The Potential Impacts of Interchange Regulation on the U.S. Credit Card Industry

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1. Executive Summary

This study assesses the potential impact of interchange regulation, in particular fee caps and routing mandates, on the U.S. credit card industry. The rationale stems from the fact that a proposal is being considered to extend the Durbin Amendment of the Dodd-Frank Act from debit to credit. The proposed policy would place caps on credit card interchange fees that acquirers pay to issuers and extend routing mandates to credit card transactions.

Given this credit interchange regulation has yet to be passed by Congress, this study takes a prospective approach that is built on three components. First, it documents prior evidence based on the Durbin Amendment for the U.S. debit card industry and comparable policies that were considered or implemented in Australia and Canada. Second, the study builds on the model developed by CRA International (2008) for the Australia case to simulate what interchange regulation could mean for different stakeholders in the U.S. credit card industry, in particular credit cardholders/consumers, merchants, and banks. Third, it summarizes data from the 2019 Survey of Consumer Finances and the 2019 Survey of Underbanked and Unbanked Households to speculate about impacts on consumers of different incomes, races/ethnicities, and credit scores.

The following key findings emerge. Interchange regulation would:
1. Decrease consumer surplus (for credit cardholders) by U.S.$2.006 billion, assuming a 50 percent fee reduction and a ten percent drop in cardholding (due to reduced card benefits). If the fee reduction and the drop in credit cardholders were 75 and 25 percent instead, the loss in surplus would be U.S.$3.7 billion. Lower-income and lower credit score cardholders will feel these losses more intensely and thus, may be more likely to drop out of the credit market. Even though these subgroups constitute 11.73 percent of the credit card population, back-of-the-envelope predictions suggest that they could bear as much as 21.64 percent of the loss in surplus. Finally, the value of consumer rewards from credit cards is roughly $50 billion and if a future regulation were to upset the credit market beyond what is contemplated in this paper, the impact to consumers could be far greater.
2. Increase merchant profits due to acquiring banks passing through interchange-fee savings in the form of lower merchant charges. However, this effect would depend on the acquirer's pass-through rate. At lower pass-through rates, which is likely to be the case for smaller merchants, profits would stay the same or go down. So, interchange regulation would benefit larger companies while adversely impacting small business.
3. Decrease overall bank profits, although this net effect could result from (i) both issuing and acquiring banks losing or (ii) issuing banks losing and acquiring banks gaining. These effects do not account for routing mandates which may exacerbate the impacts on smaller financial institutions.

In short, the findings suggest that policymakers should take heed in extending the Durbin Amendment to the U.S. credit market as it can have several unintended consequences. All of this would occur to the U.S. economy and its citizens as they try to recover from the impacts of the COVID-19 global pandemic (e.g., Consumer Financial Protection Bureau 2021).

2. Introduction

Background and Context

The electronic payment system facilitates credit and debit card transactions. The average U.S. adult made almost 500 card purchases in 2020, placing American consumers among the most active card users in the world (Verisk Financial 2021). At the end of 2020, there were over 2.1 billion credit and debit cards in circulation for an adult population of over 258 million (U.S. Census 2020). Credit cards were the leading card type, accounting for more than half of all active payment cards in circulation and over half of total payment cards' purchase volume (Verisk Financial 2021).

Payment cards typically involve four parties, in addition to the networks themselves: (1) the cardholder, (2) the institution/bank that provides the card to the cardholder, i.e., the issuer, (3) the merchant/firm that provides the goods/services to the cardholder, and (4) the institution/bank that provides services to the merchant, i.e., the acquirer. In the case of Mastercard and Visa, the networks themselves do not issue or acquire transactions; instead, their member institutions (e.g., issuing and acquiring banks) provide these services to the cardholder or merchant. In addition, the issuer and acquirer can be different institutions. These networks are thus often referred to as "four-party" networks. In the case of American Express and Discover, the networks themselves issue and acquire transactions. These networks are thus often referred to as "three-party" networks. Figure 1 depicts the flow of funds in a four-party network as portrayed by for example CRA International (2008) and Morris et al. (2017, Chart 2).

