Market Predators*

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ABSTRACT

We find evidence of predatory trading in the corporate bond market. Exploiting novel data on the short selling behavior of institutional investors, we demonstrate that short sellers target those bonds likely to experience the largest negative events in the future: bonds about to be downgraded to junk status, and specifically those held by insurance companies and other institutions that are required to liquidate when bonds fall to junk status. We show that shorting in these bonds predicts large negative returns, which largely reverse over the next year. Short sellers' trading activity is premeditated: they build up large short positions in a firm's liquid bonds first, and then help to trigger cascades and downgrades by subsequently heavily shorting illiquid bonds after they have already built up these large positions.

JEL Classification: G12, G14, G02

Key words: Predatory trading, short selling, predictable returns.

In any market in which an agent is not a pure price-taker, the agent can both influence price, and potentially benefit from that price. The market for short-selling presents an interesting laboratory to this end, because the transaction is not a buy or sell, but instead a temporary borrowing of a good that must be returned at some point in the future. Because the value of a short sale is determined by the value at the time of borrowing minus the value at return, net of transactions costs, the borrower has clear benefit from a change in price of the good in the interim. In particular, the short seller benefits from a drop in the price of the good. For this reason, short sellers are often pointed to as being impetuses - and in some cases more pointedly as direct causes - of price declines in securities. Financial policy makers typically justify actions that limit short selling in financial markets by asserting or warning that these "predatory activities" represent a substantial threat to the health of financial markets. Former SEC Chairman Christopher Cox's justification for banning short selling in financial stocks during the financial crisis of 2008 relied on this argument.

On the other hand, the academic literature almost universally views short selling as a positive force and necessary mechanism in financial markets. Many theoretical and empirical works put forward evidence in support of the hypothesis that short selling increases market liquidity, function, and informational efficiency. In contrast, there is little to no evidence in the academic literature supporting the hypothesis that short selling damages or hurts financial markets. This lack of evidence may be because there are no negative consequences of shorting selling. However, it could equally be a by-product of the difficulty associated with testing for manipulative or predatory behavior. Thus, there may be real, countervailing negative effects of short selling that have gone largely undetected.

In this paper, we attempt to test for predatory short selling in financial markets. Predatory actions are often subtle and difficult to identify, but there does exist a novel empirical setting in which predatory behavior is more likely and the trading pattern of

predators will be different than other types of traders. We use rating downgrades in the bond market as our empirical setting. Specifically, we examine bond rating downgrades that push the bonds below investment grade. This setting provides a unique opportunity to test for predatory behavior by short sellers because it is a setting where short selling can potentially be used to trigger a rating downgrade that nearly immediately leads to large profits after triggering the downgrade. In other words, this is a setting where the ability to effectively predate exists and the incentive to predate is strong.

Bond market downgrades are important possible predatory events because downgrades by rating agencies typically lead to significant bond price declines (particularly in the case when the bond loses its investment grade status). In our sample, the average return during the month when a bond loses its investment grade status is about 4%. The price impact of a rating downgrade is large for two important reasons: (1) the rating change is an informative and a negative news event because it reveals or indicates to the market that the probability of default has increased, and (2) in certain cases it mechanically triggers liquidation of bond holdings by institutions with substantial ownership positions. For example, many insurance companies, mutual funds, and pension funds are only permitted (or willing) to hold investment grade corporate bonds. Therefore, when a bond is downgraded from investment to speculative grade, it typically triggers liquidation of significant holdings by insurance companies and pension funds; these liquidations then amplify the price decline. Thus, if predatory short sellers can trigger a ratings downgrade to below investment grade, their trading will both partially cause and realize these amplified returns.

Short sellers can potentially trigger downgrades because bonds' prices and yields contain useful information about the probability of default, and rating agencies want their ratings to accurately reflect the probability of default. Suppose that predatory short sellers know that a firm is barely above the threshold of investment grade. In this case, if there is information indicating increased probability of default, a rating agency is likely to

downgrade the firm (or bonds issued by the firm) from investment grade to speculative grade (BBB to BB). Consequently, when a firm is near the boundary of a rating change, its bonds are especially sensitive to bond price changes. If predatory short sellers start shorting the bonds of the firm, they may be able to push down the bond prices and consequently push the yields up. In response, the rating agency may view this as confirming evidence that the firm's credit rating needs to be revised. If the rating agency downgrades the bond, the bond prices will drop significantly (given both effects described above), benefitting short sellers. This underscores a necessary condition for predatory trading in this context: the rating agency must (at least on the margin) adjust ratings in response to actions taken by predatory traders. In this case, as bonds are not in infinite supply, the act of short selling by the traders could drive changes in prices and yields, resulting in this condition.

Even in this setting where the potential effectiveness and payoff to predatory behavior are high, detecting predatory behavior is difficult. One must distinguish between a number of hypotheses that, while differing starkly in terms of motivation, look similar empirically. The predatory hypothesis is that some short selling agents (for instance, specialized hedge funds) engage in predatory behavior. Specifically, that these agents try to create downgrades by pushing down bond prices, which then trigger a rating downgrade. A second hypothesis is that these same agents are good at anticipating or predicting rating downgrades. They are skilled at detecting when a firm's fundamentals are deteriorating and the probability of default is increasing. If this *general anticipation hypothesis* is correct, these same short sellers are simply prescient and not predators. A related hypothesis is that not only do these short selling agents anticipate rating downgrades but they concentrate their efforts in situations where a rating downgrade will trigger the largest price declines. If this *targeted anticipation hypothesis* is correct, these short selling hedge funds will be most likely to short in anticipation of rating downgrades when both of the following conditions hold: credit rating is downgraded from investment

grade to speculative grade, and insurance companies and pension funds have large holdings.

In order to test for predatory trading, we exploit novel data on short selling by institutions in the corporate bond market, covering the period 2005-2013. We merge this shorting data with data on corporate bond rating changes, price and return data for corporate bonds, accounting data, and data on institutional bond holdings by insurance companies and pension funds. We then examine the behavior of short sellers around corporate bond downgrades.

We first show that past bond returns predict future changes in ratings even after controlling for changes in past and future fundamentals such as ROA, leverage, profit margin, and the interest coverage ratio of the firm. Therefore, we do provide evidence that rating agencies may indeed change ratings in response to market movements.

We then demonstrate that short sellers trade in advance of these large price declines. Categorizing bonds by the amount of short selling *prior* to a downgrade event, we find that the bonds with relatively high short selling have larger negative returns on average in the 11-day window around downgrades-to-junk status than bonds with low shorting. The difference between the low and high shorting groups is nearly 3% (and statistically significant). These results indicate that short sellers target precisely the most profitable bonds to short, namely those about to be downgraded from investment grade to junk status.

We confirm that bond downgrades are met with large price declines, particularly when a bond is downgraded to junk status (i.e., falls from investment grade status). This large return effect is concurrent with the rating change, but also extends to the subsequent month *after* a downgrade. For example, the portfolio of bonds that is downgraded specifically from investment grade status to junk status earns -4.07% per month (t=4.08) on average in the month of a downgrade event, and a further -2.12% per month (t=-2.55) on average in the month following the downgrade event.

