Corporate Bond Specialness

Amrut Nashikkar
New York University

Lasse Heje Pedersen*
New York University, CEPR, and NBER

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Abstract

Using data on all corporate bond loans by one of the world's largest custodian banks, we study the main determinants of shorting costs as measured by rebate rate specialness. We find that 3.0% of corporate bonds are on loan, and 11% of loaned bonds have substantial shorting costs above 50 basis points. In the cross section, specialness is higher for bonds that are of worse credit rating, higher yield spread, smaller issues, less time to maturity, more illiquid, and bonds that appear expensive relative to the corresponding credit default swap. Bonds that are downgraded to speculative grade are more likely to be on special for several weeks before and after the downgrade, and have large shorting activity. Finally, equity specialness is positively related to the firm's bond specialness and the bond-CDS basis.

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*Nashikkar is a doctoral candidate at the Stern School of Business, New York University. Pedersen is at the Stern School of Business, New York University, CEPR, and NBER, 44 West Fourth Street, Suite 9-190, New York, NY 10012-1126, lpederse@stern.nyu.edu, http://pages.stern.nyu.edu/∼lpederse/. We are grateful for helpful comments from Marti Subrahmanyam, and especially from Sriketan Mahanti and Gaurav Mallik, as well as from seminar participants at Ohio State University.

1 Introduction

When a trader wants to shortsell a bond, he must first borrow it and post cash collateral. The bond lender pays interest on the cash collateral at a rate called the rebate rate, but if a bond is attractive to short, the rebate rate can be below the prevailing market interest rate. The difference between the rebate rate and the market interest rate is called the (rebate rate) *specialness*, and this is the main measure of shorting costs or lending fees.

We study empirically the costs of shorting corporate bonds — or, equivalently, the benefits of lending corporate bonds — using data on all corporate bond loans by one of the world's largest custodian banks. We study the distribution of specialness, its cross-sectional determinants, the time-series evolution of specialness around downgrade events, and the relationship between corporate bond specialness, equity specialness, and the credit default swap (CDS) basis.

The lending market for corporate bonds has, to our knowledge, not yet been studied academically. It is clearly important, however, since shorting frictions affect the price efficiency of the bond market, which is an important source of financing for most firms. We use an extensive and unique data set to shed light on the costs of shorting corporate bonds. We find that short selling of bonds is surprisingly prevalent. Indeed, of the available US$501 Billion corporate bonds in our sample, 3.0% of the market value is on loan, that is, 3.0% of the bonds are presumably being shorted. This "on-loan-percentage" is an estimate of the total short interest of the corporate bond market — the true short interest is not known since corporate bonds are traded over the counter (OTC). The number may be slightly overstated since our data provider's clients may be more likely to lend than the average bond owner. As a check of this number, we find that the equity on-loan-percentage in our dataset is 4.4%, similar to the marketwide short interest numbers reported for equities.

The costs of shorting corporate bonds are significant. Over 11% of corporate bond loans (value weighted) have specialness above 50 basis points (bps), and 7.2% have specialness in the hundreds of basis points. In comparison to equities, corporate bonds are more likely to be special, but equities are more likely to be extremely special (e.g. more than 500 bps). This

larger prevalence of corporate bond specialness is likely due to the fact that, for corporate bonds, both the lending market and the cash market (i.e. the market for buying and selling) are illiquid OTC markets, whereas equities have a more liquid exchange-based cash market. This conclusion is supported by our finding that the more illiquid bonds and bonds with smaller issue sizes tend to have higher specialness.

The shorting costs are economically significant. The total annual shorting costs paid for all loans in our sample is on average $58.1 million. Since our sample represents about a tenth of the market, the implied total annual shorting cost for the whole lending market is estimated to be approximately $600 million. Most of these costs accrue to a small and time-varying subset of bonds that experience an event leading some investors to take significant short positions, and, for these bonds, the shorting costs are substantial. For instance, a bond rated Baa1 that experiences a specialness of 100 bps has a per-day shorting cost roughly equal to the per-day yield-spread over the risk-free rate. Hence, for such special bonds, the shorting cost is of the same magnitude as the credit spread.

It is interesting to consider the cross-sectional determinants of specialness. We find that one of the main determinants is credit risk: a worse credit rating (or higher yield spread over the Treasury rate) is associated with larger shorting costs. This is expected since riskier bonds have more downside potential, which is attractive for shortsellers, and may be associated with greater differences of opinion or information asymmetry. Also, worse rated bonds appear to be more frequently shorted since they have higher average on-loan-percentage.

Another important driver of specialness is liquidity. Indeed, specialness is higher for bonds with smaller issue size, smaller issuer size (i.e. the value of all outstanding bonds issued by a firm), older bonds, and bonds with lower liquidity as measured by latent liquidity.[1] Corporate bonds are also slightly more special if they are callable and slightly less

[1]Latent liquidity is defined as the weighted average turnover of the investors holding a bond, where the weights are their fractional holdings of the bond. For a detailed discussion, please see Mahanti, Nashikkar, Subrahmanyam, Chacko, and Mallik (2006). We do not have data on the bid-ask spread of corporate bonds, and other liquidity measures often used for equities (such as market impact) are hard to estimate given the infrequent trading of corporate bonds.

special if they have floating interest, perhaps because this implies lower price volatility. Interestingly, specialness is lower if a larger fraction of the bonds are in custody with our data provider. This is likely because our data provider is a large custodian with a large fraction of institutional clients that may be more likely to lend than the average bond owner, thus increasing lending supply, and because a large custodian is more connected, thus reducing search frictions.

In the time series, specialness is persistent in the short term but varies substantially in the longer term as a bond goes "on" and "off special," that is, as events happen that make the bond an especially interesting object of short selling. A potentially important event is a downgrade from investment grade to speculative grade, signifying potential credit risk and selling pressure from investors focused on investment grade bonds. In a sample of 396 corporate bonds that experience such a downgrade, we find that the median bond is not especially expensive to sell short, but the top 10% most special of the bonds have unusually large shorting costs several weeks before and after the downgrade. The increased shortselling before the downgrade could reflect that 1) some investors traded on private information that the bond was likely to be downgraded, 2) some investors traded on public information — not fully reflected in the price — that the bond was likely to be downgraded, or 3) that some investors had an increased hedging reason to short in connection with the downgrade. The increased shortselling after the announcement is most consistent with 2) and 3).

It is interesting to consider the relationship between corporate-bond specialness and equity specialness for the same firm. If bonds are shorted to hedge long positions in the corresponding equity (e.g. in capital structure arbitrage), and equity is shorted to hedge a long position in a bond (e.g. convertible bond arbitrage), then bond and equity specialness could be negatively related, that is, one or the other would be expensive to short — but not both. Alternatively, bond and equity specialness could be positively related if all securities issued by a firm are perceived to be over-valued at the same time, that is, arbitrageurs short both stocks and bonds of such over-valued companies. We find evidence consistent with the latter view. Indeed, conditional on a firm's equity being special, its corporate bonds are

more likely to be special, and vice versa. The cross sectional correlation of bond and equity specialness is around 0.3.

