0.068)
Individual Controls	✓	✓	✓
State Fixed Effects	✓	✓	✓
Survey-Wave Fixed Effects	✓	✓	✓
Observations	2,313	2,354	2,290
R^2	0.151	0.105	0.463

Notes: This table reports OLS estimates of the effect of relevant tweets on inflation uncertainty, interest rate expectations, and sensitivity of long-run inflation expectations. The sample is restricted to uninformed respondents. Individual controls are dummy variables for being female, married, homeowner, Hispanic, and for high risk averse. They also include household nominal income categories, age, and survey tenure. Robust standard errors are in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

2.5 Pressure escalates during Trump second term

Donald Trump second presidential mandate begun in January 2025 and since then the pace and intensity of his attacks on the Fed have escalated. Trump has continued to criticize the Fed and its Chair on social media, in public interviews, and in press conferences.

A distinguishing feature of the political attacks by Trump during the first few months of his second mandate is the on-again, off-again threats to fire Powell and the calls for his resignation. On April 17, Trump accused Powell of “playing politics” by not cutting interest rates, asserting he had the power to remove Powell from his job “real fast”, and that Powell’s termination as Fed chair “cannot come fast enough”.¹⁵ According to the *The New York Times*, Trump moved forward with his intentions to remove Powell by drafting

¹⁵Calls for Powell’s resignation were made on several occasions – e.g., “Too Late should resign immediately!!!” and “I’d love it if he wants to resign”.

a letter to fire him.¹⁶

Trump further escalated his pressure campaign by visiting (on July 24) a construction area at the Fed where costly renovations of two historic buildings were taking place. The visit to the Fed, accompanied by Powell, was the first by a sitting president in roughly two decades and just one week ahead of a scheduled meeting of the Federal Open Market Committee (FOMC).¹⁷ During the tour of the Fed alongside Powell, Trump publicly expressed his demand for lower interest rates – “I’d love him to lower interest rates ” – and criticized the cost overruns of the project. Trump’s interest on the project was widely perceived as a potential avenue to fire Powell for cause, as fraud or other signs of project mismanagement by Powell could strength the case for removing him for cause. Despite the disagreement over the renovation cost and previous threats to firing Powell, Trump later told reporters that “To do that [i.e., fire Powell] is a big move, and I just don’t think it’s necessary. And I believe that he’s going to do the right thing.”

In an unprecedented and more consequential threat to the Fed’s independence, Trump announced (on August 25) his decision to fire Federal Reserve governor Lisa Cook, appointed by former President Biden in 2022. The Trump administration justified the firing citing (unproven) allegations that governor Cook submitted fraudulent information on mortgage applications – made before being appointed to the Board. In response to Trump announcement, governor Cook said she would not step down (“I will not resign”), arguing that “President Trump purported to fire me for cause when no cause exists under the law, and he has no authority to do so.”

2.6 Conclusion

During his first presidential mandate, Trump frequently criticized the Fed and its Chair for not cutting interest rates or doing so only slowly. While political pressure on the Fed

¹⁶“Trump Has Draft of Letter to Fire Fed Chair. He Asked Republicans if He Should Send It,” *The New York Times*, July 16, 2025. Available at: <https://www.nytimes.com/2025/07/16/us/politics/trump-powell-firing-letter.html>

¹⁷The last visit by a sitting president was in 2006, when George W. Bush attended the swearing-in of Ben Bernanke as Fed chairman. The FOMC held its benchmark interest rate steady at the decision meeting.

is not a new phenomenon associated with Trump, his attempts to interfere with monetary policy were unusual as they were made publicly – mostly on social media. Given the importance of inflation expectations for the conduct of monetary policy, this paper asks whether the tweets advocating for lower interest rates de-anchored households’ inflation expectations

The main result of this paper is that Trump tweets pressuring the Fed to cut interest rates de-anchored households’ inflation expectations. Households became less confident about their inflation forecast and their longer-term inflation expectations became more sensitive to their short-run counterpart. Because of information frictions, however, these findings only applies to households who were more likely to be attentive to that piece of information. The effect is relatively persistent as uncertainty stayed higher for about two months after the tweets. Trump continued to criticize the Fed in the first few months of his second presidential mandate, openly suggesting he would fire Powell before the end of his mandate in May 2026. Descriptive evidence suggests economists and financial market participants viewed the escalation of political pressure as a significant threat to Fed independence.¹⁸ Future research should delve into how households and other economic agents respondent to this new series of political attacks on the central bank.

The de-anchoring of inflation expectations due to political pressure indicates that Fed’s legal independence is not fully transmitted to households. While central banks have been successful in their efforts to improve their communications with expert audiences, the results of this paper demonstrate that enhancing credibility among the general public remains a challenging task and a fruitful topic for future research.

¹⁸For instance, the July’s 2025 Wall Street Journal’s survey of professional forecast reported that roughly a third of the respondents expected lower interest rates under the next Fed Chairman given Trump stated preference for rate cuts. Available at: https://www.wsj.com/economy/economists-us-recession-expectation-survey-91e45d95?mod=article_inline.

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Chapter 3

Labor market shocks and consumer finance – evidence from Brazil

Abstract

¹This paper studies the effect of job displacement on individuals' labor and credit market outcomes. Using Brazil as a laboratory, we link credit registry data to employment data to track those individual outcomes. Our difference-in-difference estimates show that workers who are hit by a permanent income decline delever and default following job loss. In contrast, workers who experience a transitory income decline maintain their consumption, as they borrow in anticipation of the upcoming job loss and also default on their debts. Moreover, these workers continue to increase their loan balances even after reemployment and full wage replacement.

3.1 Introduction

Job displacement is the main source of idiosyncratic earnings risk for most individuals in their prime age. A large body of research documents that losing a job has detrimental and highly persistent effects on labor market outcomes (e.g., Jacobson, LaLonde, and D. G.

Sullivan 1993; Kenneth A. Couch and Placzek 2010; Stevens 1997). The earnings losses associated with job displacement are typically large enough to adversely affect workers' well-being in multiple dimensions.²

One of the main economic costs associated with job loss is the decline in household consumption. The decrease in consumption at the onset of unemployment is large, but it is generally smaller than the associated income decline. A wealth of research documents that public and intra-household insurance provision allow displaced workers to weaken the contemporaneous impact of shocks to income on consumption (e.g., Bentolila and Ichino 2008; Gruber 1997; Halla, J. Schmieder, and A. Weber 2020; Khanna et al. 2021).

In this paper, we investigate the dynamics of household labor income, consumption, and borrowing over a 36-month period around job loss using newly linked administrative employment and credit registry data. Where previous studies have focused mostly on rich countries, we provide novel empirical evidence by turning to a large middle-income economy, Brazil. The matched data cover all credit contracts of the universe of formal private-sector workers whose total exposure to a financial institution is above a reporting threshold.

We implement a difference-in-differences strategy that compares changes in labor income, consumption, and credit variables for displaced workers to changes in the same outcomes for a control group of employed workers before and after layoff. To create an adequate set of always employed individuals for the control group, we use an almost exact matching procedure that takes advantage of a rich set of worker characteristics prior to job loss. These include demographics (e.g., age and gender), labor market outcomes (e.g., wage and sector of activity), and balance sheet variables (e.g., debt-to-income ratio). The key identifying assumption is that the trajectory of outcomes for displaced and employed workers would have been similar in the absence of layoff. We divide the pre-layoff period into non-anticipation and anticipation, allowing us to test the plausibility of the parallel trends assumption as well as study any potential anticipatory response to job loss.

²See Britto, Pinotti, and Sampaio (2022) and Khanna et al. (2021) on criminal activity, Browning and Heinesen (2012) on health, and Eliason (2012) on divorce.

Our analysis yields three main findings. First, we show that job displacement has a striking heterogeneous effect on labor income, echoing the evidence from the extant literature. More specifically, workers displaced from large firms experience a permanent income decline, likely reflecting the loss of a “good job” and the depreciation of firm-specific human capital. In contrast, workers laid off from small firms face only a temporary income decline. The substantial differences in income dynamics following job displacement occur even though all workers in our sample return to the formal labor market relatively fast, i.e., no longer than six months after job loss.

Mirroring the persistent wage loss, we then show that consumption of workers dismissed from large firms remains persistently lower. Our estimates imply a long-run loss 18 months after layoff of 24% for this group of workers. They also experience a decline in consumption at the onset of unemployment, but the drop is substantially smaller, likely mitigated by job displacement insurance benefits. On the other hand, the consumption of workers whose wages essentially recover does not decrease at the month of layoff and is it lower than the no-displacement counterfactual only momentarily during the unemployment spell.

Third, we show that workers dismissed from large firms delever and default in the months following job loss, as one would expect given the permanent hit to their income. Workers displaced by small firms, on the other hand, increase their loan balances in the months prior to unemployment, when they may gradually become aware of the upcoming job loss. This increase is driven by credit card debt and it is not accompanied by higher credit card spending, consistent with a *precautionary borrowing* motive: individuals who expect tighter credit constraints due to unemployment borrow for a rainy day while credit is still available. Their loan balances continue to increase over the period of analysis, while they also default on their debt.

