



**FINTECH AND CONSUMER  
FINANCIAL WELL-BEING IN THE  
INFORMATION AGE**

**Non-Technical Report**

**Michaela Pagel  
Arna Olafsson  
Bruce Carlin**

**THINK FORWARD  
INITIATIVE**

# FINTECH AND CONSUMER FINANCIAL WELL-BEING IN THE INFORMATION AGE \*

## NON-TECHNICAL REPORT

Michaela Pagel, Arna Olafsson & Bruce Carlin †

February 2019

### Abstract

This paper analyses how better access to financial information via new technology changes use of consumer credit and affects financial fitness. We address these issues by using a unique data set from Iceland and exploit the introduction of a mobile app by a financial aggregator. We find that the introductions of this smartphone application eases their consumers' plight to gather information and make good choices in two ways. First, it lowers search costs and makes finding personal information easier. Second, it makes financial information more salient.

**Keywords:** Consumer debt, Online banking platform, Technology, Information access

---

\* This report has been prepared by the authors for the Think Forward Initiative

† Pagel: Columbia Business School, email: mpagel@columbia.edu. Olafsson: Copenhagen Business School, email: ao.fi@cbs.dk. Carlin: Anderson Graduate School of Management, UCLA, email: bruce.carlin@anderson.ucla.edu.

# 1. Introduction

We are interested in how access to information affects individual decision making. For decades, this has been one of the most fundamental questions in economics. With the advent of the information age, and the surge of FinTech products consumers use (e.g., mint.com, personalcapital.com, YNAB.com, and Meniga.com), we would presume that people are better informed and equipped to make good choices. However, beyond measuring the adoption of new technology, actually measuring its economic impact is challenging. We know that people of different generations and demographic backgrounds incorporate new technology into their lives at different rates. But we know very little to date about how this affects actual outcomes, and whether any effects vary cross-sectionally in the population.

Sorting this out in a robust and careful way is challenging because it is typically impossible to deal with the econometric challenges -- endogeneity, omitted variables, and reverse causality -- without making some leaps of faith. Endogeneity and omitted variables refer to the idea that individuals decide, in response to their circumstances, whether to access information. We thus cannot tell whether individual circumstances or the information access itself causes changes in economic outcomes we may observe when individuals pay more attention. Reverse causality refers to the idea that less costly access to information may increase welfare, but it is

also likely that higher wealth increases either the incentives to acquire information or the ease of accessing it.<sup>2</sup>

In this paper, we address these issues by using a unique data set from Iceland. A substantial fraction of the citizens in the country use a common on-line platform that consolidates all of their bank account information and transaction histories in one place. Before 2014, access to this personal financial information only occurred via the Internet on a desktop or laptop computer. On November 14, 2014, a mobile application was exogenously released, which gave users easier and remote access to bank account information. Figure 1 shows the propensity to log in to the financial aggregation platform before and after the mobile app introduction, documenting that consumers indeed increased their information access in response to the availability of new technology.

