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The cost of being late? The case of credit card penalty fees

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ABSTRACT

This paper is the first in the literature to examine the determinants of US credit card penalty fees. Many critics of credit card fees – including a number of US Senators – have argued that credit card penalty fees reflect banks' market share. Using a unique data set we find that fees are increasing in customer risk which supports the position of defenders of penalty fees, such as banks. However, our finding that fees are increasing in a bank's market share is consistent with the concerns expressed by politicians and regulators. We also find card penalty fees are direct substitutes for card interest rates.

1. Introduction

The current financial crisis has had a significant negative effect on consumers' welfare globally. With banks limiting home equity lines, gas and food bills on the rise and homeowners struggling to make their mortgage payments, consumers are turning to credit cards to make ends meet. At the end of 2008, Americans' credit card debt reached $972.73 billion, up 1.12% from 2007 (Nilson Report, April 2009).[1] Many, however, are finding their cards more expensive to use as credit card companies increasingly raise interest rates, raise card fees, lower credit limits and cancel inactive accounts. The interest rate on the card with the largest balance (or on the newest card, if no outstanding balances existed) rose 1%, to 12.5% (Federal Reserve Survey of Consumer Finances, February 2009) and late fees reached up to $39 per incident (Consumer Action credit card survey, July 2008). In the last 12 months, 15 percent of American adults have been late making a credit card payment (National Foundation for Credit Counseling, 2009 Financial Literacy Survey, April 2009).

Moreover, this trend is also occurring internationally with 20% of British adults incurring a penalty fee in 2008, and some 5.7 million charged a penalty fees more than three times in that year (2008 UK Financial News). Interestingly, during this economic downturn, British credit card supplies collected £213 million in penalty charges in 2008, while according to R.K. Hammer, a consultant to the credit card industry, the penalty fees from credit cards in the US will add up to about $20.5 billion in 2009 (New York Times, September 2009). However, such fees are of less concern in countries of Scandinavia, France and Italy where debit cards are more prevalent than credit cards.

Yet despite of the importance of the issue the literature has been quiet on important aspects of the pricing structure of credit card debt, especially as to the determinants of credit card penalty fees that are generating such considerable revenue for card suppliers. Two such fees that have caught the attention of both regulators and politicians are late fees and overlimit fees. The rising level of these penalty fees and their impact on consumers has been prominent in recent public policy debates in the US. For example, as part of his 2004 Presidential campaign, John Kerry called for credit card penalty fees to be regulated. In January 2007 the Chairman of the Senate Banking Committee, Senator Chris Dodd, at a hearing over rising credit card fees said he was "putting the industry on notice that if it doesn't improve practices on its own, legislation may be warranted" (Associated Press, 7 March 2007). In March 2007, Senator Carl Levin said he is "threatening possible legislation to outlaw them (card fees) as a spur to the banking industry for voluntary changes" (Associated Press, 7 March 2007). In July 2008 the New York Times reported that new credit card regulation (includ-

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[1] In comparison, to the net issues of US debt securities during 2007 it was 1.154 trillion (IMF report on Global Financial Stability, October 2008).

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ing the regulation of card fees) was becoming much more likely because Congress believed that lack of regulation in the mortgage market had resulted in the mortgage crisis (5 July 2008).[2] Indeed, in response to the 2007–2009 financial crisis, the US Senate has proposed the establishment of a Consumer Protection Agency to oversee issues such as the level of credit card penalty fees.

Despite the significant public policy interest in card penalty fees as well as the large dollar magnitudes involved, this is the first paper in the literature to focus specifically on their determinants. Indeed, until now, the credit card literature has focused almost exclusively on credit card *interest rates* and not on *penalty* fees (e.g. Ausubel, 1991; Brito and Hartley, 1995; Calem and Mester, 1995; Stango, 2000; Stango, 2002; Knittel and Stango, 2003; Berlin and Mester, 2004; Calem et al., 2006)[3] (see Scholnick et al., 2008 for a survey).

Credit card penalty fees, however, serve a very different function than interest rates. Penalty fees are essentially a way that banks use to extract rents from (or to "punish") only those borrowers who exceed their contractual obligations (by being late or overlimit), while interest rates are charged to all borrowers who use their credit cards and do not repay the full amount on receipt of their credit card bill. Furthermore, penalty fees are imposed only when a consumer is late or overlimit independent of dollar value.[4] By comparison, card interest charges are increasing functions of both time and amount borrowed. Two different types of penalty fee are commonly charged by banks; late fees which are charged when borrowers repay after their due date and overlimit fees which are imposed when borrowers charge amounts that are larger than their pre-approved limits. For example, Chase Manhattan in 1998 charged a $20 overlimit fee and a $20 late fee while in 2002 it charged a $28 overlimit fee and a $28 late fee. A credit card borrower can be either late with a payment (i.e. a time dimension to the loan) or have charged an amount over their preauthorized limit (i.e. a dollar dimension to the loan) or both (in which case both the late and overlimit fees would be applied). Importantly, in this paper we focus only on credit card *penalty fees* charged to consumers as a punishment for being late or overlimit and not other fees such as the fixed annual fees paid up-front by all holders of specific cards (i.e. annual membership fees), or for certain services associated with a credit card (e.g. travel rewards, etc.).

The main contribution of this paper is to investigate the determinants of credit card penalty fees. The standard argument is that the price of credit card debt should be positively related to a consumers' default risk. Such an argument has been proposed by those who defend penalty fees, in particular the American Bankers Association (2005) (henceforth the ABA) who have argued that penalty fees compensate banks' for increased credit card default risks. Furthermore, in describing the fee structure of credit cards, Furletti and Ody (2006b, p. 18) argue that card fees consumers pay are "based on their risk". Until now, however, no formal empirical study has been undertaken to examine whether consumer default risk is a determinant of credit card penalty fees. Evaluating whether penalty fees are based on risk is especially important, given recent public policy debates on the determinants and size of these fees.

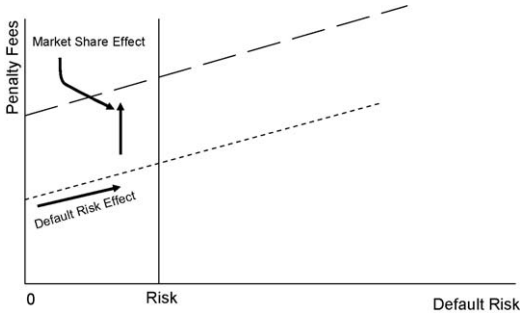

Fig. 1. The relationship between penalty fees, default risk and market share.

In order to account for potential rent extraction behavior by banks, we examine whether penalty fees are also related to a bank's credit card market share. The issue of larger banks being able to exploit their size and market share has played an important role in the banking literature in general. However, research on whether market share is related specifically to bank fees is much more limited, see for example Hannan (2006). Stripped to the basics we examine whether: (1) penalty fees are positively related to consumer default risk and (2) whether for any *given* level of default risk an increase in bank credit card market share also increases fees (see Fig. 1).

In addition to the determination of credit card penalty fees we also examine the relationship between such fees and card interest rates. A finding that card penalty fees and interest rates are substitutes, i.e. penalty fees increase when card interest rates go down, implies that banks may simply be changing the composition of their card pricing structure by charging higher fees while lowering card interest rates. A finding that card fees and interest rates are substitutes could imply that if regulators impose a ceiling on card fees, then banks might respond by raising card interest rates.

The outline of the remainder of the paper is as follows. In Section 2 of the paper, we provide further evidence of the importance of credit card penalty fees to banks by analyzing the impact of various proposed changes in card penalty fee regulations on US banks stock returns and market values.