Finally, we relate the corporate-bond specialness to the CDS-bond basis, that is, the CDS spread minus the bond's yield spread over the risk-free rate.[2] Under certain conditions, the basis should be (close to) zero since the CDS is a derivative which is closely related to the bond. A non-zero basis could imply simply that these conditions fail to be satisfied, or alternatively that the bond and CDS are not priced consistently. In particular, a positive basis indicates that the bond yield is low, that is, the bond price is high. We find that shorting costs are positively related to bond-CDS basis, consistent with the view that a bond is "over-valued" when it is expensive to sell short. Said differently, owners of a bond on special earn a lending fee, and this additional income contributes to the bond's elevated price. Similarly, Blanco, Brennan, and Marsh (2003) find price informativeness to be greater in CDS markets than in corporate bond markets and suggest that shorting costs can help explain deviations of the basis from zero (but they do not have extensive data to test this), and Longstaff, Mithal, and Neis (2005) link the basis to bond illiquidity. Our finding confirms that lending fees affects asset pricing, and, specifically, the theoretical implication of Duffie (1999) that specialness increases the CDS-bond basis.

Perhaps surprisingly, we find that a higher degree of equity specialness, controlling for bond specialness, also predicts a positive CDS-bond basis. One explanation for this would be that firms with high equity shorting costs have an over-valued capital structure, including both equity and corporate bonds (consistent with our other finding above), and that equity specialness is a more informative measure of an over-valued capital structure than bond specialness.

Our findings are consistent with the theories on short selling frictions, such as models with impossible shorting (Miller (1977)), costly shorting (Duffie (1996)), and especially shorting through a search-based lending market (Duffie, Gârleanu, and Pedersen (2002), Vayanos and Weill (2005)). The theoretical predictions concerning specialness include that (a) specialness

[2]One can measure the risk-free rate as, e.g., the Treasury or swap rate. The choice does not affect our cross-sectional results since the risk-free rate affects all bonds in (almost) the same way.

is higher for securities with lower float, (b) specialness is higher for securities with larger differences of opinions, (c) zero lending fees when there are low search frictions, but possibly a non-monotonic relationship between search problems and specialness (Duffie, Gârleanu, and Pedersen (2002)), and (d) higher specialness is associated with higher valuations and lower future returns (Duffie (1996), Duffie, Gârleanu, and Pedersen (2002), Vayanos and Weill (2005)).

Our corporate bond findings complement the existing empirical research on Treasury and equity market short sales constraints. Consistent with the theoretical predictions, Treasury specialness is related to the expensiveness of the bonds (Jordan and Jordan (1997), Krishnamurthy (2002)), increases when there is more shorting demand (Graveline and McBrady (2006)), is higher for smaller issues (Meli (2004)), and new issues, and equity specialness is higher for initial public offerings (Geczy, Musto, and Reed (2002)), DotCom stocks during 1999–2000 (Ofek and Richardson (2003)), stocks with higher proxies for differences of opinion (D'Avolio (2002)), and predicts low subsequent stock returns (Jones and Lamont (2002), Cohen, Diether, and Malloy (2007)), and equity shortsale constraints affect price efficiency (Bris, Goetzmann, and Zhu (2007), Diether, Lee, and Werner (2007b), Saffi and Sigurdsson (2007)).

In summary, our results generate new stylized facts on corporate bond shorting by documenting their economic magnitude, their determinants, and their relation to market efficiency as measured by the corporate-bond-CDS basis, and, finally, we find an interesting cross-market link between specialness of stocks and bonds.

2 The Institution for Shorting and Our Data

We use a proprietary dataset from one of the world's largest custodian banks, which provides custody for more than 20% of U.S. corporate bonds as well as securities in almost any other asset class. Our dataset includes the security identifier, rebate rate, and security value for all lending transactions during the period 1/1/2005–6/30/2006.

To understand our data and the securities lending market, consider a lending transaction

as illustrated in Figure 1. A client of a custodian (e.g. a mutual fund or pension fund) lends his bonds to the custodian lending desk, who lends the bond to a sell-side broker (e.g. Morgan Stanley), who in turn lends it to a buy-side client (e.g. a hedge fund). The buy-side client borrows the bond in order to sell it short. Since naked shorting in the corporate bond market is prohibited, a shortseller must have a "locate" on the bond from his broker before he can short it. Cash collateral in excess of 100% of the market value of the security[3] is passed in the other direction to minimize counterparty credit risk in the event that the borrower fails to return the security. The cash collateral is often larger than the value of the borrowed security (usually 102%) to protect the lender of the security in case the market value of the security has increased by the time the borrower fails. The lending transaction can be done as a so-called "stock loan" or "repo" trade, with minor institutional differences. A stock loan is typically rolled over every day with no predetermined return date, while repo trades typically have a return date. When the bond loan is terminated (e.g. the next day), the bond is returned to its owner and cash plus interest is returned to the bond borrower (in a stock loan, the interest is paid monthly). The interest paid on the cash is denoted the "rebate rate" on a stock loan and the "repo rate" on a repo transaction. We use the term "rebate rate" below since corporate bonds are typically lent as a stock loan (along with equities), although corporate bonds can also be lent as repo (along with government and agency bonds).

If there is a high demand to short a bond (because several borrowers expect the bond to decline in value or need it as a hedge), and finding lenders is difficult because of lack of supply or frictions, then the borrower has to accept a rebate rate that is lower than the general overnight interest rate for collateralized loans, which is called the "general-collateral rate" (GC rate). Such expensive-to-short securities are denoted to be "on special."

We estimate the GC rate for each day as the 90th percentile rebate rate for all bond loans on that day. (Intuitively, the GC rate would be the highest rebate rate, but we use

[3]The broker typically provides the custodian with a collateral of a 102%, and the shortseller typically provides the broker with at least 102%, although this collateral may depend on the shortseller's overall portfolio.

the 90th percentile since it is more robust and, in any case, approximately the mode.) Our results are robust to this measure of the GS rate since, as we shall see, about half the loans have essentially the same rebate rate. Occasionally, there is such a high demand to borrow a bond that the rebate rate is zero or even negative — the latter is often quoted as a zero rebate rate and commission charged by the bond lender. In any case, the total percentage cost of borrowing is called the "specialness" and is therefore given by:

$$\text{specialness} = \text{GC rate} - \text{rebate rate} + \text{commission}$$

Since the custodian lending desk can invest the cash collateral at the GC rate (or a higher rate if they take credit risk), the lending desk makes a daily profit equal to the specialness times the cash amount divided by 360 days per year. This lending fee is divided between the beneficiary owner and the lending desk in negotiated proportions, typically between 67% and 75% to the owner and the rest to the lending desk. Hence, the specialness in our data is higher than a bond owner's benefit of lending and it is likely to be lower than the shorting cost for the final borrower.

