Moral Hazard and Adverse Selection in the Originate-to-Distribute Model of Bank Credit*

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Abstract

Over the last two decades, bank credit has evolved from the traditional relationship banking model to an originate-to-distribute model where banks can originate loans, earn their fee, and then sell them off to investors who desire such exposures. We show that the borrowers whose loans are sold in the secondary market underperform other bank borrowers by between 8% and 14% per year on a risk-adjusted basis over the three-year period following the sale of their loan. Furthermore, they suffer a value destruction of about 15% compared to their peers over the same period. This effect is more severe for small, high leverage, speculative grade borrowers. There are two alternative explanations for this underperformance - either banks are originating and selling bad loans based on unobservable private information, similar to the events in the current subprime mortgage crisis, and/or the severance of the bank-borrower relationship allows the borrowers to undertake suboptimal investment and operating decisions, in the absence of the discipline of bank monitoring. Our results also show that borrowers whose loans are not sold in the secondary market do not underperform their peers, reinforcing the inference that bank loan financing is indeed "special", *except for borrowers whose loans are sold*. In light of these moral hazard and adverse selection problems, the originate-to-distribute model of bank credit may not entirely be "socially desirable". We propose regulatory restrictions on loan sales, increased disclosure, and a loan trading exchange with a clearinghouse as mechanisms to alleviate these problems.

JEL Classifications: G12, G18, G21, G32

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1. Introduction

The historic subprime mortgage crisis of 2008 has brought an important question sharply into focus – to what extent should bank credit be allowed to evolve from its traditional relationship banking model to the transaction oriented model that has largely emerged over the last two decades? This fundamental shift in banking has primarily been due to the explosive growth in the secondary syndicated loan and the credit default swap (CDS) markets.[1] The presence of these markets transforms bank credit to an "originate-to-distribute" model, where banks can originate loans, earn their fees, and then distribute it to other investors in a largely opaque manner. The demand for loans in the secondary market has also been fueled by securitization and the tremendous growth in the Collateralized Debt Obligations (CDO) and Collateralized Loan Obligations (CLO) funds, who have been major buyers of syndicated loans in the secondary markets.

This shift to the originate-to-distribute model of bank credit has important implications for all market participants, including the originating banks, the participating investors, the borrowing firms and the regulators. The banks' superior information about the credit quality of their loans gives rise to concerns about adverse selection – are the banks selling off loans about which they have negative private (unobservable) information? In a perfect market, this should lead to a breakdown of the loan secondary market due to the classic "lemon's" problem. This issue is important from the perspective of the participating investors – can they trust that the bank selling the loan is doing so due to private motives (like capital relief and risk management) rather than due to negative private information? Does it lead to moral hazard in terms of an impairment in the monitoring function of banks, thereby having a negative effect on the borrowers? For the borrowing firms, this raises an important question – are loan sales beneficial or detrimental to their long-term interests?

There are several policy questions that arise from this debate. Should the regulatory authorities restrict the originate-to-distribute activities of banks, and/or should they enforce enhanced disclosure of the banks' activities in the loan sales and the CDS markets at the firm level? How are the borrowing firms being affected, in the long run, by banks moving from the traditional relationship banking model to the originate-to-distribute model of credit? Does this shift lead to value creation or value destruction in the corporate sector? These questions are, ultimately, empirical ones. Using extensive data from the secondary syndicated loan market, this paper is the first empirical investigation of these

[1] From 1997 to 2007, the secondary syndicated loan market has grown from \$60b to \$342b in annual trading volume, while the CDS market has grown from \$94b to \$45.5 trillion in outstanding notional.

important but as yet unanswered questions.[2]

Banks could sell loans in the secondary market for one of two sets of motives – for capital relief and risk-management reasons, or due to negative private information about the borrower. There are several legitimate reasons for loan sales. First, as pointed out by Gorton and Haubrich (1990), Carlstrom and Samolyk (1995), Demsetz (2000) and others, loan sales allow banks to free up capital that could then be deployed in more profitable activities. It also allows them to increase their fee-based loan origination activity, in which they have a comparative advantage over nonbank financial institutions. This has a positive impact on the return on assets and return on equity of banks. Second, the loan sales market provides an effective mechanism for risk diversification for banks (see, for example, Cebenoyan and Strahan (2002)), especially in light of the classic "credit paradox".[3] Third, from a macro perspective, loan sales improve the liquidity of the balance sheets of banks, thereby reducing financing frictions and lowering their cost of capital. This makes asset liability management easier, and increases the banks' ability to successfully respond to negative economic environments.[4] This has led to a point of view that the originate-to-distribute model of bank credit may be "socially desirable".

On the other hand, there is a vast literature on banks being "special", since they generate proprietary information about the borrowers in the course of lending to them (see Diamond (1984), Ramakrishnan and Thakor (1984), Fama (1985), Rajan (1992), and others). The loan buyers who do not have a lending relationship with the borrowers are then likely to be at an information disadvantage when buying a loan originated by a relationship bank. This could lead to a moral hazard and an adverse selection problem (Pennacchi (1988) and Gorton and Pennacchi (1988)). Banks that sell loans would have a reduced incentive to engage in costly screening and monitoring of the borrowers. In addition, they would have an incentive to sell the loans of the borrowers about whom they have negative private information. Duffee and Zhou (2001) examine this moral hazard and adverse selection problem in a theoretical setting with bank loans and the presence of credit risk mitigation via the CDS markets or the loan sales markets. Whether banks are indeed selling loans due to these reasons is an important empirical question that we

[2]Our empirical analysis is primarily based on the secondary market for syndicated loans. During our sample period, the CDS market was liquid primarily for investment-grade obligors, while nearly 80% of the syndicated loan market has been concentrated in the speculative-grade segment. Therefore, the overlapping sample between the syndicated loan market and the CDS market is statistically too small to analyze.

[3]Loan originators are often not the best holders of loans, since they end up being over-concentrated in some industries and some obligors due to the pressure to maintain client relationships.

[4]These concepts have been explored in prior literature, for example Stein (1998), Kashyap and Stein (2000), Greenspan (2004), Schuermann (2004), and Diamond and Rajan (2006).

investigate in this paper.

From a borrower's perspective, there are positive as well as potentially negative consequences of their loans being sold in the secondary market. Gupta, Singh, and Zebedee (2008) show that loans with higher expected secondary market liquidity carry lower yield spreads in the primary market, thereby lowering the cost of capital of these borrowers. Drucker and Puri (2008) show that borrowers whose loans are liquid in the secondary market have an increased access to debt capital, and, surprisingly, more durable lending relationships, since they are more likely to receive loans in the future from the original lenders. Arping (2004) proposes a "termination threat effect", wherein a relationship lender has more incentives to let a poorly performing borrower fail if they do not have any exposure to the loan, which may discipline the borrowing firms in terms of corporate managerial incentives. There may also be a positive information effect, as outlined in Gande and Saunders (2008), who argue that the secondary market trading of a borrower's loans provides an additional source of complimentary information about the borrower.

Alternatively, the originate-to-distribute model of bank credit could affect the borrowers in a negative way through several channels. First, there is a concern that loan sales could lead to a breakdown of the relationships between borrowers and lenders, which could impact the borrowers negatively.[5] Second, the reduced screening and monitoring of the borrowers could lead to their taking suboptimal investment and operating decisions, as well as encourage managers to indulge in risk-shifting behavior and in pursuing agency benefits that may reduce the borrower's cash flows. Third, as shown in Drucker and Puri (2008), loan trading in the secondary market is associated with harsher covenants on the borrowing firm which may impact the firm negatively. Fourth, it is likely to be harder for the borrower to renegotiate with the investors in the loan sales market, which may lead to suboptimal or premature defaults (Carey, Prowse, Rea, and Udell (1993)). In this regard, Arping's model has a countervailing effect, which he terms as an "incentive dilution effect", wherein the joint incentives of the borrower and the lender to enhance value are diluted if the lender has sold the loan, since the benefits of the value increase would have be shared with the loan buyers.

Parlour and Plantin (2008) present a theoretical model which embeds some of the bank and borrower incentives and effects outlined above. However, from an empirical standpoint, it is not clear which of these effects dominate. If the originate-to-distribute model of credit creates perverse incentives for banks to originate bad loans and then sell

[5] Lending relationships have been shown to be valuable for borrowers since they enhance the availability of credit, reduce the requirement for collateral, and reduce the costs of financial distress, as shown by Petersen and Rajan (1994), Berger and Udell (1995), Hoshi, Kashyap, and Scharfstein (1990), Hoshi, Kashyap, and Scharfstein (1991), etc.

them off in the secondary market, such borrowers should underperform the rest of the borrowing firms in the long run. However, if banks are not selling lemons, and there is no adverse effect of loan sales on the borrowing firms, then such borrowers should have a long-run performance comparable to the rest of the universe of borrowers in the syndicated loan markets. Since theoretical arguments on this issue can go either ways, it can only be resolved empirically. Our paper is the first one in the literature to empirically examine and compare the long-run performance of these two groups of borrowers, namely, the ones that have an active secondary market for their loans versus the rest that do not.

The existing empirical literature has largely focused on the impact of bank loan announcements on the borrowers' stock returns. Most of these studies have shown that loans are "special" – their announcements elicit positive short-term abnormal returns for the borrowers, in contrast to the announcement effect of most other forms of corporate financing such as common stock, preferred stock, straight debt, convertible debt, etc.[6] This result has been somewhat reversed by Billett, Flannery, and Garfinkel (2006), who show that firms announcing bank loans suffer negative abnormal returns in the long run (subsequent three years). The literature on the announcement effect of loan sales is rather sparse. While Dahiya, Puri, and Saunders (2003) document a negative announcement effect of the sale of a borrowers' loans by its lending bank, Gande and Saunders (2008) document the opposite announcement effect – that of a positive stock price response when a borrower's loans trade for the first time in the secondary loan market. However, none of these studies has analyzed the long-run performance of the borrowers whose loans trade in the secondary loan market.

Using extensive primary and secondary market data on syndicated loans, hand-matched to multiple financial databases, we examine the long-run performance of borrowers whose loans have an active secondary market over a three-year horizon subsequent to their loans being listed on the loan secondary market. For measuring long-run abnormal returns, we use several alternative techniques that are well established in the literature, especially in the studies that have examined the long-run performance of firms after an IPO or an SEO. We examine the three-year abnormal stock returns using the calendar-time approach (alphas from the Carhart (1997) four-factor model and mean calendar-time abnormal returns) as well as the event-time approach (cumulative abnormal returns and buy-and-hold abnormal returns), using both equally-weighted and value-weighted portfolios, in order to ensure the robustness of our results. We also examine the relative valuation of these two groups of firms using match-adjusted Tobin's

[6]See, for example, James (1987), Lummer and McConnell (1989), Best and Zhang (1993), Billett, Flannery, and Garfinkel (1995), etc.

q, which is a widely-used measure of firm valuation.