The rest of the paper is organized as follows. Section 3.2 relates our work to the extant literature. Section 3.3 summarizes common theoretical predictions that guide the interpretation of our results. Section 3.4 provides institutional details on Brazilian labor and credit markets, and describes our data sources. Section 3.5 describes our empirical

framework. We show our main results in Section 3.6. Section 3.7 concludes.

3.2 Related literature

This paper contributes to several branches of the literature. First, our paper relates to a large body of research on the effects of job loss on labor income and consumption. This literature documents large, persistent, and highly heterogeneous earnings losses following job displacement (e.g., Eliason and Storrie 2006; Seim 2019; J. F. Schmieder, Von Wachter, and Heining 2023). Research also shows that this significant and lasting earnings reduction is accompanied by a decrease in consumption expenditures, although the pass-through is typically incomplete. Displaced workers tend to mitigate the effects of the income loss due to unemployment by raising money inflows from other sources or running down their savings (e.g., Fagereng, Onshuus, and Torstensen 2024; Halla, J. Schmieder, and A. Weber 2020; McGarry 2016).³ Most closely related to our paper is Gerard and Naritomi (2021), who study the spending profile of laid off Brazilian workers using de-identified expenditure and employment data in an event study design similar to ours. However, their objective is different from ours, as they are interested on the extent to which households smooth consumption around job displacement. Their empirical evidence is in stark contrast to standard economic models with forward-looking agents, as workers increase spending at layoff by 35% despite experiencing a 14% long-term loss. Their paper, however, abstracts from household debt in explaining the main empirical results.

Our work also connects to studies that investigate the potential role of credit markets for consumption smoothing. The empirical evidence emerging from this literature is far from clear. Several studies show that credit markets allow job losers to partially smooth idiosyncratic job loss shocks. The smoothing generally takes place with unconstrained households borrowing through unsecured debt (e.g., J. X. Sullivan 2008; Crossley and

³Money inflows from other sources include spousal labor supply, private transfers from family and friends, and government-mandated severance pay.

Low 2014; Braxton, K. Herkenhoff, and M. Phillips 2024) and the constrained defaulting on their loans (e.g., Gerardi et al. 2018; Keys 2018). On the other hand, Hundtofte, Olafsson, and Pagel (2019) and Andersen et al. (2023) show that individuals do not borrow to smooth consumption when they experience a typical transitory income shock of unemployment, relying instead on adjustments of liquid balances, spousal labor supply, and private transfers.

We contribute to these strands of the literature in two different ways. First, we confirm that job loss has heterogeneous effects on credit outcomes. While households who suffer a large and persistent income loss delever and default, households whose wages eventually recover use credit markets to replace their lost income. In addition, we provide empirical evidence on a novel consumer behavior due to (anticipated) job loss, the precautionary borrowing. The underlying motive for precautionary borrowing is that current debt can potentially soften a household’s borrowing constraint in future periods, thus providing extra liquidity. More specifically, we show that households who suffer a temporary income loss increase their credit card limits – but not consumption – in the months preceding job displacement.

Our paper also relates to a rapidly expanding literature on household finance (see Gomes, Haliassos, and Ramadorai (2021) for a literature review). A large part of this literature is concerned with the determinants and consequences of over-indebtedness. Using a major credit expansion program through government banks in Brazil in 2011, Garber et al. (2024) find robust evidence of a “consumption binging” behavior. In particular, they show that financially unsophisticated public sector workers over-borrowed (through payroll-backed loans) in response to the credit expansion, later experiencing lower average and higher variance of consumption. While we find that workers who suffer a temporary income decline due to job loss increase their borrowing in the subsequent months, their consumption does not drop after layoff .

3.3 Theoretical considerations

We draw on theoretical predictions of a vast literature for structuring the interpretation of our empirical findings. We consider both standard and alternative theoretical explanations for consumption-saving decisions in the context of a decline in income. The discussion focuses on the potential role of credit markets for self-insurance, and ignores other sources such as an increase in spouse labor supply and private transfers from family and friends.

In the canonical life-cycle/permanent income hypothesis (LCPIH) model, exponential discounting consumers can borrow and lend freely at a constant interest rate.⁴ Conceptually, to smooth consumption round a predictable and transitory income decline, consumers only need to build up a buffer of assets in anticipation of the decrease in income. As a result, consumers will exhibit no excess drop in spending in the period when income falls as they draw on their accumulated savings. The LCPIH model also predicts that consumption will decline in response to unanticipated and adverse innovations to income. Since the present discounted value of income – i.e., lifetime disposable resources – is the only relevant constraint on consumption, permanent innovations will have a larger impact on consumption than transitory innovations.

Adding uncertainty about future income, however, does not influence households' saving behavior in the LCPIH model with quadratic utility (e.g., Flavin 1981; J. Y. Campbell 1987). Because of certainty equivalence, households save only if they expect their income to decline, and they do not adjust their saving behavior if income becomes more uncertain. Models that include a precautionary saving motive (e.g., Leland 1968; J. Y. Campbell 1987; Carroll and Kimball 1996), on the other hand, predict that an increase in future income dispersion results in households wanting to save more.⁵ Therefore, consumers might increase their savings if they *perceive* the job loss leading to higher future income uncertainty. In this case, a precautionary saving motive induces self-imposed reluctance to borrow, irrespective of consumers' ability to raise external finance.

⁴It is also assumed that utility is additively separable across time and across consumption and leisure.

⁵Formally, the precautionary motive arises even if the expected future income remains unchanged in response to the shock.

The inability to borrow against future income also changes household behavior in meaningful ways (e.g., Zeldes 1989; Deaton 1991). First, households may be forced to adjust consumption even in response to transitory or predictable shocks to income. In particular, constrained households would exhibit a higher marginal propensity to consume out of a unexpected transitory income decline than predicted by the canonical LCPIH model, whereas unconstrained consumers would borrow in credit markets. Moreover, the presence of credit constraints interacts with income risk to strongly affect precautionary savings. In the basic version of the buffer-stock model (e.g., Carroll (1997)), potentially constrained consumers build up a “buffer stock” of savings to mitigate the large consumption decline they would otherwise experience after being hit by a sequence of negative incomes shocks.⁶

3.4 Institutional background and data

This section provides institutional background information on Brazilian credit and labor markets. Next, it describes the datasets used for our analysis.

3.4.1 Consumer Credit Markets

Brazil’s banking sector is highly concentrated. By the end of 2023, the four largest banks controlled around 58% of the total stock of credit in the country.⁷ Two of these are public banks, *Caixa Economica Federal* and *Banco do Brasil*, whose overall market share was 36% at the time.

Government-owned banks are the major players in the market for residential mortgages and the so-called *consignado* credit (“payroll lending”). *Consignado* credit is a personal loan whereby creditors are paid straight out of debtors’ paychecks. Payroll loans

⁶Indeed, the model does not necessary predict that precautionary wealth will be strictly positive. With enough credit, consumers would only need to maintain some ability to borrow.

⁷Relatorio de Economia Bancaria, December 2023.

are thus collateralized by the borrowers' stream of labor income.⁸ Public sector workers and retirees are the most important pool of borrowers, and pay significantly less interest than private sector employees, as their income stream is much less volatile. During our sample period, specific regulation mandates that the principal and interest amount to no more than 35% of the borrowers' income.

Private banks control the market for credit cards, auto loans, other personal (non-payroll) loans. While private banks' presence in these markets is historically higher than that of public banks, their share has been decreasing since 2011 (garber2019household).

3.4.2 Labor Markets

Labor contracts in Brazil are regulated by the Consolidação das Leis de Trabalho (CLT) enacted in 1943 and the 1988 Federal Constitution. The labor code only covers registered workers and is considered strict.⁹ The minimum wage is around 79% of median wage (in 2015) and workers are entitled to one-month-pay Christmas bonus, 30 days of paid leave per year with additional 1/3 wage bonus, 120 days of maternity leave, and 50% overtime premium for hours worked in excess 44 hours a week. Brazilian workers who are involuntarily laid off from a private-sector formal job are entitled to collect displacement insurance benefits from two sources: unemployment insurance (state-contingent) and severance pay (lump-sum). Together, the two insurance schemes provide sizable temporary liquidity to laid-off workers.

Unemployment insurance (UI) UI benefits can be collected by workers provided they have reached a minimum level of job tenure. The benefits are deposited every 30 days at the state-owned bank *Caixa Economica Federal* as long as claimants are not reemployed in the formal sector. The potential UI duration depends on the accumulated tenure across

⁸coelho2012brazilian show that *consignado* credit increased the volume of personal credit and reduced interest rates in Brazil.