In principle, the specialness should always be non-negative since the bond owner can always lend the bond and borrow cash at the GC rate. We do compute some slightly negative specialness observations in the database, which is because we do not know the GC rate at the exact time of the transaction, some loans are rolled over from the day before when the GC rate was different, and potentially because of minor data problems which do not affect our results.

We emphasize that both the cash market (for buying and selling bonds) and the lending market are OTC, meaning that there is no central exchange and all transactions are fixed in a bilateral negotiation. As a practical matter, many bonds in the system can be borrowed using an automated system in which the rebate is the GC rate, but bonds on special (or that could become special) have a "hot bond flag" which means that they can only be borrowed by contacting the lending desk over the phone.

The lending transaction itself is typically overnight. If it is longer term, it is typically

"soft term" meaning that both parties have an intention but not an obligation to keep the transaction going. Hence, both sides can terminate the transaction or renegotiate its terms whenever they desire. In a small fraction of the loans, the lending agreement is longer term with penalties for early termination. Termination may occur either when the short seller desires to close his position and returns the borrowed bonds, or when the bond lender desires to sell his bond, needs it in connection with a corporate action, or feels that the shorting is hurting the value of his position. In our sample, we find that a bond stays lent for about 35 days on average, consistent with the intuition that a shortseller wants to keep the short on for a non-trivial period during which the price can decline.

When the transaction is terminated at the behest of the lender, the short seller must locate another bond that he can borrow, or, if he cannot find the bond, he must either buy it outright or fail to deliver. If the borrower fails to deliver and the bond owner sells the bond, then the bond owner may in turn fail to deliver to the broker that executes his sale and a chain reaction may be set off. If the bond is extremely difficult to locate, it can take months to resolve delivery failures and the bond continues to remain special[4]. Alternatively, the bond-lending desk may use the borrower's cash collateral to buy the bond from another source, if it can be located, in the event of a failure to deliver. This is called a "buy in." In this event, the lending desk returns the remaining cash collateral to the bond borrower (or asks for additional cash in case the collateral was not sufficient). There do not appear to be any significant explicit monetary penalties on a failure to deliver a bond, apart from intangible costs like loss of reputation and trade processing and poor execution in connection with a buy in.

3 The Distribution of Specialness and On-Loan-Percentage

We first study the prevalence of corporate bond lending, Table 1 documents the total market value of assets under custody for our data provider, averaged across days, as well as the percent of securities that are being lend by the lending desk. As a reference, we also

[4]This phenomenon is also observed in the Treasury lending market (Fleming and Garbade (2005)).

report the total market capitalization of the corporate bond market as reported by the Bond Market Association (www.bondmarkets.com). As can be seen from the table, the coverage of securities is large. More interestingly, the percent of securities on loan is an indicator of the amount of shorting in each market. The percent of market value of corporate bonds on loan is 3.0%. For equities, 4.4% of the market value is on loan (not reported in the table), which is similar to the average market-wide ratio of short interest to shares outstanding (see e.g. Lamont and Stein (2004)). While the corporate bond on loan percentage is lower than that of equities, it is surprisingly large given how illiquid corporate bonds are and given the limited attention payed to short selling of corporate bonds in the academic literature.

Given this significant amount of shorting of corporate bonds, it is interesting to consider how expensive they are to short. The distribution of corporate-bond specialness is reported in Table 2, and, for comparison, the distribution of equity specialness is reported in Table 3. We see that short sale costs are prevalent and significant. To understand the magnitude of these numbers, consider for example a corporate bond with a specialness of 100 bps. The cost of short selling $100 million of this bond for a year, is $1 million, that is, 100 bps or a full percent, comparable to the yield spread of Baa1 rated bonds in our sample. Said differently, an owner of such a bond could earn as most from lending the bond as from bearing its credit risk. Of course, a particular lending transaction rarely happens over as long periods as a year, but this is just a way of understanding a cost measure which is inherently on a per-time basis just like bond yields are (and some traders do continuously lend or short sell certain securities). Another measure of the economic magnitude of the shorting cost is the total annual shorting cost, which is $58.1 million on average for all loans in our sample. Given that our sample represents about a tenth of the market, this corresponds to total annual lending fees of around $600 million.

The distribution of bond- and equity specialness are similar, but there are also noticeable differences. Most of the volume in both the corporate bond lending market and the equity lending market appears to be concentrated in transactions where the degree of specialness is relatively low. Both bonds and equities have about three quarters of the lending activity

(by market value) with almost no shorting cost (i.e. the specialness between 0 to 25 basis points). This is natural since the shorting costs should be zero in a frictionless market as shown theoretically by Duffie, Gârleanu, and Pedersen (2002). Hence, the existence of non-zero specialness is evidence that frictions matter in the corporate bond lending market. About 4.5% of corporate bond loans are more special than 200 bps, while the corresponding number for equities in only 2.6%, so bonds are more likely to be severely special. Extreme specialness above 500 bps, however, is mostly seen in equities (though this is rare also for equities).

4 Cross-Sectional Determinants of Specialness

Given the prevalent specialness of corporate bonds, we want to study what determines whether a bond becomes difficult to short — or, attractive to lend — i.e. on special. We first look at relationships between specialness and bond characteristics, such as rating, credit spread, issue and issuer size and the liquidity of the bonds.

Credit Risk: Table 4 considers bond loans broken down by Moody's credit rating. For each rating category, the table shows the average credit spread, i.e., the bond yield minus the yield on a Treasury of the same maturity, and the distribution of specialness. We see that bonds with higher credit risk (worse rating and higher yield spread) have higher mean shorting costs, and a larger right tail. (Almost) all of the loans with specialness above 100 bps are risky bonds with rating Baa or worse.

Issue Size: Table 5 shows the specialness of bond loans when grouped into quintiles on the basis of the size of the issue. It can be seen that bonds with smaller issue sizes tend to have a higher degree of specialness. This is intuitive, because these bonds are likely to have a lower supply available for lending, and hence are likely to become special when there is a demand to short them.

Size of Issuer: Table 6 shows specialness of the bond loans grouped into quintiles based on the size of the issuer. It can be seen that bonds that have the highest degree of specialness are from the smallest issuers. This can be attributed to two different reasons. Bonds issued by smaller issuers are likely to be less liquid and hence have restricted supply in the lending market. Additionally, smaller issuers are also likely to have poorer ratings, increasing the risk of the bond and making it more likely that these bonds will be shorted in the first place. Later we consider the marginal effect of size, controlling for other characteristics.

