Consumer bankruptcy, bank mergers, and soft information*

Jason Allen
Bank of Canada

H. Evren Damar
Bank of Canada

David Martinez-Miera
Universidad Carlos III de Madrid

Abstract

This paper analyzes the relationship between consumer bankruptcy patterns and the destruction of soft-information caused by mergers. Using a major Canadian bank merger as a source of exogenous variation in local banking conditions, we show that local markets affected by the merger exhibit a relative increase in consumer bankruptcy rates following the merger. We analyze different plausible mechanisms by which the merger might have led to higher bankruptcies and provide evidence consistent with the most plausible mechanism being the disruption of consumer-bank relationships. Markets affected by the merger show a decrease in the merging institutions' branch presence and market share, including those stemming from higher switching rates, without overall changes in quantity of credit, loan rates, or observable borrower characteristics.

Keywords: Consumer bankruptcy, financial institutions, soft information
JEL classification: G2, D4

*The views expressed in this paper are those of the authors. No responsibility for them should be attributed to the Bank of Canada. We thank the Office of the Superintendent of Bankruptcy for their support. We thank Hans Degryse, Emre Ergungor, Reint Gropp, Ben Keys, Sheisha Kulkarni, Jim MacGee, Randall Morck, Adi Mordel, Steven Ongena, Teodora Paligorova, Barry Scholnick, Javier Suarez, Francesco Trebbi and seminar participants at the Bank of Canada conference on financial intermediation and vulnerabilities, European Central Bank, the Office of the Superintendent of Bankruptcy's *Symposium on Insolvency and Financial Literacy Research*, University of Alberta, University of Victoria, Lakehead University Competition Bureau, ESSFM Gerzensee, IFASB Valencia, Kansas City Fed and CEMFI. Part of this research was done when David Martinez-Miera was a visiting scholar at the Bank of Canada. Andrew Usher, Chloé Yao and Mark Rempel provided excellent research assistance. All errors are our own.

Consumer bankruptcy, bank mergers, and soft information

Abstract

This paper analyzes the relationship between consumer bankruptcy patterns and the destruction of soft-information caused by mergers. Using a major Canadian bank merger as a source of exogenous variation in local banking conditions, we show that local markets affected by the merger exhibit a relative increase in consumer bankruptcy rates following the merger. We analyze different plausible mechanisms by which the merger might have led to higher bankruptcies and provide evidence consistent with the most plausible mechanism being the disruption of consumer-bank relationships. Markets affected by the merger show a decrease in the merging institutions' branch presence and market share, including those stemming from higher switching rates, without overall changes in quantity of credit, loan rates, or observable borrower characteristics.

Introduction

The recent financial crisis has spurred a restructuring in the banking sector worldwide. An area where this restructuring can have an important impact is on consumer lending, which is now larger than business credit in many developed countries (Beck et al. (2012)). In this study we focus on the relationship between changes in the banking environment, more specifically mergers, and consumer bankruptcy. Understanding the determinants that affect consumer bankruptcies is important given how bankruptcy can affect the soundness of the banking sector, in addition to the socioeconomic implications.[1]

This paper provides an empirical analysis to questions such as: Do bank mergers affect consumer bankruptcy rates? How persistent are these effects? By which mechanism do mergers affect consumer bankruptcy rates? Our first contribution is to show that bank mergers can lead to an increase in consumer bankruptcies, at least in the short-run. Our second contribution is to show that this increase in consumer bankruptcies comes from the disruption of lender-borrower relationships post-merger.

The nature of household financing suggests that, among other factors, a lenders' ability to acquire and process borrowers' information is an important factor in determining whether a borrower might ultimately file for bankruptcy.[2] The widespread adoption of computerized technologies, during the 1980's and 1990's increased banks' abilities to lend to high risk households previously excluded from the banking market (Edelberg (2006)). Lending to these riskier households has been argued to be one of the causes underlying the substantial increase in consumer bankruptcies observed over the past decades (Dick and Lehnert (2010) and Livshits et al. (2011)).

In addition to changes that affect hard information, changes in the banking sector that affect the gathering of soft information can also be a relevant factor in explaining consumer bankruptcy

[1] Han and Li (2011), for example, document that recently bankrupt individuals have less access to credit and accumulate less wealth than individuals that never file, all else equal.

[2] The literature on bank information has broadly differentiated two types of information: *hard information* which is computerized, quantitatively intensive, easy to store and objective (e.g credit scores) and *soft information* which is human intensive, qualitative in nature and is more difficult to obtain, process and store. We also note that monitoring by banks is also human intensive and is associated with loan default probabilities. See for example Stein (2002), Petersen and Rajan (2002), Hauswald and Marquez (2006), Agarwal and Hauswald (2010) for businesses and Ergungor (2010) for consumers. A more precise definition of hard and soft information can be found in Petersen (2004)

patterns, and have been overlooked in the literature. In this study we focus on determining how the process of a bank merger can hamper the availability of consumers' soft information and lead to an increase in consumer bankruptcy rates. The underlying factor driving our result is that bank mergers destroy valuable bank-borrower relationships.

Relationships with consumers, similar to businesses, are built over time and allow banks to gather soft information about their consumers (Berger and Udell (1995)). Importantly this soft information is not all obtained at the relationships conception, but takes time to develop (Bolton et al. (2013)). Following a bank merger, soft information can be destroyed for several reasons. Mergers and acquisitions commonly result in the replacement of target management and loan officers, who can be the depositaries of soft information (Hadlock et al. (1999)). Mergers also often lead to the adoption of organizational structures and policies familiar to the acquirer, which can favor policies based on hard information (Peek and Rosengren (1998)).[3] Furthermore, a merger can lead to the restructuring and closure of pre-existing offices, which can affect consumer-bank relationships. This restructuring can lead some consumers to switch banks (Deloitte (2010)), which also destroys soft information.[4] Hence, the bank merging process creates a destruction of soft information which can be temporary in some situations or permanent if banks decide to change their lending strategies post-merger.

The destruction of soft information can therefore have an impact ex ante on the types of contracts signed, and types of borrowers, as well as ex post in terms of outcomes. Our analysis will rule out ex ante changes to contracts, and therefore we focus on consumer bankruptcy outcomes. Without soft information, neither the newly merged bank, nor the switchers' new banks have all the tools to identify, counsel and guide vulnerable borrowers who might be considering bankruptcy. Banks without soft information have to rely on hard information and let vulnerable households who might be temporarily illiquid fail.[5] Importantly, this effect should fade through time as soft

[3] Along these lines, Berger et al. (2005) find that larger banks stay away from informationally difficult loans relative to smaller banks, resulting in valuable soft information previously used by the stand-alone bank being ignored as it is now part of a bigger entity

[4] Since soft information is not transferrable and time-intensive, the new bank to which these consumers switch bases lending decisions relying more on hard information

[5] The literature on mortgage modifications confirms that most of the options available to banks with distressed borrowers (such as modifications, accepting partial payments or direct counseling) involve informational asymmetries and the lender may need soft information in order to make the best decision (Ergungor (2010), Adelino et al. (2013)

information about the new borrowers' is gathered by the banks that hold the new relationships.

To undergo our analysis we match a detailed administrative data-set on the population of Canadian bankruptcy filers between 1998-2007 to the location of bank branches in their neighborhood. We then exploit the variation in changes to more than 500 local banking markets caused by a merger between a (major) Canadian bank, Toronto Dominion, and the largest trust company, Canada Trust, that took place in 2000.

The variation in the geographical presence of the merging banks and their competitors prior to the merger naturally leads to a difference-in-difference estimator, and allows us to extract conclusions concerning the effects of bank mergers on consumer bankruptcy rates.[6] The main argument for our empirical approach is that since the merger was negotiated nationally, the changes we exploit can be viewed as exogenous relative to local market conditions that determined the location of branches pre-merger. We provide an analysis of the differences between the treatment and control areas in the main text. Importantly for our identification we find that the trends of consumer bankruptcies pre-merger in treated and control markets were practically identical pre-merger.[7]

We document how the merger led to an increase in the average bankruptcy rate of up to 13.6% over three years. The translates into an average cumulated loss to lenders of about $470,000 stemming from the higher bankruptcy rates.[8] This observation allows us to conclude that bank mergers result in a sizable increase in consumer bankruptcy rates in those markets in which merging institutions overlapped pre-merger. We also show how this effect is not persistent, since six years post-merger the differential effects we document disappears. The fact that mergers can lead to an increase in consumer bankruptcies is an important finding to take into account by policy-makers when analyzing the welfare impact of mergers, beyond the standard price effects, already documented in previous studies and normally analyzed by antitrust authorities.

In addition to showing a relationship between bank mergers and consumer bankruptcies we

and Kruger (2013))

[6] A similar identification strategy has been used in the banking literature by Sapienza (2002), Focarelli and Panetta (2003), and Allen et al. (2013), in the health-care literature by Dafny et al. (2011), and the market for gasoline by Hastings (2004) and Houde (2012).

[7] It is also important to note that if anything markets affected by the merger exhibit slightly lower bankruptcies pre merger.

[8] It should be noted that there are also cost reduction benefits, such as the closing of branches, that stem from the merger.

analyze different plausible mechanisms that might lead to these higher bankruptcy rates. Bank mergers have been shown to create changes in the local banking structure that affect, among other issues, loan rates, service quality and access to credit, and all of these changes could affect consumer bankruptcy rates. Importantly, in contrast to previous studies, we argue that bank mergers also result in a loss of consumers' soft information. Our underlying hypothesis is that the disruption of borrower-lender relations, via changes in the merging banks' policies, reallocation of bank staff or because consumers decide to switch banks, can result in an increase in consumer bankruptcy rates. We first analyze this mechanism and then test for competing explanations.

We provide evidence that the TD-Canada Trust merger affected the local banking structure in treated markets in a way which disturbed borrower-lender relations. Treated markets exhibit (i) a higher intensity of branch closures by merging banks than by competitors, (ii) reductions in the market shares of the merging banks without any overall change in credit quantity in the local market and (iii) higher consumer switching rates (coming from consumers of the merging institutions). Therefore we conclude that the changes related to the merger led to a degradation of bank-specific consumer information.

A more precise analysis of the local banking structure prior to the merger allows us to differentiate treated markets in which affected consumers have more switching options at the time of the merger. We do so by identifying markets in which the relative branch presence of competitors pre-merger was higher. We show that in markets in which affected consumers have more switching options, the consumer bankruptcy rate post-merger is higher than markets with fewer switching options. We show how this effect is especially true in those markets in which the branch presence of the acquired bank was higher. This is consistent with the hypothesis that acquiring institutions suffer larger re-organizational changes and switching of consumers. We therefore conclude that a disruption of bank-borrower relations, which implies a reduction in the soft information available in the market, is related to higher consumer bankruptcy rates.[9]

Finally, we undergo an analysis of competing explanations that can relate mergers and higher

[9]This argument is in line with those in Berger and Udell (2002) and Stein (2002), among others. These models show the importance of soft information and its relation with the depository of such information, loan officers, in business lending. It should be noted that soft information would be destroyed both if the loan officer changes or if the consumer stops receiving loans from that bank (independently of switching to a new institution or not).

consumer bankruptcy rates. We show that the merger did not lead to significant changes between the treatment and control markets in other relevant variables that could affect consumer bankruptcy rates like: loan rates, aggregate credit supply, borrower characteristics, or organizational structure. Hence, we can rule out that the observed increase in bankruptcy in our study was driven by any of these mechanisms, importantly in our case we do not find any changes in local credit policies that can be the cause of these increase in bankruptcy rates.[10]

Overall, we conclude that the (locally exogenous) merger between two banks, involving nearly 1,300 branches, created an increase in consumer bankruptcy rates in areas affected by the merger. We also provide evidence in line with the most plausible mechanism underlying the increase in consumer bankruptcy being related to the disturbance of borrower-lender relations generated by the merger.