⁹The 2009 World Bank Enterprise Survey with business owners and top managers shows that Brazil has one of the highest share of firms, 63.2%, identifying labor regulations as a major constraint, compared to only 16.7% of firms of all of Latin America and the Caribbean, and 11.2% of firms from all of the 143 surveyed countries.

all registered jobs in the 36 months prior to the layoff. Workers are eligible for 3, 4, or 5 monthly payments if they had respectively 6 to 11, 12 to 23, or more than 24 months of tenure including a one-month advance notice period. Benefit levels are based on the average wage in three months prior to the layoff and range from around 1 to 1.8 of the minimum wage. Replacement rates are full at the bottom of the wage distribution and decrease with wage.

The eligibility criteria for UI were modified twice since 2015, by the MP665 (Provisional Measure 665) and Law 13.134. Before the MP665, workers were eligible to UI if they had worked continuously in the 6 months prior to layoff. After the MP665 came into effect at the end of February 2015, workers were required to have at least 18 months of accumulated tenure in the 24 months prior to layoff. Following the approval of the Law 13.134 in July 2015, the minimum tenure requirements has become less strict. Workers now need to have at least 12 (rather than 18) months of cumulative tenure in the 18 (rather than 24) months prior to layoff. Since our analysis sample consists of workers with at least two years of tenure at layoff (actual or “placebo”), these changes do not affect our empirical analysis, for all displaced workers are eligible for 5 monthly UI payments.

Severance pay (SP) Every month, employers contribute to their workers’ government-mandated severance savings account, the *Fundo de Garantia de Tempo de Serviço* (FGTS). Specifically, employers deposit 8% of their workers’ monthly wage in an account under each worker’s name at *Caixa Economica Federal*. Every labor contract is associated to a different account. Displaced workers have large incentives to withdraw the full balance at layoff since inflation usually exceeds the interest rate accrued in those accounts. These interests are also exceeded by those easily available from holding regular savings accounts.¹⁰ Employers must also pay workers who are involuntarily laid off a monthly wage as advance notice and a redundancy fine equal to 40% of the amount deposited in their severance account over the employment spell.

¹⁰In addition to involuntary displacement, Brazilians can access FGTS accounts after staying 3 years without a formal job, to purchase residential property, and when they experience serious health shocks.

3.4.3 Data

We describe the datasets used for our empirical analysis.

SCR Credit Registry The Credit Information System (SCR) records confidential information on credit relationships between individuals and financial institutions.¹¹ The data are transmitted at a monthly frequency from financial institutions to the Brazilian Central Bank (BCB), and cover all credit contracts of individuals whose total exposure to a financial institution is above a given reporting threshold.¹² From 2003 to 2019, the SCR had information on around 141 million unique natural individuals. The dataset contains several loan-level characteristics such as the balance of bank debt, interest rate, and delinquency. In this paper we analyze the dynamics of both unsecured/revolving (e.g., credit cards) and secured (e.g., payroll loans) sources of debt around a layoff event.

Annual Review of Social Information – RAIS RAIS is a matched employer-employee administrative database assembled yearly by the Brazilian Ministry of Labor and Employment. It is a high-quality census of the Brazilian formal labor market, covering the universe of formal employment in Brazil. Providing accurate information to RAIS is required for workers to receive in-work benefits, and firms face fines for failing to report. RAIS includes detailed information on the employer (tax number, establishment size, sector of activity), the employee (social security number, age, gender, race, education), and the employment contract (salary, type of contract, contracted hours, occupation, tenure, hiring/separation months, etc.). We use data from RAIS for the 2013–2019 period. We select this sample period for two main reasons. First, the start in 2013 is determined by RAIS availability in the BCB’s corporate dataset. Second, to focus on quintessential labor and credit market conditions following layoff, the sample ends in 2019 to exclude the COVID-19 pandemic.

¹¹Confidential data were handled exclusively by BCB staff.

¹²The threshold was 5,000 Brazilian Reals (BRL) from January 2003 to December 2011 and 1,000 BRL from January 2012 to May 2016. Since June 2016, it has been 200 BRL.

3.5 Empirical framework

We investigate the effect of job loss using a difference-in-differences framework. Our approach hence compares changes in outcomes for displaced workers to changes in the same outcomes for a matched control group of employed workers before and after layoff. We estimate the following regression:

$$Y_{it} = \sum_{\substack{k \neq -6 \\ k=-18}}^{18} \delta_k 1(t - t_i^* = k) \times \text{Displaced}_i + \sum_{k=-18}^{18} \theta_k 1(t - t_i^* = k) + \alpha_i + \gamma_t + \varepsilon_{it}, \quad (3.1)$$

where i and t index individuals and month-years, respectively. The indicators $1(t - t_i^* = k)$ denote time relative to layoff, t_i^* , for each individual.¹³ Displaced_i is a dummy variable taking value one if individual i is ever displaced between July 2014 and June 2018. Individual fixed effects, α_i , account for a worker's time-invariant characteristics. The vector of month-year dummies, γ_t , absorbs seasonal variation in the outcome variable and the average of all aggregate factors. The estimates of interest, $\hat{\delta}_k$, trace differential changes in the outcomes of interest for displaced workers in the months around layoff and relative to a reference month ($k = -6$). We cluster standard errors at the individual level.

The key identifying assumption is that the trajectory of outcomes for displaced and employed workers would have been similar in the absence of layoff. Although this parallel trends assumption cannot be tested, we can assess its plausibility: ideally, the estimated coefficients $\hat{\delta}_k$ should be close to zero for event months preceding layoff. However, since it is conceivable that workers learn about job loss a few months before the observed separation date, the validity of parallel trends requires the estimated coefficients to be indistinguishable from zero only for a subset of the pre-layoff period, namely, before the possible anticipation of job loss. Our research design thus requires $\{\hat{\delta}_{-18}, \hat{\delta}_{-17}, \dots, \hat{\delta}_{-7}\}$ to be zero.¹⁴

¹³For control workers, $1(t - t_i^* = k)$ is equal to one if a displacement event occurs in k months relative to the current period at the matched treated worker.

¹⁴By setting event month -6 as the reference period, we allow anticipation to start at event month -5. In their survey of UI applicants in Brazil, Gerard and Naritomi (2021) find that a large proportion of displaced

The presence of never-displaced workers means that the identification of the dynamic treatment effects does not rely on comparisons between earlier and later treatment groups. Therefore, we avoid the treated/treated comparisons that can be problematic in a two-way fixed effect model.¹⁵

3.5.1 Matched samples

We impose some restrictions on the data to obtain the sample from which we extract the treatment and control group of workers used in the empirical approach. The first set of restrictions is applied to the RAIS data. We begin by considering the total pool of private-sector workers holding open-ended and full-time contracts in the formal/urban economy.¹⁶ Since we aim to investigate the effects of job displacement on credit outcomes and not on the decisions to retire or resume full-time studies, we also require that workers have a potential attachment to the labor force. We implement this condition by selecting individuals aged 23 to 55. Next, we follow the literature on the costs of job displacement by focusing on job separations of high-tenured workers, defined here as employees with at least two years of tenure in the same firm at layoff. This condition implies that all workers are eligible for 5 monthly UI payments.

Next, we describe how we obtain the treatment group. Workers who are involuntarily laid off between July 2014 and June 2018, satisfy the restrictions imposed above, and experience short unemployment spells form the treatment group.¹⁷ Even though RAIS reports the cause of job separation and our focus on high-tenured workers, we apply an additional restriction to mitigate the concern about measurement error in the definition of

workers report having learned about their upcoming layoff prior to the layoff month – by about 3 months, on average.

¹⁵For details on the issues raised by the recent methodological literature, see De Chaisemartin and d'Haultfoeuille (2020), Callaway and Sant'Anna (2021), and Goodman-Bacon (2021).

¹⁶We exclude part-time workers and public servants because the former are not eligible for UI benefits and the latter are rarely fired. By public servants, we mean employees in state-owned and mixed-ownership firms.

¹⁷Workers fired for cause are excluded to make job loss as exogenous as possible with respect to individual characteristics. We use the July 2014-June 2018 period to track labor and credit outcomes 18 months before and after layoff.

job displacement – e.g., voluntary or planned separations recorded as job loss.¹⁸ We thus exclude from the treatment group involuntarily laid-off workers – as identified in RAIS – who return to the same employer.¹⁹ By requiring workers to return to a formal job within 6 months after layoff, we focus on unemployment shocks that are observed to be temporary. While the spells of unemployment are ex post temporary, we cannot rule that individuals expected the shocks to have a permanent effect on their earnings.

We obtain the control group via (almost) exact matching using characteristics at and before layoff – specifically, 6 months before job loss. The matching variables at layoff are gender, age, tenure, formal education, firm sector, and month-year of displacement. The matching variables for the pre-layoff period are wage, debt-to-income ratio, and a dummy variable for whether a worker has credit available (i.e., has not exhausted her credit limits). For the variables age, tenure, wage, and debt-to-income (with an additional category for those without debt), we match workers by decile groups. When a displaced worker is matched to multiple control workers, we randomly select one control unit.

