

**Do Hedge Funds Trade on Private Information?**  
**Evidence from Syndicated Lending and Short-selling**

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# **Do Hedge Funds Trade on Private Information?**

## **Evidence from Syndicated Lending**

### **ABSTRACT**

This paper investigates important contemporary issues related to hedge fund involvement in the syndicated loan market. In particular, we investigate potential conflicts of interest that arise due to the lack of regulation relating to hedge funds' permissible dual holding of loans and short positions in the equity of borrowing firms. We find evidence of possible trading on private information in the equity of the hedge fund borrowers prior to the public announcements of both loan origination and loan renegotiation (amendments). In addition, our results show that hedge funds are more likely to lend to highly leveraged, low credit quality firms, where access to private information is potentially more valuable and trading on such information can lead to greater profits. Our results have important implications for the current debate regarding regulation of the hedge fund industry.

**Keywords:** Hedge funds, short-selling, private information, conflict of interest, syndicated loans, loan origination, loan renegotiation, loan amendment.

**JEL Classifications:** D82, G2, G38

## I. Introduction

Over the past decade, hedge funds have made significant inroads into the syndicated loan market. In particular, anecdotal evidence suggests that hedge funds are willing to lend to borrowers that commercial banks are unwilling to lend to.<sup>1</sup> As of 2005, hedge funds and other institutional investors provided almost 50% of the \$509 billion loans made in the “highly leveraged” segment of the syndicated loan market. The entry of hedge funds into these markets raises a number of important questions and issues that hitherto have not been addressed. In particular, we investigate the potential and actual conflicts of interest that arise due to the lack of regulation relating to hedge funds participation in syndicated lending, while at the same time being able to trade (short) the stocks of borrowing firms. This issue is especially pertinent since hedge fund loan originators are privy to private information about the performance of borrowing firms around both loan origination and loan renegotiation/amendment dates.<sup>2</sup>

Recently, there have been public concerns about hedge fund involvement in corporate lending. An article in the *Business Week* on October 31, 2005 voiced these apprehensions: “*a new breed of lender is stepping in: Hedge funds are providing hundreds of millions of dollars to companies whose shaky credit disqualifies them for prime bank loans or whose needs are too puny to attract big commercial bankers. But with the new source of capital come new dangers, including the possibility that hedge funds will make risky loans and exploit information gained as lenders to benefit their trading gambits...*”. These concerns are also consistent with the

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<sup>1</sup> James Sprayregen, a bankruptcy lawyer with Kirkland & Ellis LLP in Chicago says, “They (hedge funds) are willing to take more risk for more return. And they are agnostic about outcomes as long as they are protected.” Further, an article in *Business Week*, Hedges: The New Corporate ATMs, October 2005, mentions that hedge funds are willing to cut deals quickly, without the red tape big banks require meeting regulator's demands. As one anonymous hedge fund executive mentioned, “We do an enormous amount of analysis very fast and provide these companies with rescue financing that allows them to preserve value in their businesses.”

<sup>2</sup> See, Dennis and Mullineaux (2000) and Sufi (2007) who establish that the origination and maintenance of syndicated loans depend crucially on borrowers providing lenders with updated confidential information. Thus, syndicate participants in loans of publicly traded firms routinely have access to material non-public information prior to it being revealed to the public markets.

recognized difference between the objectives and expertise of hedge funds and traditional lenders such as commercial banks (see for example Diamond (1984) and Fama (1985)). Specifically, hedge funds may seek to maximize short term profits, while commercial banks seek to maximize long term profits by building “customer relationships” over time. Indeed, prior research has shown strong support for a relationship effect when a loan is extended by a commercial bank. What has not been established is whether, or how, short term profit maximizers (such as hedge funds) are different from long term profit maximizers especially in protecting their clients' interests when originating loans. Consequently, in this paper we investigate the potential conflict of interest that arises when hedge funds participate in syndicated lending. In general, the empirical evidence supports the view that the capital market discounts the share price of a company who announces borrowing from hedge funds.<sup>3</sup> Thus, one potential profitable benefit from the private information generated during the loan origination and renegotiation process is to sell short the equity of a borrower prior to loan announcements. In this paper we investigate this potential conflict of interest as whether hedge funds short-sell a borrower's equity prior to new hedge fund loan announcements and benchmark it against the short selling behaviour exhibited around commercial bank loan announcements.<sup>4</sup>

Anecdotally, it is known that hedge funds enforce very strict covenants on the loans they grant to financially troubled firms where failure to comply with these covenants will result in a technical default of the credit agreement. As a result, this gives lenders such as hedge funds, the

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<sup>3</sup> Indeed, during the period 2005 to 2007, we find the capital market reacts positively for bank loans where the cumulative abnormal return is 1.52% during (0, +5) window and it is significant at 5% while the market reacts negatively to announcement of the hedge fund loans the cumulative abnormal return is -1.29% during (0, +5) window and it is significant at 10%.

<sup>4</sup> Since regulation may prevent banks from directly engaging in trading on the equity of the borrower (except under certain special circumstances), we conduct various robustness checks of our above results by comparing the short selling by hedge funds to several alternative benchmarks with potentially lower regulatory barriers, finding similar results. James (1995) examined the conditions under which banks hold the equity of their borrowers and found that when they do hold equity, they obtain a substantial proportion of the firm's stock and maintain their position for over two years.

right to reevaluate the financial position of the borrower and decide whether or not to amend an existing loan contract. Indeed following a covenant violation a restructured loan might include, increasing or decreasing the loan interest rate, the loan's maturity, and/or the principal amount.<sup>5</sup> During this process of renegotiation lenders may obtain "new" material private information about the future performance of a borrower. Thus, a conflict of interest arises when hedge fund lenders take advantage of this private information and trade on it in the market.

For example, on March 6, 2006, executives from Movie Gallery, a large movie rental chain, held a *private* conference call for their lenders –many of which were hedge funds– to discuss how new challenges facing the industry had caused the company to recognize a record loss of \$522 million.<sup>6</sup> These losses violated one of the major covenants of a \$1.35 billion syndicated loan extended by hedge funds such as Highland Capital Management, Canyon Capital, and Silver Point Capital. The Movie Gallery executives requested that their lenders amend existing loan contracts and relax existing financial covenants.<sup>7</sup> Nearly two weeks after the private conference call, Movie Gallery publicly announced their syndicated loan covenant amendments to the public (on March 17, 2006). However, after the conference call of March 6, 2006 and before the announcement of March 17, 2006, short-selling of Movie Gallery's stock rose significantly. In particular, between March 7, 2006 and March 13, 2006 the weekly cumulative short sale volume increased from 0.4 million shares (1.23% of the outstanding shares) to 3.04 million shares (9.5% of the outstanding shares). By March 13, 2006, Movie

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<sup>5</sup> Maskin and Moore (1999) argue that renegotiation is an issue that arises largely as an out-of-equilibrium phenomenon and could provide pareto improvement over bankruptcy.

<sup>6</sup> See *The New York Times* cover story, "As Lenders, Hedge Funds Draw Insider Scrutiny" by Jenny Anderson, October 16, 2006.

<sup>7</sup> Movie Gallery incurred significant fees related to this amendment including a 50 basis point upfront fee totaling \$4.5 million and various administrative fees.

Gallery's stock price had fallen by 61% as its closing price dropped from \$3.27 on March 6, 2006 to \$2.01 on March 13, 2006.

The above example and a number of similar examples raise an important regulatory policy issue regarding hedge funds' common practice of acting as both lenders and equity traders in the same borrowing firm. In comparison to commercial banks, hedge funds are unregulated vis-à-vis their equity holdings (either long or short), and commonly have fewer information barriers, such as "Chinese walls", between those in the hedge fund who initiate loans and those who trade in the equity of the borrowing firm. For example, a hedge fund originator of loans, who may have access to material private information regarding a borrowing firm, may face few restrictions on trading the equity of the borrowing firm, or, in some cases, they may even be the same person.

Regulators in other countries have expressed concern with respect to this issue. For example, in Britain the Financial Services Authority is examining whether hedge funds are illegally using sensitive private information gathered as lenders when they trade a company's bonds and stocks.<sup>8</sup> In the US, the SEC has tried to force hedge fund advisers to register with the commission, but a federal court overturned its ruling in 2006.<sup>9</sup> Now lawmakers in the US have introduced several bills in the House and Senate to give the SEC the authority it lost in court.<sup>10</sup> Indeed, recently, the SEC charged Blue River Capital for failing to have internal information barriers in place to prevent the misuse of sensitive privately obtained information garnered in the process of lending.

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<sup>8</sup> See the *Business Week* editorial article, *The Invisible Lenders*, October 31, 2005.

<sup>9</sup> The SEC's rule which became effective on February 2005 was adopted under the Investment Advisors Act of 1940, 15 U.S.C. 80b-1. In June 2006 the US Court of Appeals for the DC Circuit overturned the SEC ruling.

<sup>10</sup> See Reuters article, *Momentum Grows for U.S. Hedge Fund Adviser Registration*, May 07, 2009.

These uncertainties and potential conflicts of interest have not stopped companies from lining up to borrow from hedge funds. The list of the companies turning to “alternative lenders” includes U-Haul International's parent, AMERCO, Krispy Kreme, Aloha Airlines, textile manufacturer Dan River, Tower Automotive Inc., SLS International Inc. and Salton Inc., which makes George Foreman grills.<sup>11</sup>

To investigate the potential conflict of interest resulting from hedge fund involvement in syndicated lending we collected pertinent data from a number of different databases. The source of our loan data is the *DealScan* database provided by Reuters’ Loan Pricing Corporation (LPC). Because of the lack of formal regulation for hedge funds, one of the major challenges of hedge fund research is to build a hedge fund database that can address the questions raised above. One important aspect of our paper is that we build a comprehensive database using seven major hedge fund data bases including the TASS Hedge Funds Database (TASS), the Hedge Fund Research database (HFR), Center for International Securities and Derivatives Markets database (CISDM) and Private Equity Information Hedge Fund Database (PEI). Our source of short-sales data is REGSHO.

To address whether conflicts of interest arise in the short-selling of equity prior to hedge fund loan origination announcements, we employ multiple approaches to control for potential endogeneity and self selection biases. In particular, we employ propensity score matching and switching regressions with endogenous switching. Our major finding is that short-selling of a borrower’s equity prior to loan origination date is significantly larger for borrowers using hedge funds compared to that of a matched borrower that uses banks. The above result is robust to

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<sup>11</sup> In the first quarter of 2007, \$7.5 billion was raised for distressed securities funds, mounting to a record \$80.3 billion in 238 funds, according to Hedge Fund Research in Chicago. Funds that invest in distressed debt rose 0.95% in June 2007 and are up 9.1% year-to-date, according to the Credit Suisse/Tremont Hedge Fund Index. That outperformed the fund’s general index which rose 0.78% in June and 8.7% year-to-date, Reuters July 23, 2007.

several alternate specifications, including restricting our bank lender sample to only those that are part of a bank holding company; restricting our hedge fund sample to include only hedge fund *lead* lenders; restricting our hedge fund sample to include only stand alone hedge funds; and finally, restricting our hedge fund sample to include only loans that have financial covenants attached to them. In all cases, the above result remains qualitatively unchanged.

We then focus on loan *amendments*, since prior to loan amendments lenders necessarily have private information about the borrowers expected future performance and covenant violations. Such private information may include information on the perceived financial weakness of the borrower and an impending renegotiation of the loan contract. Thus, short-selling activity around loan amendment dates is more likely to be attributable to trading on private information relating to borrower's quality. By contrast short-selling of borrowers' equity at the time of new loan origination, could also be attributed to potential hedging activities by the lenders if such short selling occurs on or after the announcement date of the loan. Consistent with the Movie Gallery example above, we find strong evidence supporting trading on private information in the equity of hedge fund borrowers just prior to loan *amendment* dates in comparison to that found in the bank borrowers sample.

Specifically, average "abnormal" short-selling is positive and significant prior to amendment date announcements for hedge fund borrowers and its mean difference from the bank borrower sample is positive and significant at the 1% level. Using a simple trading strategy, based on actual or abnormal short-selling volume around loan amendment announcement dates, we show that short-selling *prior* to a loan amendment date is economically significant and profitable for the equity of hedge fund borrowers, while it is not profitable for the equity of bank borrowers. These results are also robust to various sample specifications including restricting our

hedge fund loans to stand alone hedge fund lenders only, sorting loan amendments based on the outcome of the negotiations (favorable and unfavorable), and sorting loan amendments into quintiles based on changes in the credit quality of the borrower *post*-loan origination and prior to loan amendments.

Our paper is closely related to the literature on recent changes that have altered the structure of the syndicated loan market and which has brought into focus the potential conflict of interest that may exist when non-bank financial institutions participate in the syndicated lending.<sup>12</sup> In a recent paper, Bushman, Smith, and Wittenberg-Moerman (2009) analyze the relationship between syndicated loans and the speed of price discovery in both the secondary loan market and the equity market over quarterly earnings cycles. They find that price discovery in the equity market is faster for firms that have institutional syndicated loan lenders. However, their paper does not directly consider trading activities (both long and short) in the borrower's stock around the potential leakage of private information nor does it explicitly analyze participation by hedge funds. Ivashina and Sun (2007) study the potential conflicts of interest that arise when institutional managers simultaneously make syndicated loans as well as hold the equity of borrowing firms. However, their paper does not consider short positions taken in the equity of borrowing firms nor does it explicitly analyze participation by hedge funds. Jiang, Li, and Shao (2008) analyze dual holdings, i.e., the simultaneous holding of both equity and debt claims of the same company by non-bank institutional investors. They, however, do not analyze

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<sup>12</sup> Anecdotal evidence suggests that the introduction of loan ratings opened the door for institutional investors such as hedge funds to enter the loan market which led to an increase in the availability of financing in the syndicated loan market (see, Mullineaux and Yi (2006) and Sufi (2009)). Nandy and Shao (2007) provide an analysis of institutional investment in the syndicated loan market and show that institutions primarily act as lenders of last resort, charging higher spreads and lending to poorer credit quality borrowers, compared to commercial banks. Nini (2008) documents how the entry of non-banks increased the credit availability to lower quality firms. During the same time, the secondary loan trading market also greatly expanded in scope: see Gande and Saunders (2006) who analyze the secondary loan market and show that when a borrower's existing loans trade for the first time in the secondary market, it elicits a positive stock price response.

any potential conflict of interest nor do they explicitly investigate whether hedge funds engage in a conflictory manner. Our paper is also broadly related to conflicts of interest that may arise in financial intermediaries in other markets, such as those analyzed by Bodnaruk, Massa and Simonov (2007), who investigate the potential of information leakage around M&A events from the deal advisors to their investment arms within a financial conglomerate and that of Acharya and Johnson (2007) who provide evidence consistent with the trading desk of banks and other financial institutions exploiting private information and engaging in potential insider trading in the credit default swap (CDS) market.

Consequently, this paper complements the existing literature and makes four additional contributions. First, this is the first paper to provide compelling evidence linking private information flows from the syndicated loan market to short-selling activity in the equity market. Second, our paper differentiates potential conflicts of interest based on the type of lender: banks, hedge funds, and other non-bank institutional investors. Third, our paper provides significant insights into the current debate regarding the regulation of hedge funds. Fourth, we outline and build a comprehensive hedge fund database using seven major data sources, thus contributing to future research on hedge fund investments holdings and strategies.<sup>13, 14</sup>

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<sup>13</sup> Our paper is also related to the literature on loan renegotiation. In the theoretical literature a large stream of research has analyzed the incentive to renegotiate a loan contract as a result of an exogenous shock that affected borrower characteristics and rendered the existing loan contract inefficient. See, Aghion, Dewatripont, and Rey (1994), Harris and Raviv (1995), Maskin and Moore (1999), Gorton and Kahn (2000), Tirole (2006), and Garleanu and Zwiebel (2007) among others. A number of papers have also empirically investigated loan renegotiation and the information content of such restructurings (see, Brown, James, and Mooradian (1993)). Roberts and Sufi (2008) is most closely related to our study, and show that the determinants of renegotiation depend on the accrual of new information concerning the credit quality, investment opportunities, and collateral of the borrower, as well as macroeconomic fluctuations in credit and equity market conditions.

<sup>14</sup> There are also a number of studies that focus primarily on the outcome and implications of violations of covenants, see, e.g., Beneish and Press (1993, 1995), Chen and Wei (1993), Smith (1993), Chava and Roberts (2007), and Nini, Smith, and Sufi (2007). Another set of papers investigate the outcome of *ex-post* bargaining in payment default and bankruptcy, see, e.g., Gilson (1990), Gilson, John, and Kang (1990), Asquith, Gertner, and Scharfstein (1994), and Benmelech and Bergman (2007).

The paper is organized as follows. In Section II, we present our hypothesis. In section III, we describe our data. In Section IV we present our empirical methodology and related variables. Section V presents the empirical results. Finally, Section VI concludes.

## II. Hypotheses

In this section we develop testable hypotheses to frame the potential conflict of interest that may arise due to the lack of regulation relating to hedge funds' simultaneous involvement in both syndicated lending and the short-selling of equity in borrowing firms. If short-selling activities are driven by loan hedging motives, then we should expect to see short-selling increasing from its “normal” levels just *after* or *immediately around* the public announcement of the new or amended loan contract. On the other hand, if abnormal short-selling activities are observed prior to loan announcements then it is more likely to be related to trading activity that exploits private information gathered during the loan origination and/or renegotiation process. In particular, we believe that the cleanest test for trading on private information in a borrowing firm’s equity will be just prior to loan *renegotiation announcements* given the private knowledge of actual or impending financial covenant weaknesses that may affect existing loan contracts. In general, regardless of who initiates loan amendments all participants in the loan syndicate get access to this private information. Consequently, we test the following two hypotheses (H1 and H2):

- **Hypothesis 1 (H1):** *The equity of the firms that have hedge funds as lenders are more likely to be short sold prior to public announcements of loan originations.*
- **Hypothesis 2 (H2):** *The equity of the firms that have hedge funds as lenders are more likely to be short sold prior to loan amendment dates.*

- **Hypothesis 3 (H3):** *Further, such short-selling is likely to be greater the weaker the financial situation of the borrower.*

### **III. Data and Sample Construction**

#### ***III. A. Loan Database***

We use loan information from the *DealScan* database provided by Reuters' Loan Pricing Corporation (LPC) and restrict our loan sample to run from 1995 to the first quarter of 2008<sup>15</sup>, due to the fact that the number of hedge fund and institutional borrower loans prior to 1995 were relatively small (Sufi (2009) and Nandy and Shao (2007)). We remove observations with missing borrower names, deal active dates, facility active dates, facility amount, all-in-drawn-spreads, or loan maturities and then restrict our loan sample again to include revolver loans and term loans made only to U.S. borrowers. We merge our loan sample with *Compustat* and *CRSP* either by borrower ticker and year of loan origination or by borrower name when the ticker information is missing in *DealScan*.<sup>16</sup> After merging, our loan sample consists of 21,830 loans at the deal level consisting of 30,832 loan facilities.