We then show that short sellers trade in advance of downgrades to junk status. Six months before a downgrade to junk status the average utilization rate (shares on loan divided by the number of lendable shares) is 6.95% for these bonds and the average utilization rate for other investment grade bonds is 6.46%. However, one month before the downgrade, utilization is 9.66% (the difference relative to other investment grade bonds is statistically significant). The pattern is even more dramatic for loan fees. The loan fee is the main direct cost of shorting and represents the interest rate paid to the lender for the bond on loan. Loan fees right before the downgrade are greater than 30% on average. These results indicate that short sellers target and on average build large positions in bonds that are subsequently downgraded to junk status. Furthermore, we also find that in the year after the downgrade event, those bonds targeted by short-sellers see their price declines almost entirely reverse. This is consistent with one of the main differential predictions of the predatory trading hypothesis. *Predatory trading* versus *anticipatory targeting* have different implications in terms of what we would expect to observe after a downgrade has occurred. If predatory trading causes a rating downgrade, then the rating change is more likely to be temporary.

Next, we exploit cross-sectional variation in the holdings of insurance companies and pension funds. If these shorting and price effects are larger when insurance company and pension fund ownership is larger, this allows us to distinguish the first and third explanations above (predation or targeted anticipation where insurance companies and pension funds have to liquidate large positions after a downgrade) from the second (general anticipation of downgrades by short sellers). Again, we find evidence consistent with predatory trading by short sellers. In particular, we document that downgraded bonds with a large amount of prior shorting activity *plus* a large amount of insurance company and pension fund holdings have the largest negative return reaction in the future. These findings confirm that short sellers are able to target precisely the bonds that will give the largest negative return reaction following a downgrade: the soon-to-be downgraded (to

junk) bonds with large institutional holdings.

However, this result is consistent with both the predation and the targeted anticipation explanations. Our final series of tests seek to distinguish predation from targeted anticipation. The short selling pattern of predators should be different from that of anticipators. Predators need to cause price declines. This should lead to a distinctive trading pattern by predators in advance of the rating downgrades for the bonds of some types of firms. First, it is easier to cause price declines if a bond is illiquid. Therefore, predators will have the highest probability of successfully triggering downgrades for firms with illiquid bonds. On the other hand, it is easier to build a large short position (and eventually experience a large profit) in liquid bonds. Firms often have multiple bonds, and these bonds typically vary in terms of liquidity. Therefore, an ideal target for a predator is a firm with bonds that vary significantly in terms of their liquidity. In these situations, a predator can build up a substantial position in the liquid bond first (which should have small price impact), and then target and cause a price decline in the illiquid bond for the same firm by shorting it heavily. A downgrade of the firm's credit will then trigger large price declines in both the liquid and illiquid bonds. If a short selling hedge fund simply anticipates downgrades, we would not expect this same trading pattern. We confirm this pattern in the data, and find that short selling on these "targeted bonds" is consistent with short sellers gaining a large toe-hold in the most liquid bonds first, and then trading in the corresponding illiquid bonds afterwards.

In summary, manipulative or predatory short selling is a major worry of policy makers and market participants. It is very difficult to test for this behavior because the behavior is often subtly different than other benign, but empirically quite similar, behavior. In this paper we explore a novel setting in the bond market that allows us to mitigate these empirical challenges, and in doing so find evidence of predatory trading by institutional short sellers. The rest of the paper proceeds as follows. Section II provides some background information and a brief review of the literature. Section III summarizes the

data used in this study. Section IV describes the empirical evidence on predatory trading in the corporate bond market, and Section V concludes.

II. Background

Our paper contributes to a large literature on market manipulation and predatory trading in the financial markets. To date, however, this literature has been largely theoretical in nature. For example, Allen and Gale (1992) formalize a model in which an uninformed trader can profit if investors think the manipulator may be an informed trader.[1] Brunnermeier and Pedersen (2005), on the other hand, construct a model in which a predatory trader can exploit another trader's desire and need to liquidate.

In the wake of the financial crisis, regulators turned their focus specifically on short sellers, and on the potential negative impacts of short selling on financial stability as well as other outcomes. As noted by Brunnermeier and Oehmke (2013), which formalizes a model of predatory short selling, the theoretical justifications for restrictions on short selling are similar to those found in the literature on feedback effects from stock prices to firms' real investment decisions (see Bond, Edmans, and Goldstein (2012) for a summary). For example, Goldstein and Gumbel (2008) provide an asymmetric information model, in which a feedback loop to real investment decisions allows a short seller to make a profit even in the absence of fundamental information. In their model, and in Khanna and Mathews (2012), short sellers reduce price informativeness, thereby inducing the firm (whose manager learns from prices) to inefficiently distort its investments, which then makes the short position profitable. In Brunnermeier and Oehmke (2013), however, the mechanism by which short selling is profitable is slightly different; in their model price

[1] See also Allen and Gorton (1992), Benabou and Laroque (1992), Kumar and Seppi (1992), Gerard and Nanda (1993), Chakraborty and Yilmaz (2004), and Brunnermeier (2005).

declines brought about by short sellers can trigger inefficient early liquidation of existing investments via a leverage constraint (see also Liu (2011)).

Despite these advances in modeling the potential drivers and impacts of predatory trading, however, there is very little empirical evidence documenting (or even explicitly testing for) predatory trading. Much of the evidence cited by the SEC, and in the press, is primarily anecdotal in nature. Our paper attempts to fill this gap by empirically testing for predatory trading across a large sample of firms and institutions, using more than 10 years of daily data on short selling, bond returns, and institutional holdings.

Our paper also contributes to a large literature studying the impact of short sale constraints and shorting activity on asset prices more generally. Much of the theoretical work in this area stresses the link between short sale constraints and potential overvaluation in the equity market. For example, Miller (1977) argues that the combination of differences of opinion and short sale constraints can lead to overpricing. Differences of opinion can arise from overconfidence (Scheinkman and Xiong (2003)) or from differences in prior beliefs which are updated rationally as information arrives (Morris (1996)). In this setting, stock prices reflect the views of optimists, and this pattern of overpricing leads to low subsequent returns. Diamond and Verrecchia (1987), in contrast, argue that rational uninformed agents take the presence of short sale constraints into account when forming their valuations, and thus that there is no overpricing conditional on public information as all participants recognize that negative opinions have not made their way into the order flow.

The effect of short sale constraints on stock prices is thus ultimately an empirical question, and the evidence from this empirical literature is somewhat mixed. Many of the earlier studies focused on short interest ratios -- shares sold short divided by shares outstanding -- as a proxy for shorting demand, finding consistent evidence that high short interest is followed by low future returns. For example, Asquith and Meulbroek (1995) and Desai, Ramesh, Thiagarajan, and Balachandran (2002) find significant abnormal returns for

stocks with high short interest on, respectively, the NYSE and Nasdaq exchanges for 1976 to 1993 and 1988 to 1994.[2] The evidence on the impact of shorting in the corporate bond market, however, is less developed than the evidence in equities. In one of the first studies exploring this issue, Asquith et al. (2013) find little evidence of a link between shorting in the bond market and future bond returns.[3] To our knowledge, our paper is thus early in this literature establishing an empirical link between shorting activity in the bond market and future bond returns.