Our results show that borrowers with an active secondary market for loans significantly underperform firms that have borrowed in the syndicated loan market but do have actively traded loans, over a three-year period subsequent to their loans being traded in the secondary market. Based on the particular measure of abnormal stock returns, this underperformance varies between 8% and 14% per year over a three-year horizon on a risk-adjusted basis. This result is robust to most techniques of measuring long-run abnormal performance. The underperformance is stronger for smaller, high-leverage borrowers that have a speculative-grade credit rating. This is intuitive, since these are precisely the firms where moral hazard and adverse selection problems may be more severe. This effect is also largely present in borrowers that are classified as "manufacturing" and as "others" (includes firms in business services, entertainment, finance, hotels, etc.) as per the Fama-French classification of all firms into five different industry groups. Using Tobin's q, we find significant value destruction amongst the borrowers that have an active loan market when compared to their peers. It amounts to almost 15% of the value of the total assets of the borrowers, on average, over a three-year period.

The long-run underperformance and value destruction of borrowers with an active secondary loan market is a striking result, which is consistent with two possible explanations. First, banks may be selling loans of the borrowers about whom they have negative private information that is unobservable to outsiders. This implies that banks are cherry picking – they keep the good loans for themselves, and sell the lemons. A related explanation could be that banks are knowingly originating some lemons, primarily to expand their origination-fee-based income, since they are able to sell these loans, relatively easily, in the secondary market to outside investors (mostly nonbank financial institutions and hedge funds). This is somewhat similar to the current events in the subprime mortgage crisis, where banks have been originating mortgages of questionable quality just because there was an active secondary market for such loans. In a perfect market, such actions should not be sustainable, since reputation concerns would prevent a bank from doing this on a systematic basis. If it is still happening, it is perhaps an indication of a market failure, where the investors have not (yet) recognized the adverse selection that they are facing in the syndicated loan secondary market. This, again, has remarkable similarities to the events that have unfolded in the ongoing subprime mortgage crisis.

The second explanation for our results is based on the moral hazard argument, wherein banks have diminished incentives to monitor their borrowers once the lending relationship is severed. When the borrowers lose the discipline of bank monitoring, they may be more prone to making suboptimal investment and operating decisions, which leads to their negative long-run performance and value destruction. Based on our tests and results, it is not possible to clearly assert which one of the two explanations is the primary reason for the underperformance of the borrowers with an active secondary loan market. It is likely that both these mechanisms play a role in explaining our results.

It is interesting to note that, while the borrowers with an active loan market underperform their peers, the borrowers without an active loan market do not show any significant long-run underperformance. This is in direct contrast to the results of Billett, Flannery, and Garfinkel (2006), who show that firms announcing bank loans suffer negative abnormal stock returns over the subsequent three years. We show that this negative long-run performance is confined to borrowers with an active secondary loan market. Therefore, for the set of borrowers whose loans do not trade in the secondary loan markets, bank loans are still "special", in the context of the literature on the specialness of corporate financing mechanisms. This is also contrary to the results of Gande and Saunders (2008) who claim that banks are "special" even in the presence of a secondary market for loans. The differing results in Gande and Saunders (2008) are due to their inferences being based on the announcement effect of bank loan sales, while our results are based on the long-run performance over the subsequent three-year period. Our sample of 1054 borrowers is also significantly larger than prior studies. *Therefore, bank loans are still "special", but only if the bankers do not sell them.*

Our results have important policy implications for regulators. Whether the underperformance and value destruction of borrowers with an active secondary loan market is due to the banks originating and selling lemons, or due to the diminished monitoring of borrowers, it raises serious questions about the extent to which the originate-to-distribute model of bank credit is "socially desirable". While there are clear benefits of enhancing the liquidity of the secondary syndicated loan market (as outlined in prior research), we demonstrate some of the long-term undesirable consequences of the growth of this market. It is likely that the highly deregulated nature of the secondary syndicated loan market is one of the major contributing factors for these undesirable consequences, which is strikingly similar to some of the causes of the current crisis. Should the regulators impose restrictions on the sales of bank loans by originating banks? Perhaps. At the minimum, there could be regulations in place requiring the originating banks to retain a certain proportion of the loans on their balance sheet, which would limit the moral hazard and adverse selection problems. In addition, there must be additional disclosure requirements about the bank loans being traded in the secondary market, along with disclosure about the market participants that are trading them. A loan trading exchange with a clearinghouse, similar to the one that is now being contemplated in Germany, could be a possible partial solution. It is certainly clear that the originate-to-distribute model of bank credit needs to be modified, and the transactions made more transparent.

The rest of our paper is organized as follows. In Section 2, we provide information about our data along with some descriptive statistics. In Section 3, we explain the different methods used in this paper for examining the long run performance of the borrowing firms. We describe and interpret our results in Section 4. Section 5 concludes.

2. Data

The data for this study is drawn from all U.S. publicly listed firms that borrowed in the syndicated loan market from January 1, 2000 until December 31, 2004.[7] We obtain the loan origination data from the DealScan database maintained by the Loan Pricing Corporation (LPC). That data covers over $2.5 trillion in loans originated in the large corporate and middle market segments over the last two decades, from SEC filings and other private sources. We focus on borrowers with syndicated term loans originated during this period, excluding borrowers that only obtained other forms of financing such that revolvers and lines of credit. In the case of revolvers and lines of credit, only the drawn portion trades in the secondary market – the undrawn portion remains with the original lenders. Since we do not have any information on the drawdown schedule of these lines of credit, the moral hazard and adverse selection issues are not clear when these lines of credit trade in the secondary markets. Therefore, we focus only on syndicated term loan borrowers.

To classify borrowers into the two groups, those with and without an active secondary loan market, we rely on the loan secondary market database from the Loan Syndication and Trading Association (LSTA). LSTA provides an independent, daily mark-to-market pricing service on several thousand syndicated loans to over 100 institutions that manage over $500 billion in bank loan portfolios. LSTA receives bid and ask price quotes, every day, on nearly five thousand syndicated loan tranches, from over 35 dealers that represent the loan trading desks of virtually every major commercial and investment bank. Our conversations with market participants indicate that these dealers and their quoted loans represent over 80% of the secondary market trading in syndicated loans. Therefore, these loan price quotes provide an adequate representation of the loan secondary market. LSTA aggregates these price quotes, and, as part of its pricing service, provides the average of

[7]We consider loans originated only until 2004 so that we can use stock-return data up to 2007 to analyze the long-run performance of all these borrowers over a three-year period.

all bids and all asks for all loans that have at least two bid quotes that day (generally, about two-thirds of all loans quoted in the market have at least two bid quotes). They also provide the number of quotes on the ask and the bid side. (Many of the loans have quotes from three or more dealers, sometimes from as many as 17 dealers). In addition, LSTA provides some identifying information about the borrower and the loan tranche, which is used to hand-match this sample to the loan origination database from DealScan. The hand-matching is necessary since there is no common identifier between DealScan and the LSTA secondary pricing database.

Following Gupta, Singh, and Zebedee (2008), we use this LSTA secondary market database to classify borrowers into two categories – those that have loans with an active secondary market (LIQ), and those without loans with an active secondary market ($no\,LIQ$). If a borrower's term loans are quoted in our secondary market database by at least two dealers, and the first quoted bid price is greater than 98 (i.e., it is a "par" loan), we classify the borrower as LIQ. If there were at least two dealers that quoted bid prices for a loan, it is reasonable to infer that it was possible to trade the loan on that day. Further, if the loan is first quoted at par, it implies that it was not a distress sale, since the loan did not have to be discounted for it to be sold in the secondary market. Therefore, we classify a borrower as LIQ only if its loans had an active interest from secondary market dealers without initiating "fire sales" by discounting them. Our results are robust to alternative ways of defining the two categories of firms. Nevertheless, any errors due to misclassification will only bias our tests against finding any results.

Next, we match these loan databases to CRSP and Compustat, in order to obtain firm-level accounting and stock return data. Again, there is no common identifier between the loan databases and CRSP/Compustat, so the borrowers have to be carefully hand-matched. Our CRSP and Compustat data is over the period 2000-2007. However, following Cornett, Mehran, and Tehranian (1998), we impose the requirement that all firms have CRSP/Compustat data at least two years prior, i.e., from 1998 onwards, to avoid the new listing bias. We also eliminate all non U.S. incorporated borrowers and borrowers with non-USD currencies. After applying all of these filters, we end up with a large sample of 1054 borrowers.

Table 1 presents some descriptive statistics for our sample of borrowers. Based on the definition of LIQ, we find that 309 out of the 1054 borrowers have an active secondary market for their syndicated term loans, while the remaining 745 have syndicated term loans originated during the 2000-2004 period, but they are never liquid as per our definition. Our total sample of 1054 borrowers represents a large proportion of firms in the corporate universe over our sample period – they have, in the aggregate, about

\$3.2 trillion in market capitalization, about \$4.7 trillion in total assets, and about \$750 billion in net sales. Of these firms, the ones that have an active loan market appear to be generally larger in size, compared to those firms that do not have an active loan market. The median size of the firms in the LIQ group is about \$1 billion in market capitalization, \$1.7 billion in total assets, and \$328 million in sales, while the median firm in the $no\,LIQ$ category is about one-third to one-fourth in size on these parameters. This is not surprising, since there is more public information (including greater analysts following) available for the larger firms, which would help investors in the secondary loan market in evaluating these borrowers. Prima facie, one would also expect this trend as an indirect mechanism for loan investors to reduce being negatively affected by moral hazard and adverse selection issues, since smaller firms should be more susceptible to these problems. Therefore, if we still find evidence of moral hazard in this market, despite the fact that is is generally the larger borrowers whose loans are sold in the secondary market, it would be an even more striking result.

We also observe that borrowers that have an active loan market are more levered and less profitable than those without an active loan market. This is clearly indicated by the breakdown of borrowers by their credit rating. Nearly 87% of borrowers that have an active loan market are speculative grade (SG), while this percentage is lower at 65% amongst the borrowers that do not have an active secondary loan market.[8] Figure 1 provides more details on the distribution of borrowers by credit rating. Most of the syndicated term loan market is concentrated on BBB, BB, and B rated borrowers – higher rated borrowers are able to issue equity, bond or commercial paper directly to investors, thus avoiding the costs of intermediation. The lower-rated borrowers often do not have any choice but to approach a financial institution for a loan. However, most of the actively traded loans are concentrated within the BB and B rating categories, and there is very little trading activity in investment-grade (IG) loans. This is primarily due to demand-side reasons. Speculative-grade loans are high-yield credits with spreads over LIBOR that are upwards of several hundred basis points. These are precisely the loans that investors (including CDO/CLO hedge funds) are interested in buying due to their higher expected returns. The return on investment-grade loans is generally not high enough to entice most loan investors to participate in this market.

[8]Note that we only consider publicly listed borrowers with complete CRSP/Compustat data in our study, so many of the smaller syndicated loan borrowers are already excluded from our sample.

