INTEREST RATES: PRICES HIDDEN IN PLAIN SIGHT*

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Abstract

I construct a new record of credit terms from mail-order catalogs of the 20th Century and find that when creditors switched from dollar to interest rate price disclosure in the 1960s, prices starkly jumped and price sensitivity to cost-of-funds diminished. I investigate possible explanations by using accompanying historical evidence and conjecture that the shift in price disclosure method diminished consumer ability to determine credit cost obligations and subsequently creditor incentives to compete on price. In an experiment I find that interest rate price disclosures do indeed prevent consumers from determining cost obligations leading to insensitivity to price and non-optimal borrowing and purchasing.

Keywords: Price Disclosures, Interest Rates, Revolving Credit, Historical Credit Prices
JEL: D12, D14, D40, L11, G20, N22

1. Introduction

Interest rates are the standard method used to communicate price of credit to consumers. And for some popular credit instruments, such as credit cards, it is the primary price disclosure available to consumers at the time of purchasing and borrowing that enables the calculation of credit cost obligations.[1] However, this has not always been the case. For the first two thirds of the 20th Century, before the ubiquity of credit cards, liquidity-constrained households in the United States who desired to purchase home goods would obtain credit directly from retailers and this credit, called "installment credit," was overwhelmingly quoted in dollar terms. For

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[1] See Appendix Figure 1 for an example of a credit card rates and fees table.

example, a household that wanted to purchase a $200 television set on credit from Montgomery Ward in 1954 would be told to add $19.50 to this cash price and to pay down this summed amount in monthly installments of $13 (see Panel A of Figure 1 for the credit terms table as it appeared in the 1954 Montgomery Ward Fall catalog). Then, in the 1950s and 1960s retailers en masse started offering a different type of credit, "revolving credit," that charged a monthly percentage fee on credit accounts based on outstanding credit balance (see Panel B of Figure 1 for the credit terms table as it appeared in the 1963 Aldens Fall/Winter catalog). And like its successor credit cards, revolving credit only disclosed an interest rate to convey costs.

In this paper I examine ways this historical shift in credit offerings and corresponding shift in price disclosures have impacted consumers and firms. More specifically and more relevant for today's credit environment, by using historical dollar-terms disclosures to determine counterfactuals, I can identify what impact interest rate price disclosures have on credit cost comprehension, borrowing and purchasing decisions, and optimal creditor behavior. I use two complementary approaches for analysis in this paper. First, I conduct an experiment in which participants make borrowing and purchasing decisions. Second, I construct and analyze a new historical data set of credit terms found in major U.S. mail-order catalogs throughout the 20th Century.

In the experiment, participants from an online labor market are provided a monthly income stream that can be used to make purchases from a menu of goods. This income stream intentionally forces liquidity constraints on participants, as it is insufficient for making any immediate purchases. A participant who chooses to purchase a good would have to wait between 2 to 10 months to receive a good as this would be the amount of time needed to save up enough income to purchase it. Some participants are also offered the option to use credit plans to acquire goods immediately rather than waiting until enough income has been saved up for a purchase. The credit plans offered vary between participants by price and price-quoting method. Some participants are offered credit plans quoted in "revolving terms" (i.e., an interest rate in percent) and others receive credit plans quoted in "installment terms" (i.e., dollar terms). Regardless of quoting method, there is only one single way to repay any loan of a given amount once a participant chooses to use credit for a purchase (i.e., unlike typical revolving credit, participants do not have the ability to repay their credit balance in full fast enough to avoid incurring interest charges).

After participants are informed that any decision they make has a probability of occurring, they are then asked to decide what to purchase (including the option of making no purchase at all and receiving the income stream in full). If participants are in one of the credit arms and plan to make a purchase, they also must choose whether to purchase with credit or with savings. Finally, participants in the credit arms are presented with a calculation question and asked to determine the number of months it would take to pay off a specified credit purchase, with a chance of reward for a correct response.

Responses from the calculation question reveal that participants are overwhelmingly unable to calculate the required months needed to pay off a credit plan if credit prices are quoted in interest rates. Specifically, at most 20% of revolving terms arm participants answer the calculation question correctly among several variations of revolving terms arms. In stark contrast, nearly 60% of installment terms arm participants answer the calculation question correctly. Even more damning for interest rates as a method to convey credit cost obligations, revolving terms arm participants take significantly more time arriving at their mostly incorrect responses than their installment terms arm counterparts. The new finding here is that participants are not simply ignoring or neglecting price information when it is delivered in percent form, but rather they lack the ability to translate these disclosures into cost obligations even with effort, incentives, and no limitations on utilizing outside tools. Even the revolving terms arms participants who answer the question correctly spend on average 4 times longer on the question than those who answer correctly in the installment terms arm. The results from the calculation question clearly show that interest rate price disclosures, when unaccompanied by other disclosures, obfuscate credit cost obligations from borrowers. Said in another way, interest rates require much more effort and perform much worse than dollar terms for relaying the exact same cost information.

How does this obfuscation impact borrowing and purchasing decisions? The purchasing exercise in the experiment reveals participants reacting in two different ways to not understanding credit costs. Some participants (around 12%) non-optimally avoid using credit when price is quoted as an interest rate. These participants underconsume or non-optimally delay consumption because they do not understand credit costs. Another subset of participants (around 12%) purchase goods when credit is quoted in interest rates that they would not otherwise purchase had credit been quoted in dollar terms. These participants are non-optimally purchasing

goods at prices above their value for those goods because they are not correctly incorporating the cost of credit into total price. In both of these cases, these reactions do not vary with credit price once price is above 0 (i.e., participants have one consistent "yes" or "no" decision concerning use of credit once costs are obfuscated). Overall, 20% more participants make purchases with interest rate price disclosures than with dollar terms price disclosures when credit is at its most expensive price in the experiment, 42% APR. The implications of these findings are that if revolving credit terms for credit cards and other open-end credit were to become more salient at the time that consumers make purchasing and borrowing decisions, then a portion of convenience users and non-borrowers would borrow and consume more and a portion of borrowers would borrow and consume less, each group correcting their non-optimal behavior. The findings also imply that policies that utilize interest rates as tools for reducing non-optimal borrowing will generally be ineffective in changing behavior. Finally, effective policy would need to increase salience of revolving credit costs before, not after, consumers make their purchasing decisions.

The experiment also allows me, under a small assumption, to quantify the percentage of participants who always make a purchase (either through savings or credit) regardless of credit price and the percentage of participants who are only interested in making a purchase if they can acquire the good immediately when credit is cheap. I find that these two groups of participants have heterogeneous responses to credit costs being obscured by the use of interest rates, with a subset of the former (around 39%) avoiding use of credit for purchases irrespective of credit price, the majority of the latter (around 63%) choosing to always make a credit purchase irrespective of credit price, and a minority of the latter (around 26%) choosing to never use credit nor make any purchases irrespective of credit price (all in the range of positive credit prices).

The results from this experiment highlight why studying price salience in the credit setting adds value to previous studies conducted in comparable contexts, such as that of sales taxes (Chetty, Looney and Kroft, 2009; Feldman and Ruffle, 2015; Goldin and Homonoff, 2013; Taubinsky and Rees-Jones, forthcoming). First, the necessary effort and ability to translate non-salient price information to salient price information is typically much higher in the credit setting than in the sales tax setting. So whereas researchers have found that consumers *can* incorporate sales tax into their purchasing decisions but *do not* do so as a matter of framing (Feldman and Ruffle, 2015), I find that consumers in the credit setting *cannot* translate interest rates into dollar

cost obligations. The inability, rather than failure, to translate interest rates into cost obligations has implications for consumer behavior, mechanisms and policy remedies that are different from those in the sales tax setting. Most evidently, the observation of participants underconsuming (or delaying consumption) in response to the opaqueness of costs has not been documented previously in sales tax literature. To the best of my knowledge, this is the first paper to demonstrate underconsumption in response to not understanding credit terms. As another example of differences in behavior across settings, Taubinsky and Rees-Jones (forthcoming) find that participants become significantly more attentive to sales taxes as sales taxes increase. In contrast, I find that participants appear to make no distinction in terms of purchasing nor borrowing between credit priced at 18% APR and credit priced at 42% APR when credit price is quoted as an interest rate (despite doing so when quoted in dollar terms). Second, the credit setting itself differs from other more studied settings because unlike sales taxes, credit is an optional feature with an avoidable cost. Hence, the credit setting allows me to examine a richer choice set than in previous research of responses to changes in prices and salience (i.e., buying both credit and good, avoiding both credit and good, and avoiding credit but still buying good).

In the second part of the paper I examine how the introduction of revolving credit instruments impacts creditor behavior. Creditors may find revolving credit to be more profitable than installment credit for several reasons including: 1) they find they can charge higher prices and behave less competitively with revolving credit than with installment credit without experiencing a drop in demand and 2) they find they earn more interest income as interest charges accrue in a compound fashion with revolving credit rather than additively with installment credit as consumers add purchases to a credit balance. As to the first point, if consumers are sufficiently inattentive to interest rates disclosed on revolving credit (e.g., they are not incorporating them into their purchasing decisions) and there is a sufficient number of these consumers who overconsume as a result, then creditors might not find it optimal to educate consumers on their cost obligations in order to more effectively compete. This is because such revelations of true costs can lead consumers to avoid credit purchases altogether rather than borrow from the most competitive creditor. Due to the disincentive to educate, creditors can find that they are instead able to raise prices in equilibrium without experiencing lowered demand and optimally they will raise prices to the highest level that does not illicit cost awareness of consumers or regulators, such as a usury ceiling. In such a case, credit price will be less sensitive

to fluctuations of the cost of funds that creditors incur; in other words, credit price will become more sticky. Operating in such a "shrouded equilibrium," an equilibrium in which no creditor educates consumers on costs, would be especially attractive for less efficient creditors who incur higher costs to provide credit. This is because they will be able to appear more competitive since credit cost obligations are hidden with interest rate disclosures. On the other hand, some consumers may avoid credit or delay purchasing if credit cost obligations are obscured, as demonstrated in the experiment. Likewise, there may exist consumers that are sophisticated enough to understand the cost of credit even when disclosed as an interest rate. Hence, some creditors might find it beneficial to offer transparently priced installment credit at competitive prices to capture these consumers. Offering installment credit would be most fruitful for efficient creditors as they will be able to set the most competitive prices; and consumers, comprehending costs, will be able to respond to them easily. Both installment and revolving credit instruments can co-exist simultaneously in a market despite having a divergence in price if 1) consumers who are inattentive to interest rates are deterred from using installment credit because of the salience of its costs and prefer to use revolving credit because of their failure to detect its costs and 2) efficient creditors are not tempted to educate all consumers on costs because they themselves offer revolving credit and hold a large enough share of its market.

To examine creditor and market behavior, I construct a new data set of credit terms spanning the 1920s to the early 1990s from credit plans found in the major U.S. mail-order catalogs of the twentieth century: Sears, Montgomery Ward, J.C. Penney, Aldens, and Spiegel. This dataset provides one of the first records of consumer credit prices spanning this length of time for a period before such information was consistently and formally collected.

I find that small retailers, who face higher cost of funds than their larger competitors, adopt revolving credit, immediately abandon installment credit, raise credit prices, and lower monthly payment requirements to match those of their larger competitors. Upon adoption of revolving credit, these retailers experience significant growth in credit sales relative to cash sales. In contrast, large retailers who face lower cost of funds introduce revolving credit in a more tempered way. They retain their installment credit offerings for a significant period of time after adopting revolving credit, and price their installment credit offerings more competitively than their competitors' and their own revolving credit offerings. Revolving credit prices, whether from small or large retailers, are stickier (relative to fluctuations of cost of funds) than

installment credit prices. Despite the existence of more competitively priced credit on the market over long periods of time, small retailers never succumb to any pressure to lower their revolving credit prices. On the contrary, large efficient retailers eventually follow the suite of smaller retailers by phasing out installment credit accounts and only offering revolving credit at higher prices and lower minimum monthly payments. Furthermore, revolving credit prices remain sticky even in periods with drastic declines in cost of funds.

These creditor behaviors are consistent with revolving credit ushering in shrouding and a dampening of competition. And whereas there are certainly other plausible factors (e.g. more attractive or costlier features, higher operating costs, riskier clientele) that can explain some of the observed behaviors (i.e., why revolving credit might be more expensive, more in demand, more sticky or more preferred by less efficient creditors than installment credit) it is difficult for any one of these factors to explain the behaviors altogether. In contrast, all these behaviors can be easily explained by shrouding. It is important to point out that price stickiness for revolving credit is not an anomaly exclusive to the retail setting studied here (in which gains or losses from credit can potentially be transferred to the price of the underlying goods sold) but has persisted in the bank credit card industry decades later as thoroughly documented in Ausubel (1991) and Calem and Mester (1995). The findings of this paper add shrouding brought about by interest rate price disclosures as another explanation to the leading theories for credit card price stickiness – search costs, switching costs, and adverse selection. Finally, shrouding theory suggests that less efficient creditors offering expensive revolving credit and more efficient creditors offering cheaper installment credit means that the two types of credit attract different types of consumers (i.e., naive and sophisticated) and that consumers who use revolving credit are potentially exploited. Even in today's credit card market, borrowers of the same risk level can hold credit cards with vastly different prices, even when controlling for credit card characteristics (Stango and Zinman, 2016). This dispersion in credit card prices can be explained, in part, by some of the same forces that allowed expensive revolving credit to co-exist with cheaper installment and revolving credit without succumbing to competitive pressures – namely, the inability for consumers to appreciate cost differences between credit instruments when prices are quoted in interest rates. Without such appreciation, consumers may not be motivated nor aware enough to search and switch to cheaper credit.

The remainder of the paper is organized as follows. Section 2 presents a literature review. Section 3 describes the experiment and its findings on consumer behavior. Section 4 investigates the impact of the innovation of revolving credit instruments on creditor behavior in the mail-order catalog industry. And Section 5 discusses the implications of these findings and concludes.

2. Literature Review

The findings of this paper complement research on the impacts of disclosures on borrower behavior. For example, Seira, Elizondo and Laguna-Müggenburg (2017) find that mailings that emphasize credit card interest rates do not have any impact on levels of credit card debt, delinquency, account closing, or switching, something that can be easily explained by the findings of this paper. Perhaps the closest study to the one conducted in this paper is the payday loan field experiment of Bertrand and Morse (2011). The authors find that presenting borrowers with examples of summed-up fees (in dollar terms) that would be incurred if payday loans were rolled over beyond their original maturity dates is effective in reducing subsequent payday loan borrowing despite the fact that payday loans already disclose the annualized percentage rates (APR) of these fees at the time of loan origination. The experiment in this paper is distinct from the one in Bertrand and Morse (2011) in three crucial ways: disclosures, repayment flexibility and mechanism. Unlike revolving credit, payday loans disclose fees in dollar terms at origination along with the APR. Hence, all participants in Bertrand and Morse (2011) have access to the dollar terms of their credit. Similar to the sales tax setting, the mechanisms that drive Bertrand and Morse's results are related to failure to consider fees that would accumulate upon rolling over of the loan (if rollovers occur) rather than inability to calculate them (e.g., a tendency to use too narrow a decision frame, procrastination amplified by short decision periods). In contrast, the experimental setting in this paper either discloses credit price in dollar terms or interest rate terms, but not both, to each participant. It also disables any repayment flexibility which could allow for roll overs, prepayment, or any variation in cost obligations. Hence, these simplifications enable the isolation of only one mechanism − the interest rate price disclosure mechanism − and abstracts from alternate mechanisms that emerge from typical features of revolving credit (e.g., grace periods). This experimental design then allows me to find that interest rate price disclosures, by themselves, lead to significant non-optimal borrowing and consumption even before introducing more flexible features to credit instruments. To the best of my knowledge, this is one of the first papers to isolate the (inability to translate) interest rate

price disclosure mechanism, examine it on its own, and to highlight its affects on consumer and borrower behavior. Finally, in contrast to most studies on credit disclosures that only focus on borrowing outcomes (due to data limitations), this study also focuses on purchases, including purchases not made with credit. This is important because, as is the case in this experiment, it is possible for aggregate borrowing to look equivalent across experiment arms but for purchases to be significantly different. To the best of my knowledge, this is one of the first papers to examine purchasing, and not just borrowing, outcomes in the credit disclosure setting.

The experimental findings also add to the subset of literature that relates to mistakes that consumers make with credit (Stango and Zinman, 2015, 2014, 2009b; Agarwal, Driscoll, Gabaix and Laibson, 2008; Agarwal, Skiba and Tobacman, 2009; Gross and Souleles, 2002; Ponce, Seira and Zamarripa, 2017; Gathergood, Mahoney, Stewart and Weber, 2017). Unlike most of this literature, this paper focuses on mistakes in purchasing and credit origination, such as non-optimal purchasing and borrowing, rather than mistakes occurring after the purchasing decision has already been made, such as non-optimal credit allocation or repayment.[2] Furthermore, by measuring both inattention (accuracy of and time spent on calculation question) and shocks to salience of credit costs (method of quoting credit prices), this paper more directly identifies limited attention than previous work in this literature.[3]

The experiment used in this paper strengthens previous findings in financial literacy and marketing literature that people have difficulties with compound interest calculations and translating interest rates into cost obligations (Lusardi and Mitchell, 2011, 2017; Lusardi and Tufano, 2015; Soll, Keeney and Larrick, 2013) by incentivizing correct responses and inducing and measuring effort. The experiment also extends this literature by connecting inability with subsequent borrowing and purchasing behavior. The finding that participants can calculate cost obligations accurately and more quickly when credit price is quoted in dollar terms also redirects some of the source of financial literacy problems towards an increase in the complexity of disclosures themselves.