In Section 3 of the paper, we provide empirical tests of three hypotheses. The first is that penalty fees are positively related to consumer default risk, the second is that card penalty fees are direct substitutes for card interest rates, while the third relates to the positive impact of bank credit card market share on the level of penalty fees. In Section 4 of the paper, we test these hypotheses using a unique data base developed from a number of primary sources. The core of our data base is the TCCP (Term of Credit Cards Plans) data base collected by the Federal Reserve. In addition we utilize a number of other data bases, including Bank Call Reports and the American Bankruptcy Institute consumer bankruptcy database, to derive measures of consumer risk, credit card market share and consumer income. Using three different econometric methodologies (2SLS, 3SLS and GMM) in order to control for endogeneity, we find strong support for our theoretical hypotheses concerning the effects of risk, market share and card interest rates on penalty fees.

2. Credit card penalty fees and banks' equity market values

In order to motivate the importance of credit card penalty fees for banks, in this section we analyze the impact of the US Supreme Court's Smiley v. Citibank case in 1996 on US bank equity market values. The Smiley ruling was a landmark decision regarding credit card penalty fee regulation. In addition, we analyze the mar-

[2] Moreover, the issue of credit card fees has gained prominence in the national press, with headlines claiming: "Credit Card Fees Can Suck You In", USA Today (2006), "Credit Card Penalties, Fees Bury Debtors", Washington Post (2005), "Credit Card Fees become Cash Cow", USA Today (2004) and "Credit Card Firms Collect Record Level of Late Fees" Wall Street Journal (2002).

[3] Other papers have used Credit Card data to examine topics such as personal bankruptcy (Gross and Souleles, 2002a; Domowitz and Sartain, 1999), liquidity constraints (Gross and Souleles, 2002b) and factors affecting the growth of bank credit cards (Peterson, 1977).

[4] Furletti and Ody (2006b) report that until 2002 banks charged a single "flat" fee irrespective of how late or overlimit the card account was. After 2002 banks began to charge "tiered" fees. We discuss this issue below in our data section.

ket's response to Senator John Kerry's announcement concerning possible credit card penalty fee regulation made during his 2004 Presidential campaign.

2.1. US Supreme Court case: Smiley vs. Citibank (1996)

The Smiley case concerned issues relating to the way banks had been imposing credit card penalty fees up until that date. The US Supreme Court had previously ruled, in the 1978 Marquette case, that credit card interest rates charged by a bank in the specific state in which it was based, could be charged in all other states where the card was provided, regardless of where card users resided. For this reason many credit card issuers relocated to states such as South Dakota or Delaware with few if any usury restrictions on credit card issuers. Following the Marquette case, many banks began treating credit card penalty fees in the same way as credit card interest rates (i.e. overriding state specific restrictions). The Smiley case (Smiley vs. Citibank (1996)) was crucially important because it decided whether credit card penalty fees should be considered in the same fashion as interest rates in the context of the 1978 Marquette decision. That is whether banks could effectively ignore state specific restrictions on credit card penalty fees (see Toh, 1996). The outcome of the Smiley ruling was that credit card fees were free-of-state restrictions.

To examine the impact of the Smiley case we conducted an event study[5] to examine the market's interpretation of the Supreme Court's decision. Specifically, we analyzed three particular information events; (i) the day that the Supreme Court accepted to hear the case (19 January 1996), (ii) the day the case was argued (24 April 1996) and (iii) the day the ruling of the Court was announced (3 June 1996). The event study tests were run on all 317 publicly traded banks for which stock return data were available. We find that on the days when the case was (i) accepted and (ii) argued, these banks had significantly negative abnormal returns of −0.24% (significant at the 5% level) and −0.14% (significant at the 5% level), respectively. These negative abnormal returns could be explained by bank investors' fears that by agreeing to hear the case, the Supreme Court might withdraw the ability of card providing banks to supersede state level restrictions on credit card penalty fees. Importantly, on the day that the Supreme Court ruled in favor of Citibank (i.e. that credit card penalty fees were effectively free of state level restrictions) there was a significant positive abnormal return on bank stocks of 0.13% (significant at the 10% level) which reflected the good news this decision generated for bank card providers.

Since credit cards (and their penalty fees) may have a varying degree of importance across banks according to the size of their credit card portfolios, we repeated the event study by separating our sample into those banks whose ratio of credit card receivables to total assets was above as opposed to being below the median. The card receivables to total asset ratio was calculated using 1996 Call Report data for bank holding companies. As expected, we find that the impact of the Smiley case was significantly stronger for those banks with an above median level of card receivables/assets ratio, on both the days that the case was argued and decided. On the day the case was argued, the above median credit card banks had an average negative abnormal return of −0.47% (significant at 1% level) while the below median banks had no significant abnormal returns on average. Similarly, on the day that the case was decided, the above median credit card banks had an average positive abnormal return of 0.25% (significant at the 10% level) while on the other hand, the below median credit card banks had no significant abnormal returns.[6]

2.2. John Kerry's credit card penalty fee announcement (2004)

We also examined the equity markets reaction to John Kerry's announcement of 27 August 2004, that if elected President he would seek to regulate credit card penalty fees. Specifically, the Associated Press reported that to curb credit card penalty fees, Kerry wanted to restrict banks charging overlimit fees (27 August 2004 press release). On the day of this announcement bank abnormal returns were negative i.e. −0.22% (significant at the 1% level) for the 608 publicly traded banks for which data were available. In terms of market capitalization, the −0.22% negative abnormal return implied a loss in these banks' equity market values of more than $2.5 billion.

As in the case of the Smiley event, we also examine the impact of this announcement on banks with above or below median credit card receivables/assets ratios. As in the Smiley case, we find that the negative impact of this event on the above median credit card banks is greater on average (−0.19% at the 1% significance level) than the impact on below median credit card banks (−0.16% at the 10% significance level).

3. Hypotheses

As discussed in the introduction we examine three specific hypotheses relating to the determination of credit card penalty fees. The three hypotheses are motivated by both the existing literature as well as theory.[7]

H1 *(The Risk Pricing Hypothesis)*. The Risk Pricing hypothesis states that banks that face greater default risks from borrowers will charge higher penalty fees to compensate for this risk.

While the argument that banks will charge higher credit card penalty fees to compensate for risk has not been empirically examined in the credit card literature, the relationship between fees and risk has been examined in other contexts. For example, Sarangi and Verbrugge (2000) provide a model to explain penalty fees in the video rental market where late penalty fees from video cassette rentals can sometimes exceed the actual rental fee itself. In this model Sarangi and Verbrugge (2000) show that Video rental stores compensate for the risk of the late return of a hired video by increasing late fees charged when such a risky outcome occurs. Related research on the link between fees and risk has also been conducted in the corporate banking context. Gande and Saunders (1999) examine the relationship between underwriting fees and corporate risk, while Bharath et al. (forthcoming) examine the relationship between the fees associated with bank loans to corporations and measures of corporate risk.

[5] We used a one factor market model to test the impact of different announcements on bank stock prices. The model is: $R_{i,t} = a_i + b_i R_{M,t} + e_{i,t}$, where $R_{i,t}$ is the return on the common stock of the ith bank in a sample of all public banks with usable data at time t; $R_{M,t}$ is the return on the equally weighted Market Index (CRSP) at time t and $e_{i,t}$ is the error term. Return data for each sample firm was obtained from CRSP Standardized abnormal returns were calculated following Patell (1976). The market model was estimated over a 255-day period, ending 46 days before the event day. We report parametric test statistics based on the Patell test.

[6] In general, we obtain similar results when we employ the value-weighted market index. For example, we find that on the day when the case was accepted these banks had significantly negative abnormal returns of −0.42% (significant at the 1% level); on the day the case was decided, 3 June 1996, the abnormal return was positive 0.17% and significant at the 1% level and for those banks with above median levels of card receivables/asset ratios (it was +0.29%, significant at the 5% level), while it was insignificant for those below the median.