Related Literature

Our paper is related to the household finance literature, more specifically to the recent strand of literature that analyzes the role of information in explaining consumer bankruptcy rates.[11] Recent papers such as Dick and Lehnert (2010) and Livshits et al. (2011) have focused on analyzing the impact of hard information technology adoption by banks and attribute the observed increases in consumer bankruptcy rates to this adoption. The reason being that by better pricing risk, hard information technology leads to riskier consumers receiving credit. In contrast to these studies we focus on identifying a short-horizon soft information channel. We do so by focusing on a period in which the major trends in hard information adoption have already taken place and use a bank merger as a source of variation in banks' soft information.

We complement previous research by showing how the destruction of soft information resulting from the disruption of borrower-lender relationships is a relevant factor in explaining changes in consumer bankruptcy rates. In contrast to previous results, and consistent with our analysis being in the short-run with no major hard information adoption, we show how the increase in consumer

[10] Our analysis can not rule out that there was global changes in the credit policies. We do observe changes in the overall loan rates and quantity of credit but not differentially in treatment and control markets.

[11] At the individual level there is also a literature that tries to explain consumer bankruptcy decisions, e.g. Domowitz and Sartain (1999), focuses on health, income, and marital shocks.

bankruptcy comes from the intensive margin and not the extensive margin. That is, the increase in bankruptcy following the merger does not come from a change in the distribution of borrowers receiving credit. Also, contrary to Dick and Lehnert (2010) we observe that a reduction in bank competition stemming from a merger leads to an increase in consumer bankruptcies, and that it is due to changes in the banks' information structure and not driven by a change in credit policies.

The second strand of literature our paper is related to is that which analyzes the effects of merger-driven changes in banking structure on consumer welfare. Most of the literature has focused on prices (Sapienza (2002)), but also service quality (Focarelli and Panetta (2003) and Panetta et al. (2009)) and organizational structure (Berger and Udell (2002)), among other issues.[12] In contrast to these studies we are the first to provide evidence on the effect of bank mergers on consumer bankruptcies and to show how bank mergers can lead to an increase in consumer default.

Our focus on the underlying mechanisms that result in an increase of consumer bankruptcy rates links our study to a large literature analyzing how and why changes in local banking structure triggered by a merger affect firm borrowing.[13] The papers most closely related to ours are those that analyze empirically the impact of changes in banking structure on loan characteristics. Bank mergers can lead to a change in the charter value of banks, affecting risk appetite, and therefore the distribution of borrower type (Keeley (1990)) or they can affect borrower-lender relationships by reducing credit to small firms which can result in a loss of soft information and riskier borrowers (Sapienza (2002) Panetta et al. (2009), Karceski et al. (2005) and Degryse et al. (2011)).

In line with the findings of Karceski et al. (2005) and Panetta et al. (2009) who show that bank mergers lead to firm-bank relationship terminations, we show that this is also true with consumer relationships. Importantly, contrary these previous studies, we focus on market-level effects and find that although relationships are affected, consumers switch to new banks and the overall amount of credit does not vary in the market. The fact that these relationship terminations are not homogenous across local markets and depend on the exact market structure pre-merger can rationalize the different results concerning the effects of bank mergers on switching behavior

[12] For an extensive literature reviews on the effects of bank consolidation please see Berger et al. (1999).

[13] See DeYoung, Evanoff, and Moyneaux (2009) for a review of the literature on the effects of bank mergers on firms. Note that although some mechanisms are important for business loans, they might not be for consumer loans.

found in Sapienza (2002) and Ongena and Smith (2001). We also show how local areas with more disturbances of relationships are related to areas with higher consumer bankruptcy rates.

The remainder of the paper is structured as follows: Section 1 gives an overview of the bankruptcy process in Canada and specific details of the underlying merger in our study. Section 2 determines and explains our main hypotheses. Section 3 explain our main data sources and unit of analysis. Section 4 describes our identification strategy. Section 5 provides our empirical findings supporting our hypothesis that the observed increase in bankruptcies post-merger are related to the destruction of soft information. Section 6 presents alternative hypotheses. and finally Section 7 concludes.

1 Consumer Bankruptcies and the TD Bank-Canada Trust Merger

This section provides a brief explanation of the main characteristics of the consumer bankruptcy process in Canada and also background information on the Canadian banking sector, focusing on the merger between Toronto-Dominion Bank and Canada Trust in 2000.

1.1 The Bankruptcy Process in Canada

In Canada, consumer insolvencies are governed by the *Bankruptcy and Insolvency Act* (BIA) and supervised by the Office of the Superintendent of Bankruptcy (OSB). Consumers facing insolvency can either file for bankruptcy or file a debt-restructuring proposal. A proposal does not require the assets of the consumer to be liquidated; rather if the proposal is accepted by the creditors, the consumer makes payments on outstanding unsecured debts for a pre-specified period of time. This procedure is similar to a Chapter 13 filing in the U.S.

If the consumer decides to pursue the bankruptcy option, he/she is required to work with a bankruptcy trustee, who directly negotiates with the consumer's creditors. The trustee is also responsible for selling the individual's assets and determining their stream of payments during bankruptcy (based on OSB guidelines). First-time filers who fulfill all bankruptcy requirements are automatically discharged after nine months and make a "fresh start."[14] All other filers obtain

[14]Even after a "fresh start" some of the filer's debts, such as child support or court ordered payments are not

a recommendation from their trustee and attend a discharge hearing before leaving bankruptcy. Overall, this procedure is equivalent to a Chapter 7 bankruptcy filing in the U.S. However, unlike in the U.S., consumers in Canada do not have to wait for a fixed period of time before being able to file another proposal or file for bankruptcy again.

1.2 Trends in Canadian Insolvencies

Figure 1 shows the increase in bankruptcies and proposals per 1,000 adults between 1987 and 2008. Although proposals increase sharply during our primary period of study (1998-2007) they still only account for a relatively low fraction of consumer insolvencies by the end of 2007. Putting these figures in context, Serra (2008) reports that in 2004, the U.S. had 7.0 insolvencies (Chapter 7 and Chapter 13) per capita (per 1,000 people), while the United Kingdom and Austria had 1.1 and 1.6 insolvencies per capita respectively. This suggests that consumer bankruptcy rates in Canada are between those of the U.S. and Europe.

Figure 1: **Consumer bankruptcies and proposals per 1,000 adults in Canada (1987-2008)**

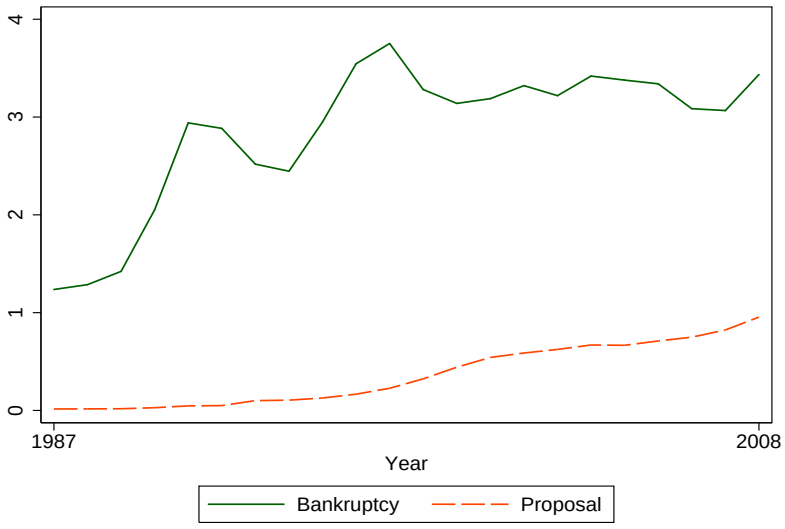
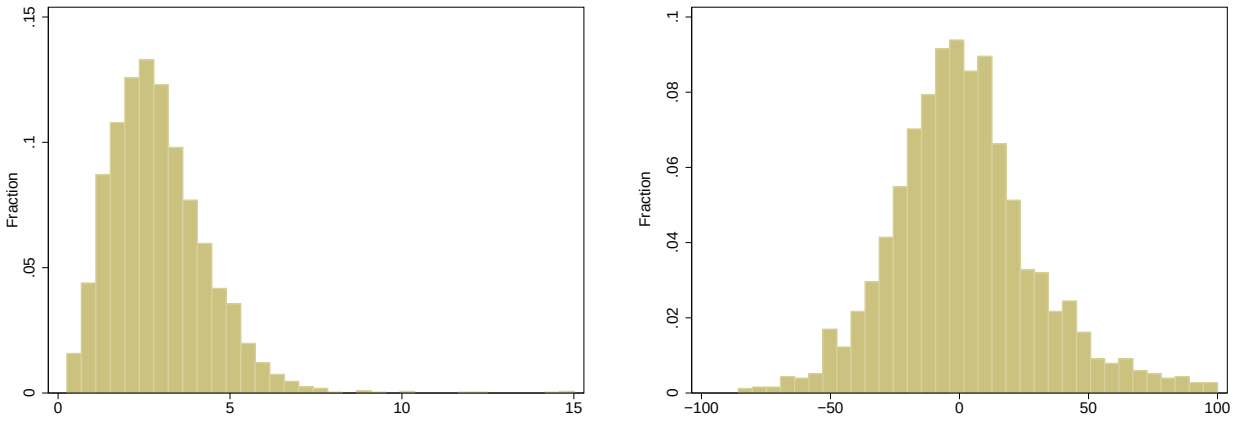


Figure 2 provides a histogram of the level and annualized growth rate of bankruptcies between

discharged. Student loan debts are discharged only if the filer has been out of school for a lengthy period of time (10 years during our sample period, decreased to 7 years in 2009).

1998 and 2003, our primary period of study, at the "forward sortation area" (FSA) level (our local market definition, described in detail in section 3.3). While some areas have growth rates close to zero, there are other areas where the bankruptcy rate either fell or rose by a substantial amount (for example, ±50% a year). Our primary goal is to better understand the relationship between the heterogeneity in bankruptcy rates across different local areas and to analyze the importance of banks in determining such bankruptcy rates.

Figure 2: **Annual Bankruptcy Filings in an FSA per 1,000 Individuals and Annualized within FSA Bankruptcy Growth Rates (1998-2003, excluding 2000)**



(a) Levels

(b) Growth rates

1.3 Merger background

The Canadian banking industry is currently dominated by six largely similar national banks (Bank of Montreal, Bank of Nova Scotia, Banque Nationale, Canadian Imperial Bank of Commerce, Royal Bank Financial Group, and TD Bank Financial Group), a regional co-operative network (Desjardins in the province of Québec), and a provincially owned deposit-taking institution (ATB Financial in the province of Alberta). In addition, Canadian consumers are served by a wide variety of small credit unions, trust companies, foreign branches and foreign bank subsidiaries. The market share of consumer credit of the Big 6 banks over our sample period ranges from 60% pre-merger to 67%

post-merger.[15] Credit unions' market share is about 15% and other, foreign bank branches and subsidiaries make up the remainder.

There was a substantial consolidation wave in the Canadian banking sector during the 1990s. This merger activity was triggered by a change in the Canadian *Bank Act* in 1992, which allowed banks to acquire trust companies. Until that point, trust companies (which can roughly be compared to Savings and Loans in the United States) played an important role in the retail market. Our analysis focuses on the largest and last large merger between a bank and a trust, TD Bank and Canada Trust, which was announced in August 1999, approved by the Minister of Finance on January 31, 2000 and completed February 2, 2000.[16]

The TD-Canada Trust merger followed the Federal governments rejection of the proposed mergers of RBC and BMO and TD with CIBC in 1998. TD began looking for an acquisition target as they were the smallest of the Big 5 banks and needed scale in order to compete. They were also looking to improve their retail business.[17] BAT, which owned Canada Trust was looking to sell Canada Trust and focus on their tobacco business (Imperial). Given that the merger was driven by the search for scale, it is highly unlikely that the acquisition decision was driven by concerns such as branch overlap at the local level, where Canada Trust branches were located, or bankruptcy rates at the local markets where branch networks overlap. Instead, the decision to purchase Canada Trust was based on their national branch network and their total assets. Therefore, it is highly unlikely that the merger decision was endogenous to bankruptcy rates at the local level.