[2] Several papers address if consumers optimally accept credit card offers by examining their post-offer debt accumulation behavior (Shui and Ausubel, 2005; Agarwal, Chomsisengphet, Liu and Souleles, 2015b).

[3] In the consumer credit setting, Stango and Zinman (2014) shock the salience of overdraft fees by use of surveys. Alan, Cemalcılar, Karlan and Zinman (2018) shock the salience of overdraft fees by text messages.

The paper's documentation of firm response to the innovation of price-obfuscating credit instruments complements other empirical works that have found evidence of shrouding in the credit industry (e.g., Alan, Cemalcılar, Karlan and Zinman, 2017; Agarwal, Chomsisengphet, Mahoney and Stroebel, 2015a; Agarwal, Song and Yao, 2017). This paper, however, highlights that, with the use of interest rates, shrouding can occur with the primary price disclosure for credit and not just with auxiliary fees, secondary prices and add-ons (e.g., overdraft or late payment fees).

Outside of the consumer credit literature, this paper complements the theoretical literature on shrouding of price (Gabaix and Laibson, 2006; Heidhues, Kőszegi, and Murooka, 2016, 2017) by providing experimental evidence of the channel for shrouding as well as empirical historical examples of firm behavior. It also contributes to the growing literature of consumer inattention to price. Of great relevance are papers that document the ability of sellers to increase prices or profitability through the use of innovations or strategies that decrease salience (Finkelstein, 2009; Cabral and Hoxby, 2013; Hossain and Morgan, 2006; Brown, Hossain and Morgan, 2010; Ellison and Ellison, 2009).

Finally, this paper contributes to economic history literature by the construction of a new dataset of consumer credit terms and documentation of consumer credit costs over previously undocumented periods of the twentieth century. The dataset presents changes of credit terms over significant historical events, such as the Great Depression, World War II, and the enactment of the Truth-in-Lending Act (TILA) as well as the adoption of revolving credit. The paper specifically contributes to the strand of literature that addresses credit card rate stickiness (Ausubel, 1991; Calem and Mester, 1995). It highlights that rate stickiness was occurring decades before it became apparent in the credit card market in the 1980s and that rates were not always as sticky prior to the innovation of revolving credit.

3. Interest Rate Price Disclosures and Consumer Behavior

3.1 Experimental Procedure and Design

1,477 participants were recruited over 3 days in February 2017 through the online labor market Amazon Mechanical Turk (MTurk).[4] Participants were limited to those who lived in the United States, spoke English, were over the age of 18, and had at least a 90% MTurk task

[4] Several studies have found that MTurk workers are more diverse than student pools but tend to be younger, more educated and have lower income than the general population (Berinsky, Huber and Lenz, 2012; Paolacci, Chandler and Ipeirotis, 2010).

completion rate.[5,6] Participants were not restricted from using outside tools or help during the experiment and could take the experiment at any location where they have internet access. This flexibility in use of outside aids and location aimed to better mirror the natural information environment that households experience when making purchasing and spending decisions. Participants were told that they would receive $2 for completion of the study (which would take 15–20 minutes) and had a 1 in 30 chance of receiving up to $77.50 worth of bonus payments and Amazon gift cards.

Those who chose to participate in the study were directed to an online tutorial. In the tutorial, participants learned that they would be presented with an income stream of $5 a month for 13 months starting in a month. They could keep this money in full, which would be deposited directly into their MTurk account that can be linked to their bank account, or they could use part of this money to make a purchase from a set of attractively priced Amazon Gift Cards[7] (see Figure 2). The income stream was intentionally insufficient for making any immediate purchases of gift cards. Participants were told that they could purchase a desired gift card by first forgoing income stream payments until they had "saved" up enough money to cover the cost of the gift card. After forgoing enough payments, participants would receive a claim code to redeem the Amazon Gift Card. Remaining income stream payments would then resume as scheduled. Since the gift cards were priced between $10 and $50, participants who desired to purchase through savings would have to wait between 2 to 10 months to receive their desired gift card. Some participants were also offered an additional purchasing method, "credit," which enabled participants to receive the claim code for the gift card more immediately.[8] If participants purchased with credit, they then started a credit balance, and that balance would then be paid off through automatic monthly withdrawals from the income stream. Once the credit balance was fully paid, any remaining income stream payments resumed as scheduled. After participants had completed the tutorial and answered questions to demonstrate comprehension, they were asked

[5] In two instances, recruitment postings also added the criteria that participants needed to have completed at least 100 previous MTurk tasks. This does not seem to be a binding condition among the majority of recruited participants. Furthermore, dropping responses of all participants who were recruited at the time that this extra criteria was posted does not change the results presented in this section.
[6] I also prevented people from taking the study more than once (through IP address and Worker ID checks) and disqualified people who restarted the experimental instrument multiple times.
[7] Amazon Gift Cards where priced at approximately 80% of their purchasing value.
[8] Participants were informed that Amazon Gift Cards would be provided on the next business day.

to make their purchasing decisions (see Figure 2).[9] First, they were asked to decide what to purchase, if anything at all. Second, if participants were in one of the credit arms and planned to make a purchase, they also chose whether they would like to purchase with credit or with savings. To motivate honest responses, participants were told that there was a 1 in 30 chance that they would receive the income stream and have their purchasing decision occur.[10] Finally, participants in the credit arms were presented with a calculation question and asked to determine the number of months it would take to pay off a specified credit purchase (see Figure 3). Soll, Keeney and Larrick (2013) ask a similar calculation question in reference to a revolving credit instrument. To encourage effort, participants were told that one participant from the pool of those who answered this question correctly would win $10 through a random draw.

Credit plans offered to participants varied in price and quoting method. Participants received plans that charged 0%, 18%, or 42% APR and were quoted in either installment terms or one of three revolving terms.[11] Figure 4 presents examples of the four possible quoting methods. The "installment" plan is pictured in Panel A and instructs participants to add a one-time service fee to the price of the gift card to calculate the starting credit balance. The first revolving credit plan, the "base" plan, is pictured in Panel B and discloses a monthly percentage rate (MPR) that would be applied every month to the outstanding credit balance. The second revolving plan, the "APR" plan, is pictured in Panel C and contains the same information as the "base" plan but also includes the annualization of the MPR (i.e., the APR).[12] The third revolving plan, the "unshrouded" plan, is pictured in Panel D and contains the same information as the "base" plan except that it uses larger font size, underlines, bold font and red color to emphasize

[9] Tutorial questions were open-ended and not multiple-choice. If participants were not able to answer the tutorial questions correctly, they did not move forward with the rest of the experiment. Tutorial questions did not address specifics of costs of credit, but rather asked questions about the mechanics of different components of the experiment (i.e., income stream, purchasing through savings and purchasing through credit).

[10] When a participant completed all questions in the study, she was prompted to select a number between 1 and 30, inclusively. Then a random number generator would do the same. If the numbers matched, then the participant's purchasing decision would occur.

[11] Regardless of type of credit plan quoting method, credit cost or cost of desired gift card, all plans list the same required monthly payment of $5.

[12] The APR is required to appear on credit plans ever since TILA. Due to the prevalence of APR, I include an arm with credit quoted in APR in case participants are more familiar with credit quoted in this method.

the service fee information in the fine print.[13] Regardless of quoting methods, all credit plans with the same price require exactly the same stream of monthly payments for purchases of the same size. As mentioned earlier, this experimental setup is an intentional simplification of the flexibility options typically available in revolving credit that offer borrowers an array of ways to pay off credit balances (including the option to pay the balances in full before incurring any interest charges). The income stream provided in the experiment and the minimum monthly payments required by the credit plans do not allow for early prepayment of the credit balance or any variation in the stream of payments to pay off credit balances. This simplification is made in order to isolate the effects of interest rate price disclosures from those of other confounding mechanisms, such as borrower over-optimism of repayment speed that is proposed in Ausubel (1991). Appendix Table 1 provides a crosswalk between revolving terms and installment one-time fees for varying gift card prices. For example, revolving plans charging 1.5% and 3.5% MPR are equivalent to those charging 18% and 42% APR, respectively. For a $50 credit purchase, an 18% APR credit plan is equivalent to an addition of a $4.58 installment credit fee, and a 42% APR plan is equivalent to an addition of a $12.63 installment credit fee. For ease of exposition, I will refer to the cost of all credit plans in APR terms regardless of how the plan was quoted to participants. After making their purchasing decisions, all credit arm participants were asked to calculate the number of months it would take to pay off a credit balance for a gift card priced at $40 if it were purchased using a 42% APR credit plan quoted in the method of their previously assigned credit plan (see Figure 3).

3.2 Predictions

As prices of credit increase, we should see that demand for credit or gift cards decreases. Specifically, we should see that demand for *both* credit and gift cards decreases for participants who only purchase if they can obtain the gift card immediately. Participants who desire the gift card regardless of when they receive it will decrease their demand for *only* credit as credit prices increase by purchasing the gift card through savings instead.

We should see a divergence of demand based on credit quoting method if one quoting method confuses prices more than another. Participants can react to a confusing price in one of two ways. Some participants may consume weakly less credit/gift cards. They will be behaving

[13] Revolving credit varies from installment credit not only by using an interest rate to quote price, but also by placing that information in fine print. The "unshrouded" credit plan aims to make the information in the fine print more prevalent and less hidden.

like the rational consumers modeled in Milgrom's (1981) persuasion game that assume that if credit cost information is unclear or hidden it must mean that it is expensive. In the most extreme case, they will completely stop using credit as soon as they stop understanding credit costs (e.g., this can happen when credit costs increase from 0 to a positive number) and will be insensitive to further increases in credit costs.[14] Other participants may ignore or not consider credit costs that they do not understand and consume weakly more credit/gift cards. These participants will be behaving like the consumers in shrouding models (e.g., Gabaix and Laibson, 2006; Heidhues, Kőszegi, and Murooka, 2017). They will not be as sensitive to credit price increases and in the most extreme case, they will always use credit and make purchases regardless of price.

3.3 Results[15]

Responses from the calculation question reveal that participants are overwhelmingly unable to calculate the required months needed to pay off a credit plan if credit prices are quoted in interest rates.[16] It takes 10 months to pay off a credit balance for a $40 credit purchase at 42% APR (or a $7.77 one-time installment service fee) at $5 a month. As seen in the distribution of responses in Panel A of Figure 5, the most popular response among all revolving terms arm participants is 8 months, a response that indicates confusion concerning credit costs. At most 20% arrive at the correct response in the "unshrouded" revolving terms arm, whose treatment emphasizes credit costs. In stark contrast, 60% of installment arm participants answer correctly. Even more striking, as seen in Panel B of Figure 5, revolving arm participants take significantly more time compared to their installment arm counterparts to arrive at these overwhelmingly incorrect responses. This new result is significant because it indicates that participants are not simply ignoring or neglecting price information when it is delivered in interest rate form or in fine print. Rather participants are unable to translate these disclosures into cost obligations even with effort, incentives, and no limitations on utilizing outside tools. Specifically we see that

[14] In such a case, the largest divergence in demand between quoting methods will occur at lower-priced credit.

[15] Since there were no questions in the tutorial that specifically asked participants to demonstrate understanding of their total credit cost obligation over the life of the loan (to avoid biasing what is being tested in the experiment), it is possible for participants to put little effort in understanding the credit plan apart from learning what their monthly required payment would be. To avoid participants whose main objective is to complete the study as quickly as possible to earn the participation fee, I drop observations from participants who spent less than 30 seconds examining their credit plan in the tutorial section. Conclusions are not changed if I include these participants.

[16] Soll, Keeney and Larrick (2013) also find that participants underestimate the time it takes to pay off a credit balance.

installment arm participants spend an average of 65 seconds on the calculation question, while revolving arm participants average between 97 and 145 seconds (with those in the "unshrouded" revolving terms arm spending the most time on the question reaping very modest improvements in accuracy). Even those who get the answer correct among revolving arm participants spend almost 4 times longer on the question than those who get the answer correct among installment arm participants (4.26 minutes versus 1.08 minutes; see Appendix Table 2). The results from the calculation question clearly show that interest rate price disclosures, when unaccompanied by other disclosures, obfuscate credit cost obligations from borrowers due to borrower inability rather than lack of effort. Said in another way, interest rates are a much more taxing and much less salient method than installment terms for relaying the exact same cost information.

How does this obfuscation impact borrowing and purchasing decisions? The purchasing exercise in the experiment reveals that participants can respond in one of two ways – non-optimally avoiding credit or overconsuming goods. Panels A and B of Figure 6 (and corresponding Appendix Tables 3 and 4) summarize the percentage of participants in installment, pooled revolving, and no-credit arms who use any credit and make any purchases, respectively. The dashed line in Panel B of Figure 6 indicates that approximately 60% of participants purchase a gift card when no credit is offered to them. At 0% APR, 79% and 77% of installment and pooled revolving arm participants purchase a gift card, respectively. Correspondingly, at 0% APR, 53% and 49% of installment and pooled revolving arm participants use credit, respectively. None of these outcome differences between quoting methods are statistically significant even at the 15% level. The fact that people make purchases through savings rather than through credit when credit is priced at 0% APR indicates that there is either some degree of mistrust of credit or there is a preference among some participants to receive gift cards at a future date rather than immediately.

As the cost of credit increases from 0% to 18% APR, the percentage of participants who use credit decreases significantly for both types of quoting methods. This indicates that participants recognize a difference between 0 and positive credit cost even when this information appears only in the fine print as a percent, as it does in revolving credit. At 18% APR, 37% of installment arm participants demand credit while only 25% of revolving arm participants do, levels that are significantly different from each other at the 5% level. This means that interest

rate price disclosures cause 12% of participants to non-optimally avoid using credit.[17] These participants underconsume or non-optimally delay consumption because they do not understand credit costs. The fact that these participants forgo credit use at prices when they should consume credit indicates that, just like in the case of Milgrom's (1981) consumers, this rejection of credit is a rule that does not vary with credit price once cost is obfuscated (e.g., price is above 0). As for purchases, at 18% APR, 79% and 74% of installment and pooled revolving arm participants purchase a gift card, respectively, which are not significantly different from each other even at the 15% level. Because the percent of purchasers do not change significantly with the credit price increase, it means that the drop in credit usage is mostly due to purchasers switching from purchasing through credit to purchasing through savings (see more details on this later in the section).

As credit costs increase from 18% to 42% APR, the existence of a different type of participant becomes apparent. While installment arm participants significantly reduce their demand for both credit and gift cards, revolving arm participants have little to no reaction to the increase in prices. Specifically, the percentages of installment arm participants who demand any credit and purchase any goods decrease by 18 and 19 percentage points, respectively, while the percentages of revolving arm participants who demand any credit and purchase any goods decrease by a statistically insignificant 1.7 and 2.1 percentage points, respectively. And at 42% APR, 60% of those in the installment terms arm make a purchase, which is nearly the same demand as those in the no-credit arm. In contrast, 72% of those in revolving arms make a purchase. This means that interest rate price disclosures cause 12% of participants to purchase goods that they would not otherwise have purchased had credit been in dollar terms.[18] These participants are non-optimally consuming goods at prices above their value for those goods because they are not correctly incorporating the cost of credit into total price, just like consumers

[17] Another possible explanation is participants who have "payment/interest bias," which is the tendency to underestimate the interest rate on credit when calculating it from the principal and payment stream of installment terms (Stango and Zinman, 2009a). Under this explanation, it is installment terms that cause participants to use too much credit rather than revolving terms that cause participants to use too little credit. This bias, however, cannot explain borrowing and purchasing behavior at higher credit prices.

[18] Another possible explanation for this finding other than revolving credit being less salient than installment credit is that participants overweight the installment service fee, which they pay off over time, by treating it as if it were the net present value of credit costs. However, the results from the calculation provide some evidence against this explanation as participants are much more aware of their credit obligations under installment credit than they are under revolving credit.

in shrouding models. The fact that these participants use credit and purchase goods at too high of a price level indicates that these participants heuristically decide to consume credit and buy goods when they do not understand costs. Overall, at 42% APR, 20% more participants make purchases with interest rate price disclosures than with dollar terms price disclosures. At that same price, there is no significant difference between the percent of participants who use credit across treatment arms.[19]

The fact that, generally, more people make purchases when credit is available than when it is not allows me to decompose purchasers into two groups. First, "credit-only" purchasers are only interested in purchasing a good if they can acquire it immediately, through credit, at sufficiently low enough prices. Otherwise, they prefer to consume their income stream in full rather than waiting to acquire a good through savings. Second, "always" purchasers make a purchase regardless of the price of credit. A subset of "always" purchasers will use credit at sufficiently low enough prices but otherwise will purchase through savings. I assume that 60% of participants are "always" purchasers based on the percent of participants who purchase in the no-credit arm. At 0% APR, I can identify that 19% of installment arm participants are "credit-only" purchasers, 34% are "always" purchasers who use credit for purchasing, and 26% are "always" purchasers who purchase through savings. At 0% APR, revolving arm participants have a very similar composition of purchasers (see Figure 7 for a pictorial representation of this story).

At 18% APR, we see that the 19% of installment arm participants who are "credit-only" purchasers continue to purchase. However now only 18% of installment arm participants are "always" purchasers who use credit for purchasing (a decrease from 34%), and 42% are "always" purchasers who purchase through savings (an increase from 26%). In contrast, 14% of revolving arm participants are "credit-only" purchasers who purchase, 11% are "always" purchasers who use credit for purchasing, and 55% are "always" purchasers who purchase through savings. This means that 26% of "credit-only" purchasers and 39% of "always" purchasers avoid using credit as a rule when they do not understand credit cost obligations due to interest rates price disclosures.

As price increases from 18% APR to 42% APR, we see that the composition of "always" purchasers across both arms remains unchanged. However, no "credit-only" purchaser in the

[19] This can occur because some participants who non-optimally forgo use of credit still decide to purchase a good through savings.

installment arm decides to make a purchase while 12% of revolving arm participants are "credit-only" purchasers who make purchases. This means that 63% of "credit-only" purchasers always use credit (and make purchases) as a rule when they do not understand credit cost obligations.