Figure 1: Four-Party Network
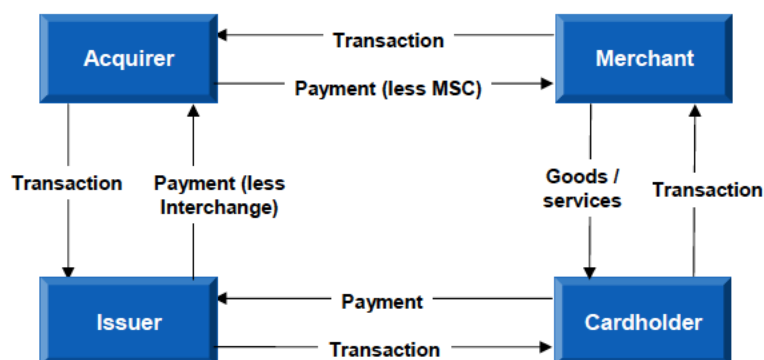
Source: CRA International (2008)

Generally, for networks and card payment systems to function, both cardholders and merchants need to participate. Stated differently, cardholders would not use credit cards if merchants did not accept them, and merchants would not accept them if cardholders did not use them. So, payment card networks are often referred to as "two sided markets". This means that incentives for cardholders to use cards and merchants to accept them need to be aligned. For example, credit cards enable consumers to (1) carry funds around more easily, (2) obtain rewards for such

transactions (e.g., delayed payment, special offers, and points), (3) easily checkout, (4) build credit, and (5) reduce risks due to theft and fraud. Similarly, credit cards enable merchants to (1) increase sales revenue, (2) save money by accepting cards instead of cash, (3) earn rewards through small business credit cards, (4) obtain prompt payment, and (5) establish safer and faster transactions for themselves and their customers. Concurrently, these benefits come at a cost. Acquirers charge a fee to the merchant while the issuer earns revenue from fees and interest paid by cardholders. In short, all the parties in the system reap some benefits while also bearing some cost.

Purpose of the Study

This study seeks to assess the potential impact of interchange regulation, in particular fee caps and routing mandates, on the U.S. credit card industry. The reason for this stems from a policy that is being considered, to extend the Durbin Amendment of the Dodd-Frank Act by (1) placing caps on credit card fees that acquirers pay to issuers and (2) extending routing mandates from debit to credit.

The rationale for capping fees is that this will cause acquiring banks to charge lower fees to merchants who will in turn pass such savings onto cardholders/consumers. The rationale for extending routing mandates to credit is that they would function as some type of price control. From the merchant perspective, mandating additional networks would increase competitive pressure on each transaction, driving down overall acceptance costs.[1]

Given interchange regulation has yet to be passed by Congress, this study will take a prospective approach that is built on three components. First, it will document prior evidence based on the Durbin Amendment (for the U.S. debit card industry) and comparable policies that were proposed or implemented in the Australian and Canadian payment card industries. Second, the study will build on the model developed by CRA International (2008) for the Australia case to simulate what interchange regulation could mean for the U.S. credit card industry. Third, it will summarize data from the Federal Reserve Board's 2019 Survey of Consumer Finances (SCF) and the Federal Deposit Insurance Corporation's 2019 Survey of Underbanked and Unbanked Households (SUUH) to speculate about impacts on consumers of different incomes, races/ethnicities, and credit scores. The study will thus conclude with potential implications that interchange regulation could have on different types of stakeholders in the four-party network, in particular lower-income or low credit score cardholders, smaller merchants, and smaller banks.

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[1] For example, data from the Federal Reserve System suggests that routing mandates have created downward pressure on prices, see https://bit.ly/3ndSX8F. However, routing mandates largely undermine the economics of networks and issuers. Instead of ensuring all American Express or Visa transactions from a consumer credit card run over either American Express or Visa, the consumer would no longer have this certainty. An American Express cardholder could expect future transactions to run over virtually any network globally, including China UnionPay, the largest network in the world. As the volume that runs over a particular card is uniquely tied to its economics and potentially, valuable offerings by the network, routing mandates would largely break that link, devaluing many of the rewards and features cardholders currently enjoy.

3. Findings from Prior Work

Much can be learned from prior research on the impacts of regulation in the payment card industry. This section synthesizes findings across a select set of papers. In order to keep the discussion tractable, two types of studies are summarized. First, those that assess the impact of the Durbin Amendment on the U.S. debit card industry. Second, those that assess the impact of Durbin-like policies on the credit card industry in other countries, specifically Australia and Canada.

The Impact of the Durbin Amendment on the U.S. Debit Card Industry

Several studies have assessed the retrospective impact of the Durbin Amendment in the U.S. As expected, the cap reduces banks' revenues obtained from interchange fees as well as rates for some large merchants. However, banks compensate this loss in interchange revenue by reducing benefits to cardholders, most notably by reducing free checking accounts and increasing monthly fees as well as minimum balance requirements. Moreover, merchants do not seem to pass through savings to cardholders. For example, Wang et al. (2014), which is discussed further below, found that 77 percent of merchants failed to change prices and 21-25 percent increased prices because of the Durbin Amendment.