At the time of the merger TD and Canada Trust operated around 900 and 440 branches, respectively, and each represented approximately 9% of total consumer credit. There were some important differences in how these two banks conducted their business. Canada Trust was well-known as a community-based financial institution that depended on a branch-based relationship lending business model, with almost 90% of its branches concentrated in three provinces (Ontario, Alberta and British Columbia). Canada Trust was also known for its extended business hours, in

[15] Based on outstanding balances on mortgages, loans and leases, lines of credit and credit cards, where pre-merger refers to the years 1998-1999 and post-merger refers to the years 2001-2002.

[16] Other examples of such bank-trust mergers are Royal Bank of Canada-Royal Trust (1993), Bank of Montreal-Household Trust (1995), CIBC-FirstLine Trust (1995), and Scotiabank-National Trust (1997). We do not analyze these mergers because of data limitations.

[17] Accessed May, 2013: http://www.thecanadianencyclopedia.com/articles/macleans/td-bids-for-canada-trust.

particular the "8 to 8 six days straight" service at its branches.[18] TD was a larger institution, with more sparsely distributed branches (for example, only 76% of its branches were in Ontario, Alberta and British Columbia). The merger cost roughly $8 billion, and included minimal divestiture.[19]

2 Hypotheses development

This section determines and explains the rationale underlying our main hypotheses and also explains the different mechanisms that are analyzed in the empirical section. We focus on two hypotheses:

H1 A merger between two banks with overlapping networks results in an increase in consumer bankruptcies.

H2 Mergers disrupt borrower-lender relationships, resulting in a loss of soft information and higher bankruptcies.

2.1 Economic rationale

Our main goals are to establish that changes in local banking structure affect consumer bankruptcy rates and then explain how. We focus on analyzing the impact that merger have on soft information. As argued by Petersen (2004), among others, soft information is a determinant of borrowers' default, hence, any change in soft information use or availability can result in changes in consumer bankruptcy rates.

Consistent with the theoretical literature, our main hypothesis is that changes in the banking structure that result in a reduction in consumers' soft information lead to an increase in consumer bankruptcy rates. Lower soft information results in banks having less information in order to effectively grant loans to safer (more creditworthy) consumers. In addition, there is less information to identify existing borrowers who might be considering defaulting and less time counseling them.

[18] Accessed September, 2011: http://www.td.com/about-tdbfg/corporate-information/tds-history/we-take-pride-in/history.jsp

[19] These three markets were Brantford, ON, Kitchener, ON and Port Hope, ON. We exclude these markets from our analysis, although our results are robust to including them.

One of the main challenges in analyzing soft information is its endogenous nature. Different economic conditions (consumer bankruptcies among them) may affect borrower-lender relationships and, therefore, the optimal amount of banks' soft information, making it difficult to isolate the effect of soft information on consumer bankruptcies. In order to analyze the effects of soft information on bankruptcy we focus on a situation with an exogenous shock to soft information.

Our exogenous shock to soft information is a merger between two banks. Bank mergers are a natural shock to soft information since information about consumers across the merging parties might not be maintained due to re-organizational changes that lead to replacement of loan officers and managers, closing of branches or changes in the lending policies that favor more standardized hard information models. The changes that occur during the merger can lead to higher consumers' dissatisfaction and therefore switching. The fact that bank mergers result in consumers leaving the merged institution is well established in the industry (Deloitte (2010)). Kiser (2002) provides evidence that after a bank merger consumers often switch and this switch is not always related to price factors. In a recent survey by Moody's, 35% of individuals that switch following a merger do so for emotional factors involving the merger. Hence, we conclude that the merger process can lead to a destruction of soft information that results in higher bankruptcy rates. Note that generating soft information is not instantaneous hence any shock to soft information will have some effects that can fade out with time. [20]

Although mergers are endogenous at the national level, they create exogenous changes in local markets conditions, which, after controlling for local market fixed effects, is the source of variation we use to measure the effects of changes in local market structure on consumer bankruptcy. The variation in the location of bank branches pre-merger allows us to test whether consumer bankruptcies in areas in which the branch network of merging banks overlap are significantly different than in locations where they do not.

Mergers may not only affect soft information, which is the mechanism we attempt to isolate, but also prices, credit policies, and hierarchical changes in the organization which can all affect consumer bankruptcy. Once we identify our main mechanism, therefore, we show that it is robust

[20] See Bolton et al. (2013) for a model with soft information generation by banks that is not instantaneous.

to these other potential explanations.

2.1.1 Alternative mechanisms affecting bankruptcies

As already highlighted, there is a long literature on the effects of bank mergers on local market structure. In order to isolate mechanisms related to soft information destruction, we are primarily interested in those effects which can affect consumer bankruptcy. Among the plausible mechanisms, in addition to our bank-borrower relations mechanism, that can take place when a merger occurs we identify the following (i) credit supply mechanism (ii) the non-exclusive lending mechanism (iii) risk appetite mechanism (iv) loan rate mechanism and (v) hierarchical mechanism.

We briefly explain these alternative mechanisms and their link to consumer bankruptcy. Some of these are clearly linked, therefore although we explain them relatively isolated, we acknowledge possible feedback.

The *credit supply mechanism.* A merger can change the supply of credit to consumers, which can affect the risk profile of consumers that receive credit. As the merging bank has more market power it might want to restrict credit, in order to increase price (Sapienza (2002)), however, this effect can be compensated by a higher supply by competitors.[21] Hence, the overall credit supply mechanism does not have a clear prediction. A change in the overall credit in an area could change the riskiness of existing consumers by changing their debt to income ratio, which is an intensive margin effect or it can lead to a decrease in lending to the riskiest borrowers, i.e., extensive margin effect (Dick and Lehnert (2010)).

The *non-exclusive lending mechanism.* Related to credit supply, Degryse, Ioannidou, and von Schedvin (2013) finds that once a bank learns that a firm is borrowing from another bank it reduces the amount it lends to that firm. A merger between banks can therefore shed light on previously unknown bank-lending relationships and lead to a reduction in lending.[22] The reduction in lending could have an effect on bankruptcy.

[21] Berger and Hannan (1998) argue, and provide evidence, that the plausible decline in credit supply by merging banks might be overset by competitors granting more credit.

[22] Uncertainty about the number of lending partners also leads to a negative externality, which is not correctly priced. Following this argument, a merger should lead to a lessening of the negative externality, and therefore lower prices.

The *risk appetite mechanism.* The merger of two banks can create a change in the risk appetite of the merged bank. On the one hand the merged bank has higher charter values and hence, its risk appetite could be reduced (Keeley (1990)). On the other hand sufficiently bigger banks might have more incentive to take risk given implicit government guarantees as they become too big to fail. It could also be that the adoption of new risk management techniques changes the risk profile of the merged institution (this is also related to the *hierarchical structure mechanism*). Although the underlying forces are different we refer to this effect as the (observable) risk appetite mechanism.

The *loan rate mechanism.* By changing the competitive setup in the local market the merger can also affect the pricing of loans. A change in the loan rate can affect borrowers as higher loan rates, ceteris paribus, makes them riskier. It could also be that higher loan rates affects the selection of borrowers by increasing the pool of risky borrowers (Stiglitz and Weiss (1981)) or by increasing the pool of safer borrowers (De Meza and Webb (1987)). However, the merger can also create efficiency gains that reduce loan rates which, for a given loan size, makes consumers safer.[23]

The *hierarchical structure mechanism.* A merger between banks can change the hierarchical structure of the merging institutions (Stein (2002), Panetta et al. (2009)). By creating a more complex institution the merging institution may choose to rely more on hard information and less on soft information. This might reduce bankruptcy if the hard information adoption compensates for the reduction in soft information. As previously argued, differentiating from Dick and Lehnert (2010) we analyze consumer bankruptcies in a setup in which there was no major adoption of hard information and in a merger in which this effect is assumed to be low as both financial institutions used hard information technologies before the merger.

We analyze each of these alternative mechanisms in turn and determine that the most plausible mechanism that explains the observed increase in bankruptcy rates following the TD-Canada Trust merger is the destruction of soft information. We next present the data.

[23]It should be noted that changes in the loan rate could also capture a change in the (observable) credit policy of the banks. If banks decide to lend to riskier households they should increase their loan rate. Hence, we refer to changes in the loan rates for a given risk profile.

3 Data

For our analysis we use different sources of data for the years 1998-2007. Although our main analysis relies on the years 1998 to 2003, other years are used in order to construct robustness tests. Consumer bankruptcy data comes from the Office of the Superintendent of Bankruptcy (OSB) and represents the universe of bankruptcy filings in Canada. We use the Canadian Financial Monitor (CFM) survey in order to analyze and control for credit related patterns such as loan prices, market shares, amount of credit or characteristics of the borrowers. We also use data from the Canadian Census in order to control for local demographics such as population growth or income. Finally we have data on all bank branch locations from the Financial Services Canada directory, which is produced by Micromedia ProQuest. A more specific characterization of the data follows.

3.1 Individual level bankruptcy data

Our sample contains all bankruptcy filings in Canada for the years 1998-2007. For all the years in our sample we observe each filers location, total assets, and total liabilities at the time of filing. In Canada bankruptcy fillings can be made electronically or on paper with the help of a trustee. For households who filed for bankruptcy electronically we have additional self-reported information on creditors and liabilities. In 2003, around 20% of filings were completed electronically compared to 98% by 2007. This extended information related to electronic filings is not available for our main analysis, however it is useful to provide a general picture of bankruptcy in Canada.

The data on electronic bankruptcy filings for 2003-2007 suggests that the majority of households declaring bankruptcy are renters. Consistent with what Domowitz and Sartain (1999) find for the U.S., about 20% of filers own a home, about the same percentage as those who own a mortgage.

Table 1 provides information on the main categories of creditors; banks (including mortgages, personal loans, bank-issued credit cards), non-bank issued credit cards (which includes retail chains such as Wal-Mart, Circuit City, etc.), government, other finance companies (including companies such as the Canadian subsidiary of Well's Fargo, Investor Group, payday lenders, and auto finance companies) and other creditors (such as medical expenses, lawyers etc.).

We observe that banks are the major creditors, followed by non-bank credit card issuers. Bank

debt therefore plays mayor role in determining household bankruptcies.

Table 1: **Breakdown of Liability Types on Bankruptcy Filers' Portfolios (2003-2007).** *Other* includes loans to individuals, lawyers, doctors, businesses. Since the CFM survey does not contain information on liabilities to the government, payday loans or other types of non-financial debt, these categories are excluded.

Category of Creditor	2003	2004	2005	2006	2007
Panel A: Bankruptcy Filers					
Bank	33.35	33.83	34.93	36.08	36.84
Other financial	16.30	15.69	14.77	13.69	13.27
Non-bank Credit Cards	19.45	19.81	19.70	19.69	20.00
Government	12.35	13.15	13.14	13.24	12.77
Payday Lenders	1.31	1.37	1.86	1.91	2.02
Other	17.23	16.15	15.60	15.39	15.04
Panel B: CFM Respondents					
Bank	71.77	72.94	73.01	73.58	81.84
Other financial	2.82	2.88	2.80	3.01	2.73
Non-bank Credit Cards	25.41	24.17	23.39	23.41	15.42

Figure 3 plots the distribution of both the level and growth rates of bankruptcy filings across our relevant markets in the treatment and control groups pre-merger. In terms of the number of filings there are slightly more filings per 1,000 people in the control group pre-merger than in the treatment group. The growth rate in both the treatment and control groups are nearly identical.