Altogether, this indicates that the majority of "credit-only" purchasers, those who only purchase goods when they can consume them immediately, always use credit when they do not understand terms, sometimes leading to non-optimal consumption. On the other hand, a minority of these "credit-only" purchasers stops consuming goods altogether when faced with credit with unclear terms, sometimes leading to non-optimal underconsumption. And around 40% of "always" purchasers, those who make purchases regardless of credit access, forgo use of credit as a rule when credit terms are unclear, sometimes leading to non-optimal delays in consumption.

Panels C and D of Figure 6 show participant behavior separated out by each type of revolving plan. We see in these figures (and in corresponding Appendix Tables 5 and 6) that including APR or emphasizing costs in the fine print does not result in significantly different behavior.

Though some participants make non-optimal credit purchases, it is possible that these purchases are actually quite small. To address this possibility, I turn to the intensive margin of borrowing and purchasing. Panel E of Figure 6 (and corresponding Appendix Table 7) presents the average amount borrowed among those who borrow in each experiment arm, and Panel F of Figure 6 (and corresponding Appendix Table 8) presents the average price of a gift card purchased by those who make purchases in each arm. We see from both Panel E and Panel F that revolving arm borrowers and purchasers react very minimally to credit cost increases over the 18% to 42% APR range. Hence, these results further support the findings in the extensive margin analysis that there exist participants that overconsume credit and gift cards when credit price is quoted as an interest rate. Furthermore we see in Panel E that at 42% APR, borrowers in revolving arms borrow $4.12 more than borrowers in the installment arm, a difference that is statistically significant at the 10% level. Hence, though the percentages of participants who use any credit are not statistically different between arms, the overall demand of credit is higher among revolving arm participants than among installment arm participants when credit is priced at 42% APR. As an aside, we see in Panel F that not only does credit access cause more people to make purchases (as seen in Figure 6, Panel B), but it also makes purchasers purchase more

compared to purchasers with no credit access. This highlights why many retailers incorporate credit into their sales strategies.

3.4 Discussion

There are two main takeaways from this experiment. First, consumers *cannot*, and not simply *do not*, translate interest rate price disclosures into cost obligations. This is despite effort, incentives, and no limitations on accessing outside aids. Second, interest rate price disclosures, when not accompanied by other disclosures, lead some consumers to underconsume and others to overconsume credit and goods. This is the case even if consumers are not present biased (Laibson, 1997) and even if all flexibility features of revolving credit are stripped away. For policy makers, the implications of these findings are that policies that disclose or emphasize interest rates will not be effective in changing borrowing or purchasing behavior. Unfortunately for revolving credit, an interest rate is its most natural price disclosure to relay due to its flexible structure. Interestingly enough, early versions of what would become TILA did require prior disclosure of finance charges (the summed amount of interest charges over the life of a loan) for revolving credit. However, revolving and other open-end credit were eventually exempt from such prior disclosure when it was argued (by several parties including credit issuers and retailers) that such disclosures were impractical (Rubin, 1992).

To counter the non-optimal effects of interest rate price disclosures, effective policy would need to increase salience of revolving credit costs before, not after, consumers make their purchasing decisions with tools other than interest rates. And if effective, such policies would cause a portion of revolving credit convenience users and non-borrowers to borrow and consume more and a portion of revolving credit borrowers to borrow and consume less.

4. Interest Rate Price Disclosures and Firm Behavior

In the second part of the paper I examine how the introduction of revolving credit instruments impacts creditor behavior. If consumers are sufficiently inattentive to interest rates disclosed on revolving credit and there is a sufficient number of these consumers who overconsume as a result, then creditors might not find it optimal to educate consumers on their cost obligations in order to more effectively compete. This is because such revelations of true costs can lead consumers to avoid or reduce credit purchases rather than simply borrow from the most competitive creditor. We see this occur in Alan, Cemalcılar, Karlan and Zinman (2018) in which promoting a large discount in overdraft fees causes a drop in usage of overdrafts. Due to

the disincentive to educate, creditors can find that they are instead able to raise prices in equilibrium without experiencing a drop in demand. Optimally, creditors will raise prices to the highest level that does not illicit price awareness of consumers or regulators, such as a usury ceiling. If this highest price is not a function of the cost of funds that creditors incur, then the price of credit will be less sensitive to fluctuations of market interest rates; in other words, credit price will be sticky. Operating in such a "shrouded equilibrium," an equilibrium in which no creditor educates consumers on costs, would be attractive to creditors as it can be profitable under certain conditions. It would be especially attractive for less efficient creditors who incur higher costs to provide credit. This is because they will be able to appear more competitive since credit cost obligations are hidden by interest rates. A theoretical framework for this story based on the shrouding model of Heidhues, Kőszegi, and Murooka (2017) in a setting where retailers are also the creditors is found in the Appendix along with consumer welfare implications of shrouding as well as anecdotal historical support for the existence of the conditions necessary for profitability in equilibrium.

There is another significant reason, related to cost obfuscation, for why creditors might prefer offering revolving credit to installment credit. Holding repayment amounts, repayment frequency, and credit prices constant, consumers will repay more interest with revolving credit than with installment credit on new purchases added to non-zero credit balances. This occurs even when the repayment streams and interest costs are identical across credit types when the initial credit balance is 0 (as is the case in the experiment of this paper). In other words, adding a $200 television to a $100 revolving credit balance would accrue more interest charges over the life of the loan than adding a $200 television to a $100 installment credit balance, holding monthly payments and prices constant. This is because interest charges accrue in a compound fashion with revolving credit rather than additively with installment credit. So whereas installment credit will only charge new interest on the amount of the new purchase, revolving credit will charge interest based on the new credit *balance*. Hence, creditors may find that they reap more interest income under revolving credit than installment credit as consumers add to their credit accounts. Consumers, on the other hand, may not detect this difference in cost obligation due to cost information being disclosed in interest rates.

Some creditors, however, might prefer to offer installment credit to revolving credit. As demonstrated in the experiment, some consumers may avoid credit or delay purchases if credit

cost obligations are obscured. Likewise, there may exist consumers who are sophisticated enough to understand the cost of credit even when disclosed as an interest rate. Hence, some creditors might find it beneficial to offer transparently priced installment credit at a competitive price to capture these consumers. Offering installment credit would be most fruitful for efficient creditors as they will be able to set the most competitive prices; and consumers, comprehending costs, will be able to respond to them easily.

Finally, Heidhues, Kőszegi, and Murooka (2017) present a model in which both goods with and goods without shrouded price components (revolving and installment credit in this paper's setting) can exist simultaneously in a market despite having different prices. This can occur if 1) consumers who are inattentive to costs when disclosed as interest rates prefer to use revolving credit to installment credit because revolving credit appears to be cheaper and 2) efficient creditors are not motivated to educate consumers on costs because they hold a high enough share of the revolving credit market.

In this section I examine how the introduction of revolving credit instruments impacts creditor and market behavior specifically in the U.S. general merchandise mail-order catalog industry. And by comparing creditor behavior when only installment credit is available to creditor behavior after the innovation of revolving credit we can gain insights to some of the dynamics of revolving credit that we see today. In the next few subsections I describe the industry setting and the data set constructed for analysis, document retailer behavior around the introduction of revolving credit, and discuss the implications of this behavior in the context of today's setting.

4.1 Industry Setting and Data

Retailers in the U.S. general merchandise mail-order catalog market offer department store merchandise (e.g., furniture, appliances, apparel) through catalogs and deliver them to consumers by mail. There were four major market players early in the twentieth century: Sears, Montgomery Ward, Spiegel, and Aldens. A fifth, J.C. Penney, entered the catalog market in 1963.[20] Sears, Montgomery Ward and J.C. Penney were much bigger retailers, in terms of sales, than Spiegel and Aldens. And based on information gleaned from company annual reports, Sears and Montgomery Ward were able to contract into a cheaper range of credit than their smaller

[20] Several of the mail-order catalog retailers also had physical retail stores and offered credit in those stores as well.

competitors (see Panel A in Appendix Figure 2). In 1963, catalog sales from three of these retailers Sears, Montgomery Ward, and Spiegel captured a 55%, 21.6%, and 14.1% share of the general-merchandise mail-order company market, respectively – 90.7% in sum (Company Annual Reports). And according to the *Monthly Retail Trade Reports* released by the U.S. Department of Commerce and Bureau of the Census, "mail-order houses" accounted for 11.3% of nationwide department store sales in 1963.

All of these catalog retailers offered credit to facilitate and encourage sales. In fact, for a large part of the twentieth century, retailers were a major (formal) source of consumer credit, as seen in Appendix Figure 3. Whereas consumers did take out personal loans from commercial banks, finance companies and other institutions for various purposes including consolidating their retail credit (Hyman, 2011), when purchasing goods, evidence points to consumers obtaining credit directly from retailers (or retailer-contracted finance companies). For example, very few of the respondents to the Spring 1961 Survey of Consumer Attitudes and Behavior who had made recent purchases from local stores or department stores with the use of credit claimed to have obtained this credit from a bank or other financial institution. Retail credit was also fairly accessible and pervasive. For example, in 1981 57% of U.S. households held at least one Sears credit card (Mandell, 1990; see Appendix Table 9). It was only in the 1980s that bank credit cards overtook retail-issued credit (Hyman, 2011), as seen in Appendix Figure 4.

Three types of credit appeared in catalogs at some point, sometimes concurrently: charge, installment, and revolving credit. Charge credit accounts gave customers, at no cost, a window of time, typically 30-days after purchase, to pay for their purchases in full. That is, charge accounts essentially charged customers 0% APR for short-term credit. In practice, charge account holders typically did not incur any financial penalties for not fulfilling their repayment obligations by 30 days and if they did incur a penalty, it would typically not occur until 90 days after purchase.[21] Installment and revolving credit accounts are as previously described in the paper with the addition of a grace period (typically 28 to 30 days) for revolving credit and even sometimes for installment credit for which no interest charge is assessed if the balance is paid in full within a designated time period after purchase.

[21] Based on a 1958 survey conducted by the Credit Management Division of the National Retail Merchants Association (Trotta, 1958), 72 out of 152 department and specialty store retailers (47%) did not assess any late charges on delinquent charge accounts. Of the remainder of retail stores, 61 out of 80 (76%) did not assess a late charge until after 90 or more days.

Data was collected from Sears, Aldens, Montgomery Ward, Spiegel, and J.C. Penney catalogs spanning spring 1928 through spring 1994, though no one company covers that entire range. Catalogs were gathered from libraries, archives, online resources, and directly purchased from an online auction sight. Credit plan information was only recorded when plans covered an array of goods in the catalog rather than when a plan was specified for each good individually. It was not uncommon for several credit plans to exist in a single catalog covering different product types (e.g., furniture, appliances).

Credit terms gathered include ranges of loan sizes, monthly payment requirements, finance fees, and fee calculation procedures. From this information, I was able to construct a time series of credit prices for each catalog credit plan. First, I determined the stream of payments required to pay off various borrowed amounts from each plan. For revolving credit, I determined the payment stream that results from only paying the minimum monthly requirements. Second, I used the payment streams to calculate my main price variable of interest: the annualized internal rate of return (IRR). The internal rate of return is defined as the interest rate for which the net present value of the cash flows is zero; in other words, it is the interest rate such that the borrowed amount is equal to the expected value of the monthly payments under credit. The equation used to calculate the IRR is:

$$0 = NPV = -Borrowed\ Amount\ + \sum_{n=1}^{n} \frac{Monthly\ Credit\ Payment_n}{(1 + IRR^n)}.$$

I annualize the IRR by multiplying it by 12. To my knowledge, this is the first study that documents consumer credit prices over the span of the twentieth century, as the Federal Reserve did not systematically collect finance rates from consumer lending institutions until 1971 (Hull and Davidson, 1973).

4.2 Retailer Behavior with the Introduction of Revolving Credit

Figure 8 presents the lowest and highest minimum monthly payment requirements and annualized internal rate of return among credit plans in each catalog for a loan of $200 around the period revolving credit was introduced into catalogs.[22, 23] I focus on this period of time and this loan amount for ease of exposition. A corresponding view of annualized internal rate of

[22] All values in this paper are nominal as APR is nominal. Real values and IRR for other loan amounts can be provided on request.

[23] I drop credit plans for home modernization loans that covered the same items applicable for Federal Housing Authority (FHA) backed Title 1 Loans.

return and minimum monthly payment requirements for each credit plan in each catalog over a longer period of time can be found in Appendix Figures 5 and 6, respectively. Furthermore, the main retailer behaviors in this section can be generalized for other loan amounts (with the addition of a little bit more nuance for small loan amounts).

We see in Panels A.i and B.i of Figure 8 that Sears, the largest retailer in this market, consistently offered the most competitive credit terms both in terms of minimum monthly payment requirements and price. For example, a person purchasing a $200 television on credit from Sears in 1954 could contract into paying $9.50 a month with credit priced at 11% APR whereas she would have contracted into paying between $13 and $15 a month with credit priced between 12% and 13% APR had she purchased from a rival mail-order retailer. Towards the late 1950s Sears' competitors started offering credit plans that matched Sears' low minimum monthly payment requirements. However, unlike Montgomery Ward, which was also able to match Sears' low prices, the two smaller retailers in the market, Spiegel and Aldens, hiked prices up significantly. They accomplished this price increase concurrently with their adoption of revolving credit. Each colored vertical dashed line in Figure 8 indicates when each catalog of the same corresponding color started to offer revolving credit. Spiegel was the first to offer revolving credit in its fall 1958 catalog. Sears, Montgomery Ward and Aldens followed suit in fall 1959, spring 1960 and fall 1960, respectively. In Panels B.i and B.ii we see that when Spiegel and Aldens adopted revolving credit, they immediately raised the price of a $200 loan from around 14-15% APR to 18% APR. This price jump did not correspond to jumps in the underlying cost of funds at the time, as proxied by the 3-month Treasury bill rate (see Appendix Figure 5).[24] Upon adoption of revolving credit, minimum monthly payment requirements were heavily emphasized in Spiegel and Aldens catalogs with declarations like, "These are the LOW MONTHLY TERMS that E-X-P-A-N-D the Shopping Power of your income up to 20 times," "THE LOWEST TERMS IN OUR HISTORY!" and "HAVE MORE FOR THE SAME MONTHLY PAYMENT."[25] Aldens and Spiegel immediately abandoned their installment credit offerings upon adoption of revolving credit. This meant that all price information for credit in these catalogs was disclosed through interest rates and relegated to fine print. From annual reports, we see that Aldens and Spiegel experienced a surge in sales subsequent to these changes

[24] And from all indications from data in company annual reports, cost of funds of mail-order retailers move in lockstep with Treasury rates (See Panel B of Appendix Figure 2).
[25] Found in 1963 Fall/Winter Aldens and Spiegel catalogs.

(see Figure 9).[26] Furthermore, the surge in sales was predominantly driven by credit sales and not cash sales and hence cannot be explained by changes in the underlying cash price of goods in the catalog alone.

In contrast to these smaller retailers, Sears and Montgomery Ward did not abandon installment credit when they adopted revolving credit into their catalogs. To the contrary, not only did they retain installment credit, they also retained it at the most competitive terms on the market (both in terms of price and minimum monthly payment requirements). And instead of setting revolving credit minimum monthly payment requirements at low competitive levels, as did smaller retailers, Sears and Montgomery Ward initially set them at the highest levels in the market. Hence, the most competitive credit instruments offered by Sears and Montgomery Ward and on the market at large were installment credit instruments. Specifically, Sears and Montgomery Ward retained their installment credit offerings for around 19 and 10 years after revolving credit adoption, respectively. As seen in Panels A.i and B.i in Figure 8, Sears and Montgomery Ward did not change the terms of a $200 installment loan from $9.50 a month at 14-15% APR when they adopted revolving credit into their catalog. They priced a $200 revolving credit loan at 18% APR, the same price as offered by Spiegel and Aldens (see Panel B.ii). However, as seen in Panel A.ii, they set minimum monthly payment requirements for a $200 revolving credit loan at $20 a month. This is much higher (almost double) the minimum monthly payment requirements of any other credit instruments on the market, whether installment or revolving. Not surprisingly, and in contrast to the behavior of smaller retailers, Sears and Montgomery Ward did not list or emphasize minimum monthly payment requirements for revolving credit in the main credit advertising pages of their catalogs. Instead, minimum monthly payment requirement information was found in the fine print of credit contract pages that would be mailed to the retailer to open an account. From annual reports we see that the incorporation of revolving credit into the credit portfolio of large retailers had a much more tempered impact on credit sales than it did for smaller retailers. As seen in Figure 9, credit sales for large retailers grew faster than cash sales but the growth trend did not perceptibly change after the adoption of revolving credit.

J.C. Penney, another large retailer, entered the mail-order catalog business in 1963. J.C. Penney is peculiar because its founder, James Cash Penney, was morally opposed to offering

[26] Sales are company-wide sales covering both sales in stores and catalogs.

credit despite acknowledging the positive impacts it could have on sales and profits. As a result, J.C. Penney did not start offering credit until 1958, much later than its competitors did and only after the retirement of James Cash Penney (who stayed on as a board member). Even upon adoption of credit, J.C. Penney emphasized its stance that credit was to be used only as a tool to promote merchandise sales and not as one to profit from finance charges themselves (Trumbull, 2014). J.C. Penney only offered revolving credit in its catalogs despite piloting both revolving and installment plans in some of its physical stores in 1958.[27] And potentially due to the company philosophy, J.C. Penney chose to price its revolving credit more competitively than all revolving credit plans offered by other retailers but more expensive than installment credit plans on the market, at approximately 16.8% APR, (see Panels B.i and B.ii in Figure 8). It also set minimum monthly payment requirements closer to the low levels of the smaller retailers ($11 per month for a $200 loan) rather than at the high levels of large retailers (see Panels A.i and A.ii in Figure 8). We also see, in Appendix Figure 5, that J.C. Penney revolving credit plans were at times (the 1970s) the cheapest credit plans offered of all plans on the market even with comparably low minimum monthly payment requirements.