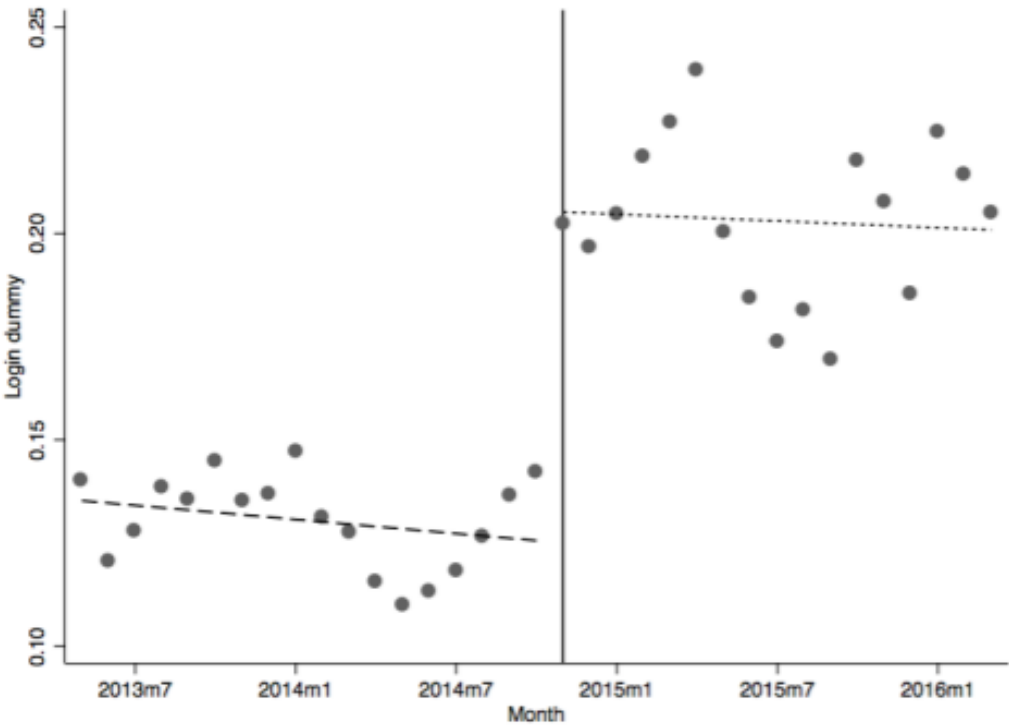
Before turning to the effects this had, it is important to note that the mobile application did not offer consumers either notifications or financial advice before they actually logged in and it did not have a functionality to execute transactions. As such, any observable change in consumer outcomes that we document occurred because of less costly access to information and thus more frequent information acquisition, not because of notifications, financial advice, or more convenient transactions.

---

<sup>2</sup> In the United States, as of 2015, high income consumers were much more likely than low income consumers to use the Internet (97% versus 74%) and own a smartphone (87% versus 52%). Also, this difference is greater in adults

older than 65 years. In this age group, 90% of high income elderly people access the Internet, whereas only 39% of low income seniors go on-line.

Figure 1: Propensity to log in around the app introduction



## 2. Data & Methodology

In our data set, we have time-series information about the frequency and method of access to bank information (desktop vs. smartphone), which we can analyse together with demographic data, economic decisions (e.g., spending and savings), channels through which consumers access credit (credit cards versus debit card overdrafts), and the resultant financial outcomes (consumer debt and bank fees). One key economic outcome that we focus on is the tendency for people to pay penalties in the form of interest on short-term uncollateralized debt and other fees, such as late and non-sufficient fund fees.

We believe that, no matter what, paying lower bank fees in response to voluntarily acquiring more frequent information should improve people's welfare.

We use a regression discontinuity in time design, where the time of the exogenous introduction of the mobile application is used to instrument logins to the app. This allows us to isolate the causal impact of more information on economic outcomes, i.e., we can tell for sure that access to information causes certain changes to economic outcomes. This estimation technique proceeds in two stages. In the first stage, we estimate the change in an individual's propensity to log into their financial accounts, which characterizes how new technology affects access to information. In the second stage, we use the

predicted jump in logins at the time of the app introduction to identify the per login effect of the app introduction on financial fee payments and other economic outcomes. In both stages, we include individual fixed effects to control for all time-invariant omitted factors or individual characteristics that could affect the economic outcomes we measure. In technical terms, we thus estimate a causal within-individual local average treatment effect (LATE). However, since the app was broadly adopted relatively quickly by all age groups and we look at a long time period before and after the introduction of the app, we believe our results can be generalized.

Because the regression discontinuity in time design relies on time-series variation for identification, one potential challenge is a higher likelihood that important covariates are also discontinuously changing at the same time. If other confounding events take place at the same time and affect adopters differently from non-adopters, our identification approach would be challenged.