One of the most comprehensive studies on this issue is by Mukharlyamov and Sarin (2020) who sought to characterize behavior of all players in a four-party network. To be more precise, they conducted an event study analysis of the Durbin Amendment using data on (1) bank financials (e.g., interchange income from call reports), (2) bank account pricing (i.e., fee-setting practices according to RateWatch), (3) merchant interchange rates (i.e., proprietary data from a leading payments industry player), (4) gas/retail price data to assess potential savings to consumers, and (5) card usage by demographics from the Federal Reserve Board's SCF and the Federal Deposit Insurance Corporation's SUUH.

They found the following: First, interchange revenues decreased but so did free checking accounts. Second, gas retailers who were most heavily impacted by the Amendment passed such savings through to consumers but those who were less affected, did not adjust their prices. Finally, there was suggestive evidence that the Amendment had regressive impacts on underbanked and lower-income households. In short, they showed that banks, who collectively lost U.S.$5.5 billion in annual revenue because of Durbin, passed 42 percent of these losses through to their customers while merchants passed through at most 26 percent of Durbin savings to customers. So, Durbin led to a net consumer loss of roughly U.S.$3 billion and a windfall to a small number of large merchants.

Manuszak and Wozniak (2017) ran panel fixed-effect regressions using bank account pricing data from RateWatch and came to similar conclusions as Mukharlyamov and Sarin (2020) in terms of bank behavior. They found that banks who were subject to the interchange fee cap raised checking account prices by decreasing free accounts, raising monthly fees, and increasing minimum balance requirements. Interestingly, banks that were not subject to the cap also

responded in the same way. This further exacerbated the loss in consumer/cardholder surplus as a result of the cap. While a leader-follower/Stackelberg-type model in game theory would predict similar behavior across exempt and non-exempt banks, there could also be a deeper reason for such behavior. Exempt banks were still subject to the debit routing mandates. So, this could have led to revenue losses for these smaller financial institutions, which decided to counteract revenue losses by raising checking account prices.

Wang et al. (2014) ran ordered logit regressions using a survey of U.S. merchants conducted by the Federal Reserve Bank of Richmond and Javelin Strategy & Research. They found limited and unequal impacts on merchants' debit acceptance costs as a result of the Durbin Amendment. While most merchants reported no change in debit costs or that they did not know of a change in debit costs, some merchants reported an increase in debit costs and others a decrease in debit costs. They also found evidence of asymmetric merchant responses to the interchange fee regulation: Merchants raised prices/debit restrictions as costs increased, but they did not reduce prices/restrictions as costs decreased.

Evans et al. (2013) conducted an event study analysis of the Durbin Amendment, using Bloomberg stock price data for large U.S. retailers. Like Mukharlyamov and Sarin (2020), they found that consumers lost more on the bank side than they gained on the merchant side. Based on investor expectations, they estimated that the loss to consumers because of the Durbin Amendment was between U.S.$22 and U.S.$25 billion.

The Impact of Durbin-like Policies on the non-U.S. Credit Card Industry

In addition to assessments of the Durbin Amendment in the U.S. debit card industry, two case studies are particularly noteworthy when drawing potential implications of a Durbin extension to the U.S. credit card industry: the Australian case (e.g., Chang et al. 2005 and CRA International 2008) and the Canadian case (e.g., Morris et al. 2017).

Starting in 2003, the Reserve Bank of Australia implemented regulations in the payment card industry; in particular, they reduced the interchange fee on four-party credit cards by approximately 50 percent and allowed merchant surcharging. CRA International (2008) reviewed the evidence up to that point and built a mathematical model to assess the potential impacts of these policy changes on cardholders, using data from interviews, Mastercard, and major Australian banks.

They found that reductions in interchange fees by the Reserve Bank of Australia led to (1) higher cardholder fees and less valuable reward programs, (2) reductions in merchant service charges, although there was no evidence from merchants or the Reserve Bank of Australia that such savings were passed onto consumers, (3) surcharges that exceeded average merchant service charges, and (4) disincentives by issuing banks to invest in new card technologies and innovation. In short, while the regulation clearly benefitted merchants, it harmed consumers and issuers by increasing cardholder fees, reducing the value of reward programs, and creating disincentives to invest in new types of cards and payment system innovations.

Chang et al. (2005) did a short-run assessment of the interchange fee reductions in Australia and found similar effects as CRA International (2008). In addition, they found that (1) there was relatively little evidence up to that point that the intervention affected the volume of card transactions (as intended by the regulation) and (2) since proprietary systems such as American Express were not subject to the pricing regulations and could strike deals with banks to issue cards, banks shifted volume from the regulated association systems to the unregulated proprietary systems.

Retail Council of Canada (2016) also lobbied for mandatory caps on interchange fees. In fact, the idea had been taken up in a private member's bill in the Canadian parliament. Morris et al. (2017) built a mathematical model that used a combination of proprietary and public data on credit card use, household income and expenditure, and other economic variables, to explore the likely impacts of such regulation.