#### ***III.B. The Hedge Fund Databases***

Due to the absence of strict regulations regarding reporting requirements, there is no single comprehensive database on hedge funds and/or hedge fund management firms. One crucial step therefore is to identify syndicated loan lenders that are hedge funds or hedge fund management firms. In order to accomplish this task, we exploit seven major hedge fund data bases that have been widely used in the prior literature, namely: the TASS Hedge Funds Database (TASS), the Hedge Fund Research database (HFR), Center for International Securities

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<sup>15</sup> We restrict the sample to the first quarter of 2008 based on the data availability when we conducted our tests.

<sup>16</sup> Finally, as some borrowers in *DealScan* are subsidiaries of publicly traded companies, we matched their parents' information to *Compustat* and *CRSP*.

and Derivatives Markets database (CISDM), *Nelson's Directory of Investment Managers* 2004 to 2006 (Nelson), *Institutional Investor* magazine's annual Hedge Fund 100 List (II100) 2003 to 2007, the database of Cottier (1997), and the Private Equity Information Hedge Fund Database (PEI), which collects hedge fund information from SEC ADV forms. Each of the seven listed sources reports both hedge fund names and their managing company's names.

We compile a comprehensive list of hedge funds from these sources by including hedge fund names from TASS (4,590 firms and 10,838 funds), HFR (2,328 firms and 8,052 funds), CISDM (4,058 firms and 12,367 funds), Nelson (288 firms and 639 funds), II100 (170 firms and 603 funds), Cottier's (28 firms and 34 funds), and PEI (6,555 firms and 27,338 funds) at both the fund level and the firm level. We identify and remove duplicate observations by checking hedge fund names and their addresses from our compiled hedge fund database. Specifically, when observations from PEI are duplicated with those from one or more of the other six sources, we keep the former to preserve the information from SEC's ADV forms. We do this separately at both the management firm as well as the fund level.

Many hedge fund management firms, especially large ones, have more than one functional area. For example, the II100 2007 Hedge Fund List ranked J.P. Morgan Asset Management as the largest hedge fund firm. However, the company manages different asset classes other than hedge funds, such as fixed income, currency, real estate, infrastructure, and private equity, etc.. Therefore it is particularly difficult to define hedge funds at the managing firm level. During our sample period, investment advisers managing assets of \$25 million or more were generally required to register with the SEC and to file ADV forms until the

registration requirements were overturned by the courts in June 2006.<sup>17</sup> Using the information on the ADV forms (from PEI) and following Griffin and Xu (2007) and Huang (2008), we are able to apply the following criteria to observations from PEI to define a hedge fund management firm: the company charges performance-based fees and at least 50% of its clients are either “high net worth individuals” or at least 50% of its clients are in “Other pooled investment vehicles (e.g., hedge funds)”.<sup>18</sup> After excluding duplicates and hedge fund firms that do not meet these criteria, we end up with a comprehensive hedge fund sample comprising 9,525 unique hedge fund management firm names and 48,601 unique fund names with detailed hedge fund information from all sources.

### ***III.C. Construction of the Hedge Fund-Syndicated Loan Sample***

Finally, we construct our sample of syndicated loan lenders who are hedge funds by merging *DealScan* lender names with hedge fund names (at both the management firm level and fund level). We verify the robustness of the merged results by comparing lender domiciles from *DealScan* with hedge fund addresses, and by conducting web-based searches for merged lender names and hedge fund names. Our merged hedge fund lenders include the following four sub-cases: (1) A lender in *DealScan* is defined as a hedge fund or a hedge fund management company according to our hedge fund databases, e.g. Ares Leveraged Investment Fund II LP, a

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<sup>17</sup> See, Brown, et. al. (2008) who provide a detailed analysis on the benefits and drawbacks of mandatory disclosure as a regulatory tool, arising due to this controversial SEC policy requiring hedge funds to register. Overall, their findings suggest that Hedge funds operated by managers who filed Form ADV had better past performance and had more assets than those operated by managers who did not file. Moreover, they find a strong positive association between potential conflicts identified in the Form ADV filing and past legal and regulatory problems.

<sup>18</sup> It is important to note that our sample does not focus on the particular subset of hedge funds that file form ADV, since many hedge funds, particularly those that are non-U.S. domiciled did not file form ADV and many were exempt from the requirements. We simply use this form to “clean” our hedge fund data from the other sources since many of the management firms identified in TASS, HFR, or CISDM as hedge funds also have substantial operations that are not related to hedge fund activities. Thus, this issue could not be totally resolved, since the Form ADV sample does not comprise the universe of hedge funds and therefore the other six hedge fund databases may still contain hedge fund management companies with multiple functional areas, implying that we fail to remove certain management firms of investment companies from our sample with only a small hedge fund department. The presence of this random error in the data therefore would only bias against us finding significant results.

lender in *DealScan*, is defined as a hedge fund managed by Ares Management LLC according to PEI. (2) A lender in DealScan is a subsidiary of a hedge fund management company, e.g. *DealScan* records Cyrus Opportunities Master Fund Ltd as a lender, its management company, Cyrus Capital Partners, L.P., is recorded as a hedge fund management company. (3) A hedge fund or a hedge fund company is a subsidiary of a lender in *DealScan*, e.g., New York Life Capital Partners is a hedge fund company, and its parent, New York Life Capital Corp, is recorded as a lender in *DealScan*. (4) A lender is defined as a hedge fund company in some hedge fund database(s), but this lender could also have other functional areas, such as in the case of J.P. Morgan Asset Management we mentioned before. When (3) or (4) occurs, we consider the lender to be a hedge fund only if the loan(s) made by the lender are defined as institutional loan(s) by *DealScan*. We find 341 unique lender names in our *DealScan* loan sample that can be identified as hedge funds (193) or as hedge fund management firms (148).

Once the hedge fund sample has been defined, we then divide our Dealscan syndicated loan sample into three distinct lender categories: hedge fund lender, other institutional lender, and commercial bank lender. The hedge fund lender category consists of all loan deals where at least one of the 341 hedge fund lenders participated in the loan. We define institutional loan facilities following Nandy and Shao (2007). If *DealScan* reports one of the market segments for the loan facility as “institutional” and if none of the lenders involved in the facility are hedge funds, we define the loan deal as “other institutional”. Our bank lender category comprises loan deals where all lenders are banks.<sup>19</sup> Finally, we remove overlapping loan deals within 60 trading days of the same borrower. This leaves us with 1,844 (12.59%), 543 (3.71%), and 12,254

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<sup>19</sup> If any borrower in the hedge fund lender loan sample also has loans made by banks or other institutions, we keep the observations in the hedge fund lender sample only.

(83.70%) loan deals for the hedge fund lender, other institutional lender, and bank lender categories respectively.

Roberts and Sufi (2008) have highlighted certain shortcomings in the DealScan database. In their sample, they found that 47% of loan renegotiations (amendments) are recorded as independent loan observations. Following their approach, we hand checked all loan contracts between January 2, 2005 to July 7, 2007. *Importantly, this is the sub-period over which short-selling data at the firm level is actually available and is thus the focus of this paper.* During this sample period, we were able to identify 217 amended loan deals from a total of 577 new loans contracts on DealScan. Recognizing the special characteristics of the amended loans we wrote an algorithm to identify the amended loans for the rest of the sample.<sup>20</sup> As a result, for the period from 1995 to the first quarter of 2008, we identify 7,808 new loans from 14,641 loans from DealScan.<sup>21</sup> The sample breakdown is shown in Table I Panel A, while Table I Panel B shows the number of unique borrowers in each lender category. Further description of the loan sample is presented in Table I Panel C breaks down the sample by industry using a 4-digit SIC code based on industry classes as defined by Fama and French. As can be seen, there is a diverse set of borrowers with no industry comprising more than 16% of any one subsample.

*<Insert Table I>*

### ***III.D. Short-Selling Data***

On June 23 2004, the U.S. Securities and Exchange Commission (SEC) adopted Regulation SHO (*REGSHO*) under the Securities Exchange Act of 1934. According to *REGSHO*, all Self Regulatory Organizations (SROs) had to make tick-data of short-sales available to the

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<sup>20</sup> We develop an algorithm to capture loan amendments: for any given borrower, a loan is defined as a loan amendment if the loan deal happens before the maturity of a previous deal and at least 10 percent of lead lenders in the previous loan remain unchanged.

<sup>21</sup> Although the short-selling data is only available from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007, for completeness we extend our sample from 1995 to the first quarter of 2008.

public after January 1st 2005. These short-sales data include information on ticker name, short-sale volume, short-sale price, transaction time and date, listing exchange, and trade type. These data are available from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007, after which the mandatory public disclosure of short-sale data was eliminated.

We collected short-sale information on stocks traded on nine major U.S. exchanges from the NYSE TAQ database, and from the websites of the American Stock Exchange (AMEX), National Association of Securities Dealers Automated Quotations (NASDAQ), National Stock Exchange (NSX), Archipelago (ARCA), Boston Stock Exchange (BSE), Chicago Stock Exchange (CHX), National Association of Securities Dealers (NASD) and Philadelphia Stock Exchange (PHLX). We first aggregated the raw data at the transaction level to a daily level by ticker symbol, trading date and the stock exchange on which the stock was traded (some stocks might be traded on more than one exchange). Next, we merged this daily short-sale database with CRSP daily equity price data by ticker and date, and verified our merged results by comparing the daily average short-sale prices with CRSP stock prices. We exclude short-sales of stocks not listed in NYSE, AMEX and NASDAQ and generate aggregated daily non-exempted short-sale volumes for each stock in our sample from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007. This leaves us with short-sales data on 3,117, 1,353 and 3,915 NYSE, AMEX and NASDAQ stocks, respectively. We then merge the short-sale data to the syndicated loan sample borrowers.

### ***III.E. Loan Amendments Sample Construction***

In this paper we focus particular attention on the potential for hedge fund trading on private information prior to the public announcement of loan *amendments*. We measure “trading on private information” in terms of short-selling the equity of the firm to whom the hedge fund amended a loan prior to the public loan amendment announcement date. As discussed in section

III.D comprehensive data for short-selling is only available from January 2 2005 to July 6 2007. Accordingly, we focus our attention on loan amendments for this time period. We obtain our loan amendment sample from two sources: (i). loan amendments as defined by *DealScan database* and (ii). hand-collected amendments from borrower filings with the SEC from forms 10-K, 10-Q and 8-K mentioned in section III.C. In total we have 113 (hedge fund) and 263 (bank) loan amendments that can be confirmed with SEC filings and merged with short-selling data, in the hedge fund and bank lender samples, respectively. From SEC filings we collect the following information: the announcement date of the amendment (we take the filing date as the announcement date if there is no explicit announcement date in the filing), as well as any changes in the principal amount, interest rate and/or maturity.

We define “favorable” amendment changes as larger principal amounts, lower interest rates or longer maturities for the amended loans. We define “favorable” loan amendments in our sample as those loan amendments with at least one favorable loan contract term change, but with no unfavorable loan contract term changes, where an unfavorable loan amendment change involves smaller principal, a higher interest rate and/or a shorter maturity. Our hedge fund lender sample contains 76 favorable amendments and 37 non-favorable amendments, whereas the bank lender sample contains 126 favorable amendments and 137 non-favorable amendments.

#### **IV. Methodology and Related Variables**

Our objective, with respect to testing hypothesis 1, is to compare abnormal short-selling of the equity of hedge fund borrowers prior the public announcement of a loan origination compared to the short-selling of the equity of bank borrowers.<sup>22</sup> One concern with this

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<sup>22</sup> Following the short-selling literature, we use “abnormal” short-selling. We define abnormal short-selling by adjusting the short-selling activities around the loan origination date by normal short-selling activities outside the

comparison is that the decision to lend may be endogenous since lender–borrower matching is nonrandom. Lenders (banks or hedge funds) to a certain extent self-select which loans to finance which in turn is likely to be related to observed firm characteristics such as a borrower’s size, leverage, financial risk, etc.. This self-selection issue can be controlled for using different econometric techniques. Specifically, in this paper we use two commonly employed econometric techniques to control for potential endogeneity: (i) Propensity Score Matching (PSM), as described by Heckman (1979) and (ii) Switching Regression with Endogenous Switching (SRES) described by Maddala (1983, p. 282). The PSM approach conditions for selection on observables, while the switching regression framework accounts for selection on unobservables (through the inverse Mills-ratio) and also has the key advantage in that it gives estimates of (unobserved) counterfactual outcomes, Maddala (1983).

To test H2 and H3 we examine the abnormal short-selling of equity prior to loan amendments for both hedge fund borrowers and banks borrowers. As discussed earlier, loan amendments are commonly triggered when the borrower violates covenants for reasons that include poor financial performance and deterioration in credit quality. In other cases, borrowers may want to renegotiate a loan contract due to their improved credit quality, which gives them the ability to refinance at lower rates. In general, the amendment circumstances ought to be similar for both hedge fund and bank borrowers which allows us to create a natural match or comparison between hedge fund borrowers and bank borrowers. Thus to test H2, we use a three stage approach. First, using univariate tests, we compare abnormal short-selling for hedge fund borrowers to that for bank borrowers prior to loan amendments. Second, we sort amendments

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event window (-120, -61). We define our “normal” short-selling benchmark for any borrower, the average daily short-selling over the period from January 2nd 2005 to July 6th 2007 but excluding event period(s) (-60,+60). The daily abnormal short-selling is the difference between the daily short-selling in the event window (-60, +60) and “normal” short-selling benchmark. We normalize the degree of short-selling by either outstanding shares (Short/SHROUT) or average daily volume prior the event window (Short/Avol).

based on the outcome of amendments (favorable or unfavorable), and then conduct a number of comparisons. Specifically, we compare abnormal short-selling of the equity of hedge fund borrowers based on both favorable and unfavorable loan amendments and then we repeat the same analysis for bank borrowers. Finally, we conduct an additional test that sorts amendments into quintiles based on the change in borrowers credit quality measured over the period prior to and *subsequent* to the public loan amendment announcement and analyze differences in abnormal short-selling of a borrower's equity by hedge funds relative to banks *prior* to the announcement of the amendment by the borrowing firms.<sup>23</sup>

#### ***IV.A. Propensity Score Matching Model***

To test H1, we first employ propensity score matching. The propensity score tests allow us to examine abnormal short-selling activities of the treatment (hedge fund) sample of (borrowing) firms, in comparison to a matched bank control group of borrowing firms. These tests are implemented in four steps. In the first step, we utilize logistic regression where the binary dependent variable is one for loans financed by a hedge fund and zero for loans financed by banks. This allows us to identify the characteristics of borrowers who are more likely to obtain financing from hedge funds rather than traditional bank lenders. We include a number of market and accounting variables that *a priori* measure the performance and riskiness of a borrowing firm. In particular, we include a borrower's leverage, Altman Z-score and expected default frequency (EDF) as measures of financial riskiness while we include profitability and growth of sales as measures of firm performance. We also include size, cash flow, institutional ownership, Beta, momentum and idiosyncratic risk as additional borrowing firm control variables. In the second step, we calculate each firm's propensity score based on the probability

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<sup>23</sup> The essential idea is the private information on a borrower weakness is likely to be reflected in the borrower's subsequent performance.

that a firm with given characteristics will be financed by a hedge fund. In the third step, firms are matched using Leuven and Sianesi's (2003) propensity score matching procedure to the nearest neighborhood within a 0.8 caliper. In the final step, we employ univariate tests to compare the abnormal short-selling of the equity of matched commercial banks and hedge fund borrowing firms around loan origination dates.

#### ***IV.B. Switching Regression with Endogenous Switching (SRES)***

A potential source of endogeneity is that there may be unobserved factors or private information that affects loan self-selection by borrowers. To address this issue we use Switching Regressions with Endogenous Switching (SRES) since this can account for unobservables not factored into PSM (which is based on observables). In addition, one of the important features of SRES is that it allows us to ask "what-if" type of questions. For example, for a loan extended by hedge funds, what would the alternative abnormal short-selling activity level have been for the same borrower's equity had it been extended by a bank? The model consists of a binary outcome equation in the first stage, that reflects the matching between the borrower and the lender, and two regression equations in the second stage, for each type of borrower (hedge fund and bank) on the variable of interest, here short-selling of their equity. This model appears in Fang (2005) in her study of the relationship between investment bank reputation and the price and quality of bond underwriting services and more recently in Nandy and Shao (2007) in their study on institutional loans. It is a generalization of the two-stage model used in Gande, Puri, and Saunders (1999) and Puri (1996), which studies the entry of commercial banks into the bond underwriting market. In these papers the authors use a similar two-stage model, except that instead of two equations for the variable of interest for the two financial institution groups, there is one second-stage equation, which in effect restricts the coefficients to be the same across bank

types. Relaxing this equality of coefficients makes the model more general since, as already discussed above, there is no reason to believe that the two types of lenders will engage in short-selling in a similar manner.

In the first stage, we estimate a Probit regression model where the binary dependent variable is one for loans financed by a hedge fund and zero for loans financed by banks. To control for selection bias, we introduce the inverse Mills-ratio in the second stage as an additional regressor where we estimate the factors that explain the *ex-ante* short-selling of the equity of the two types of borrowers (hedge fund and bank) using OLS. This two-stage estimation method yields consistent estimates (Heckman (1979) and Maddala (1983)). To infer the impact of hedge fund participation in loans on the *ex-ante* abnormal short-selling activities of the borrower's equity, we compute the difference between the actual abnormal short-selling activities for the hedge fund (bank) borrower's equity and the hypothetical abnormal short-selling activities for the same borrower's equity had the loan been made by a bank (hedge fund). If the difference is positive, then the hypothetical abnormal short-selling of the borrower's equity is lower for bank borrowers than the actual abnormal short-selling by hedge fund borrowers, thus providing support for our hypotheses.