We undertake a number of steps to address this problem. First, we carefully analyse whether any other confounding institutional changes or new regulations occurred during our time period of the app introduction.<sup>3</sup> Second, we include controls for the month of the year and for concurrent economic

---

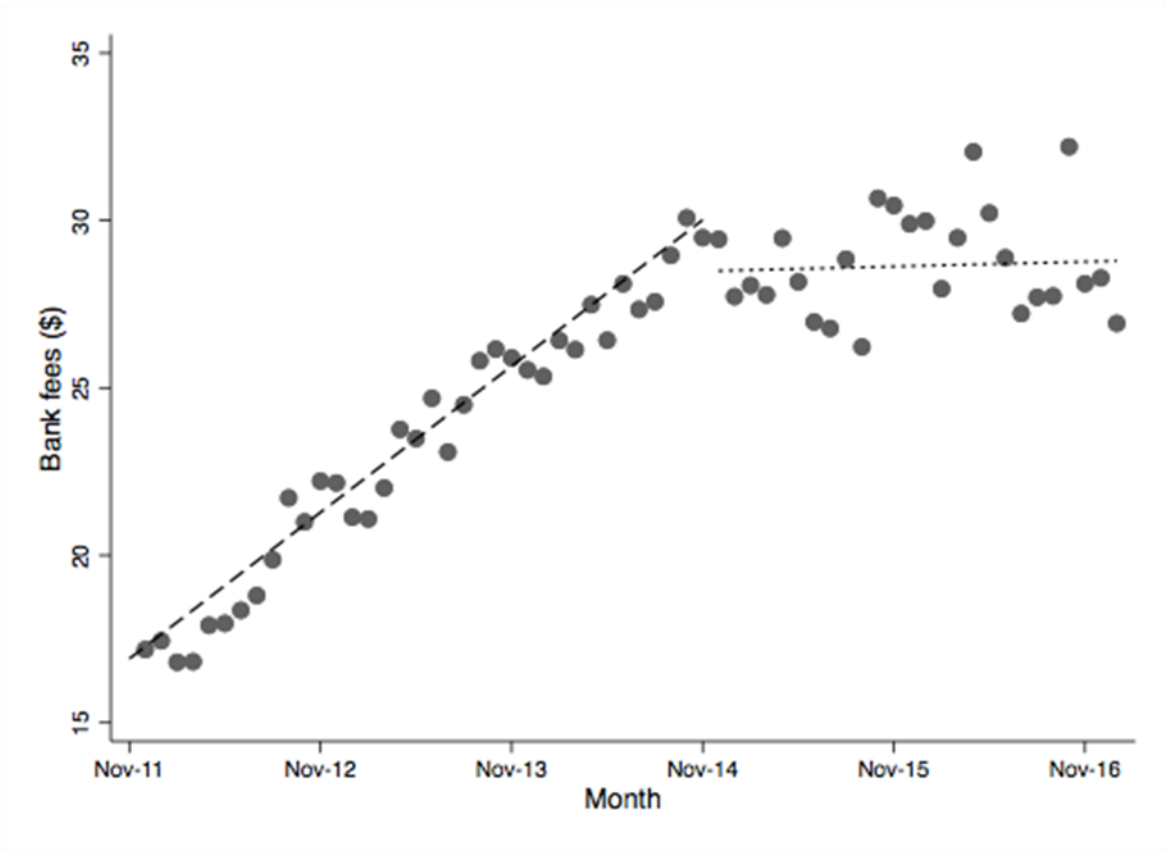
<sup>3</sup> To our knowledge, the only institutional change that occurred during our evaluation window was on December 14 2014, when a court ruling took place that addressed deceptive merchant fee practices. However, this ruling did not involve consumer financial fees. Furthermore, the central bank of Iceland was reducing interest rates

marginally in November 2014, a potential confound that we address by controlling for the central bank policy rate directly. Furthermore, the time fixed effects control for all macroeconomic trends before and after the app introduction.

conditions (e.g., interest rates, inflation, and unemployment). Third, we use different functional forms and bandwidths of time from the app introduction to alleviate concerns about time-series trends and time-varying confounds that we assume to change smoothly across the date of the experiment.<sup>4</sup> Finally, as a robustness check and to complement our within-individual time-series

identification approach with cross-sectional identification, we also employ a difference-in-differences estimation strategy to document the effects of the app introduction on adopters versus non-adopters.