Age of the issue: Table 7 shows the cross-sectional relationship between a bond and its age since issuance. Older issues are more likely to have high specialness, which could be due to the fact that their effective available supply in the market is reduced as larger and larger proportions of an issue is "stacked away" by non-lending buy-and-hold investors. Another potential explanation is that bonds are not issued when the company is in trouble or investors suspect bad news, and, therefore, the shorting demand is small around the time of issue. We note that age effect is different from the on-the-run/off-the-run effect in the U.S. Treasury repo market in which newly issued securities are likely to be special due to the large demand to short these securities.

Latent Liquidity: Table 8 shows the specialness of bond loans when grouped into quintiles on the basis of their latent liquidity. The latent liquidity of the bonds is simply the weighted average turnover of the funds holding the bonds where the weights are their fractional holdings in the bond. This measure of liquidity does not require transaction data in the individual bonds, and is thus suited for a highly illiquid market such as the corporate bond market. Additionally, this measure is related to transaction costs and price impact, as shown by Mahanti, Nashikkar, Subrahmanyam, Chacko, and Mallik (2006). We find that illiquid bonds held by relatively low turnover funds (the fifth quintile) have higher levels of specialness than the other quintiles. This is likely due to higher shorting frictions when bonds are held by more passive investors.

Multivariate Effects: So far, we have considered the impact of several bond characteristics, one characteristic at a time (i.e. using univariate sorts). To evaluate the marginal effect of each of these variables on specialness while controlling for the other variables, we perform a multivariate regression analysis. In order to reduce noise and solve problems with missing data, we perform the analysis using monthly data (not daily). We consider as dependent variables the average monthly specialness, and the average of the fraction of bonds shorted for each bond in our sample, and as independent variables a host of bond characteristics also averaged monthly. We use the Moody's ratings of a bond and transform them to a numeric scale (Aaa-1 as coded 1, Aaa-2 is coded 2, and so on), with higher numbers representing poorer ratings. We use dummy variables for optionality and the presence of floating interest rates. We perform cross-sectional regressions where each bond-month constitutes an observation. In case of the regression on specialness, we left-censor our values at 0, since negative values of specialness do not make sense, and use the standard errors based on a censored regression model. The results of these regressions are shown in Table 10. Columns 3 and 4 are the base-case specifications, and columns 1-3 control for, respectively, equity specialness, CDS basis, and CDS spread as discussed further in the sections below.

As expected, a worse rating is strongly related to higher degree of specialness, and (perhaps less obviously) a worse rating is also related to a larger fraction of securities being on loan. These effects are likely due to a higher shorting demand for riskier bonds. Further, a downgrade during the month leads to higher specialness and a larger on-loan percentage. Interestingly, the estimated downgrade effect is significantly larger than the coefficient on the rating variable, which means that a downgrade event leads to increased short-term shorting and shorting costs, over and above the average effect of a worse rating. We examine downgrades further in Section 5. The effects of rating and coupon disappear when we include the CDS spread in the regression in column 3. This is natural since CDS spread is likely a better measure of credit risk. (We prefer to include the CDS spread to the bond credit spread since the latter is more contaminated by endogeneity stemming from feedback from the specialness to the bond spread.)

It is intuitive that higher credit risk leads to more specialness, since credit risk leads to more volatility and downside risk, both of which create potential for shorting profits and, thus, increase demand for borrowing. Another expression of this, is our finding that higher coupon rates are related to higher specialness since riskier bonds are typically issued with higher coupons. (We do not include the yield spread on the right hand side due to the potential reverse causality arising from the fact that specialness can effect yield spreads.)

Another interesting finding is that bonds of smaller issues are more special and have larger on-loan percentage. This is likely due to the higher illiquidity of such small issues. It is more puzzling that specialness appears to increase with the total size of all debt issued by the issuer, in contrast to the univariate result presented earlier. This result may be due simply to multi-colinearity problems due to correlation between the size variables. Alternatively, it can perhaps be understood by rewriting the regression as follows:

$$\begin{aligned} \text{specialness} &= -3.3\ \log(\text{Issue Size}) + 1.9\ \log(\text{Issuer Size}) + ... && (1) \\ &= -3.3\ \log\left(\frac{\text{Issue Size}}{\text{Issuer Size}}\right) - 1.4\ \log(\text{Issuer Size}) + ... && (2) \\ &= -1.4\ \log(\text{Issue Size}) - 1.9\ \log\left(\frac{\text{Issue Size}}{\text{Issuer Size}}\right) + ... && (3) \end{aligned}$$

The latter two equivalent representations of the regression show that size and "size relative to the total issuer size" are both negatively related to specialness as would be expected. (Of course, the other regression coefficients are unaffected by rewriting these variables.) This means that a small issue and an issue that is small relative to the total size of the issuer tend to have higher specialness. Naturally, we cannot regress on both the logarithms of Issue Size, Issuer Size, and the ratio of the two.

Another liquidity effect is that a larger fraction is the issue under custody by our data provider tends to be associated with a smaller specialness and larger fraction on loan. This is likely because our data provider is one of the largest custodians and therefore especially accessible. Hence, bonds held by this custodian are more easily found, leading to more supply and lower lending fees. Said differently, if fewer bonds are held by our large custodian, then

bonds are more likely to be "spread out" and hard to locate. Another interpretation is that the custodian loses bargaining power if he needs to lend more, thus receiving lower fees. (Recall that prices in an OTC market are privately negotiated and are not uniform across the market.)

The marginal effect of liquidity as measured by latent liquidity is not significantly related to specialness, which could be because liquidity is better captured by issue size and the fraction under custody. Better liquidity, as measured by latent liquidity, is significantly related to a larger fraction on loan, likely due to more lending supply. Similarly, older bonds are more likely to be held by buy-and-hold investors who participate little in the cash- and lending markets. This reduces the supply, explaining the lower fraction on loan.

The effects of optionality on specialness appear small. Variable interest such as step-up coupons are often designed to induce less price of the bonds since the coupons change to offset change in credit risk. Since a shortseller profits from price changes, it is natural that specialness is smaller for such bonds. Similarly, floating interest bonds are less sensitive to changes in the risk free rate, and perhaps for this reason they appear to have a lower fraction on loan.

As discussed further below, column 1 shows that corporate bond specialness is positively related to equity specialness, and column 2 shows that bond specialness is positively related to the CDS-bond basis.

5 Specialness around Ratings Downgrades

A ratings downgrade, especially one from investment grade to speculative grade, can be a significant event for a corporate bond. Hence, this is a natural event to study the amount of shorting activity and the cost of doing it, and the time-series dynamics of a shorting event.

The results from Section 4 show that, cross-sectionally, the credit risk of a bond is a major determinant of its specialness. Credit risk also varies in the time series as opposed to most of the other cross-sectional determinants that we investigate (issue and issuer size, coupon, optionality, etc.). While a direct time-series study of yield spread and specialness

would be affected by the reverse causality that arises because specialness may be priced into the bond thus affecting the yield, fortunately our study of the time-series evolution of specialness around a downgrade does not suffer from this problem.