3. Long-Run Performance and Valuation Analysis

The existing literature on measuring long-term abnormal performance dates back to Ritter (1991) and often focuses on testing IPO and SEO performance.[9] Adapting and suitably modifying that methodology for firms with bank loans, we estimate the risk-adjusted long-run abnormal stock returns for two portfolios: borrowers with an active loan market and borrowers without an active loan market.

There are two widely-used approaches for measuring long-term abnormal returns: (i) calendar-time methods proposed by Fama (1998) and Brav, Geczy, and Gompers (2000) that allow the simulation of investment strategies that could be implemented by a portfolio manager, and (ii) event-time studies, recently applied in Cornett, Mehran, and Tehranian (1998) and Ergungor, Krishnan, Laux, Singh, and Zebedee (2008), that focus on the aftermarket performance of event firms. Fama (1998) and Mitchell and Stafford (2000) point out that the event-time approach may overstate the long-run performance since it can grow with the return horizon even when there is no abnormal return after the first period. Moreover, since event-time measures are computed over a long-horizon, time-period overlap can introduce cross-sectional correlations. This cross-sectional dependence in sample observations can lead to poorly specified test statistics (see, for example, Fama (1998), Lyon, Barber, and Tsai (1999), and Brav (2000)). We therefore rely on the calendar-time analysis to measure long-term abnormal returns, and use the event-time approach as a robustness check.

3.1. Calendar-Time Analysis

Our primary abnormal return measure is the alpha coefficient from the monthly time-series regression of excess returns on the three Fama and French (1993) factors MKT, SMB and HML, and on the momentum factor, UMD, introduced by Jegadeesh and Titman (1993):

$$\begin{aligned} R^j(t) - R_f(t) &= \alpha + \beta_{MKT} MKT(t) + \beta_{SMB} SMB(t) + \beta_{HML} HML(t) \\ &\quad + \beta_{UMD} UMD(t) + \varepsilon(t), \quad j \in \{LIQ, no\, LIQ\}, \end{aligned} \tag{1}$$

where R_f is the one-month T-bill rate. $R^{LIQ}(t)$ denotes the monthly return on the portfolio of borrowers whose loans first became liquid in the secondary market in the q months prior to t, where $q = 12, 24$, or 36 months, depending on the long-run return

[9]For recent applications see, for example, Kooli, L'Her, and Suret (2003), Chan, Cooney, Kim, and Singh (2008), and Ergungor, Krishnan, Laux, Singh, and Zebedee (2008).

horizon being analyzed. $R^{no\,LIQ}(t)$ denotes the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. We distinguish between equally-weighted and value-weighted portfolio returns $R^j(t)$. If in a particular calendar month t there are no firms in the portfolio, Lyon, Barber, and Tsai (1999) drop that month from estimating equation (1). Since the number of our test firms is generally large enough, we are able to run the regressions under the stricter requirement that portfolios need to consist of at least 30 firms for any month.[10]

We directly compare the abnormal returns on the LIQ portfolio to that on the $no\,LIQ$ portfolio by replacing $R^j(t) - R_f(t)$ in (1) with $R^{noLIQ}(t) - R^{LIQ}(t)$. We run the time-series regression

$$\begin{aligned} R^{noLIQ}(t) - R^{LIQ}(t) &= \alpha + \beta_{MKT} MKT(t) + \beta_{SMB} SMB(t) + \beta_{HML} HML(t) \\ &\quad + \beta_{UMD} UMD(t) + \varepsilon(t), \quad j \in \{LIQ, no\,LIQ\}. \qquad (2) \end{aligned}$$

Such a regression yields the alpha estimate for a portfolio that is long in borrowers with no active loan market and short in borrowers that have an active loan market. An estimate for alpha that is significantly less than zero is evidence of underperformance in the long run of borrowers with an active loan market relative to those without an active loan market.

To understand if the performance of borrowers with an active loan market relative to borrowers without an active loan market is uniform throughout the sample, or if there are certain types of firms that exhibit a stronger or a weaker effect, we stratify borrowers along different dimensions. In particular, we repeat the regression analysis in (1) and (2) after stratifying the set of all borrowers by size (market value of equity), industry, S&P long-term credit rating, and book leverage. The cutoff point between small and large firms, for example, is computed each month as the median size of all NYSE-traded stocks in our control set, that is, of firms that did not issue bank loans between 2000 and 2004. Similarly, we distinguish between low-leverage and high-leverage borrowers. The industry groups considered are consumer industries (consumer durables, nondurables, wholesale, retail, and some services), manufacturing (manufacturing, energy, and utilities), technology (business equipment, telephone and television transmission), healthcare (healthcare, medical equipment, and drugs), and other industries (mines, construction, building materials, transportation, hotels, business services, entertainment, and finance).[11]

[10]When stratifying the sample, we reduce that requirement to 10 or more firms for large, IG or low-leverage borrowers, and for all industry portfolios.

[11]For more details, including the distribution of SIC codes across industries, see Kenneth French's

An alternative calendar-time portfolio method computes mean calendar-time abnormal returns (MCTARs). For each month t and borrower i, the calendar-time abnormal return of firm i is calculated relative to the time-t return on its reference portfolio, $R^{i,ref}(t)$:

$$CTAR^{i}(t) \quad = \quad R^{i}(t) - R^{i,ref}(t), \tag{3}$$

where $R^{i}(t)$ denotes the return on firm i in month t.

We follow the procedure of Daniel, Titman, and Wermers (1997) and Cornett, Mehran, and Tehranian (1998) in constructing 125 reference portfolios based on size (market value of equity (ME)), book-to-market ratio, and momentum characteristics. Our reference portfolios include all firms listed on the NYSE, AMEX, and Nasdaq exchanges from 2000 to 2007, provided that the following three requirements are met: (i) Compustat data are available for the firm at least two years prior to the inclusion of the firm into the portfolio, (ii) the firm has market value data available in CRSP both one year and six months prior to the inclusion, and (iii) in the twelve months prior to the inclusion, at least six monthly returns are available in CRSP. Reference firms exclude firms that issued bank loans between 2000 to 2004. This leaves us with a reference sample of 7,324 firms to be sorted into the 125 reference portfolios.[12]

The exact portfolio formation works as follows. First, all NYSE firms in our reference sample are sorted into quintiles according to their market equity value, calculated at the end of each month from January 2000 to December 2007. AMEX and Nasdaq firms are then put into the quintiles according to their size. Within each quintile, we further sort firms into five portfolios according to their book-to-market ratios.[13] Finally, for each size and book-to-market sorted portfolio, we sort the firms into quintiles according to their preceding twelve-month return. This process gives us a total of 125 portfolios. Once we form the 125 reference portfolios for a particular month t, we match each borrower to a benchmark portfolio according to its size, book-to-market ratio, and momentum rank at time t. The reference portfolio return is the equally-weighted or the value-weighted return of the portfolio of reference stocks.

website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[12]The requirement to exclude all firms that issued bank loans between 2000 to 2004 from the reference portfolios may introduce a small look-ahead bias in (3) that can be avoided by only excluding borrower i when computing $R^{i,ref}(t)$. We have implemented this latter version as well. It yields similar results, which is not surprising given the large number of firms in our reference set.

[13]Following Fama and French (1993), we do not use negative book equity values when calculating these cutoff points.

In each calendar month t, a mean return across borrowers is calculated as

$$\overline{CTAR^j}(t) \;=\; \sum_i w^i(t)\, CTAR^i(t), \quad j \in \{LIQ, no\, LIQ\}. \tag{4}$$

$\overline{CTAR^{LIQ}}(t)$ denotes the weighted calendar-time abnormal return on the portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, where $q = 12, 24$, or 36 months. $\overline{CTAR^{no\, LIQ}}(t)$ denotes the return on the portfolio of borrowers that had bank loans originated prior to time t, but did not have an active secondary loan market in the q months prior to time t. The weights $w^i(t)$ are all equal when reference portfolios and abnormal returns are equally weighted, and equal to $ME^i(t-1)/\sum_j ME^j(t-1)$ when they are value weighted. A grand mean monthly abnormal return is calculated as

$$MCTAR^j \;=\; \frac{1}{T}\sum_{t=1}^{T} \overline{CTAR^j}(t), \quad j \in \{LIQ, no\, LIQ\}. \tag{5}$$

To directly compare the abnormal returns on the LIQ portfolio to that on the $no\, LIQ$ portfolio, we estimate the average difference in calendar-time abnormal returns between the portfolio of borrowers with no active loan market and the portfolio of borrowers that have an active loan market, by replacing $\overline{CTAR^j}(t)$ in (5) with $\overline{CTAR^{no\, LIQ}}(t) - \overline{CTAR^{LIQ}}(t)$.

3.2. Event-Time Analysis

Our event-time tests examine the cumulative abnormal returns (CARs) and the buy-and-hold returns (BHARs) for the portfolio of borrowers with an active loan market, and for the portfolio of borrowers without an active loan market. The analysis of CARs answers the question whether borrowers in one of these categories persistently earn abnormal monthly returns.

The weighted abnormal return at s months after the event is calculated as

$$\overline{AR^j}(s) \;=\; \sum_i w^i(s)\left(R^i(s) - R^{i,ref}(s)\right), \quad j \in \{LIQ, no\, LIQ\}, \tag{6}$$

where $\overline{AR^{LIQ}}(s)$ denotes the weighted event-time abnormal return on the portfolio of borrowers whose secondary loan market first became liquid s months ago, and $\overline{AR^{no\, LIQ}}(s)$ denotes the return on the portfolio of borrowers that do not have an active loan market.

To be precise, for each borrower that does not have an active loan market during our sample period, we randomly assign an "event month" on or after that firm's first loan origination date. We use 1000 simulations, and $\overline{AR^{no\,LIQ}}(s)$ is stored for each. The weights $w^i(s)$ are all equal when reference portfolios and abnormal returns are equally weighted, and equal to $ME^i(s-1)/\sum_j ME^j(s-1)$ when they are value weighted. Reference portfolios are formed as in the previous section. We distinguish between continuously rebalanced reference portfolios, and reference portfolios that are not allowed to update.

The q-month cumulative abnormal portfolio return is calculated as

$$CAR^j \;=\; \sum_{s=1}^{q} \overline{AR^j}(s), \quad j \in \{LIQ, no\,LIQ\}, \tag{7}$$

where $q = 12, 24$, or 36 months. To account for potential skewness in cumulative abnormal returns, we rely on skewness-adjusted t-statistics as discussed in Barber and Lyon (1997). We report the median, across the 1000 simulations, of the difference in the cumulative abnormal returns between the portfolio of borrowers without an active loan market and the portfolio of borrowers that have an active loan market, as well as the median of the associated two-sample t-test statistics with unpooled variances.