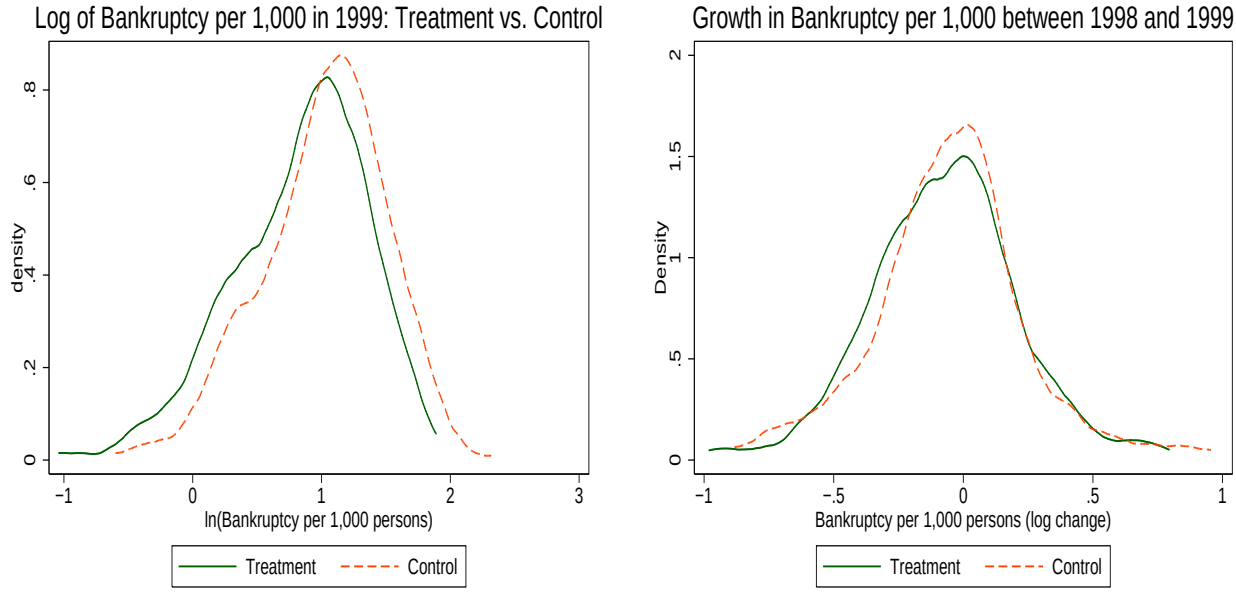
3.2 Data on all Canadian households

We supplement the data on bankruptcy filings with the *Canadian Financial Monitor* (CFM) survey to identify and control *for local credit market patterns*. This is a bi-annual Ipsos-Reid administered repeated cross-sectional survey that started in 1999.[24] The survey asks approximately 12,000 respondents a wide variety of questions on their finances. Unlike the bankruptcy data, CFM respondents are more likely to be homeowners and around 50% of these homeowners fully own their home. Table 1 provide some statistics related to the creditors of households in this survey.

It is difficult to get a full picture of CFM respondents' liability portfolios, given that the survey does not ask about "non-financial" debts, such as taxes owed, payday loans, etc. However, as shown

[24] We also use census data which happens every 5 years in Canada to get population figures at the FSA level as well as information on income, housing and rental costs, housing characteristics, and average borrower characteristics such as age, education, and financial literacy.

Figure 3: **Distributions of Bankruptcy Filings Pre-Merger**



in Table 1 survey participants use more bank debt in relation to non-bank credit cards and other financial institutions. While non-bank credit cards form 20% of all liabilities of bankruptcy filers, they correspond to around 23% of the "purely financial debt" portfolio in the CFM sample.

3.3 Unit of analysis and relevant banking market definition

Our main unit of analysis is a "forward sortation area" (FSA), which is the first three digits of the six-digit Canadian postal code. For urban areas, a small or middle-sized city is usually covered by a single FSA, while larger cities have more than one FSA assigned to them. The average number of households served by an FSA is approximately 7,000, but the number can range from zero to more than 50,000 households. Out of the 1,610 FSAs in Canada, we drop those that are too sparsely populated (for example, industrial areas), too small (less than 2 square kilometers) or too large (larger than 25π square kilometers). This leaves 1,224 FSAs. From this we also drop 21 FSA-financial districts. Finally, we drop FSAs where the overlap between the treated markets and

control markets is not sufficiently close, where close is defined in terms of the number of banks. In our baseline specification this leaves 637 FSAs.

We define the relevant banking market as the circular area within a radius of $x \in \{3, 5, 7\}$ kilometers of the centroid of each FSA.[25] Hence, each FSA (or area) has a unique relevant banking market, and a given branch can be part of the relevant banking market of different FSAs.

Table 2: **Local Banking Market Statistics**

	Control Before				Control After			
	Mean	SD	p(25)	p(75)	Mean	SD	p(25)	p(75)
Bankruptcy/1,000	3.2	1.4	2.2	3.9	3.1	1.3	2.2	3.9
Asset/Debt	0.28	0.17	0.15	0.36	0.25	0.14	0.14	0.31
Bank branches	17.2	18.1	5.8	21	14.2	13.9	5.33	16
Bank branches/1,000	1.5	2.7	0.4	1.5	1.3	2.4	0.4	1.3
Banks	6.4	1.7	5	8	6.1	1.6	5	7.3
Population	17,534	10,345	10,315	23,012	17,108	10,599	9,494	22,704
Income	$52,436	$13,627	$43,131	$59,723	$58,103	$15,990	$47,430	$66,217
	Treatment Before				Treatment After			
	Mean	SD	p(25)	p(75)	Mean	SD	p(25)	p(75)
Bankruptcy/1,000	2.7	1.1	1.8	3.4	2.9	1.3	1.9	3.7
Asset/Debt	0.23	0.14	0.14	0.31	0.25	0.14	0.15	0.32
Bank branches	25.1	18.2	13	32.5	23.8	16.7	13	30
Bank branches/1,000	1.5	1.9	0.5	1.7	1.5	1.8	0.5	1.7
Banks	7.9	1.1	7	9	6.9	1.2	6	8
Population	23,662	12,260	14,797	31,678	23,515	12,345	14,497	31,678
Income	$59,040	$14,883	$49,641	$69,681	$66,307	$17,933	$53,678	$77,599

Table 2 presents some descriptive statistics related to our definitions of unit of analysis (FSA) and the relevant local banking markets. We present the data in terms of the four groups - control pre- and post-merger and treated pre- and post-merger.[26] By construction, there are more banks in the treated markets than the control. There are also more branches – pre-merger the mean number of branches in the control is 17.2 versus 25.1 in the treated markets. The treated markets are also more populated and have higher income, consistent with them being more urban. The treatment

[25] Hence, we are assuming that households live in the center of the FSA and that their relevant bank options are those at a radius x of this center of the FSA. A more precise definition would require drawing the circle among each household primary residence, however we do not have all relevant information for this level of precision.

[26] Pre-merger is the average of the 2 years before the merger (1998 and 1999) and post-merger is the average of the 2 years after the merger (2001 and 2002).

areas also have ex-ante lower consumer bankruptcy rates than the control areas, ruling out that the merger was targeting disinvestment in areas with worse economic conditions. A more in depth analysis of the treatment and control areas show that pre-merger they do not show any differences in consumer bankruptcy rates. A more in depth analysis of other market conditions post-merger is done in our empirical analysis section where we show that other relevant variables such as credit characteristics, consumers' characteristics, income, etc follow the same trend in treatment and control markets pre- and post-merger.

Given the amount of respondents of the CFM (12,000) and our fine local market definition when using CFM related data some FSAs have no respondents. One possibility is to limit our attention for those FSAs for which we have CFM respondents in the FSA (which reduces the amount of FSAs in our sample and could create a potential selection bias against smaller FSAs).[27] Another option is to expand our market definition when using CFM information. In our empirical analysis we choose the former option. It must be highlighted that results are (qualitatively) robust to changes in the relevant branching market definition or the different samples that data limitations impose.

4 Empirical Analysis

This section explains the nature of the empirical sample and the key identification strategy.

4.1 Sample choice

We empirically analyze the effects on consumer bankruptcy rates resulting from the TD-Canada Trust merger in 2000. For the purposes of this study, the TD-Canada Trust merger has the interesting feature of a bank known for branch-based soft information intensive business model, Canada Trust, being incorporated into an institution that depended more on hard information, TD. If some of the soft information used by Canada Trust prior to the merger was lost during the reorganization of the newly merged institution, default rates of customers could have been affected by this loss. This loss can happen because of internal reorganization lending to staff and

[27] We analyze this potential bias in section 5.1 and we do not find that restricting our sample creates biases in our results.

managerial changes, because of consumers switching banks or both. As we will show in our results, there is evidence in line with customers switching banks, either by choice or due to their inability to continue borrowing from TD-Canada Trust after the merger.

4.2 Empirical Strategy

Our empirical strategy relies on a key identifying assumption: when two national firms merge the changes to local banking market conditions can be viewed as exogenous to local area (FSA) factors, particularly in the short run. This strategy has been previously used, among others, by Sapienza (2002) to analyze the impact of mergers in Italy on business lending and, in a paper more closely related to ours, Allen et al. (2013) for mortgage lending in Canada. There are many reasons why banks might merge, ranging from economies of scale, economies of scope, and credit management. Importantly for our identification strategy is that these decisions are exogenous to the idiosyncratic area (FSA) factors set in place the pre-merger location of bank branches.

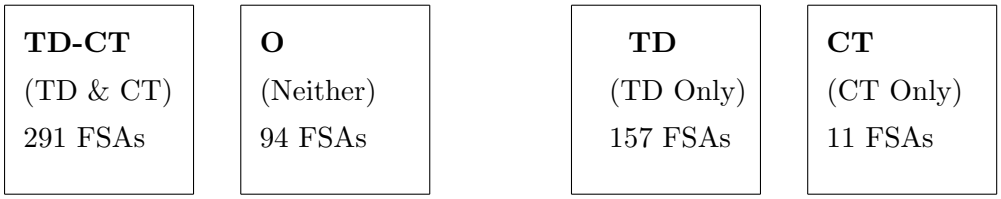
In our analysis we follow a difference-in-difference approach. In order to examine the impact of these mergers on consumer bankruptcies, we first determine the treatment and control groups. To define the set of consumers directly exposed to the merger we assume that consumers do their banking within a neighborhood of fixed radius around the center of their FSA. Our preferred specification uses a radius of 5KM although we also present results with neighborhoods defined using a 3KM and 7KM radius for robustness.[28] The treatment group is therefore defined as the set of FSA where both merging banks have at least one branch in a 5KM radius of the center of each FSA. The control group is the set of remaining FSA where either one of the merging banks have a branch or none of the merging banks have any presence. The separation of the FSA in the sample into the treatment versus control groups for both mergers is illustrated in Figure 4. As seen in Figure 4, the FSAs in our sample are divided into four categories. "TD-CT" are the FSA where both merging institutions had at least one branch within 5KM from the centroid of the FSA. Areas "TD" and "CT" are those FSAs where only one of the merging institutions were present within

[28] Allen et al. (2013) show that for Canada 5KM appears to be a reasonable assumption for a market definition as about 80% of Canadians shop (for their mortgage at least) in a neighborhood of 2KM from their home. Furthermore the same paper also shows that the majority of households bank only at one financial institution and it is therefore also reasonable to assume this definition holds for other products.

5KM. Areas "O" are those FSA where neither merging institution had a branch. The treatment group is the set of "TD-CT" areas, since these are most directly impacted by the merger. FSAs in "TD", "CT" and "O" are the control group since they are not directly affected by the merger.

Figure 4: **Allocation of FSAs into "treatment" and "control" groups**

The "treatment" group is "TD-CT" and the "control" group consists of "TD", "CT" and "O". The number of FSAs in each category is provided for the year immediately preceding the acquisition using a 5km radius around the centroid of the FSA.



Our construction of the treatment and control groups can potentially create some biases coming from using FSAs where the control and treatment groups do not resemble each other. The most important potential source of bias is that, by construction, pre-merger the number of banks in the treatment areas are greater than in the control markets. In order to be included in a treatment the relevant banking market has to have at least 2 banks, however this is not the case in order to be included as a control FSA. This difference in the banking intensity could be correlated with bankruptcy rates, for instance, with neighborhoods having fewer banks the result of poor economic conditions. A similar construction bias happens when we explore highly competitive areas (those with more than 10 banks present). If there are more than 10 banks it is very improbable that two big banks do not have a branch present which biases the construction in favor of the treatment group. We therefore restrict the set of neighborhoods to be those with 4-9 banks.[29]

[29]It should also be noted that in our empirical analysis we also control for FSA fixed effects. This aims to capture any time invariant differences across the FSAs in order to limit the potential biases emerging from our definition of treatment and control markets. We also control for other potential relevant variables such as average income or age.