III. Data and Summary Statistics

A. Data Sources

We exploit a variety of data sources to create the sample we use in this paper. Our final sample covers the 2005:Q1-2013:Q2 time period. For tests that don't require short-selling data our sample period is slightly longer: 2005-2014. The primary data on short selling activity is drawn from Markit Securities Finance (MSF), which provides institutional fund flow, short interest, and borrowing cost data and analysis on over 30,000 global equities and 120,000 global bonds. The data is sourced from 120 custodian banks, 36 prime brokers, and over 300 hedge funds. The dataset is available at the daily frequency, and contains virtually all of the securities lending transactions on a daily basis in the United States.

We extract issue credit ratings and bond characteristics from Mergent FISD. We find that almost all large, liquid US corporate bond issues are rated by both S&P and Moody's.

[2] For additional evidence exploring the link between short selling and market efficiency and market quality, see also Dechow, Hutton, Meulbroek, and Sloan (2001), Desai, Krishnamurthy, and Kumar (2006), Bris, Goetzmann, and Zhu (2007), Chang, Cheng, and Yu (2007), Boehmer, Jones, and Zhang (2008), Diether, Lee, and Werner (2009), Saffi and Sigurdsson (2011), and Boehmer and Wu (2013).

[3] See also Nashikkar and Pedersen (2007).

As described in Bongaerts, Cremers, and Goetzmann (2012), Fitch typically plays the role of a "third opinion" for large bond issues. We use the following rule when classifying bonds as investment grade: a bond is considered investment grade if at least two ratings agencies rate the bond BBB-/Baa3 or higher. Additionally, we use a similar rule when classifying bonds as high investment grade; specifically, a bond is considered high investment grade if at least two ratings are AA-/Aa3 or higher

To measure bond returns, we employ the Trade Reporting and Compliance Engine (TRACE) database which reports dates, yields, and bond prices. We follow Bessembinder, Kahle, Maxwell and Xu (2009), Dick-Nielsen (2009), and Becker and Ivashina (2013) in cleaning this data. Based on the Mergent data we remove bonds with special characteristics. We compute daily prices and returns as the trade-weighted average. Bessembinder et al. (2009) indicate the trade-weighted prices exhibit better statistical properties. We primarily follow the method outlined by Dick-Nielsen (2009) to remove and clean the data (i.e. to fix problems that arise from duplicate, canceled, or corrected trades).

We also use data on bond holdings drawn from Lipper eMAXX. This database has a comprehensive coverage of quarterly fixed income holdings for insurance companies and pension funds. Insurance companies constitute approximately half of holdings, by number and by dollars, throughout our sample. The data contains both managers (e.g., Fidelity) and ultimate investors (e.g., Allstate). eMAXX classifies investors into categories based on type (e.g., pension funds vs. insurance companies). The coverage of foreign bond buyers and hedge funds is limited. eMAXX does not cover households, banks, and governments. We exclude convertible bonds, preferred stock, other preferred securities, and government or government sponsored enterprises' bonds from our sample. We also use accounting data from Compustat's quarterly data file. We use the Compustat data to compute fundamental variables such as the profit margin and interest coverage ratio of a firm.

B. Summary Statistics Across Bond Ratings

Table I presents pooled summary statistics by bond type: non-investment grade, investment grade, and high investment grade. Average daily volume is higher for investment and high investment grade bonds relative to non-investment grade bonds, but median dollar volume is not meaningfully higher. The characteristics of financial ratios for investment grade versus junk bonds are not surprising. For example, profit margin (EBIT/Sales) is 22.3% for high investment grade bonds, 17.9% for investment grade bonds, and only 9.3% on average for junk bonds. Additionally, the average interest coverage ratio (EBITDA/Interest Expense) is 18.4 for high investment grade bonds, 11.4 for investment grade bonds, and 4.2 for junks bonds.

IV. Empirical Results

A. Past Returns and Changes in Bond Prices

We begin our analysis by examining whether past bond returns predict bond rating downgrades. A necessary condition for the predation mechanism is that bond ratings change in response to changes in bond prices. Furthermore, this predictability needs to exist even after controlling for changes in the fundamentals of the firm that occur during the same period as the ratings change. We test this for this necessary condition. Specifically, we estimate monthly pooled regressions where the dependent variable is the change in the average (across the rating agencies) numerical rating of a bond, and the independent variables of interest are extreme past returns from 1-month to 12-months back. Extreme past returns are categorical variables for the lowest and highest returns in month t-x based on the deciles of the cross-sectional distribution of bond returns. We construct the dependent variable by mapping each bond rating into an integer. For example, the numerical rating of AAA bonds is one, and the numerical rating of an A rated bond is six. In the regressions, we control for fundamentals by including firm fixed effects, month fixed effects, and control variables. The control variables in the regressions are ROA,

leverage, profit margin, and the interest coverage ratio measured as of the next quarter-end. We also include lagged versions of these control variables. Finally, we adjust standard errors for clustering based on calendar month.

We report the results of these regressions in Table II. In every specification extreme negative past returns ($r_{low,t-x}$) are significant predictors of lower ratings (i.e., a higher numerical rating) even after controlling for changes in fundamentals. For example, the estimated coefficient for the one month lagged, low return dummy ($r_{low,t-1}$) is 0.0212 with a t-statistic of 5.53. On the other hand, from Column 1 the one month lagged, high return dummy is small and insignificant. Furthermore, there is a strong relation between ratings declines and 1-, 2-, 3-, 6 to 4-, and 12 to 7-month lagged, low return dummy variables and changes in ratings. For each of these variables, the t-statistic is greater than three. In specification five, we include both lagged changes in fundamentals and lagged one-year rating fixed effects. Even with these controls, every past return dummy is significant with t-statistics all still above three.

B. Bonds Returns Around Downgrades from Investment Grade

Another necessary condition for the predation hypothesis is that downgrades through the investment grade boundary are important enough return events that predators can potentially profit from shorting them. Of course, this part of the overall hypothesis is also consistent with the anticipation hypothesis. If returns around downgrades from investment grade are large in magnitude, then short selling agents have an incentive to try to anticipate or predict when a bond is downgraded from investment grade.

In Table III we estimate monthly Fama-MacBeth (1973) regressions of bond returns on a dummy variable for downgrades from investment grade. In the regressions, we classify a bond as downgraded below investment grade if a bond drops from having a least two

investment grade ratings to having one or less. The estimated coefficient for the *downgrade below investment grade dummy* is -3.73% percent per month (t-statistic = 3.53) when we include no controls, and is almost -4% (t-statistic = 4.07) when we include controls for logged dollar volume, past returns (one month and cumulative returns from t-12 to t-2), and one-year lagged rating fixed effects.