Another simple measure of long-run stock returns is the buy-and-hold abnormal return (BHAR). The reason why BHAR is an appealing approach is that the implied investment strategy is simple and representative of the returns that a long-horizon investor might earn (see, for example, Barber and Lyon (1997) and Kothari and Warner (2005)). The weighted abnormal return from a buy-and-hold strategy over a q-month period is computed as

$$\overline{BHAR^j} \;=\; \sum_i w^i BHAR^i, \quad j \in \{LIQ, no\,LIQ\} \tag{8}$$

where

$$BHAR^i \;=\; \left(\prod_{s=1}^{q} (1 + R^i(s)) - \prod_{s=1}^{q} (1 + R^{i,ref}(s)) \right), \tag{9}$$

for $q = 12, 24$, or 36 months. $\overline{BHAR^{LIQ}}$ denotes the weighted buy-and-hold abnormal return on the portfolio of borrowers with an active loan market, whereas $\overline{BHAR^{no\,LIQ}}$ is the buy-and-hold abnormal return on the portfolio of borrowers that do not have an active loan market. Since long-run buy-and-hold abnormal returns are often positively skewed, we use skewness-adjusted t-statistics as discussed in Barber and Lyon (1997). As we did for CAR, for each borrower that does not have an active loan market during the our sample period, we again randomly assign an "event month" on or after that firm's first loan origination date. We use 1000 simulations, and $\overline{BHAR^{no\,LIQ}}$ is stored for each. As before, we distinguish between equal and value-weighting, and between reference portfolios with continuous rebalancing and those without rebalancing.

We compute the median, across the 1000 simulations, of the difference in the buy-and-hold abnormal returns between the portfolio of borrowers without an active loan market and the portfolio of borrowers with an active loan market, as well as the median of the associated two-sample t-test statistics with unpooled variances.

3.3. Valuation Analysis

As a complement to our study of long-run stock returns, we also examine a measure of long-run changes in borrower valuation. A widely used proxy of firm valuation is Tobin's q, defined as the ratio of the sum of the market value of equity plus the book value of debt to total assets.[14]

Our measure of changes in Tobin's q is match-adjusted: the long-run change in a borrower's valuation is measured relative to that of a matched sample of non-borrowers. Using the methodology of Barber and Lyon (1996), for each borrower and a given month t, we consider a list of two-digit SIC code and valuation-matched non-borrowing firms, that is, firms that did not originate bank loans between 2000 and 2004. To be more precise, when determining the set of matched non-borrowers we impose the restrictions that matched firms must have the same two-digit SIC code as the borrower, and that the Tobin's q of the matched firms must fall within 90% and 110% of that of the issuer at the end of the previous month, $t-1$. For firms with an active loan market, t denotes the end of the month during which the loan market first became liquid. For borrowers without an active loan market, we randomly sample t from the months that follow the firm's first loan origination date. Note that we winsorize all firm valuation measures at the 1 percent and 99 percent levels to avoid our results being driven by outliers.

The reference 36-month-ahead Tobin's q for borrower i, $TQ^{i,ref}(t{+}36)$, is computed as the median Tobin's q at the end of month $t+36$, across all firms in borrower i's reference group. One drawback to using the *level* of the reference group's firm-valuation measure is that it ignores the history of the borrower's valuation measure relative to that of the reference group. An alternative reference 36-month-ahead Tobin's q for borrower i can by

[14]For a recent application, see Roll, Schwartz, and Subrahmanyam (2008).

computed under the assumption that a borrower's reference valuation measure is equal to its past valuation measure plus the change in the reference portfolio's valuation measure. In other words, we also compute the reference 36-month-ahead valuation measure for borrower i as $TQ^i(t) + \big(TQ^{i,ref}(t+36) - TQ^{i,ref}(t)\big)$, where $TQ^i(t)$ stands for the time-t Tobin's q of borrower i.

For borrower i, the 36-month-ahead difference in Tobin's q relative to the reference group firms using *levels* is defined as

I: $TQ^i(t+36) - TQ^{i,ref}(t+36)$.

Similarly, the 36-month-ahead difference in Tobin's q relative to the reference group firms using *changes in levels* is given as

II: $TQ^i(t+36) - \big[TQ^i(t) + \big(TQ^{i,ref}(t+36) - TQ^{i,ref}(t)\big)\big]$.

We use both methods I and II to compute the average, across all borrowers with an active loan market, of the 36-month-ahead difference in Tobin's q relative to the reference group firms. The same statistic is computed for borrowers without an active loan market. For the latter group, we report the median across the 1000 simulations of event times. Besides 36 months, we also consider 12-month-ahead and 24-month-ahead differences in Tobin's q.

4. Results

4.1. Calendar Time Analysis

In Table 2, we report the intercept terms (alphas) from regressing the portfolio returns for loans with and without an active secondary market on the three Fama-French and the momentum factors. These alphas can be interpreted as the average monthly abnormal returns of these two portfolios. We also report the alpha from a portfolio that is long in firms with no active loan market and short in firms that have an active loan market. This long-short return is indicative of the abnormal return of an admissible trading strategy based on the liquidity of the borrowers' loans in the secondary market. For all three of these portfolios, we report the long run abnormal returns over 12, 24, and 36 month horizons, for equally-weighted as well as value-weighted portfolios.

The results clearly show that the borrowers whose loans are sold in the secondary market underperform the rest of the universe of borrowers. For borrowers with an active loan market, the monthly abnormal return is on average about -0.75% (t=-2.79) using equally weighted portfolios. The result is very similar using value weighted portfolios, with the estimated alpha of -0.74% (t=-1.93). On the other hand, the borrowers that do not have an active loan market do not underperform in the long run. The long-short portfolio performance indicates that the strategy would yield an abnormal monthly return of 1.18% (t=3.81) using equally weighted portfolios. This result remains similar (though less significant) using value-weighted portfolios, with an abnormal return of 0.67% (t=1.79). These results show that over the three years following the sale of the loans of borrowers, the long-short strategy could yield annual abnormal risk-adjusted returns of between 8% and 14.1%, which is an economically large magnitude. The large magnitude of these abnormal returns also implies that even in the presence of reasonable transaction costs, this strategy would lead to positive abnormal returns of significant magnitude. Therefore, this certainly appears to be a trading strategy that is admissible and profitable. It is interesting to note that this abnormal return is primarily due to the underperformance of the borrowers whose loans are sold in the secondary market – this group of firms underperforms by about 9% annually on a risk-adjusted basis.

This is clear evidence of underperformance of firms whose loans are sold in the secondary market. These results are also somewhat different from, but intuitively consistent with, those reported by Billett, Flannery, and Garfinkel (2006), who report that firms announcing bank loans suffer negative abnormal stock returns over the subsequent three years. We find that this negative return is *only* for firms whose loans are sold, while the other firms, whose loans are not sold, do not suffer this negative abnormal return. It is interesting to note that the negative three-year alphas that they report in their paper are smaller in magnitude than the alphas that we report for the active loan market firms. Perhaps the pooling of these two types of firms, which have different long run performance, gives rise to their results. In fact, if we average the alphas for the two types of firms in our sample, we obtain average alphas that are close to the ones that they report. This distinction is important – our results reconfirm the results in all prior studies that bank loan financing is "special" and different from other forms of corporate financing like IPOs, SEOs, public debt, convertible debt, etc., since it does not lead to negative long run performance of the borrowers, *except for firms whose loans are being sold by the lending banks.*

Next, we drill down into our sample of borrowing firms to understand if this underperformance of firms with an active loan market is uniform throughout the sample, or there are some types of firms that exhibit a stronger or a weaker effect. We first stratify our firms by size (market value of equity). If banks are selling lemons, or if the severance of the lending relationship is affecting the borrowers in a negative way, it is likely that this effect is stronger for smaller firms. Table 3 reports the four-factor alphas for our sample stratified into small and large firms based on the median firm size. We find that this relative underperformance is present only in the smaller firms. The long-short strategy for smaller firms yields an average monthly abnormal return of 0.87% (t=3.25) using equally weighted portfolios and 0.41% (t=1.71) using value-weighted portfolios, while the alphas are insignificant for large firms. The smaller firms are more likely to be more opaque, with less public information about them, in which case the private information advantage of the bank is likely to be greater, resulting in a greater ability of the banks to sell the loans of firms that they *internally* believe will perform poorly in the future. Alternatively, the smaller firms are more likely to benefit from the discipline of the lending banks monitoring them closely, since they may not have sophisticated corporate governance systems in place, or as much public scrutiny as the larger firms. In this case, the severance (or the weakening) of their relationship with their lenders could affect them negatively. It is also interesting to note that the alphas are marginally positive for small borrowers with no active loan market. This implies that the bank loan financing is followed by positive abnormal returns for small firms, further reinforcing our earlier inference that bank loans are indeed special, for the subset of borrowers whose loans are not sold in the secondary market, especially the smaller borrowers.

The second stratification is based on the industry of the borrower. We use the Fama-French classification into five industries – consumer, manufacturing, technology, healthcare, and others. In Table 4, we report the alphas from the four-factor regressions for the long-short strategy. We do not report the results for the two groups of firms (active and no loan market) separately to save space, since they do not show anything different from that shown by the results for the long-short strategy. Our results show that the positive abnormal returns for the long-short strategy are largely due to firms in the "manufacturing" and "other" sectors. The "other" sector includes firms in business services, entertainment, finance, hotels and other industries, where the private information advantage of the bank may be higher that that in some of the other industries. We also find weak evidence of abnormal returns in the consumer industries.

The third stratification is based on the credit rating of the borrowing firms. We broadly classify borrowers into two groups – investment grade and speculative grade firms. The four-factor alphas for this stratification are reported in Table 5. We find that the underperformance of the firms with an active secondary loan market, as well as the positive abnormal returns for the long-short strategy, are only due to firms that are speculative grade. The speculative grade firms with an active loan market have an average abnormal monthly return of -0.78% (t=-2.64) using equally weighted portfolios and -1.11% (t=-2.38) using value weighted portfolios. The long-short strategy for these speculative grade firms produces annual abnormal returns of between 10.2% and 10.8% over a three year horizon. This is not surprising, since the speculative grade firms are riskier firms where the lemon's problem is more likely to be there, and these are also the firms that could benefit the most from the discipline imposed by bank monitoring. Consistent with our results before, we do not find any significant underperformance in the firms that do not have an active secondary loan market, reinforcing the conclusion that banks loans are indeed special, but only if the banker decides not to sell them.

Our fourth stratification is based on the leverage ratio of the borrowers. We classify borrowers into high leverage and low leverage borrowers based on the median leverage of all NYSE traded stocks in our control set of firms. These results are presented in Table 6. Consistent with our previous results, we find that the relative underpeformance of borrowers is only amongst high leverage firms. The long-short strategy implemented on high leverage borrowers yields a risk-adjusted annual abnormal return of between 12.5% and 16.5% over the three year horizon subsequent to the sale of the borrowers loans. This is again intuitive, given our results for stratifications by size and credit rating, since these two variables are generally correlated with leverage. In this stratification as well, we find no evidence that borrowers without an active loan market exhibit any long-run underperformance, indicating that banks loans are indeed special for this subset.