5 Empirical results

In this section we present our main empirical findings. Section 5.1 shows how the TD-Canada Trust merger led to a temporary increase in the bankruptcy rates of consumers in those local markets that were directly affected by the merger. This is the main result. Once this result is established we provide evidence consistent with the reason underlying the increase in consumer bankruptcies being the destruction of soft information caused by the merger. We then analyze in the following subsections other potential mechanisms, explained in section 4, and do not find evidence consistent with them being the cause.

5.1 Consumer Bankruptcy Rates

We first analyze the effect of the merger on consumer bankruptcy rates in local markets. We estimate different specifications of the following difference-in-difference regression:

$$Bankrupt_{it} = \alpha_1 \cdot Treatment_i \cdot Post_t + \alpha_2 \cdot Post_t + \alpha_3 \cdot Treatment_i + \mu_i + \gamma_t + \epsilon_{it}, \qquad (1)$$

where $Bankrupt_{it}$ is the number of bankruptcies per thousand individuals in FSA i at time t. $Treatment_i$ is a dummy variable for the "TD-CT" FSAs, i.e., those FSAs in which both merging institutions had a branch in their relevant banking market prior to the merger (and is absorbed into the FSA fixed effect, μ_i when these are included in the regression). The control markets are therefore markets with either only TD or only CT or neither pre-merger.[30] $Post_t$ takes the value of one for the post-merger period and 0 otherwise. $Treatment_i \cdot Post_t$ captures the merger effect in the post-event period and is the main variable of interest. The coefficient α_1 captures the difference in the bankruptcy intensity post-merger between the "merger" and the "non-merger" FSAs. In order to capture any time invariant difference across FSAs we include FSA fixed effects μ_i. We also cluster the standard errors at the FSA. For robustness we also include specifications with

Section 5.4 undergoes an in depth analysis of the credit conditions in both markets before and after the merger and show that market characteristics like average age, income, employment status, etc. do not follow different trends.

[30] In analysis not provided here we also consider as control using only markets with only TD or neither (markets with only CT are too few). The results are qualitatively similar for both controls, which is why we combine them here.

time-varying FSA-level socio-economic variables, such as income. We also include year dummies γ_t to capture any potential aggregate trends in bankruptcy patterns and interact the time trend with a rural/city indicator to allow for potential differences in time trends between cities and rural markets.[31] In calculating the pre- and post-merger periods, we eliminate the year of the merger, 2000, from the analysis given that the merger took place *during* the year. We then consider two different specifications for the pre- and post-merger "windows": (i) two years before and two years after the merger, and (ii) two years before and three years after the merger. We include (ii) in our analysis because consumer bankruptcy is not instantaneous and the impact of the merger on bankruptcies may take time to appear. For example, mortgages in Canada are typically 5 years in length, although most defaults happen within a year after closing. Canadian mortgages are also special relative to the U.S. in that borrowers can port them. That is, mortgages are attached to the person, not the house, and people can move homes and banks within 5 years. In addition most personal loans are 3-5 year terms. Credit cards are by their nature short-term loans. The downside of having a long post-event window is the possibility of including factors unrelated to the merger, confounding the results. Specification (i) attempts to minimize such confoundedness.

The results presented in Table 3 show that the TD-Canada Trust merger is associated with an increase in bankruptcy rates in the areas in which both institutions had overlapping branches pre-merger. The merger led to an increase in the average bankruptcy rate of between 5.8% and 13.6% over 2-3 years, depending on the specification. The impact of the merger, therefore, is an increase in the number of bankrupts of about 3-8 people per 10,000. This is not insignificant, given the low bankruptcy rates in Canada, with less than 100,000 Canadians filing per year.[32]

The increase in bankruptcy rates caused by the merger translates into an average cumulated

[31] This also allows for differences in transaction costs correlated with distance, e.g. (Agarwal and Hauswald (2010) and Degryse and Ongena (2005)).

[32] As a robustness check, we also used a propensity score matching (PSM) approach to estimate the impact of the merger on bankruptcy rates (available upon request). This approach starts with the estimation of a logit model, where the dependent variable takes the value of one if the FSA is in the treated group. The independent variables in this regression were chosen among the census variables used in columns (vii) and (viii) of Table 3, along with the local market banking variables in Table 2. We then obtained and sorted the predicted probabilities of being exposed and matched each FSA to its closest neighbor from the opposing group. The mean difference in the bankruptcy rates for each matched pair of FSAs yields the average treatment effect (i.e. the impact) of the merger on bankruptcy rates. The point estimates we obtained were quite similar to the coefficients in Table 3, while the significance was slightly weaker (although the impact was still statistically significant).

Table 3: **Impact of the TD-Canada Trust Merger on Bankruptcies per Capita.**

Dependent variable: log of bankruptcy filings per 1,000 residents in an FSA. The year of the merger (2000) is excluded from the analysis. Treated markets are defined as markets where both TD and Canada Trust had at least one branch within 5 kilometers from the centroid of the FSA. The pre-merger period is always 98-99. All regressions include year and FSA fixed effects. The number of observations is lower for the regressions including census variables due to data availability issues. Some specifications include rural-time fixed effects to allow for the possibility of different trends in cities versus rural neighborhoods. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1%, ♭ is significant at 5% and * is significant at 10%.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Treat*Post	0.074†	0.098†	0.107†	0.136†	0.058♭	0.085†
	(0.022)	(0.021)	(0.024)	(0.023)	(0.025)	(0.024)
Post	0.013	0.036*	-0.098†	-0.090†	-0.030	-0.022
	(0.020)	(0.020)	(0.025)	(0.023)	(0.061)	(0.069)
Constant	0.923†	0.924†	0.994†	0.995†	8.389†	8.127†
	(0.011)	(0.012)	(0.012)	(0.012)	(2.852)	(2.815)
FSA FE	Yes	Yes	Yes	No	No	No
Rural-Time FE	No	No	Yes	Yes	No	No
Census Variables	No	No	No	No	Yes	Yes
After Window	01-02	01-03	01-02	01-03	01-02	01-03
Observations	2,218	2,776	2,218	2,776	2,130	2,663
R-squared	0.802	0.787	0.804	0.790	0.816	0.800

lost to lenders of up to $470,000. This is because pre-merger the total debt held by filers in treated markets is $4.81 million and there are on average 61 filers in a market. An increase of 13.6% is about 8 people over 3 years. Relative to the cost of operating a branch, which Radecki and Orlow (1995) reports to be about $700,000 annually, the losses are not large. Of course, branches also generate revenue, and are not only in markets to monitor vulnerable borrowers. Hence the decision of opening and closing branches in a merger process is not only driven by there potential effect on consumer bankruptcy.

Focarelli and Panetta (2003) suggest that when analyzing the effects of bank mergers longer post-event windows can be appropriate in order to capture the full effect of mergers. This analysis can be especially relevant when studying consumer bankruptcies given the timing of the bankruptcy process. Following their suggestions in Panel A of Table 4 we present rolling window regressions where we extend the post-merger period from 2001-2002 in column (i) to 2006-2007 in column

(vi). The immediate impact of the merger on bankruptcy rates is 7.4%. However, consistent with the bankruptcy of consumers not being instantaneous, the treated markets exhibit an increase in bankruptcy rates beyond that in the years immediately following the merger. There is no observable effect, however, 6 years after the merger takes place. This results highlight the fact that the effect of the merger on bankruptcy rates tends to be short-term, in contrast to the adoption of credit scoring methods which appear to have had a permanent effect on consumer bankruptcy (Dick and Lehnert (2010)).

Table 4: **Robustness Analysis of the Average Merger Effect on Bankruptcies per Capita**

Dependent variable: log of bankruptcy filings per 1,000 residents in an FSA. The year of the merger (2000) is excluded. Treated markets are defined as markets where both TD and Canada Trust had at least one branch within 5 kilometers from the centroid of the FSA. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and ♭ is significant at 5% and * is significant at 10%. All specifications include FSA fixed effects and year fixed effects. The coefficient on *Post* and *constant* are excluded for brevity.

A. [Alternative event windows]

	98/99-01/02	98/99-02/03	98/99-03/04	98/99-04/05	98/99-05/06	98/99-06/07
Treat * Post	0.074†	0.139†	0.123†	0.076†	0.009	-0.031
	(0.022)	(0.023)	(0.024)	(0.026)	(0.027)	(0.028)
Observations	2,218	2,212	2,213	2,213	2,204	2,192
R-squared	0.802	0.787	0.777	0.760	0.745	0.737

B. [Alternative neighborhood sizes]

	FSA + 3km		FSA + 5km		FSA + 7km	
Treat * Post	0.052♭	0.074†	0.074†	0.098†	0.083†	0.106†
	(0.021)	(0.020)	(0.022)	(0.021)	(0.022)	(0.021)
After Window	01-02	01-03	01-02	01-03	01-02	01-03
%-Treated	39.9%	39.9%	52.6%	52.6%	59.4%	59.4%
Observations	2,218	2,776	2,218	2,776	2,218	2,776
R-squared	0.801	0.786	0.802	0.787	0.802	0.787

Our results are also robust to different market sizes. Increasing the market size adds markets to the treatment group that potentially shouldn't be included whereas decreasing the market size removes markets from the treatment group that potentially should be included. Panel B of Table

4 highlights that the effect of the merger in the 3KM neighborhood is 5.2-7.4% and in the 7KM we estimate an effect of 8.3-10.6%. Overall, our estimate of the effect of the merger on consumer bankruptcy is robust to similar market sizes. Table 5 presents estimates of the impact of the merger on bankruptcy using a sub-sample of FSAs that is important to our analysis of the alternative mechanisms that underlie the merger effect. For some hypotheses we are constrained to using CFM survey data where the coverage is not as complete. This is important, for example, to construct total credit in a market. Table 5 shows that even if we omit these markets (either because we do not have enough loans in a year or a market) our main results on the effect of the merger leads to an increase in bankruptcy holds. Our main specification for the remainder of our analysis will be the 5KM neighborhood with FSA fixed effects. However, given the results in Tables 3, 4, and Table 5 the results are qualitatively similar across specifications.

Finally, an important assumption for using the difference-in-difference methodology is that bankruptcy rates would have evolved in a parallel fashion over time in treated and control markets absent the merger. We rule out the possibility of different trends by regressing quarterly bankruptcy rates on quarterly dummy variables interacted with the treatment variable.[33]

$$\begin{aligned} Bankrupt_{it} &= \alpha_1 \cdot Treatment_i \cdot D_{98q1} + \alpha_2 \cdot Treatment_i \cdot D_{98q2} + ... + \alpha_{24} \cdot Treatment_i \cdot D_{03q4} \\ &+ \beta_1 \cdot D_{98q1} + \beta_2 \cdot D_{98q2} + ... + \beta_{24} \cdot D_{03q4} + \psi \cdot Treatment_i + \mu_i + \gamma_t + \epsilon_{it}, \end{aligned}$$

where D_i is a dummy that takes the value of one for quarter i. The coefficient α_i can then be used to examine the trend of bankruptcies in the treated markets (at a quarterly level) during our sample period. If there is indeed a trend of increasing bankruptcy filings in the treated markets even before the crisis, we should expect a steady increase in α_i starting in 1998q1 and continuing throughout our post-merger period. Figure 5 shows the difference in bankruptcy rates between the treated and control groups for every quarter in our sample. Pre-merger the difference in bankruptcy rates is zero, and once the merger happens bankruptcy rates increase. Approximately 6 years post-

[33] While it might be more attractive to conduct all of our empirical analysis using quarterly (and not annual) data, bankruptcy filings is the only component of our dataset that is in quarterly frequency. All of the other data sources we use, such as branch locations, credit supply, loan rates, etc. are only available annually without the possibility of a conversion to quarterly frequency.