[7] A longer version of this paper posted on SSRN contains an Appendix that provides a theoretical motivation for each of the three hypotheses.

H2 *(The Substitution Hypothesis).* The second hypothesis we examine in this paper concerns whether credit card interest rates and fees are substitutes or complements, the null being that fees and rates are complements. This hypothesis reflects the different ways that banks extract revenue from their card customers (e.g. interest rates, penalty fees, etc.). This issue is particularly important in light of the public policy debate as to whether banks are using card penalty fees to extract rents. A finding that card fees and card interest rates are complements, such that both rise together (after controlling for risk, market share, etc.) would provide additional support for those who claim that banks are indeed extracting rents from their card customers. A finding that fees and interest rates are substitutes, however, is consistent with banks changing the weighting on the different components of their card revenue sources, rather than increasing fees and rates simultaneously. Such a finding of fee and interest rate substitutability can also imply that if regulators imposed a ceiling on card fees, then banks could respond by raising card interest rates.

H3 *(The Market Share Hypothesis).* Our third hypothesis is that if a bank has a larger card market share it will be able to extract rents by charging higher fees.

While there is a large literature on the impact of market share and bank pricing in general, the specific literature on bank fees and market share is limited. Hannan (2006) provides evidence that there is a significant positive relationship between market share and different bank fees related to *deposit* accounts (e.g. stop payment fees, "not sufficient funds" fees, deposit overdraft fees, and ATM fees[8]). This paper is the first to examine the relationship between market share and fees in the context of credit cards.

4. Data sources, variables, methodology and empirical results

4.1. Data sources and variables

In this section we discuss data used to test the three hypotheses specified above. The endogenous variables are: a bank's optimal choice of two card prices (interest rates and penalty fees); the consumer's optimal choices of credit card provider (which determines each bank's market share); and the consumer's optimal choice of the dollar amount of the loan and the dollar amount of default (which determines the bank's default/loan ratio). Thus penalty fees, interest rates, market share and the default/loan ratio are treated as endogenous in our empirical tests below. Importantly, Stango (2000) also argues that bank losses from credit card default and bank market share are endogenous.

4.1.1. Endogenous variables

4.1.1.1. Credit card pricing (penalty fees and interest rates). For data on credit card penalty fees and interest rates, we use the twice yearly survey undertaken by the Federal Reserve. This survey (called "Terms of Credit Card Plans" or TCCP) has data from 1990 to 2002 and covers approximately 150 banks per survey. In this survey, each bank reports on the card specific details of its most popular credit card.[9] These details include pricing variables (interest rate, late fee, overlimit fee) details of the characteristics of the card (gold/standard, Visa/MasterCard), geographic/market size variables (the specific US states where each card is marketed) as well as a large variety of other variables related to the benefits available to users of the card (insurance discounts, travel rewards, rebates, extended warranty, etc. . .). Our data set is an unbalanced panel, since some bank cards appear in different bi-annual surveys while others do not. In total there are 2,592 usable data points in the sample. Furletti and Ody (2006a) provide a detailed description and evaluation of the TCCP database.[10]

4.1.1.2. Consumer loan and default choices (chargeoff ratio). Our empirical proxy for their default choice is the credit card default/loan ratio. The default/loan ratio is the standard metric used in the banking industry to measure bank specific risk due to the loan and default choices made by consumers of that bank.

Our specific proxy measure of a bank's default/loan ratio is its credit card chargeoff/credit card receivables ratio.[11] This variable is calculated from banks Report of Condition and Income (Call Reports), which are matched with the TCCP survey data by using bank specific (FDIC code numbers) attached to both data sources. The chargeoff ratio has also been widely used in the literature on credit cards as a measure of the default loss associated with a particular bank's credit card portfolio (e.g. Ausubel, 1991; Stavins, 2000; Stango, 2000; Stango, 2002).[12]

4.1.1.3. Bank market share. Our empirical proxy for the credit card market share for each bank is its total credit card receivables per year (taken from FDIC call report balance sheet data) divided by the total credit card receivables in the US for that year (The Card Industry Directory, various years). The reason we use total US receivables as the denominator in our market share variable is that since the Marquette Supreme Court decision in 1978, interstate-banking restrictions have essentially been eliminated on card provision. Thus, the credit card market can legally be considered a national market, with banks facing few if any barriers to entry into the national market (even though some banks still choose to market their cards in a subset of states and in some cases a single state only). In this paper we focus on the market share impact of a bank on card pricing using its national credit card market share.[13]

Further evidence to support our nationally based measure of market share can be seen by examining the TCCP database. This database reports the interest rate and fees that banks charge for the

[8] Other research that has examined the relationship between ATM fees and market share includes Massoud and Bernhardt (2002) and Massoud et al. (2006).

[9] The TCCP database does not provide information on the number of cards issued by provider.

[10] Furletti and Ody (2006b) conclude that the TCCP penalty fee data are appropriate data to be used by researchers. They also conclude that TCCP data on credit card interest rates are unbiased and efficient. The TCCP data do not however reflect the emergence after 2002 of tiered penalty fees (where fees are no longer flat, but tied to the amounts that are late or overlimit). It is specifically for this reason that the data used in our paper ends in 2002.

[11] An issue relating to the use of the chargeoff ratio as a measure of risk, concerns the effects of credit card receivable securitization (see Furletti, 2003b). Our measure of risk (credit card chargeoffs on the income statement, divided by total credit card receivables remaining on the balance sheet after securitization) is an appropriate measure of the credit card risk "retained" by each individual bank assuming that those credit card loans are securitized without recourse. Furletti (2003b) also describes how in the period from 1991 to 2000 (covering most of our sample period), there is a very high correlation between aggregate on-balance-sheet chargeoffs and off-balance-sheet (securitized) chargeoffs on credit card loans.

[12] Furletti (2003b) describes in detail the importance of the chargeoff ratio as a measure of loss in the credit card industry, as well as the method of its calculation. Our measure of the chargeoff ratio matches the method described by Furletti (2003b). Furthermore, in the FDIC Call Report data, both the series on credit card chargeoffs as well as credit card receivables are reported in "year to date" format. Because we have to match our Call Report data with the TCCP data (which is twice annual data based on surveys in January and July), we standardize our data so that all FDIC data is for a full calendar year, ending on the date of the TCCP survey (either January or July). We also take into account bank mergers as well as the fact that some banks have international credit card portfolios.

[13] As is well known in the IO literature, the issue of market power is subject to significant measurement difficulties (Office of Fair Trading, UK Government, 1999).

same credit card across the different states where each individual card is marketed. The TCCP database shows that all banks charge the same interest rates and penalty fees for each particular card across *all* the states where a card is marketed. If credit card markets were regionally segmented then the data would have shown the same card with different prices in different regions or states.[14]

An argument against a national definition of market share is that the card market could be segmented across banks based on customer risk (i.e. separate markets for high and low risk borrowers or prime vs. sub-prime borrowers). We argue however, that any such risk based market segmentation is imperfect, both at the bank level as well as the consumer level. In particular, at the bank level many of the largest credit card issuers are active in both the high and low risk markets,[15] e.g. Chase, Citibank and MBNA.[16] At the consumer level, based on their income shocks, individual consumers can face rapid changes in their risk profiles, which would impact their access to different types of card (prime versus non-prime) over time.