Overall, our results lead to two important inferences. First, the borrowers whose loans are sold in the secondary market suffer a negative abnormal return, on a risk-adjusted basis, of about 9% per year over the three years following the sale of their loan. A trading strategy of going long firms with no active loan market and short on firms with an active loan market yields risk-adjusted abnormal returns of between 8% and 14% per year over a three year period. Further, these returns are concentrated within small, high leverage, speculative grade firms. Second, we find that the borrowers that have no active secondary loan market do not have any abnormal returns over a three year horizon, which is different from the results of underperformance of the firms raising capital through other means such as equity or public debt issuance.

As explained in the previous section, we next examine the MCTARs based on calendar time portfolios, as an alternative to the alphas obtained from factor regressions. The results for the full sample are presented in Table 7, where we report the MCTARs for borrowers with an active loan market, without an active loan market, and the long-short strategy of the difference between the two. We report the abnormal returns for 12, 24, and 36 month periods for both equally and value-weighted portfolios, to ensure that our results are robust. These results clearly show that the borrowing firms with traded loans significantly underperform relative to their peers, as well as relative to the borrowing firms whose loans are not traded. Over a three year horizon, the firms with an active loan market experience an average monthly abnormal return of -0.85% (t=-3.17) using equally weighted portfolios and -0.73% (t=-2.50) using value-weighted portfolios. Similarly, the long-short strategy yields an average abnormal monthly return of 0.76% (t=2.91) using equally weighted portfolios and 0.70% (t=2.46) using value-weighted portfolios, which translates to an annual abnormal return between 8.4% and 9.1% over a three year period. These results are both economically and statistically significant. The stratifications by size, industry, leverage and credit rating yield results similar to those reported for the factor regressions earlier, that this effect is mostly due to small, high leverage, speculative grade firms.

Figure 2 presents the calendar time cumulative average returns for borrowers with and with an active secondary loan market, as well as the returns on their control portfolios. We present the plots for both equally weighted and value-weighted portfolios over our entire sample period. The plots clearly show that the portfolio of borrowers with an active loan market has cumulative returns that are significantly lower than the other three portfolios.

4.2. Event Time Analysis

In this subsection, we present the results for the abnormal returns of firms in our sample based on event time methodology. Our objective is to measure abnormal returns using all available techniques, in order to ensure that our results are robust to the measurement technology used to estimate them.

In Figure 3, we present the event-time CARs for borrowers with and without an active loan market and their respective control portfolios, both equally and value-weighted, for portfolios that are rebalanced as well as for those that are not rebalanced. Consistent with prior results, the borrowers with an active loan market have the lowest CARs in all four plots, as shown by the bottom graph line in these plots. Even visually, this group of borrowers clearly and consistently underperforms the other borrowers as well as the control portfolio firms over the three year period subsequent to the sale of their loans in the secondary market.

In Table 8, we present the CARs for firms with and without an active loan market, as well as for the long-short strategy. Panel A presents the results when the control portfolios are rebalanced every month, while Panel B presents the results without rebalancing the control portfolios. The results are presented over 12, 24, and 36 month periods for both equally and value-weighted portfolios. Our results show, using rebalanced control portfolios, that the firms with an active loan market have a 3-year CAR of -11.62% (t=-2.21) using equally weighted portfolios and -7.36% (t=-1.95) using value-weighted portfolios. These firms appear to be experiencing negative returns relative to the return of the control portfolio matched based on size, B/M and momentum. On the other hand, the firms with no active loan market have a positive abnormal return which is significant only using value-weighted portfolios. The long-short strategy has a CAR of 12.12% (t=2.00) using equally weighted portfolios and 11.15% (t=2.67) using value-weighted portfolios. As reported in Panel B, the results using control portfolios that are not rebalanced are similar (though not statistically significant for equally-weighted portfolios) – for the long short strategy, we obtain a CAR of 7.89% (t=1.26) using equally weighted portfolios and 12.62% (t=2.95) using value-weighted portfolios. This is consistent with our results in the previous subsection, which show that borrowers whose loans are being sold appear to underperform other syndicated loan borrowers, as well as their peers in the control portfolios, and the magnitude of this underperformance is statistically and economically significant. When we stratify our sample based on size, industry, leverage and credit rating, we get results that are qualitatively similar to the ones reported for the factor regressions. However, we lose statistical significance in some of the tests due to the small sample sizes in each of the strata.

In Table 9, we present the BHARs as an alternative measure of returns aggregated based on event time. The sign of these abnormal returns is similar, but we do not find statistical significance in the abnormal returns using this measure. In both the panels, using control portfolios that are either rebalanced monthly or not rebalanced at all, we find that the borrowers with an active loan market have lower BHARs, and the long-short strategy has a positive BHAR, though they are not statistically significant. Stratification by size, industry, leverage or credit ratings yields results similar to the ones reported before.

4.3. Borrower Valuation

One of the inferences of the literature on loan sales has been that it is "socially desirable", given all the benefits of loans sales that accrue to the borrowers as well as the banks. Some papers (such as Arping (2004)) have suggested that the presence of this market could even lead to "value creation" in the corporate sector, due to the "termination threat" argument that we explained earlier in the paper. Our results so far suggest that the borrowers whose loans are sold underperform their control portfolios as well as the borrowers whose loans are not sold, over a three year period following the loan sale. What is the long-run impact of the loan sales market on the valuation of such borrowers? We answer this question by analyzing the changes in Tobin's q, which is a widely used proxy for firm valuation.

In Table 10, we report the difference in Tobin's q, in percentage points, for the two group of borrowers with respect to their control group firms matched by two-digit SIC code and valuation, as recommended by Barber and Lyon (1996). We report the differences in the mean and the median Tobin's q using two benchmarks for the "expected" Tobin's q - the first one using the level of Tobin's q for the control group, and the second one using the change in the Tobin's q for the control group. As Barber and Lyon (1996) show, these two models are the most reliable in detecting the differences between the test and the control portfolios. The results are striking - we find that, on average, borrowers with an active loan market lose between 11.5% and 14% of their value (as a percentage of their Total Assets) when compared to their control firms, over the three year period subsequent to their loan sale. This result is significant based on the median Tobin's q as well. In addition, the borrowers without an active loan market do not show any abnormal changes in Tobin's q, when compared to their control firms. This again reaffirms our earlier conclusion that bank loan financing has no negative long run effects on the borrowers, except for the ones whose loans are being sold in the secondary market.

The results in the last row of the table show that borrowers with an active loan market end up with a Tobin's q ratio that is about 15 percentage points less than (and is statistically significantly different from) that for borrowers without an active loan market. That is a significant valuation loss over a three year period, which indicates that the effect of loan sales on borrowers is far from value creation – in fact, it results in a destruction in value to the extent of about 15% of the total value of the assets of the borrowers. Therefore, it does not appear that, in the long run, the presence of an active secondary market for syndicated term loans is "socially desirable", at least from the perspective of the borrowing firms.

5. Concluding Remarks

We investigate the effects of the transition in bank credit from the relationship banking model to the "originate-to-distribute" model, on a large sample of borrowers in the syndicated loan market. This shift has largely been due to the growth in the secondary market for syndicated loans, which has allowed banks to sell loans to participating investors in a largely opaque manner. While the prior literature has documented several benefits of the loan sales market for the banks as well as the borrowers, the long run effects of the existence of this market on the borrowing firms has never been examined. This is precisely what we examine in this paper.

When banks sell syndicated loans in the secondary market, it raises several moral hazard and adverse selection questions. Are the banks selling lemons? Do they only sell the loans of borrowers about whom they have negative private information that is unobservable to outside investors? Are they deliberately originating bad loans to enhance their fee income, just because there is an active secondary market where they can sell these loans? How does this affect the incentives of the bank to monitor their borrowers? Is the severance of their lending relationship harmful for borrowers? What is the consequent impact on the long run valuation of the borrowers? Is the secondary loan market "socially desirable"? Theory alone cannot predict the answers to these questions, since, from an intuitive standpoint, there are positive as well as negative effects of the secondary market for syndicated loans. Ultimately, these questions must be resolved empirically, which is the focus of our paper.

We find that borrowers with an active secondary market for their loans underperform their peers by about 9% per year in terms of annual, risk-adjusted abnormal returns, over a three year period subsequent to the initial sale of their loans. A strategy of going short the stock of the borrowers with an active loan market and long the stock of the borrowers with no active loan market results in an annual abnormal return of between 8% and 14% over a three year period, depending on the particular method used to measure abnormal returns. These abnormal returns are largely concentrated amongst small, high leverage, speculative grade borrowers. In addition, the borrowers with an active loan market suffer a valuation loss of about 15% of the value of their Total Assets over a three year period compared to their peers.

These are striking results which could be due to one of two reasons. First, banks may indeed be selling lemons based on their unobservable private information about the borrower. This would be an indication of a market failure, since, in an efficient market, reputation concerns should inhibit such actions on the part of banks. This is remarkably similar to the events that have unfolded in the historic, ongoing subprime mortgage crisis. Second, borrowers might suffer due to their diminished relationship with banks, since it removes the discipline of bank monitoring. In the absence of such discipline, borrowers may undertake suboptimal investment and operating decisions, and even allow some stakeholders to appropriate cash flows at the expense of other stakeholders, which would destroy value in the long run. Our results are consistent with both these explanations.

We also find that the borrowers without an active secondary loan market do not suffer any negative long-run effects after obtaining syndicated bank loans. This reaffirms the inference that, for some borrowers, banks loans are indeed "special" when compared to other forms of corporate financing such as IPOs, SEOs, public bonds, convertible debt, etc., all of whom result in negative long run performance of the firms raising capital. Our result is contrary to the findings of Billett, Flannery, and Garfinkel (2006) who document a negative long run performance of firms that borrow in the syndicated loan market. We show that this negative long run performance is limited to the borrowers that have an active secondary market for their loans. Our results also do not support the inferences in Gande and Saunders (2008), who infer that banks continue to be special even in the presence of a secondary market for loans. They also suggest that secondary market loan trading is valuable to equity investors. Their inferences are based just on the announcement effect of loan sales on the stock price of the borrowers, while we examine the long run performance of the borrowing firms. Our results suggest that bank loans are "special", but only for the subset of borrowers that do not have secondary market trading in their loans. We also show that secondary market loan trading is actually associated with destruction in the value of the borrowers over the long run.

We show that the "originate-to-distribute" model of bank is not entirely "socially desirable", since we document some of the negative effects of this model of bank credit on the long run performance and valuation of borrowers. Our results have important policy implications for regulators. The highly deregulated nature of this market is perhaps one of the reasons for the moral hazard and adverse selection problems that we detect in this market. One solution could be to impose restrictions on the sale of the loans that the banks originate, in terms of requiring them to hold at least a certain percentage of those loans on their books. This would hinder banks from originating bad loans, and would preserve some of the benefits of bank monitoring of borrowers. There should of course be additional disclosure requirements on all participants in the loan sales market, in order to reduce the occurrence of adverse selection. Lastly, the establishment of a loan trading exchange with a clearinghouse could benefit all market participants by way of greater transparency and regulatory oversight.