They found that if the interchange fee were reduced by 40 percent, it would lead to (1) each adult Canadian being worse off by C$89-C$250 per year due to loss of rewards and increased annual card fees, (2) reduced spending at merchants in aggregate, resulting in a net loss to merchants of C$1.6-C$2.8 billion, (3) gross domestic product falling by 0.12-0.19 percent per year, and (4) federal revenue falling by 0.14-0.4 percent. They also estimated that a tighter cap on interchange fees would have a more dramatic negative effect on middle-income households and the broader economy.

Main Insights from Prior Work

While the interchange fee cap on debit cards in the U.S. due to the Durbin Amendment seems to have had some expected effects (such as reductions in debit costs for large merchants), it has had several unintended consequences. Banks have made up the losses in fee revenues by increasing the price of existing products; in particular, checking accounts. Moreover, merchants did not (fully) pass the debit cost savings onto consumers. In fact, evidence suggests that most merchants saw no fee changes or were unaware of such changes and one in four actually saw an increase.

While credit card transactions are clearly different from debit card transactions, these collective findings as well as those from the credit card industry in other parts of the world (i.e., Australia and Canada) suggest that policymakers should take heed in extending the Durbin Amendment to the U.S. credit card industry. Evidence suggests that fee caps in the U.S. credit market are likely to lead to reduced rewards, more expensive credit, increased annual fees and interest rates, negative small business card impacts, and less adoption of and spending on credit cards. While lower fees might benefit large merchants, such savings would not necessarily be passed onto consumers, thus transferring wealth from consumers and banks to large merchants. This could cost the broader economy through reductions in gross domestic product and tax revenue (e.g., Morris et al. 2017).

Given the prevalence of credit cards among middle- to high-income households in the U.S., the aggregate impacts are likely to be greatest among such groups (e.g., Koulayev et al. 2016 and Morris et al. 2017). However, such impacts might be felt most intensely by lower-income cardholders, an issue that is discussed in the section "**Impacts on Different Types of Consumers, Merchants, and Banks**". These effects may further be exacerbated by the lasting impacts of the COVID-19 pandemic (e.g., Sandler and Sciolli 2021). In the medium to long run, these effects could also dampen experimentation with and adoption of (new) credit cards by consumer segments who currently have less access to them, e.g., lower-income, lower credit-score, and/or rural households (e.g., Lux and Greene 2016).

4. The Potential Effects of Interchange Regulation

Since the extension of the Durbin Amendment to the U.S. credit card industry is a policy proposal at this stage, it is infeasible to assess the ex-post impacts of the policy. Instead, this section assesses prospective impacts of such a policy by (1) documenting the profile of U.S. credit cardholders (based on data from Verisk Financial), (2) describing the typical benefits that U.S. consumers derive from credit cards, (3) using the model developed by CRA International (2008, Appendix E, page 71) to simulate the surplus losses/gains that could occur due to interchange regulation, and (4) discussing impacts of such regulation on different types of stakeholders.

What Are the Demographics of U.S. Credit Cardholders?

As of the first quarter of 2020, there were approximately 174.5 million credit cardholders in the U.S. (Verisk Financial 2021), i.e., 67.5 percent of the U.S. adult population (U.S. Census Bureau 2020). Eighty percent of credit cardholders were White, 4.1 percent were African American, 11 percent were Hispanic, 4.4 percent were Asian, and 0.5 percent were Other. This compares to the following racial/ethnic composition of the U.S. population: 61.6 percent are White, 12.4 percent are Black or African American, 18.7 percent are Hispanic, 6 percent are Asian, 1.1 percent are American Indian and Alaska Native, and 0.2 percent are Native Hawaiian and Other Pacific Islander (U.S. Census Bureau 2020). So, White Americans are overrepresented among the credit cardholder population while most other racial/ethnic groups are underrepresented.

Almost 55 percent of the credit cardholder population was female, compared to 50.8 percent of the U.S. population (U.S. Census Bureau 2020). Close to 34 percent of the credit card population (33.84 percent) had a household income below U.S.$75,000, compared to a median household income of U.S.$67,521 (U.S. Census Bureau 2020). A quarter of U.S. credit cardholders had a FICO score in the range of poor to fair (below 680), while half had a FICO score in the range of very good to exceptional (above 760). This suggests that one's credit score/history is associated with credit card access (as expected); although not exclusively. Geographically, 34.81 percent of credit cardholders reside in California, Texas, Florida, and New York relative to 32.88 percent of the overall U.S. population (U.S. Census Bureau 2021). We return to importance of cardholder demographics in the section "**Impacts on Different Types of Consumers, Merchants, and Banks**".