We then link the employee-employer data to the SCR using individual-specific taxpayer number. For this purpose, we aggregate the transaction level credit data at the individual level. We also impose a constant reporting threshold of 1,000 BRL on the SCR throughout the sample period to avoid composition effects. Due to computational constraints, we ultimately select (at random) and use 25% of the treatment group in the empirical analysis. Table 3.1 shows that our matching procedure is successful in finding an adequate control group. Our monthly individual level data on labor and credit outcomes span from January 2013 to December 2019.

¹⁸Most related studies impose minimum tenure restrictions to avoid misinterpreting planned or expected separations of temporary workers.

¹⁹For instance, Van Doornik, Schoenherr, and Skrastins (2023) provide evidence consistent with firm-worker coordination to extract rents from the UI system in Brazil. Specifically, they show that layoffs and recalls are timed to coincide with eligibility for UI benefits. Such job transitions are significantly less likely to be unanticipated and exogenous with respect to individual characteristics.

Table 3.1: Statistics of 25% Matched Sample

	Control	Treatment	Difference (p-value)
Number of categories	73,244	73,244	not applicable
Number of workers	80,287	80,287	not applicable
Average wage (in BRL)	1,922.88	1,917.53	5.35 (0.624)
Average tenure at layoff (in months)	41.48	41.20	0.28 (0.039)
Average debt-to-income (in %)	6.72	6.17	0.55 (9.49e-07)
Average age (in years)	33.06	33.04	0.02 (0.634)

Note: A category is defined by the combination of the values of all matching variables. P-values in parenthesis refer to the two-sided test of equality between the mean wage of control and treatment matched sample groups.

3.6 Effects of job displacement

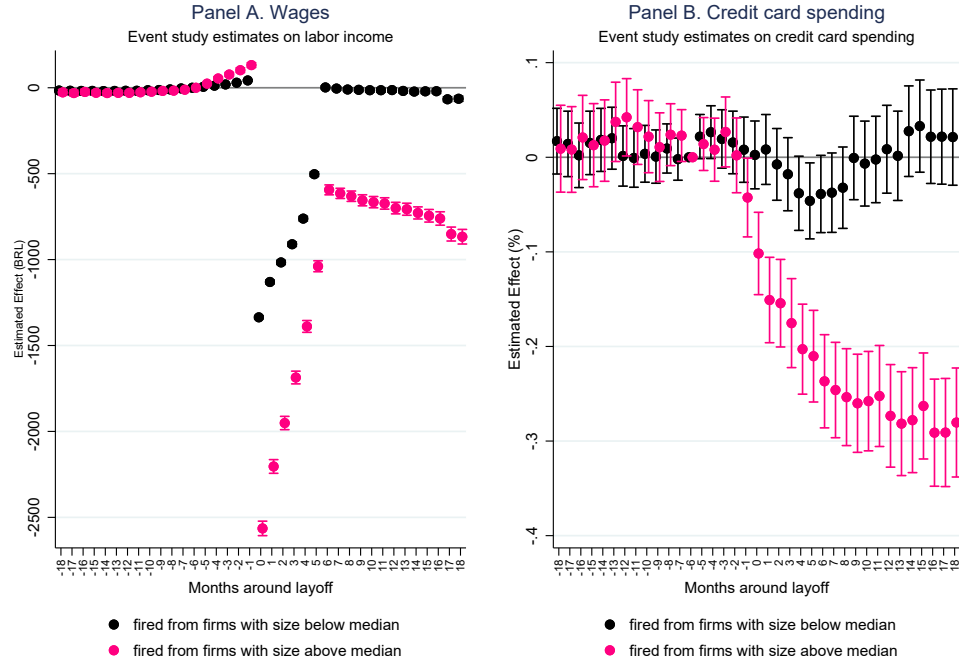
3.6.1 Main results

We start by reporting the effect of job displacement on wages and consumption in Figure 3.1. In this paper, we use credit card purchases as a proxy for consumption since they account for a sizable proportion of spending outlays.²⁰

Panel (a) shows the estimated effects on the wages of workers dismissed from large and small firms. Job loss has a striking heterogeneous effect on labor income. While the wages of workers involuntarily laid off from small firms virtually recover to pre-

²⁰Survey data from Serasa Experience – a credit bureau – documents that Brazilian households use credit cards for various purposes and, more importantly, credit card spending accounts for one-third of grocery shops and pharmacy expenditures. For these reasons, we believe that credit card spending is a sensible proxy for consumption. The survey is available in Portuguese at www.serasa.com.br/ecred/blog/habitos-de-uso-de-cartoes-de-credito.

Figure 3.1: Wages and credit card spending around job displacement



Note: The figure shows the estimated changes in wages (panel a) and credit card spending (panel b) around displacement events. Wages are equal zero during unemployment. Credit card spending is expressed in natural logarithm. As a result, the coefficients of interest of the latter specification have a semi-log interpretation, i.e., the exact percentage change in the dependent variable is given by $(e^{\delta_k} - 1) \times 100$. Point estimates and their 95% confidence intervals are obtained using the specification in equation 3.1.

displacement levels, the wages of workers dismissed from large firms remain persistently lower. Thus, despite the relatively short spell of unemployment, workers displaced from large firms experience a decrease in labor income that persists for at least a year after reemployment. This result is consistent with that in Menezes-Filho and Fernandes (2004). They explain the sizable and persistent earnings decline among Brazilian workers laid off from large firms as a combination of the depreciation of firm-specific human capital and the loss of a “good job”.

Panel (b) shows that the effects of job loss on the spending behavior of workers dismissed from large and small firms also differ substantially from each other. Mirroring the

persistent wage loss, workers who are laid off from large firms experience a permanent decline in consumption. The decrease in consumption is relatively smaller (-10%) in the month of job loss, likely due to the transitory inflow of liquidity provided by job displacement insurance policies – i.e., severance pay and unemployment insurance. Spending continues to decline in the following months and the estimates become roughly stable in the longer-run, implying a long-run loss 18 months after layoff of 25%. By contrast, workers dismissed from small firms maintain their consumption in the months following job loss. Their spending then declines momentarily before recovering.

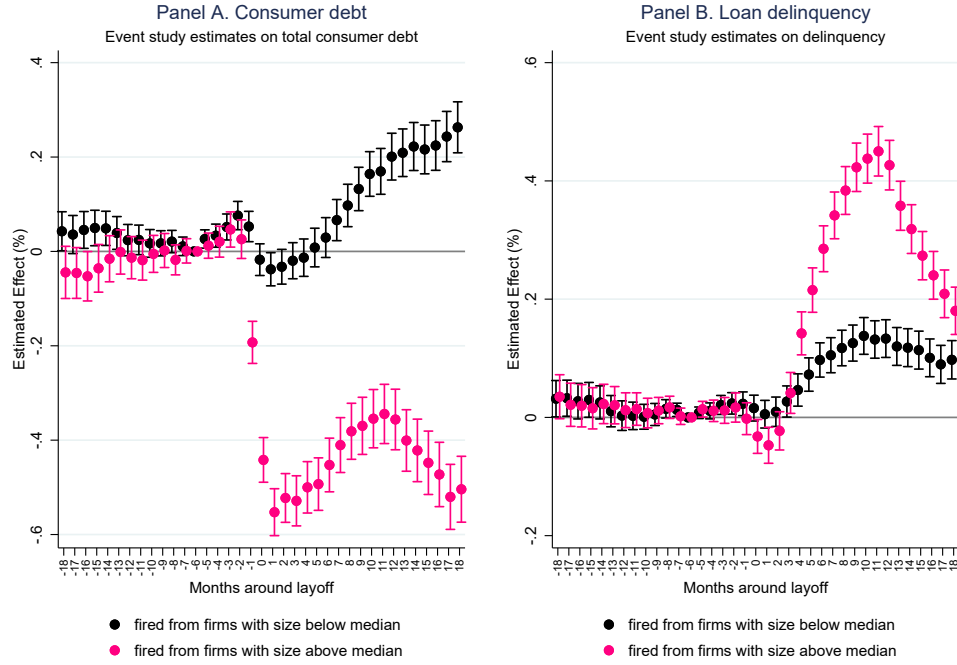
Next, we document the credit market consequences of job displacement. Figure 3.2 reports the estimated effects of job loss on total consumer debt (panel a) and debt delinquency (panel b). Consumer debt excludes auto loans and residential mortgages, as these are not used for self-insurance – i.e., for consumption smoothing. Debt delinquency is the amount of consumer debt that is 90 days or more past due.

We find that workers who are displaced from large firms significantly reduce their total loan balances in the months following displacement. Despite deleveraging, they also default on their debt after job loss. These results reflect the significant and persistent hit to income those workers experience. While their loan balances remain persistently lower, the amount of debt that past due begins to decline 12 months after job loss. This reduction is likely driven by the combination of debt repayment and debt charge-off by banks.²¹ As workers return to the labor market, they use part of their income to repay the debt that is overdue. However, given the persistent decline in their labor income, the repayment is only incomplete, which would explain the charge-off.

Workers displaced by small firms, on the other hand, increase their loan balances in the months prior to unemployment, when they may gradually become aware of the upcoming job loss. Their loan balances evolve similarly to the control group during the months of unemployment before rising again in the following months. At the same time, they also default on their debt after job loss.