Implementing the SRES model requires specifying two sets of variables: those determining the selection of the borrowers (in the first stage) and those determining the short-selling activities prior the public announcement of the loan (in the second stage). In the first stage, we need at least one variable that is correlated with lending self-selection (an instrument) that is not correlated with the short-selling activities in the second stage. In addition to the market and accounting variables discussed in the PSM model above, we propose to include cumulative loan amount borrowed by a firm in the past five years interacted with a high leverage

borrower dummy as an instrumental variable. The cumulative loan amount is defined as the natural logarithm of 1 plus the cumulative amount of loans (in million dollars) that a borrower has borrowed over the past 5 years. We interact this with a dummy variable which equals 1 if the loan is classified as a highly leveraged loan and zero otherwise.<sup>24</sup> The more positive this interaction variable the more likely it is that next loan will come from a hedge fund. This is because hedge funds have focused on lending to the highly leveraged borrower segment of the syndicated loan market. This instrumental variable should not be correlated with abnormal short-selling behavior since the market is aware of the highly levered status of the borrowers.

#### ***IV.C. Related Variables***

Table II Panel A summarizes the different variables we use in our tests. Panel A.1 summarizes the borrowing firm control variables, Panel A.2 summarizes the loan characteristics and Panel A.3 summarizes the instrumental variables. The variables in Panel A.1 comprise a wide variety of performance measures – both accounting and market based reflecting a borrowing firm’s performance and default risk exposures. Specifically, all operating performances variables are measured using COMPUSTAT data at the last fiscal year-end at least 3 months prior to the loan origination date.

Firm size refers to the natural logarithm of total assets and Altman’s Z score is a measure of borrower quality.<sup>25</sup> The cash/assets ratio refers to the ratio of cash and equivalents to total assets, the net worth/assets ratio is defined as net worth divided by total assets, EBIT/assets ratio

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<sup>24</sup> In order to define a highly leveraged loan, we use the *DealScan*’s classification in market segment, or the definition of a highly leveraged loans as set by SEC regulators, who define it as loans to companies whose debts exceed 75% of assets after a transaction, or whose debts double and rise to a level that is more than 50% of assets.

<sup>25</sup> For manufacturing companies, Altman’s Z score is defined as  $1.2 \times (\text{Working Capitals/Total Assets}) + 1.4 \times (\text{Retained Earnings/Total Assets}) + 3.3 \times (\text{EBIT/Total Assets}) + 0.6 \times (\text{Mkt Value of Equity/ Book Value of Total Liabilities}) + 1.0 \times (\text{Sales/Total Assets})$ . For non-manufacturing companies, Z-score is defined as  $6.56 \times (\text{Working Capitals/Total Assets}) + 3.26 \times (\text{Retained Earnings/Total Assets}) + 6.72 \times (\text{EBIT/Total Assets}) + 1.05 \times (\text{Mkt Value of Equity/ Book Value of Total Liabilities})$ . See Altman and Hotchkiss (2006), Chapter 11.

is defined as earnings before interests and tax divided by total assets, Book to Market refers to the book-to-market ratio of equity, Tobin's q is the ratio of the market value of assets to the book value of assets, leverage is measured as the sum of long-term debt plus debt in current liabilities divided by total assets, sales growth refers to the average rate of sales growth over 3 years prior to loan origination date, profit margin is defined as the ratio of earnings to sales, the interest coverage ratio is measured as gross earnings divided by the sum of total interest expense and capitalized interests, the return on equity (ROE) refers to the ratio of net income to equity and return on assets (ROA) refers to the ratio of net income to total assets. The variable expected default frequency refers to the estimated probability of default based on Bharath and Shumway's methodology (2004). Beta and RMSE are respectively the estimated market risk coefficients and root mean squared errors based on the market model, calculated over the interval (-312, -61) with respect to the loan origination date. Run-up is the holding period return over the same estimation window (-312, -61). Institutional ownership is the percentage of shares held by institutional investors, measured as the average of the last 4 quarters ending at least 3 months prior to loan origination date. These variables are described in more detail in Appendix A.

*<Insert Table II>*

The variables in Panel A.2 consist of three dummy variables capturing loan characteristics: Investment Grade dummy, Covenant dummy and Secured loan dummy. Investment Grade dummy indicates whether the borrower was at investment grade at the loan close day. It equals to 1 if the S&P senior long-term debt was rated at "BBB" or higher and 0 otherwise. Covenant dummy equals 1 if at least one facility of a loan has any covenant and 0 otherwise. Secured dummy is an indicator of whether a loan deal is secured or not. It equals 1 if at least one facility is secured and 0 otherwise.

The variables in Panel A.3 presents the instrumental variable, i.e., the interaction of a high leverage dummy with the cumulative loan amount borrowed in the past five years. We are using the definition of highly leveraged loans as one specified by the SEC regulators, who define it as loans to companies whose debts exceed 75% of assets after a transaction, or whose debts double and rise to a level that is more than 50% of assets. The dummy variable equal 1 if the loan is highly leveraged loan and zero otherwise. The cumulative loan amount equals the natural logarithm of 1 plus the cumulative amount of loans (in million dollars) that a borrower has borrowed in the past 5 years. The larger this variable, the more likely it is that the loan comes from a hedge fund.

Table II Panel B reflects univariate differences among these variables for the hedge fund and bank lender samples using t-tests and Wilcoxon rank sum tests. Finally, Table II Panel C shows the correlations among these variables.

## **V. Empirical Results**

The results are presented in Tables II to X and in Figures I to IV. The univariate tests, in Panel B.1 of Table II, showed that in comparison to borrowers in the bank lender sample, borrowers in the hedge fund sample are much larger, as measured by asset size, are more risky as measured by Altman Z-score and Expected Default Frequency (EDF), are more leveraged, have lower liquidity, have lower growth as measured by sales growth and Tobin's-q and are less profitable as measured by ROA. In general, borrowers in the hedge fund lender sample appear to have lower ex-ante performance prospects in comparison to borrowers in the bank and other institutional lender sample. Table III presents the logit regression results together with the elasticity (economic importance) of each of the explanatory variables described above where the

dependent variable is binary, i.e. 1 for hedge fund borrowers and 0 for bank borrowers. In Table III, we examine four alternative logit models to show the robustness of our results by including a new variable or an alternative variable in the logit tests. In total we have 5,071 observations, although, the number of observations vary from model to model based on data availability for control variables.

*<Insert Table III>*

As can be seen, from Table III our results are consistent with our univariate tests in Table II. In particular, we find that the coefficient on the leverage variable is positive and significant at the 1% level in all related specifications while EDF is positive (high EDF indicates a higher defaulting probability) and is significant at the 5% level in all specifications. Our results are also economically significant. For a 1% increase in leverage the probability of hedge fund undertaking lending increases by 0.62% (from its mean value), see Model I. The results from the univariate tests and the logit tests are consistent with the view that hedge funds target so-called highly leveraged transaction borrowers.<sup>26</sup>

#### ***V. A. Potential Conflicts of Interest Prior to Loan Origination Announcements (H1)***

Next we present our results for the potential conflict of interest that arises due to hedge funds simultaneous involvement in both originating syndicated loans and in short-selling the equity of borrowing firms. That is, we present tests of Hypothesis 1: *The equity of the firms that have hedge funds as lenders is more likely to be short sold prior to public announcement of loan origination.* Following the short-selling literature (for example, see the recent paper by Zheng

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<sup>26</sup> While not central to our paper, one possible reason for hedge funds participating in ex-ante more risky loans is securing higher spreads on origination. We find that hedge funds indeed charge higher spread on their loans in comparison to propensity score matched loans extended purely by banks. In our sample, the average of All-In-Spread Drawn (AISD) on a loan deal for hedge fund loans is 269.02 basis points in comparison to 162.8 basis points for propensity score matched bank loans (see section IV.A.1. for more details on propensity score matching). A difference that is significant at 1% level.

(2008)), we use “*abnormal*” short-selling. We define abnormal short-selling by adjusting the actual short-selling activities around the loan origination date by “normal” short-selling activities. We define “normal” short-selling for any borrower, as the average daily short-selling over the period from January 2nd 2005 to July 6th 2007 but excluding the event window (-60,+60). The daily abnormal short-selling is the difference between the daily short-selling in the event window (-60, +60) and “normal” short-selling benchmark. We then normalize the degree of short-selling by either outstanding shares (Short/SHROUT) or by the average daily volume over (-120, -61), prior to the event window (Short/Avol).<sup>27</sup> Our results are robust to using either definition of abnormal short-selling.<sup>28</sup> Next we present our results for the two alternative approaches to analyze the relative degree of short-selling of the equity of hedge fund borrowers, namely, Propensity Score Matching model and Switching Regression with Endogenous Switching.

#### ***V. A.1. Propensity Score Matching Model***

We first match the borrowers in the hedge fund lender sample with those in the bank lender sample *prior* to loan origination using propensity score matching (PSM). PSM is based on logit model I in Table III since it has the largest sample size.<sup>29</sup> Since short-selling data is available from January 1st 2005 to July 6th 2007 only we find that there are 70 firms from the hedge fund sample and 66 firms from the matched bank sample, of which, there are 55 PSM pairs. Table IV summarizes the borrowing companies’ characteristics in each sample after PSM matching. As expected since PSM initially matches borrowers with similar characteristics, there

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<sup>27</sup> We take the earlier date of the loan deal origination in *Dealscan* and the announcement date in the firm’s corresponding SEC filing.

<sup>28</sup> For example our results are robust if we define normal short-selling as the mean short-selling on the same day and in the some stock exchange as the borrowing company.

<sup>29</sup> As a robustness test, we also used Model IV of Table III for PSM. Our results are robust except that the sample size is smaller.

are no significant differences (at the 5% level or higher) between the hedge fund borrowers and PSM bank borrowers at the time of loan origination, see Table IV.

<Insert Figure I> and <Insert Table V>

Consistent with the conflict of interest hypothesis, Panel A of Figure I shows that most of the abnormal equity short-selling activity in the hedge fund sample takes place prior to the deal announcement date whereas the abnormal short-selling for the equity of matched bank borrowers is more evenly dispersed around the loan announcement date and the abnormal amount is generally non-positive. Figure 1, Panel B, shows that the cumulative abnormal short-selling activity of the two samples. As can be seen, the cumulative short-selling activity of hedge fund borrowing firms is positive and steeply rising prior the announcement date ((-10, -1) window) and appears to be marginally positive during the *post*-announcement (0, +10) window. By comparison, the cumulative abnormal short-selling activity in the bank lending sample is non-positive over both the *pre*- and *post*-announcement periods.<sup>30</sup>

In Table V we first present our results using the two alternative definitions for the abnormal short-selling behavior where in Panel A we present the abnormal short-selling results normalized by average trading volume (Short/Avol) while in Panel B short-selling is normalized by the outstanding number of a borrower's shares (Short/SHROUT). Table V, Panel A.1 and B.1, shows that cumulative abnormal short-selling is *positive* and *significant* at 5% level for the hedge fund sample prior to the loan deal announcement date (over three windows (-10,-1), (-10,-6) and (-5,-1)) while it is positive but statistically *insignificant* *post* the loan deal announcement date (over three windows (0,+5), (+6,+10) and (0,+10)). On the other hand, and by comparison, the abnormal short-selling in the matched bank sample is negative and

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<sup>30</sup> Interestingly, the capital market reacts positively for bank loans where the cumulative abnormal return is 1.52% during (0, +5) window and it is significant at 5% while the market reacts negatively to announcement of the hedge fund loans the cumulative abnormal return is -1.29% during (0, +5) window and it is significant at 10%.

significant for the *pre*- and *post*-announcement periods in Panel A.2 while it is insignificant in Panel B.2 over the same *pre*- and *post*-announcement windows. Table V, Panels A.3 and B.3 show the *difference* in abnormal short-selling of the equity of hedge fund borrowers versus bank borrowers, for the relevant *pre*- and *post*-announcement windows. As can be seen, for all windows the difference is statistically and economically significant. In particular for window (-10, -1) the cumulative abnormal short-selling is 130.4% for the hedge fund sample (Panel A.1) while it is -47.0% for the matched bank lender sample. The difference is positive (183.1%) and is statistically significant at the 5% level.<sup>31</sup>

The next three panels in Table V provide robustness tests of the above results. First, in Panel C, we compare hedge fund lenders to bank holding company lenders. Due to regulatory restrictions, banks by themselves cannot directly engage in short selling, however for bank holding companies, the presence of a section 20 subsidiary or an investment affiliate allows them to legally engage in short selling through their subsidiaries. Hence, the previous significant differences between the hedge fund borrower sample and the bank borrower sample could potentially be driven by this regulatory restriction on banks. The results in Panel C, however show that significant differences continue to exist even when comparing the hedge fund sample to the bank holding company sample, suggesting the existence of material “Chinese walls” between banks and their investment affiliates and subsidiaries. Second, in Panel D, we compare the abnormal short selling activity in the hedge fund sample after separating out those deals where at least one of the *lead* lenders is a hedge fund. Our intuition is that if a hedge fund is not a lead lender in the deal then it could potentially fall under an “indirect regulation” effect brought about by the lead bank in the deal. We find strong evidence supporting this view, with the

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<sup>31</sup> As a robustness test for leakage of information prior deal announcement, we excluded all loans that are financing merger and acquisition deals, all of our results are still hold.

differences in the abnormal short selling between the hedge fund lead lender and non-lead lender groups being significant at the 5% level or better, suggesting that hedge funds are able to exploit private information more fully when they are the lead lenders in the deal. Finally, in Panel E of Table V, we split our hedge fund sample between those deals with financial covenants and those without.<sup>32</sup> Our intuition is that the presence of financial covenants in a loan brings about the disclosure of more precise and timely information about borrowers condition to syndicate members. Thus, it may be potentially more profitable to take advantage of private information and short sell in loan deals with covenants than in those without. We find some support for this hypothesis, with short selling being significant and greater in magnitude in the hedge fund borrower sample with covenants, with the difference between the two samples being significant at the 10% level. This result is also consistent with a similar result in Bushman et. al. (2009), who find that the price discovery process is quicker for deals with financial covenants. Thus overall, our results in Table V strongly support our Hypothesis 1.

#### ***V. A.2. Switching Regression with Endogenous Switching(SRES)***

By using SRES, we are able to construct counterfactual cases that allow us to answer “what-if” type questions, e.g., for a loan extended by a hedge fund, what would the short-selling activity level for the same borrower’s equity have been if it had been extended by a bank? The results for the first and second stages of the SRES estimation are presented in Appendix B in Tables B.1 and B.2. In general, the results from the first stage in Appendix Table B.1, are consistent with the univariate tests and the logit results which support the view that hedge funds target the highly leveraged segment of the syndicated loan market. In addition, we find that the higher the value of the interaction of the high leverage loan dummy variable with the loans

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<sup>32</sup> Loans with no or limited covenants are often called “covenant-lite”.

accumulated in the past five years (the instrumental variable in the SRES) the more likely it is for borrowers to borrow from hedge funds. In the second stage, Appendix Table B.2, to estimate consistent standard errors, we use a bootstrap procedure.<sup>33</sup> As can be seen from Table B.2 the inverse Mills-Ratio is significant at the 10% level for the hedge fund borrower sample, while it is insignificant for the bank borrower sample. Moreover, the difference between the two inverse Mills ratios is positive and significant at the 10% level. These results provide some support for the notion that unobservables and private information have some affect on the short-selling activity in the hedge fund borrower sample.

Table VI compares the actual and hypothetically estimated abnormal short-selling over the (-10, -1) loan amendment announcement window by the two types of borrowing groups, Panels A.1 and B.1 for hedge fund borrowers and Panels A.2 and B.2 for bank borrowers. Consistent with the PSM tests, we find higher abnormal short-selling of hedge fund borrowers' equity prior to loan origination. In particular, in Panel A.1, the mean actual abnormal short-selling for the hedge fund borrowers' equity is 127.7%, which is 163.1% higher than the hypothetical -35.4% amount estimated if banks had undertaken the same lending activity to the same borrowers. This difference is significant at the 1% level in Panel A.1 and Panel B.1. By contrast, Panel A.2 indicates that for bank borrowers, the actual abnormal short-selling by banks (-43.8%) is lower than the hypothetical amount of abnormal short-selling by hedge funds (92.7%) if they have made loans to the same borrowers. The difference is again significant at the 1% level in Panels A.2 and B.2. Thus, our SRES results also support Hypothesis (H1).

*<Insert Table VI>*

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<sup>33</sup> We thank Bill Greene of New York University for his suggestion regarding correction of the error terms in the second stage of SRES.

## ***V. B. Potential Conflict of Interest Prior to Loan Amendments (H2 and H3)***

Next we look at short-selling activity prior to public announcements of loan *amendments*. If short-selling activities are driven by loan hedging motives then we should expect to see short-selling increasing from normal levels just after or immediately around the public announcement of an amended loan contract. On the other hand, if the abnormal short-selling activities are observed prior to such an announcement then it is more likely to be related to trading activity seeking to exploit private information gathered during the loan renegotiation process. In particular, we believe that the potential for generating private information, that will be useful in making short-selling decision, will be strongest around loan renegotiation or amendment dates rather than loan origination dates since hedge funds have both the private knowledge and the ability to force such amendments given a firm's financial weakness leading up to possible loan covenant violations. Our results are presented in Tables VII to X and Figures II to IV. First, Table VII and Figure II show our univariate results comparing abnormal short-selling, prior to loan amendment announcements, for hedge fund borrowers and bank borrowers. In Table VIII we show the potential profit that a short seller could have made by trading on the knowledge of an impending loan amendment. Next, we show a comparison of short-selling results conditional on two sorting approaches: i) amendment outcomes: favorable and unfavorable in Table IX and Figure III and ii) changes in credit quality quintile *ex-post*, i.e. highest and lowest EDF change quintile, between the *pre-* and *post-*announcement periods, in Table X and Figure IV.