A ratings downgrade from investment to speculative grade signifies both an increased credit risk and a potential selling pressure from investors restricted to hold investment grade bonds, and makes it an interesting candidate for investigation. If ratings downgrades are entirely expected, prices of bonds are likely to adjust beforehand, and there is unlikely to be any significant benefit by shorting these bonds. On the other hand, if a ratings downgrade — or simply the timing of the downgrade — is unexpected by a significant fraction of the market, but possibly expected by a few agents, there is likely to be a fall in the prices of bonds after the ratings downgrade, making it beneficial for agents who short the market. Our results are consistent with this latter view that downgrades to speculative grade are shorting-related events.

We identify 396 ratings downgrade events from investment to speculative grade over our sample in which we have lending data on the day of the downgrade. We define an investment grade bond to be any bond with a Moody's rating Baa-3 and higher, and a speculative grade bond to be a bond with a rating Ba-1 and lower. We next consider the daily specialness of these bonds in the period from 100 days before the downgrade to 100 days after. Figure 2 shows the distribution of specialness in event time. We see that mean, 90th, and 95th percentile specialness increase significantly starting around 20 trading days (i.e. a month) before the downgrade and lasting until approximately 20 days after the downgrade.

Figure 3 shows the number of bonds with some non-zero lending activity. The sample is constructed such that all 396 bonds are being lent at the day of the downgrade. We see that the number of bonds being lent is significantly smaller shortly before and after the event. Figure 4 shows the evolution of the fraction of bonds on loan around the downgrade, among the bonds with non-zero lending. It indicates that short interest in bonds that are about to get downgraded is high, and falls after the downgrade. Since there are many large lending transactions, the number of bonds being lent evolves more smoothly than the fraction of

bonds on loan and the specialness. One interpretation of this is as follows. Around 20 days before the downgrade, shortsellers start looking for opportunities to take significant short positions, and the number of bonds where shorting occurs slowly increases. When shorting happens, however, a large part of the lenders' available securities is transacted, and the specialness immediately reflects the profit opportunity related to the downgrade.

These increases in short selling and short selling costs before the downgrade and their subsequent declines indicate that certain investors successfully anticipate some of these events and act on this by short selling the bonds. The anticipation may be based on private information, superior research ability, or simply due to prices reacting slowly to public information (e.g. an early warning by the rating agency).

6 Equity and Corporate Bond Specialness

It is intriguing to consider the link between shorting of equities and corporate bonds. On the one hand, specialness of bonds and equities of the same company could be negatively related. For instance, if a bond is shorted to hedge a long position in the corresponding equity (e.g. in capital structure arbitrage) or an equity is shorted to hedge a long position in a bond (e.g. convertible bond arbitrage), this would give rise to an inverse correlations between the shorting demands on the bonds and the equities, leading to a negative correlations between their specialness.

On the other hand, specialness of bonds and equities of the same company could be positively related if investors find the whole capital structure of a company to be over-valued, that is,"bad companies" have "bad equity" and "bad bonds". This would be especially true if some agents are overly optimistic about the value of a firm's assets. Since bonds and equities are both claims on the firm's assets, this would lead to a simultaneous over-valuation in both the equities and the bonds, since short sales constraints operate in both the equity and the corporate bond markets. In such a case, arbitrageurs would try to take advantage of the over-valuation by attempting to short both the bonds and the equities of the firm. Demand to short both the bonds and the equities of a firm would lead to simultaneous specialness in

both the equity and the bonds issued by the firm.

To compare the equity and bond specialness, we first compute the average specialness in each bond over the length of our sample period, and the average specialness in the equity of the issuer over the same sample period, restricting attention to firms where both the bond and the equity have been shorted. We first group our data according to the average equity specialness and, for each category of equity specialness, we compute the mean, 90th percentile and 95th percentile of the specialness in the bond. These are illustrated in Figure 5. Second, we group our data according to the average bond specialness, and, as before, compute the distribution of equity specialness in each group as illustrated in Figure 6.

It is clear from the two figures that there is a strong relationship between the specialness in the issuer's equity and the specialness in the bond. Bonds that are highly special tend to have equities that are also correspondingly highly special. Similarly, equities that are highly special tend to be from issuers whose bonds are also highly special. The correlation between the specialness of the bond and the equity for our over all sample is about 0.29, which in itself is surprisingly high. Further, Column 1 of Table 10 shows that bond and equity specialness remain positively related after controlling for a variety a characteristics including size and rating.

This evidence of a positive relation between bond and equity shorting costs suggest that investors sometimes perceive a firm's equity and corporate bonds to be simultaneously over-valued. Consistent with this, the next section shows that equity specialness is related to corporate bond expensiveness measured relative to credit default swaps (CDS).

7 Specialness and the CDS-Bond Basis

A theoretical implication from the literature on short sales constraints is that assets that are short sale constrained are likely to be expensive since the most pessimistic investors have a limited ability to express their view (Miller (1977)) and lenders' benefit of earning a lending fee can further increase the price (Duffie (1996), and Duffie, Gârleanu, and Pedersen (2002)). As a result, we expect corporate bonds on special to be expensive relative to a

benchmark that captures their value absent lending fees and shorting frictions. CDS spreads constitute such a benchmark. Indeed, CDS contracts are derivatives and, therefore, they can be shorted without a securities-lending transaction. Further, CDS contracts are usually more liquid than the corresponding corporate bonds. While there are naturally links between the derivative CDS market and the cash bond market, implying that price pressure can spill over from one to the other, theory predicts that CDS spreads are less affected by corporate bond lending fees than the bond itself (Duffie (1999)).

There are several ways of computing the CDS/bond basis, depending on the assumptions made about the true risk-free curve, and the specific model for the evolution of the term-structure of credit risk, see e.g. Blanco, Brennan, and Marsh (2003) and Longstaff, Mithal, and Neis (2005). We use the simple approach of taking the difference between the 5 years CDS price and the yield spread of the corporate bond over the Treasury rate.[5] CDS spreads should in principle be equal to the coupon of a par bond minus the risk free rate. The CDS basis can rationally deviate from zero, however, because of mis-measurement of the risk free rate (e.g. one could either use Treasury rates, swap rates, or something else), because bonds are not traded at par value (e.g. a premium bond is only protected at par), and because a CDS may be linked to a different reference bond of the issuer than the one that we consider (or another bond may be cheaper to deliver). Nevertheless, the CDS-bond basis does capture potential expensiveness of the bond relative to the CDS, but it does so in a slightly noisy way due to these caveats.