Table 1: **Descriptive Statistics** This table presents the descriptive statistics for firms with bank loans originated between 2000 and 2004. The first two columns, identified as LIQ, refer to the subset of borrowers with an active loan market, columns three and four refer to the subset of borrowers without an active loan market, and the last two columns refer to the set of all borrowers. We report the number of firms, firm characteristics including the ratio of net income to total assets (ROA) and the ratio of net income to revenue (profit margin), and the distribution of borrowers across industry and median credit quality. All summary statistics are computed over the sample period from 2000 to 2007.

	LIQ		no LIQ		All borrowers	
Number of firms	309		745		1054	
	Mean	Median	Mean	Median	Mean	Median
Size ($m)	3173.29	1042.17	2968.84	345.10	3024.39	519.63
Total assets ($m)	5108.08	1746.20	4196.08	429.17	4443.43	716.61
Sales ($m)	832.01	328.25	667.89	100.21	712.38	149.82
Leverage	0.67	0.69	0.55	0.56	0.58	0.60
ROA (%)	0.42	0.68	0.47	0.94	0.46	0.86
Profit margin (%)	-8.08	3.31	-5.62	3.70	-6.29	3.59
	Distribution of borrowers across industry and credit quality					
Consumer	0.20		0.26		0.24	
Manufacturing	0.25		0.22		0.23	
Technology	0.21		0.19		0.20	
Healthcare	0.08		0.09		0.08	
Other industries	0.26		0.25		0.25	
IG	0.13		0.35		0.25	
SG	0.87		0.65		0.75	

Table 2: **Factor regressions** This table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for two portfolios: borrowers with an active loan market and borrowers without an active loan market. We report estimates for alpha in the time-series regression of excess returns on the three Fama-French factors MKT, SMB and HML, and momentum, UMD: $R^j(t) - R_f(t) = \alpha + \beta_{MKT}MKT(t) + \beta_{SMB}SMB(t) + \beta_{HML}HML(t) + \beta_{UMD}UMD(t) + \varepsilon(t)$, $j \in \{LIQ,\ no\,LIQ\}$. $R^{LIQ}(t)$ is the return on the equally-weighted (EW) or value-weighted (VW) portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, $q \in \{12, 24, 36\}$. $R^{no\,LIQ}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. R_f denotes the one-month T-bill rate. We also report the alpha of a portfolio that is long in borrowers with no active loan market and short in borrowers that have an active loan market, by replacing $R^j(t) - R_f(t)$ with $R^{no\,LIQ}(t) - R^{LIQ}(t)$. For each regression, we report the estimate for alpha (in percent), Newey-West t-statistics (in parentheses), and the number of monthly observations during the 2000-2007 sample period.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Active loan market					
-0.73	-1.09	-0.93	-1.06	-0.75	-0.74
(-1.57)	(-2.29)	(-2.62)	(-2.27)	(-2.79)	(-1.93)
50	50	67	67	80	79
No active loan market					
0.30	-0.21	0.39	-0.18	0.40	-0.19
(1.87)	(-1.10)	(2.37)	(-0.89)	(2.32)	(-0.92)
93	93	93	93	93	93
No active loan market – active loan market					
1.19	0.99	1.36	0.97	1.18	0.67
(2.34)	(2.06)	(3.47)	(2.05)	(3.81)	(1.79)
50	50	67	67	80	79

Table 3: **Factor regressions by size** This table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for two portfolios: small borrowers with an active loan market and small borrowers without an active loan market. We report estimates for alpha in the time-series regression: $R^j(t) - R_f(t) = \alpha + \beta_{MKT}MKT(t) + \beta_{SMB}SMB(t) + \beta_{HML}HML(t) + \beta_{UMD}UMD(t) + \varepsilon(t)$, $j \in \{LIQ, no\,LIQ\}$. $R^{LIQ}(t)$ is the return on the equally-weighted (EW) or value-weighted (VW) portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, $q \in \{12, 24, 36\}$. $R^{no\,LIQ}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. R_f denotes the one-month T-bill rate. We also estimate the alpha of a portfolio that is long in borrowers with no active loan market and short in borrowers that have an active loan market, by replacing $R^j(t) - R_f(t)$ with $R^{no\,LIQ}(t) - R^{LIQ}(t)$. For each regression, we report the estimate for alpha (in percent), Newey-West t-statistics (in parentheses), and the number of monthly observations during the 2000-2007 sample period. The second panel shows the results for similar portfolios of large firms. The cutoff point between small and large firms is computed each month as the median size of all NYSE-traded firms that did not issue bank loans between 2000 to 2004.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Small borrowers					
Active loan market					
0.29	0.71	-0.65	-0.37	-0.53	-0.42
(0.46)	(1.24)	(-1.91)	(-0.98)	(-2.37)	(-1.57)
22	22	53	53	65	65
No active loan market					
0.36	0.31	0.44	0.43	0.45	0.45
(1.84)	(1.08)	(2.18)	(1.52)	(2.15)	(1.57)
93	93	93	93	93	93
No active loan market – active loan market					
0.03	-0.37	1.09	0.37	0.87	0.41
(0.05)	(-0.69)	(2.95)	(1.10)	(3.25)	(1.71)
22	22	53	53	65	65
Large borrowers					
Active loan market					
–	–	0.14	-0.04	0.29	-0.01
		(0.76)	(-0.20)	(1.54)	(-0.03)
		23	23	45	45
No active loan market					
-0.01	-0.17	0.10	-0.15	0.11	-0.16
(-0.08)	(-0.96)	(0.69)	(-0.76)	(0.81)	(-0.81)
88	88	88	88	88	88
No active loan market – active loan market					
–	–	0.27	0.42	0.05	0.15
		(1.14)	(0.91)	(0.23)	(0.44)
		23	23	45	45

Table 4: **Factor regressions by industry** Each panel of this table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for a portfolio that is long in borrowers in a particular industry that have no active loan market and short in borrowers in that industry that have an active loan market. We distinguish between five industries: consumer (consumer durables, nondurables, wholesale, retail, and some services), manufacturing (manufacturing, energy, and utilities) technology (business equipment, telephone and television transmission), healthcare (healthcare, medical equipment, and drugs), and other industries (mines, construction, building materials, transportation, hotels, business services, entertainment, and finance). We report estimates for alpha in the time-series regression of zero-cost portfolio returns on the three Fama-French factors MKT, SMB and HML, and momentum, UMD: $R^{no\,LIQ}(t) - R^{LIQ}(t) = \alpha + \beta_{MKT}MKT(t) + \beta_{SMB}SMB(t) + \beta_{HML}HML(t) + \beta_{UMD}UMD(t) + \varepsilon(t)$, $j \in \{LIQ,\, no\,LIQ\}$. $R^{LIQ}(t)$ is the return on the equally-weighted (EW) or value-weighted (VW) portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, $q \in \{12, 24, 36\}$. $R^{no\,LIQ}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. R_f denotes the one-month T-bill rate. For each regression, we report the estimate for alpha (in percent), Newey-West t-statistics (in parentheses), and the number of monthly observations during the 2000-2007 sample period.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
		Consumer			
–	–	0.85	0.20	1.33	0.40
		(1.62)	(0.42)	(3.83)	(0.85)
		49	48	65	64
		Manufacturing			
1.08	1.13	1.29	1.56	0.75	0.67
(1.72)	(3.58)	(2.79)	(2.52)	(2.44)	(1.83)
35	35	59	59	71	71
		Technology			
1.85	2.07	2.42	2.15	1.53	1.72
(2.27)	(1.84)	(2.67)	(1.90)	(1.58)	(1.77)
35	35	69	69	78	78
		Healthcare			
–	–	0.69	-0.01	0.32	-0.90
		(0.45)	(-0.01)	(0.39)	(-1.19)
		10	10	29	29
		Other industries			
0.43	0.93	0.84	1.22	0.98	1.07
(0.92)	(1.86)	(1.83)	(1.97)	(2.74)	(1.97)
31	31	61	61	72	72

Table 5: **Factor regressions by rating** This table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for two portfolios: IG borrowers with an active loan market and IG borrowers without an active loan market. We report estimates for alpha in the time-series regression of excess returns on the three Fama-French factors MKT, SMB and HML, and momentum, UMD: $R^j(t) - R_f(t) = \alpha + \beta_{MKT} MKT(t) + \beta_{SMB} SMB(t) + \beta_{HML} HML(t) + \beta_{UMD} UMD(t) + \varepsilon(t)$, $j \in \{LIQ, no\,LIQ\}$. $R^{LIQ}(t)$ is the return on the equally-weighted (EW) or value-weighted (VW) portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, $q \in \{12, 24, 36\}$. $R^{no\,LIQ}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. R_f denotes the one-month T-bill rate. We also estimate the alpha of a portfolio that is long in borrowers with no active loan market and short in borrowers that have an active loan market, by replacing $R^j(t) - R_f(t)$ with $R^{no\,LIQ}(t) - R^{LIQ}(t)$. For each regression, we report the estimate for alpha (in percent), Newey-West t-statistics (in parentheses), and the number of monthly observations during the 2000-2007 sample period. The second panel shows the results for similar portfolios of SG firms.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
IG borrowers					
Active loan market					
–	–	0.24	-0.17	0.29	-0.28
		(0.49)	(-0.31)	(1.23)	(-0.91)
		25	25	52	52
No active loan market					
0.36	0.03	0.37	0.04	0.36	0.03
(2.63)	(0.16)	(2.75)	(0.23)	(2.62)	(0.18)
90	90	90	90	90	90
No active loan market – active loan market					
–	–	0.05	0.46	-0.26	0.38
		(0.09)	(0.68)	(-0.91)	(0.95)
		25	25	52	52
SG borrowers					
Active loan market					
-0.12	-0.34	-0.92	-1.41	-0.78	-1.11
(-0.17)	(-0.53)	(-2.30)	(-2.47)	(-2.64)	(-2.38)
29	29	62	62	74	74
No active loan market					
-0.11	-0.38	0.17	-0.19	0.22	-0.18
(-0.54)	(-1.18)	(0.88)	(-0.54)	(0.97)	(-0.48)
84	84	82	82	82	82
No active loan market – active loan market					
0.41	0.77	0.99	1.17	0.85	0.90
(0.65)	(1.09)	(2.10)	(1.85)	(2.52)	(1.70)
29	29	62	62	74	74

