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Explaining changes in the US credit card market: Lenders are using more information☆

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ABSTRACT

We examine two changes in the cross-sectional distribution of credit card contracts over time: the increasing variance in interest rates and the increasing variance in credit limits, using data from the 1989–2013 Survey of Consumer Finances. Within this dataset, we show that financial institutions seem to be collecting and using more consumer information when extending credit. We then develop a life-cycle model of lending using a novel contract structure reflecting modern credit cards, where interest rates and credit limits are jointly determined before actual borrowing takes place. Within the model, giving lenders more information on consumers generates realistic results along several dimensions. More information leads to better pricing, moving the market from a 'pooling' to a 'separating' equilibrium, generating the observed increase in variances, with the gains primarily going to young agents.

1. Introduction

Unsecured credit, primarily exemplified by credit cards, has long since become a common feature of daily life in America and many other countries, with the 2013 edition of the Survey of Consumer Finances showing that some 64% of American households hold at least one credit card. While for many credit cards are effectively only a means of payment, rather than an actual instrument for borrowing, for many others the interest rate they pay on credit card debt and their credit limit are important variables in their economic decision-making. Empirical evidence for this is presented in Gross and Souleles (2002), who find that exogenous changes in a household's credit card interest rate or credit limit generate significant impacts on consumption/savings behavior.

Since credit access and credit pricing influences consumer actions, it is natural to wonder what determines how much consumers pay and how much they can borrow in the unsecured credit market. Interest rates are often modelled as determined through a zero-profit condition that takes into account default probabilities and the costs of default, while borrowing capacity is typically determined as depending on available collateral. However, in the case of credit cards and more generally other forms of unsecured debt, collateral is not required as security against the value of the loan. Rather, the lender is relying on other incentives faced by the consumer not to default (instead of forfeiting collateral), such as future exclusion from financial markets or the cost of bankruptcy proceedings. This implies the necessity of credit limits (credit rationing) for unsecured debt. Absent such limits, many would simply borrow large amounts and then immediately default. This implies that credit limits should be based on individual characteristics, just as are interest rates, and that credit limits and interest rates cannot be determined separately from each other.

In this paper, we first document how credit limits and interest rates have evolved over time in the credit card market, relying on data from the Survey of Consumer Finances. First, we update the facts on how the variance of interest rates charged on credit card debt is increasing over the length of our sample. Second, we examine a similar pattern in terms of credit limits, the cross-sectional variance of which has also increased over time. In particular, we believe that the empirical information presented on credit limits is new to the literature.

We also discuss how the determinants of credit limits have changed over time, reflecting changes in the information available to lenders, or changes in how they use the information available to them in setting contract terms. We find that a much wider set of information has become strongly correlated with the terms of unsecured credit con-

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tracts. While at the beginning of our sample in the 1980s, income was the only strong predictor of an individual's credit terms, in the 2010s information including homeownership status, educational attainment and credit history has become quite correlated with credit terms. This reflects the usage of both more information by lenders and evidence of a more sophisticated understanding of default – potentially attempting to measure permanent income and unemployment risk.

These stylized facts motivate our model, which relies on imperfect information in the financial industry. We assume lenders cannot know everything about a prospective borrower; they can only decide on how much credit to extend and what interest rate to charge based on what they can observe about any given individual and their expectations given what they know about the population. Competition in the financial sector and household preferences jointly determine the actual terms of the contract reached with any given household. We do not pursue an optimal contracting approach here, rather we restrict the financial sector to offering contracts solely in terms of an interest rate and credit limit in an attempt to mimic the reality of the modern credit card market.

For our quantitative exercise, we examine a world where the information available to lenders improves in quality. We find that this change generates model outcomes that match several trends observed in the data, including the increasing cross-sectional variances in rates and limits. Intuitively, with relatively poor information about the riskiness of borrowers, lenders initially operate in an equilibrium that is more 'pooled', where the best they can do is aggregate risks together and set common interest rates and credit limits. As information improves, lenders can increasingly extend credit to each individual based upon their individual characteristics, generating increases in the variance of credit limits and interest rates. The improved information available to lenders alters the composition of the pool of households which decide to borrow, driving out households revealed to be severe credit risks, but drawing in secure households which could not previously borrow at the new, more favorable terms that reflect their true financial position.