Table 9 shows the bond specialness for bonds grouped by their CDS-bond basis. We see that bonds with larger basis tend to have larger specialness. Column 2 of Table 10 finds a similar pattern after controlling for a variety of other effects. As noted above, this is natural. An investor who shorts a corporate bond and sells protection on the issuer in the credit default swap market is, to a large extent, hedged against the risk of default in

[5]The reason for choosing the 5 year CDS contract is that for most issuers this is the most liquid contract, and for many issuers, the only one that is actively traded. We have data on one CDS contract per issuer. Hence, in case of default the protection buyer receives the difference between the notional amount and the price of a reference obligation (in case of cash settlement which is now typical). We compute the CDS-bond spread for any bond of an issuer, although this may entail an error if the reference obligation is different.

the corporate bond. Such an investor earns the difference between the CDS yield and the bond's yield spread, reduced by the lending fee associated with shorting the bond. This trade is attractive if the bond is expensive relative to the CDS, that is, if the bond yield is low corresponding to a positive basis.

Section 6 above shows that there is a positive link between specialness a firm's equity and bonds. It is interesting to consider whether this equity-specialness link extends to the expensiveness of the corporate bonds relative to the CDS market. To consider this, we regress the CDS-bond basis on both the bond and equity specialness. As a comparison, we also consider the univariate regression where bond specialness is the only dependent variable. We perform monthly cross-sectional regressions and report the results in Table 11.

In order to perform the regressions, we first aggregate our data at the monthly level, by computing the average specialness in a bond in any given month. To find the CDS price for the issuer for any bond, we match the CUSIP of the bond with its Bloomberg ticker, from a mapping of Tickers to Bond CUSIPs made available by Bloomberg, as of December 2006. Owing to the relative recency of the data, we are confident that changes, if any, caused due to mergers/acquisitions, are minimal. We then take available price quotes on the CDS contract on the basis of the Bloomberg ticker. For every month between September 2005 and June 2006, we compute the average CDS spread for the month. Additionally, from transactions recorded by the custodian in specific bonds as part of their custodial business, we compute the yield spread of the bond over yield of an equivalent treasury. We then average these yield spread for any given month. The difference between the CDS price and the yield spread gives us the average basis for any bond for a given month.

We see that in the univariate relationship between the CDS basis and bond specialness, there is a positive relationship between the two variables. Bonds that are special are also expensive relative to the CDS contract. This indicates that the profit achieved by using a strategy of shorting the bonds and selling protection on the issuer through the CDS market is at least partially be offset by the shorting cost of the bond.

In the bivariate regression, we see that the equity specialness also appears to be related

to the basis, in fact, perhaps in more so than the bond specialness. The R-squared increases substantially when equity specialness is included. This strong relationship between equity specialness and the CDS-bond basis is, at least at first, surprising. There are several possible explanations.

One possible explanation would be that companies' stock and bonds get over-valued at the same time as some investors become buyers of the whole capital structure. This would lead to shorting of both stocks and bonds, and it is possible that the equity specialness would provide a clearer indication of this activity. The equity specialness could be more timely due to the larger transparency of the equity cash market and due to smaller search frictions in the lending market. Said differently, it is possible that the search frictions and trading costs of the bond cash and lending markets lead investors to shy away from shorting in this market. Investors may also be reluctant to short bonds due to the larger risk of a recall of the securities, e.g. because owners may need possession during a possible bankruptcy negotiation.

Another possible explanation would be that a perceived overvaluation of a firm's equity leads to shorting of the equity, combined with a hedging trade of "buying the firm" in the corporate bond. This could lead to an increase in the bond price, and, in turn, an increase in the basis. However, since the CDS is more liquid, such a hedge would likely take place in the CDS market, which would actually make the CDS expensive relative to the bond, inconsistent with the positive basis.

8 Conclusion

While the $5 Trillion U.S. corporate bond market is large in size and a significant source of financing for firms, the OTC market structure of its cash and lending markets have limited the transparancy and, as a result, the academic research. Using a unique dataset consisting of corporate bond lending transactions arranged by one of the world's largest custodians, we shed light on the drivers of shorting activity, shorting costs, and the economic implications.

We find that 3% of the corporate bonds in our sample are on loan, implying that corporate

bond lending and shorting is almost as prevalent as equity shorting. Corporate bond lending fees are substantial and tend to be largest for risky low-rated bonds — especially around the time of downgrade — small issues, old bonds, and bonds where a smaller fraction is under custody by the largest custodian (i.e., likely harder to locate).

Interestingly, we find that a company's equity specialness is positively related to the specialness of the same company's corporate bonds. This may indicate that shortselling investors view the company's entire capital structure as overvalued, in particular, both stock and bonds are viewed as overvalued at the same time.

Finally, we present evidence that corporate bonds that have high shorting costs are likely to be overpriced relative to the CDS contract on the issuer. Said differently, bonds with a higher specialness have a more positive bond-CDS basis. Surprisingly, equity specialness is also significantly related to corporate bond over-valuation relative to the CDS, even after controlling for corporate bond specialness.

In conclusion, our results provide stylized facts on short-sale frictions, confirm several theoretical predictions of shorting models, and produces new insight into the interactions between stock, bond, and CDS markets. Our findings give rise to additional theoretical and empirical work that further explains these links.

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Total corp bond market ($ Billion)	Corp bonds under custody ($ Billion)	Corp bonds on loan ($ Billion)	Fraction on loan	Average Specialness (bps)	Annual custodian Lending fee ($ Million)
5209	501	14.9	3.0%	39	58.1

Table 1: **Summary Statistics.** This table shows the daily averages of the total amount outstanding, the amount under custody of our data provider, the amount lent in the bond-lending market, the shorting cost and the shorting cost in terms of dollar value, of the set of bonds in our sample. The data consists of bonds held under custody of our data provider from September 2005 to June 2006. The shorting cost here is computed relative to the GC rate.

Corp bond specialness (bps)	Mean in range	Percent of loans by value	Cumulative percent by value	Percent of loans by number	Cumulative percent by number
0 - 25	8.3	77.2	77.2	65.5	65.5
25 - 50	37.1	12	89.2	26.6	92.1
50 - 75	61.3	2.4	91.6	3.6	95.7
75 - 100	87.4	1.2	92.8	0.4	96.1
100 - 125	113.4	1	93.8	0.4	96.5
125 - 150	136.9	0.6	94.4	0.3	96.8
150 - 175	162.2	0.7	95.1	0.3	97.1
175 - 200	187.4	0.5	95.5	0.2	97.3
200 - 225	213.1	0.4	95.9	0.2	97.5
225 - 250	238.9	0.4	96.4	0.2	97.6
250 - 275	263.1	0.6	96.9	0.2	97.8
275 - 300	286.9	0.5	97.4	0.2	98
300 - 325	312.8	0.4	97.9	0.2	98.2
325 - 350	337.8	0.4	98.2	0.3	98.5
350 - 375	364.3	0.2	98.5	0.3	98.8
> 375	464.7	1.6	100	1.2	100

Table 2: **Distribution of Corporate Bond Specialness.** This table shows, the cross-sectional distribution of the amount of bonds lent with respect to specialness. The data consists of all repo transactions arranged by one of the world's largest custodians between September-2005 to June-2006. In order to focus on the cross-sectional distribution, we first compute the fractional distribution of specialness for every stock in our sample for every day in the period covered by our data-set and the average amount lent for each stock. We then compute the average distribution of specialness for the period of the sample, by taking the averages of the daily distributions. These proportions are reported in the last two columns.