Table 5: **Average Merger Effect on Bankruptcies per Capita, Restricted Samples**

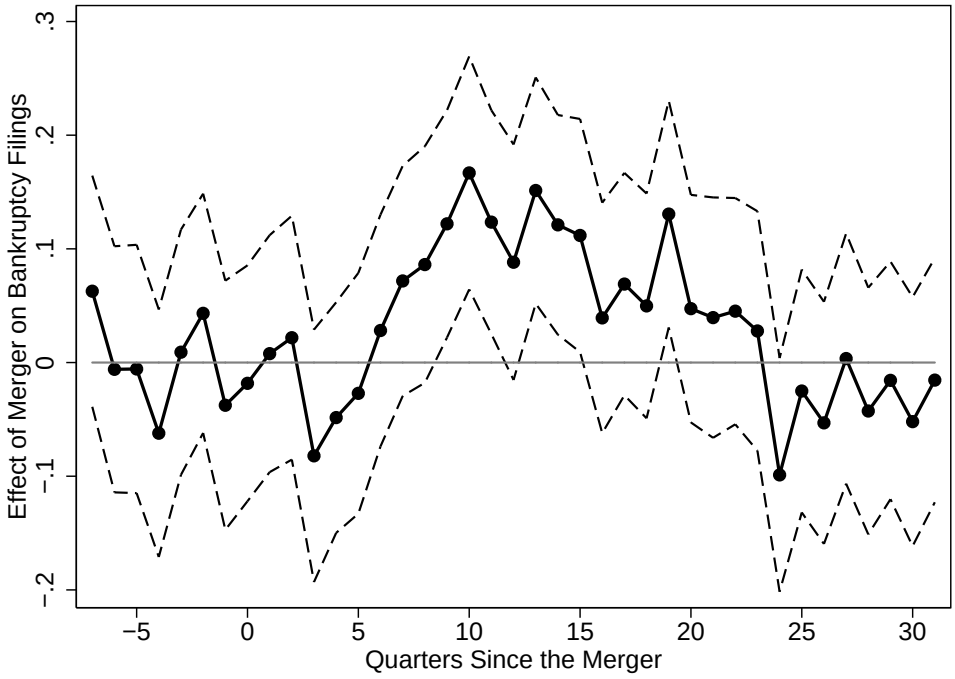
Dependent variable: log of bankruptcy filings per 1,000 residents in an FSA. The year of the merger (2000) is excluded. All specifications include FSA and year fixed effects. Treated markets are defined as markets where both TD and Canada Trust had at least one branch within 5 kilometers from the centroid of the FSA. "Supply (1)" and "Supply (2)" represent the two different credit supply measures. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and ♭ is significant at 5% and * is significant at 10%.

	(i)	(ii)	(iii)	(iv)	(v)
Treat * Post	0.125†	0.068♭	0.082†	0.117†	0.106♭
	(0.043)	(0.029)	(0.030)	(0.033)	(0.052)
Post	-0.108†	-0.030	-0.041	-0.039	-0.071*
	(0.035)	(0.024)	(0.025)	(0.028)	(0.042)
Constant	1.052†	0.995†	1.018†	0.948†	1.020†
	(0.017)	(0.012)	(0.013)	(0.014)	(0.019)
Restriction:	Supply (1)	Supply (2)	Loan Rate	Mortgage Rate	Borrower Info
After Window	01-02	01-02	01-02	01-02	01-02
Observations	384	1,132	896	776	504
R-squared	0.839	0.822	0.802	0.823	0.911
Treat * Post	0.076	0.106†	0.066♭	0.142†	0.121♭
	(0.050)	(0.028)	(0.032)	(0.032)	(0.048)
Post	-0.028	-0.002	0.027	-0.033	-0.050
	(0.050)	(0.025)	(0.028)	(0.031)	(0.049)
Constant	1.034†	0.994†	1.067†	0.969†	1.046†
	(0.024)	(0.014)	(0.017)	(0.016)	(0.020)
Restriction:	Supply (1)	Supply (2)	Loan Rate	Mortgage Rate	Borrower Info
After Window	01-03	01-03	01-03	01-03	01-03
Observations	300	1,257	805	740	538
R-squared	0.825	0.807	0.790	0.841	0.896

merger, however, the effect of the merger on consumer bankruptcy fades away. Although there are potentially many confounding factors for this, it is also consistent with the idea that soft information is time-intensive and therefore even though there is a short-run increase in mergers, in the long-run bank-consumer relationships are rebuilt.

We conclude that the TD Bank-Canada Trust merger led to a temporary increase in consumer bankruptcy rates in local markets directly affected by the mergers. In the following section we

Figure 5: **Results for the quarter-by-quarter difference in bankruptcy rates across treated and control groups**



analyze plausible mechanisms consistent with this finding.

5.2 Local Banking Structure and Bank-Consumer Relations

In this subsection we analyze the change in the local banking structure created by the merger and how it affected consumer-bank relationships. Mergers can distort consumer-bank relations in a number of ways. On the one hand the merger might lead to branch closures, increasing the distance between borrowers and lenders. In addition, a staff reorganization post-merger can disturb relationships (Hadlock et al. (1999) and Peek and Rosengren (1998)). Also customers might be more likely to switch banks following a merger (Kiser (2002)). This could be because of branch closures, however, among switchers the most common reason cited are emotional factors. Banks have used this in advertising. For example Canada-Trust launched a national campaign in 1997 to attract customers following Scotia Bank's acquisition of National Trust. This advertisement

was part of a Canada-Trust campaign trying to capitalize on those National Trust individuals that where unhappy with their trust being purchased by a bank. Another piece of suggestive evidence related to disturbance of consumer-bank relations leading to consumers switching is that in the CFM survey 22% of the consumers who identified Canada-Trust as their "main financial institution" in 1999 switched financial institutions by 2003. For those banks not involved in the merger the switching rate was 22% lower for the same period using the same CFM survey.

We first analyze whether the merger generated a change in the market share of merging banks in the treated areas. We calculate the total number of credit cards, loans, mortgages and personal lines of credit in each market and use these figures to calculate the market share of TD-Canada Trust pre- and post- merger. For the pre-merger period, individual market shares of TD and Canada-Trust are added to create a market share for "quasi TD-Canada Trust".[34] Using these market shares, we estimate:

$$y_{jt} = \alpha_1 \cdot Treatment_i \cdot Post_t + \alpha_2 \cdot Post_t + \alpha_3 \cdot Treatment_i + \mu_j + \gamma_t + \epsilon_{jt}, \tag{2}$$

where y_{jt} is the log transformed market share of TD and Canada Trust in area j at time t. The results in Table 6 show that TD-Canada Trust lost market share in treated markets post-merger. Independent of the underlying reason for such loss, and conditional on a constant aggregate supply of credit (which we show in section 5.3), TD-Canada Trust losing market share post-merger implies that some households stopped receiving loans from TD-Canada Trust. This disruption of bank-consumer relationship creates a lost of soft information independently of these households being able to obtain credit from another institution or not.

We now analyze impact of the merger on the possibility of restructuring of bank branches post-merger. It has been well established in the literature that the distance to the borrower matters for the riskiness of the loan.[35] If there was a higher rate of branch closure in those markets affected by the merger then these could affect the bankruptcy rates of consumers. Branch closures increase the distance between banks and consumers, and also reduces the amount of effective locations in

[34] We weight each observation based on the total number of loan products in the market, since the number of loans/survey respondents in each market can differ substantially by market size.

[35] See Petersen and Rajan (2002), among others.

Table 6: **Average Merger Effect on the Market Share of TD-Canada Trust**

Dependent variable: loan count-based market share of TD-Canada Trust market i at year t, calculated using CFM data and log transformed ($y = ln(x/(1-x))$). Only FSAs with more than 50 loan products in any category in a given year are included as valid observations. The sample is limited to one year before and two years after the merger (1999 and 2001-2002). The year of the merger (2000) is excluded. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and $*$ is significant at 10%.

	All Liabilities	Credit Cards	Mortgages
Treat * Post	-0.119†	-0.212†	-0.245†
	(0.011)	(0.013)	(0.049)
Post	0.019*	-0.045†	0.207†
	(0.011)	(0.013)	(0.043)
Constant	-2.253†	-2.499†	-1.424†
	(0.004)	(0.004)	(0.016)
Observations	499	487	356
R-squared	0.779	0.740	0.700

which soft information can be gathered. We estimate the following regression:

$$\log(1+Branches)_{it} = \alpha_1 \cdot Treatment_i \cdot Post_t + \alpha_2 \cdot Post_t + \alpha_3 \cdot Treatment_i + \mu_{FSA,i} + \gamma_t + \epsilon_{it}, \quad (3)$$

where $Branches_{it}$ is the number of bank branches per 1,000 residents within x KM of FSA i, at the beginning of year t.[36] The results from Table 7 show that the treated areas have a slightly higher branch closure rate than the control markets. We can see how this is because TD-Canada Trust closed branches, whereas competitors were not closing as many branches in the treatment areas as in the control areas. The fact that TD-Canada Trust closed branches in the treatment areas at a higher rate than in the control areas could be due to a lost of customers in those areas or due to efficiency factors. Although we are not able to distinguish why branches were closed in areas affected by the merger, we have been able to identify how in those areas there was a loss of customers and a reduction of bank branches by the merging banks. Independent of what is the underlying cause both result in a final disruption of consumer-bank relationships.

We next use the branch density in each local market pre-merger to analyze whether it played

[36] For the TD-Canada Trust merger, we exclude the 21 FSAs located in the three geographical markets where TD was required to divest its branches as a condition of the approval of the merger.

Table 7: **Average Merger Effect on the Availability of Branches**

Dependent variable: log of branches per 1,000 for all banks, for TD-Canada Trust, and all banks other than TD-Canada Trust. The year of the merger (2000) is excluded. All specifications include FSA and year fixed effects. "Whole Sample" and "Sampling" represents the two different methods used to create the new credit supplied data, as discussed in the text. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and ♭ is significant at 5%.

	All Banks		TD-Canada Trust		All Other Banks	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Treat * Post	-0.022†	-0.024†	-0.054†	-0.073†	0.004	0.020†
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Post	-0.035†	-0.032†	-0.012†	-0.007♭	-0.023†	-0.029†
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.612†	0.611†	0.171†	0.171†	0.512†	0.514†
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
After Window	01-02	01-03	01-02	01-03	01-02	01-03
Observations	2,178	2,726	2,178	2,726	2,178	2,726
R-squared	0.994	0.995	0.955	0.938	0.990	0.988

a role, by creating opportunities for switching, in explaining post-merger bankruptcy rates. This analysis allows us to determine markets in which consumers had greater opportunities of switching banks because competing banks had a higher relative branch presence. We argue that when consumers have more switching options the destruction of soft information in the market will be higher. This analysis also allows us to differentiate markets that were relatively more affected by the merger in general from those in which relatively more soft information consumers, CT costumers, were affected. As pointed out by Karceski et al. (2005), among others, mergers can have a larger effect on the the target bank, in our case CT. It should be noted that CT is also the bank suffering a higher "emotional" cost for its consumers as it is the one acquired.

For this analysis we differentiate the treatment markets into four different groups based on pre-merger branch presence market shares: (i) those markets in which pre-merger CT had above median market share but overall $TD-CT$ combined had below median market share ($HighCT-LowTDCT$), (ii) markets in which CT had above median market share and combined $TD-CT$ also above median market shares ($HighCT-HighTDCT$), (iii) markets in which CT had below

median market share and combined $TD-CT$ above the median ($LowCT-HighTDCT$), and (iv) markets in which CT had below median market share and combined $TD-CT$ had below median market share.

From Table 8, we see that in line with our hypothesis that the bankruptcy rates post-merger are higher in those markets in which competitors had a higher branch density which allows for lower switching cost. Importantly we find that those markets that exhibit higher consumer bankruptcy rates are those in which the acquired costumers represent a higher relative fraction of the market and have higher options to switch (High CT-low TDCT). The bankruptcy rates in these markets are more than twice those of markets in which there is a relative low presence of CT borrowers and low options to switch (Low CT-High TDCT).

Having established a link between soft information and consumer bankruptcy, we now explore other potential mechanisms that may be valid explanations for the rise in consumer bankruptcy. We ultimately do not find consistent evidence for these mechanisms being relevant in our analysis.