### ***V. B.1. Univariate results***

We first present our results for univariate tests that compare abnormal short-selling activities for hedge fund borrowers and bank borrowers around loan amendment dates in Table VII and in Figure II. From Figure III it can be seen that short-selling activity is abnormally

higher in the days prior to an amendment announcement date (day 0) in the hedge fund sample, especially between days -5 to 0. For the bank sample, abnormal short-selling is negative over the entire *pre*-announcement window. Specifically, In Table VII, Panel A, the cumulative abnormal short-selling for the hedge fund sample is a *positive* and significant 28.4% for the (-5, -1) window while it is *negative* and significant for all windows for the bank sample in Panel B, with the difference between the cumulative short-selling for the hedge fund sample and the bank sample being positive and significant for virtually all windows.<sup>34</sup> Thus, the empirical findings above are consistent with a potential conflict of interest by hedge funds with their loan borrowers and are supportive of H2.

*<Insert Figure II> and <Insert Table VII>*

### **V. B.2. Short-selling Profits Around Loan Amendments**

A natural question to ask is how much profit could a short seller have made by trading on private knowledge of an impending loan amendment? To answer this question we construct a simple naïve strategy where we consider the daily actual average abnormal short-selling volume in the 10 days around the loan amendment announcement (i.e., -10, 0, +10). In Table VIII the first column called “shorting day” indicates the day of the abnormal short-selling relative to day zero (amendment announcement day). For each day, we allow short sellers to close their positions on the announcement date, or one day, two days and up to 30 days after the amendment announcement. We call these “short position closing days”. Profit (in thousands of dollars) is defined as  $profit_t = (Short\ Price_t - Ask_n) \times Abnormal\ Short\ Volume$ , whereas  $Short\ Price_t$  refers to the weighted average short-selling price at shorting day  $t$ ,  $Ask_n$  refers to the close ask price on the  $n^{th}$  trading day after the announcement, and abnormal short volume refers to the abnormal

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<sup>34</sup> These results are robust if we exclude from our hedge fund sample all hedge funds that are affiliated with financial conglomerate financial firms.

number of shares being shorted on day  $t$ . The results in Panel A of Table VIII, show that the short sellers in the hedge fund sample could make economically significant profits if they closed their positions on day 0 or after.<sup>35</sup> For example the total abnormal short-selling in the hedge fund borrowers equity on day -10 would make *abnormal* profit of approximately \$5.0 million, \$5.4 million and \$5.6 million if it closed at its positions on day 0 (the amendment announcement date), day 1 after and day 2 after, respectively. If we consider the *actual* short-selling volume rather than abnormal short-selling volume then total short-selling profits would also be even larger, i.e., on day -10 the total profits from actual short-selling the hedge fund borrowers equity is approximately \$5.8 million if the position was closed on day 0.<sup>36</sup> In comparison to the short sellers of the hedge fund borrowers, those for the bank borrowers would mostly generate losses following a similar strategy, see Panel B of Table VIII. This is also true if we use the level of short-selling volume. In sum, our results indicate that hedge fund short sellers could make economically significant profits as a result of exploiting information gathered in their syndicated lending activities prior to loan amendment announcements.

<Insert Table VIII>

#### ***IV. B.3. Loan Amendment Outcomes: Favorable versus Unfavorable***

In this section, we test H3 and present short-selling results based on the *outcome* of the renegotiations. As mentioned above, the outcome from renegotiations can result in tighter (unfavorable) or looser (favorable) contractual terms for the borrower, see Tirole (2006).<sup>37</sup> We define favorable term changes as a larger principal amount, lower interest rate, or longer maturity for the amended loans. Following this, we define favorable loan amendments as those with at

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<sup>35</sup> A similar trading strategy is also profitable for the hedge fund sample by the trading on the private information collected during the due diligence prior to new loan announcement. The table is available upon request.

<sup>36</sup> The table of the profitability of total short-selling activity around loan amendments is available upon request.

<sup>37</sup> The lenders might offer a favorable amendment even when a borrower violates loan covenants to help the borrower to payoff the loan.

least one favorable contract term change, but with no unfavorable loan term changes, and the remainder of loan amendments as unfavorable renegotiations. Table IX and Figure III present the results. Of the 113 amendments in the hedge fund sample, there are 37 unfavorable amendments and 76 favorable ones, while for the bank sample there are 137 unfavorable amendments and 126 favorable ones. Figure III, Panel A, shows that the abnormal short-selling activities are significantly positive prior to the announcement of a loan amendment *only for unfavorable amendments* in the hedge fund sample, while they are negative for the bank sample (Panel B). As can be seen for the hedge fund borrowers, in Panel A of Table IX, abnormal short-selling activities are positive and significant in all windows prior to an unfavorable amendment announcement (i.e. for windows (-10, -1), (-10, 0), (-10, -6), (-5, -1) and (-5, 0)) while they are either negative or insignificant for favorable amendments. By contrast, for the bank loan amendment sample (Panel B of Table IX), abnormal short-selling activity is negative for both unfavorable and favorable amendments. Panel C of Table IV shows the differences between short-selling activity prior to unfavorable amendment announcements for the hedge fund and bank samples. As can be seen, the differences in abnormal short-selling are positive and significant for all windows prior to an (unfavorable) amendment date. Thus, the empirical findings above support our hypothesis H3.

<Insert Figure III> and <Insert Table IX>

#### ***V. B.4. Loan Amendments: Sorted Based on Changes in EDF Quintiles***

It can be argued that the potential for private information based short-selling profits are the highest when amendments are triggered by a borrower's credit deterioration and technical default on a loan contract. Accordingly, we sort amendments based on the change in the expected default frequency (EDF), which is a measure of the probability of default, between the

*pre-* and *post-*loan amendment announcement periods. We measure the change in EDF as the difference between the EDF estimated at the month end of the amendment announcement date month and the EDF estimated six months prior to the amendment date. We then present the results for the lowest EDF quintile (lowest credit deterioration) and the highest EDF quintile (highest credit deterioration) in Table X and Figure IV.

*<Insert Figure IV> and <Insert Table X>*

Consistent with our prior results, only the highest credit quality deterioration quintile in the hedge fund sample (Panel A of Table X) shows positive and significant abnormal selling by hedge funds of borrowing firms equity prior to loan renegotiation/amendment announcements for all (-10, -1), (-10, 0), (-5, -1) and (-5, 0) windows, and it is significantly larger (Panel C of Table X) than the similar quintile in the bank lender sample. In summary, our tests in this section provide evidence consistent with hedge funds exploiting private informational advantages regarding a weakening of a borrower's credit worthiness by trading a borrowing firm's equity prior to a loan amendment announcement.

## **VI. Conclusion**

In this paper we have analyzed potential conflicts of interest relating to hedge funds' increased involvement in the syndicated lending market. We find that hedge funds tend to make more loans to more risky borrowers. Importantly, we find that the equity of hedge fund borrowers is more likely to be sold short prior to loan originations and amendment dates, in comparison to the equity of bank borrowers. These results are even stronger when a borrower's loan amendment is unfavorable or the credit quality of the borrower is deteriorating. Interestingly, for hedge fund borrowers, we show that such short-selling can be profitable around

both loan origination and loan amendments announcement dates. Our results raise important issues regarding the regulation of hedge funds and the separation of their syndicated lending and equity short-selling activities.

## References:

- Acharya, V. and T. Johnson, 2007 Insider Trading in Credit Derivatives, *Journal of Financial Economics*, 84(1), 110–141.
- Aghion, P., M. Dewatripont, and P. Rey, 1994, Renegotiation Design with Unverifiable Information, *Econometrica* 62: 257-282.
- Altman, E and Hotchkiss, 2006, Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt, 3rd Edition, John Wiley & Sons.
- Asquith, Paul, Robert Gertner, and David Scharfstein, 1994, Anatomy of Financial Distress: An Examination of Junk-bond Issuers, *Quarterly Journal of Economics* 109: 625-658.
- Beneish, M. D. and E. Press, 1993, Cost of Technical Violation of Accounting-Based Debt Covenants. *Accounting Review* 68(2), 233-257.
- Beneish, M. D. and E. Press, 1995, The Resolution of Technical Default. *Accounting Review* 70(2), 337-353.
- Benmelech, E. and N. Bergman, 2007, Liquidation Values and the Credibility of Financial Contract Renegotiation, Working paper, MIT Sloan.
- Bharat, S. and T. Shumway, 2008, Forecasting Default with the Merton Distance-to-Default Model, *Review of Financial Studies* 21 (3), 1339-1369.
- Bodnaruk, A., M. Massa and A. Simonov, 2007, Investment Banks as Insiders and the Market for Corporate Control. EFA 2007 Ljubljana Meetings Paper; AFA 2008 New Orleans Meetings Paper.
- Brown, D., C. James, and R. Mooradian, 1993. The information content of distressed restructurings involving public and private debt claims. *Journal of Financial Economics* 33, pp. 93–118.
- Brown, Stephen, William Goetzmann, Bing Liang and Christopher Schwarz, 2008, Mandatory Disclosure and Operational Risk: Evidence from Hedge Fund Registration . *Journal of Finance*, forthcoming.
- Bushman R. M., A.J. Smith, and R. Wittenberg-Moerman, 2009, Price Discovery and Dissemination of Private Information by Loan Syndicate Participants. Working Paper, University of Chicago.
- Chava, S. and M. R. Roberts, 2007, How Does Financing Impact Investment? The Role of Debt Covenant violations, *Journal of Finance*, forthcoming.
- Chen, Kevin C. W. and K. C. John Wei, 1993, Creditors' Decisions to Waive Violations of Accounting-based Debt Covenants, *The Accounting Review* 68: 218-232.
- Cottier, P., 1997, Hedge Funds and Managed Futures: Performance, Risks, Strategies and Use in Investment Portfolios (Bern: Verlag Paul Haupt).
- Dennis, S., and D. Mullineaux, 2000, Syndicated loans, *Journal of Financial Intermediation*, 9, 404-426.
- Diamond, D. W., 1984. Financial intermediation and delegated monitoring. *The Review of Economic Studies* 51, 393-414.
- Fama, E. F., 1985. What's different about banks? *Journal of Monetary Economics* 15, 29-39.
- Fang, Lily Hua, 2005. Investment Bank Reputation and the Price and Quality of Underwriting Services. *The Journal of Finance* 60(6), 2729-2761

- Gande, A. and A. Saunders, 2006, Are Banks Still Special when there is a Secondary Market for Loans? Working Paper. New York University.
- Gande, Amar, Manju Puri, and Anthony Saunders. 1999. Bank entry, competition, and the market for corporate bond underwriting. *Journal of Financial Economics* 54, 165–195.
- Garleanu, N. B. and J. H., Zwiebel, Design and Renegotiation of Debt Covenants, 2004. AFA 2004 San Diego Meetings; EFA 2005 Moscow Meetings Paper.
- Gilson, S., 1990, Bankruptcy, Boards, Banks, and Blockholders: Evidence on Changes in Corporate Ownership and Control When Firms Default, *Journal of Financial Economics* 26: 315-353.
- Gilson, S., K. John, and L.H.P. Kang, 1990, Troubled Debt Restructurings: An Empirical Analysis of Private Reorganization of Firms in Default, *Journal of Financial Economics* 26: 315-353.
- Gorton, G. and J. Kahn, 2000, The Design of Bank Loan Contracts, *Review of Financial Studies* 13: 331-364.
- Griffin, J. M., and J. Xu, 2007, How smart are the smart guys? A unique view from hedge fund stock holdings, *Review of Financial Studies*, forthcoming.
- Harris, M. and A. Raviv, 1995, The Role of Games in Security Design, *Review of Financial Studies* 8: 327-367.
- Heckman, J. James, 1979, Sample selection bias as a specification error, *Econometrica* 47, 153–161.
- Hotchkiss, E. S., and T. Ronen, 2002, The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis, *Review of Financial Studies* 15, 1325-1354.
- Huang, J., Hedge Fund Activism in Leveraged Buyouts, 2008, Working paper, Boston College.
- Ivashina, V. and Z. Sun, Institutional Stock Trading on Loan Market Information, 2009. AFA 2008 New Orleans Meetings Paper; EFA 2007 Ljubljana Meetings
- Leuven, E., and B. Sianesi. 2003, PSMATCH2: Stata Module to Perform Full Mahalanobis and Propensity Score Matching, Common Support Graphing and Covariate Imbalance Testing.” Statistical Software Components S432001, Boston College Department of Economics, revised 28 Dec 2006.
- James, C., 1995. When do Banks take Equity in Debt Restructurings? *Review of Financial Studies* 8 (4), 1209 – 1234.
- James, Christopher and Robert Mooradian, 1993 “The Information Content of Distressed Restructurings Involving Public and Private Debt Claims, David Brown, *Journal of Financial Economics*, 33: 93-118.
- Jiang, W., K. Li, and P. Shao, 2009, When Shareholders are Creditors: Effects of the Simultaneous Holding of Equity and Debt by Institutional Investors. Working Paper,
- Maskin, E., and J. Moore. 1999. Implementation and Renegotiation, *Review of Economic Studies*, 66: 39—56
- Maddala, G. S., 1983, Limited Dependent and Qualitative Variables in Econometrics, *Econometric Society Monographs* No. 3 (Cambridge University Press, Cambridge).
- Mullineaux, D J. and H.C. Yi, 2006, The Informational Content of Bank Loan Ratings, *Financial Management*, Forthcoming.
- Nandy, D. and P. Shao, 2007, Institutional Investment in Syndicated Loans, Working paper, York University.

- Nini, G., 2008, How Non-banks Increased the Supply of Bank Loans: Evidence from Institutional Term Loans. Working paper, Wharton.
- Nini, G., D. Smith, and A. Sufi, 2007, Creditor Control Rights and Firm Investment Policy, Working Paper University of Chicago.
- Puri, Manju. 1996. Commercial banks in investment banking: Conflict of interest or certification role? *Journal of Financial Economics* 40, 373–401.
- Roberts, M. and A. Sufi, 2007, Control Rights and Capital Structure: An Empirical Investigation, Working Paper, Wharton.
- Roberts, M. and A. Sufi, 2008, Renegotiation of Financial Contracts: Evidence from Private Credit Agreements, Working Paper, Wharton.
- Smith, C. W., 1993, A Perspective on Accounting-Based Debt Covenant Violations. *Accounting Review* 68(2), 289-303.
- Sufi, A., 2007, Information asymmetry and financing arrangements: Evidence from syndicated loans, *The Journal of Finance*, 62, 629-668.
- Sufi, Amir, 2009, The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings, *The Review of Financial Studies* 22 (4): 1659-1691.
- Tirole, Jean, 2006. *The Theory of Corporate Finance*, Princeton University Press.
- Zheng, Lin, 2008, Short Sales and Post Earnings Announcement Drift, Working paper, Cornell University.

**Table I**  
**Distribution of Loan Sample by Year and Industry**

Panel A reports the number of loans (at deal level) by lender category for each year from 1995 to 2008 (1<sup>st</sup> quarter). The Hedge Fund borrower sample includes all loan deals with at least one lender defined as a hedge fund or as a hedge fund management company. The other Institutional borrower sample includes all loan deals with an Institutional borrower that is not identified as a hedge fund. The Bank borrower sample covers all loan deals that are made by a lender or a syndicate of lenders where all lenders are commercial banks. Panel B reports the number of borrowers in each lender category by year. Panel C summarizes the number of borrowers by the Fama-French's industry classification. Specifically, we categorize borrower's 4-digit SIC codes into 30 major industry classes as defined by Fama and French.

Panel A: Number of Deals in Each Category by Year						
Year	Hedge Fund Borrower Sample		Other Institutional Borrower Sample		Bank Borrower Sample	
	N	Pct (%)	N	Pct (%)	N	Pct (%)
1995	24	5.15	4	0.86	438	93.99
1996	52	6.52	8	1.00	737	92.47
1997	73	8.45	15	1.74	776	89.81
1998	42	5.59	26	3.46	684	90.96
1999	61	8.65	27	3.83	617	87.52
2000	42	6.49	24	3.71	581	89.80
2001	33	5.66	18	3.09	532	91.25
2002	53	7.89	29	4.32	590	87.80
2003	68	13.15	24	4.64	425	82.21
2004	69	13.61	24	4.73	414	81.66
2005	56	12.10	25	5.40	382	82.51
2006	46	10.72	49	11.42	334	77.86
2007	40	12.20	39	11.89	249	75.91
2008(1 <sup>st</sup> Q)	1	1.28	4	5.13	73	93.59
All	660	8.45	316	4.05	6,832	87.50

Panel B: Number of unique Borrower's in Each Category by Year						
Year	Hedge Fund Borrower Sample		Other Institutional Borrower Sample		Bank Borrower Sample	
	N	Pct (%)	N	Pct (%)	N	Pct (%)
1995	24	5.21	4	0.87	433	93.93
1996	52	6.65	8	1.02	722	92.33
1997	72	8.56	14	1.66	755	89.77
1998	42	5.74	24	3.28	666	90.98
1999	61	8.76	27	3.88	608	87.36
2000	42	6.59	24	3.77	571	89.64
2001	33	5.82	18	3.17	516	91.01
2002	53	8.05	27	4.10	578	87.84
2003	66	13.12	22	4.37	415	82.50
2004	69	13.80	24	4.80	407	81.40
2005	55	12.01	24	5.24	379	82.75
2006	45	10.71	46	10.95	329	78.33
2007	40	12.31	38	11.69	247	76.00
2008 (1 <sup>st</sup> Q)	1	1.28	4	5.13	73	93.59
All	655	8.55	304	3.97	6,699	87.48