Table 6: **Factor regressions by leverage** This table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for two portfolios: low-leverage borrowers with an active loan market and low-leverage borrowers without an active loan market. We report estimates for alpha in the time-series regression: $R^j(t) - R_f(t) = \alpha + \beta_{MKT} MKT(t) + \beta_{SMB} SMB(t) + \beta_{HML} HML(t) + \beta_{UMD} UMD(t) + \varepsilon(t)$, $j \in \{LIQ,\ no\,LIQ\}$. $R^{LIQ}(t)$ is the return on the equally-weighted (EW) or value-weighted (VW) portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, $q \in \{12, 24, 36\}$. $R^{no\,LIQ}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. R_f denotes the one-month T-bill rate. We also estimate the alpha of a portfolio that is long in borrowers with no active loan market and short in borrowers that have an active loan market, by replacing $R^j(t) - R_f(t)$ with $R^{no\,LIQ}(t) - R^{LIQ}(t)$. For each regression, we report the estimate for alpha (in percent), Newey-West t-statistics (in parentheses), and the number of monthly observations during the 2000-2007 sample period. The second panel shows the results for similar portfolios of high-leverage firms. The cutoff point between low-leverage and high-leverage firms is computed each month as the median size of all NYSE-traded firms that did not issue bank loans between 2000 to 2004.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Low leverage					
Active loan market					
0.29	-0.53	-0.25	-0.56	-0.01	-0.16
(0.49)	(-0.88)	(-0.55)	(-0.92)	(-0.02)	(-0.31)
33	33	67	67	78	78
No active loan market					
0.41	-0.32	0.45	-0.29	0.43	-0.32
(1.68)	(-0.85)	(1.84)	(-0.76)	(1.75)	(-0.83)
94	94	94	94	94	94
No active loan market – active loan market					
-0.07	0.37	0.42	0.40	0.15	-0.08
(-0.12)	(0.52)	(0.85)	(0.50)	(0.43)	(-0.12)
33	33	67	67	78	78
High leverage					
Active loan market					
0.10	-0.22	-0.94	-1.12	-0.89	-0.97
(0.24)	(-0.49)	(-3.05)	(-2.41)	(-3.34)	(-2.46)
26	26	61	61	73	73
No active loan market					
0.28	-0.01	0.40	0.03	0.44	0.05
(1.44)	(-0.03)	(1.99)	(0.15)	(2.15)	(0.21)
92	92	92	92	92	92
No active loan market – active loan market					
0.53	0.81	1.33	1.03	1.30	1.04
(0.90)	(1.65)	(3.78)	(2.25)	(4.45)	(2.91)
26	26	61	61	73	73

Table 7: **Mean Calendar-Time Abnormal Returns** This table shows the four-factor calendar-time risk-adjusted long-run abnormal stock returns for two portfolios: borrowers with an active loan market and borrowers without an active loan market. For each calendar month, the abnormal return for each borrower is calculated relative to the returns on the 125 control portfolios based on size (market value of equity), book-to-market ratio, and momentum: $CTAR^i(t) = R^i(t) - R^{i,ref}(t)$. The reference portfolio return is the equally-weighted (EW) or value-weighted (VW) return of the portfolio of reference stocks. Reference portfolio stocks must have entered the Compustat database at least two years before the beginning date of computation of MCTAR, and exclude firms that issued bank loans between 2000 to 2004. In each calendar month t, a mean return across firms in the portfolios is calculated as $\overline{CTAR^j}(t) = \sum_i w^i(t)\, CTAR^i(t)$, $j \in \{LIQ,\, no\, LIQ\}$. $\overline{CTAR^{LIQ}}(t)$ denotes the weighted calendar-time abnormal return on the portfolio of borrowers whose secondary loan market first became liquid in the q months prior to t, where $q = 12, 24$, or 36 months. $\overline{CTAR^{no\, LIQ}}(t)$ is the return on the portfolio of borrowers that did not have an active secondary loan market in the q months prior to t. A grand mean monthly abnormal return is calculated as $MCTAR^j = 1/T \sum_{t=1}^{T} \overline{CTAR^j}(t)$. T-statistics (in parentheses) and the number of monthly observations during the 2000-2007 sample period are provided with each estimate. The last three rows report the statistics for the average difference in calendar-time abnormal returns between the portfolio of borrowers without an active loan market and the portfolio of borrowers that have an active loan market, by replacing $\overline{CTAR^j}(t)$ with $\overline{CTAR^{no\, LIQ}}(t) - \overline{CTAR^{LIQ}}(t)$.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Active loan market					
-0.85	-1.37	-0.87	-0.99	-0.85	-0.73
(-1.69)	(-2.62)	(-2.55)	(-2.80)	(-3.17)	(-2.50)
37	37	64	64	76	76
No active loan market					
-0.15	-0.07	-0.10	-0.05	-0.08	-0.06
(-0.95)	(-0.26)	(-0.63)	(-0.20)	(-0.50)	(-0.21)
93	93	93	93	93	93
No active loan market – active loan market					
0.47	1.16	0.67	0.91	0.76	0.70
(1.11)	(2.71)	(2.05)	(2.67)	(2.91)	(2.46)
37	37	64	64	76	76

Table 8: **Cumulative Abnormal Returns** This table shows the 12, 24 and 36-month cumulative abnormal stock returns (CAR) for two portfolios: borrowers with an active loan market and borrowers without an active loan market. CAR is computed using Lyon, Barber, and Tsai (1999) reference portfolio method, with 125 reference portfolios based on size (market value of equity), book-to-market ratio, and momentum. The reference portfolio return is the equally-weighted (EW) or value-weighted (VW) return of the portfolio of reference stocks. Reference portfolio stocks must have entered the Compustat database at least two years before the beginning date of computation of CAR, and exclude firms that issued bank loans between 2000 to 2004. The first panel reports results for continuously rebalanced reference portfolios, whereas in the second panel reference portfolios are not allowed to update. For each portfolio, we report the estimate for CAR (in percent), its skewness-adjusted t-statistic (in parenthesis) as discussed in Barber and Lyon (1997), and the number of firms in the portfolio. For borrowers without an active loan market, we randomly draw 1000 samples of event dates following the firm's first loan origination date, and show the median of the statistics. The last two rows of each panel report the median, across the 1000 simulations, of the difference in the cumulative abnormal returns between the portfolio of borrowers without an active loan market and the portfolio of borrowers that have an active loan market, as well as the median of the associated two-sample t-test statistics with unpooled variances.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Rebalanced control portfolios					
Active loan market					
-4.70	-8.42	-8.89	-10.44	-11.62	-7.36
(-1.30)	(-3.22)	(-1.93)	(-3.23)	(-2.21)	(-1.95)
187	187	187	187	182	182
No active loan market					
-0.73	1.09	-0.64	2.43	0.50	3.80
(-0.39)	(0.98)	(-0.25)	(1.60)	(0.17)	(2.09)
507	507	515	515	524	524
No active loan market – active loan market					
3.97	9.51	8.25	12.87	12.12	11.15
(0.98)	(3.35)	(1.57)	(3.60)	(2.00)	(2.67)
Control portfolios not rebalanced					
Active loan market					
-3.14	-5.53	-6.15	-7.74	-5.43	-4.44
(-0.87)	(-2.09)	(-1.31)	(-2.33)	(-0.99)	(-1.15)
187	187	187	187	182	182
No active loan market					
0.07	2.13	0.82	5.10	2.46	8.18
(0.04)	(1.91)	(0.31)	(3.32)	(0.80)	(4.44)
507	507	515	515	524	524
No active loan market – active loan market					
3.21	7.66	6.97	12.85	7.89	12.62
(0.79)	(2.67)	(1.30)	(3.52)	(1.26)	(2.95)

Table 9: **Buy-and-Hold Abnormal Returns** This table shows the 12, 24 and 36-month buy-and-hold abnormal stock returns (BHAR) for two portfolios: borrowers with an active loan market and borrowers without an active loan market. BHAR is computed using Lyon, Barber, and Tsai (1999) reference portfolio method, with 125 reference portfolios based on size (market value of equity), book-to-market ratio, and momentum. The reference portfolio return is the equally-weighted (EW) or value-weighted (VW) return of the portfolio of reference stocks. Reference portfolio stocks must have entered the Compustat database at least two years before the beginning date of computation of BHAR, and exclude firms that issued bank loans between 2000 to 2004. The first panel reports results for continuously rebalanced reference portfolios, whereas in the second panel reference portfolios are not allowed to update. For each portfolios, we report the estimate for BHAR (in percent), its skewness-adjusted t-statistic (in parenthesis) as discussed in Barber and Lyon (1997), and the number of firms in the portfolio. For borrowers without an active loan market, we randomly draw 1000 samples of event dates following the firm's first loan origination date, and show the median of the statistics. The last two rows of each panel report the median, across the 1000 simulations, of the difference in the buy-and-hold abnormal returns between the portfolio of borrowers without an active loan market and the portfolio of borrowers with an active loan market, as well as the median of the associated two-sample t-test statistics with unpooled variances.

12 months		24 months		36 months	
EW	VW	EW	VW	EW	VW
Rebalanced control portfolios					
Active loan market					
-3.60	-6.96	-3.92	-9.45	-13.63	-9.64
(-0.93)	(-0.60)	(-0.65)	(-0.64)	(-1.34)	(-0.39)
187	187	187	187	182	182
No active loan market					
-1.40	1.18	-3.40	2.89	-4.19	4.86
(-0.49)	(0.32)	(-0.69)	(0.45)	(-0.53)	(0.53)
507	507	515	515	524	524
No active loan market – active loan market					
2.20	8.14	0.52	12.34	9.44	14.50
(0.47)	(0.84)	(0.07)	(0.92)	(0.74)	(0.71)
Control portfolios not rebalanced					
Active loan market					
-0.92	-2.79	2.82	-2.72	4.80	0.13
(-0.25)	(-0.17)	(0.54)	(-0.07)	(0.63)	(0.13)
187	187	187	187	182	182
No active loan market					
0.82	2.34	3.78	6.69	8.29	11.28
(0.35)	(0.62)	(0.94)	(1.11)	(1.40)	(1.36)
507	507	515	515	524	524
No active loan market – active loan market					
1.74	5.13	0.96	9.41	3.49	11.15
(0.40)	(0.52)	(0.14)	(0.69)	(0.33)	(0.56)

Table 10: **Valuation analysis** We report results for two models of long-run changes in firm valuation: (I) the 36-month-ahead difference in Tobin's q of borrowers relative to a reference group using *levels* of firm valuation, and (II) the 36-month-ahead difference in Tobin's q of borrowers relative to a reference group using *changes* in firm valuation. Besides 36 months, we also report results for 12-month-ahead and 24-month-ahead differences. For both models, the reference group is two-digit SIC code and valuation matched. The table is divided into three panels. The first panel shows results for firms with an active loan market, whereas the second panel reports the results for borrowers without an active loan market. For each of these two panels, the first and second row show the average difference in 36-month-ahead Tobin's q and the associated t-statistic, respectively. Rows three and four report the median difference in 36-month-ahead Tobin's q and the p-value of the associated Wilcoxon signed rank test statistic. Row five reports the number of firms in the test sample. For the second panel, we report the median statistics over 1000 simulations of event dates. The third panel of the table reports the median, over the 1000 simulations, of the difference between the abnormal valuation estimate for the no-active-loan-market group minus that of the active-loan-market group, as well as the median of the associated two-sample t-test statistics with unpooled variance.