Benefits and Costs from Holding U.S. Credit Cards

According to Morris (2021), the top three most in-demand cash-back credit card features are (1) security and control (61 percent of respondents find this feature extremely valuable), (2) double cash-back rewards at the end of the first year (48 percent find this feature extremely valuable), and (3) earned rewards for paying off card balance in full (47 percent find this feature extremely valuable). In fact, among 49 cash-back credit card features, rewards are front and center. This is consistent with the Consumer Financial Protection Bureau (2021), which reports that cardholders increasingly prefer cash rewards to miles, although cards that earn other types of rewards, such as points, special offers, or discounts, remain the most common by purchase volume (39 percent relative to 32 percent for cash back and 18 percent for miles in 2020).

Dunn (2020) reports that U.S. credit cardholders reap aggregate benefits of U.S.$445 billion annually while incurring aggregate costs of U.S.$150 billion annually. So, U.S. consumers get an average net benefit of U.S.$140.92 per month from holding a credit card. Dunn's analysis suggests that the largest benefit to U.S. consumers from holding a credit card is expanded purchasing ability (U.S.$300 billion), followed by services (U.S.$70 billion), rewards (U.S.$45 billion), and avoiding cash expenses (U.S.$30 billion). On the other hand, the greatest cost to U.S. consumers from holding a credit card is interest expenses (U.S.$135 billion), followed by fees (U.S.$15 billion).

Model Intuition

In order to get a sense of the potential impacts of interchange regulation in the credit card industry on the different stakeholders in a four-party network, the model by CRA International (2008) is used. For precise details such as the algebraic expressions for the demand and merchant profit functions as well as the model solutions, see their Appendix E. Some basic details are also provided in "**Appendix I: Model Setup and Calibration**".

As CRA International (2008) notes, the basic intuition for the model is as follows. Consumers will tend to be worse off from a reduction in interchange fee (a fee cap) if the extent to which issuers pass-through the reduction in interchange fee revenues (in the form of higher cardholder fees and lower card benefits) is greater than the product of (1) the extent to which acquirers pass-through the reduction in interchange fee expenses to merchants (in the form of reduced merchant service charges) and (2) the extent to which merchants pass-through the reduction in merchant service charges to consumers (in the form of lower prices).

Aggregate Impacts on Consumers, Merchants, and Banks

Table 1 presents the percent changes in key outcomes, specifically surpluses to credit cardholders, merchants, and banks, because of a change in interchange fee a. The table is best read by comparing three rows at a time. For example, consider rows 2-4. The yellow-highlighted row, i.e., the fourth row, represents the baseline case in which the interchange fee a is 0.018 (1.8 percent), as suggested by data from Verisk Financial (2021). The second and third rows consider different

levels of interchange a, i.e., 0.012 (a 35 percent reduction) and 0.009 (a 50 percent reduction), while holding all other parameters constant, i.e., the fraction of credit cardholders $t = 0.6$ and the pass-through rates $r_f = r_m = 0.1$, for those three rows (see below for other values). So, the second and third rows represent percent changes in surplus for different stakeholders relative to the baseline case in which the interchange fee a is assumed to be 0.018. Specifically, a 50-percent reduction in interchange fee a from 0.018 to 0.009 leads to a 0.07 percent loss in surplus to credit cardholders/consumers. Similarly, a 35-percent reduction in interchange fee a from 0.018 to 0.012 leads to a loss in surplus of 0.05 percent. Other groups of rows can be interpreted similarly, noting that those rows vary the pass-through rates $r_f = r_m$ across 0.22 (rows 6-8), 0.5 (rows 10-12), 0.75 (rows 14-16), and 0.9 (rows 18-20). One can also compare across $t = 0.675$ (bottom half of the table, i.e., rows 22-40) and 0.6 (top half of the table, i.e., rows 2-20).

In short, a reduction in/cap on interchange fee a would have the following main effects in the model:

1. Consumer surplus for credit cardholders decreases by 0.04 to 0.68 percent. Taking the aggregate benefits from credit cardholding discussed in the section "**Benefits and Costs from Holding U.S. Credit Cards**" as a guide, this parameterization of the model predicts a loss in card benefits to U.S. consumers of U.S.$2.006 billion. This comes from multiplying U.S.$295 billion by 0.68 percent.
2. The above number could be significantly greater if interchange regulation led to (1) a fee reduction greater than 50 percent, (2) a more than ten percent drop in credit cardholders (e.g., due to reduced benefits such as higher fees and/or lower rewards), and/or (3) multiplier effects, e.g., networks and/or issuing banks not investing in innovations (this is not explicitly accounted for in the model but a key finding from prior literature). In fact, if the interchange fee were reduced by 75 percent, all else equal, this would lead to a loss in credit cardholder surplus of 1.02 percent (not shown in **Table 1**), i.e., U.S.$3.004 billion. If in addition, the fraction of credit cardholders dropped to 50 percent, the loss in surplus would be 1.26 percent (not shown in **Table 1**), i.e., U.S.$ 3.7 billion.
3. Merchant profits increase by 0.01-0.02 percent due to acquiring banks passing through savings in the form of lower merchant charges, although this effect depends on the acquirer's pass-through rate. At low pass-through, which is likely to be the case for smaller merchants, profits stay the same or decrease.
4. Overall bank profits decrease by 0.06 to 0.82 percent.