Panel C: Industry Classification of Borrowers in Each Category

Industry Categories	Industry Descriptions	Hedge Fund Borrower Sample		Other Institutional Borrower Sample		Bank Borrower Sample	
		N	Pct (%)	N	Pct (%)	N	Pct (%)
1	Food Products	12	1.86	7	2.36	133	2.02
2	Beer & Liquor	3	0.47	.	.	24	0.36
3	Tobacco Products	1	0.16	1	0.34	5	0.08
4	Recreation	37	5.74	13	4.38	146	2.21
5	Printing and Publishing	4	0.62	3	1.01	74	1.12
6	Consumer Goods	9	1.40	10	3.37	108	1.64
7	Apparel	6	0.93	4	1.35	117	1.77
8	Healthcare, Medical Equipment, Pharmaceutical Products	41	6.36	27	9.09	463	7.02
9	Chemicals	18	2.79	1	0.34	78	1.18
10	Textiles	4	0.62	6	2.02	48	0.73
11	Construction and Construction Materials	15	2.33	10	3.37	215	3.26
12	Steel Works Etc	14	2.17	9	3.03	119	1.80
13	Fabricated Products and Machinery	26	4.03	8	2.69	250	3.79
14	Electrical Equipment	6	0.93	9	3.03	79	1.20
15	Automobiles and Trucks	15	2.33	4	1.35	86	1.30
16	Aircraft, ships, and railroad equipment	3	0.47	.	.	51	0.77
17	Precious Metals, Non-Metallic, and Industrial Metal Mining	2	0.31	.	.	56	0.85
18	Coal	5	0.78	1	0.34	5	0.08
19	Petroleum and Natural Gas	37	5.74	10	3.37	312	4.73
20	Utilities	11	1.71	5	1.68	217	3.29
21	Communication	68	10.54	11	3.70	163	2.47
22	Personal and Business Services	81	12.56	41	13.8	857	13.00
23	Business Equipment	39	6.05	29	9.76	722	10.95
24	Business Supplies and Shipping Containers	25	3.88	4	1.35	103	1.56
25	Transportation	20	3.10	10	3.37	200	3.03
26	Wholesale	22	3.41	11	3.70	318	4.82
27	Retail	28	4.34	20	6.73	493	7.48
28	Restaurants, Hotels, Motels	17	2.64	12	4.04	129	1.96
29	Banking, Insurance, Real Estate, Trading	66	10.23	28	9.43	986	14.96
30	Everything Else	10	1.55	3	1.01	36	0.55

**Table II**  
**Summary Statistics and Correlations**

Panel A.1 of Table II summarizes firm characteristics of borrowers across different lender categories. The statistics are reported at the deal level. All operating performance variables are measured with COMPUSTAT data as of the fiscal year-end at least 3 months prior to the loan origination over the period 1995 to 2008 (1<sup>st</sup> quarter). Firm Size refers to the natural logarithm of total assets (in million dollars). For manufacturing companies, Altman's Z score is defined as  $1.2 \times (\text{Working Capital} / \text{Total Assets}) + 1.4 \times (\text{Retained Earnings} / \text{Total Assets}) + 3.3 \times (\text{EBIT} / \text{Total Assets}) + 0.6 \times (\text{Mkt Value of Equity} / \text{Book Value of Total Liabilities}) + 1.0 \times \text{Sales} / \text{Total Assets}$ . For non-manufacturing companies, Z-score is defined as  $6.56 \times (\text{Working Capital} / \text{Total Assets}) + 3.26 \times (\text{Retained Earnings} / \text{Total Assets}) + 6.72 \times (\text{EBIT} / \text{Total Assets}) + 1.05 \times (\text{Mkt Value of Equity} / \text{Book Value of Total Liabilities})$ . The Cash/assets ratio refers to the ratio of cash and equivalents to total assets. The Net worth/assets ratio is defined as net worth divided by total assets. The EBIT/assets ratio is defined as earnings before interest and tax divided by total assets. Book to Market refers to the book-to-market ratio of equity. Tobin's q is the ratio of the market value of assets to the book value of assets. Leverage is measured as the sum of long-term debt plus current liabilities divided by total assets. Sales Growth refers to the average rate of sales growth over the 3 years prior to loan origination date. Profit margin is defined as the ratio of earnings to sales. The interest coverage ratio is measured as gross earnings divided by the sum of total interest expense and capitalized interest. Return on equity (ROE) and return on assets (ROA) refers to the ratio of net income to equity and the ratio of net income to assets respectively. Expected Default Frequency (EDF) refers to the estimated probability of default measured 3 months prior to loan origination based on Bharath and Shumway's method (2008). Beta and RMSE is the estimated slope coefficient and root mean squared error based on the market model, calculated over the window (-312, -61) with respect to the loan origination date. Run-up is the holding period return over the same estimation window (-312, -61). Institutional ownership data is from Thompson form 13F and it is the percentage of shares held by institutional investors, measured as the average of last 4 quarters at least 3 month prior to loan origination date. Panel A.2 summarizes loan characteristics. Investment Grade indicates whether the borrower was at investment grade at the loan close day (equal to 1 if the S&P senior long-term debt was rated at "BBB" or higher and 0 for the rest). Covenant equals to 1 if at least one facility of a loan has a covenant, and equals to 0 for the rest. Similarly, Secured is the indicator whether a loan deal is secured or not (equal to 1 if at least one facility is secured, and 0 for the rest). Panel A.3 summarizes the instruments: the interaction of (HighLever×Cum. Loan), where HighLever refers to the Highly Leveraged Loan indicator variable (1 for Highly Leveraged Loan and 0 otherwise) and Cum. Loan refers to the natural logarithm of the cumulative amount of loans a company has borrowed (in millions of dollars) within the past five years before the current loan deal. We report *t*-statistics for mean differences and Wilcoxon's

rank-sum test for differences in distribution between the samples in Panel B. Panel C presents the correlations between the explanatory variables. All variables except Expected Default Freq. are winsorized at the 2 and 98 percentiles, \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1% respectively.

Panel A: Summary Statistics									
	Hedge Fund Borrower Sample			Other Institutional Borrower Sample			Bank Borrower Sample		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
<b>Panel A.1. Borrower Characteristics</b>									
Size (log assets)	616	6.992	6.868	295	5.609	5.501	6,490	5.652	5.539
Altman's Z	441	3.366	2.120	253	4.134	2.444	4,785	5.138	3.556
Expected Default Freq.	369	0.116	1.2E-5	200	0.094	1.1E-5	4,436	0.086	8.8E-6
Cash/Assets	616	0.085	0.044	295	0.106	0.050	6,489	0.117	0.057
Interest Coverage Ratio	541	11.281	1.993	251	10.152	2.695	5,476	13.468	3.572
Leverage	613	0.385	0.377	294	0.321	0.303	6,455	0.254	0.220
NetWorth/Assets	615	0.314	0.327	295	0.398	0.397	6,473	0.448	0.457
Book-to-market	507	0.532	0.425	269	0.595	0.507	5,668	0.624	0.511
Tobins q	458	1.611	1.346	257	1.702	1.387	5,351	1.773	1.374
EBIT/Assets	613	0.055	0.064	293	0.043	0.063	6,455	0.046	0.072
Profit Margin	611	-0.010	0.028	293	-0.010	0.024	6,437	-0.003	0.038
ROE	613	0.058	0.084	293	0.031	0.076	6,446	0.047	0.096
ROA	613	0.003	0.021	293	0.003	0.025	6,460	0.005	0.034
Sale Growth	570	0.242	0.089	289	0.225	0.090	6,032	0.266	0.123
Beta	477	1.129	1.012	247	1.040	0.965	5,674	1.064	0.947
RMSE	477	0.032	0.027	247	0.035	0.027	5,674	0.035	0.030
Runup	477	0.201	0.152	247	0.192	0.097	5,674	0.129	0.062
Institutional Ownership	417	0.503	0.532	239	0.462	0.455	5,210	0.403	0.374
<b>Panel A.2. Loan Characteristics</b>									
	Hedge Fund Borrower Sample			Other Institutional Borrower Sample			Bank Borrower Sample		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
Investment Grade	660	0.082	0	316	0.019	0	6,832	0.113	0
Covenant	660	0.759	1	316	0.753	1	6,832	0.731	1
Secured	660	0.746	1	316	0.813	1	6,832	0.579	1
<b>Panel A.3. Instrument Variable</b>									
HighLever×Cum. Loan	660	1.502	0	316	1.422	0	6,832	0.661	0

**Panel B: Mean differences between samples: *t*-statistics, and Wilcoxon's *Z*-statistics**

	Hedge Fund – Other Institution						Hedge Fund – Bank						Other Institution – Bank					
	Panel B.1: Firm's characteristics																	
	Mean Diff	<i>t</i> -value		Wil.			Mean Diff	<i>t</i> -value		Wil.			Mean Diff	<i>t</i> -value		Wil.		
Size (log assets)	1.383	12.06	***	11.50	***	1.340	17.94	***	16.98	***		-0.044	-0.46		0.13			
Altmans Z	-0.768	-2.00	**	-2.12	**	-1.771	-8.19	***	-9.57	***		-1.004	-3.00	***	-5.00	***		
Expected Default Freq.	0.022	1.06		0.54		0.030	2.17	**	2.19	**		0.008	0.50		0.90			
Cash/Assets	-0.021	-2.30	**	-1.13		-0.032	-6.77	***	-4.01	***		-0.011	-1.38		-1.40			
Interest Coverage Ratio	1.129	0.50		-0.47		-2.187	-1.56		-4.99	***		-3.316	-1.76	*	-2.68	***		
Leverage	0.064	3.68	***	3.56	***	0.131	12.29	***	12.47	***		0.068	4.78	***	4.82	***		
NetWorth/Assets	-0.084	-4.38	***	-4.19	***	-0.134	-11.65	***	-11.54	***		-0.050	-3.15	***	-3.13	***		
Book-to-market	-0.063	-1.53		-1.90	*	-0.092	-3.57	***	-4.66	***		-0.029	-0.85		-1.13			
Tobins q	-0.091	-1.21		-0.55		-0.162	-3.73	***	-1.68	*		-0.071	-1.09		-0.60			
EBIT/Assets	0.012	1.37		0.65		0.009	1.91	*	-1.12			-0.002	-0.32		-1.45			
Profit Margin	-3.6E-04	-0.03		0.82		-0.007	-0.85		-3.25	***		-0.007	-0.64		-3.49	***		
ROE	0.027	0.92		0.78		0.011	0.67		-1.01			-0.016	-0.63		-1.57			
ROA	2.7E-04	0.04		-0.60		-0.002	-0.44		-4.40	***		-0.002	-0.35		-2.19	**		
Sale Growth	0.016	0.50		0.23		-0.025	-1.24		-3.63	***		-0.041	-1.52		-2.96	***		
Beta	0.089	1.66	*	1.44		0.065	1.96	*	2.46	**		-0.024	-0.54		0.08			
RMSE	-0.002	-1.71	*	-2.05	**	-0.003	-2.85	***	-2.59	***		0.000	-0.01		0.37			
Runup	0.009	0.20		0.40		0.072	2.57	**	2.76	***		0.062	1.67	*	1.51			
Institutional Ownership	0.041	1.71	*	1.72	*	0.101	6.87	***	6.86	***		0.060	3.06	***	3.03	***		

**Panel B.2: Loan Characteristics**

	Hedge Fund – Other Institution						Hedge Fund – Bank						Other Institution – Bank					
	Mean Diff	<i>t</i> -value		Wil.			Mean Diff	<i>t</i> -value		Wil.			Mean Diff	<i>t</i> -value		Wil.		
Investment Grade	0.063	4.78	***	3.82	***	-0.031	-2.76	***	-2.45	**		-0.094	-10.96	***	-5.25	***		
Covenant	0.006	0.20		0.20		0.028	1.58		1.54			0.022	0.87		0.85			
Secured	-0.068	-2.44	**	-2.35	**	0.166	9.25	***	8.31	***		0.234	10.29	***	8.27	***		

**Panel B.3: Instrument Variable**

HighLever×Cum. Loan	0.080	0.51		0.17		0.842	8.73	***	9.87	***		0.762	6.05	***	7.45	***
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**Panel C: Correlations**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1 Size (log assets)	1.00																		
2 Altmans Z	-0.10	1.00																	
3 Expected Default Freq.	-0.07	-0.23	1.00																
4 Cash/Assets	-0.21	0.46	-0.09	1.00															
5 Interest Coverage Ratio	0.03	0.49	-0.16	0.19	1.00														
6 Leverage	0.09	-0.53	0.28	-0.37	-0.36	1.00													
7 NetWorth/Assets	-0.20	0.62	-0.24	0.35	0.33	-0.70	1.00												
8 Book-to-market	-0.04	-0.27	0.25	-0.20	-0.15	0.00	0.12	1.00											
9 Tobins q	-0.14	0.66	-0.17	0.43	0.29	-0.27	0.24	-0.60	1.00										
10 EBIT/Assets	0.19	0.32	-0.30	-0.18	0.43	-0.06	0.14	-0.10	0.09	1.00									
11 Profit Margin	0.25	0.17	-0.23	-0.26	0.32	-0.06	0.08	0.01	-0.07	0.79	1.00								
12 ROE	0.11	0.18	-0.24	-0.09	0.19	-0.01	-0.03	-0.16	0.07	0.46	0.39	1.00							
13 ROA	0.21	0.32	-0.32	-0.17	0.43	-0.13	0.20	-0.04	0.05	0.97	0.83	0.46	1.00						
14 Sale Growth	-0.15	0.17	0.06	0.20	-0.05	0.01	0.10	-0.14	0.23	-0.17	-0.25	-0.11	-0.17	1.00					
15 Beta	-0.03	0.18	0.06	0.30	0.06	-0.14	0.13	-0.20	0.29	-0.16	-0.23	-0.12	-0.16	0.21	1.00				
16 RMSE	-0.55	-0.10	0.51	0.16	-0.16	0.01	0.02	0.17	0.02	-0.45	-0.45	-0.33	-0.48	0.19	0.28	1.00			
17 Runup	0.01	0.10	-0.38	0.04	0.07	-0.05	0.02	-0.14	0.13	0.19	0.15	0.15	0.20	-0.05	0.00	-0.18	1.00		
18 Institutional Ownership	0.45	0.14	-0.22	0.03	0.14	-0.08	0.10	-0.13	0.09	0.17	0.14	0.09	0.18	-0.09	0.16	-0.40	0.02	1.00	
19 Investment Grade	0.47	-0.06	-0.12	-0.12	-0.01	0.00	-0.09	-0.08	-0.03	0.12	0.16	0.09	0.12	-0.10	-0.11	-0.30	0.01	0.19	1.00
20 Covenant	-0.19	0.05	-0.02	0.03	0.03	-0.07	0.10	0.04	0.02	-0.01	-0.03	-0.02	-0.01	0.04	0.05	0.11	0.02	0.03	0.03
21 Secured	-0.44	-0.09	0.18	0.10	-0.14	0.08	-0.03	0.10	-0.03	-0.25	-0.24	-0.14	-0.25	0.13	0.10	0.41	-0.07	-0.21	-0.21
22 HighLever×Cum. Loan	-0.04	-0.12	0.09	-0.16	-0.08	0.27	-0.15	0.01	-0.09	0.03	0.02	0.01	0.00	0.01	-0.06	0.03	0.01	0.00	0.00

	19	20	21	22
19 Investment Grade	1.00			
20 Covenant	-0.11	1.00		
21 Secured	-0.35	0.31	1.00	
22 HighLever×Cum. Loan	-0.10	0.04	0.08	1.00

**Table III****Logit Regressions on the Probability of Borrowing from Hedge Funds**

This Table reports our logit regression results. The dependent variable in these regressions takes the value of 1 if there is at least one Hedge Fund lender in a given loan deal, otherwise it takes the value of 0 if all lenders are commercial banks. This analysis is based on loan deals during the sample period 1995 to 2008 (1<sup>st</sup> quarter). Elasticity (Elast.) was calculated as  $d(\ln F)/d(\ln x)$ , where  $d$  is the first derivative,  $\ln(F)$  is the natural logarithm of the density function and  $\ln(x)$  is the natural logarithm of the explanatory variable and is evaluated at the sample means of the explanatory variables. Heteroskedasticity corrected robust  $t$ -statistics ( $t$ -stats) are reported in all specifications. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1% respectively.

	<b>Regression I</b>			<b>Regression II</b>			<b>Regression III</b>			<b>Regression IV</b>						
	Coef.	$t$ -stats.	Elast.	Coef.	$t$ -stats.	Elast.	Coef.	$t$ -stats.	Elast.	Coef.	$t$ -stats.	Elast.				
Size (log assets)	0.34	***	8.85	1.955	0.375	***	8.64	2.169	0.374	***	8.72	2.151	0.385	***	7.22	2.176
Expected default frequency	----	----	----	----	----	----	----	----	0.752	**	2.04	0.054	0.771	**	2.04	0.057
Cash/assets	-0.341		-0.57	-0.037	-0.249		-0.38	-0.027	-3.516	***	-4.18	-0.347	-2.612	***	-2.75	-0.264
Leverage	2.678	***	9.71	0.62	2.865	***	9.16	0.665	----	----	----	----	----	----	----	----
Book-to-market	-0.127		-0.94	-0.075	0.048		0.33	0.028	-0.426	**	-2.51	-0.254	----	----	----	----
Tobin's q	----	----	----	----	----	----	----	----	----	----	----	----	-0.166		-1.63	-0.275
EBIT/assets	1.171	*	1.84	0.064	0.932		1.4	0.051	0.62		0.9	0.034	1.057		1.17	0.058
Sale growth	0.055		0.3	0.013	0.022		0.11	0.005	0.26		1.42	0.061	0.166		0.83	0.04
Beta	-0.062		-0.62	-0.063	-0.164		-1.48	-0.167	-0.028		-0.26	-0.028	0.018		0.14	0.018
RMSE	27.406	***	5.47	0.87	21.866	***	3.93	0.696	32.974	***	5.11	1.067	25.021	***	3.39	0.829
Run-up	0.372	***	3.28	0.051	0.328	***	2.81	0.045	0.54	***	4.31	0.072	0.472	***	3.42	0.061
Institutional ownership	1.383	***	5.36	0.568	1.43	***	5.37	0.593	1.724	***	5.77	0.7	1.65	***	4.89	0.672
<b>Year Effect</b>	<b>Yes</b>				<b>Yes</b>				<b>Yes</b>				<b>Yes</b>			
<b>Industry Effect</b>	<b>No</b>				<b>Yes</b>				<b>No</b>				<b>Yes</b>			
<b>Observations</b>	5071				4983				4073				3689			
<b>Chi Square</b>	284.83				368.78				206.79				256.89			
<b>Pseudo R-square</b>	0.129				0.176				0.116				0.15			

**Table IV**  
**Firm Characteristics after Propensity Score Matching**

This table reports the characteristics of the propensity score matched hedge fund borrowers and bank borrowers sample during the sample period from 1995 to 2008 (1<sup>st</sup> quarter). We conduct propensity score matching (PSM) based on regression I in Table III using the nearest neighborhood within a 0.8 caliper. After PSM, we have 342 observations in each of the treatment (hedge fund borrowers) and the matching sample (bank borrowers). Table IV summarizes the borrowing companies' characteristics in each sample after matching and prior to the loan origination date.