4.1.2. Exogenous variables

4.1.2.1. Default risk. In order to test our hypotheses, we require a measure of exogenous systematic income shocks that impact a consumer's probability of default. Our proxy for consumer default risk is consumer bankruptcy filings per capita in the appropriate geographical area where each card is made available. For each card in the TCCP credit card database, we know specifically which of the various US states the card is marketed and made available. For example, bank 1 may make its credit card available in one state (e.g. New York), bank 2 may make its credit card available in some states (e.g. California, Washington and Oregon) and bank 3 may make its credit card available in all 50 states (i.e. nationally).[17] Because we have data on which states each card for each bank is made available, we are able to match the TCCP data with data on per capita state level bankruptcies provided by the American Bankruptcy Institute. Then for example, if a card is made available in three states we measure the number of consumer bankruptcy filings in those three states and derive an average rate weighted by each state's population. This generates an average level of bankruptcy risk applicable for each card. Importantly, we use the American Bankruptcy Institute's measure of consumer bankruptcies rather than business bankruptcies for each US state each year.

The state level bankruptcy per capita variable can be considered exogenous since it is unlikely that any individual bank's card pricing activities alone can significantly impact a state (or multi-state or national) level of the default risk measure. Another way of stating this exogeneity argument is that the fees and interest rates of an individual credit card are unlikely to impact materially the number of bankruptcy filings across a state or group of states.

4.1.2.2. Other control variables. We also include a large number of other control variables in our empirical tests. A large amount of additional credit card specific data is made available in the TCCP database. These data include characteristics of the card (e.g. Gold/standard and Visa/MasterCard), as well as a large variety of benefits made available to consumers who own or use a card (e.g. product rebates, insurance, product discounts, warranty extensions, whether an introductory interest rate is offered, etc.). In practice once a set of characteristics are introduced they are not changed for any specific card (for example a card will not change from being gold and providing air miles to being a silver and not providing air miles). Rather, if required, the card provider will simply introduce a new card with a new "bundle" of card characteristics (see, for example, Furletti and Ody, 2006b). Because banks do not change the bundle of card characteristics for specific cards (the way, for example, they change interest rates and fees), we argue that specific card characteristics are exogenous control variables.

We also include, as an exogenous control variable, average income per capita in states where each card is made available. In calculating the state income (GDP) per capita variable, we use the same approach described above as that for determining state bankruptcies per capita – i.e. an average of state per capita income for the relevant states where each credit card is made available, weighted by each state's population. These data were collected from Bureau of Economic Analysis statistics. This variable captures the extent to which the level of state income may impact the fees charged by card providers.

Our final control variable is the average 1 year CD rate which captures the marginal cost of open market funds for the credit card issuing banks.

4.2. Econometric methodology

Our model has four endogenous variables (card penalty fees, card interest rates, card chargeoff ratio and card market share). In order to estimate this model, we use two stage least squares (2SLS), three stage least squares (3SLS) and generalized method of moments (GMM) estimation. In order to verify the robustness of our results, we provide estimates based on all three of these methodologies (2SLS, 3SLS and GMM).[18]

An additional issue concerns the different types of credit card penalty fee we examine in this paper – late fees and overlimit fees. For two reasons, we do not include both fees as endogenous variables in the *same* system of equations. The first reason is that our data on late fees runs for 12 years from 1990 to 2002, while our data on overlimit fees runs for only 6 years (from 1996 to 2002). Thus, by including both overlimit and late fees in the same equation system would lose half our dataset on late fees. The second, and more fundamental reason is that when data on both late and overlimit fees became available (after 1996) a simple OLS regression between these two fees over the 1996–2002 period resulted in a slope coefficient of 0.98 with a *t*-statistic of 208.6. In other words, the dollar *levels* of each of these two penalty fees tend to be extremely similar for each bank-time data point. For example, as noted in the introduction, Chase Manhattan bank in 1998 charged a $20 overlimit fee and a $20 late fee while in 2002 it charged a $28 overlimit fee and an identical $28 late fee. For these reasons, in all our tests below we run separate equation systems, with either late fees or alternatively overlimit fees as one of the four endogenous variables in the system.

In terms of the 2SLS and 3SLS methodologies, we specify a system, which has four endogenous variables (Eqs. (1)–(4)). The four endogenous variables are the credit card penalty fee ($P_{j,t}$), the credit card interest rate ($r_{j,t}$), the bank specific chargeoff ratio ($ov_{j,t}$) and the credit card market share ($m_{j,t}$). Exogenous variables include bankruptcies per capita ($rup_{j,t}$) and average income per

[14] Because the data shows that specific cards have the same fees across states, the variability in our data occurs because different cards are marketed in very different combinations of states in different times.

[15] The high-risk market is often called the market for "sub-prime" borrowers.

[16] We are grateful to Mark Furletti of the Payments Card Center of the Philadelphia Federal Reserve for pointing this institutional factor out to us.

[17] It should be noted that this geographical area only concerns the States where a card will be marketed and issued by a particular bank, but it does not affect the area where the consumer can use the card. Most US credit cards have no restrictions on whether the consumer can use the card nationally or even internationally.

[18] As another robustness test, we employ a (bank) fixed effect model to investigate the determinant of the over limit and the penalty fees separately. In general, our results are robust for this different specification.

Table 1
Descriptive statistics.

Variable	Source	Obs	Mean	Std. Dev.	Min	Max
Overlimit fee (cents)	Terms of Credit Card Plans	1782	1754	721.102	0	5000
Late fee (cents)	Terms of Credit Card Plans	2969	1468	720.976	0	5000
Card interest rate (basis points)	Terms of Credit Card Plans	3674	1633	273.711	550	2495
Market share (Bank/US total credit card receivables)	Call Reports/Card Industry Directory	3415	0.003	0.007	0	0.066
Charge off ratio (credit card charge off/receivables)	Call Reports	3308	0.047	0.060	0.0004	0.964
Bankruptcy average (filings per capita - state weighted)	American Bankruptcy Institute	3674	0.003	0.001	0.0001	0.011
State income per capita ($ - state weighted)	Bureau of Economic Analysis	3674	20,080	3334	12,395	35,113
National (all states) Market (dummy)	Terms of Credit Card Plans	3674	0.452	0.498	0	1
Regional (some states) Market (dummy)	Terms of Credit Card Plans	3674	0.321	0.467	0	1
State (single state) Market (dummy)	Terms of Credit Card Plans	3674	0.227	0.419	0	1
Premium/Gold card (dummy)	Terms of Credit Card Plans	3674	0.067	0.253	0	1
Rebate on purchases (dummy)	Terms of Credit Card Plans	3674	0.014	0.116	0	1
Extension of manufacturer's warranty (dummy)	Terms of Credit Card Plans	3674	0.075	0.263	0	1
Purchase protection (dummy)	Terms of Credit Card Plans	3674	0.080	0.271	0	1
Travel accident insurance (dummy)	Terms of Credit Card Plans	3674	0.284	0.451	0	1
Travel discounts (dummy)	Terms of Credit Card Plans	3674	0.044	0.205	0	1
Car rental insurance (dummy)	Terms of Credit Card Plans	3674	0.109	0.312	0	1
Non-travel discounts (dummy)	Terms of Credit Card Plans	3674	0.020	0.140	0	1
Card registration (dummy)	Terms of Credit Card Plans	3674	0.023	0.149	0	1
Other plan enhancements (dummy)	Terms of Credit Card Plans	3674	0.170	0.376	0	1
Visa card (dummy)	Terms of Credit Card Plans	3674	0.645	0.479	0	1
Certificate of deposit 1 year (basis points)	Federal Reserve	3674	489	167.989	175	817
Reduced introductory APR (dummy)	Terms of Credit Card Plans	3674	0.064	0.244	0	1

This table includes descriptive statistics for the variables used in our analysis. These variables are taken from the following data sources: (1) Terms of Credit Card Plans (TCCP) twice annual survey from the Federal Reserve, (2) Call Reports bank balance sheet data from the FDIC, (3) Bankruptcy per Capita data from the American Bankruptcy Institute (4) CD Rate from the Federal Reserve. The TCCP survey has data from 1990 to 2002 which covers approximately 150 banks per survey twice annually, where each bank reports the card specific details of its most popular credit card.