Upon adoption of revolving credit, credit prices became more sticky to movements to costs of funds. We see in Table 1 that movements in the 3-month Treasury bill rate explain more of the movements of installment credit prices than movements of revolving credit prices in each catalog. Furthermore, this stickiness cannot be easily explained by binding usury ceilings. If usury ceilings were binding, we should have seen rationing of credit as the cost of funds increase. Though I do not have information on credit-application rejections or credit-account closures for the mail-order catalog retailers, I do have information on credit terms and credit sales volume. We see in Appendix Table 6 that minimum monthly payment requirements generally decreased or stayed the same even as cost of funds increased over the 1960s and 1970s. Since more liberal terms should attract more liquidity-constrained individuals, it seems unlikely that firms were facing binding usury ceilings at all times that rate stickiness existed. Furthermore, we see in Figure 9 that credit sales grew faster than cash sales, even in periods

[27] According to its Annual Reports, J.C. Penney first started piloting credit in a subset of its stores in September of 1958. In 1959 J.C. Penney offered two types of credit plans at various stores: a revolving plan that charges 1.5% a month and an installment plan where 8% was added to the cash price. Credit was expanded to all stores by 1962. 1963 was the first full year of credit selling, coinciding with the release of J.C. Penney's first mail-order catalog.

when cost of funds were increasing. Finally, though there is evidence of binding usury ceilings during the extremely high cost of funds period in the early 1980s, we see in Appendix Figure 5 that revolving credit prices of Sears, Spiegel and J.C. Penney remained close to their highest levels even after the cost of funds significantly declined over the remainder of the decade.[28] In contrast there is evidence that installment credit was more responsive to competitive market pressures than revolving credit. Specifically, under Regulation W, the Federal Reserve enacted several varying restrictions on credit to discourage consumption of durables and deter inflation during war and postwar efforts in three separate periods between 1941 and 1952. As a result of Regulation W, we see in Appendix Figure 5 that installment credit prices increased. However, unlike revolving credit prices, installment credit prices in catalogs fell soon after regulations were lifted, rather than staying at these regulation-induced high levels.

Despite the concurrent existence of both cheaper installment credit and cheaper revolving credit (from J.C. Penney) for significant periods of time, smaller retailers never succumbed to pressure to price their revolving credit competitively.[29] And as previously mentioned, despite periods of large declines in cost of funds, the price of revolving credit never succumbed to decreases. Rather the price of revolving credit in the catalogs remained sticky, a characteristic later found in credit cards. And it was the larger efficient retailers who eventually mimicked the credit terms of smaller retailers. In 1963, Montgomery Ward consolidated its general installment and revolving credit plans that covered all items in the catalog and introduced a new general revolving credit plan with much lower minimum monthly payment requirements at same price as the previous revolving credit plan (see Panels A.ii and B.ii in Figure 8). Unlike with its previous revolving credit plan, Montgomery Ward heavily advertised the lowered minimum monthly payment requirements, touting "Up to 50% lower than former Revolving Charge Payments; up to 40% lower than former Monthly Payment terms" and "Wards All-Purpose Credit Account

[28] Several retailers report losses in credit operations in their annual reports in the late 1970s and early 1980s and attribute these losses to the high cost of funds environment during this inflationary period. This points to the likelihood that usury ceilings were binding. As a result, states raised usury ceilings (Sears reports that higher credit rate ceilings were legislated in 23 states in its 1981 annual report), and we see retailer credit prices jump exactly at this time in Appendix Figure 6.

[29] Interestingly enough, Sears, Montgomery Ward, and Spiegel did demonstrate wariness of J.C. Penney's cheaper revolving credit pricing to the extent that they backed away from several years of opposition to annual (rather than monthly) percentage rate disclosures on revolving credit during the Truth-in-Lending Act legislative process once they realized that monthly percentage rate disclosures would enable J.C. Penney to better emphasize its cheaper pricing (Rubin, 1992).

CHARGE-all LOWERS YOUR PAYMENTS BOOSTS YOUR BUY-POWER." By 1970, Montgomery Ward had retired its remaining installment credit plan that covered durable goods and replaced it with a revolving credit plan for durables (see Appendix Figure 5). Sears, held on to its installment credit offerings for a longer time than did Montgomery Ward but eventually retired them in 1978. See Appendix Figure 8 for the plateau and decline of Sears installment accounts and the fast growth of Sears revolving accounts over time. It also lowered the minimum monthly payment requirements on revolving credit dramatically during the 1970s (see Appendix Figure 6). J.C. Penney eventually increased its credit prices in 1974 to levels that were in line with those of its competitors (see Appendix Figures 5). The head of the credit division of J.C. Penney explained that the impetus for the price increase was that, "consumers have generally not been rate-sensitive," and that J.C Penney "surveys have consistently shown that they [consumers] are more concerned about annual card fees than finance charge rates."[30] Finally, all retailers eventually started to make revenue-increasing modifications to the methods they use to calculate interest charges on revolving credit. For example, all retailers eventually included minimum monthly interest charge language into their revolving credit contracts. This modification increased prices especially for small loans. All retailers also eventually started to base finance charges on the average credit balance of the prior month rather than on the credit balance at the beginning of the current month.[31] In this way the balance used for interest calculations would include days before the monthly payment was received and deducted.

As to the fate of charge accounts and grace periods on installment credit, upon adopting revolving credit, all retailers abandoned these offerings preferring to only offer grace periods with revolving credit plans.[32] Thus revolving credit enabled retailers who formerly offered charge accounts a straightforward way to charge "slow paying" charge account holders (i.e., those who did not pay their account in full after 30 days). In other words, adoption of revolving

[30] J.C. Penney Corporate Records, Credit: Credit Rates, 1986–1987, Ralph Spurgin, "Presentation: JC Penney Finance Charge Rates", Management Council, January 27, 1986, 11. as reported in Trumbull (2014).

[31] J.C. Penney, citing consumer fairness and historical company philosophy, was the only mail-order retailer to buck industry trends, at least up till 1974, by calculating finance charge based on the credit balance at the beginning of the current month rather than on a function of the balance from the previous month (Trumbull, 2014)).

[32] Prior to the introduction of revolving credit, Aldens and Montgomery Ward offered credit on installment with a policy to not charge any finance charges if the balance was paid in full within 30 days (i.e., installment credit with a grace period). Sears and Spiegel offered 30-day charge accounts that were separate from installment accounts.

credit with grace periods essentially raised the price of charge accounts outstanding beyond 30-days from 0% to 18% APR.

4.3 Discussion

These market behaviors − the jump in credit prices upon adoption of revolving credit, the stickiness of revolving credit prices in comparison to installment credit prices, the preference of less efficient creditors for revolving credit over installment credit, the concurrent existence of expensive revolving credit and cheaper revolving and installment credit over long periods of time, the growth of credit sales versus cash sales upon the adoption of revolving credit, the replacement of installment credit with revolving credit in the long run, and the incorporation of revenue-increasing modifications of interest calculations to revolving credit − can altogether be easily explained within the context of a shrouded equilibrium and a dampening of competition supported by revolving credit.[33] And though there are other plausible factors that can explain some of the observed behaviors, it is difficult for any one of them alone to explain all behaviors as easily as does shrouding. For example, it is plausible that prices for revolving credit are higher than those for installment credit because revolving credit has more attractive or costlier features, has higher operating costs, or is offered to riskier clientele.[34] However, though these factors may be valid and in play, they alone do not explain why revolving credit prices are stickier than installment credit prices or why less efficient retailers prefer revolving credit to installment credit. Price stickiness of revolving credit may exist because products sold are not exact substitutes across catalogs. However, this does not explain why price stickiness would not also occur with installment credit. Price stickiness may come about from binding usury ceilings. However, as discussed in the previous subsection, there is evidence that usury ceilings are not always binding when prices are sticky as rationing does not seem to occur as costs of funds increase nor do decreases of revolving credit prices occur as costs of funds decrease. Price stickiness may occur if gains and losses from credit are reflected in the cash prices of goods sold

[33] The addition of minimum monthly fees and the varying of methods for calculating monthly finance charges can be thought of as "exploitative innovations" as presented in Heidhues, Kőszegi, and Murooka (2016). In their model, the adoption of price increasing "exploitative innovations" would further preserve the "shrouding condition" necessary for a shrouded equilibrium to exist.

[34] A possible attractive feature of revolving credit is the ease that it allows consumers to add more purchases at different points in time to a single credit account. However, every installment credit plan in catalogs also allowed and advertised the ability for consumers to "add-on" purchases to one installment account. Hence, this feature of revolving credit already existed in installment credit when retailers chose to adopt revolving credit.

in the catalogs. Again, it is not obvious why this explanation would only apply to revolving credit and not also to installment credit. And, as discussed further below, price stickiness of revolving credit instruments persists even in cases when creditors do not control the price of goods sold on credit such as the case with bank credit cards. Shrouding brought upon by the price disclosure methods of revolving credit can more easily explain why revolving credit has both higher and stickier prices than installment credit. Furthermore, the proliferation of revolving credit especially among less efficient creditors and its resistance to price competition indicate that creditor gains from shrouding dominate their gains from competing on true costs.

The proliferation of revolving credit is not exclusive to the mail-order catalog industry. It occurred contemporaneously in other retail environments. For example, in 1953, between 26% and 65% of department stores and specialty retailers, depending on the size of the retailers, offered revolving credit, according to annual surveys conducted by the National Retail Dry Goods Association (Trotta, 1959). Just five years later in 1958, that range jumped to between 83% and 93% (Trotta, 1959).[35] Such rapid proliferation can also be explained by shrouding theory. Shrouding theory predicts that if a *profitable* shrouded equilibrium can be supported by revolving credit, then it will be the most likely equilibrium to occur. This is because retailers would prefer the positive profit afforded by revolving credit over the 0 profit afforded by an unshrouded equilibrium of installment credit. Furthermore, retailers who adopt revolving credit would also desire that other retailers adopt revolving credit, as that would decrease the likelihood of unshrouding (Heidhues, Kőszegi, and Murooka, 2016). See the Appendix for a discussion on the conditions needed for a profitable shrouded equilibrium as well as anecdotal evidence that these conditions were met in retail settings. Also see Ausubel (1991) for evidence of supra-normal profits in the bank credit card industry.

The sticky credit price of 18% APR (or 1.5% a month) that is charged for decades on revolving credit in mail-order catalogs is also charged on revolving credit in other settings. Specifically, the highest price of revolving credit ever reported by department stores and

[35] Data on installment credit, though not as systematically collected, points in the direction of a decline. In a survey of 263 department and specialty stores from 41 states in 1949, 73% offered installment accounts while only 23% offered revolving accounts (Trotta, 1949). In a 1958 survey conducted by the same entity of 153 (mostly) department and specialty stores, a minimum of 76% offered revolving credit while a minimum of 64% offered installment credit (Trotta, 1958). It is difficult to surmise the actual percentage of stores with specific credit accounts due to the wording of the 1958 survey. So I infer these percentages from other responses of retailers on details of their credit accounts. Comparison between 1949 and 1958 is made more difficult given that the latter survey contains mostly department store respondents.

specialty retailers in several formal and informal surveys conducted by the National Retail Dry Good Association, from 1956 through 1958 was 1.5% a month.[36] And according to their 1958 survey, 75% of retail store respondents who offered revolving credit charged 1.5% a month.[37] Even decades later, 18% APR was the dominant price that was charged on bank credit cards throughout the 1980s despite significant drops in cost of funds during that time period, as documented by Ausubel (1991). As previously mentioned, shrouding theory predicts that revolving credit prices would be set to the highest possible price that would not illicit attention from consumers or regulators, such as usury ceilings. And indeed usury ceilings for revolving credit started appearing in the late 1950s and 1960s.[38] For example, the assistant treasurer of the department store Kresge-Newark noted in an article in 1957 that "New York State has passed a law limiting, among other rates, revolving credit service charges to 1.5% on balances up to $500 and 1% on balances over $500" (Roberts, 1957). Evidence of usury ceiling pricing appear in the fine print of catalogs in the early 1970s with postings of differing credit charges (both monthly interest fee and minimum monthly dollar fee) for residents of different states.[39] Hence there is evidence that creditors were pricing revolving credit at usury ceilings and this can explain both the jump in price of credit upon adoption of revolving credit as well as the price stickiness of revolving credit.

Researchers have proposed that search and switching costs drive price stickiness in credit cards (Ausubel, 1991; Calem and Mester, 1995). However, the analysis of this paper of the mail-order catalog setting reveals that even when search and switching costs are held constant across credit instruments, price stickiness is greater for revolving credit than for installment credit and hence must be driven by additional factors. Ausubel (1991) proposes that good type (less risky) borrowers mistakenly believe they will repay revolving credit quickly enough to avoid costs and, as a result, will ignore credit price information when making purchases on revolving credit. Bad type (more risky) borrowers know that they will incur interest charges and search for the

[36] National Retail Dry Goods Association (1956, 1957) and Trotta (1958)
[37] 22% charged 1% a month.
[38] As noted in Curran (1967), most states did not consider retail credit to be under usury regulation before 1957. This is because the courts viewed goods sold on installment credit as simply having a different price than those sold on cash, which was not illegal. However, with the prevalence of credit use in general and revolving credit in particular, lawsuits emerged claiming usury violations that led to the enactment of stricter regulations on retail credit in some states throughout the 1960s.
[39] For figures and analysis, I use the most general credit plan information listed in catalogs that was not associated with a specific state.

cheapest credit. Hence, in such a situation, price stickiness on revolving credit would occur because it would not be optimal for creditors to compete on credit price, as that would attract bad types and lower profits on good types. The mail-order catalog setting provides examples of creditors (Aldens and Montgomery Ward) offering installment credit instruments with prepayment features (i.e., installment credit with grace periods in which interest charges would be reduced or not assessed upon prompt repayment of loan). Yet, despite having these credit features that drive Ausubel's price stickiness theory, these installment credit instruments did not experience sticky prices until their replacement with revolving credit instruments. Furthermore, upon replacement, creditors assigned more liberal minimum monthly payment requirements to revolving credit, which would attract more risky (liquidity constrained) types of borrowers. Hence, the mail-order catalog setting reveals that grace period features and repayment over optimism alone do not drive revolving credit price stickiness. The findings of this paper add shrouding brought about by interest rate price disclosures to the other leading explanations for revolving credit price stickiness.[40]

Finally, even in today's credit card market, borrowers of the same risk level can hold credit cards with vastly different prices, even when controlling for credit card characteristics (Stango and Zinman, 2016). This dispersion in credit card prices can be explained, in part, by some of the same forces that allowed expensive revolving credit to co-exist with cheaper installment and revolving credit without succumbing to competitive pressures – namely, the inability for consumers to appreciate cost differences between credit instruments when prices are quoted in interest rates. Without such appreciation, consumers may not be motivated nor aware enough to search and switch to cheaper credit. And as Stango and Zinman (2016) point out, such efforts can drastically impact the price of credit held.

5. Conclusion

[40] Credit card interest rates today are less sticky than they were in the 1980s. However, this does not necessarily imply that unshrouding has occurred and that credit card issuers are competing on price. The reduction of stickiness only occurred after a serious threat of a national credit card interest rate cap of 14% APR passed the Senate in 1991 (Hyman, 2011). After this, credit card companies started to issue credit cards with variable interest rates, typically priced at some measure of the cost of funds (e.g., prime rate) plus a premium. Under variable interest rates, a shrouded equilibrium can exist as the premium used might not be competitive and could preserve profitability. In such a case, instead of being at a fixed level, the shrouded price ceiling in the theoretical model will simply be a function of cost of funds. As a note, variable-rate credit cards are generally exempt from the rate increase restrictions of the 2009 Credit Card Accountability Responsibility and Disclosure (CARD) Act. (Consumer Financial Protection Bureau, 2013).

This paper examines how successful the primary way we disclose credit prices, interest rates, is at communicating credit cost obligations to consumers and what impact that has on borrowing and purchasing decisions. Unlike previous work that demonstrate that consumers ignore some credit terms when multiple terms are present or when terms are for add-on features or fees, this paper's experiment shows that borrowers ignore price even when it is the only term to consider. This occurs by disclosing credit price in the form of an interest rate, even if all other confounding features of revolving credit instruments are stripped away. Furthermore, consumers do not simply ignore interest rate price disclosures; rather, they lack the ability to translate them into cost obligations even with effort, incentives and no limitations on access to outside tools. This inability causes some to forgo credit and goods even when it is optimal to consume them and others to consume credit and goods even when it is optimal to forgo them. The experiment demonstrates that consumers react to confusing credit price disclosures by following a rule to either always use credit or never use credit, regardless of price.

This paper also examines how the innovation of credit instruments that only disclose interest rates, revolving credit, impacts a market. Using a newly constructed historical record of credit terms from mail-order catalogs, I find that the introduction of revolving credit causes a jump in credit prices, credit sales, and credit price stickiness. Less efficient creditors quickly adopt revolving credit, increase offered credit prices and contemporaneously start offering more competitive repayment terms while more efficient creditors initially continue offering more transparent installment credit at competitive prices. Expensive revolving credit co-exists with cheaper installment and revolving credit for long periods of time without succumbing to competitive pressures. In the long run, all creditors offer only revolving credit. These market behaviors are consistent with revolving credit ushering in a shrouded equilibrium and diminished competition. And comparisons with behaviors under installment credit in the same markets rules out other plausible explanations. The quick proliferation of revolving credit instruments, especially among less efficient creditors, and the emergence of shrouding imply that some consumers experience a loss in welfare due to the innovation of revolving credit. Sticky price behavior found decades later in bank credit cards can also be explained by shrouding brought about by interest rate price disclosures. And today's dispersion in credit card prices can also be explained, in part, by the inability for consumers to appreciate cost differences between credit instruments when prices are quoted in interest rates.