Figure 2: Total paid bank penalties during time series



<sup>4</sup> As documented by Hausman and Rapson (2018), estimates may be biased if the time-series properties of the data are ignored, for instance in the presence of autoregressive processes. In contrast, tests for sorting or bunching near the discontinuity, as typically done for

standard regression discontinuity (RD) designs, are irrelevant, making the methodology closer to an event study than a regression discontinuity design. Thus, unlike in standard RD designs, using large bandwidths around the threshold does not constitute a problem.

## 3. Results

The mobile application helped consumers pay less financial fees. Based on just the raw data, Figure 2 shows the total bank penalties paid during our time series. Up until the introduction of the app, financial fees increased. But, once the app was introduced, there was a trend reversal and the amount of fees paid grew at a lower rate.

Based on our regression results for the entire population, each added login was associated with approximately \$2.24 lower bank fees per month and \$1.77 lower overdraft interest. Accounting for the frequency of individual monthly logins, logging in at least once in response to the app introduction was associated with a decrease of \$19.62 in bank fees and \$15.47 in overdraft interest.

Given that the average individual who adopted the app rolls over \$1,356 in overdraft debt (\$4,698 conditional on having overdraft debt) and pays around \$13 in interest expenses per month, when they look at their overdraft balance one more time per month, they reduce their overdrafts by approximately 14 percent over a 2-year period.<sup>5</sup>

Thus, relative to the monthly expenditures during the sample period, the effect we document represents an economically meaningful change, especially for lower income households.<sup>6</sup>

Moreover, our findings help to shed light on why high-interest consumer debt exists in such

magnitudes, even though it is not consistent with standard preferences in life-cycle consumption models (refer to Laibson et al., 2000). Indeed, the 2015 American Household Credit Card Debt Study estimates the total credit card debt owed by an average U.S. household to be \$15,762, which amounts to a total of \$733 billion. Our empirical finding that consumers manage to reduce their debt holdings by paying more attention to it speaks to non-standard preferences and overconsumption problems as a likely explanation for the initial use of consumer debt (Laibson et al., 2007), rather than rational consumption smoothing in response to permanent income shocks when funds are tied up in illiquid savings (Kaplan et al., 2014) or rational consumption smoothing in response to transitory income shocks (Keys, 2010).

Beyond making more responsible consumption-savings decisions after paying more attention to bank account balances, the observed drop in financial penalties could be explained by changes in how people used consumer credit. We find this to be the case as well. In the total population, adoption of the technology was associated with a 10.6% growth in credit card use relative to debit cards in managing short-term liabilities. Increasing credit card use is a rational response to having better information. Since credit cards offer a 30-50 day float to avoid paying interest for convenience users, compared to overdrafts where interest is incurred immediately,

---

<sup>5</sup> The use of a long time period allows us to generalize our effect. Furthermore, we find that this estimated effect does not change when we use alternative bandwidths of one fourth, one half, and two thirds of the bandwidth in our baseline specification. Given that the app had been quickly

and broadly adopted, we believe we can generalize our estimated effects.

<sup>6</sup> We provide back-of-the-envelope calculations to show that the average individual is plausibly better off logging in more as opposed to not logging into the app.

they are superior to consumers for very short-term debt holdings.

However, such better liability management can only explain a fraction of our reduction in overdraft interest. We thus conclude that paying greater attention to finances itself causes more prudent consumption and savings decisions, which is also consistent with the fact that we observe most of the fee reductions in overdraft interest rather than late fees or non-sufficient fund fees. In other words, the savings appear driven by more prudent spending decisions instead of relatively mechanical reductions in avoidable fees.