²¹Debt being charged-off is a conceivable explanation since loans that are a year or more past due are classified as losses.

Figure 3.2: Total loan balances and delinquency around job displacement



Note: The figure shows the estimated changes in total balances (panel a) and loan delinquency (panel b) around displacement events. Both outcomes are expressed in natural logarithms. As a result, the coefficients of interest have a semi-log interpretation, i.e., the exact percentage change in the dependent variable is given by $(e^{\delta_k} - 1) \times 100$. Point estimates and their 95% confidence intervals are obtained using the specification in equation 3.1.

How do our empirical findings relate to theory? The deleveraging by workers who suffer a persistent hit to their income is consistent with the presence of borrowing constraints associated with the reduction in labor income inflows. Another plausible explanation relates to changes in beliefs about permanent income. In particular, even though the durations of the unemployment shocks analyzed in this paper are relatively short, they potentially signal changes in expected permanent income, to which households should respond by deleveraging and revising downward their optimal consumption plans. Alternatively, the unemployment shocks might lead households to expect higher future income uncertainty. In this case, they would delever and reduce consumption even if the expected permanent income does not change.

The increase in loan balances in the months prior to job loss by workers who eventually recover their pre-displacement wages is difficult to reconcile with standard consumption models. These models would predict higher savings or repayment of debt in anticipation of the upcoming job loss. The fact that these workers do not raise consumption during the same period suggests they are borrowing in anticipation of possible future income shocks that may lead to tighter credit constraints. We show (see Figure C1) an increase in their credit limits in the months just prior to unemployment. While the credit registry data do not inform whether the increase in credit limits was initiated by the borrower or the lender, we argue that the timing of the increase – i.e., just prior to job loss – hints at a role for demand. Similar to other studies (e.g., Keys 2018; Braxton, K. Herkenhoff, and M. Phillips 2024), we also find that credit markets provide some insurance against idiosyncratic shocks through default.

Interestingly, Druedahl and Jørgensen (2018) rely on this *precautionary borrowing* to rationalize the “credit card debt puzzle”, defined as households simultaneously holding low return liquid assets and credit card debt. The authors add the precautionary borrowing motive to an otherwise standard buffer-stock consumption model by including risk regarding access to new credit, which is assumed to increase under unemployment. After calibrating their model to match the distributions of credit card debt and liquid assets in the U.S., Druedahl and Jørgensen (2018) show numerically that it can be optimal for a household to hold positive gross debt and positive gross assets, especially when negative income shocks are assumed to be positively correlated with a high risk of a decline in the availability of new credit.

3.6.2 Additional Results

To shed further light on our results, we investigate the effects of job loss on unsecured/revolving and secured debts. Unsecured, revolving credit include credit cards and overdrafts. These two sources of credit can be drawn down immediately after job loss, with no additional application or income verification. Credit card debt can be characterized as a long-term

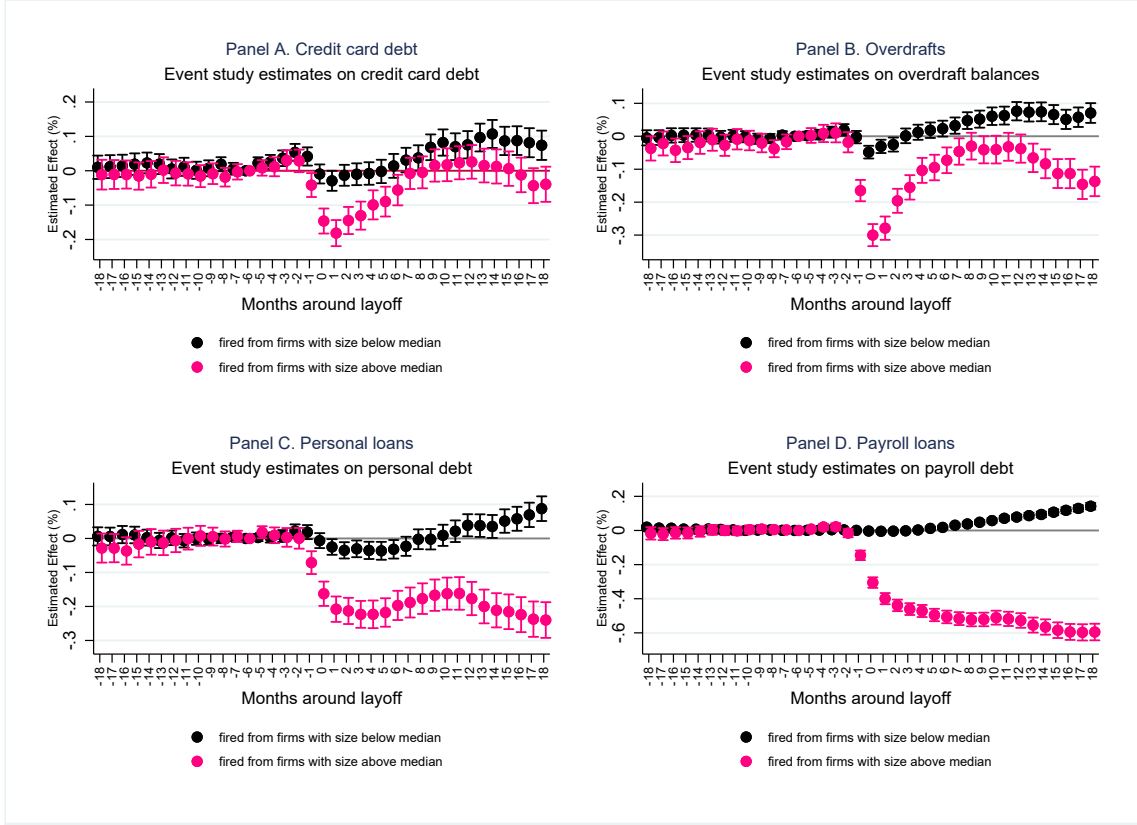
revolving debt contract, as it can be repaid slowly. An overdraft occurs when the checking account holder initiates a transaction that makes the balance negative, or more negative. While a personal loan is also unsecured, obtaining a new loan after job loss is arguably more difficult as it requires a new application as part of the approving process. Payroll loans or “consignado”, whereby creditors are paid straight out of debtors’ paychecks, are the main type of multipurpose collateralized personal debt.

Figure 3.3 reports the results. Workers who are hit by a persistent income decline due to job loss – i.e., displaced from large firms – experience a sizable and statistically significant reduction in all types of credit balances upon layoff. They then build back their credit card balances (panel a) relatively fast, but their personal loans (panel c) and payroll loans (panel d) remain persistently below the no-layoff counterfactual – i.e. 22% and 45% respectively. At the same time, we observe a recovery in their overdrafts balances between months 7 and 11 after layoff before declining again in the subsequent months. While credit constraints are able to explain the decline in the amount of borrowing in payroll loans, they cannot fully account for it. With the persistent income reduction following job displacement and given that payroll loans are tied to a borrower’s labor income, we would expect to see a decrease in the amount of new loans even in the longer-term. However, credit constraints are less likely to explain the decline in the probability of holding a payroll loan in the long run (see Figure C2). Since all workers have been reemployed and hence on steady income for at least a year 18 months after layoff, we argue that demand factors are also a plausible explanation for the permanent decline in payroll loan balances in the longer term. For instance, it is conceivable that households do not apply for payroll loans due to potentially misguided subject beliefs of credit rejection.

Workers laid off from small firms also tend to delever at layoff and in the subsequent months, consistent with binding borrowing constraints associated with unemployment. Once these workers are reemployed, however, their borrowing dynamics are remarkably different from that of workers displaced from large firms. Across the board, we find that their credit balances not only recover but become permanently higher after layoff.

Interestingly, the increase in total loan balances in the months preceding the job loss

Figure 3.3: Unsecured and secured debt around job displacement



Note: The figure shows the estimated changes in credit card debt (panel a), overdrafts (panel b), personal loans (panel c), and payroll loans (panel d) around displacement events. All outcomes are expressed in natural logarithms. As a result, the coefficients of interest have a semi-log interpretation, i.e., the exact percentage change in the dependent variable is given by $(e^{\delta_k} - 1) \times 100$. Point estimates and their 95% confidence intervals are obtained using the specification in equation 3.1.

previously documented in Figure 3.2 is driven by credit card debt. This finding further corroborates the existence of precautionary borrowing as in Druedahl and Jørgensen (2018): individuals who expect to experience job loss in the near future borrow in their credit cards while their credit is still good and income is still steady.

Why do households anticipating a job loss borrow in credit cards and not on low-interest personal loans and/or “consignado”? While a full explanation would require a detailed model with assumptions on the primitives (e.g., preferences) and additional data

(e.g., holdings on liquid and illiquid assets), here we aim to provide a reasonable explanation that relies on the institutional characteristics of the Brazilian labor and credit markets – and the interactions between the two.