6 Alternative Mechanisms

So far we have presented evidence that the TD-Canada Trust merger led to an increase in consumer bankruptcies. This was our first result. We have argued that the mechanism for this relationship is the destruction of soft information. There are, however, some other explanations, for example, changes in credit availability, rates, borrower types, and organizational structure. We examine these alternative mechanisms below and find that they do not represent significant explanations for the observed increase in consumer bankruptcies following the TD-Canada Trust merger.

6.1 Aggregate Credit and Borrowers' Characteristics

There are a number of other plausible alternative explanations for why consumer bankruptcy rates might increase following a merger. One such possibility, as pointed out by Dick and Lehnert (2010) and Livshits et al. (2011), is a change in the supply of credit. In order to analyze if the merger led to a change in credit or to a change in bank risk appetite we study the evolution of credit in treated and control areas. We document that there was no change in aggregate credit due to the merger

Table 8: **Average Merger Effect on Bankruptcy Across Different Markets**

Dependent variable: log of bankruptcy filings per 1,000 residents in an FSA. The year of the merger (2000) is excluded. There are 169 treated markets in $HighCT-HighTDCT$, 20 in $HighCT-LowTDCT$, 71 in $LowCT-HighTDCT$, and 139 in $LowCT-LowTDCT$. The control markets are as in Table 3. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and ♭ is significant at 5%. The coefficient on *Post* and *constant* are excluded for brevity.

	HighCT-HighTDCT				HighCT-LowTDCT			
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Treat * Post	0.027	0.047*	0.027	0.047*	0.299†	0.316†	0.299†	0.316†
	(0.027)	(0.027)	(0.028)	(0.027)	(0.071)	(0.061)	(0.071)	(0.061)
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
After Window	01-02	01-03	01-02	01-03	01-02	01-03	01-02	01-03
Observations	1,515	1,897	1,515	1,897	1,088	1,364	1,088	1,364
R-squared	0.796	0.777	0.793	0.775	0.779	0.765	0.775	0.762

	LowCT-HighTDCT				LowCT-LowTDCT			
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Treat * Post	0.062*	0.098†	0.062*	0.098†	0.133†	0.150†	0.133†	0.150†
	(0.034)	(0.032)	(0.035)	(0.033)	(0.031)	(0.028)	(0.031)	(0.028)
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
After Window	01-02	01-03	01-02	01-03	01-02	01-03	01-02	01-03
Observations	1,403	1,757	1,403	1,757	1,392	1,745	1,392	1,745
R-squared	0.774	0.757	0.770	0.753	0.796	0.785	0.794	0.783

or in the (observable) characteristics of borrowers. For this analysis we use the CFM survey, which includes detailed information on loan characteristics, including information about the holder of the loan, the loan rate and the maturity and stream of payments. Unfortunately, the survey does not explicitly ask the respondents when the loan was initially issued. Given the available information, however, we are able to approximate when the loan issue date.[37] Using the constructed credit supply data, we calculate "new credit issued per capita", which is the amount of new loans per

[37] We do so by comparing the original amount of the loan to the stated current balance. This calculation is subject to many caveats, including whether or not the household is paying more than the required amount. This method is meant to be an approximation rather than a definitive registry for household loans in Canada. We do not use data on credit cards and personal lines of credit since we are unable to identify when those products were first issued. A discussion of the methodology used in order to retrieve when the loan was issued, is contained in the appendix.

We also limit the sample to those areas where we have data for at least three out of the four sample-years, guaranteeing that we have information both pre- and post-merger.

1,000 individuals, and re-estimate equation (2) where y_{it} is now new credit issued per capita.

Table 9: **Average Merger Effect on Quantity of Credit Supplied**

Dependent variable: log of loans per capita issued in FSA i at year t. The year of the merger (2000) is excluded. Only FSAs with more than the "Minimum No of Loans" in a given year are included as valid observations. For the "01-02" post-merger window, the sample is further limited to markets for which there is such credit supply data available for at least three of the four years in the sample. For the "01-03" window, FSAs with less than four out of five years of data are excluded. All specifications include FSA and year fixed effects. "Whole Sample" and "Sampling" represents the two different methods used to create the new credit supplied data, as discussed in the appendix. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1% and * is significant at 10%.

	Whole Sample		Sampling	
	(i)	(ii)	(i)	(ii)
Treat * Post	0.036	0.016	-0.065	0.059
	(0.150)	(0.164)	(0.174)	(0.165)
Post	-0.376†	-0.283*	0.088	0.160
	(0.128)	(0.151)	(0.151)	(0.155)
Constant	11.717†	11.842†	10.084†	10.110†
	(0.071)	(0.088)	(0.084)	(0.090)
Minimum No of Loans	5	5	1	1
After Window	01-02	01-03	01-02	01-03
Observations	384	300	1,134	1,257
R-squared	0.500	0.436	0.381	0.341

Results are presented in Table 9 and suggest that the TD-Canada Trust merger had no impact on the overall supply of credit. Overall, it appears that the merger did not lead to a noticeable change in the supply of credit in markets affected by the merger relative to markets unaffected by the merger. Hence, in contrast to Dick and Lehnert (2010), for example, we do not find that the observed increases in consumer bankruptcies in Canada was driven by an increase in credit supply.

Our result on the supply of credit also suggests that non-exclusive contracting is either not an important mechanism in our study, or that consumers did not borrow from both TD and Canada Trust pre-merger. Using household level from CFM we find that less than 0.5% of consumers borrowed from both financial institutions in the period before the merger, even though collectively the institutions market share was about 14%. This suggests that if the mechanism documented

in Degryse, Ioannidou, and von Schedvin (2013) did exist for Canadian consumers it was *ex ante* (maybe due to information available through credit bureaus) and uncorrelated with the merger.

Although the overall amount of credit in the treated market did not change, it could be that the risk characteristics of the borrowers changed (and hence their risk profile). We analyze whether the (observable) characteristics of the borrowers in the treated markets were affected by the merger. As in the previous regression we use CFM data and re-estimate equation (2) where y_{it} is now one of age, income, labor force participation, debt-to-income, total debt, or a self-employment indicator.[38]

Table 10 shows that in there is no consistent difference between the (observable) characteristics of the borrowers in a given area post-merger. Although we do not have measures of the overall riskiness of a borrower we can conclude that the observable characteristics (which normally are related to bankruptcy probabilities) of these individuals do not change. This finding is consistent with banks in our analysis using hard information techniques pre-merger that do not vary post-merger. This result is also consistent with banks not changing their risk profile post-merger. Hence, we do not find evidence of the merger affecting the overall supply of credit or banks granting loans to observably riskier individuals in our setup. This findings allow us to focus on mechanisms different to those proposed by Dick and Lehnert (2010) and others that rely on an extensive margin effect concerning changes in the observable risk profiles of consumers.

6.2 Loan Rates

We use data from the CFM survey to test whether the merger led to an increase in loan rates, which could explain the increase in bankruptcy.[39] Using the stated interest rates of "newly issued loans" identified from the CFM survey we calculate a weighted average of all loans issued in a given FSA i in year t. Given the differences in the nature of personal loans versus mortgages, we calculate separate average interest rates for each category. We re-estimate equation (2) for different loan rate spreads. For personal loans, we use the 1 year Canadian Treasury bill rate as the benchmark

[38] Results using other characteristics, e.g. education level, marital status etc. are similar and available upon request.

[39] Stiglitz and Weiss (1981) argue that due to moral hazard an increase in loan rates can result in an increase in the default probability of loans. Also the classical Merton (1977) study determines that higher interest payments can result in higher bankruptcies.

Table 10: **Average Merger Effect on Borrower Characteristics**

The year of the merger (2000) is excluded. Only FSAs with more than three unique borrowers in a given year are included as valid observations. For the "01-02" post-merger window, the sample is further limited to markets for which there is borrower data available for at least three of the four years in the sample. For the "01-03" window, FSAs with less than four out of five years of data are excluded. The pre-merger period is always 98-99. All specifications include FSA and year fixed effects. † is significant at 1% and ♭ is significant at 5% and * is significant at 10%.

	ln(Age)		ln(Income)		Labor Force		Debt-to-Income		ln(Total Debt)		Self Employed	
	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
Treat * Post	-0.018	-0.054	0.013	-0.023	-0.025	0.011	-0.002	0.113	-0.003	0.042	-0.034	-0.037
	(0.048)	(0.044)	(0.075)	(0.073)	(0.063)	(0.055)	(0.170)	(0.146)	(0.280)	(0.268)	(0.076)	(0.068)
Post	0.080♭	0.073*	0.095	0.130*	0.091*	0.044	0.228*	0.065	0.322*	0.192	0.066	0.103♭
	(0.039)	(0.038)	(0.067)	(0.074)	(0.052)	(0.048)	(0.132)	(0.130)	(0.189)	(0.239)	(0.057)	(0.050)
Constant	3.650†	3.653†	11.081†	11.070†	0.136†	0.155†	0.847†	0.900†	10.684†	10.695†	0.251†	0.240†
	(0.019)	(0.019)	(0.030)	(0.032)	(0.023)	(0.023)	(0.068)	(0.065)	(0.090)	(0.092)	(0.028)	(0.028)
After Window	01-02	01-03	01-02	01-03	01-02	01-03	01-02	01-03	01-02	01-03	01-02	01-03
Observations	506	539	505	536	506	539	505	536	506	539	506	539
R-squared	0.579	0.488	0.697	0.604	0.555	0.510	0.625	0.551	0.549	0.465	0.552	0.479

rate since most personal loans are short-term, while for mortgage loans, the benchmark rate is the 5 year Canadian government bond. Nearly all mortgages in Canada are renewed every 5 years.

Similar to the credit supply analysis, we consider two years pre-merger and two and three years post-merger (with the merger year excluded).[40] The estimation results are given in Table (11). They suggest that the merger did not have a significant impact on rates in the affected markets, except maybe a decrease in mortgage rates. Therefore, the possibility of this merger leading to increased loan rates in the treated markets (and hence to higher interest payments) and contributing to bankruptcies can be largely ruled out. Loan rates increase overall post-merger, but they do so in all markets. This could mean that the merger reduced competition but that prices are set at a national level and the effects on prices are across both the treatment and the control markets. Given our estimation technique we cannot rule out that there is a national effect on consumer bankruptcies that depends on the loan rates, however, the higher increase in bankruptcies in the treatment markets, cannot be explained by a difference in loan rates.

Table 11: **Average Merger Effect on the Rates of Newly Issued Loans**

Dependent variable: spread between the newly issued loan rate and a benchmark rate. For personal loans the benchmark is the 1 year Canadian , while the 5 year Canadian government rate is the benchmark for mortgages. The year of the merger (2000) is excluded. Only FSAs with more than the "Minimum No of Loans" in a given year are included as valid observations. For the "01-02" post-merger window, the sample is further limited to markets for which there is loan rate data available for at least three of the four years in the sample. For the "01-03" window, FSAs with less than four out of five years of data are excluded. The pre-merger period is always 98-99. All specifications include FSA and year fixed effects. † is significant at 1% and $*$ is significant at 10%.

	Personal Loans		Mortgages	
	(i)	(ii)	(i)	(ii)
Treat * Post	29.247	55.395	-25.098	-31.433*
	(44.121)	(46.887)	(18.720)	(18.040)
Post	70.326*	141.479†	36.195♭	59.857†
	(39.204)	(42.090)	(15.924)	(14.659)
Constant	316.052†	300.436†	90.056†	91.078†
	(24.547)	(26.906)	(10.124)	(11.945)
After Window	01-02	01-03	01-02	01-03
Observations	900	805	776	740
R-squared	0.327	0.297	0.311	0.249

[40] We run the two post event windows for internal consistency of the analysis. However, we acknowledge that the effect of the merger on prices should happen in a shorter amount of period than that of defaults.

Overall, the total number of bank branches does not change in treated markets relative to the control, and neither does credit or loan rates. Our results are consistent with models in which the primary driver in order to determine the price and quantity in the market is the capacity of the supply, for example the Cournot model. In such models when there are no changes in the overall supply we should not expect to see a change in equilibrium loan rates or quantities.