To counter the negative impacts of revolving credit on consumers, regulators need to increase the salience of credit card costs. However, this task is not easy. For example, TILA mandated the disclosure of APR on all consumer credit. However, such a mandate should have minimal effects based on the findings in this paper that interest rates themselves are not salient. Indeed, as seen in Appendix Figures 5, there were generally no large downward movements in price of revolving credit plans in catalogs when TILA went into effect.[41] And in fact, the standardization of interest rate price disclosures through the APR in TILA might potentially have caused consumers to become more trusting of such disclosures, bringing about a quicker demise to installment credit. The 2009 Credit Card Accountability Responsibility and Disclosure (CARD) Act mandated the disclosure of total finance charges for a credit card holder's outstanding balance if she only pays the minimum monthly requirement for the duration of the loan and if she takes 36 months to pay off the balance. The CARD act addresses revolving credit cost salience issues more directly than TILA because consumers can more tangibly see how interest costs add up in two examples on their statement.[42] However, consumers only see these CARD disclosures *after* they make purchasing decisions. Hence, these disclosures are less likely to prevent consumers from making non-optimal purchases. Financial education can be used to teach consumers the true cost obligations of revolving credit. In general, to mitigate overconsumption and encourage price competition, the most effective policy measures would need to increase salience of the cost of revolving credit *before* consumers make purchasing decisions and with tools other than interest rates.

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[41] In fact, for smaller balances I see an increase in revolving credit costs at the time of TILA due to adoption of minimum interest fees and changes in the way monthly outstanding balances are calculated.

[42] Agarwal, Chomsisengphet, Mahoney and Stroebel (2015a) and Keys and Wang (2016) find that 36-month payment amount creates an anchor effect. Keys and Wang present evidence that some consumers who were paying their full balance end up paying the 36-month payment. Furthermore, this disclosure itself might be shrouded for credit card customers who pay their bills and view their credit card activity online. These customers would need to open an electronic version of their paper statement in order to view the disclosure as it is not required to be displayed elsewhere.

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Figure 1
Examples of Credit Terms in Mail-Order Catalogs

Panel A: Installment Credit Terms

BUDGET POWER TABLE

Covered by Prudential Insurance

UNPAID BALANCE (Total amount, less down payment, if any)	Carrying charge	MONTHLY PAYMENT
$ 10.00 to $ 12.50	$ 1.25	$5
12.51 to 15.00	1.50	
15.01 to 20.00	2.00	
20.01 to 25.00	2.50	
25.01 to 30.00	3.00	
30.01 to 40.00	4.00	
40.01 to 50.00	5.00	
$ 50.01 to $ 60.00	$ 6.00	$6
$ 60.01 to $ 70.00	$ 7.00	$7
$ 70.01 to $ 80.00	$ 8.00	$8
80.01 to 90.00	9.00	
$ 90.01 to $ 100.00	$10.00	$9
$100.01 to $ 110.00	$11.00	$10
110.01 to 120.00	12.00	
120.01 to 130.00	13.00	
$130.01 to $ 140.00	$14.00	$11
140.01 to 150.00	15.00	
$150.01 to $ 160.00	$16.00	$12
160.01 to 170.00	17.00	
$170.01 to $ 180.00	$18.00	$13
$180.01 to $ 190.00	$19.00	$14
190.01 to 200.00	20.00	
$200.01 to $ 210.00	$21.00	$15
210.01 to 220.00	22.00	
$220.01 to $ 230.00	$23.00	$16
230.01 to 240.00	24.00	
$240.01 to $ 250.00	$25.00	$17
250.01 to 260.00	26.00	
$260.01 to $ 270.00	$27.00	$18
270.01 to 280.00	28.00	
$280.01 to $ 290.00	$29.00	$19
290.01 to 300.00	30.00	
$300.01 to $ 400.00	$40.00	$20

Source: Spiegel 1956 Spring/Summer Catalog.

Panel B: Revolving Credit Terms

BUDGET POWER

buys up to 50% MORE for the same monthly payment!

Budget Power Payment Table

Monthly Payment FOR ONLY	Unpaid Balance (Total amount* less down payment, if any) YOU CAN BUY	Monthly Payment FOR ONLY	Unpaid Balance (Total amount* less down payment, if any) YOU CAN BUY
$ 5	$100	$16	$350
$ 6	$120	$17	$400
$ 7	$140	$18	$430
$ 8	$160	$19	$460
$ 9	$180	$20	$480
$10	$200	$21	$500
$11	$220	$22	$530
$12	$240	$23	$550
$13	$260	$24	$580
$14	$280	$25	$600
$15	$310	$30	$720

ORDERS OVER $720. *For monthly payments on balances of more than $720 . . or to request a larger Credit Trust Fund, please write us. Your Prudential Life Insurance protects you on any balance up to $1000.*

***SERVICE CHARGE.** There are no carrying charges. Instead, a small service charge of 1½%, minimum 50¢, will be added to your opening balance each month.*

Source: Spiegel 1962 Fall/Winter Catalog.

Figure 2

Example of Question Page in Experiment

You will receive $5 a month for 13 months with the first payment starting in one month.

You can use some of the money from your income stream to purchase one of these specially priced Amazon Gift Cards:

You can purchase and receive your desired Amazon Gift Card today by using a credit plan OR you can wait till you have enough money saved up from your income stream to purchase it later.

If you would like to receive the Amazon Gift Card today, you must use the following credit plan:

CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card*	*Step 2: **Add** the one-time service fee listed below to the PRICE of the Gift Card to calculate your starting Credit Balance.*	*Step 3: **Pay** the amount listed below Every Month Until your Credit Balance is 0**
$10.00	$0.00	$5
$20.00	$0.00	$5
$30.00	$0.00	$5
$40.00	$0.00	$5
$50.00	$0.00	$5

** These payments will be automatically withdrawn from your income stream. If the remaining credit balance in any one month is less than the monthly payment, you will only pay the remaining balance from your income stream. The first withdrawal starts in one month.*

Which Amazon Gift Card would you like to purchase if any? Please select one choice below:

Not Interested in purchasing Amazon Gift Card at any time.					
	Value: $12.50; Price: $10	Value: $25; Price: $20	Value: $37; Price: $30	Value: $50; Price: $40	Value: $62.50; Price: $50
○	○	○	○	○	○

How would you like to make the purchase? Please select one choice below:

○ SAVING: Receive Amazon Gift Card after saving up enough money to purchase it.

○ CREDIT: Use credit plan and receive Amazon Gift Card today.

Figure 3

Calculation Question (Installment Credit Version)

*Assume that you will be receiving **$5 for 13 months** with your first payment starting in one month.*

If you are interested in purchasing the following Amazon Gift Card:

*and you are **planning to purchase it using the following credit plan**:*

CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card*	*Step 2: **Add** the one-time service fee listed below to the PRICE of the Gift Card to calculate your starting Credit Balance.*	*Step 3: **Pay** the amount listed below Every Month Until your credit balance is 0**
$10.00	$0.56	$5
$20.00	$1.94	$5
$30.00	$4.27	$5
$40.00	$7.77	$5
$50.00	$12.63	$5

** These payments will be automatically withdrawn from your income stream. If the remaining credit balance in any one month is less than the monthly payment, you will only pay the remaining balance from your income stream. The first withdrawal starts in one month.*

then how many months will it take you to pay off your credit balance? For example, if your credit balance will be equal to 0 in one month from today, then your answer is "1". Please type your response in the box below:

Figure 4
18% APR Credit Plans

Panel A: Installment

CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card*	*Step 2: **Add** the one-time service fee listed below to the PRICE of the Gift Card to calculate your starting Credit Balance.*	*Step 3: **Pay** the amount listed below Every Month Until your credit balance is 0**
$10.00	$0.23	$5
$20.00	$0.78	$5
$30.00	$1.68	$5
$40.00	$2.94	$5
$50.00	$4.58	$5

** These payments will be automatically withdrawn from your income stream. If the remaining credit balance in any one month is less than the monthly payment, you will only pay the remaining balance from your income stream. The first withdrawal starts in one month.*

Panel B: Revolving – Base

CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card. This will be the Credit Balance in the first month.*	*Step 2: **Pay** the amount listed below Every Month Until your Credit Balance is 0**
$10.00	$5
$20.00	$5
$30.00	$5
$40.00	$5
$50.00	$5

** These payments will be automatically withdrawn from your income stream. The CREDIT BALANCE in each subsequent month after the first month is calculated by first adding a service fee of 1.5% of the previous month's credit balance to the previous month's credit balance and then subtracting the monthly withdrawal amount (listed in the second column of the table above). If the summation of the previous month's credit balance plus the service fee is smaller than the monthly withdrawal amount, then only the previous month's credit balance plus the service fee will be withdrawn. The first withdrawal starts in one month.*

Panel C: Revolving – APR

CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card. This will be the Credit Balance in the first month.*	*Step 2: **Pay** the amount listed below Every Month Until your Credit Balance is 0**
$10.00	$5
$20.00	$5
$30.00	$5
$40.00	$5
$50.00	$5

** These payments will be automatically withdrawn from your income stream. The CREDIT BALANCE in each subsequent month after the first month is calculated by first adding a service fee of 1.5% of the previous month's credit balance (18% Annual Percentage Rate (APR)) to the previous month's credit balance and then subtracting the monthly withdrawal amount (listed in the second column of the table above). If the summation of the previous month's credit balance plus the service fee is smaller than the monthly withdrawal amount, then only the previous month's credit balance plus the service fee will be withdrawn. The first withdrawal starts in one month.*

Panel D: Revolving – Unshrouded

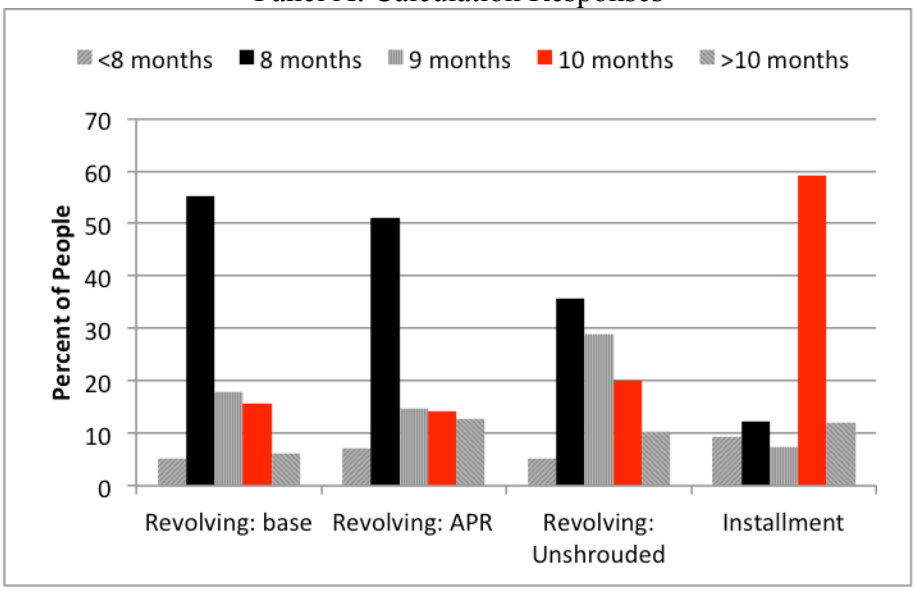
CREDIT PLAN

*Step 1: **Look up** the price of the Gift Card. This will be the Credit Balance in the first month.*	*Step 2: **Pay** the amount listed below Every Month Until your Credit Balance is 0**
$10.00	$5
$20.00	$5
$30.00	$5
$40.00	$5
$50.00	$5

** These payments will be automatically withdrawn from your income stream. The CREDIT BALANCE in each subsequent month after the first month is calculated by first adding a service fee of 1.5% of the previous month's credit balance to the previous month's credit balance and then subtracting the monthly withdrawal amount (listed in the second column of the table above). If the summation of the previous month's credit balance plus the service fee is smaller than the monthly withdrawal amount, then only the previous month's credit balance plus the service fee will be withdrawn. The first withdrawal starts in one month.*

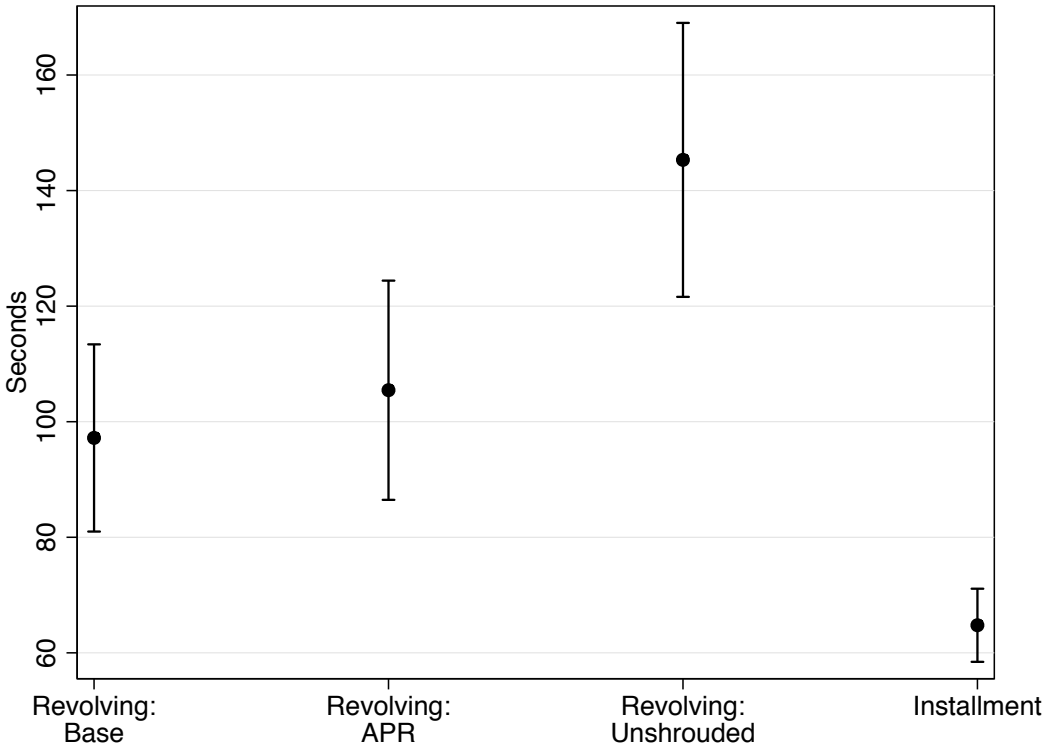
Figure 5
Calculation Question Results

Panel A: Calculation Responses



Note: The correct response is 10 months, which is designated by the red bar. 8 months, designated by the black bar, would indicate a calculation in which there is 0 cost to using credit.

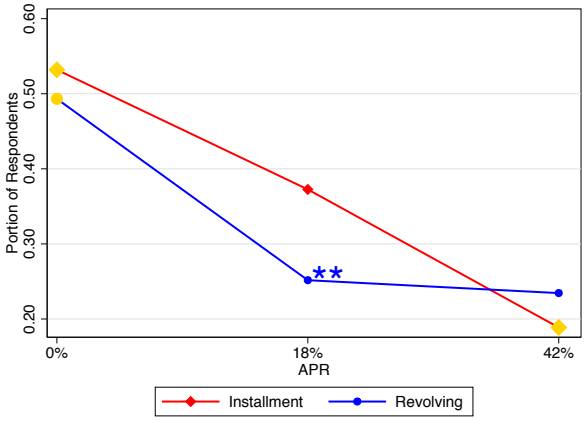
Panel B: Average Time Spent on Question



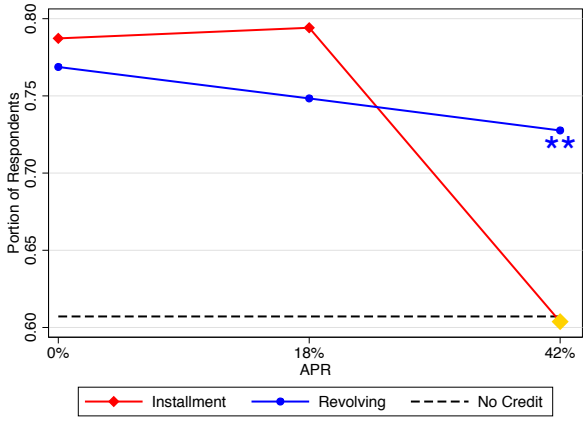
Note: Bands represent 95% confidence intervals around estimate of mean.