Table 2
Determinants of credit card late fees (2SLS) 1990–2002.

Variables	Endogenous variables							
	Late fee		Interest rate		Chargeoff ratio		Market share	
	Coeff.	**S.E.**	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Chargeoff ratio	**4366.6**	**0899.4*****	117.0	1784.6	**–**	**–**	−0.03	0.01***
Bankruptcy per capita	**59,615.8**	**24,438.6****	8587.9.0	23,366.5	−12.27	4.47***	−0.45	0.19**
Interest rate	**−1.7**	**0.5*****	**–**	**–**	4.54E−04	5.5E−5***	1.7E−5	4.0E−6***
Market share	**59,537.4**	**16,208.1*****	−50,434.0	86,209.8	−10.14	3.05***		**–**
State income	**0.04**	**0.01*****	−2.0E−2	3.4E−2	−5.1E−6	2.6E−6*	−1.6E−7	1.2E−7
Late fee	**–**	**–**	0.9	1.1	10.0E−5	2.7E−5***	5.1E−6	1.25E−6***
National dummy	**42.0**	**95.4**	−83.1	183.3	0.03	0.02	2.8E−3	6.1E−4***
Regional dummy	**139.6**	**54.1*****	−98.3	135.7	−0.01	0.01	4.7E−5	4.8E−4
Premium dummy	**−78.1**	**75.2**	52.3	101.6	0.01	0.02	1.36E−3	6.1E−4**
Visa dummy	**37.3**	**72.4**	**–**	**–**	−0.01	0.01	−1.2E−3	5.6E−4**
Purchase rebate	**–**	**–**	152.4	245.5	**–**	**–**	**–**	**–**
Warranty extension	**–**	**–**	−81.9	206.6	**–**	**–**	**–**	**–**
Purchase protection	**–**	**–**	203.7	354.0	**–**	**–**	**–**	**–**
Travel insurance	**–**	**–**	26.9	73.5	**–**	**–**	**–**	**–**
Travel discounts	**–**	**–**	23.8	129.4	**–**	**–**	**–**	**–**
Car rental insurance	**–**	**–**	−143.1	136.5	**–**	**–**	**–**	**–**
Non-travel discounts	**–**	**–**	304.6	367.2	**–**	**–**	**–**	**–**
Card registration	**–**	**–**	124.9	182.4	**–**	**–**	**–**	**–**
Other plan enhancements	**–**	**–**	−8.2	80.8	**–**	**–**	**–**	**–**
Certificate of deposit (1 year)	**–**	**–**	2.0	0.2***	**–**	**–**	**–**	**–**
Reduced introductory APR	**–**	**–**	−466.4	493.0	**–**	**–**	**–**	**–**
State income growth	**–**	**–**	**–**	**–**	**–**	**–**	2.0E−7	1.3E−6
Constant	**2755.7**	**892.0*****	Dropped	Dropped	−0.73	0.11***	−0.03	0.01***
Observations	**2592**		2592		2592		2592	
Time fixed effects included	**Yes**		Yes		Yes		Yes	

Results from a 2SLS four equation system with the four endogenous variables (Late Fees, Interest Rate, Chargeoff Ratio and Market Share). The full specification of the model is in Equations (14)–(17). Our three hypotheses are all tested using estimated coefficients in the Late Fee equation (second column in bold). These include (i) the risk pricing hypothesis (model predicts positive relationship between bankruptcy per capita and late fees); (ii) substitution hypothesis (the model predicts a negative relationship between interest rates and late fees); and (iii) market share hypothesis (the model predicts a positive relationship between market share and late fees).

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

capita ($inc_{j,t}$), both measured over the appropriate geographic area where each card is marketed. We also include in the equations, a vector Z of card, bank and market specific control variables, which are described above. Finally T is a vector of time fixed effects for each of the twice yearly TCCP sample dates, in order to control for the possible time trends in these data.

$$P_{j,t} = \alpha_1 + \beta_1 r_{j,t} + \beta_2 ov_{j,t} + \beta_3 m_{j,t} + \beta_4 inc_{j,t} + \beta_4 rup_{j,t} + \beta_5 Z + \beta_6 T + \varepsilon_j, \quad (1)$$

$$r_{j,t} = \alpha_2 + \omega_0 P_{j,t} + \omega_2 ov_{j,t} + \omega_3 m_{j,t} + \omega_4 inc_{j,t} + \omega_4 rup_{j,t} + \omega_5 Z + \omega_6 T + e_j, \quad (2)$$

$$ov_{j,t} = \alpha_1 + \chi_0 P_{j,t} + \chi_1 r_{j,t} + \chi_3 m_{j,t} + \chi_4 inc_{j,t} + \chi_4 rup_{j,t} + \chi_5 Z + \chi_6 T + \eta_j \quad \text{and} \quad (3)$$

$$m_{j,t} = \alpha_4 + \gamma_0 P_{j,t} + \gamma_1 r_{j,t} + \gamma_2 ov_{j,t} + \gamma_4 inc_{j,t} + \gamma_4 rup_{j,t} + \gamma_5 Z + \gamma_6 T + \psi_j \quad (4)$$

An important issue for the 2SLS and 3SLS models is one of identification. Consequently, we include variables that will influence some of the endogenous variables but not others in the equations in the system. Our first such variable is the exogenous market cost of funds variable (1 year CD rate), which we include in the interest rate model but not the other equations (penalty fees, etc.) on the assumption that market interest rates will impact card interest rates but not the other endogenous variables. The second variable used for identification purposes is a dummy variable as to whether or not the credit card concerned offers a "teaser rate," i.e. a low interest rate for new consumers that switch to that card. We argue that the presence of teaser interest rates should impact card interest rates but not card fees, etc., thus we include it in the interest rate equation only.

Our database also includes *nine* different card characteristics (i.e. consumer benefits such as Purchase Rebates, Warranty Extensions, Purchase Protection, Travel Insurance, Travel Discounts, Car Rental Insurance, Non-travel Discounts, Card Registration and Other Plan Enhancements) which as we argued above, can be considered exogenous variables since once part of a particular card's characteristics, banks will not change them (i.e. once a credit card awards air miles it is unlikely that a bank will remove this benefit to consumers). Furthermore, Furletti and Ody (2006b) argue that banks tend to advertise the interest rate on a card but not the penalty fee. It is also evident that banks heavily promote the benefits (e.g. air miles) available on their cards. Because of this heavy advertising of card interest rates as well as the card benefits (but not card penalty fees) we thus argue that the nine card characteristic variables (e.g. air miles, etc.) will be considered by consumers along with the card interest rate as a "bundle" of characteristics when choosing a particular credit card. For this reason, in terms of the identification of our system, we argue that these nine card characteristic (consumer benefit) variables should be included in

Table 3
Determinants of credit card late fees (3SLS) 1990–2002.