In Panel B, we also examine the predictability of bond returns based on downgrades from investment grade. We once again estimate Fama-MacBeth (1973) regressions but lag the investment grade downgrade dummy. We do find persistence in average returns. The dummy for *lagged downgrade below investment grade* is significant in all our regression specifications. For example, in the specification with full controls the downgrade dummy is -2.13% per month and the t-statistic is 2.56.

C. Short Selling around Downgrades

Next, we turn to the behavior of short sellers in the corporate bond market. To measure shorting behavior, we use the *utilization rate* and the loan fee. Both variables are drawn from the Markit data. *Utilization* is computed as the total shares shorted divided by the shares available to be lent out. *Loan Fee* represents the interest rate that the short-seller pays to lender. Table IV reports summary statistics for both *Utilization* and *Loan Fee* based on whether the bond is investment grade or junk. Loan Fees are lower on average and for the median investment grade bond versus junk bond: 8.76% versus 16.7% on average per anum. Therefore, investment grade bonds are cheaper to short on average. The utilization rate is higher on average for junk bonds. But the reverse is true for the median. Short-selling activity is very close to zero for the median junk bond.

Next, we examine the behavior of short sellers around corporate bond downgrades below the investment grade boundary. To do so, we form two equal-weight portfolios: one containing all bonds that are investment grade as of the end of month t, and another

containing bonds where the bond has been downgraded from investment grade to junk status in month t. For both portfolios we compute both the utilization rate and the loan fee for month t and lags up to six months. Figure 1 graphically presents the results and Table V reports these same numbers in tabular form and adds a column with the difference in utilization and loan fee across the two portfolios. We find that loan fees and utilization are higher for the *downgrade below investment grade portfolio* as of month t (the month of the downgrade). Utilization is 5.77% for the investment grade portfolio, and 9.66% for the downgrade portfolio when utilization is measured contemporaneously with the downgrade. The difference is statistically significant (t-statistic = 3.88). The difference is also significant for lagged utilization out to five months, but the difference decreases from 3.88% to 1.63% from month t to month t-5. By month t-6, the difference is small and no longer significant. The same generally pattern holds for loan fee. The average loan fee is 10.6% for the investment grade portfolio, and 34.4% for the downgrade portfolio when loan fee is measured contemporaneously with the downgrade. Lagged loan fee is also much higher for the downgrade portfolio. For example, the difference in average loan fee is nearly 15 percentage points higher for loan fee lagged one month.

Finally, we examine the relation between returns around downgrade events and short-selling activity. We regress event time returns (where the event is a downgrade below investment grade) on pre-event short-selling activity. We measure short-selling activity one month (21 trading days) before the event. We split the sample into high and low short-selling based on median utilization for the cross-section of the bond sample on given trading day. Table VI presents the results. In our base specification the event-time return window is measured as the cumulative daily return from t-5 to t+1. We find that cumulative returns are -2.61 percentage points lower for bonds with high pre-event shorting activity (t-statistic = -2.37). Over a longer window of t-10 to t+1, the cumulative return is –3.04 percentage points lower for more heavily shorted downgrades and the t-statistic is –2.68. Even over the finest event window of t-1 to t+1, the cumulative returns

are still –1.66 percentage points lower for heavily shorted downgrades (t-statistic = -1.81).

In summary, these results indicate that on average short sellers successfully target those bonds about to be downgraded from investment grade to junk status. It also appears that short-sellers start to target these bonds a number of months before the actual downgrade. Furthermore, the downgraded bonds that short-sellers target experience lower returns on average than downgraded bonds not targeted by short-sellers.

D. The Interaction of Short Selling and Institutional Holdings

In this section, we investigate if short sellers target not only the bonds that are about to be downgraded to junk status, but specifically those bonds held by large institutions that are likely to dump these bonds upon the news of such a downgrade event. We regress event time returns (where the event is a downgrade below investment grade) on pre-event short-selling activity, institutional ownership, and the interaction between short-selling activity and institutional ownership. We define institutional ownership in this setting as the dollar value of bonds owned by insurance companies and pension funds divided by the par amount of outstanding bonds. We measure short-selling activity and institutional ownership one month (21 trading days) before the event. We split the sample into high and low short-selling based on median short-selling utilization for the cross-section of the bond sample on given trading day. We split the sample in an analogous way to create a *forced seller* dummy variable. The *forced seller* dummy variable equals one if lagged insurance and pension fund ownership is above the median for the cross-section of the bond sample on a given trading day. Table VII presents the results. In our base specification the event-time return window is measured as the cumulative daily return from t-5 to t+1. The key coefficient of interest is the interaction term for bonds with both a high amount of forced sellers and high pre-event short selling. We find that average cumulative daily returns are –4.3% lower for bonds of this type (the t-statistic is slighter over 2.5). When the event window is expanded to t-10 to t+1, the interaction term increases to –6.5% and the

t-statistic is a little over 2.4.

E. Reversal

The final two sections are tests that aim to distinguish predatory trading from other potential explanations of the empirical relationships we've documented up to this point. Distinguishing between predatory trading and anticipatory targeting is considerably trickier. That said, these hypotheses do have different implications in terms of what we would expect to observe after a downgrade has occurred. If predatory trading causes a rating downgrade, then the rating change is more likely to be transient (at least in part). Predatory trading is more likely around the investment-speculative grade boundary (the price declines will be bigger because of forced position closing for institutions such as insurance companies and pension funds). The return in the post-downgrade period should be different for predatory trading versus anticipatory targeting. For example, in cases where predatory behavior is more likely, more of the bond price decline should reversed in the future because more of the downward movement on average in prices is unrelated to fundamentals.

To examine these differential hypotheses, we regress post-event returns (where the event is a downgrade below investment grade) on pre-event short-selling activity. We measure short-selling activity one month (21 trading days) before the event. We split the sample into high and low short-selling based on median utilization for the cross-section of the bond sample on given trading day. Table VIII presents the results. The high shorting sample exhibits significant reversal after the downgrade. When measured from t+6 trading days after the downgrade to t+42 days, we estimate an average abnormal return of 0.124% per day. Cumulatively, that's around 4.4% for the entire window. The negative return around the event was around –2.75% from t-5 to t+5. Therefore, for the stocks most targeted by short sellers the negative returns are completely reversed (the point estimate

is positive, 4.4% - 2.7%, but statistically indistinguishable from zero). After the first two trading months, there is no evidence of continued reversal. Therefore, the results confirm that reversal in future bond returns is significantly more common among the set of bonds that we identify as most likely to have been subject to predation at the time of the downgrade event. We also show this reversal pattern graphically in Figure 2 by plotting the daily cumulative returns for the high and low pre-event shorting groups.

F. Liquidity Tests

Our final series of tests seek to further distinguish targeted anticipation from predation. The short selling pattern of predators should be different from that of anticipators. Predators need to cause price declines. This should lead to a distinctive trading pattern by predators in advance of the rating downgrades of some types of firms. First, it is easier to cause price declines if a bond is illiquid. Therefore, predators will have the highest probability of successfully triggering downgrades for firms with illiquid bonds. On the other hand, it is easier to build a large short position (and eventually experience a large profit) in liquid bonds. Firms often have multiple bonds, and these bonds typically vary in terms of liquidity. Therefore, an ideal target for a predator is a firm with bonds that vary significantly in terms of their liquidity. In these situations, a predator can build up a substantial position in the liquid bond first (which should have small price impact), and then target and cause a price decline over a much shorter time period in the illiquid bond for the same firm by shorting it heavily. A downgrade of the firm's credit will then trigger large price declines in both the liquid and illiquid bonds. If a short selling hedge fund simply anticipates downgrades, we would not expect this same trading pattern.