Figure 6

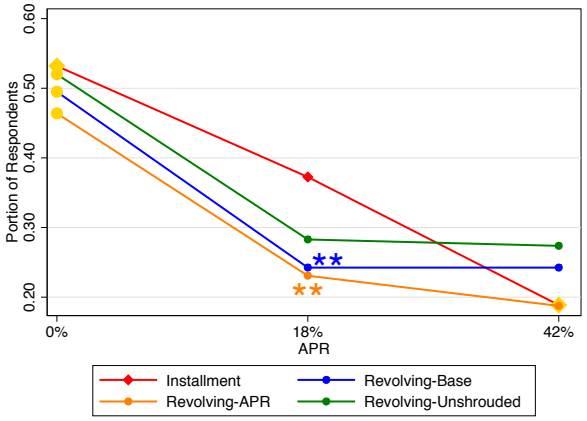
Panel A: Percent of Participants Who Use Credit



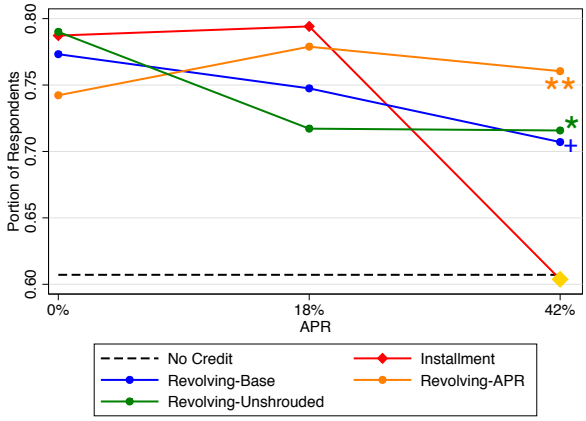
Panel B: Percent of Participants Who Make a Purchase



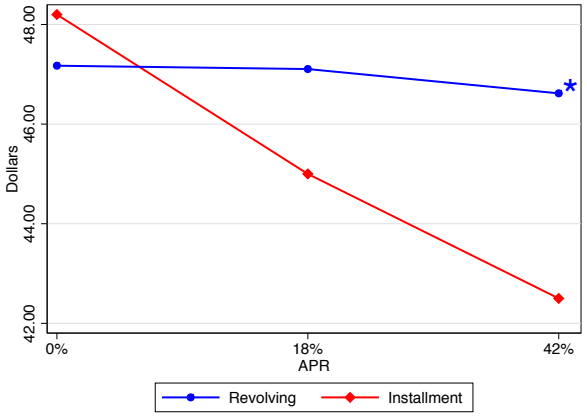
Panel C: Percent of Participants Who Use Credit



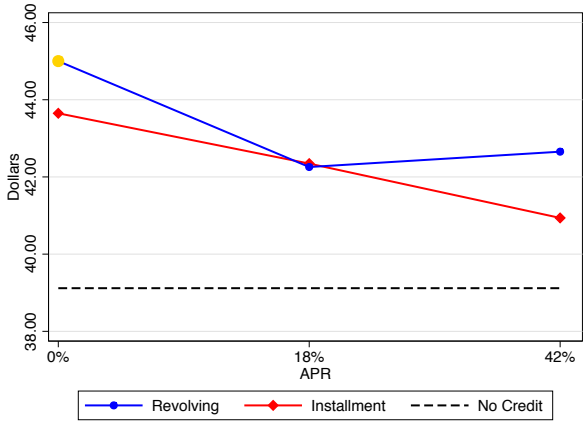
Panel D: Percent of Participants Who Make a Purchase



Panel E: Borrowed Amount per Borrower



Panel F: Purchased Amount per Purchaser



Note: +, *, and ** indicate a statistical difference at the 15%, 10%, and 5% significance level, respectively, between estimate and corresponding estimate for same priced installment arm. Yellow markers indicate a statistical difference at the 5% significance level between estimate and corresponding estimate for the arm with the same quoting method priced at 18% APR.

Figure 7
Percentage of Participants who Make a Gift Card Purchase

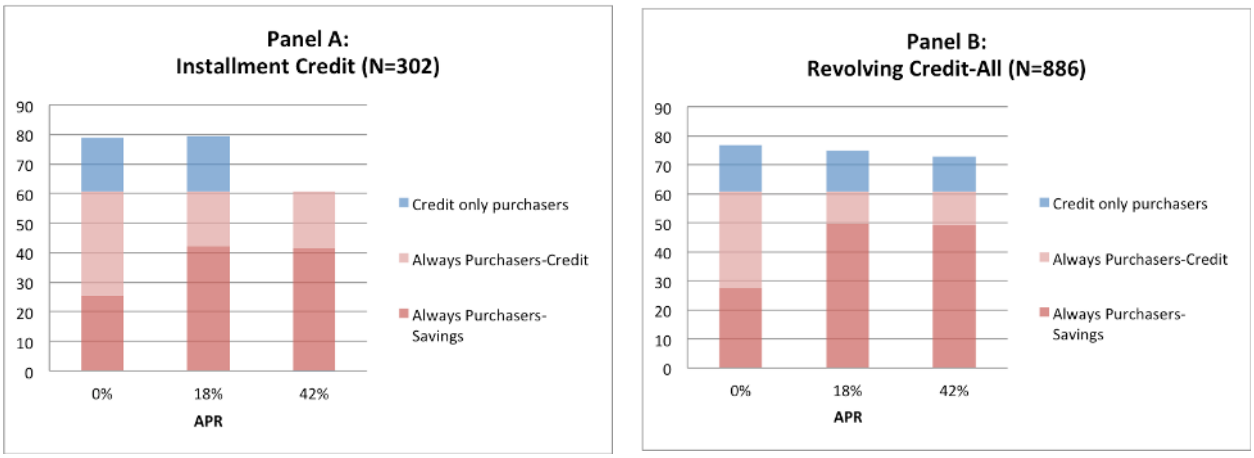
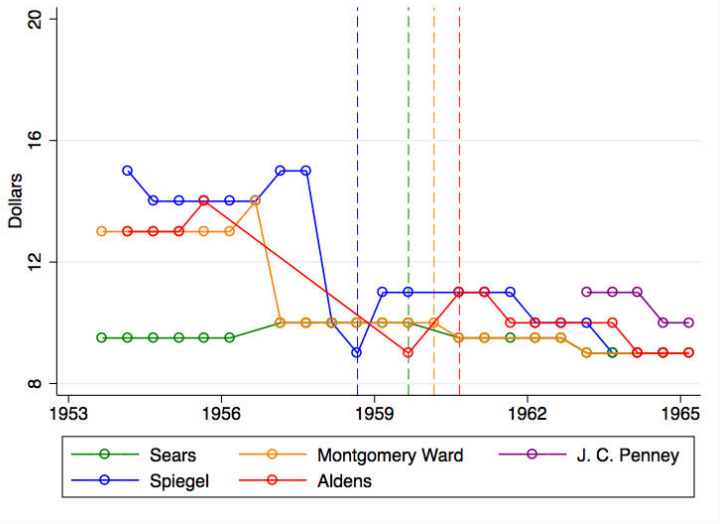


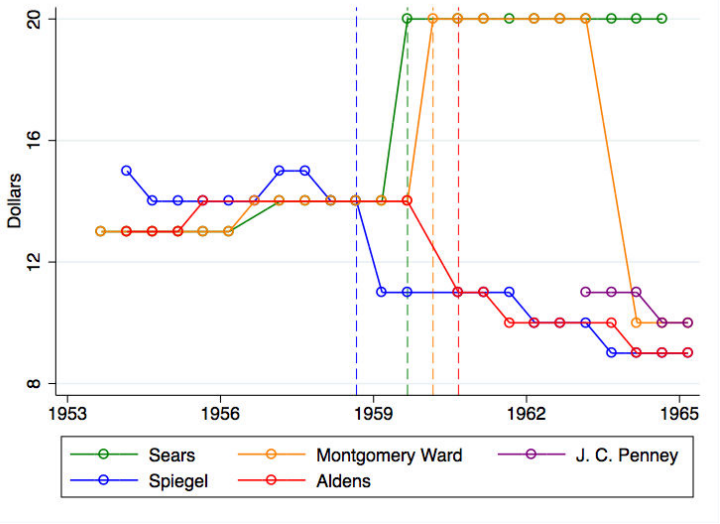
Figure 8
Internal Rate of Return and First Minimum Monthly Payment by Catalog for Borrowing $200

Panel A: Minimum Monthly Payment Requirements (in First Month)

i: Lowest Minimum Monthly Payment Requirements in Each Catalog

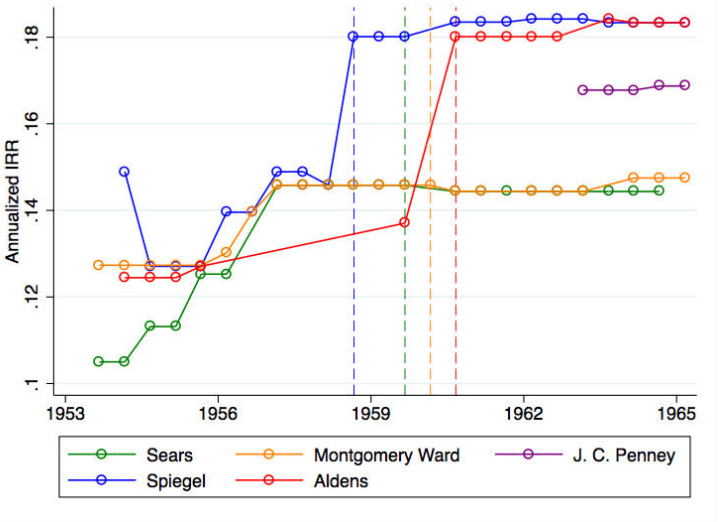


ii: Highest Minimum Monthly Payment Requirements in Each Catalog

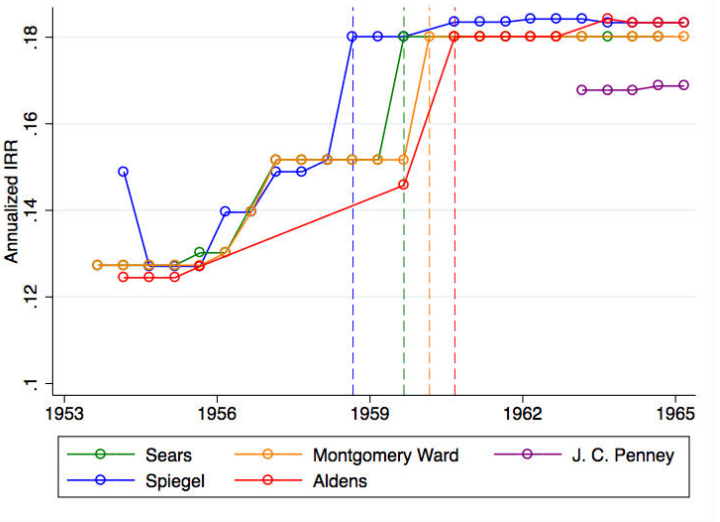


Panel B: Annualized Internal Rate of Return

i: Least Expensive Credit Plan in Each Catalog

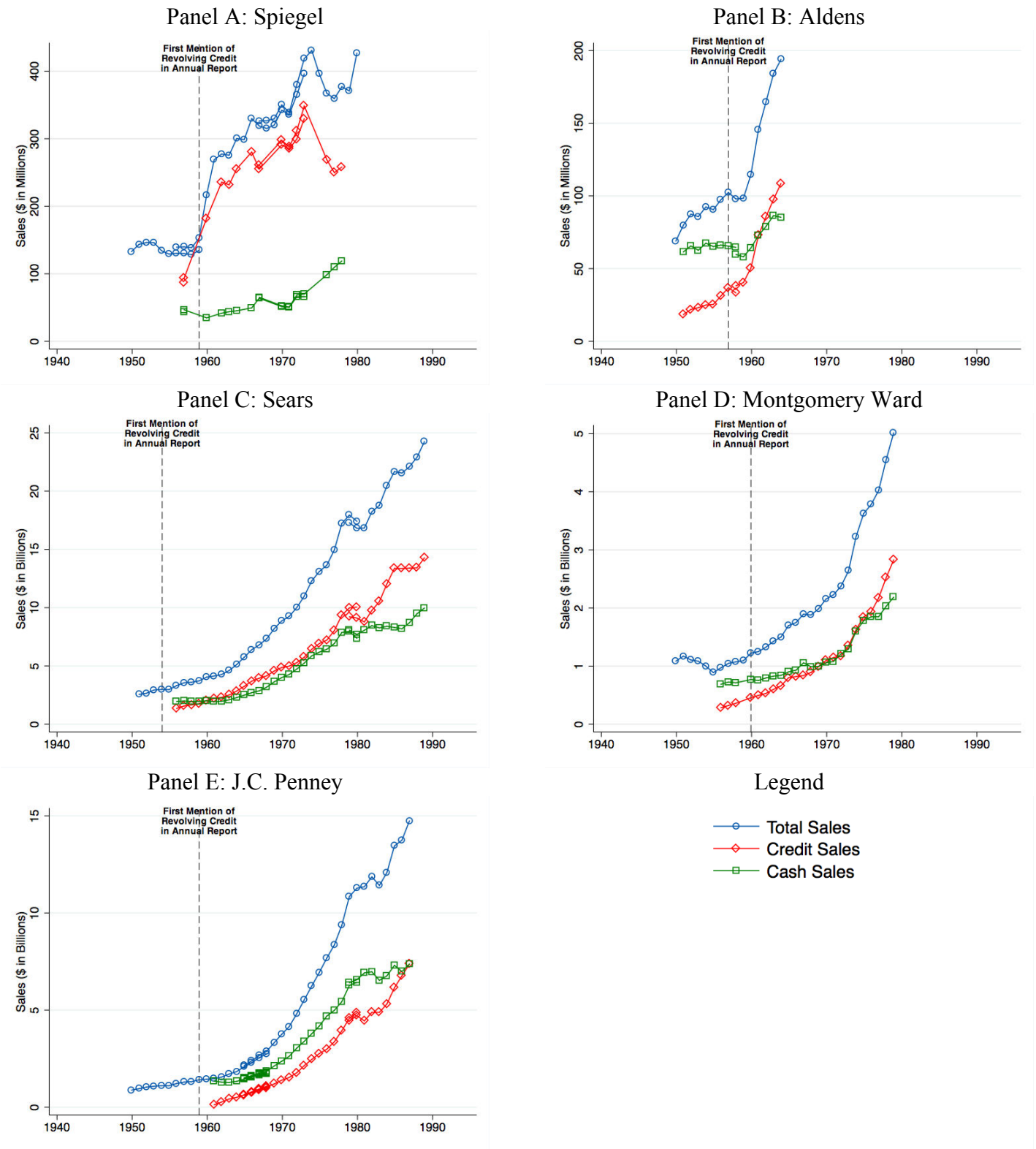


ii: Most Expensive Credit Plan in Each Catalog



Note: Vertical dashed lines indicate when revolving credit is introduced into catalog referenced by the same respective color.

Figure 9
Store Sales by Type



Note: Source: Company annual reports. Sales are company-wide sales covering both sales in stores and catalogs.

Table 1
Price Stickiness by Credit Type
Dependent Variable: Internal Rate of Return (IRR) for a $200 Loan

Panel A

	Sears: Installment	Sears: Revolving	Montgomery Ward: Installment	Montgomery Ward: Revolving
T-bill Rate	1.02***	0.08	0.79***	0.04*
	(0.09)	(0.06)	(0.11)	(0.03)
Constant	11.89***	18.54***	11.92***	18.08***
	(0.41)	(0.45)	(0.37)	(0.18)
N	50	54	33	46
R^2	0.72	0.03	0.63	0.06

Panel B

	Spiegel: Installment	Spiegel: Revolving	Aldens: Installment	Aldens: Revolving
T-bill Rate	0.39	0.22**	0.71**	0.30***
	(0.35)	(0.09)	(0.18)	(0.06)
Constant	13.31***	18.62***	11.37***	18.11***
	(0.76)	(0.52)	(0.37)	(0.40)
N	11	42	7	37
R^2	0.12	0.13	0.76	0.42

Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01. Analysis using all available pricing data per credit type per catalog after June of 1952 (i.e., after Regulation W was no longer affecting retail credit terms).

APPENDIX FOR ONLINE PUBLICATION

APPENDIX: Theoretical Framework

I directly apply the shrouding model of Heidhues, Kőszegi, and Murooka (2017) to a setting in which retailers of goods are also creditors, as is the case in the U.S. mail-order catalog industry. In a two-period model, $N \geq 2$ retailers compete for liquidity-constrained consumers in a simultaneous-move game in the first period, in which retailers set the transparent price of goods g_n, the interest rate on credit $R_n \in [0, \bar{R}]$, where $\bar{R} > 0$, and decide whether to unshroud R_n. The price of credit is shrouded when quoted in revolving terms. Furthermore, to unshroud it retailers would need to educate consumers on what the tangible cost of credit is when it is quoted in revolving terms. If consumers decide to make a purchase from retailer n, they would receive the good in the first period and pay $(1 + R_n)g_n$ in the second period. If no retailer unshrouds, then consumers make their purchasing decisions in the first period, believing that they are only obligated to pay g_n in the second period (i.e., they ignore R_n). However, if at least one retailer unshrouds, then all consumers can see the credit price from all retailers in the first period. Consumers vary in their valuation of the good received in the first period and have an outside option value from not making a purchase equal to 0. Let $D(p)$ be the demand curve for the given expected total price p incurred in the second period based on the distribution of valuations for the good. $D(p)$ has a chocking price, p', such that $D(p) = 0$ for $p \geq p'$. If some consumers decide to make purchases and they are indifferent between a subset of retailers, then each of these retailers split this demand in proportion to shares $s_n \in (0,1)$. Retailers borrow the cost of goods, $c_n^g > 0$ and repay it in the second period at the cost of funds, $R_n^c > 0$. Let $c_{min}^g = \min_n\{c_n^g\}$ and $R_{min}^c = \min_n\{R_n^c\}$. For simplicity and to allow for a competitive Bertrand outcome, I assume that at least two retailers have $c_n^g = c_{min}^g$ and $R_n^c = R_{min}^c$. I also assume that there exists $\varepsilon > 0$ such that $(p' - \varepsilon)(1 + \bar{R}) > c_n^g(1 + R_n^c)\ \forall\ n$. Otherwise, a firm cannot be profitable and would be considered nonparticipating in the market. A key aspect in Heidhues, Kőszegi, and Murooka (2017) is the existence of a floor for the always-transparent price: $g_n \geq \underline{g} > 0$.[43, 44] I assume that there is demand for the good if the perceived cost in the second period is at the price floor (i.e., $D(\underline{g}) > 0$). Finally, I assume that $\underline{g} \leq c_{min}^g(1 + R_{min}^c)$,

[43] Heidhues et al. (2012) provides a microfoundation for the existence of this floor.
[44] $\underline{g} > 0$ because $g_n = 0$ would produce 0 revenue regardless of value of R_n.

indicating that the price floor is not so high that a zero-profit outcome cannot be achieved through choice of R_n. The setup of this model mimics that of Heidhues, Kőszegi, and Murooka (2017), and so the same propositions and intuition apply here. I characterize a portion of them in broad strokes in the following.