As discussed in the next section, these effects will impact lower-income and lower-credit score cardholders as well as smaller merchants and banks more intensely. These findings thus suggest that policymakers should take heed in expanding the Durbin Amendment to the credit card market. The regulation might benefit larger merchants, but it will likely harm credit cardholders, smaller merchants, and banks. This is consistent with substantial prior evidence from the U.S. debit market as well as the credit/payments market in Australia and Canada.

Impacts on Different Types of Consumers, Merchants, and Banks

The above simulation assumes that consumers are homogeneous, e.g., in terms of their demand and income. As such, it suggests that each credit cardholder will lose U.S.$11.50-$21.21 per card in benefits on average. However, as alluded to in the section "**What Are the Demographics of U.S. Credit Cardholders?**", cardholders/consumers are not homogeneous. Close to 34 percent of the U.S. credit card population has an annual income below U.S.$75,000 relative to a median household income of U.S.$67,521 (U.S. Census Bureau 2020). Fifteen percent has an income below U.S.$50,000. In addition, lower-income credit cardholders are more likely to (1) be African American and/or Hispanic and (2) have lower credit scores. For example, **Table 2** illustrates that 45 percent of African American credit cardholders has an income below U.S.$75,000 relative to 39 percent of Hispanic and 33 percent of White credit cardholders. Moreover, **Table 3** illustrates that six percent of low credit-score cardholders (i.e., below 680) are African American relative to three percent of high-score cardholders (i.e., above 760). Meanwhile, 77 percent of low-score cardholders are White relative to 83 percent of high-score cardholders. For Hispanic cardholders, the numbers are 13 and nine percent respectively.

This is important from a policy standpoint because a lower-income and/or low credit score household will feel the impacts of interchange regulation more intensely than a higher-income and/or high credit score household. This is for at least two reasons. First, whatever the exact amount, the average loss in credit card benefits will mean more to a lower-income household than a higher-income household as the former is more budget constrained. Second, while the model assumes that the fraction of consumers that holds credit cards drops uniformly across the population, this need not be the case. Lower-income and/or lower-credit score consumers are more likely to see an increase in price of credit (i.e., fees and interest rates) as a result of regulation. In turn, they might be more likely to lose access to the credit market.

To assess these differential impacts more formally, data from the Federal Reserve Board's 2019 SCF is analyzed. This analysis suggests that:
- African American and Hispanic households are poorer than White households, with median annual incomes of U.S.$34,616.01, U.S.$38,475.36, and U.S.$61,543.12 respectively. The median household income across the sample, regardless of race/ethnicity, is U.S.$54,300.07.
- Across all types of credit cards, i.e., including store credit cards and store accounts, average outstanding balances after the last payment compare as follows: U.S.$1,919.27 for African Americans, U.S.$2,293.57 for Hispanics, and U.S.$2,963.44 for Whites.
- African Americans and Hispanics are more likely than Whites to have applied for a credit card in the last 12 months, at 29.92 percent, 31.21 percent, and 27.29 percent respectively. They are also more likely to have been turned down for credit in the last five years, at 23 percent (African Americans), 20 percent (Hispanics), and 15 percent (Whites).
- Among those who did not apply for credit in the last 12 months, African Americans and Hispanics are more likely to cite high interest rates as the reason for not doing so, at 3.03 percent and 6.09 percent respectively and 0.72 percent for Whites. African Americans and

Hispanics are also more likely to fear being denied credit at 31 and 25 percent respectively relative to Whites (12 percent).

- Median interest rates on the card with the highest balance are relatively comparable across racial/ethnic groups, at 15.9 percent for African Americans, 16 percent for Hispanics, and 16.9 percent for Whites. Still, African Americans and Hispanics are more likely to have had debt payments that are more than 60 days past due in the last year, at ten and seven percent respectively, relative to Whites (five percent).

Next, data from the Federal Deposit Insurance Corporation's 2019 SUUH is analyzed. Consistent with one of the findings from the SCF, African American and Hispanic households are less likely to have used bank credit products in the last 12 months, at 52.5 percent (African American), 58.6 percent (Hispanic), and 78.7 percent (White). They are thus more likely to have used non-bank credit products, at 8.8 percent (African American), 7.5 percent (Hispanic), and 3.6 percent (White).