Variables	Endogenous variables							
	Late fee		Interest rate		Chargeoff ratio		Market share	
	Coeff.	**S.E.**	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Chargeoff ratio	**5400.8**	**404.0*****	−654.8	1305.2	**–**	**–**	−0.04	0.01***
Bankruptcy per capita	**73,364.9**	**22,564.8*****	−3109.7	17,656.0	−13.56	4.44***	−0.54	0.19***
Interest rate	**−2.3**	**0.3*****	**–**	**–**	4.3E−4	5.3E−5***	1.9E−5	3.6E−6***
Market share	**108,320.6**	**12,606.8*****	−67,123.3	77,823.8	−19.68	2.65***		**–**
State income	**4 E−2**	**1E−2*****	−0.03	0.02	−7.3E−6	2.5E−6***	−2.2E−7	1.2E−7**
Late fee	**–**	**–**	1.3	0.8*	1.9E−4	1.2E−5***	7.4E−6	1.0E−6***
National dummy	**−200**	**75.8*****	−163.8	148.9	0.04	0.02**	2.0E−3	5.4E−4***
Regional dummy	**91.7**	**52.7***	−164.9	80.4**	−0.02	0.01	−3.7E−4	4.6E−4
Premium dummy	**−110.3**	**74.5**	75.4	88.0	0.02	0.01	1.5E−3	6.0E−4***
Visa dummy	**97.2**	**70.5**	**–**	**–**	−0.02	0.01	−1.2E−3	5.5E−4**
Purchase rebate	**–**	**–**	93	214.9	**–**	**–**	**–**	**–**
Warranty extension	**–**	**–**	−30.9	149.3	**–**	**–**	**–**	**–**
Purchase protection	**–**	**–**	121.5	296.8	**–**	–	**–**	–
Travel insurance	**–**	**–**	36.1	32.4	**–**	–	**–**	–
Travel discounts	**–**	**–**	124	113.6	**–**	–	**–**	–
Car rental insurance	**–**	**–**	−161.4	122.2	**–**	–	**–**	–
Non-travel discounts	**–**	**–**	257.8	341.6	**–**	–	**–**	–
Card registration	**–**	**–**	178.1	94.3*	**–**	–	**–**	–
Other plan enhancements	**–**	**–**	−62	64.6	**–**	–	**–**	–
Certificate of deposit (1 year)	**–**	**–**	2.0	0.2***	**–**	–	**–**	–
Reduced introductory APR	**–**	**–**	−602	340.0*	**–**	–	**–**	–
State income growth	**–**	**–**	**–**	–	**–**	–	4.7E−7	9.8E−7
Constant	**3673.3**	**604.9*****	Dropped	Dropped	−0.68	0.10***	−0.03	0.01***
Observations	**2592**		2592		2592		2592	
Time fixed effects included	**Yes**		Yes		Yes		Yes	

Results from a 3SLS four equation system with the four endogenous variables (Late Fees, Interest Rate, Chargeoff Ratio and Market Share). The full specification of the model is in Equations (14)–(17). Our three hypotheses are all tested using estimated coefficients in the Late Fee equation (second column in bold). These include (i) the risk pricing hypothesis (model predicts positive relationship between bankruptcy per capita and late fees); (ii) substitution hypothesis (the model predicts a negative relationship between interest rates and late fees); and (iii) market share hypothesis (the model predicts a positive relationship between market share and late fees).

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

the credit card interest rate equation but not in the card fee (or other equations).

As is well known, 3SLS may be asymptotically superior to 2SLS because a complete system of equations is estimated simultaneously. However, a problem with 3SLS relative to 2SLS is that any specification error in any part of the system will impact the whole system. Furthermore, if there is hetroskedacity in the data, then the GMM estimator can be considered a superior estimator (see Greene, 2003).

Thus, in addition to our 2SLS and 3SLS systems we also estimate a single equation GMM-Instrumental Variable estimator. The GMM-Instrumental Variable model is a single equation model that not only includes the dependent variable as endogenous, but also can include other variables as endogenous, which are instrumented for by other exogenous variables in the system (in this case bankruptcies per capita ($rup_{j,t}$), average income per capita ($inc_{j,t}$), the control variables in the Z vector described above, as well as the time fixed effects in the T vector. In the context of this paper, we are interested in a model with penalty fees (in both the late fee and the overlimit fee specifications) as a dependent variable but which also has interest rates, chargeoffs and market share as endogenous. The GMM model has the following form:

$$P_{j,t} = \alpha_1 + \beta_1 r_{j,t} + \beta_2 ov_{j,t} + \beta_3 m_{j,t} + \beta_4 inc_{j,t} + \beta_4 rup_{j,t} + \beta_5 Z + \beta_6 T + \varepsilon_j. \quad (5)$$

This single equation model (Eq. (5)) has the same basic format and variables as Eq. (1), the first equation is the system above, with penalty fees as the dependent variable.

4.3. Results

Table 1 reports the descriptive statistics for the variables we use in our tests. We report results for models with either late fees or overlimit fees as an endogenous variable. The late fees results are in Table 2 (2SLS), 3 (3SLS) and 6 (GMM). The overlimit fees results are in Table 4 (2SLS), 5 (3SLS) and 6 (GMM). Our three key hypotheses concern the impact of three possible determinants (consumer risk of default, card interest rates and bank market share) on credit card penalty fees. The empirical results for these three hypotheses are discussed in turn below.

4.3.1. Risk pricing hypothesis (H1)

The risk pricing hypothesis is tested by examining the impact of the bankruptcy per capita variable on penalty fees. As can be seen in Tables 2–6, this variable is statistically significant and positive, across all three of our econometric specifications (2SLS, 3SLS and GMM) and across both the penalty fee variables (late fees and overlimit fees). These results are consistent with the stance of the American Bankers Association – who argues that credit card penalty fees are based on consumer default risk.

Besides the statistical significance of the bankruptcy per capita variable on penalty fees, it is also possible to determine its economic significance. Specifically, by how much does the bankruptcy per capita variable influence credit card penalty fees charged by banks? Our estimated coefficients for this variable in the different models in Tables 2–6 range from 53,466 to 94,401. A one standard deviation increase in bankruptcy per capita leads to an increase in penalty fees ranging from $0.62 to $1.26 depending on which econometric specification is chosen. These values can be compared

Table 4
Determinants of credit card overlimit fees (2SLS) 1996–2002.

Variables	Endogenous variables							
	Overlimit fee		Interest rate		Chargeoff ratio		Market share	
	Coeff.	**S.E.**	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Chargeoff ratio	**3671.0**	**804.8*****	−9511.1	148,833.6	**–**	–	−0.03	0.01***
Bankruptcy per capita	**87,988.0**	**25,501.8*****	−639,732.8	8,924,217.0	−11.55	6.42*	−0.35	0.20*
Interest rate	**−1.3**	**0.5*****	**–**	–	4.7E−4	6.5E−5***	9.2E−6	3.3E−6***
Market share	**40,754.3**	**20,328.3****	874,376.3	12,500,000.0	−10.48	4.45**	**–**	–
State income	**3.0E−2**	**1.6E−2***	−0.3	3.4	−2.3E−6	3.8E−6	−6.3E−08	1.2E−7
Overlimit fee	**–**	**–**	9.5	131.5	9.7E−5	3.1E−5***	2.5E−06	1.1E−6**
National dummy	**146.8**	**110.8**	−6478.3	90,574.6	0.03	0.03	3.2E−03	6.0E−4***
Regional dummy	**175.6**	**72.7****	−2501	34,948.76	−0.01	0.02	4.7E−04	5.3E−4
Premium dummy	**−51.4**	**94.9**	638.7	9095.6	4.2E−3	0.02	3.2E−04	6.6E−4
Visa dummy	**−123.8**	**130.7**	**–**	–	0.03	0.03	9.1E−04	8.8E−4
Purchase rebate	**––**	**–**	−2871.6	41,064.9	**–**	–	**–**	–
Warranty extension	**–**	**–**	385.2	5170.8	**–**	–	**–**	–
Purchase protection	**–**	**–**	−1929.8	27,645.1	**–**	–	**–**	–
Travel insurance	**–**	**–**	1614.7	23,111.3	**–**	–	**–**	–
Travel discounts	**–**	**–**	2169.3	29,856.5	**–**	–	**–**	–
Car rental insurance	**–**	**–**	1175.2	17,458.1	**–**	–	**–**	–
Non-travel discounts	**–**	**–**	−2841.1	42,323.6	**–**	–	**–**	–
Card registration	**–**	**–**	1739.3	24,183.8	**–**	–	**–**	–
Other plan Enhancements	**–**	**–**	−1213.8	17,326.6	**–**	–	**–**	–
Certificate of deposit (1 year)	**–**	**–**	−3.7	92.2	**–**	–	**–**	–
Reduced introductory APR	**–**	**–**	−4691.3	63,761.0	**–**	–	**–**	–
State income growth	**–**	**–**	**–**	–	**–**	–	−1.3E−7	1.3E−6
Constant	**2359.9**	**812.9*****	Dropped	Dropped	−0.66	0.15***	−0.01	0.01**
Observations	**1542**		1542		1542		1542	
Time fixed effects included	**Yes**		Yes		Yes		Yes	

Results from a 2SLS four equation system with the four endogenous variables (Overlimit Fees, Interest Rate, Chargeoff Ratio and Market Share). The full specification of the model is in Equations (14)–(17). Our three hypotheses are all tested using estimated coefficients in the Overlimit Fee equation (second column in bold). These include (i) the risk pricing hypothesis (model predicts positive relationship between bankruptcy per capita and late fees); (ii) substitution hypothesis (the model predicts a negative relationship between interest rates and late fees); and (iii) market share hypothesis (the model predicts a positive relationship between market share and late fees).