We test this liquidity-predation hypothesis by running two different sets of regressions. The sample only includes firms with three or more bonds trading so we can examine differences based on liquidity. In the first set of regressions, the dependent variable is changes in short-selling utilization from (t-120) to (t-21) trading days for bonds

that are downgraded from investment grade. The independent variables in the regressions are dummy variables for the most liquid and the least liquid bond for each firm in the sample. We report the results in Panel A of Table IX, and we find that short-sellers do build up the positions far more in the liquid bonds than the illiquid bonds.

In panel B of Table IX, we examine the change in short-selling right before a bond is downgraded below investment grade. Specifically, the dependent variable in this set of regressions is the change in short-selling utilization from t-15 to t-6 trading days before the downgrade. This time we see the opposite pattern between changes in utilization and liquidity. In this period right before the downgrade the illiquid bonds experience large spikes in utilization. The difference across liquid and illiquid bonds is over two percentages points and statistically significant.

In summary, we find that short selling on these "targeted bonds" is consistent with some short sellers gaining a large toe-hold in the most liquid bonds first, and then short-selling heavily in the corresponding illiquid bonds right before a downgrade. This pattern of short-selling is inconsistent with hypothesis that these short sellers are simply anticipating downgrades.

V. Conclusion

In this paper we explore a novel setting in the corporate bond market in order to test for evidence of predatory trading in financial markets. We argue that examining shorting activity around bond rating downgrades is a unique opportunity to test for predatory trading, because it represents a setting where shorting can potentially be used to trigger a rating downgrade, and nearly immediately lead to large profits after triggering the downgrade. In other words, this is a setting where the ability to effectively predate exists and the incentive to predate is strong.

We exploit micro-level data on the short selling activity of institutions, and

demonstrate that short sellers target precisely those bonds likely to experience the largest negative events in the future: bonds about to be downgraded to junk status and specifically those held by insurance companies and pension funds that are required to liquidate when bonds fall to junk status. We show that shorting in these bonds predicts large negative returns, which largely reverse over the next year. We then demonstrate that short sellers' trading activity is premeditated: they build up large short positions in a firm's liquid bonds first, and then help to trigger cascades and downgrades by trading in the illiquid bonds after they have already built up large positions. Collectively, our results represent the first large-sample evidence of predatory trading in financial markets.

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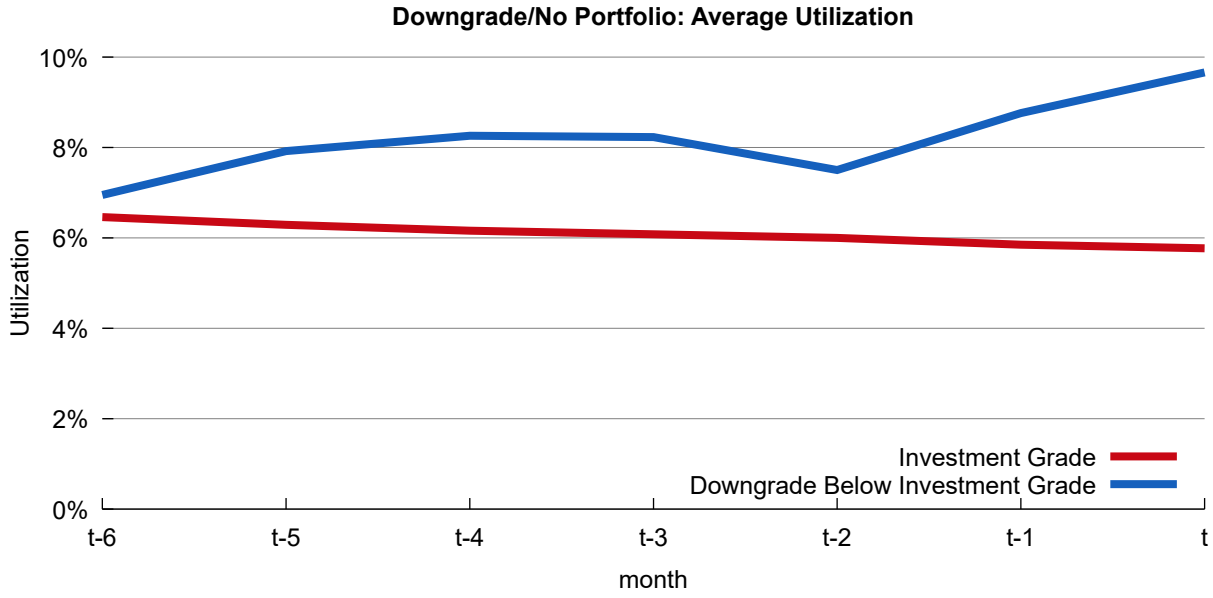
Figure 1: Downgrades from investment grade and short-selling activity

This figure presents monthly contemporaneous and lagged short-selling activity for portfolios formed on whether an investment grade bond was downgraded below investment grade in month t. A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Utilization is the number of shares on loan divided by the number of lendable shares as a percent. Fee is the loan fee and represents the interest rate that the short-seller pays to the lender. The sample period is January 2005 to April 2013.



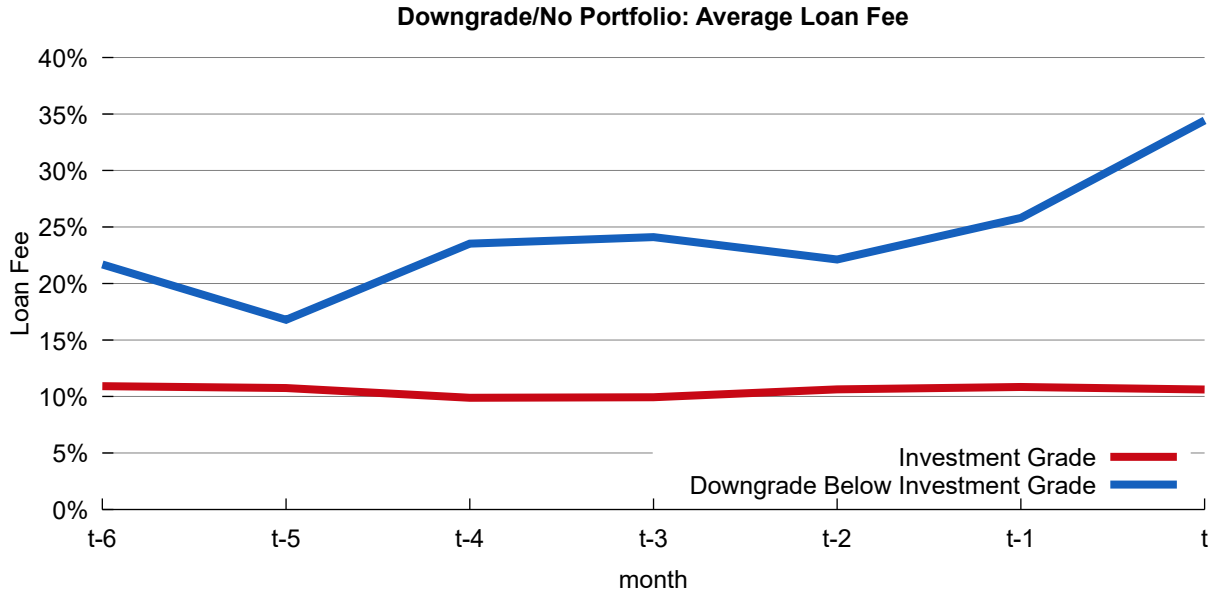


Figure 2: Daily Event-Time Returns around Downgrades Below Investment Grade and Short Selling