Collectively, the SCF and SUUH findings suggest that interchange regulation leading to higher fees and interest rates is likely to impact African Americans and Hispanics more intensely. Given these racial/ethnic groups are overrepresented among lower-income and low credit score households, this means that they would disproportionately feel the impacts of interchange regulation. The reason for this is because these subpopulations are already more likely to be denied credit and make late payments on debt. So, these households will be more likely to experience the shocks that lead to the U.S.\$3.7 billion impact discussed previously – i.e., they are more likely to face a greater drop in a (a.k.a., higher interest rates/fees) and a greater drop in t (a.k.a., lower participation in the credit card market as a result). Stated differently: Whereas the average loss in benefits per card for higher-income and high credit score credit cardholders might be U.S.\$11.50 per card, it is likely to be closer to U.S.\$21.21 per card, i.e., almost twice as much, for lower-income and low credit score cardholders. This would amount to a collective loss of U.S.\$434 million (=20,467,190*\$21.21) for lower-income and low credit score households. That is, even though this subgroup constitutes 11.73 percent of the credit card population, it would bear about 21.64 percent (=0.434/2.006 billion) of the loss in consumer surplus to credit cardholders, relative to higher-income households who would incur less dramatic losses.

Finally, the model assumes that pass-through rates and impacts will be uniform across merchants and banks of different sizes. However, prior literature suggests that this will not be the case. Smaller merchants are less likely to reap the benefits from higher profits due to fee caps. Moreover, recent literature on the Paycheck Protection Program (which was instituted due to the COVID-19 pandemic) indicates that Black-owned businesses are more likely to use non-bank lenders such as fintech (e.g., Chernenko and Scharfstein 2021 and Fei and Yang 2021). While small business lending can be different from merchant interactions with banks in the context of credit cards, these findings could still point at broader, structural barriers that characterize minority-owned business interactions with banks. To the extent that lower-income consumers shop at such merchants, this will further exacerbate the impacts on them too, e.g., due to lack of pass-through savings. Related, smaller banks are less able to weather the shocks from reduced profits due to interchange regulation. As suggested by prior literature, this is also likely to further stifle technological innovations, particularly among smaller issuers.

5. About the Author

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The views expressed in this report are those of the author and do not represent any of the organizations with which he is or has been affiliated.

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8. Appendix I: Model Setup and Calibration

At a high level, the model is based on the following assumptions and parameters:

1. There is a unit continuum of monopolistic merchants who accept cards.
2. There is a unit continuum of consumers – a fraction thereof t uses a credit card for all their purchases and the remainder uses cash only, including debit and prepaid cards. While this is typically not true in the day-to-day environment, it allows for a model that is more tractable (see CRA International 2008 for additional discussion).
3. There are no two-sided market effects. Accordingly, t is fixed and does not vary with changes in the level of interchange fees a. Also, a does not affect the fraction of merchants that accept cards, and this fraction is fixed at 1.
4. Merchant costs are normalized to zero and they charge the same price p for both card and cash transactions.
5. Card transactions are subject to ad valorem bank fees f and m, where f is the fee paid by the cardholder to the issuing bank and m is the transaction fee paid by the merchant to its acquiring bank. Note that f can be negative in which case it represents the fee/benefit the consumer receives from the issuing bank, e.g., when consumers/cardholders receive rebates such as cash back or points on purchases.
6. The behavior of issuers, acquirers, and the card network is not explicitly modeled. Instead, issuing fees f are a linear function of the interchange fee a as follows: $f = f_0 - r_f * a$, where f_0 represents the base rate and r_f represents the pass-through rate from the issuer to the cardholder (thus reducing the issuer cost). Similarly, acquiring fees m are a linear function of the interchange fee a as follows: $m = m_0 + r_m * a$, where m_0 is the base rate and r_m is the pass-through rate from the acquirer to the merchant (thus increasing the merchant cost).
7. The timing of the model is as follows: Given the interchange fee a and thus the bank fees f and m, merchants choose their price p and then, consumers decide whether to buy the merchants' goods or not.
8. The model and simulation are parameterized as follows:
    a. $t = 0.6, 0.675$. Data from Verisk Financial suggest that 67.5 percent of U.S. adults hold a credit card. Supposing that an interchange fee cap causes a 10 percent reduction in credit cardholding, leads to an alternative value of 0.60.
    b. $a = 0.009, 0.012, 0.018$. Data from Verisk Financial and Nilson suggest that average U.S. credit interchange is 0.018. This gives rise to the initial calibrated level of 0.018. Supposing further that an interchange fee cap causes a 35-50 percent reduction in a, leads to alternative values of 0.012 and 0.009 respectively.
    c. $f_0 = -0.01$. This is taken from CRA International (2008), although the negative sign is consistent with the fact that U.S. consumers reap net benefits from holding credit cards (recall discussion in the section "**Benefits and Costs from Holding U.S. Credit Cards**").

d. $m_0 = 0.03$. This is taken from CRA International (2008), although data from Verisk Financial and Nilson suggest that the merchant discount rate is in the range from 2-3 percent.