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 5
Determinants of credit card overlimit fees (3SLS) 1996–2002.

Variables	Endogenous variables							
	Overlimit fee		Interest rate		Chargeoff ratio		Market share	
	Coeff.	**S.E.**	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Chargeoff ratio	**4355.0**	**415.6*****	−26,124.9	113,384.2	**–**	–	−0.03	0.01***
Bankruptcy per capita	**94,401.4**	**25,024.3*****	−1,611,472	6,732,994.0	−21.24	6.07***	−0.51	0.19***
Interest rate	**−1.7**	**0.3*****	**–**	–	3.9E−4	6.2E−5***	1.1E−5	3.2E−6***
Market share	**84,404.6**	**18,138.5*****	2,491,526	9,152,745.0	−21.12	4.14***		
State income	**0.03**	**0.02***	−0.7	2.6	−6.3E−6	3.70E−06*	−1.1E−7	1.2E−7
Overlimit fee	**–**	**–**	24.0	99.1	2.2E−4	1.6E−5***	4.3E−6	1.1E−6***
National dummy	**−46.7**	**98.5**	−17,667.6	67,228.3	0.02	0.02	2.6E−3	5.8E−4***
Regional dummy	**133.1**	**71.3***	−6687.2	26,105.8	−0.03	0.02	9.9E−5	5.2E−4
Premium dummy	**−44.5**	**93.8**	1679.9	6817	0.01	0.02	5.2E−4	6.5E−4
Visa dummy	**−157.5**	**128.3**	**–**	–	0.04	0.03	1.1E−3	8.7E−4
Purchase rebate	**–**	**–**	−6410.6	30,286.1	**–**	–	**–**	–
Warranty extension	**–**	**–**	771.9	3769	**–**	–	**–**	–
Purchase protection	**–**	**–**	−4119.9	20,258.6	**–**	–	**–**	–
Travel insurance	**–**	**–**	3675.8	17,192.2	**–**	–	**–**	–
Travel discounts	**–**	**–**	5045.7	22,153.5	**–**	–	**–**	–
Car rental insurance	**–**	**–**	2841	12,811.1	**–**	–	**–**	–
Non-travel discounts	**–**	**–**	−6275.6	30,892.1	**–**	–	**–**	–
Card registration	**–**	**–**	3879.5	17,983.7	**–**	–	**–**	–
Other plan enhancements	**–**	**–**	−2985.7	12,954.1	**–**	–	**–**	–
Certificate of deposit (1 year)	**–**	**–**	−12.7	68.9	**–**	–	**–**	–
Reduced introductory APR	**–**	**–**	−10,338.5	48,055.8	**–**	–	**–**	–
State income growth	**–**	**–**	**–**	–	**–**	–	6.6E−8	1.2E−6
Constant	**2824.1**	**664.3*****	Dropped	Dropped	−0.65	0.14***	−0.02	0.01***
Observations	**1542**		1542		1542		1542	
Time fixed effects included	**Yes**		Yes		Yes		Yes	

Results from a 3SLS four equation system with the four endogenous variables (Overlimit Fees, Interest Rate, Chargeoff Ratio and Market Share). The full specification of the model is in Equations (14)–(17). Our three hypotheses are all tested using estimated coefficients in the Overlimit Fee equation (second column in bold). These include (i) the risk pricing hypothesis (model predicts positive relationship between bankruptcy per capita and late fees); (ii) substitution hypothesis (the model predicts a negative relationship between interest rates and late fees); and (iii) market share hypothesis (the model predicts a positive relationship between market share and late fees).
** Significant at 5%.
* Significant at 10%.
*** Significant at 1%.

to the mean levels of penalty fees in our sample (mean late fee is $14.68 and mean overlimit fee is $17.54).[19] Clearly, therefore, consumer default/repayment behavior has both a statistical as well as an economically meaningful economic impact on the penalty fees set by banks.

In addition to examining the impact of bankruptcy per capita on penalty fees, we can also examine the impact of the chargeoff ratio on penalty fees, which captures the impact of bank specific credit card risk (Furletti, 2003a). We find that the chargeoff ratio variable is also statistically significant and positively related to penalty fees, across both types of penalty fee and all three econometric approaches. In other words, the greater the bank specific risk, as measured by the bank's chargeoff ratio, the higher the penalty fees charged by that bank.

In terms of the economic impact of the chargeoff ratio on penalty fees, our estimated coefficients in the different models range from 3671 to 12,630, where penalty fees are measured in cents. A one standard deviation change in the chargeoff ratio will thus impact penalty fees in a range of $2.20 to $7.57 depending on econometric methodology. Again, these values are clearly economically important when compared to the mean levels of penalty fees in our sample (mean late fee is $14.68 and mean overlimit fee is $17.54). It is interesting to note that the bank specific chargeoff ratio measure of risk has greater economic significance than the macro based bankruptcy per capita measure of risk. Both risk variables though are clearly economically significant in impacting penalty fees.

4.3.2. Substitution hypothesis (H2)

The substitution hypothesis predicts that card penalty fees and card interest rates are substitutes – i.e. higher credit card interest rates would have a negative impact on the size of penalty fees and vice versa. In Tables 2–6 we show that the credit card interest rate variable has a significant and negative effect on penalty fees across all of our econometric specifications (2SLS, 3SLS and GMM) and across both types of penalty fee (late fees and overlimit fees).

In terms of economic significance, we find that the coefficient on the interest rate term in the different penalty fee models ranges from −0.78 to −2.33. The interest rate is measured in basis points and the late fee is measured in cents. Thus, a one standard deviation increase in credit card interest rates (i.e. 273 basis points) reduces late fees by between $2.13 and $6.36 based on the coefficients from our different models. As in the case of the risk variables above, the interest rate variable is clearly both statistically as well as economically significant.

In terms of public policy implications, the fact that there is a substitutability relationship between fees and interest rates indicates that we can reject the hypothesis that banks are raising *both* fees and interest rates simultaneously. This substitutability finding is consistent with the view that if regulators try to

[19] Note that the means for late fees and overlimit fees are somewhat different because late fee data runs from 1990 to 2002, while the overlimit fee data runs from 1996 to 2002.

Table 6
Determinants of credit card late fees and overlimit fees (GMM).