In Brazil, workers might pledge their job displacement benefits when signing a payroll loan contract to reduce its interest rate by mitigating the credit risk associated with the loss of income. Current legislation allows workers to pledge up to 10% of their severance account balance and all the redundancy fine paid by their employer (i.e., 40% of the amount deposited in their severance account) to pay down their payroll debt in the event of layoff. It is thus possible that workers are less willing to apply for a payroll loan for a precautionary motive when they become aware of the upcoming job loss since such a loan would have them with less liquidity precisely when it is most needed. Liquidity through credit card debt, while carrying higher interest rates, have the benefit of allowing slow, state-contingent debt repayment.

3.7 Conclusion

This paper evaluates the economic consequences of job displacement in Brazil. We document that workers displaced from large firms suffer a large and persistent income decline, to which they respond by deleveraging and reducing consumption. Workers laid off from small firms, on the contrary, face a temporary income decline and maintain their consumption at layoff and in the subsequent months. The ability to maintain consumption is supported by a precautionary borrowing behavior, whereby workers increase their credit card debt in the months immediately before unemployment, and by defaulting on their obligations. While these workers are hit by a temporary income decline, their loan balances remain persistently higher.

Taken together, our results indicate that job loss has ample and disparate effect on individual labor market outcomes that spill over to credit markets. Our findings also shed light on directions for future research. In particular, it would be important to test our conjecture that the increase in credit card borrowing prior to job loss and not “consignado”

is explained by workers willingness to pay higher interest on unsecured debt than compromising the liquidity from job insurance policies when it is needed the most. While evaluating the welfare implications of debt choices is beyond the scope of this paper, our finding that workers who borrow on credit card debt prior to job loss end up with higher levels of debt hint a role for debt problems in the longer run. This investigation is also left for future research.

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General Conclusion

The findings of this thesis contribute to several streams of the literature related to household finance and expectations.

The contribution of the first chapter consists of investigating whether households self-selecting out of the loan application process also contribute to the well-documented unequal distribution of credit access. The evidence reveals that discouragement does lead to a particularly large shortage in aggregate credit demand. The chapter also delves into the mechanisms behind discouragement, hinting at a role for information frictions. The shortage in credit demand also indicates that discouragement might interfere with households' ability to smooth income shocks and the credit channel of monetary policy transmission.

The results in the second chapter demonstrate that the Fed's legal independence is not fully transmitted to (informed/attentive) households, as their inflation expectations de-anchored in response to political pressure from President Trump on social media. Importantly, the effect is relatively persistent. As such, the evidence from this chapter suggests that enhancing credibility among the general public remains a challenging task and a fruitful topic for future research.

The third chapter documents the disparate effects of job loss in a large developing country, Brazil. In particular, it shows that some displaced workers borrow prior to job loss, consistent with a precautionary borrowing motive: individuals who expect tighter credit constraints due to unemployment borrow for a rainy day while credit is still available. This borrowing, however, essentially occurs through credit cards, even though cheaper loans (*credito consignado*) is likely available prior to job displacement. These

findings could inform policy-makers about the interactions between credit and labor markets, in particular regarding the successful implementation of policies aimed at reducing unsecured debt.

Appendix A – Chapter 1

Variables definitions

Table A1: Description of Variables in the SCE

Variable Name	Definition
Discouraged	Dummy = 1 if the household head did (will) not apply for credit in the past (next) 12 months because expected (expects) a rejection
Female	Dummy = 1 if the household head is a female
Household Income	Total income of all members of the household, from all sources before taxes and deductions
Age	Age of the household head
Currently working	Dummy = 1 if the household head is currently working, for someone or self-employed,full-time or part-time, or on sick leave
Married	Dummy = 1 if the household head is married or lives as a partner with someone
College	Dummy = 1 if the household head has a college degree or more
Children in the household	Dummy = 1 if the household head has a children under 18 years in the household

Variable Name	Definition
Whine/non-Hispanic	Dummy = 1 if the household head is white and non-Hispanic
Homeowner	Dummy = 1 if the household head is owns a house
Low-aversion to financial risk	Dummy = 1 if the household head is not averse to risk in a Likert scale from 1 (not willing at all to take risks regarding financial matters) to 7 (very willing to take risks regarding financial matters)
High numeracy skills	Dummy = 1 if the household head correctly answers at least 4 out of 5 financial literacy questions
Sophisticated	Dummy = 1 if the household head has (at least) a college degree or high numeracy skills
High Application Costs	Dummy = 1 if the household head did not apply for credit because she thought it was too time consuming and/or did not know how to apply
Loan delinquency	Dummy = 1 if the household head reports a loan delinquency (more than 30 days) in the past 12 months
Debt-to-income (rank)	Percentiles of consumer debt within each income category and survey interview and divide by 100. Consumer debt consists of credit card debt, mortgage debt, home-based loans, auto loans, and other personal loans.
Perceived credit scores	Household head guess about credit scores, in the ranges: less than 620, 620-679, 680-719, 720-760, more than 760

Summary statistics

Table A2 presents summary statistics on discouraged and non-discouraged borrowers. Specifically, the table shows average characteristics and their differences based on whether the household states she did not apply for credit in the past 12 months because she believed the application would be rejected. This designation implies that the same household may be represented in the second and third columns, although in different waves.

Table A2: Summary characteristics of discouraged and non-discouraged

	Discouraged	Non-Discouraged	Difference
Panel A: Demographics			
College +	0.38	0.59	-0.21***
Currently working	0.62	0.70	-0.08***
Female	0.62	0.47	0.15***
Married	0.52	0.68	-0.16***
White/non-Hispanic	0.69	0.79	0.10***
Age	47.74	48.29	0.55*
Household income (+ 50k)	0.40	0.72	-0.32***
Homeownership	0.49	0.74	-0.25***
Panel B: Perceptions and Expectations			
Discouraged over next 12 months	0.61	0.07	0.55***
Credit scores (> 680)	0.30	0.85	0.55***
Aggregate credit conditions will be easier	0.12	0.23	-0.11***
Panel C: Borrower Behavior/Type			
Loan delinquency	0.30	0.04	0.26***
Debt-to-income (rank)	0.58	0.54	0.04***
Panel D: Behavioral Traits			
High numeracy score	0.57	0.75	-0.18***
Low financial risk aversion	0.24	0.31	0.07***
Panel E: Survey specifics			
Number of interviews (credit access module)	2.44	2.49	-0.05

Notes: This table presents average characteristics on both discouraged and non-discouraged households and their differences. Discouraged households did not apply for credit in the 12 months prior to the current survey wave.

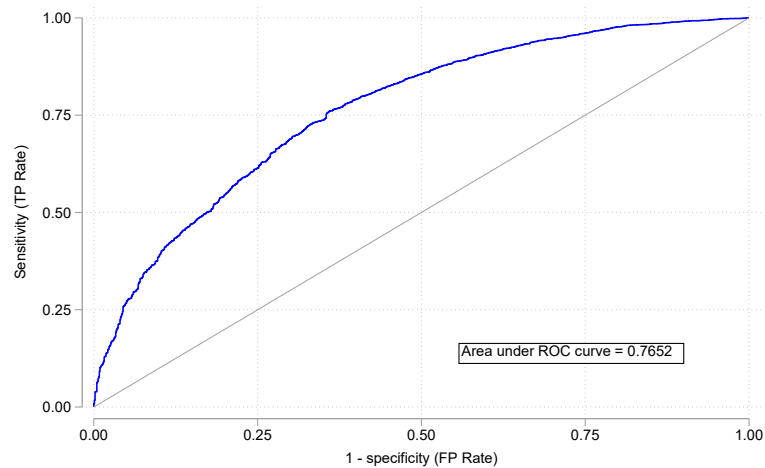
Determinants of credit approval and model validation

Table A3: The determinants of credit approval

	(1)
Female	-0.017 (0.010)
White/non-Hispanic	0.027** (0.012)
Currently working	0.021 (0.013)
Age (- 40)	-0.014 (0.016)
Age (40-59)	-0.051*** (0.015)
Homeowner	0.129*** (0.013)
Debt-to-income (rank)	-0.129*** (0.020)
Loan delinquency (+30 days)	-0.192*** (0.016)
Individual Controls	✓
State FEs	✓
Survey-Wave FEs	✓
Observations	6069
AUC	0.765 [0.749 , 0.781]
Pseudo- R^2	0.155

Notes: Estimates are average marginal effects. The dependent variables is a dummy variable for whether the household's application for a credit card was approved. The omitted group for age is *Age (+60)*, a binary indicator equal to one if the household is older than 60 years. Individual controls are household income, marital status, education. Confidence interval for the area under the receiver operator characteristics curve (AUC) in brackets. Standard errors clustered at the household level in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: ROC Curve



Note: The figure illustrates the in-sample discriminatory power of the loan approval model by providing the receiver operating characteristics curve (ROC curve) and the area under the curve (AUC). The ROC curve is estimated using a probit regression of the approval dummy on a credit card application. The explanatory variables are reported in Table A3.

Soft and hard credit inquiries

Figure A2: Soft credit inquiry, TransUnion



[Products](#) [Resources](#) [Services](#) [Insights](#) [About](#) [Consumer Support](#) [Q](#)

Question: What's the difference between a credit report and a credit score?