Equity specialness (bps)	Mean in range	Percent of loans by value	Cumulative percent by value	Percent of loans by number	Cumulative percent by number
0 - 25	15.4	71.2	71.2	69.8	69.8
25 - 50	34.4	18.5	89.7	17.8	87.6
50 - 75	60.1	3.9	93.6	4.7	92.3
75 - 100	85.5	1.6	95.2	1.9	94.2
100 - 125	111.1	0.8	96	1	95.2
125 - 150	136.3	0.4	96.4	0.6	95.8
150 - 175	161.7	0.5	96.9	0.4	96.2
175 - 200	186.4	0.5	97.4	0.3	96.5
200 - 225	213.6	0.2	97.6	0.2	96.7
225 - 250	237.1	0.3	97.9	0.2	96.9
250 - 275	260.8	0.3	98.2	0.2	97.1
275 - 300	285.9	0.5	98.7	0.2	97.3
300 - 325	312.4	0.4	99.1	0.2	97.5
325 - 350	336.8	0.6	99.5	0.3	97.8
350 - 375	363.1	0.2	99.6	0.2	98
> 375	710.1	0.4	100	2.1	100

Table 3: **Distribution of Equity Specialness.** This table shows, the average cross-sectional distribution of the amount of stocks lent with respect to specialness. The data consists of all repo transactions arranged by a major custodian between September-2005 to June-2006. In order to focus on the cross-sectional distribution, we first compute the fractional distribution of specialness for every stock in our sample for the period covered by our data-set and the average amount lent for each stock. We then compute the average distribution of specialness for the period of the sample, by taking the averages of the daily distribution. These proportions are reported in the last two columns.

Moody's Rating	Yield Spread Mean	Specialness Mean	Specialness 50th percentile	Specialness 90th percentile	Specialness 95th percentile	Specialness 99th percentile
Aaa-Aa	57	20	18	42	44	70
A	73	21	18	42	44	61
Baa	106	19	15	38	44	145
Ba	195	19	8	43	45	217
B	311	23	6	42	78	375
Caa	478	54	12	175	336	430
$>$ Caa	597	101	22	375	444	730

Table 4: **Credit Risk and Specialness.** This table shows the univariate relationship between the rating of of the bond and the average special-ness of a bond. The data consists of bond-wise averages of specialness the corresponding yield spread computed from all repurchase transactions conducted by a major custodian from September 2005 to June 2006. We group bonds into five rating categories as shown above, and compute the specialness in the mean, 50th percentile, 90th percentile, 95th percentile and 99th percentile in each group according to specialness. Specialness here is defined as the difference between the 10th percentile rebate rate for any day and the contracted rebate rate for the repurchase transaction. The ratings used are Moody's ratings.

Issue size	Mean	50th percentile	90th percentile	95th percentile	99th percentile
0 - 238 Million	39	15	54	199	434
238 - 325 Million	25	16	44	48	246
325 - 500 Million	28	14	44	78	378
500 - 800 Million	23	16	43	48	178
$>$ 800 Million	25	19	41	46	218

Table 5: **Issue Size and Specialness.** This table shows the univariate relationship between the issue size of a bond and its average special-ness. The data consists of bond-wise averages of specialness the corresponding yield spread computed from all repurchase transactions conducted by a major custodian from September 2005 to June 2006. We group bonds into five groups on the basis of size as shown above, and compute the specialness for the mean, 50th percentile, 90th percentile, 95th percentile and 99th percentile bonds in every group. Specialness here is defined as the difference between the 10th percentile rebate rate for any day and the contracted rebate rate for the repurchase transaction. The ratings used are Moody's ratings.

Total debt of issuer	Mean	50th percentile	90th percentile	95th percentile	99th percentile
0 - 1.08 Billion	32	11	45	105	425
1.08 - 3.21 Billion	31	13	45	112	412
3.21 - 6.4 Billion	21	15	41	44	139
6.4 - 21.7 Billion	27	17	44	62	258
$>$ 21.7 Billion	26	19	43	48	288

Table 6: **Issuer Size and Specialness.** This table shows the univariate relationship between the size of the issuer and the average special-ness of a bond. The data consists of bond-wise average specialness computed on the basis of all repurchase transactions conducted by a major custodian from September 2005 to June 2006. We group the bonds into buckets on the basis of the total debt outstanding of the issuer of the bonds, and compute the 50th percentile, 90th percentile, 95th percentile and 99th percentile for each bucket by specialness. Specialness here is defined as the difference between the 10th percentile rebate rate for any day and the contracted rebate rate for the repurchase transaction. Size is defined by the total amount outstanding of all corporate debt issued by the issuer.

Age since issuance	Mean	50th percentile	90th percentile	95th percentile	99th percentile
0-1.2	24	13	43	52	260
1.2-2.2	29	15	44	71	405
2.2-3.6	28	16	44	49	401
3.6-5.75	34	16	45	108	423
$>$ 5.75	40	20	48	194	432

Table 7: **Age and Specialness.** This table shows the univariate relationship between the age of a bond since its issuance and the average special-ness of the bond. The data consists of bond-wise average specialness computed on the basis of all repurchase transactions conducted by a major custodian from September 2005 to June 2006. We group the bonds into buckets on the basis of the average age of the bonds, and compute the 50th percentile, 90th percentile, 95th percentile and 99th percentile for each bucket by specialness. Specialness here is defined as the difference between the 10th percentile rebate rate on any day and the contracted rebate rate for the repurchase transaction.

Latent Liquidity Quintile	Mean	50th percentile	90th percentile	95th percentile	99th percentile
1 (most liquid)	31	15	45	88	395
2	28	15	44	56	356
3	32	18	44	84	391
4	37	23	45	101	410
5 (most illiquid)	45	22	76	276	427

Table 8: **Latent Liquidity and Specialness.** This table shows the univariate relationship between latent liquidity and the average special-ness of a bond. The data consists of all repurchase transactions conducted by a major custodian from September 2005 to June 2006. Specialness here is defined as the difference between the 10th percentile rebate rate on any day and the contracted rebate rate for the repurchase transaction.

CDS-Bond basis (bps)	Mean	50th percentile	90th percentile	95th percentile
-250 to -150	28	19	54	69
-150 to -50	27	22	46	52
-50 to 50	33	29	52	58
50 to 150	50	21	151	263
150 to 250	57	28	156	250
> 250	57	24	135	282

Table 9: **CDS-Bond Basis and Specialness.** This table shows the univariate relationship between CDS-Bond basis and the average specialness of a bond. The data consists of all repurchase transactions conducted by a major custodian from September 2005 to June 2006, for which a corresponding 5-year CDS quote is available. Specialness is defined as the difference between the 10th percentile rebate rate on any day and the contracted rebate rate for the repurchase transaction. The CDS - Bond basis is the difference between the spread of the five year CDS contract and the yield spread of the bond.