This figure presents daily event-time cumulative returns sorted on pre-event short-selling activity. The events are bond downgrades below investment grade (i.e., to junk status). A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Short-selling activity is the number of shares on loan divided by the number of lendable shares as a percent (i.e., utilization). We measure short-selling one month before the event ($t-21$ trading days. High shorting activity refers to shorting-selling activity above the median for the cross-section of the bond sample on a given trading day.

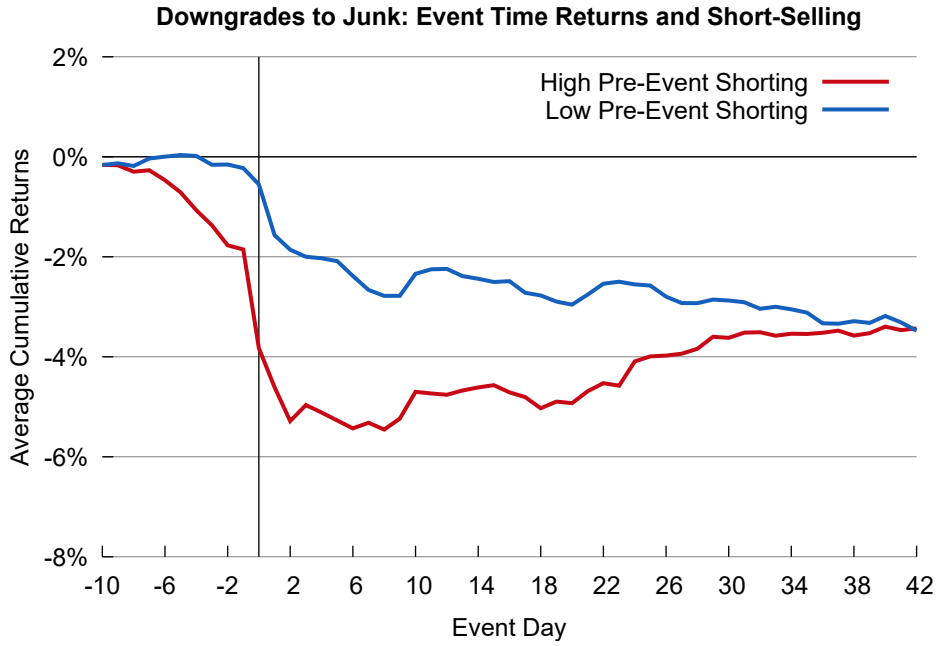


Table I: Summary Statistics For Investment Grade and Non-Investment Grade Bonds

This table presents pooled quarterly summary statistics for the characteristics of investment grade and non-investment grade bonds. A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A bond is considered high investment grade if at least two ratings are AA-/Aa3 or higher. All variables are measured as of the end of the quarter. The sample period is January 2005 to December 2014. Daily dollar volume refers to average daily dollar volume during the last month of the quarter.

	Non-Investment Grade				
	Mean	St. Dev	Median	25%	75%
Daily Dollar Volume	786193.322	1356477.987	387261.905	123809.524	938726.190
$LTD/Assets$	0.421	0.219	0.392	0.274	0.517
$EBIT/Sales$	0.093	0.487	0.101	0.041	0.193
$EBITDA/Interest$	4.168	8.132	3.272	1.985	5.380

	Investment Grade				
	Mean	St. Dev	Median	25%	75%
Daily Dollar Volume	855213.545	1824482.585	271428.571	22750.000	949047.619
$LTD/Assets$	0.254	0.136	0.241	0.161	0.324
$EBIT/Sales$	0.179	0.225	0.168	0.100	0.243
$EBITDA/Interest$	11.441	15.838	7.871	4.892	13.597

	High Investment Grade				
	Mean	St. Dev	Median	25%	75%
Daily Dollar Volume	1006754.336	1734949.568	355142.857	31702.381	1212523.810
$LTD/Assets$	0.228	0.151	0.197	0.143	0.260
$EBIT/Sales$	0.223	0.163	0.203	0.143	0.282
$EBITDA/Interest$	18.413	25.659	11.882	6.042	23.626

Table II: Changes in Ratings and Past Returns

This table presents monthly pooled regressions of changes in bond ratings on past returns and control variables. The dependent variable is the change in the average (across the rating agencies) numerical rating of a bond from month $t-1$ to t. Each bond rating is assigned an integer. For example, the numerical rating of AAA bonds is one, and the numerical rating of an A rated bond is six. $r_{low,t-x}$ is a dummy variable that equals one if the return in month $t-x$ is in the smallest decile (the breakpoints are computed every month). $r_{high,t-x}$ is a dummy variable that equals one if the return in month $t-x$ is in the highest decile. Compustat variables are measured as of the next quarter-end relative to the rating's change. ROA is earnings before extraordinary items divided by lagged total assets. Profit margin is operating income divided by revenue. Leverage is long term debt divided by total assets. $vol_{t-12,t-2}$ refers to the average monthly dollar volume from months $t-12$ to $t-2$. Industry dummies are computed using the Fama and French 49 industry classification. The sample period is January 2005 to December 2014. All standard errors are clustered by month. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
$r_{low,t-1}$	0.0212***	0.0216***	0.0199***	0.0203***	0.0223***	0.0203***
	(5.53)	(5.25)	(4.86)	(5.04)	(5.13)	(4.95)
$r_{high,t-1}$	0.0015					
	(0.38)					
$r_{low,t-2}$		0.0133***	0.0137***	0.0144***	0.0162***	0.0141***
		(3.87)	(3.80)	(3.95)	(4.20)	(3.85)
$r_{low,t-3}$		0.0164***	0.0154***	0.0148***	0.0165***	0.0144***
		(4.06)	(3.85)	(3.67)	(3.75)	(3.39)
$r_{low,t-6:t-4}$		0.0137***	0.0124***	0.0122***	0.0157***	0.0133***
		(3.68)	(3.26)	(3.27)	(3.56)	(3.20)
$r_{low,t-12:t-7}$		0.0281***	0.0240***	0.0235***	0.0273***	0.0253***
		(4.98)	(4.59)	(4.54)	(5.31)	(5.28)
$vol_{t-12,t-2}$	0.0005*	0.0003	-0.0001	0.0001	0.0010***	0.0002*
	(1.86)	(0.98)	(-0.33)	(0.25)	(6.07)	(1.94)
ΔROA_t	-0.3033***	-0.2944***	-0.2737***	-0.2658***	-0.2625***	-0.2669***
	(-3.47)	(-3.39)	(-3.25)	(-3.10)	(-2.75)	(-2.83)
$\Delta Leverage_t$	-0.0459	-0.0461	-0.0328	-0.0453	-0.0461	-0.0321
	(-0.64)	(-0.65)	(-0.46)	(-0.65)	(-0.64)	(-0.45)
$\Delta Profit\ Margin_t$	0.0030	0.0038	0.0035	0.0024	0.0000	0.0002
	(0.23)	(0.29)	(0.43)	(0.29)	(0.00)	(0.02)
$\Delta(EBITDA/Int)_t$			-0.0003**	-0.0001	-0.0002	-0.0003
			(-2.22)	(-0.81)	(-1.39)	(-1.54)
ΔROA_{t-1}				-0.1971***	-0.2162***	-0.2198***
				(-2.75)	(-3.04)	(-3.17)
$\Delta Leverage_{t-1}$				-0.0493	-0.0649	-0.0529
				(-0.77)	(-1.03)	(-0.85)
$\Delta Profit\ Margin_{t-1}$				0.0006	0.0007	0.0008
				(0.11)	(0.11)	(0.12)
$\Delta(EBITDA/Int)_{t-1}$				-0.0003*	-0.0004*	-0.0004**
				(-1.78)	(-1.94)	(-2.19)
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes		
$Rating_{t-12}$ fixed effects					Yes	
Industry fixed effects						Yes
Observations	261,497	261,497	233,728	230,779	230,736	230,184