Variables	Dependent variable	
	Late fee	Overlimit fee
Interest rate	−0.88(0.487)*	−0.781(0.436)*
Chargeoff ratio	12,630.19(3183)***	12,673.43(3025)***
Market share	51,853.13(17,066)***	28,934.49(18,132)
Bankruptcy per capita	53,466.60(28,146)*	87,055.09(21,758)***
State income	0.039(0.0177)**	0.035(0.014)**
National dummy	−81.53(135)	−26.00(163.8)
Regional dummy	137.59(61.01)**	197.88(75.49)***
Premium dummy	−38.54(84.51)	−21.82(113.33)
Visa dummy	29.10(75.73)	−23.08(87.83)
Certificate of deposit (1 year)	1.27(1.11)	2.24(1.38)
Constant	Dropped	Dropped
Observations	2592	1542
Time fixed effects included	Yes	Yes

Results from two Separate GMM (Instrumental Variable) Estimations for each of Late Fees and Overlimit Fees as the endogenous variable. Each GMM-IV Equation also includes Chargeoff Ratio, Market Share and Interest Rate as additional endogenous variables. Our four hypotheses are all tested using estimated coefficients in either the Late Fee or Overlimit Fee equations. These include (i) the risk pricing hypothesis (model predicts positive relationship between bankruptcy per capita and fees); (ii) substitution hypothesis (the model predicts a negative relationship between interest rates and fees); (iii) average income hypothesis (the model predicts a positive relationship between state income and fees) and (iv) market share hypothesis (the model predicts a positive relationship between market share and fees). S.E. in parentheses.

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

limit fees then card suppliers will seek to raise card interest rates.[20]

4.3.3. Market share hypothesis (H3)

The market share hypothesis predicts that banks with a greater card market share will be able to charge higher penalty fees and thus extract rents. This hypothesis clearly has important public policy implications given the concerns of politicians and regulators over increasing concentration in banking in general and in the credit card market in particular.

Our results in Tables 2–6 indicate that in five of our six models (the GMM overlimit model is the exception) the market share variable is positive and highly significant. The market share coefficients in the different models range from 108,320 to 40,754. This implies that a one standard deviation increase in a bank's market share will increase the credit card penalty fee charged by between $7.35 and $2.76. These results indicate that the market share variable is both statistically as well as economically significant in explaining the level of credit card penalty fees. That is banks with higher market share are able to extract rents in the form of penalty fees, even after holding consumer risk constant (see Fig. 1).

From a public policy perspective, therefore, the results in this paper are mixed. Our finding that fees are increasing in customer risk supports the arguments of the defenders of penalty fees such as banks while on the other hand, our finding that fees are increasing in bank market share is consistent with rent extraction.

5. Conclusions

This paper is the first to examine the determinants of credit card penalty fees (i.e. late fees and overlimit fees), even though the issue of credit card penalty fees has become a hot public policy topic involving very large dollar amounts.

We test three key hypotheses using credit card level panel data across a large sample of credit cards from different US banks over time. Specifically, that penalty fees are increasing in consumer default risk (H1), penalty fees and card interest rates are substitutes (H2) and banks with market share charge higher penalty fees (H3).

Overall we find that card penalty fees are increasing in the risk of consumer default – a result that is consistent with the arguments of proponents of card fees such as card issuing banks. However, we also find that the level of card fees is increasing in bank market share – a result that is consistent with banks extracting rents from consumers. Finally, we find that card penalty fees and interest rates are substitutes, i.e. banks have not raised both penalty fees and card interest rates simultaneously. Nevertheless, substitutability implies that attempts to limit fees may result in card interest rates rising.

[20] See, for example, Furletti and Ody (2006a).

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References

Ausubel, L.M., 1991. The failure of competition in the credit card market. American Economic Review 1, 50–81.
Berlin, M., Mester, L.J., 2004. Credit card rates and consumer search. Review of Financial Economics, Special 2, 179–198.
Bharath, S.T, Dahiya, S. Saunders, A., Srinivasan, A., forthcoming. Lending relationships and loan contract terms: does size matter? Review of Financial Studies.
Brito, D.L., Hartley, P.R., 1995. Consumer rationality and credit cards. Journal of Political Economy 2, 400–433.
Calem, P.S., Mester, L.J., 1995. Consumer behavior and the stickiness of credit-card interest rates. American Economic Review 5, 1327–1336.
Calem, P.S., Gordy, M.B., Mester, L.J., 2006. Switching costs and adverse selection in the market for credit cards: new evidence. Journal of Banking and Finance 30 (6), 1653–1685.
Domowitz, I., Sartain, R.L., 1999. Determinants of the consumer bankruptcy decision. Journal of Finance 1, 403–420.
Furletti, M., 2003a. Credit card pricing developments and their disclosure. Federal Reserve Bank of Philadelphia, Discussion Paper.
Furletti, M., 2003b. Measuring credit card industry chargeoffs: a review of sources and methods. Federal Reserve Bank of Philadelphia, Discussion Paper.
Furletti, M., Ody, C., 2006a. Measuring U.S. credit card borrowing: an analysis of the G.19s estimate of consumer revolving credit. Federal Reserve Bank of Philadelphia, Discussion Paper.
Furletti, M., Ody, C., 2006b. Another look at credit card pricing and its disclosure: is the semi-annual pricing data reported by credit card issuers helpful to consumers and researchers? Federal Reserve Bank of Philadelphia, Discussion Paper.
Gande, A.M.P., Saunders, A., 1999. Bank entry competition and the market for corporate securities underwriting. Journal of Financial Economics 54 (2), 165–195.
Greene, W.H., 2003. Econometric Analysis, fifth ed. Prentice Hall, NY, NY.
Gross, D.B., Souleles, N.S., 2002a. An empirical analysis of personal bankruptcy and delinquency. Review of Financial Studies 1, 319–347.
Gross, D.B., Souleles, N.S., 2002b. Do liquidity constraints and interest rates matter for consumer behavior? Evidence from credit card data. Quarterly Journal of Economics, 149–185.
Hannan, T., 2006. Retail deposit fees and multimarket banking. Journal of Banking and Finance 30, 2561–2578.
Knittel, C.R., Stango, V., 2003. Price ceilings as focal points for tacit collusion: evidence from credit cards. American Economic Review 5, 1703–1729.
Massoud, N., Bernhardt, D., 2002. Rip-off" ATM surcharges. RAND Journal of Economics 1, 96–115.

Massoud, N., Saunders, A., Scholnick, B., 2006. The impact of ATM surcharges on large vs. small banks: is there a switching effect? Journal of Business 79 (4), 2099–2126.
Office of Fair Trading, 1999. Quantitative Techniques in Competition Analysis. Research Paper 17.
Peterson, R.L., 1977. Factors affecting the growth of bank credit card and check credit. Journal of Finance 2, 553–564.
Sarangi, S., Verbrugge, R., 2000. Late fees and price discrimination. Economics Letters, November 2, 153–158.
Scholnick, B., Massoud, N., Saunders, A., Carbo-Valverde, S., Rodríguez-Fernández, F., 2008. The economics of credit cards, debit cards and ATMs: a survey and some new evidence. Journal of Banking and Finance 32 (8), 1468–1483.
Stango, V., 2000. Competition and pricing in the credit card market. Review of Economics and Statistics 3, 499–508.
Stango, V., 2002. Pricing with consumer switching costs: evidence from the credit card market. Journal of Industrial Economics 4, 475–492.
Stavins, J., 2000. Credit card borrowing, delinquency and personal bankruptcy. Federal Reserve Bank of Boston New England Economic Review 0, 15–30.
The Nilson Report, February 2007. Number 873.
Toh, K.G., 1996. Are credit-card late fees "Interest"? Delineating the Preemptive Reach of Section 85 of the National Bank Act of 1864 and Section 521 of the Depository Institutions Deregulation and Monetary Control Act of 1980. Michigan Law Review 5, 1294–1325.

Further reading

Matutes, C., Padilla, A.J., 1994. Shared ATM networks and banking competition. European Economic Review, 1113–1138.
United States Government Accountability Office, 2006. Credit cards: increased complexity in rates and fees heightens need for more effective disclosure to consumers. GA0-06-929.