	Treatment Sample (Hedge Fund Borrower)			Matching Sample (Bank Borrower)			Paired Mean Diff. Test (Hedge Fund -Bank)		
	N	Mean	Median	N	Mean	Median	N	Mean Diff.	t-stats.
Size (log assets)	342	7.033	6.894	342	7.085	6.962	342	-0.052	-0.46
Altmans Z	296	3.584	2.323	259	4.464	3.145	231	-0.622 *	-1.76
Expected Default Freq.	275	0.096	5.E-06	265	0.101	1.E-06	218	-0.006	-0.25
Cash/Assets	342	0.087	0.047	342	0.092	0.051	342	-0.005	-0.66
Interest Coverage Ratio	302	13.255	2.593	303	12.943	3.021	270	-0.354	-0.15
Leverage	342	0.365	0.359	342	0.359	0.337	342	0.006	0.48
NetWorth/Assets	342	0.353	0.367	342	0.373	0.366	342	-0.020	-1.41
Book-to-market	342	0.555	0.450	342	0.571	0.508	342	-0.015	-0.40
Tobins q	313	1.650	1.375	317	1.722	1.310	292	-0.101	-1.32
EBIT/Assets	342	0.066	0.071	342	0.063	0.069	342	0.003	0.34
Profit Margin	340	0.015	0.038	342	0.039	0.059	340	-0.026 *	-1.82
ROE	342	0.058	0.088	341	0.084	0.109	341	-0.026	-1.07
ROA	342	0.016	0.029	342	0.021	0.030	342	-0.005	-0.72
Sale Growth	342	0.233	0.095	342	0.246	0.118	342	-0.014	-0.44
Beta	342	1.095	0.998	342	1.150	1.036	342	-0.055	-1.09
RMSE	342	0.030	0.026	342	0.031	0.025	342	-4.E-04	-0.33
Runup	342	0.200	0.146	342	0.200	0.125	342	8.E-05	0.00
Institutional Ownership	342	0.541	0.558	342	0.546	0.579	342	-0.005	-0.28

## Table V

### Propensity Score Match Adjusted Abnormal Short-Selling Activity around Loan Origination

This table reports the cumulative abnormal short-selling activity around the loan origination date during the sample period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007. We use the propensity score matching methodology to construct a matched sample of bank borrower (matched sample) for every hedge fund borrower (treatment sample), based on regression I in Table III. After PSM, there are 70 firms from the hedge fund sample and 66 firms from the matched bank sample, of which, there are 55 PSM pairs. In each panel, abnormal short-selling is calculated over various windows for the hedge fund borrower sample and matched bank borrower sample. We first define our “normal” short selling benchmark for any borrower as the average daily short selling over the period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007 but excluding the event period(s) (-60,+60). The daily abnormal short selling is the difference between the actual daily short selling in the event window (-60, +60) and this “normal” short selling benchmark. We then normalize this abnormal short selling by either the average daily volume prior to the event window (Short/Avol, as in Panel A), which is calculated for a given stock as the average trading volume in the event window (-120, -61) or the contemporaneous outstanding shares (Short/SHROUT, as in Panel B). Our results are robust to using either definition of abnormal short selling. In Panel C, we restrict the bank lender sample to those observations with at least one bank holding company lender, as defined in the Bank Regulatory Database (available through WRDS), and conduct similar analysis of cumulative abnormal Short/Avol ratios. In Panel D, we separate the hedge fund lender sample into two categories: the first category consists of observations with at least one hedge fund as lead lender, and the other category consists of observations with bank lead lenders and hedge fund participants. In Panel E, we separate the hedge fund borrower sample into two groups: the loans with at least one financial covenant and those without any financial covenants and conduct similar analysis of cumulative abnormal Short/Avol ratios. In all Panels we conduct *t*-tests on short selling activities within each group and mean difference *t*-tests between the two comparison groups. We winsorize all abnormal short-selling measures at 2% and 98% for each sample and each day. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1% respectively.

<b>Panel A: PSM Analysis of Cumulative Abnormal Short/Avol</b>								
Panel A.1: Treatment Sample (Hedge Fund borrowers)								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	1.383**	0.574**	0.817**	1.304**	0.738**	0.165	0.121	0.271
<i>t</i> -statistics	2.37	2.18	2.34	2.27	2.18	1.19	0.86	1.13
Num of Observations	70	69	70	70	70	64	56	64
Panel A.2: Matched Sample (Bank borrowers)								
Mean cumulative abnormal Short/Avol	-0.555**	-0.241*	-0.314**	-0.470**	-0.229*	-0.220	-0.340***	-0.560**
<i>t</i> -statistics	-2.21	-1.94	-2.29	-2.01	-1.88	-1.48	-3.15	-2.33
Num of Observations	66	66	66	66	66	66	66	66
Panel A.3: Paired Mean Difference Test (Hedge Fund – Bank)								
Mean difference (A – B)	2.005***	0.899**	1.118***	1.831**	0.943**	0.494*	0.446**	0.942**
Mean difference test ( <i>t</i> -statistics)	2.68	2.42	2.72	2.51	2.40	1.99	2.40	2.36
Num of Observations	55	54	55	55	55	49	44	49
<b>Panel B: PSM Analysis of Cumulative Abnormal Short/SHROUT (%)</b>								
Panel B.1: Treatment Sample (Hedge Fund borrowers)								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/SHROUT	0.902**	0.316**	0.591**	0.848**	0.537**	0.095	0.047	0.136
<i>t</i> -statistics	2.52	2.22	2.50	2.44	2.37	1.03	0.54	0.92
Num of Observations	71	70	71	71	71	65	57	65
Panel B.2: Matched Sample (Bank borrowers)								
Mean cumulative abnormal Short/SHROUT	-0.148	-0.048	-0.101	-0.116	-0.068	-0.061	-0.127**	-0.188
<i>t</i> -statistics	-1.11	-0.67	-1.33	-0.95	-1.05	-0.76	-2.36	-1.50
Num of Observations	67	67	67	67	67	67	67	67
Panel B.3: Paired Mean Difference Test (Hedge Fund – Bank)								
Mean difference (A – B)	1.201***	0.418**	0.788***	1.100**	0.686**	0.250	0.215*	0.448**
Mean difference test ( <i>t</i> -statistics)	57	56	57	57	57	51	46	51
Num of Observations	2.64	2.05	2.80	2.51	2.59	1.67	2.00	2.03

<b>Panel C: Analysis of Cumulative Abnormal Short/Avol: Hedge Fund lenders and Bank Holding Company lenders</b>								
Panel C.1: Hedge Fund borrowers								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	1.194**	0.470**	0.729**	1.096**	0.631**	0.213*	0.095	0.297
<i>t</i> -statistics	2.35	2.05	2.40	2.19	2.14	1.71	0.77	1.39
Num of Observations	81	80	81	81	81	74	65	74
Panel C.2: Bank Holding Company borrowers								
Mean cumulative abnormal Short/Avol	0.052	0.012	0.040	0.019	0.007	0.074	0.090	0.162
<i>t</i> -statistics	0.18	0.08	0.26	0.07	0.05	0.42	0.53	0.51
Num of Observations	51	51	51	51	51	51	50	51
Panel C.3: Mean Difference Test (Hedge Fund – Bank Holding Company)								
Mean difference (A – B)	1.142*	0.458*	0.689**	1.077*	0.624*	0.140	0.005	0.135
Mean difference test ( <i>t</i> -statistics)	1.94	1.66	2.02	1.89	1.93	0.65	0.02	0.35
<b>Panel D: Analysis of Cumulative Abnormal Short/Avol: Hedge Fund Lead Lenders and Bank Lead Lenders</b>								
Panel D.1: Hedge Fund Lead Lenders								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	1.450**	0.548**	0.902**	1.334**	0.786**	0.264*	0.011	0.273
<i>t</i> -statistics	68	68	68	68	68	62	54	62
Num of Observations	2.43	2.07	2.53	2.27	2.26	1.83	0.08	1.13
Panel D.2: Bank Lead Lenders								
Mean cumulative abnormal Short/Avol	-0.145	0.029	-0.171	-0.149	-0.176	-0.047	0.508	0.419
<i>t</i> -statistics	13	12	13	13	13	12	11	12
Num of Observations	-0.35	0.11	-0.97	-0.38	-1.12	-0.23	1.48	1.01
Panel D.3: Mean Difference Test (Hedge Fund Lead Lenders – Bank Lead Lenders)								
Mean difference (A – B)	1.594**	0.519	1.073***	1.483**	0.962**	0.311	-0.497	-0.145
Mean difference test ( <i>t</i> -statistics)	2.21	1.36	2.70	2.09	2.53	1.26	-1.35	-0.30

**Panel E: Analysis of Cumulative Abnormal Short/Avol between Hedge Fund Loans with Covenants and without Covenants**

Panel E.1: With Covenant

	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	1.533**	0.597*	0.936**	1.450**	0.853**	0.126	-0.014	0.114
<i>t</i> -statistics	2.2	1.96	2.24	2.12	2.1	0.81	-0.09	0.42
Num of Observations	58	58	58	58	58	53	47	53

Panel E.2: Without Covenant

Mean cumulative abnormal Short/Avol	0.339	0.137	0.208	0.202	0.071	0.433**	0.381*	0.760**
<i>t</i> -statistics	1.11	0.63	1.55	0.66	0.53	2.21	2.04	2.55
Num of Observations	23	22	23	23	23	21	18	21

Panel E.3: Mean Difference Test (With Covenant – Without Covenant)

Mean difference (A – B)	1.194	0.460	0.728*	1.248*	0.782*	-0.306	-0.396	-0.646
Mean difference test ( <i>t</i> -statistics)	1.57	1.23	1.66	1.66	1.83	-1.22	-1.63	-1.63

**Table VI****Switching Regression with Endogenous Switching: Actual v.s. Hypothetical Abnormal Short Selling**

In this Table we report the actual and hypothetical cumulative abnormal Short/Avol ratios over window (-10, -1) of the Hedge Fund borrower sample and bank sample during the sample period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007. In panel A we report the actual and hypothetical abnormal short selling for the Hedge Fund borrower sample. The hypothetical refers to the model estimated abnormal short selling if the same firms had borrowed from Banks. Similarly, in panel B we report the actual and hypothetical abnormal short selling for the Bank borrower sample. In panel B we conduct similar analysis but using Cumulative Abnormal Short/SHROUT (in percentage) as the dependent variable.

<b>Panel A: Cumulative Abnormal Short/Avol over window (-10, -1)</b>			
<b>Panel A.1 : Hedge Fund Borrower Sample</b>		<b>Panel A.2: Bank Borrower Sample</b>	
Actual value	1.277	Actual value	-0.438
Hypothetical value	-0.354	Hypothetical value	0.927
Actual-Hypothetical	1.631 ***	Actual-Hypothetical	-1.365 ***
Observations	71	Observations	612
t-statistics	2.92	t-statistics	-12.21

<b>Panel B: Cumulative Abnormal Short/SHROUT over window (-10, -1) (%)</b>			
<b>Panel B.1 : Hedge Fund Borrower Sample</b>		<b>Panel B.2: Bank Borrower Sample</b>	
Actual value	6.680	Actual value	0.501
Hypothetical value	0.607	Hypothetical value	6.154
Actual-Hypothetical	6.073 ***	Actual-Hypothetical	-5.654 ***
Observations	72	Observations	613
t-statistics	15.75	t-statistics	-75.38

**Table VII****Abnormal Short-Selling Activity around Loan Amendments**

In this Table we report abnormal short selling activity around the announcement day of loan amendments for both the hedge fund and the bank loan borrower samples during the sample period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007. We present the results over various event windows. We obtain our loan amendment sample from two sources: (i) loan amendments as defined by the DealScan database, (ii) hand-collecting amendments from borrower filings of forms 10-K, 10-Q and 8-K with the SEC (discussed in section 3.C.). From these forms we also hand-collect information including the announcement date of the loan amendment (day 0), changes in loan size, maturity and interest rate. We report *t*-statistics for the differences in means between the hedge fund and the bank sample. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Hedge Fund Borrower Sample								
Event Windows	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	0.270	-0.013	0.283**	0.212	0.284*	0.083	-0.037	0.047
<i>t</i> -statistics	1.43	-0.15	2.08	1.17	1.90	0.93	-0.45	0.31
Num of Observations	113	113	113	113	113	107	105	107
Panel B: Bank Borrower Sample								
Mean cumulative abnormal Short/Avol	-0.357**	-0.178**	-0.179**	-0.331**	-0.174*	-0.187**	-0.123*	-0.309**
<i>t</i> -statistics	-2.31	-2.24	-2.05	-2.30	-1.84	-2.19	-1.91	-2.27
Num of Observations	263	262	263	263	263	263	259	263
Panel C: Mean Difference Test (Hedge Fund – Bank)								
Mean difference (A – B)	0.627**	0.165	0.462***	0.542**	0.457**	0.270**	0.086	0.355*
Mean difference test ( <i>t</i> -statistics)	2.57	1.43	2.86	2.35	2.59	2.19	0.83	1.76

**Table VIII: Profitability of Abnormal Short-Selling Activity around Loan Amendments**

This Table summarizes the profits (in thousand of dollars) that short seller can make around loan amendment announcement dates based on different strategies during the sample period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007. Shorting Day refers to the day on which short sellers start their short position and day 0 is defined as the amendment announcement date, or the next trading day if the announcement date is not a trading day. Short Position Closing Day refers to how many days after the amendment announcement short sellers fully recover their shorting position by purchasing back the securities they short sold before. Closing Day0 means that short sellers will close all their shorting position on the announcement day of the loan amendment. Profit (in thousands of dollars) is defined as  $profit_t = (Short Price_t - Ask_n) \times Abnormal Short Volume_t$ , whereas *Short Price<sub>t</sub>*, refers to the weighted average short selling price at shorting day *t*, *Ask<sub>n</sub>* refers to the close ask price on the *n<sup>th</sup>* trading day after the announcement, and abnormal short volume refers to the abnormal number of shares being shorted on day *t*. Panel A and Panel B reports the profits of abnormal short selling activity in the hedge fund sample and the bank sample, respectively.

<b>Panel A: Hedge Fund borrowers Sample</b>															
Short Position Closing Day Post Announcement															
Shorting Day	N	0	1	2	3	4	5	6	7	8	9	10	15	20	30
-10	104	5,001	5,382	5,559	5,388	4,508	4,013	3,150	2,134	1,616	1,783	526	10	2,492	-1,198
-9	104	2,655	3,390	2,372	5,198	4,799	4,143	3,438	1,952	1,299	578	194	1,269	2,324	-6,808
-8	103	6,977	7,534	6,527	5,837	6,251	6,365	7,180	7,042	7,588	6,932	9,572	7,240	9,243	3,134
-7	105	-156	403	184	1,180	1,342	732	43	-331	-1,143	-729	-852	-1,538	-1,069	-105
-6	105	4,153	5,395	5,107	5,495	4,803	4,044	3,073	2,689	1,281	1,301	1,169	-279	2,884	-575
-5	106	3,777	4,793	4,983	6,052	5,989	4,819	3,096	2,600	2,480	3,168	2,047	1,888	4,194	5,433
-4	105	807	1,488	2,756	3,119	2,283	1,614	-246	-261	-298	867	-968	-1,862	-1,721	-252
-3	105	4,090	4,763	5,471	5,221	4,396	3,968	1,869	1,868	2,113	2,650	380	143	2,838	2,939
-2	106	4,463	5,463	4,902	5,436	6,012	6,795	6,103	6,301	7,634	7,610	9,769	9,120	10,633	8,699
-1	106	562	207	444	-264	-1,107	-2,713	-2,895	-3,485	-2,044	-588	-1,735	-5,719	2,212	6,572
<b>sum(-10,-1)</b>		<b>32,328</b>	<b>38,818</b>	<b>38,304</b>	<b>42,662</b>	<b>39,274</b>	<b>33,780</b>	<b>24,810</b>	<b>20,510</b>	<b>20,527</b>	<b>23,573</b>	<b>20,101</b>	<b>10,273</b>	<b>34,028</b>	<b>17,838</b>
0	106	---	232	-212	939	611	31	-726	-1,081	-348	268	-856	-471	1,554	2,388
1	104	---	---	901	1,449	975	-343	-1,278	-1,047	-869	-861	-2,086	-3,282	92	1,885
2	105	---	---	---	1,284	1,259	350	-675	-1,078	-757	-419	-1,333	-1,170	161	3,284
3	104	---	---	---	---	-1,371	-2,059	-2,884	-3,678	-4,020	-4,161	-6,081	-6,979	-4,726	-6,562
4	105	---	---	---	---	---	-887	-1,919	-2,184	-2,738	-2,492	-4,919	-5,012	-3,367	-1,962
5	103	---	---	---	---	---	---	-2,091	-2,123	-1,873	-784	-3,702	-4,538	-5,552	817
6	104	---	---	---	---	---	---	---	310	814	-313	1,693	-498	-229	-1,553
7	103	---	---	---	---	---	---	---	---	595	52	2,168	-722	183	-1,975
8	104	---	---	---	---	---	---	---	---	---	-846	-703	-3,133	-3,927	-3,323
9	103	---	---	---	---	---	---	---	---	---	---	-1,265	-2,310	-1,165	2,197
10	103	---	---	---	---	---	---	---	---	---	---	---	-873	-596	631
<b>Sum(0,+10)</b>			<b>232</b>	<b>689</b>	<b>3,672</b>	<b>1,475</b>	<b>-2,908</b>	<b>-9,573</b>	<b>-10,882</b>	<b>-9,196</b>	<b>-9,556</b>	<b>-17,087</b>	<b>-28,989</b>	<b>-17,572</b>	<b>-4,174</b>