## 4. Conclusion

The academic profession has only hit the tip of the iceberg in characterizing the potential benefits and costs of technology on consumer financial decision-making. This is a nascent and growing literature. Agarwal et al. (2018) show that individuals learn to avoid late fees after having paid them initially. Stango (2014) documents that individuals respond to surveys about overdrafts by paying greater attention to account balances and incurring fewer fees. Levi (2015) shows that individuals respond to information about their net worth by increasing their savings in certain conditions. Medina (2017) finds that reminders for timely payment reduce the credit card late fees that are paid. Karlan et al. (2016) show that text message reminders help consumers to avoid penalties.

Generally, these studies involve some sort of reminder or stimulus that induces people to change their behaviour towards one specific form of avoidable financial fees. In contrast, in our study, we show that simply because individuals access

information more frequently without receiving reminders, messages, or other stimuli, they reduce their high-interest consumer debt. Furthermore, a defining feature of our study is that we have information not only on individual financial standing at very high accuracy and frequency, but also on individual access to that information via logins to the financial aggregation app.

The recent rise of FinTech has certainly piqued the interest of the academic community. In this study, we analyse the effect of the introduction of a mobile app by a financial aggregator which eases their consumers' plight to gather information and make good choices in two ways. First, it lowers search costs and makes finding personal information easier. Second, it makes financial information more salient. This latter mechanism is very important for consumers in retail financial markets.

**For more details on this research, see the full NBER academic working paper [here](#).**

## 6. References

Agarwal, S., Pan, J., & Qian, W. (2018). Age of decision: Pension savings withdrawal and consumption and debt response. *Available at SSRN 2487658*.

Hausman, C., & Rapson, D. S. (2018). Regression discontinuity in time: Considerations for empirical applications. *Annual Review of Resource Economics*.

Kaplan, G., Violante, G. L., & Weidner, J. (2014). *The wealthy hand-to-mouth* (No. w20073). National Bureau of Economic Research.

Karlan, D., McConnell, M., Mullainathan, S., & Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. *Management Science*, 62(12), 3393-3411.

Keys, B. J. (2010). The credit market consequences of job displacement. *Review of Economics and Statistics*.

Laibson, D., Repetto, A., & Tobacman, J. (2000). *A debt puzzle* (No. w7879). National Bureau of Economic Research.

Laibson, D., Repetto, A., & Tobacman, J. (2007). *Estimating discount functions with consumption choices over the lifecycle* (No. w13314). National Bureau of Economic Research.

Levi, Y. (2015). *Information architecture and intertemporal choice: A randomized field experiment in the United States* (Doctoral dissertation, UCLA).

Medina, P. C. (2017). *Selective attention in consumer finance: Evidence from a randomized intervention in the credit card market*. Working Paper.

Olafsson, A., & Pagel, M. (2017). *The ostrich in us: Selective attention to financial accounts, income, spending, and liquidity* (No. w23945). National Bureau of Economic Research.

## The authors



Michaela Pagel is an Associate Professor  
at Columbia Business School  
E-mail: [mpagel@columbia.edu](mailto:mpagel@columbia.edu)



Arna Olafsson is an Assistant Professor  
at Copenhagen Business School  
E-mail: [ao.fi@cbs.dk](mailto:ao.fi@cbs.dk)



Bruce Carlin is a Professor at UCLA  
Anderson Graduate School of  
Management  
E-mail: [bruce.carlin@anderson.ucla.edu](mailto:bruce.carlin@anderson.ucla.edu)

## Disclaimer

The views and opinions expressed in this report are solely those of the author(s) and do not necessarily reflect the official policy or position of the Think Forward Initiative - TFI - or any of its partners. This report has been prepared by the author(s) for the TFI. Responsibility for the information, data and content in this report lies entirely with the author(s). The primary purpose of the TFI is to inspire practical research insights in the financial decision-making domain. It does not constitute any financial advice or service offer.