12 months		24 months		36 months	
I	II	I	II	I	II
Active loan market					
-2.65	-2.95	-0.93	-1.64	-11.47	-14.00
(-0.96)	(-0.87)	(-0.23)	(-0.40)	(-2.49)	(-2.83)
-2.13	-2.78	-1.01	-2.17	-6.56	-7.43
[0.11]	[0.06]	[0.91]	[0.51]	[0.02]	[0.01]
187	187	169	169	151	151
No active loan market					
2.11	0.92	2.49	1.28	3.08	1.64
(0.70)	(0.31)	(0.72)	(0.36)	(0.76)	(0.39)
-1.03	-1.09	-1.42	-1.91	-1.85	-2.29
[0.53]	[0.45]	[0.56]	[0.39]	[0.53]	[0.37]
458	458	429	429	396	396
No active loan market – active loan market					
4.77	3.87	3.42	2.91	14.56	15.64
(1.17)	(0.86)	(0.65)	(0.54)	(2.36)	(2.40)

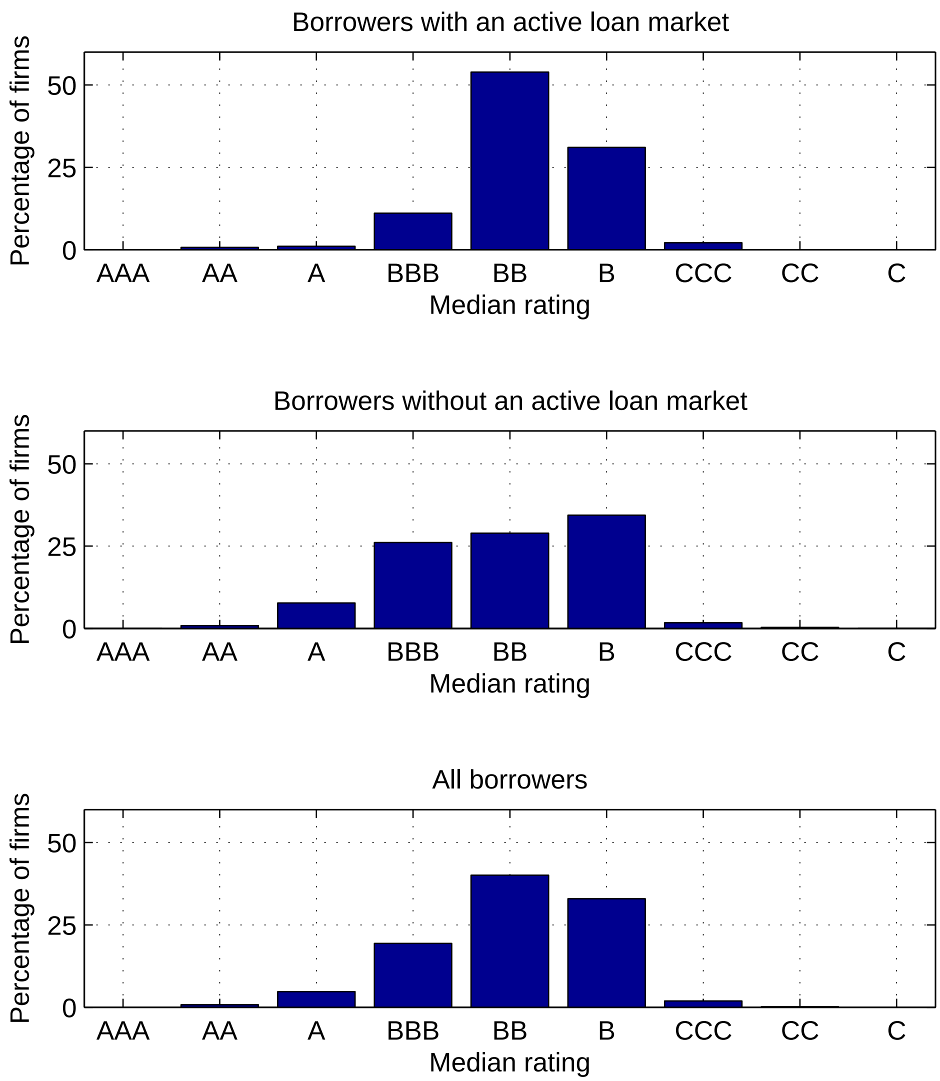

Figure 1: Median long-term S&P credit rating for borrowers with an active loan market, for borrows without an active loan market, and for all borrowers.

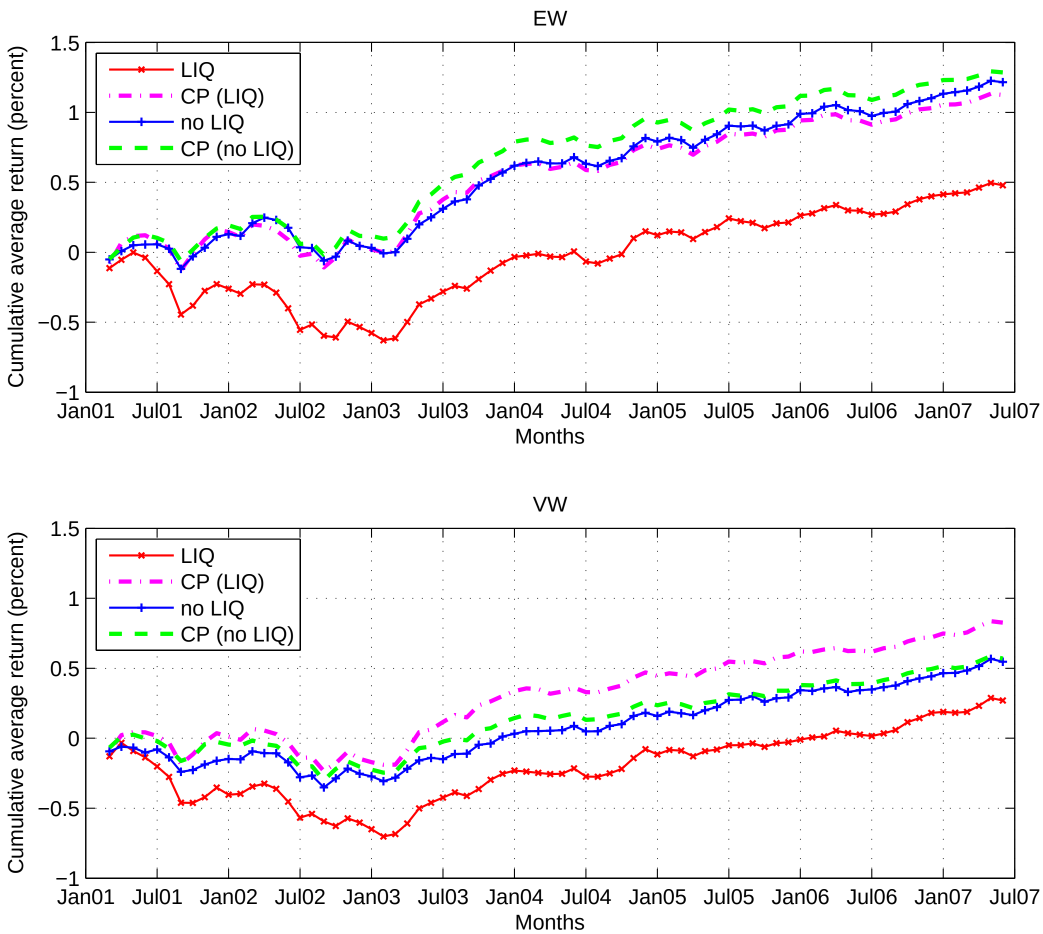

Figure 2: Calendar-time cumulative average returns for borrowers with an active loan market (LIQ), their control portfolio (CP (LIQ)), borrowers without an active loan market (no LIQ), and their control portfolios (CP (no LIQ)).

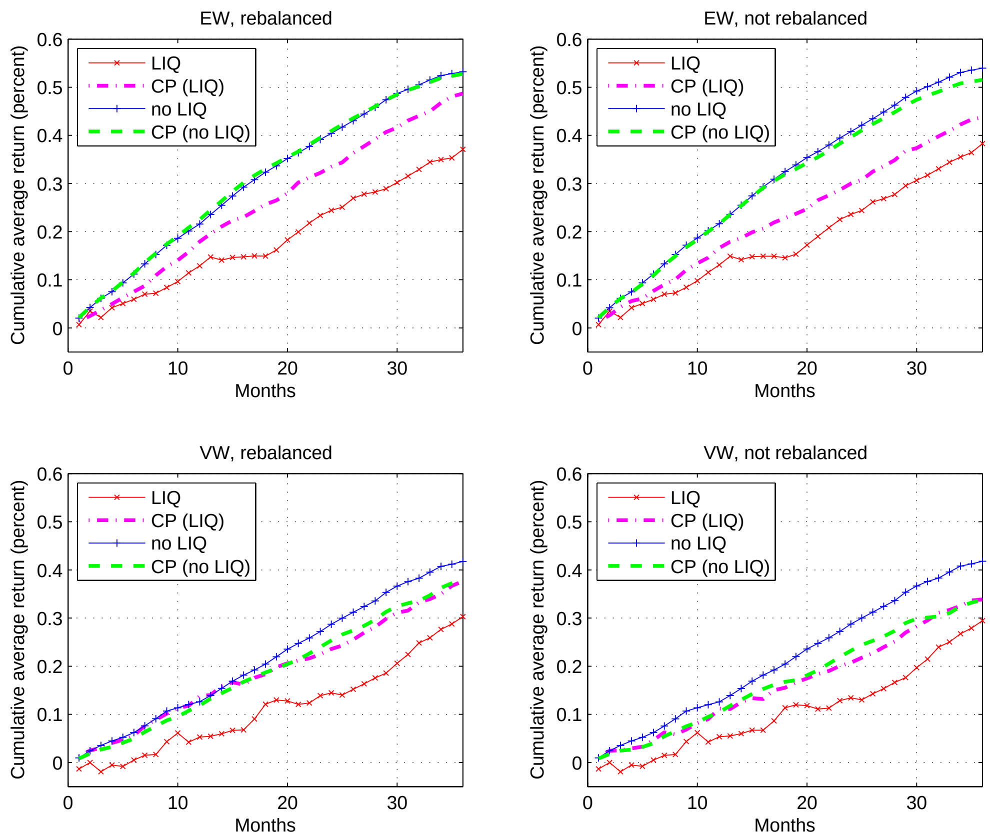

Figure 3: Event-time cumulative average returns for borrowers with an active loan market (LIQ), their control portfolio (CP (LIQ)), borrowers without an active loan market (no LIQ), and their control portfolios (CP (no LIQ)).

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