Answer: A credit report shows a listing of your credit history. A credit score represents what's in the credit report, shown by a number typically between 300 and 850. There are many different types of credit scores, and it's normal to have more than one. Lenders and credit reporting agencies use varying scoring models to calculate credit scores, and the score you view may not be the score used by a particular lender. TransUnion uses the VantageScore® 3.0 credit score. [Get more information about VantageScore.](#)

Question: Will checking my credit report hurt my credit score?

Answer: Checking your own credit report won't hurt your score because it's considered a soft inquiry. A soft inquiry is a more routine check that does not affect your credit score and is generally only seen by you. Learn more about the [difference between soft and hard inquiries.](#)

Figure A3: Soft credit inquiry, Equifax

Is It Okay to Check Your Credit Score?

Reading time: 4 minutes

Highlights:

- Checking your credit score will not negatively impact your credit history or score.
- Checking your credit score is an important step in ensuring your personal information is correct and complete.
- Checking your credit score is considered to be a "soft inquiry." Soft inquiries typically are not visible to lenders on your credit report.

The idea that checking your credit score will have a negative impact is a common myth. In reality, checking your credit score is an important step in ensuring your personal information is accurate and complete.

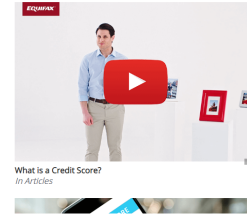
Before we jump into the topic at hand, it's important to know that you have more than one credit score, and the number may vary depending on the source.

Is it bad to check my credit score?

In general, you can check your own credit score without harming it.

Checking your credit score is an important part of monitoring your financial health. This is especially true if you're in the market for a new loan or other credit account. It's important to understand what your credit score is and how it might affect the possible credit accounts, interest rates and other lending terms you qualify for.

Related Content



Compositional changes before and after February 2020

Table A4: Probability of being unsophisticated

	(1)
Female	0.070*** (0.013)
Female $\times$ Post	- 0.004 (0.043)
White/non-Hispanic	- 0.106*** (0.018)
White/non-Hispanic $\times$ Post	- 0.005 (0.030)
HH income $< 70k$	-0.194*** (0.014)
HH income $< 70k \times$ Post	0.007 (0.024)
Homeowner	-0.066*** (0.017)
Homeowner $\times$ Post	-0.010 (0.027)
Observations	11179
R^2	0.123

Notes: The dependent variable is a dummy variable for whether the household is unsophisticated. The model is estimated by OLS. $Post_t$ equals 1 from June 2020 to February 2021, and 0 from February 2018 to February 2020. Standard errors clustered at the household level in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix B – Chapter 2

Tweets

Table B1: Description of Tweets

Date	Text
2018-04-16	Russia and China are playing the Currency Devaluation game as the U.S. keeps raising interest rates. Not acceptable!
2018-07-20	China, the European Union and others have been manipulating their currencies and interest rates lower, while the U.S. is raising rates while the dollars gets stronger and stronger with each passing day - taking away our big competitive edge. As usual, not a level playing field
2018-07-20	The United States should not be penalized because we are doing so well. Tightening now hurts all that we have done. The U.S. should be allowed to recapture what was lost due to illegal currency manipulation and BAD Trade Deals. Debt coming due and we are raising rates - Really?
2018-12-18	It is incredible that with a very strong dollar and virtually no inflation, the outside world blowing up around us, Paris is burning and China way down, the Fed is even considering yet another interest rate hike. Take the Victory!

Date	Text
2019-01-08	Economic numbers looking REALLY good. Can you imagine if I had long term ZERO interest rates to play with like the past administration, rather than the rapidly raised normalized rates we have today. That would have been SO EASY! Still, markets up BIG since 2016 Election!
2019-03-29	Had the Fed not mistakenly raised interest rates, especially since there is very little inflation, and had they not done the ridiculously timed quantitative tightening, the 3.0% GDP, and Stock Market, would have both been much higher and World Markets would be in a better place!
2019-04-30	China is adding great stimulus to its economy while at the same time keeping interest rates low. Our Federal Reserve has incessantly lifted interest rates, even though inflation is very low, and instituted a very big dose of quantitative tightening. We have the potential to go ...
2019-04-30	... up like a rocket if we did some lowering of rates, like one point, and some quantitative easing. Yes, we are doing very well at 3.2% GDP, but with our wonderfully low inflation, we could be setting major records and, at the same time, make our National Debt start to look small!
2019-06-11	This is because the Euro and other currencies are devalued against the dollar, putting the U.S. at a big disadvantage. The Fed Interest rate way too high, added to ridiculous quantitative tightening! They don't have a clue!
2019-06-24	Despite a Federal Reserve that doesn't know what it is doing - raised rates far too fast (very low inflation, other parts of world slowing, lowering and easing) and did large scale tightening, \$50 Billion/month, we are on course to have one of the best Months of June in US history...

Date	Text
2019-07-19	Because of the faulty thought process we have going for us at the Federal Reserve, we pay much higher interest rates than countries that are no match for us economically. In other words, our interest costs are much higher than other countries, when they should be lower. Correct!
2019-07-19	I like New York Fed President John Williams first statement much better than his second. His first statement is 100% correct in that the Fed “raised” far too fast and too early. Also must stop with the crazy quantitative tightening. We are in a World competition, and winning big,...
2019-07-19	...Fed: There is almost no inflation!
2019-07-22	With almost no inflation, our Country is needlessly being forced to pay a MUCH higher interest rate than other countries only because of a very misguided Federal Reserve. In addition, Quantitative Tightening is continuing, making it harder for our Country to compete. As good ...
2019-07-22	It is far more costly for the Federal Reserve to cut deeper if the economy actually does, in the future, turn down! Very inexpensive, in fact productive, to move now. The Fed raised and tightened far too much and too fast. In other words, they missed it (Big!). Don’t miss it again!
2019-07-26	Q2 GDP Up 2.1% Not bad considering we have the very heavy weight of the Federal Reserve anchor wrapped around our neck. Almost no inflation. USA is set to Zoom!
2019-07-29	The E.U. and China will further lower interest rates and pump money into their systems, making it much easier for their manufacturers to sell product. In the meantime, and with very low inflation, our Fed does nothing - and probably will do very little by comparison. Too bad!

Date	Text
2019-07-29	The Fed “raised” way too early and way too much. Their quantitative tightening was another big mistake While our Country is doing very well, the potential wealth creation that was missed, especially when measured against our debt, is staggering. We are competing with other ...
2019-07-31	What the Market wanted to hear from Jay Powell and the Federal Reserve was that this was the beginning of a lengthy and aggressive rate-cutting cycle which would keep pace with China, The European Union and other countries around the world ...
2019-08-01	Experts stated that the Fed should not have tightened, and then waited too long to undo their mistake. James Bullard of St. Louis Fed said they waited too long to correct the mistake that they made last December. “Mistake, Powell cut rate and then he started talking.” @LouDobbs
2019-08-05	China dropped the price of their currency to an almost a historic low. It’s called “currency manipulation.” Are you listening Federal Reserve? This is a major violation which will greatly weaken China over time!
2019-08-08	As your President, one would think that I would be thrilled with our very strong dollar. I am not! The Fed’s high interest rate level, in comparison to other countries, is keeping the dollar high, making it more difficult for our great manufacturers like Caterpillar, Boeing, ...
2019-08-14	We are winning, big time, against China. Companies and jobs are fleeing. Prices to us have not gone up, and in some cases, have come down. China is not our problem, though Hong Kong is not helping. Our problem is with the Fed. Raised too much and too fast. Now too slow to cut....
2019-08-14	We are winning, big time, against China. Companies and jobs are fleeing. Prices to us have not gone up, and in some cases, have come down. China is not our problem, though Hong Kong is not helping. Our problem is with the Fed. Raised too much and too fast. Now too slow to cut....

Date	Text
2019-08-21	So Germany is paying Zero interest and is actually being paid to borrow money, while the U.S., a far stronger and more important credit, is paying interest and just stopped (I hope!) Quantitative Tightening. Strongest Dollar in History, very tough on exports. No Inflation!...
2019-08-22	Germany sells 30 year bonds offering negative yields. Germany competes with the USA. Our Federal Reserve does not allow us to do what we must do. They put us at a disadvantage against our competition. Strong Dollar, No Inflation! They move like quicksand. Fight or go home!
2019-08-22	The Economy is doing really well. The Federal Reserve can easily make it Record Setting! The question is being asked, why are we paying much more in interest than Germany and certain other countries? Be early (for a change), not late. Let America win big, rather than just win!
2019-08-23	Now the Fed can show their stuff!
2019-08-28	Our Federal Reserve cannot “mentally” keep up with the competition - other countries. At the G-7 in France, all of the other Leaders were giddy about how low their Interest Costs have gone. Germany is actually “getting paid” to borrow money - ZERO INTEREST PLUS! No Clue Fed!
2019-08-29	The Economy is doing GREAT, with tremendous upside potential! If the Fed would do what they should, we are a Rocket upward!
2019-08-30	If the Fed would cut, we would have one of the biggest Stock Market increases in a long time. Badly run and weak companies are smartly blaming these small Tariffs instead of themselves for bad management...and who can really blame them for doing that? Excuses!
2019-09-03	Germany, and so many other countries, have negative interest rates, “they get paid for loaning money,” and our Federal Reserve fails to act! Remember, these are also our weak currency competitors!