Table III: Monthly Fama-MacBeth Regressions of Bond Returns on Downgrades from Investment Grade

This table presents monthly Fama-MacBeth (1973) regressions of bond returns on downgrades from investment grade and control variables. The dependent variable is log returns in percent. A bond is considered investment grade (IG) if at least two ratings agency rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. $vol_{t-12,t-1}$ refers to the average monthly dollar volume from months $t-12$ to $t-2$. r_{t-1} is the return lagged one month. $r_{t-12,t-2}$ is cumulative returns for a given bond from month $t-12$ to month $t-2$. The sample period is January 2005 to December 2014. All standard errors are clustered by month. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

Panel A: Downgrades contemporaneous with returns			
	(1)	(2)	(3)
Downgrade below IG	-3.731***	-4.074***	-3.988***
	(-3.53)	(-4.08)	(-4.07)
$log(vol)_{t-12,t-1}$		0.003	0.004
		(0.24)	(0.34)
r_{t-1}		-0.161***	-0.166***
		(-9.57)	(-9.96)
$r_{t-12,t-2}$		-0.016	-0.017
		(-1.53)	(-1.57)
$Rating_{t-12}$ fixed effects			Yes

Panel B: Downgrades lagged one month			
	(4)	(5)	(6)
Lagged downgrade below IG	-2.142**	-2.118**	-2.127**
	(-2.25)	(-2.55)	(-2.56)
$log(vol)_{t-12,t-1}$		0.010	0.011
		(0.73)	(0.78)
r_{t-1}		-0.139***	-0.143***
		(-8.06)	(-8.49)
$r_{t-12,t-2}$		-0.008	-0.008
		(-0.66)	(-0.71)
$Rating_{t-12}$ fixed effects			Yes

Table IV: Summary Statistics For Investment Grade and Non-Investment Grade Bonds

This table presents pooled monthly summary statistics for the shorting characteristics of investment grade and non-investment grade bonds. A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. Utilization is the number of shares on loan divided by the number of lendable shares as a percent. Fee is the loan fee and represents the interest rate (expressed as an annual rate) that the short-seller pays to the lender. The sample period is January 2005 to April 2013.

			Non-Investment Grade		
	Mean	St. Dev	Median	25%	75%
Utilization	7.27	14.65	0.02	0.00	6.36
Loan Fee	16.70	21.45	9.77	4.90	16.65

			Investment Grade		
	Mean	St. Dev	Median	25%	75%
Utilization	5.15	10.00	0.67	0.00	5.40
Loan Fee	8.76	10.91	7.29	3.06	10.00

Table V: Shorting Selling Around Downgrades Below Investment Grade

This table presents monthly contemporaneous and lagged short-selling activity for portfolios formed on whether an investment grade bond was downgraded below investment grade in month t. A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Utilization is the number of shares on loan divided by the number of lendable shares as a percent. Fee is the loan fee and represents the interest rate a short-seller pays to the lender. The sample period is January 2005 to April 2013. t-statistics are shown in parentheses.

	Portfolios: mean shorting				Portfolios: mean loan fee		
	Investment Grade	Downgrade Below IG	Diff		Investment Grade	Downgrade Below IG	Diff
$Utilization_t$	5.77	9.66	3.88	Fee_t	10.62	34.43	23.82
	(20.65)	(8.42)	(3.35)		(9.41)	(4.17)	(3.15)
$Utilization_{t-1}$	5.85	8.76	2.91	Fee_{t-1}	10.84	25.80	14.96
	(21.04)	(7.97)	(2.58)		(9.13)	(4.90)	(2.88)
$Utilization_{t-2}$	6.00	7.50	1.50	Fee_{t-2}	10.63	22.12	11.49
	(21.51)	(9.13)	(1.77)		(9.07)	(5.02)	(2.68)
$Utilization_{t-3}$	6.08	8.23	2.15	Fee_{t-3}	9.93	24.11	14.18
	(21.69)	(8.80)	(2.23)		(16.58)	(4.98)	(2.96)
$Utilization_{t-4}$	6.16	8.26	2.10	Fee_{t-4}	9.89	23.53	13.63
	(21.71)	(10.18)	(2.54)		(16.43)	(4.95)	(2.87)
$Utilization_{t-5}$	6.29	7.92	1.63	Fee_{t-5}	10.75	16.79	6.03
	(21.35)	(10.26)	(2.08)		(10.23)	(7.77)	(3.13)
$Utilization_{t-6}$	6.46	6.95	0.49	Fee_{t-6}	10.92	21.69	10.76
	(20.12)	(9.80)	(0.67)		(10.33)	(5.07)	(2.55)

Table VI: Event-Time Returns around Downgrades Below Investment Grade and Short Selling

This table presents event-time regressions of either cumulative daily returns or average daily returns on pre-event short-selling activity. The events are bond downgrades below investment grade (i.e., to junk status). A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Short-selling activity (short) is the number of shares on loan divided by the number of lendable shares as a percent (i.e., utilization). We measure short-selling one month before the event ($t-21$ trading days). $short_{high}$ is a dummy variable the equals one if $short$ is above the median for the cross-section of the bond sample on a given trading day. The sample period is January 2005 to April 2013. All standard errors are clustered by event month. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