Since there is no incentive to shroud when at least one firm unshrouds, there always exists an unshrouded-prices equilibrium among possible Nash-equilibrium outcomes. If all prices are transparent, such as the case when credit is quoted in installment terms or when at least one retailer unshrouds, then a Bertrand price competition game occurs: equilibrium prices are a combination of g_n and R_n such that purchasing consumers in the first period expect to pay and actually do pay in the second period a total of $c^g_{min}(1 + R^c_{min})$, selling retailers earn 0 profit, demand is $D\left(c^g_{min}(1 + R^c_{min})\right)$, and only the most efficient retailers sell goods.

In a setting in which the price floor for the always-transparent price is not binding for any retailer (i.e., where $\frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})} \geq \underline{g}$),[45] a shrouded equilibrium can occur. In this equilibrium, retailers use revolving credit terms, set the shrouded interest rate price to its highest value, $R_n = \bar{R}$, and correspondingly set the transparent good price to the lowest value where profits are not negative. The most efficient retailers (who face the lowest costs) will be able to offer the lowest transparent price of $g_n = \frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})}$ and will be the only sellers in equilibrium. At these prices, retailers earn zero profit. Since consumers only see the transparent price in the first period, they expect to pay $\frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})}$ in the second period if they make a purchase, but will pay the higher $c^g_{min}(1 + R^c_{min})$ instead. Correspondingly, the demand for the good in a shrouded equilibrium will be $D\left(\frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})}\right)$, which is greater than the demand in the unshrouded-prices equilibrium. Furthermore, $D\left(\frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})}\right) - D\left(c^g_{min}(1 + R^c_{min})\right)$ consumers are making purchases at prices higher than their value for the good. These consumers would not have made any purchase had total price been more salient.

[45] Among all retailers, $\frac{c^g_{min}(1+R^c_{min})}{(1+\bar{R})}$ is the lowest value of g_n that can be set such that any retailer maintains nonnegative profits.

In the setting in which the price floor for the always-transparent price is binding for all retailers (i.e., where $\frac{c_n^g(1+R_n^c)}{(1+\bar{R})} < \underline{g}\ \forall\ n$), a *profitable* shrouded equilibrium can occur. Specifically, each retailer can set $R_n = \bar{R}$ and compete on the transparent price g_n until reaching $\underline{g}$. At these two prices, the retailer would earn positive profits, given that the price floor is binding. To further increase market share, a retailer could unshroud and compete on total price. However, a retailer would not have an incentive to do so if the following "shrouding condition" holds: $s_n D\left(\underline{g}\right)\left(\underline{g}(1+\bar{R}) - c_n^g(1+R_n^c)\right) \geq \max_{p\in\left[\underline{g},\underline{g}(1+\bar{R})\right]} D(p)\left(p - c_n^g(1+R_n^c)\right)$, where the left hand of the inequality is the profit a retailer receives if he does not unshroud and the right hand of the inequality is the maximum he could receive by unshrouding. If a retailer decides to unshroud and offers a total price ever so slightly below $\underline{g}(1+\bar{R})$, then he will immediately cause *market* demand to shrink from $D\left(\underline{g}\right)$ to $D\left(\underline{g}(1+\bar{R})\right)$. Hence, competing on the shrouded price by unshrouding is more painful for a retailer than competing on transparent price, as it may result in both consumers exiting the market and lowered markups. If the shrouding condition holds with strict inequality for all retailers, then a shrouded equilibrium exists where all retailers quote credit in revolving terms, set $R_n = \bar{R}$ and $g_n = \underline{g}$, and earn positive profits. Total market demand for the good will be $D\left(\underline{g}\right)$. In the first period, consumers believe they will pay $\underline{g}$ in the second period if they make a purchase, but they will actually pay $\underline{g}(1+\bar{R})$. Again, in a shrouded equilibrium, some consumers make purchases that they would not make had total price been more salient.

Unless retailers have internal price floor policies or are subject to manufacturer-imposed minimum resale prices, it is unlikely that the binding price floor condition for the transparent price, a necessary condition for a *profitable* shrouded equilibrium, holds, especially for large-ticket items. This is because it is unlikely that a good priced at a naturally occurring price floor (e.g., at a level that just discourages arbitrageur consumers from entering the market) can produce enough revenue from the markup on credit to cover good costs. However, if merchandising and credit operations are decentralized enough, such that revenues and costs are not shared between departments, then a profitable shrouded equilibrium can occur. In such a case, the merchandising department would only set transparent price, would not receive any

revenues from the credit markup, but would simply receive the cash price of the good as revenue. Similarly, the credit department would only set the price of credit, would only incur costs related to providing credit, and would earn finance charge revenue assessed on the (exogenously set) transparent good price. Since the merchandising department will not incorporate credit revenue when setting the transparent good price, it will set it close to the cost of the good and net 0 profit (i.e., the Bertrand outcome). This then becomes the price floor for the transparent price. The binding price floor condition is more likely to hold at this price floor and the credit department could then retain its profit from credit price markups. In summary, this theory predicts that the more credit operations are separated from merchandising operations, the more likely a *profitable* shrouded equilibrium can exist in the credit market through the use of revolving credit.[46]

There is some evidence that large retailers did in fact decentralize departments. In a presentation to other credit managers in 1961, John Gribbon, manager of the Department of Accounts of Macy's, outlines steps in making credit a "potent factor for increased profit for the store." He states:

> The credit department should be broken off from retail operations to take the form of a separate, autonomous entity. It is as though the credit department were to be [*sic*] become a completely different unit. It would have two sources of income: the service charges paid by customers, and a commission on credit sales paid to it by the store. This credit enterprise would be charged with its full share of costs, including not only the customary costs of direct operation, but also interest and overhead. Its primary goal, identical to that of the retail operation, would be to increase store profit. The measure of its effectiveness in fulfilling this requirement would be the bottom line of its operating statement.... And, like the merchandise division, the credit department would produce substantial additions to store profit if it were to be operated under the net profit technique. The credit manager would be treated on the same basis as the merchandise manager in that he would be paid incentive bonus, so his success or failure, as well as his earnings, would be determined by the net operating results of his department. (Gribbon, 1961)

[46] In a similar logic, Murooka (2015) and Herweg and Rosato (2018) find that a *profitable* shrouded equilibrium can exist in settings in which the sales force is separated from production (either through the use of sale intermediaries or through specific sales incentive contracts).

I also find evidence that this decentralization existed within J.C. Penney as its credit division charged its retail division 1% to 2% for credit sales (Trumbull, 2014). And such "decentralization" automatically arises when retailers start accepting bank-issued credit cards.

References for Theoretical Framework

Gribbon, John. 1961. "A New Approach to Credit," *Credit Management Year Book 1961-1962*. National Retail Merchants Association.

Heidhues, Paul, Botond Kőszegi, and Takeshi Murooka. 2012. "Deception and Consumer Protection in Competitive Markets." *The Pros and Cons of Consumer Protection* (ed. Dan Sjöblom). Stockholm: Swedish Competition Authority, 44-76, 2012.

Heidhues, Paul, Botond Kőszegi, and Takeshi Murooka. 2017. "Inferior Products and Profitable Deception." *Review of Economic Studies*, 34: 323–356.

Herweg, Fabian and Antonio Rosato. 2018. "Bait and Ditch: Consumer Naïveté and Salesforce Incentives." CEPR Discussion Paper No. DP12612.

Murooka, Takeshi. 2015. "Deception under Competitive Intermediation." Working paper.

Trumbull, Gunnar. 2014. *Consumer Lending in France and America, Credit and Welfare*. New York: Cambridge University Press.

Appendix Table 1
Service Fees

Price of Gift Card	Value of Gift Card	Installment Service Fee		
(A)	(B)	(C) 0% MPR/ 0% APR	(D) 1.5% MPR/ 18% APR	(E) 3.5% MPR/ 42% APR
$10	$12.50	$0	$0.23	$0.56
$20	$25.00	$0	$0.78	$1.94
$30	$37.00	$0	$1.68	$4.27
$40	$50.00	$0	$2.94	$7.77
$50	$62.50	$0	$4.58	$12.63

Appendix Table 2
Time to Answer Calculation Question (in Minutes)

	(1) All Responses	(2) Answered Correctly	(3) Answered Incorrectly
Revolving	0.85***	3.16***	0.42**
	(0.17)	(0.35)	(0.20)
Constant	1.08***	1.10***	1.05***
	(0.15)	(0.24)	(0.18)
N	1188	326	862

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 3
Dependent Variable: % of Respondents Who Use Credit

Panel A

	(1) Installment	(2) Revolving
0%	0.16**	0.24***
	(0.07)	(0.04)
42%	−0.18***	−0.02
	(0.06)	(0.04)
Constant	0.37***	0.25***
	(0.05)	(0.03)
N	302	886

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR:42%
Revolving: All	−0.04	−0.12**	0.05
	(0.06)	(0.05)	(0.05)
Constant	0.53***	0.37***	0.19***
	(0.05)	(0.04)	(0.04)
N	388	404	396

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 4
Dependent Variable: % of Respondents Who Make a Purchase

Panel A

	(1) Installment	(2) Revolving
0%	−0.01	0.02
	(0.06)	(0.04)
42%	−0.19***	−0.02
	(0.06)	(0.04)
Constant	0.79***	0.75***
	(0.04)	(0.02)
N	302	886

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR: 42%
Revolving: All	−0.02	−0.05	0.12**
	(0.05)	(0.05)	(0.05)
Constant	0.79***	0.79***	0.60***
	(0.04)	(0.04)	(0.04)
N	388	404	396

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 5
Dependent Variable: % of Respondents Who Use Credit

Panel A

	(1) Revolving: Base	(2) Revolving: APR	(3) Revolving: Unshrouded	(4) Installment
0%	0.25***	0.23***	0.24***	0.16**
	(0.07)	(0.06)	(0.07)	(0.07)
42%	−0.00	−0.04	−0.01	−0.18***
	(0.06)	(0.06)	(0.07)	(0.06)
Constant	0.24***	0.23***	0.28***	0.37***
	(0.05)	(0.04)	(0.05)	(0.05)
N	295	297	294	302

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR: 42%
Revolving: Base	−0.04	−0.13**	0.05
	(0.07)	(0.06)	(0.06)
Revolving: APR	−0.07	−0.14**	−0.00
	(0.07)	(0.06)	(0.06)
Revolving: Unshrouded	−0.01	−0.09	0.09+
	(0.07)	(0.06)	(0.06)
Constant	0.53***	0.37***	0.19***
	(0.05)	(0.04)	(0.04)
N	388	404	396

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 6
Dependent Variable: % of Respondents Who Make a Purchase

Panel A

	(1) Revolving: Base	(2) Revolving: APR	(3) Revolving: Unshrouded	(4) Installment
0%	0.03	−0.04	0.07	−0.01
	(0.06)	(0.06)	(0.06)	(0.06)
42%	−0.04	−0.02	−0.00	−0.19***
	(0.06)	(0.06)	(0.06)	(0.06)
Constant	0.75***	0.78***	0.72***	0.79***
	(0.04)	(0.04)	(0.04)	(0.04)
N	295	297	294	302

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR: 42%
Revolving: Base	−0.01	−0.05	0.10+
	(0.06)	(0.06)	(0.06)
Revolving: APR	−0.04	−0.02	0.16**
	(0.06)	(0.06)	(0.06)
Revolving: Unshrouded	0.00	−0.08	0.11*
	(0.06)	(0.06)	(0.06)
Constant	0.79***	0.79***	0.60***
	(0.04)	(0.04)	(0.04)
N	388	404	396

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 7
Dependent Variable: Amount Borrowed per Borrowing Participant

Panel A

	(1) Installment	(2) Revolving
0%	3.20*	0.07
	(1.86)	(1.11)
42%	−2.50	−0.49
	(2.39)	(1.30)
Constant	45.00***	47.11***
	(1.40)	(0.90)
N	108	289

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR: 42%
Revolving: All	−1.03	2.11	4.12*
	(1.12)	(1.69)	(2.47)
Constant	48.20***	45.00***	42.50***
	(0.97)	(1.38)	(2.17)
N	195	114	88

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 8
Dependent Variable: Amount Purchased per Purchasing Participant

Panel A

	(1) Installment	(2) Revolving
0%	1.30	2.74**
	(2.03)	(1.14)
42%	−1.41	0.40
	(2.11)	(1.16)
Constant	42.35***	42.26***
	(1.40)	(0.81)
N	219	663

Note: Omitted category is 18% APR.

Panel B

	(1) APR: 0%	(2) APR: 18%	(3) APR: 42%
Revolving: All	1.35	−0.09	1.72
	(1.41)	(1.65)	(1.91)
Constant	43.65***	42.35***	40.94***
	(1.22)	(1.41)	(1.67)
N	300	307	275

Note: Omitted category is Installment.
Standard errors are in parenthesis. + p<0.15, * p<0.1, ** p<0.05, *** p<0.01

Appendix Table 9
U.S. Households Holding at Least One of the Specified Credit Cards in 1981

Sears	57%
Visa	53%
MasterCard	47%
J.C. Penney	39%
Montgomery Ward	27%
Federated Dept. Stores	17%
American Express	11%

Source: Mandell (1990)

Appendix Figure 1

CARDMEMBER AGREEMENT RATES AND FEES TABLE

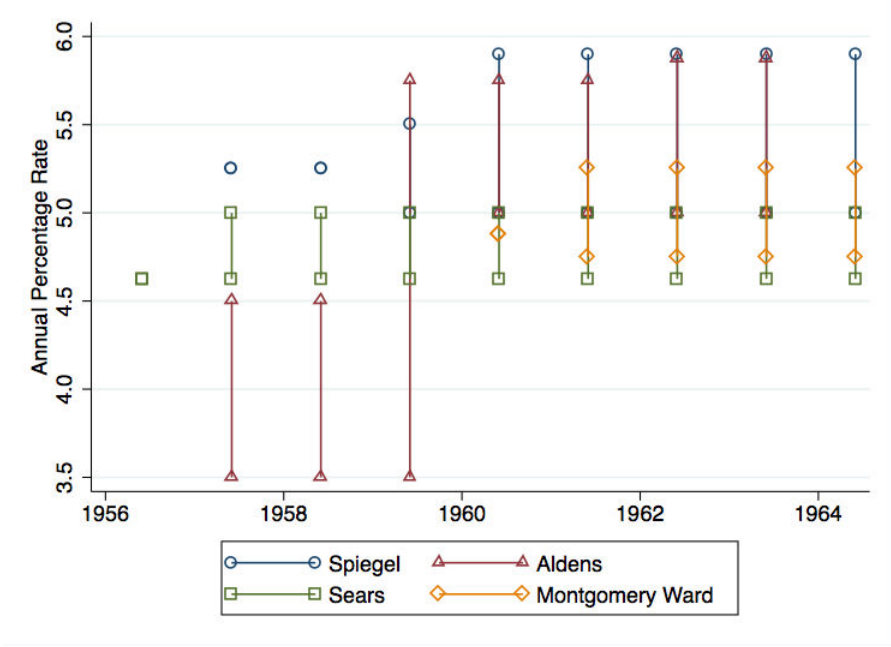
INTEREST RATES AND INTEREST CHARGES	
Purchase Annual Percentage Rate (APR)	**15.49%** to **23.49%**. This APR will vary with the market based on the Prime Rate.[a]
Balance Transfer APR	**15.49%** to **23.49%**. This APR will vary with the market based on the Prime Rate.[a]
Cash Advance APR	**26.24%**. This APR will vary with the market based on the Prime Rate.[b]
Paying Interest	Your due date will be a minimum of 21 days after the close of each billing cycle. We will not charge you interest on purchases if you pay your entire balance by the due date each month. We will begin charging interest on balance transfers and cash advances on the transaction date.
Minimum Interest Charge	None
Credit Card Tips from the Consumer Financial Protection Bureau	To learn more about factors to consider when applying for or using a credit card, visit the website of the Consumer Financial Protection Bureau at http://www.consumerfinance.gov/learnmore.