One natural question would then be who wins and who loses from this change? We find that the change from the low-information baseline to the high-information alternative generates a small positive increase in social welfare. More interestingly, not all households benefit from the change in information technology. With more accurate credit pricing, households facing high expenditure shocks are often driven out from the lending marketplace, to their detriment, while the rest of society enjoys superior terms on their loans. The removal of this insurance through cross-subsidization, however, is dominated by the efficiency gains from better pricing. We believe this phenomena of households being driven out of the unsecured credit market could be coupled with the observed growth of the modern payday loans industry in future work.

We conclude our numerical work by modelling a short-run event - a 2007–08 style recession. Faced with a large negative income shock, financial institutions respond by cutting off marginal borrowers from credit access. Conversely, high-income households increase borrowing for consumption smoothing purposes. This exercise results in significant changes in borrowing across different types of households, but the population variance remains approximately the same.

1.1. Related literature

Empirically, one paper that directly tackles the determinants of consumer unsecured credit limits is Choi et al. (2015), which adopts an IV approach within the SCF - the same dataset we exploit - however their paper does not examine changes in credit access and credit determinants over time, which is our key focus. Where our results overlap, however, the findings seem entirely consistent between papers.

Other related empirical papers include Ausubel (1999), who runs a series of randomized trials demonstrating the existence of informational imperfections in the credit card market. Karlan and Zinman (2009) also conduct similar randomized trials experiments. Dey and Mumy (2009) compute a series of cross-sectional regressions with credit card interest rates and credit limits as the endogenous variables in a reduced-form framework, though they do not consider changes over time. Stango and Zinman (2015) exploit a private, firm-side dataset, focusing only on interest rates on credit card debt, finding that shopping around for credit card pricing matters.[1] Paradiso et al. (2014) discuss the link between the quantity of consumer credit used and wealth, income, and interest rates.

Theoretically and computationally, Livshits, MacGee and Tertilt (2011) is perhaps the most similar paper to our work. They also consider a model of lenders with imperfect information on potential borrowers, with fixed costs of contracting resembling those in this paper. We extend on their work primarily through our empirical work on credit limits, and the inclusion of that data in disciplining the model and computing results. Our model also incorporates a full dynamic life-cycle instead of their two-period framework, and both these factors drive somewhat different quantitative results. Also closely related, Athreya et al. (2012) also consider an informational experiment similar to what we carry out, but we feel our model environment better captures the reality of unsecured credit markets. In their model, the quantity of borrowing and the interest rate on debt are decided simultaneously, which is rarely true in practice. Credit cards, for example, require the contract terms decided upon before borrowing occurs, which is the contracting approach we take. Sánchez (2012) also models a world of unsecured credit where the borrowing decision and interest rate are decided upon simultaneously, focusing more on the theoretical and less on the empirical side than we do.

Beyond these papers, Mateos-Planas (2013) presents a model similar to ours of the joint determination of the credit limit and the interest rate under imperfect information. However, his model has no heterogeneity in contract terms and banks randomly offer credit to households. Chatterjee et al. (2011) work in a model with the same broad characteristics, but their empirical exercises do not deal with either interest rates or credit limits. Narajabad (2012) links changes in the information lenders have about borrowers to increases in consumer default, but assumes a fixed interest rate on all lending, which is unsatisfactory. Drozd and Serrano-Padial (2013) also deal with information technology and unsecured lending, but discuss a story dealing with improved debt recovery following default rather than increased information about borrowers.

Several other papers also consider similar models though with different goals than our work. Drozd and Nosal (2008) discuss a model with long-lasting relationships between borrowers and lenders, much as we do, but are not concerned with examining trends in the data over time. Guler (2015) studies changes in information in the mortgage market rather than the credit market, also with a life-cycle component, finding similar welfare results as we do.

In general, we feel our contribution to modeling comprises three parts. One, imposing a realistic timing structure where contracts terms must be decided upon before borrowing takes place. Two, which is a consequence, requiring that credit limits must be a feature of the contract, and not just the price of credit. Regardless of the price, if the lender does not know how much borrowing will occur, a credit limit becomes a key parameter in an unsecured contract. Three, contract stickiness in unsecured credit. Just as most credit contracts are not constantly renegotiated, neither are contracts in our model, unlike many papers where contract terms are frictionless updated every period. Livshits et al. (2011) is, as mentioned, closest to our work, but in that paper model agents always want to borrow the maximum.

[1] Within our model, this is consistent with lenders getting a noisy signal about a borrower's likelihood to default, which is an intermediate point between our model cases.

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