6.3 Hierarchical Change

We analyze if there were major changes in the organizational structure of TD-Canada Trust that could drive consumer bankruptcies. We compare changes in consumer bankruptcies in those FSAs in which TD was part of the relevant market to those areas in which TD was not present. That is, we change the definition of the treatment and control group. In order not to confound results with a disruption of bank borrowers relations we focus on those FSAs in which TD and CT do not overlap. Our treatment group are those markets in which TD has a branch but it does not overlap with CT and the control groups are those FSAs in which TD did not have a branch prior the merger. The treatment effect should therefore capture any TD-specific structural changes. We re-estimate equation (1) with our new definition of treatment and results are presented in Table 12. The results suggest that there is no difference in consumer bankruptcy changes across treatment and control groups. This allows us to rule out that the increase in consumer bankruptcy rates comes from a change in the organizational structure of TD bank.[41]

Overall, our results suggest that the change in bankruptcy levels was triggered by a reallocation of borrowers between banks. Given that neither the quantity of credit supplied nor the characteristics of the borrowers nor the loan rates changed in the affected markets, the increase in the bankruptcy rates must have been caused by an increase in the default probability of existing borrowers (i.e. the "intensive margin").

[41] We are unable to run the same regression concerning CT as there are not enough markets in which CT was present and TD was not. Hence, unfortunately we are not able to rule out a change in the organizational structure of CT Trust after the merger. However, as shown in section 5.4 we can rule out that this organizational restructuring changed the targeted customers of the institution.

Table 12: **Average Merger Effect on Bankruptcies per capita; Alternative Treatment Group**

Treatment: FSAs with TD branches within 5 KM of the centroid (TD). Control: FSAs with Canada Trust or other bank branches within five kilometers (CT and O). Dependent variable: log of bankruptcy filings per 1,000 residents in an FSA. The year of the merger (2000) is excluded. All specifications include FSA and year fixed effects. The year of the merger (2000) is excluded from the analysis. The pre-merger period is always 98-99. Heteroscedasticity-robust standard errors are given in parentheses. † is significant at 1%.

	(i)	(ii)
Treat * Post	-0.041	-0.018
	(0.034)	(0.032)
Post	-0.001	0.014
	(0.031)	(0.031)
Constant	1.024†	1.026†
	(0.015)	(0.017)
Treatment	TD Only Markets	TD Only Markets
Control	Other and CT Only	Other and CT Only
After Window	01-02	01-03
Observations	1,060	1,329
R-squared	0.774	0.759

7 Conclusion

This paper explores the determinants of consumer bankruptcy, focusing on consumer-bank relationships and soft information. We analyze the (exogenous) change in local market conditions created by a merger between two major Canadian lenders in 2000. We find that local markets that were affected by the merger exhibit a temporary increase in consumer bankruptcy post-merger in relation to those markets not affected by the merger.

The mechanisms by which a merger between banks can affect consumer bankruptcies are diverse. After analyzing various plausible mechanism we conclude that, in our case the merger disturbed the lending relationships between the merging institution and its borrowers. Consistent with this mechanism we find that (i) the merging institution closed branches and lost market share in the affected markets post-merger at a higher rate than in the control market (ii) consumers affected by the merger were more prone to switch banks after the merger and (iii) those markets in which

soft information intensive consumers were prevalent and faced lower switching costs exhibit higher increase in consumer bankruptcy rates. This finding highlights the importance of local banking conditions in determining consumer bankruptcies.

Although the nature of our study abstracts from the nature of the bank merging decision it shows the consequences of such decisions on consumer bankruptcy rates in affected markets. This study highlights the importance of soft information that banks obtain through lending relationships. Decisions that lead to weaker borrower-lender relations such as a merger, but also hard information-based regulation or hierarchical restructuring, can result in a destruction of soft information and lead to an increase in consumer bankruptcy. These results can be especially important in periods of intense bank restructuring, like those following the current financial crisis.

Appendix: Constructing Credit Supply

To construct a measure of credit supply we approximate when a household loan was issued by comparing the original amount to the stated current balance. We use this methodology for 12 years of CFM surveys (1999-2010) and identify the loans and mortgages that appear to have been originally issued in each year between 1999 and 2006. Aggregating the original loan amounts at a market level forms our "quantity of credit supplied" data. Even though the CFM survey includes population weights, we still do not have sufficient survey respondents to calculate credit supply at the FSA level. Instead, we construct a somewhat larger market measure in order to calculate the supply of credit. This larger market definition is based on Canada Post's definition and usage of FSAs. Most municipalities in Canada are served by more than one FSA, while small urban and rural areas are covered by a single FSA. The number of FSAs that cover a municipality ranges from two to 156. We treat municipalities that are covered by 13 or fewer FSAs to be a single market. The remaining large urban areas that are covered by 14 or more FSAs (there are 15 such municipalities) are divided into sub-markets consisting of anywhere between 7 and 13 FSAs.[42] For example, the Greater Toronto Area, which consists of 156 FSAs, is divided into 18 such sub-markets. The quantity of loans supplied data from CFM is aggregated at this market level. Overall, there are 632 markets with reliable credit supply data. Given the nature of CFM-based methodology, the approximated issue years of our sample is somewhat skewed. This is because we can only draw on 5 years of CFM surveys to identify loans that were issued in 2006 (2006-2010), while we can use all 12 years of CFM surveys to identify loans that were originated in 1998. Accordingly, we adopt two different approaches:

- Stack all year-market observations (Whole Sample)
- Identify the year between 1999 and 2006 with the lowest number of loans identified from CFM and randomly sample the same number of loans from all other years to create a sample with a uniform number of loans (Sampling Method)

[42] While dividing these cities into sub-markets we took care to pay attention to obvious divisions between different parts of cities, such as major highways, rivers, bays, etc.

References

Adelino, M., K. Gerardi, and P. Willen (2013). Why don't lenders renegotiate more home mortgages? redfaults, self-cures, and securitization. mimeo.

Agarwal, S. and R. Hauswald (2010). Distance and private information in lending. *The Review of Financial Studies 23*, 2757 – 2788.

Allen, J., R. Clark, and J. F. Houde (2013). The effect of mergers in search markets: Evidence from the Canadian mortgage industry. Forthcoming *American Economic Review*.

Beck, T., B. Büyükkarabacak, F. Rioja, and N. Valev (2012). Who gets the credit? and does it matter? household vs. firm lending across countries. *The B.E. Journal of Macroeconomics: Contributions 12*, 1–43.

Berger, A., R. Demsetz, and P. Strahan (1999). The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance 23*, 135–194.

Berger, A. and T. Hannan (1998). The efficiency cost of market power in the banking industry: A test of the "quiet life" and related hypotheses. *Review of Economics and Statistics 80*, 454–465.

Berger, A., N. Miller, M. Petersen, R. Rajan, and J. Stein (2005). Does function follow organizational form? evidence from the lending practices of large and small banks. *Journal of Financial Economics 76*, 237 – 269.

Berger, A. N. and G. Udell (1995). Relationship lending and lines of credit in small firm finance. *The Journal of Business 68*, 351 – 381.

Berger, A. N. and G. Udell (2002). Small business credit availability and relationship lending: The importance of bank organisational structure. *Economic Journal 112*, F32 – F53.

Bolton, P., X. Freixas, L. Gambacorta, and P. Mistrulli (2013). Relationship and transaction lending in a crisis. Economic Working paper 1385 Universitat Pompeu Fabra.

Dafny, L., M. Duggan, and S. Ramanarayanan (2011). Paying a premium on your premium? Consolidation in the health insurance industry. forthcoming *American Economic Review*.

De Meza, W. and D. Webb (1987). Too much investment: A problem of asymmetric information. *Quarterly Journal of Economics 102*, 281–292.

Degryse, H., V. Ioannidou, and E. von Schedvin (2013). On the non-exclusivity of loan contracts: An empirical investigation. Tilburg University, Center for Economic Research.

Degryse, H., N. Masschelein, and J. Mitchell (2011). Staying, dropping, or switching: The impacts of bank mergers on small firms. *Review of Financial Studies 24*, 1102–1140.

Degryse, H. and S. Ongena (2005). Distance, lending relationships, and competition. *Journal of Finance 60*, 231 – 266.

Deloitte (2010). Beyond day one: Minimizing customer attrition during mergers and acquisitions.

DeYoung, R., D. Evanoff, and P. Moyneaux (2009). Mergers and acquisitions of financial institutions: A review of the post-2000 literature. *Journal of Financial Services Research 36*, 87–110.

Dick, A. and A. Lehnert (2010). Personal bankruptcy and credit market competition. *The Journal of Finance 65*, 655 – 686.

Domowitz, I. and R. Sartain (1999). Determinants of the consumer bankruptcy decision. *The Journal of Finance 54*, 403 – 420.

Edelberg, W. (2006). Risk-based pricing of interest rates for consumer loans. *Journal of Monetary Economics 53*, 2283 – 2298.

Ergungor, O. E. (2010). Bank branch presence and access to credit in low- to moderate-income neighborhoods. *Journal of Money, Credit and Banking 42*, 1321–1349.

Focarelli, D. and F. Panetta (2003). Are mergers beneficial to consumers? Evidence from the market for bank deposits. *American Economic Review 93*, 1152–1172.

Hadlock, C., J. Houston, and M. Ryngaert (1999). The role of managerial incentives in bank acquisitions. *Journal of Banking & Finance 24*, 221–249.

Han, S. and G. Li (2011). Household borrowing after personal bankruptcy. *Journal of Money, Credit, & Banking 43*, 491–517.

Hastings, J. (2004). Vertical relationships and competition in retail gasoline markets: Empirical evidence from contract changes in Southern California. *American Economic Review 94*, 317–328.

Hauswald, R. and R. Marquez (2006). Competition and strategic information acqusition in credit markets. *The Review of Financial Studies 19*, 967 – 1000.

Houde, J.-F. (2012, August). Spatial differentiation and vertical mergers in retail markets for gasoline. *American Economic Review 102*(5), 2147–2182.

Karceski, J., S. Ongena, and D. Smith (2005). The impact of bank consolidation on commercial borrower welfare. *Journal of Finance 60*, 2043–2082.

Keeley, M. (1990). Deposit insurance, risk, and market power in banking. *American Economic Review 80*, 1183 – 1200.

Kiser, E. (2002). Household switching behavior at depository institutions: Evidence from survey data. *Antitrust Bulletin 47*, 619 – 640.

Kruger, S. (2013). The effect of mortgage securitization on foreclosure and modification. mimeo.

Livshits, I., J. MacGee, and M. Tertilt (2011). Costly contracts and consumer credit. NBER working paper 17448.

Ongena, S. and D. C. Smith (2001). The duration of bank relationships. *Journal of Financial Economics 61*, 449–475.

Panetta, F., F. Schivardi, and M. Shum (2009). Do mergers improve information? Evidence from the loan market. *Journal of Money, Credit and Banking 41*(4), 673–709.

Peek, J. and E. Rosengren (1998). Bank consolidation and small business lending: It's not just bank size that matters. *Journal of Banking & Finance 22*, 799–819.

Petersen, M. (2004). Information: Hard and soft. mimeo.

Petersen, M. and R. Rajan (2002). Does distance still matter? The information revolution in small business lending. *The Journal of Finance 57*, 2533–2570.

Radecki, Lawrence J., J. W. and D. K. Orlow (1995). Bank branches in supermarkets. Current Issues in Economics and Finance, Federal Reserve Bank of New York (December 1996).

Sapienza, P. (2002). The effects of banking mergers on loan contracts. *The Journal of Finance 57*, 329–367.

Serra, J. (2008). Economic rehabilitation: Understanding the growth in consumer proposals. Office of the Superintendent of Bankruptcy Research Paper.

Stein, J. C. (2002). Information production and capital allocation: Decentralized versus hierarchical firms. *The Journal of Finance 57*, 1891–1921.

Stiglitz, J. and A. Weiss (1981). Credit rationing in markets with imperfect information. *American Economic Review 71*, 393 – 410.