Date	Text
2019-09-06	I agree with @jimcramer, the Fed should lower rates. They were WAY too early to raise, and Way too late to cut - and big dose quantitative tightening didn't exactly help either. Where did I find this guy Jerome? Oh well, you can't win them all!
2019-09-11	The Federal Reserve should get our interest rates down to ZERO, or less, and we should then start to refinance our debt. INTEREST COST COULD BE BROUGHT WAY DOWN, while at the same time substantially lengthening the term. We have the great currency, power, and balance sheet...
2019-09-18	Jay Powell and the Federal Reserve Fail Again. No "guts," no sense, no vision! A terrible communicator!
2019-10-01	As I predicted, Jay Powell and the Federal Reserve have allowed the Dollar to get so strong, especially relative to ALL other currencies, that our manufacturers are being negatively affected. Fed Rate too high. They are their own worst enemies, they don't have a clue. Pathetic!
2019-10-09	They don't have a clue, but I do. The USA is doing great despite the Fed!
2019-10-09	The Federal Reserve is derelict in its duties if it doesn't lower the Rate and even, ideally, stimulate. Take a look around the World at our competitors. Germany and others are actually GETTING PAID to borrow money. Fed was way too fast to raise, and way too slow to cut!
2019-10-31	People are VERY disappointed in Jay Powell and the Federal Reserve. The Fed has called it wrong from the beginning, too fast, too slow. They even tightened in the beginning. Others are running circles around them and laughing all the way to the bank. Dollar and Rates are hurting...

Date	Text
2019-11-19	At my meeting with Jay Powell this morning, I protested fact that our Fed Rate is set too high relative to the interest rates of other competitor countries. In fact, our rates should be lower than all others (we are the U.S.). Too strong a Dollar hurting manufacturers and growth!
2019-12-02	Manufacturers are being held back by the strong Dollar, which is being propped up by the ridiculous policies of the Federal Reserve - Which has called interest rates and quantitative tightening wrong from the first days of Jay Powell!
2019-12-02	The Fed should lower rates (there is almost no inflation) and loosen, making us competitive with other nations, and manufacturing will SOAR! Dollar is very strong relative to others.
2020-01-28	The Fed should get smart and lower the Rate to make our interest competitive with other Countries which pay much lower even though we are, by far, the high standard. We would then focus on paying off and refinancing debt! There is almost no inflation-this is the time (2 years late)!
2020-03-02	As usual, Jay Powell and the Federal Reserve are slow to act. Germany and others are pumping money into their economies. Other Central Banks are much more aggressive. The U.S. should have, for all of the right reasons, the lowest Rate. We don't, putting us at a ...
2020-03-03	The Federal Reserve is cutting but must further ease and, most importantly, come into line with other countries/ competitors. We are not playing on a level field. Not fair to USA. It is finally time for the Federal Reserve to LEAD. More easing and cutting!

Robustness

Balance tests

Table B2: Balance tests - mean differences in characteristics

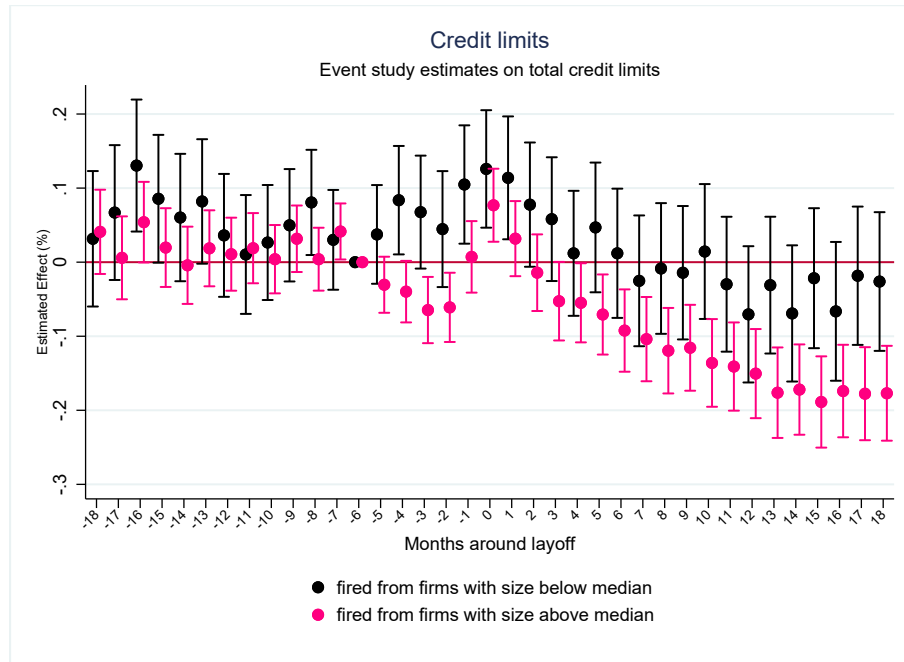
	(1 = Control)	(2 = Treated)	(3 = difference)
Female (dummy)	0.500	0.482	0.018 (1.388)
Homeowner (dummy)	0.716	0.729	-0.013 (-1.156)
Age (in years)	51.468	51.119	0.349 (0.881)
Hispanic (dummy)	0.079	0.076	0.004 (0.531)
Married (dummy)	0.625	0.623	0.001 (0.121)
Take high risk (dummy)	0.317	0.305	0.012 (-0.11)
College (dummy)	0.533	0.546	-0.012 (-0.968)
Make financial decisions (dummy)	0.424	0.424	0.000 (0.023)
High numeracy skills (dummy)	0.718	0.721	-0.003 (-0.279)
Survey tenure (in months)	5.661	5.563	0.097 (1.142)

Notes: This table reports the mean levels of key characteristics of participants included in the sample for the control group and the treatment group. The differences between the means are reported in the third column, with test statistics of a two-sample t-test reported in parentheses. For the tests, a 5-day window was considered.

Appendix C – Chapter 3

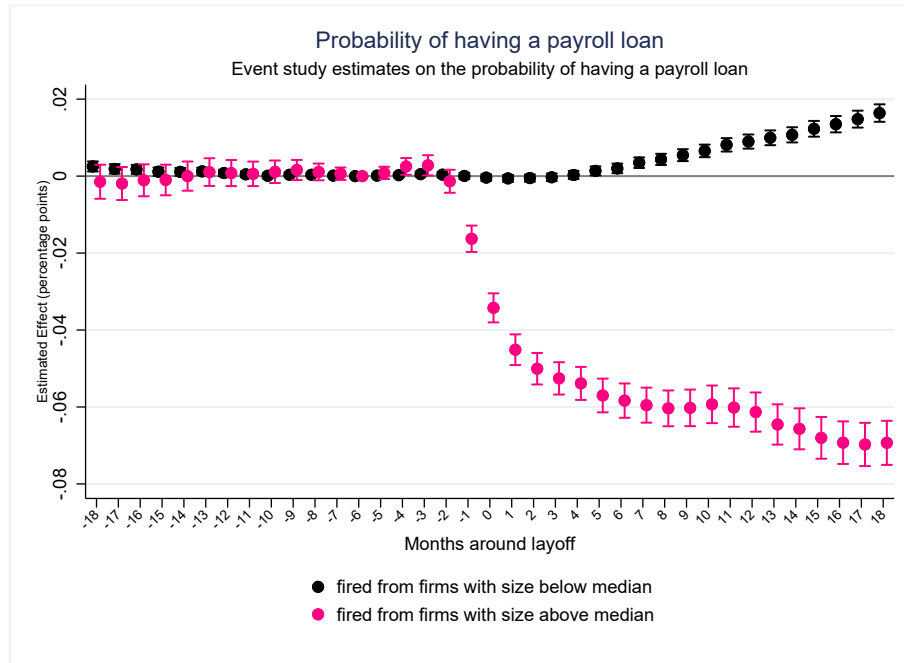
Additional results

Figure C1: Credit limits around job displacement



Note: The figure shows the estimated changes in credit limits around displacement events. Credit limits are expressed in natural logarithm. As a result, the coefficients of interest have a semi-log interpretation, i.e., the exact percentage change in the dependent variable is given by $(e^{\delta_k} - 1) \times 100$. Point estimates and their 95% confidence intervals are obtained using the specification in equation (3.1).

Figure C2: Likelihood of having a payroll loan around job displacement



Note: The figure shows the estimated changes in the likelihood of having a payroll loan around displacement events. The coefficients of interest have a percentage point interpretation, once multiplied by 100. Point estimates and their 95% confidence intervals are obtained using the specification in equation (3.1).