**Panel B: Bank Borrower Sample**

Shorting Day	N	Short Position Closing Day Post Announcement													
		0	1	2	3	4	5	6	7	8	9	10	15	20	30
-10	258	6,599	6,733	8,826	8,914	10,184	8,080	7,049	7,406	8,767	9,387	7,749	7,794	6,540	9,575
-9	256	-4,186	-4,678	-4,145	-5,379	-3,539	-5,707	-6,973	-6,289	-8,973	-11,040	-12,438	-17,202	-18,379	-15,225
-8	259	-277	-1,614	-1,313	-1,579	-2,393	-3,624	-3,814	-3,149	-4,979	-4,112	-7,053	-6,535	-8,862	-9,771
-7	258	5,185	4,182	4,898	4,565	3,557	1,552	1,796	2,801	2,217	2,338	-91	-3,706	-5,338	-1,079
-6	257	-3,751	-4,211	-2,517	-1,876	886	-991	-1,071	-2,339	-3,593	-1,907	-6,267	-5,672	-6,847	-4,750
-5	257	-1,481	-2,489	-1,057	702	3,073	1,560	345	-2,009	-4,882	-1,360	-6,413	-2,936	828	4,680
-4	255	-1,204	-4,419	-4,391	-3,288	-643	-2,514	-2,746	-7,588	-9,870	-8,185	-15,157	-10,264	-8,456	-4,417
-3	259	-1,844	-4,206	-6,183	-4,465	-1,822	-3,164	-2,172	-5,480	-7,240	-6,409	-10,879	-12,241	-12,593	-16,912
-2	260	-590	-4,283	-5,163	-6,234	-4,316	-4,800	-4,901	-7,267	-11,287	-11,953	-15,760	-17,711	-15,818	-16,022
-1	261	222	-949	-1,481	-1,785	47	-1,794	-1,811	-3,907	-4,454	-4,788	-8,293	-9,498	-9,911	-10,721
<b>sum(-10,-1)</b>		<b>-1,328</b>	<b>-15,933</b>	<b>-12,526</b>	<b>-10,426</b>	<b>5,032</b>	<b>-11,403</b>	<b>-14,297</b>	<b>-27,822</b>	<b>-44,295</b>	<b>-38,030</b>	<b>-74,602</b>	<b>-77,970</b>	<b>-78,837</b>	<b>-64,644</b>
0	259	---	-944	1,604	74	1,219	-901	396	933	-1,461	-2,721	-5,143	-3,330	-5,065	-10,786
1	262	---	---	-460	-618	1,705	-617	775	2,357	-2,853	-3,383	-6,619	-7,125	-6,716	-7,649
2	255	---	---	---	535	2,407	1,264	-313	732	-4,167	-3,757	-5,027	-8,243	-7,232	-5,660
3	256	---	---	---	---	1,246	1,742	1,962	3,403	-323	-3	-4,347	-131	-4,832	2,986
4	255	---	---	---	---	---	-1,744	-1,160	-3,039	-6,990	-3,257	-6,519	-11,719	-20,459	-18,254
5	257	---	---	---	---	---	---	-1,706	-3,297	-4,781	-4,264	-10,522	-10,487	-13,871	-10,499
6	257	---	---	---	---	---	---	---	-1,818	-4,158	-5,877	-10,530	-8,272	-10,438	-2,703
7	254	---	---	---	---	---	---	---	---	-3,369	-5,667	-6,112	-11,324	-11,710	-6,536
8	254	---	---	---	---	---	---	---	---	---	-655	-3,597	-2,046	-3,375	-963
9	252	---	---	---	---	---	---	---	---	---	---	652	-6,315	-7,910	-4,460
10	254	---	---	---	---	---	---	---	---	---	---	---	-12,367	-9,587	7,771
<b>Sum(0,+10)</b>			<b>-944</b>	<b>1,144</b>	<b>-9</b>	<b>6,577</b>	<b>-256</b>	<b>-46</b>	<b>-728</b>	<b>-28,104</b>	<b>-29,584</b>	<b>-57,764</b>	<b>-81,359</b>	<b>-101,194</b>	<b>-56,754</b>

**Table IX**  
**Abnormal Short-Selling Activity around Loan Amendments**  
**Sorted based on Favorable and Unfavorable Amendments**

In this table we show abnormal short selling activity around favorable and unfavorable loan amendments during the sample period from January 2nd 2005 to July 6th 2007. An amendment is categorized as favorable, when changes include a larger loan amount, lower interest rate, and extended maturity. An amendment is categorized as unfavorable when changes include smaller loan amount, higher interest rate, and shortened maturity. Favorable loan amendments are defined as amendments with at least one favorable term change, but no unfavorable term change. The amendments other than favorable ones are therefore defined as unfavorable amendments. Panel A presents the results for the hedge fund sample; Panel B for the bank sample; and Panel C for the difference between the hedge fund and bank samples.

Panel A: Hedge Fund Borrowers Sample								
Panel A.1: Favourable Amendments								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	-0.035	-0.179**	0.144	-0.064	0.154	-0.007	-0.103	-0.109
<i>t</i> -statistics	-0.19	-2.25	0.94	-0.38	0.98	-0.07	-0.98	-0.61
Num of Observations	76	76	76	76	76	73	72	73
Panel A.2: Unfavourable Amendments								
Mean cumulative abnormal Short/Avol	0.897**	0.328*	0.569**	0.778*	0.549*	0.276	0.108	0.380
<i>t</i> -statistics	2.13	1.75	2.10	1.86	1.71	1.51	0.90	1.44
Num of Observations	37	37	37	37	37	34	33	34
Panel A.3: Mean Difference Test (Favorable – Unfavorable)								
Mean difference (A.1 – A.2)	-0.932**	-0.507**	-0.425	-0.841*	-0.395	-0.283	-0.211	-0.489
Mean difference test ( <i>t</i> -statistics)	-2.03	-2.49	-1.37	-1.87	-1.10	-1.37	-1.32	-1.54
Panel B: Bank Borrowers Sample								
Panel B.1: Favourable Amendments								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	-0.601**	-0.291**	-0.310**	-0.56**	-0.33**	-0.273**	-0.209**	-0.480**
<i>t</i> -statistics	-2.37	-2.20	-2.28	-2.38	-2.10	-2.08	-2.16	-2.28
Num of Observations	126	126	126	126	126	126	125	126
Panel B.2: Unfavourable Amendments								
Mean cumulative abnormal Short/Avol	-0.132	-0.073	-0.059	-0.119	-0.027	-0.108	-0.043	-0.151
<i>t</i> -statistics	-0.73	-0.81	-0.53	-0.70	-0.26	-0.97	-0.50	-0.86
Num of Observations	137	136	137	137	137	137	134	137
Panel B.3: Mean Difference Test (Favorable – Unfavorable)								
Mean difference (B.1 – B.2)	-0.469	-0.217	-0.251	-0.441	-0.306	-0.164	-0.166	-0.329
Mean difference test ( <i>t</i> -statistics)	-1.50	-1.36	-1.43	-1.52	-1.60	-0.95	-1.28	-1.20
Panel C: Mean Difference Test of Unfavourable Amendments (Hedge Fund - Bank)								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean difference (A.2-B.2)	1.029**	0.402*	0.628**	0.897*	0.577*	0.384*	0.151	0.531*
Mean difference test ( <i>t</i> -statistics)	2.25	1.92	2.15	1.99	1.70	1.80	1.02	1.67

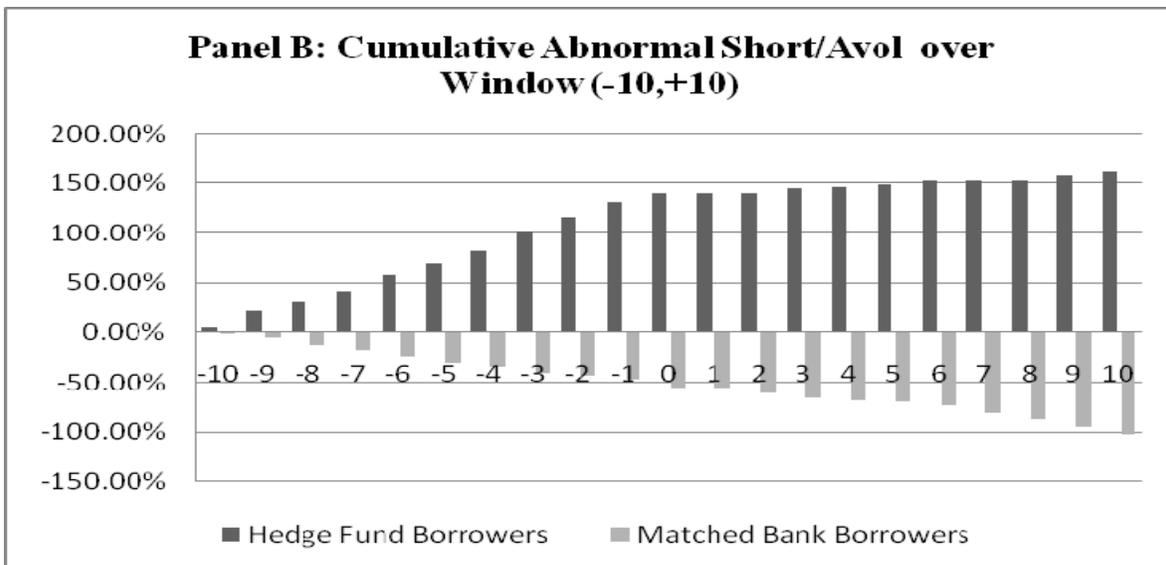
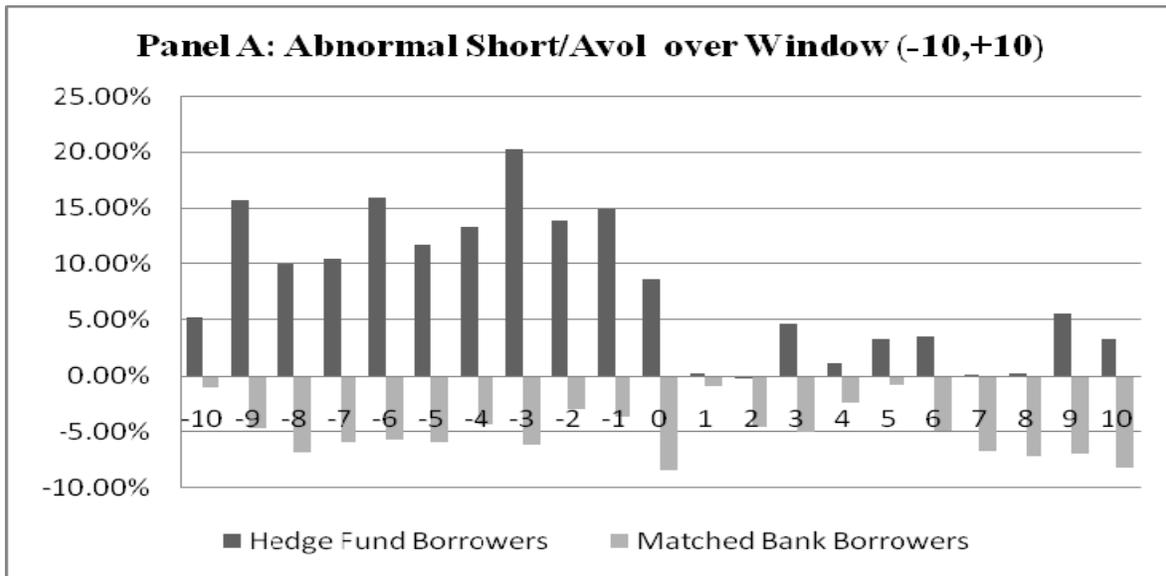
**Table X**  
**Abnormal Short-Selling Activity around Loan Amendments**  
**Sorted Based Changes by Highest and Lowest EDF Quintiles**

In this Table we show abnormal short selling results for the sample period from January 2nd 2005 to July 6th 2007 based on sorting loan amendments by changes in expected Default Frequency (EDF). We sort changes in EDF into quintiles. Changes in EDF are defined as the difference between the EDF estimated at the month end of the amendment announcement date and the EDF estimated 6 months prior to the announcement date. The lowest quintile contains observations whose EDFs have decreased most, whereas the highest quintile contains observations whose EDFs have increased the most. The largest decreases in EDF are more likely to be associated with unfavorable changes in the borrowers' financial conditions. Panel A presents the results for the hedge fund sample; Panel B for the bank sample; and Panel C for the difference between the hedge fund and bank samples.

Panel A: Hedge Fund Borrower Sample								
Panel A.1: Lowest Quintile of Change in EDF								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	-0.095	-0.153	0.058	-0.079	0.074	-0.130	-0.249*	-0.380
<i>t</i> -statistics	-0.32	-0.82	0.22	-0.29	0.32	-0.75	-1.93	-1.40
Num of Observations	21	21	21	21	21	21	21	21
Panel A.2: Highest Quintile of Change in EDF								
Mean cumulative abnormal Short/Avol	1.369**	0.172	1.197**	1.242*	1.199**	0.342	0.153	0.495
<i>t</i> -statistics	2.21	0.63	2.75	2.07	2.42	1.34	0.62	1.03
Num of Observations	20	20	20	20	20	18	18	18
Panel A.3: Mean Difference Test (Lowest – Highest)								
Mean difference (A.1 – A.2)	-1.464**	-0.325	-1.139**	-1.321*	-1.125**	-0.472	-0.402	-0.875
Mean difference test ( <i>t</i> -statistics)	-2.12	-0.99	-2.24	-2.01	-2.05	-1.53	-1.45	-1.58
Panel B: Bank Borrower Sample								
Panel B.1: Lowest Quintile of Change in EDF								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean cumulative abnormal Short/Avol	-0.306	-0.141	-0.164	-0.315	-0.326	0.014	-0.096	-0.082
<i>t</i> -statistics	-0.67	-0.61	-0.66	-0.74	-0.96	0.06	-0.56	-0.21
Num of Observations	45	45	45	45	45	45	45	45
Panel B.2: Highest Quintile of Change in EDF								
Mean cumulative abnormal Short/Avol	-0.994***	-0.507***	-0.487**	-0.922***	-0.405**	-0.445*	-0.244	-0.684*
<i>t</i> -statistics	-2.76	-3.19	-2.22	-2.84	-2.16	-1.94	-1.43	-1.83
Num of Observations	46	46	46	46	46	46	45	46
Panel B.3: Mean Difference Test (Lowest – Highest)								
Mean difference (B.1 – B.2)	0.688	0.365	0.323	0.608	0.078	0.459	0.148	0.602
Mean difference test ( <i>t</i> -statistics)	1.18	1.30	0.98	1.14	0.20	1.36	0.62	1.11
Panel C: Mean Difference Test of Highest Quintile of Change in EDF (Hedge Fund -Bank)								
	(-10,0)	(-10,-6)	(-5,0)	(-10,-1)	(-5,-1)	(0,+5)	(+6,+10)	(0,+10)
Mean difference (A.2-B.2)	2.362***	0.679**	1.684***	2.164***	1.603***	0.787**	0.397	1.179*
Mean difference test ( <i>t</i> -statistics)	3.30	2.16	3.45	3.17	3.02	2.29	1.33	1.94

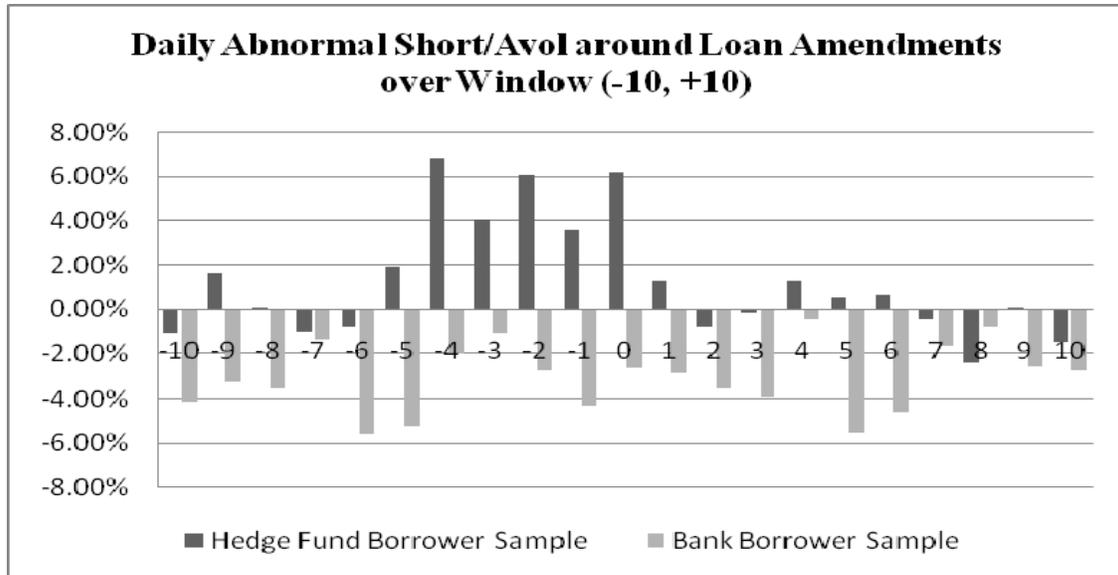
**Figure I: Short-Selling Activity around Loan Origination**

This figure shows short-selling activity around the loan origination (day 0). Panel A plots the abnormal shorting activity of the equity of the treatment sample (hedge fund borrowers) and those of the matched sample (bank borrowers). Shorting activity is measured as the ratio of daily total number of shares being shorted to the average daily trading volume over the window (-120,-61) (Short/Avol). For any given borrower, the benchmark “normal” shorting activity is defined as the company’s average Short/Avol ratio over the period from January 2<sup>nd</sup> 2005 to July 6<sup>th</sup> 2007 but excluding the event period(s), which is the window (-60, +60). The darker column plots the abnormal daily Short/Avol ratio of the treatment sample, and the lighter column represents the same ratio for the matched sample. The matching is based on regression I in Table III. We winsorize the abnormal short-selling activity at the 2% and 98% percentiles for each sample each day. Panel B presents the Cumulative abnormal Short/Avol ratios over the (-10, 0, +10) window.