FEES	
Annual Membership Fee	**None**
Transaction Fees	
Balance Transfers	Either **$5** or **5%** of the amount of each transfer, whichever is greater.
Cash Advances	Either **$10** or **5%** of the amount of each transaction, whichever is greater.
Foreign Transactions	**None** to **3%** of each transaction in U.S. dollars.
Penalty Fees	
Late Payment	Up to **$15** if the balance is less than $100; up to **$27** if the balance is $100 to less than $250; up to **$37** if the balance is $250 or more.
Return Payment	Up to **$37**.
Return Check	**None**

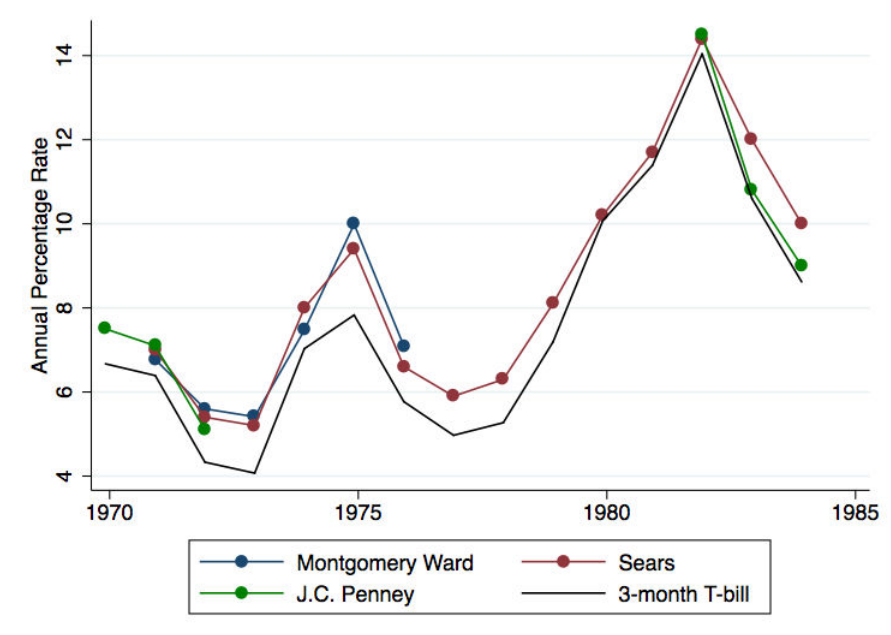
Source: Chase Bank Amazon Visa Signature Agreement pulled from the Consumer Financial Protection Bureau Credit Card Agreement Database on March 26, 2018.

Appendix Figure 2
Cost of Debt

Panel A: Interest Rate on Long-Term Debt

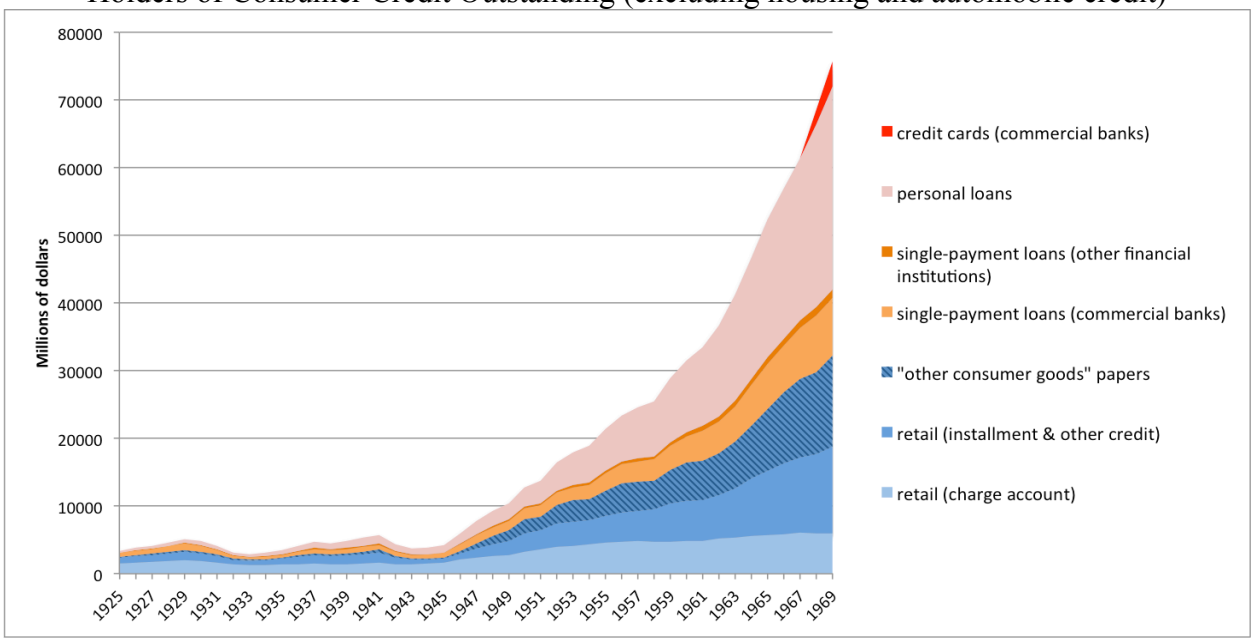


Panel B: Cost of Funds



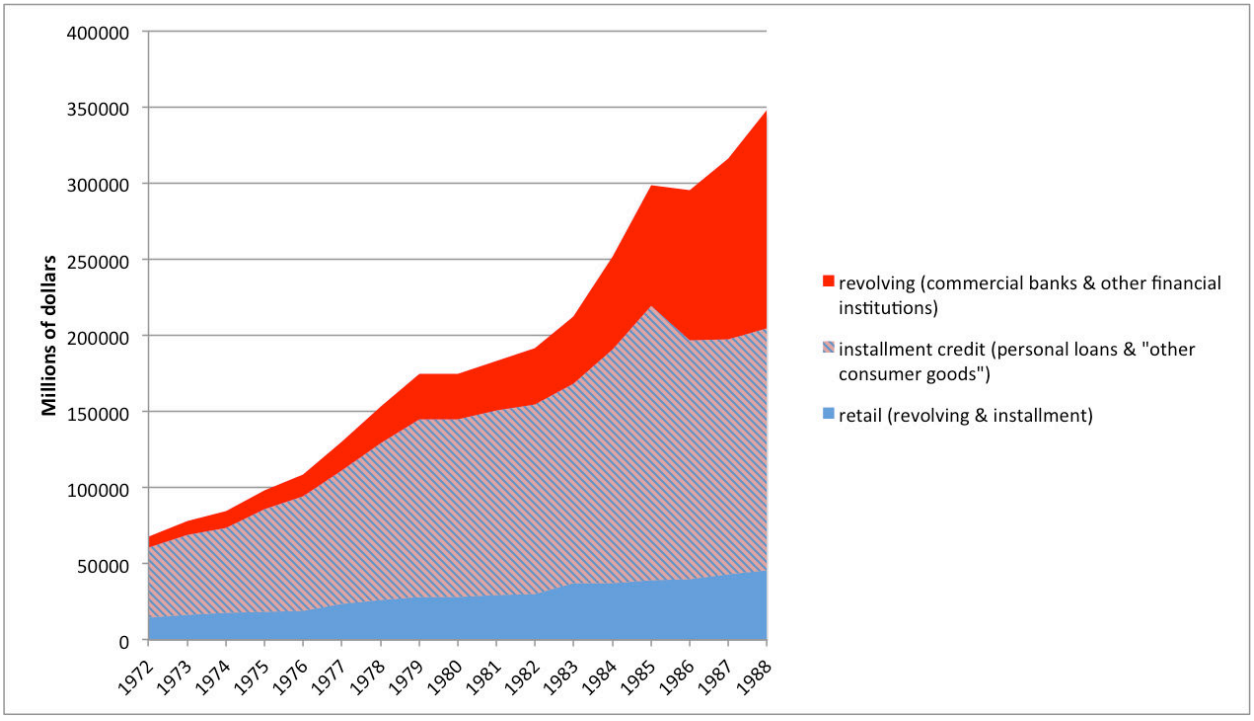
Source: Company Annual Reports.

Appendix Figure 3
Holders of Consumer Credit Outstanding (excluding housing and automobile credit)



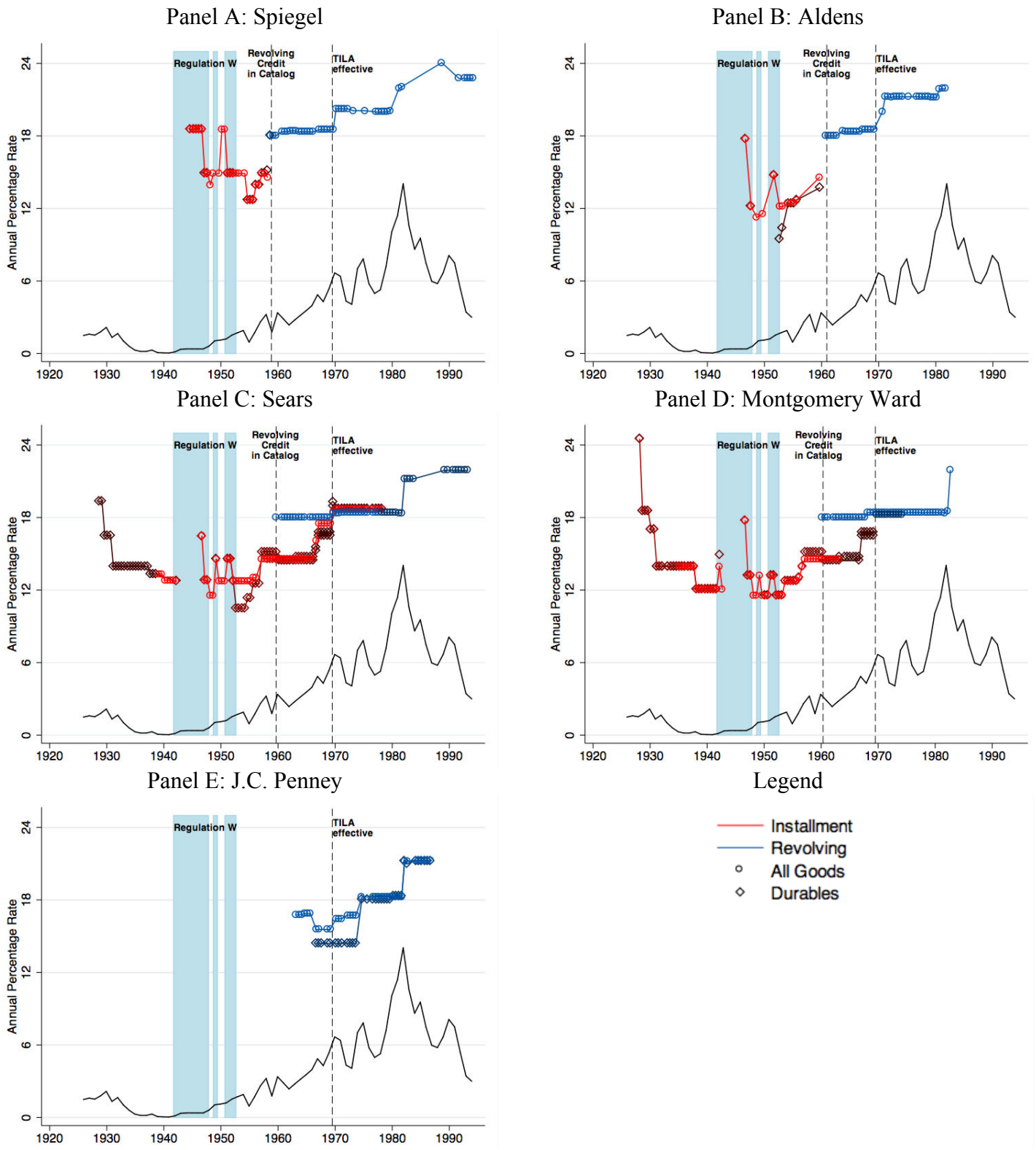
Source: Federal Reserve Bulletins.

Appendix Figure 4
Holders of Consumer Credit Outstanding



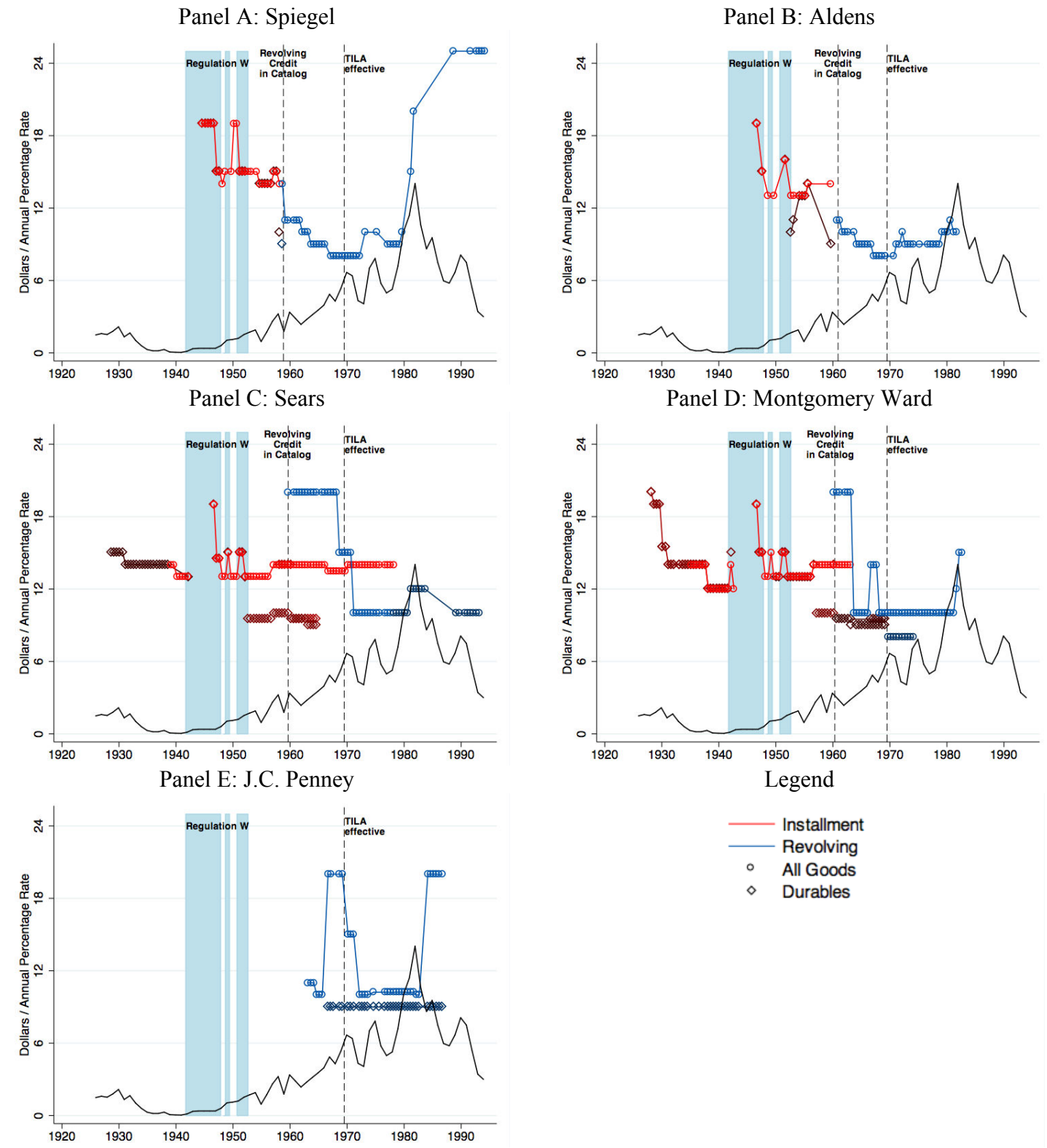
Source: Federal Reserve Bulletins.

Appendix Figure 5
Internal Rate of Return for Borrowing $200



Notes: Solid black line represents the rate on the 3-month Treasury bill.

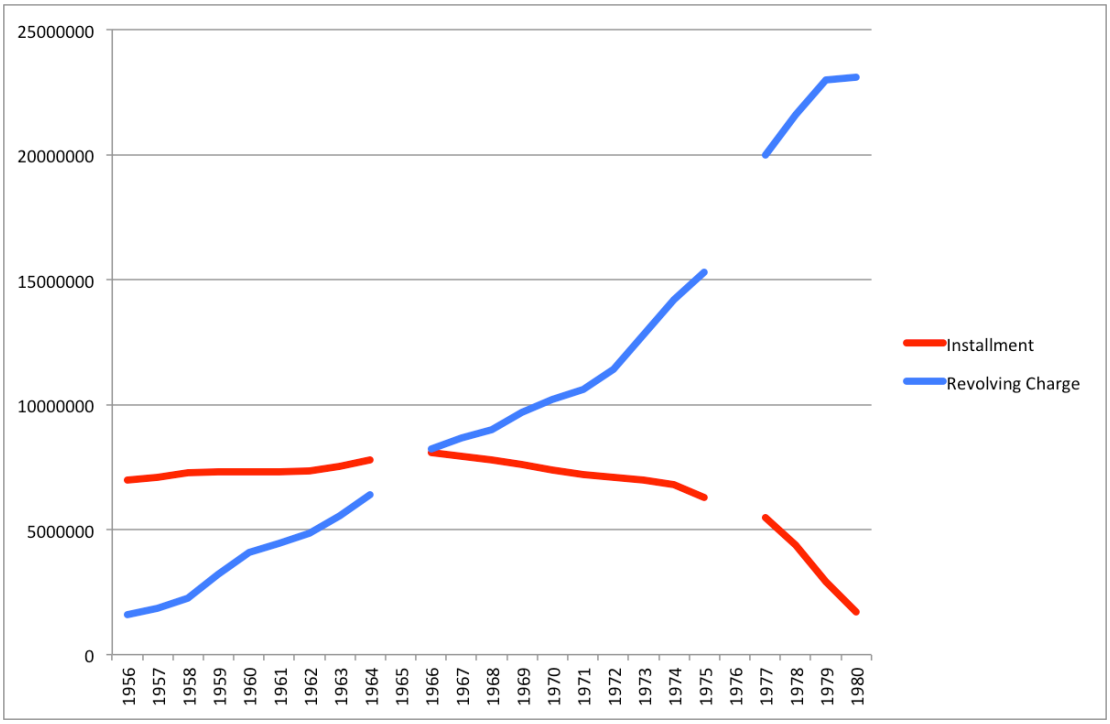
Appendix Figure 6
First Monthly Payment Amount for Borrowing $200



Notes: Solid black line represents the rate on the 3-month Treasury bill.

Appendix Figure 7

Number of Sears Credit Accounts from All Stores and Mail Order



Source: Sears Annual Reports 1956–1980.