	Panel A: Dependent Variable is Cumulative Returns						
	$r_{t-5,t+1}$	$r_{t-10,t+1}$	$r_{t-21,t-2}$	$r_{t-1,t+1}$	$r_{t-1,t+5}$	$r_{t-5,t+5}$	$r_{t+2,t+5}$
Intercept	-1.569***	-1.569**	-0.297	-1.478***	-2.005***	-2.100**	-0.400
	(-2.74)	(-2.36)	(-0.44)	(-3.19)	(-2.76)	(-2.51)	(-1.16)
high	-2.610**	-3.043***	-1.900**	-1.660	-1.844**	-2.753***	-0.423
	(-2.37)	(-2.68)	(-2.34)	(-1.81)	(-2.18)	(-2.65)	(-0.93)
N	838	838	838	838	838	838	838

	Panel B: Dependent Variable is Daily Average Returns						
	$\overline{r}_{t-5,t+1}$	$\overline{r}_{t-10,t+1}$	$\overline{r}_{t-21,t-2}$	$\overline{r}_{t-1,t+1}$	$\overline{r}_{t-1,t+5}$	$\overline{r}_{t-5,t+5}$	$\overline{r}_{t+2,t+5}$
Intercept	-0.231***	-0.134**	-0.017	-0.488***	-0.266***	-0.183**	-0.099
	(-2.67)	(-2.33)	(-0.52)	(-3.19)	(-2.73)	(-2.49)	(-1.15)
high	-0.411**	-0.275**	-0.093**	-0.563	-0.241**	-0.261***	0.000
	(-2.21)	(-2.52)	(-2.23)	(-1.80)	(-2.25)	(-2.61)	(0.00)
N	838	838	838	838	838	838	838

Table VII: Event-Time Returns around Downgrades Below Investment Grade, Short Selling, and Forced Sellers

This table presents event-time regressions of cumulative daily returns on pre-event short-selling activity and bond ownership by forced sellers (i.e.., high levels of ownership by insurance companies and pension funds). The events are bond downgrades below investment grade (i.e., to junk status). A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Short-selling activity ($short$) is the number of shares on loan divided by the number of lendable shares as a percent (i.e., utilization). We measure short-selling one month before the event ($t-21$ trading days). $short_{high}$ is a dummy variable the equals one if $short$ is above the median for the cross-section of the bond sample on a given trading day. We measure institutional ownership as the dollar value of raw insurance ownership and pension fund ownership divided by the face value of all holdings in the EMAXX database for a given bond. We lag institutional ownership 21 trading days. *Forced Sellers* is a dummy variable the equals one if lagged insurance and pension fund ownership is above the median for the cross-section of the bond sample on a given trading day. In columns 1 and 4, the sample is all downgrade events, and in the other columns the sample is all events with non-zero ownership by insurance companies and pension funds. The sample period is January 2005 to April 2013. All standard errors are clustered by event month. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

	Dependent Variable is Cumulative Returns					
	Dependent Variable: $r_{t-5,t+1}$			Dependent Variable: $r_{t-10,t+1}$		
Intercept	-1.569***	-2.057	-2.112	-1.671***	-3.229**	-3.278**
	(-2.74)	(-1.40)	(-1.44)	(-2.70)	(-2.04)	(-2.04)
$short_{high}$	-2.610**	2.753	2.646	-1.618**	4.568	4.472
	(-2.37)	(1.72)	(1.69)	(-2.00)	(1.73)	(1.70)
forced sellers		0.668	0.660		1.672	1.664
		(0.42)	(0.41)		(0.99)	(0.98)
$short_{high}$ × forced seller		-4.157**	-4.301**		-6.377**	-6.507**
		(-2.43)	(-2.52)		(-2.37)	(-2.41)
volavg			0.000***			0.000
			(2.70)			(1.81)
Observations	838	437	437	838	437	437

Table VIII: Event-Time Returns around Downgrades Below Investment Grade and Short Selling

This table presents event-time regressions of average daily returns on pre-event short-selling activity. The events are bond downgrades below investment grade (i.e., to junk status). A bond is considered investment grade (IG) if at least two ratings agencies rate the bond BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. Short-selling activity ($short$) is the number of shares on loan divided by the number of lendable shares as a percent (i.e., utilization). We measure short-selling one month before the event ($t-21$ trading days). $short_{high}$ is a dummy variable that equals one if $short$ is above the median for the cross-section of the bond sample on a given trading day. The sample period is January 2005 to April 2013. All standard errors are clustered by event month. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

	Dependent Variable				
	$\overline{r}_{t-21,t-2}$	$\overline{r}_{t-1,t+5}$	$\overline{r}_{t+6,t+21}$	$\overline{r}_{t+6,t+42}$	$\overline{r}_{t+43,t+125}$
Intercept	-0.017	-0.266***	-0.002	-0.007	0.039**
	(-0.52)	(-2.73)	(-0.03)	(-0.19)	(2.16)
$short_{high}$	-0.093**	-0.241**	0.115**	0.124***	0.030
	(-2.23)	(-2.25)	(2.25)	(3.92)	(0.48)
Observations	838	838	838	838	838

Table IX: Regressions of change in short selling for bonds downgraded from Investment Grade on Liquidity

The dependent variable in the regressions is the change in short-selling utilization (expressed as the change per day) before bonds are downgraded from investment grade. The independent variables are dummy variables for whether the bonds for a given company are it's most liquid (liquid) or least liquid (not liquid). Short-selling utilization is the number of shares on loan divided by the number of lendable shares as a percent. Panel A reports longer term changes in short selling before a company's downgrade; the change in utilization is measured from $t-120$ to $t-21$. Panel B examines changes in short selling right before the downgrade; the change in utilization is from trading day $t-16$ to $t-5$. A bond is considered investment grade (IG) if a least two ratings agencies rate the bond as BBB-/Baa3 or higher. A downgrade below investment grade equals one if a bond drops from having at least two investment grade ratings to having one or less. The *liquid* and *not liquid* dummy variables are created based on daily trading volume from $t-250$ to $t-126$. We only include firms with three or more bonds trading at the time of the downgrade. The sample period is January 2005 to April 2013. t-statistics are shown in parentheses, and 1%, 5%, and 10% statistical significance are indicated with ***, **, and *, respectively.

Panel A: $\Delta Utilization$ (As Daily Change): $t-120, t-21$				
	(1)	(2)	(3)	(4)
Liquid	0.045***	0.053***	0.046***	0.061***
	(2.64)	(2.84)	(2.61)	(3.11)
Not Liquid			0.007	0.040**
			(0.38)	(2.04)
Month Fixed Effects		Yes		Yes
SE clustered by Month	Yes	Yes	Yes	Yes

Panel B: $\Delta Utilization$ (As Daily Change): $t-15, t-6$				
	(1)	(2)	(3)	(4)
Liquid			-0.109	-0.077
			(-1.68)	(-1.03)
Not Liquid	0.133	0.179***	0.119	0.162**
	(1.92)	(2.64)	(1.73)	(2.19)
Month Fixed Effects		Yes		Yes
SE clustered by Month	Yes	Yes	Yes	Yes