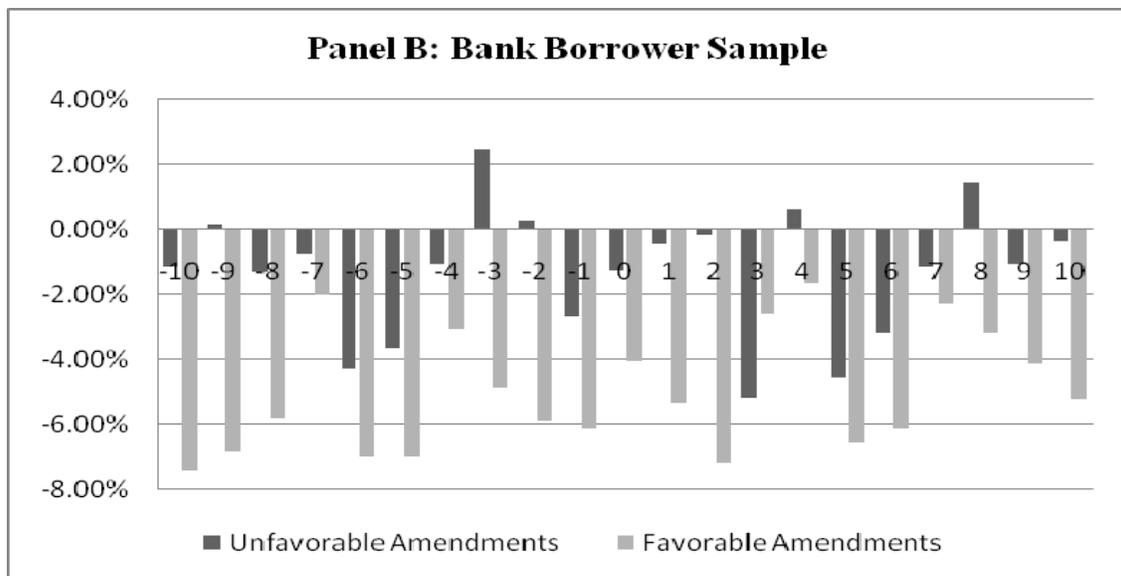
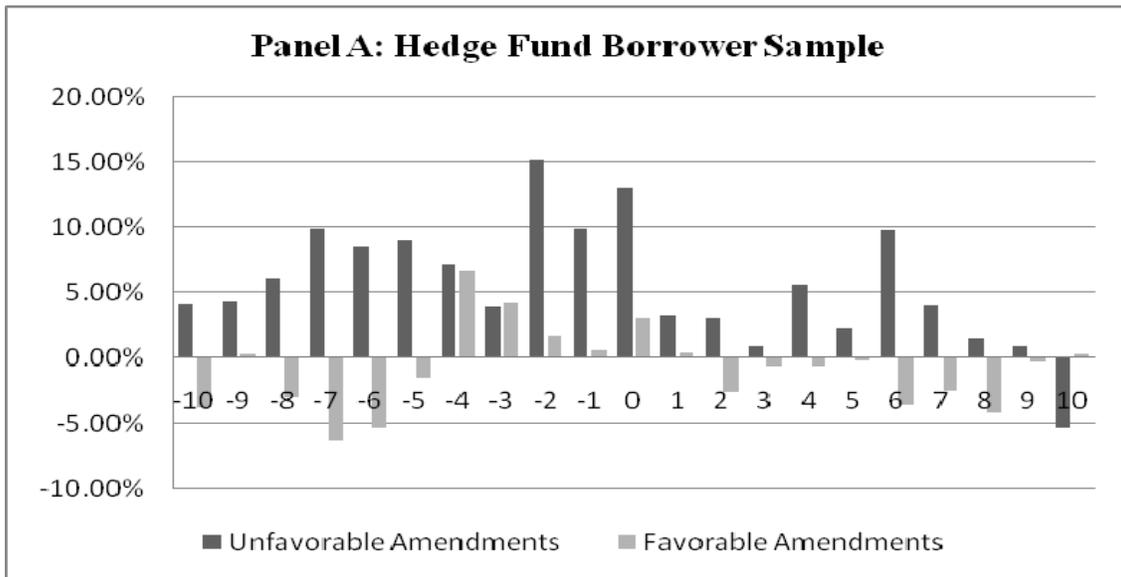
## Figure II Short-Selling Activity around Loan Amendments

This figure depicts short-selling activity around the announcement date (day 0) of loan amendments. The darker columns and lighter columns depict abnormal shorting activity of the equity of hedge fund borrowers (114 observations on day 0) and of bank borrowers (267 observations on day 0), respectively. Abnormal Short/Avol is defined in Figure I.



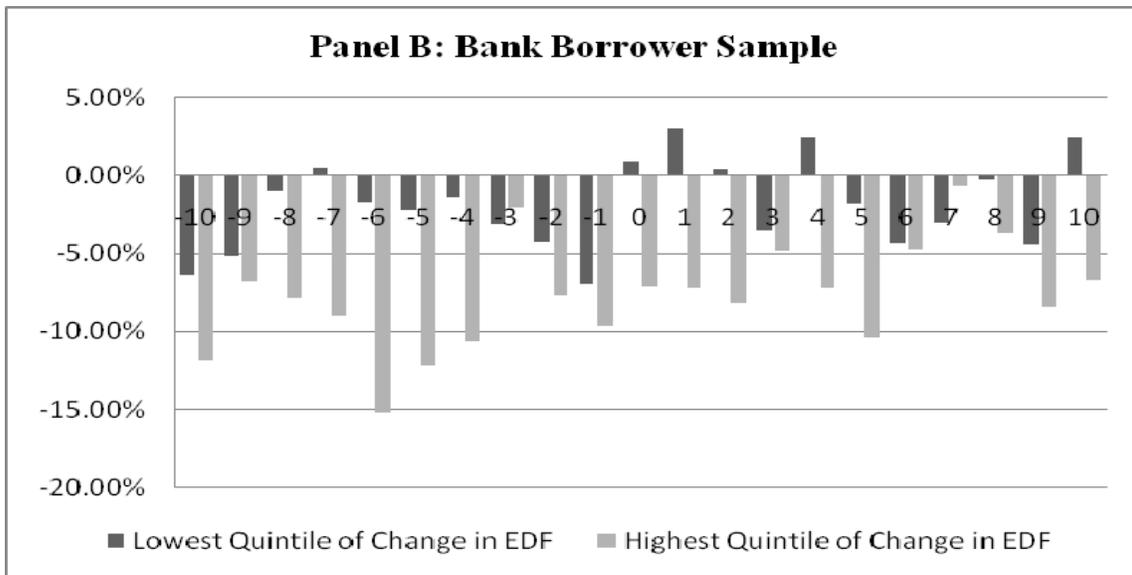
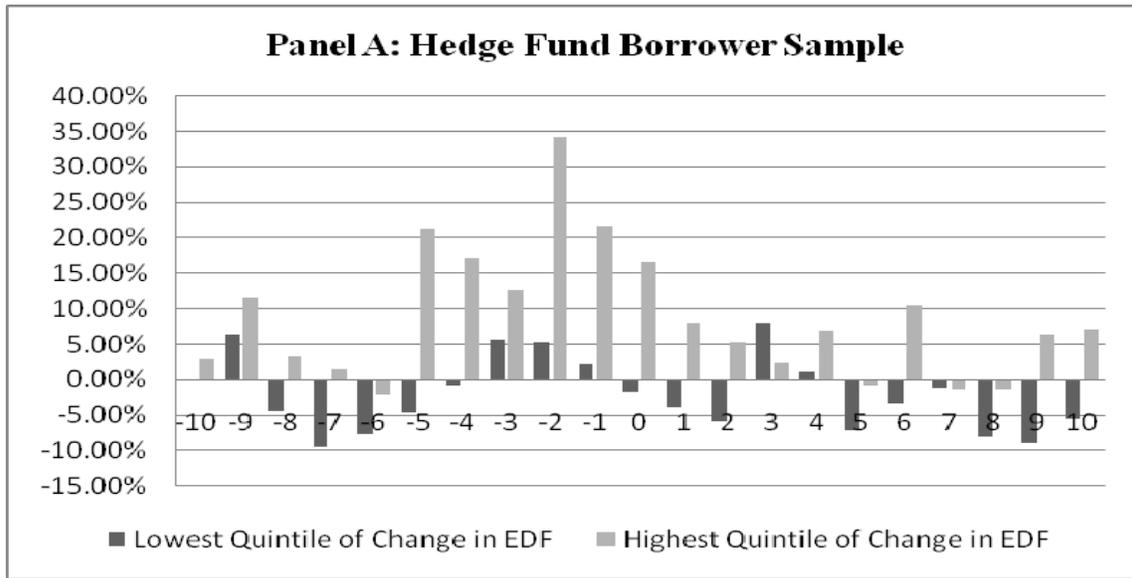
**Figure III**  
**Abnormal Short-Selling Activity around Loan Amendments**  
**Sorted by Favorable and Unfavorable Amendments**

This figure contrasts the daily abnormal Short/Avol around favorable amendments with those around non-favorable amendments in each of the hedge fund borrowers (Panel A) and bank borrowers (Panel B) samples. Favorable term changes include larger loan amounts, lower interest rates and longer maturities. Unfavorable term changes include smaller loan amounts, higher interest rates and shorter maturities. Favorable loan amendments are defined as amendments with at least one favorable term change, but no unfavorable term change. The amendments other than favorable ones are therefore defined as unfavorable amendments.



**Figure IV**  
**Abnormal Short-Selling Activity around Loan Amendments**  
**Sorted by Lowest and Highest Quintile of Changes in EDF**

This figure shows the abnormal Short/Avol around loan amendments of the quintile with lowest changes in EDF and those of the quintile with highest changes in EDF. Lowest quintile contains observations whose EDFs decreased most around the loan amendment date, whereas highest quintile contains observations whose EDFs have increased most. Loan amendments with the lowest decrease in EDF are more likely to be caused by unfavorable changes in the borrowers' financial condition. Panel A and Panel B presents the Hedge Fund Borrower sample and Bank Borrower sample, respectively.



## Appendix A: Variable Description

Variable	Description
<b>Short/Avol</b>	Shorting activity (Short/Avol), is measured as the ratio of daily total number of shares being shorted to average daily volume over the window (-120, -61), adjusted to change in number of shares outstanding.
<b>Abnormal Short/Avol</b>	Short/Avol minus benchmark, which is defined as the average Short/Avol ratio over the period from January 1st 2005 to July 6th 2007 but excluding event periods (-60,+60).
<b>Short/SHROUT</b>	The ratio of daily total number of shares being shorted to the total number of shares outstanding.
<b>Abnormal Short/SHROUT</b>	Short/SHROUT minus benchmark, which is defined as the average Short/SHROUT ratio over the period from January 1st 2005 to July 6th 2007 but excluding event periods (-60,+60).
<b>Firm Size</b>	Natural logarithm of total assets (COMPUSTAT data 6) in 2007 dollars. All operating performances are measured with COMPUSTAT data at the last fiscal year-end at least 3 months prior to the loan origination date.
<b>Altman's Z Score</b>	For manufacturing firms, $Z=1.2 \times (\text{Working Capitals}/\text{Total Assets}) + 1.4 \times (\text{Retained Earnings}/\text{Total Assets}) + 3.3 \times (\text{EBIT}/\text{Total Assets}) + 0.6 \times (\text{Mkt Value of Equity}/\text{Book Value of Total Liabilities}) + 1.0 \times \text{Sales}/\text{Total Assets}$ . For non-manufacturing firms, $Z=6.56 \times (\text{Working Capitals}/\text{Total Assets}) + 3.26 \times (\text{Retained Earnings}/\text{Total Assets}) + 6.72 \times (\text{EBIT}/\text{Total Assets}) + 1.05 \times (\text{Mkt Value of Equity}/\text{Book Value of Total Liabilities})$ .
<b>Expected Default Frequency</b>	The estimated probability of default based on Bharath and Shumway's method (2004), which is a simplified version of KMV-Merton model.
<b>Cash/assets</b>	Ratio of cash and equivalents to total assets (data1/data6).
<b>Net worth/assets</b>	Ratio of net worth to total assets ( $([\text{data6}-\text{data181}]/\text{data6})$ ).
<b>EBIT/assets</b>	Ratio of Earnings Before Interests and Tax to total assets ( $([\text{data18}+\text{data16}+\text{data15}]/\text{data6})$ ).
<b>Book to Market</b>	Ratio of book value of equity to market value of equity ( $(\text{data60}/[\text{data25} \times \text{data199}])$ ).
<b>Tobin's q</b>	Ratio of the market value of assets to the book value of assets ( $([\text{data6}+\text{data25} \times \text{data199}-\text{data60}-\text{data74}]/\text{data6})$ ).
<b>Leverage</b>	Sum of long-term debt plus debt in current liabilities divided by total assets ( $([\text{data9}+\text{data34}]/\text{data6})$ ).
<b>Growth of sales</b>	Average rate of sales (data12 in 2007 dollars) growth over 3 years prior to loan origination date.

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<b>Profit Margin</b>	Ratio of income before extraordinary items to sales (data18/data12).
<b>ROE</b>	Return on equity (data18/data60).
<b>ROA</b>	Return on asset (data18/data6).
<b>Interest Coverage</b>	Ratio of gross earnings divided to the sum of total interest expense and capitalized interests ( $[\text{data178}+\text{data61}]/[\text{data15}+\text{data147}]$ ).
<b>Institutional Ownership</b>	Percentage of shares held by institutional investors, measured as the average of last 4 quarters at least 3 month prior to loan origination date based on Thomason Financial 13F database.
<b>Beta</b>	Estimated coefficients based on the market model, calculated over the interval (-360, -61).
<b>RMSE</b>	Estimated room mean squared error based on the market model, calculated over the interval [-360, -61].
<b>Run-up</b>	Holding period return over the estimation window [-360, -61].
<b><math>\Delta</math>Performance</b>	Performance at (t+1) minus performance at (t-1). Performance at (t+1) is measured at the earliest fiscal year end at least 3 months after the loan origination date. Similarly performance at (t-1) is measured at the last fiscal year-end at least 3 months prior to the loan origination date. Changes in sales ( $\Delta$ Sales) refer to the ratio of $(\text{Sales}_{t+1} - \text{Sales}_{t-1})/\text{Sales}_{t-1}$ .
<b>Investment Grade</b>	Investment Grade indicates whether the borrower was at investment grade at the loan close day. It equals 1 if the S&P senior long-term debt was rated at “BBB” or higher and 0 for the rest.
<b>Covenant Secured</b>	Covenant equals 1 if at least one facility of a loan has any covenant, and 0 otherwise. Secured is an indicator of whether a loan deal is secured or not. It equals 1 if at least one facility is secured, and 0 otherwise.
<b>HighLever</b>	HighLever refers to the Highly Leveraged Loan indicator variable (1 for Highly Leveraged Loan and 0 otherwise).
<b>Cum. Loan</b>	Cum. Loan refers to the natural logarithm of the cumulative amount of loans a company has borrowed (in million dollars) within the past five years before the current loan deal.
<b>HighLever×Cum. Loan</b>	HighLever×Cum. Loan refers to the interaction of HighLever and Cum .Loan.
<b>Year Fixed Effects</b>	Indicators for year of loan deal origination
<b>Industry Fixed Effects</b>	Indicators of 30 major industry classes defined by Fama-French

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## Appendix B: Switching Regression with Endogenous Switching (SRES) Results

**Table B.1. SRES Stage One Results: Determinants of Borrowing from Hedge Fund Borrowers from 1995 to the July 6<sup>th</sup> 2007**

In Table I we report the Probit regression results for the choice between hedge fund loans and bank loans. The dependent equals to 1 if at least one lender is a hedge fund and 0 if all lenders are banks. Our instrument variable is the interaction of HighLever and Cum. Loan. (*HighLever*×*Cum Loan*), where *Cum Loan* refers to the natural logarithm of the cumulative amount of loans a company has borrowed within the past five years before the current loan deal and HighLever refers to the Highly Leveraged Loan indicator variable (1 for Highly Leveraged Loan and 0 otherwise).

Determinants of Borrowing from Hedge Funds			
(Hedge Fund=1)			
Variables	Coeff.		z stats.
Size (log assets)	0.298	***	11.07
Leverage	0.890	***	5.71
EBIT/Assets	0.749	**	1.97
Book-to-market	-0.127	*	-1.81
RMSE	0.072	***	2.77
Runup	0.148	***	2.61
Sale Growth	0.017		0.19
Institutional Ownership	0.557	***	4.40
Investment Grade	-0.473	***	-4.29
Covenant	0.059		0.72
Secured	0.650	***	8.00
HighLever×Cum. Loan	0.090	***	5.82
Constant	-4.677	***	-14.28
<b>Year effect</b>	<b>Yes</b>		
<b>Observations</b>	<b>4885</b>		
<b>Chi Square</b>	<b>336.78</b>		
<b>Pseudo R-square</b>	<b>0.201</b>		

**Table B.2. SRES Stage 2 Results: Determinants of Abnormal Short Selling for  
the Period from 2005 to the July 6th 2007**

This Table reports the results of the second-stage regressions for the two abnormal short selling equations, one for the hedge fund borrowers and one for the bank borrowers. We report the mean difference between the coefficients of hedge fund and bank borrower regressions and its Z-statistics. Abnormal short selling is measured as the cumulative of Short/SHROUT ratio over window (-10, -1). IMR is the Inverse Mills-Ratio variable used to adjust for self-selection, as discussed in the text. In order to estimate consistent standard errors in the second stage, we employ the bootstrap procedure with 50 replications in these regressions. <sup>1</sup>

Dependent Variable: Cumulative Abnormal Short/SHROUT over window (-10, -1) (%)									
	Hedge Fund			Bank			Hedge Fund- Bank		
	Coeff.		Z-stat.	Coeff.		z-stat.	Diff. in coeff.		Z-stat.
Size (log assets)	1.600	**	2.39	0.172	***	3.78	1.428	*	1.86
Leverage	4.421		1.57	-0.268		-1.17	4.688		1.44
EBIT/Assets	1.525		0.36	-0.252		-0.38	1.776		0.37
Book-to-market	1.001		0.67	-0.107		-0.66	1.109		0.69
RMSE	0.942	*	1.79	0.254	***	3.73	0.688		1.24
Runup	0.017		0.02	0.496	***	2.76	-0.479		-0.52
Sale Growth	-1.097		-0.94	0.192		1.12	-1.289		-1.00
Institutional Ownership	0.573		0.41	0.490	**	2.09	0.082		0.05
Investment Grade	-3.051	*	-1.79	-0.371	***	-2.91	-2.680		-1.45
Covenant	1.804		1.38	0.070		0.69	1.735		1.46
Secured	2.650	*	1.91	0.023		0.18	2.627	*	1.70
IMR	3.965	*	1.90	0.070		0.14	3.896	*	1.68
Constant	-16.228		-1.55	-1.394	***	-3.67	-14.834		-1.25
<b>Year effect</b>	<b>Yes</b>			<b>Yes</b>					
<b>Observations</b>	<b>72</b>			<b>613</b>					
<b>Adjusted R-square</b>	<b>0.164</b>			<b>0.096</b>					

<sup>1</sup> We thank Bill Greene of New York University for his suggestion regarding correction of the error terms in the second stage of SRES.