$r_f = r_m$ and the values range from $0.1, 0.22, 0.5, 0.75,$ and 0.9. The wide range is consistent with prior literature which suggests that pass-through rates are likely to depend on the size of the merchant. See for example Wang et al. (2014) as well as https://bit.ly/3oru3C7. These pass-through rates also encompass the values assumed by CRA International (2008).

9. Appendix II: Tables

Table 1: Simulation Results – Changes in Cardholder Surplus, Merchant Profits, Bank Profits, and Overall Welfare

Row		t	a	r_f	r_m	Cardholders	Merchants	Banks	Overall
1									
2		0.6	0.009	0.1	0.1	-0.07%	0%	-0.09%	0%
3		0.6	0.012	0.1	0.1	-0.05%	0%	-0.06%	0%
4	Baseline	0.6	0.018	0.1	0.1	0	0	0	0
5									
6		0.6	0.009	0.22	0.22	-0.16%	0%	-0.20%	0%
7		0.6	0.012	0.22	0.22	-0.11%	0%	-0.13%	0%
8	Baseline	0.6	0.018	0.22	0.22	0	0	0	0
9									
10		0.6	0.009	0.5	0.5	-0.38%	0.01%	-0.45%	0%
11		0.6	0.012	0.5	0.5	-0.25%	0.01%	-0.30%	0%
12	Baseline	0.6	0.018	0.5	0.5	0	0	0	0
13									
14		0.6	0.009	0.75	0.75	-0.57%	0.02%	-0.68%	0%
15		0.6	0.012	0.75	0.75	-0.38%	0.01%	-0.46%	0%
16	Baseline	0.6	0.018	0.75	0.75	0	0	0	0
17									
18		0.6	0.009	0.9	0.9	-0.68%	0.02%	-0.82%	-0.01%
19		0.6	0.012	0.9	0.9	-0.46%	0.01%	-0.55%	0%
20	Baseline	0.6	0.018	0.9	0.9	0	0	0	0
21									
22		0.675	0.009	0.1	0.1	-0.06%	0%	-0.09%	0%
23		0.675	0.012	0.1	0.1	-0.04%	0%	-0.06%	0%
24	Baseline	0.675	0.018	0.1	0.1	0	0	0	0
25									
26		0.675	0.009	0.22	0.22	-0.13%	0%	-0.20%	0%
27		0.675	0.012	0.22	0.22	-0.09%	0%	-0.13%	0%
28	Baseline	0.675	0.018	0.22	0.22	0	0	0	0
29									
30		0.675	0.009	0.5	0.5	-0.31%	0.01%	-0.45%	0%
31		0.675	0.012	0.5	0.5	-0.21%	0.01%	-0.30%	0%
32	Baseline	0.675	0.018	0.5	0.5	0	0	0	0
33									
34		0.675	0.009	0.75	0.75	-0.47%	0.02%	-0.68%	0%
35		0.675	0.012	0.75	0.75	-0.31%	0.01%	-0.46%	0%
36	Baseline	0.675	0.018	0.75	0.75	0	0	0	0
37									
38		0.675	0.009	0.9	0.9	-0.56%	0.02%	-0.82%	-0.01%
39		0.675	0.012	0.9	0.9	-0.38%	0.01%	-0.55%	0%
40	Baseline	0.675	0.018	0.9	0.9	0	0	0	0

Source: Author's calculations. Recall that $m_0 = 0.03, f_0 = -0.01$. Additional results are available upon request.

Table 2: Percent Credit Cardholders by Income and Race

	<$50K	$50K-$75K	$75K-$100K	$100K-$150K	$150K+	Sum
overall	0.16	0.18	0.18	0.25	0.23	1.00
White	0.15	0.18	0.18	0.26	0.24	1.00
African American	0.24	0.21	0.17	0.21	0.16	1.00
Hispanic	0.18	0.21	0.19	0.24	0.18	1.00

Source: Author's calculations based on data from Verisk Financial (2021).
White cardholders: 140,259,110. African American cardholders: 7,239,410. Hispanic cardholders: 19,279,680.

Table 3: Low and High Score Credit Cardholders by Race

	Low score (<680) High risk	High score (>760) Low risk
White	0.77	0.83
African American	0.06	0.03
Hispanic	0.13	0.09
Asian	0.04	0.05
Other	0.00	0.00
Sum	1.00	1.00

Source: Author's calculations based on data from Verisk Financial (2021).
Low credit score cardholders: 42,817,640. High credit score cardholders: 86,984,380.