	Specialness				Fraction Shorted
Intercept	8.727	105.972	136.392	5.658	-2.436
	(0.37)	(2.61)**	(3.72)**	(0.24)	(4.09)**
Fraction under custody	-6.502	-3.892	-4.314	-6.576	0.253
	(6.38)**	(3.11)**	(3.56)**	(6.40)**	(13.94)**
Fraction of issuer under custody	-2.017	-1.294	0.232	-1.929	0.093
	(0.90)	(0.38)	(0.08)	(0.85)	(2.14)*
Log (Issue Size)	-3.369	-4.488	-4.223	-3.283	-0.239
	(2.51)*	(3.54)**	(3.47)**	(2.40)*	(7.51)**
Log (Issuer Size)	1.847	-0.117	-1.138	1.887	0.045
	(2.56)*	(0.09)	(0.90)	(2.59)**	(2.80)**
Coupon	1.693	0.397	-1.118	1.793	0.079
	(2.50)*	(0.33)	(1.10)	(2.62)**	(5.39)**
Rating	1.273	0.455	-0.349	1.327	0.059
	(4.17)**	(0.89)	(0.89)	(4.23)**	(11.31)**
Downgrade	6.726	3.741	3.664	6.588	0.078
	(2.20)*	(5.95)**	(5.87)**	(2.14)*	(1.43)
Latent Liquidity	0.689	1.828	1.600	0.697	0.014
	(1.14)	(8.87)**	(6.55)**	(1.15)	(2.56)*
Age	0.324	-0.018	0.327	0.322	-0.105
	(0.72)	(0.03)	(0.58)	(0.71)	(12.08)**
Time to Maturity	-0.253	0.080	-0.097	-0.252	0.018
	(4.42)**	(0.96)	(1.47)	(4.37)**	(7.57)**
Private Placement	-3.631	-14.596	-10.727	-3.662	-0.042
	(1.27)	(2.18)*	(2.28)*	(1.28)	(0.56)
Callable	2.670	32.044	17.259	2.333	-0.069
	(0.90)	(2.59)**	(2.09)*	(0.78)	(1.13)
Convertible	-2.999	-22.802	-18.962	-2.631	0.651
	(0.53)	(1.38)	(1.87)	(0.46)	(6.15)**
Floating interest	-5.796	-49.891	-10.107	-5.653	-0.088
	(2.66)**	(4.33)**	(2.63)**	(2.58)*	(1.11)
Variable Interest	0.024	-7.817	-1.717	0.461	-0.353
	(0.00)	(1.38)	(0.39)	(0.07)	(2.23)*
Equity Specialness (bps)	0.016				
	(2.05)*				
CDS basis (bps)		0.0721			
		(5.14)**			
CDS mid-price (bps)			0.060		
			(4.82)**		
Observations	26628	9777	10670	26628	26628
Number of bonds	4825	1632	1825	4825	4825

Robust z statistics in parentheses
* significant at 5%; ** significant at 1%

Table 10: **Specialness in the Cross Section.** This table shows the relationship between bond characteristics and, respectively, the specialness of the bond and the fraction of the issue shorted. The data consists of all repurchase transactions conducted by a major custodian aggregated at the monthly level, from September, 1st, 2005 to June 30th, 2006. The regressions are in the form of random-effects regressions with each observation defining for a bond-month. Standard errors are adjusted for clustering by bond. Specialness here is defined as the difference between the 10th percentile rebate rate on any day and the contracted rebate rate for the repurchase transaction. Age and Time to maturity are expressed in years and are computed as averages over the month. The rating is the rating at the beginning of the month. The downgrade dummy variable takes a value of 1 if there was a rating downgrade during the month, and 0 otherwise.

	Bond Specialness	Const	R^2	Bond Specialness	Equity Specialness	Const	R^2	N
Sep-05	0.164	-0.391	0.00	0.042	2.141	-0.934	0.19	1065
	(1.73)	(7.26)**		(0.49)	(15.64)**	(15.41)**		
Oct-05	0.381	-0.384	0.02	0.222	2.361	-0.928	0.25	1097
	(4.18)**	(7.57)**		(2.75)**	(18.27)**	(17.07)**		
Nov-05	0.406	-0.345	0.01	0.382	0.060	-0.367	0.02	1097
	(4.08)**	(5.46)**		(3.85)**	(2.93)**	(5.78)**		
Dec-05	0.678	-0.403	0.03	0.520	3.004	-1.373	0.30	1119
	(5.40)**	(5.43)**		(4.87)**	(20.91)**	(17.57)**		
Jan-06	0.926	-0.519	0.03	0.715	1.204	-0.979	0.15	1100
	(6.19)**	(6.69)**		(5.07)**	(12.47)**	(12.03)**		
Feb-06	1.048	-0.595	0.05	0.893	0.476	-0.759	0.10	1117
	(7.34)**	(8.41)**		(6.36)**	(8.16)**	(10.51)**		
Mar-06	3.132	-1.262	0.27	1.737	2.799	-1.942	0.55	1117
	(20.52)**	(15.25)**		(13.18)**	(26.17)**	(27.52)**		
Apr-06	0.627	-0.425	0.02	0.084	1.798	-1.047	0.35	1087
	(4.31)**	(6.79)**		(0.69)	(23.48)**	(18.06)**		
May-06	0.690	-0.456	0.02	0.028	1.492	-1.004	0.38	1097
	(4.83)**	(8.47)**		(0.24)	(25.20)**	(20.45)**		
Jun-06	0.838	-0.465	0.04	0.553	1.493	-0.954	0.35	1117
	(7.34)**	(9.33)**		(5.41)**	(22.55)**	(20.28)**		

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 11: **CDS-Bond Basis and Specialness of Corporate Bonds and Equity.** This table shows, for each month from September, 2005 to June, 2005, the relationship between the average CDS basis for the month with the average specialness in the bond for that month, and the average specialness in the equity of the issuer for that month. The data consists of bonds for which repurchase transactions were conducted by a major custodian from September 2005 to June 2006, for names on whom at least one CDS mid-price is available for any given month. The CDS data here is taken from Bloomberg. The dependent variable is the CDS basis, defined as the difference between the CDS spread and the option adjusted spread of the underlying bond over treasury rates. A higher basis indicates that the bonds are more expensive relative to the CDS contract. Specialness is the difference between the 10th percentile rebate rate on any day and the contracted rebate rate for the repurchase transaction. The first set is a set of univariate regressions of the CDS basis on the specialness in the bond. The second set of regressions includes bothe the specialness in the bond and the specialness in the equity of the issuer of the bond.

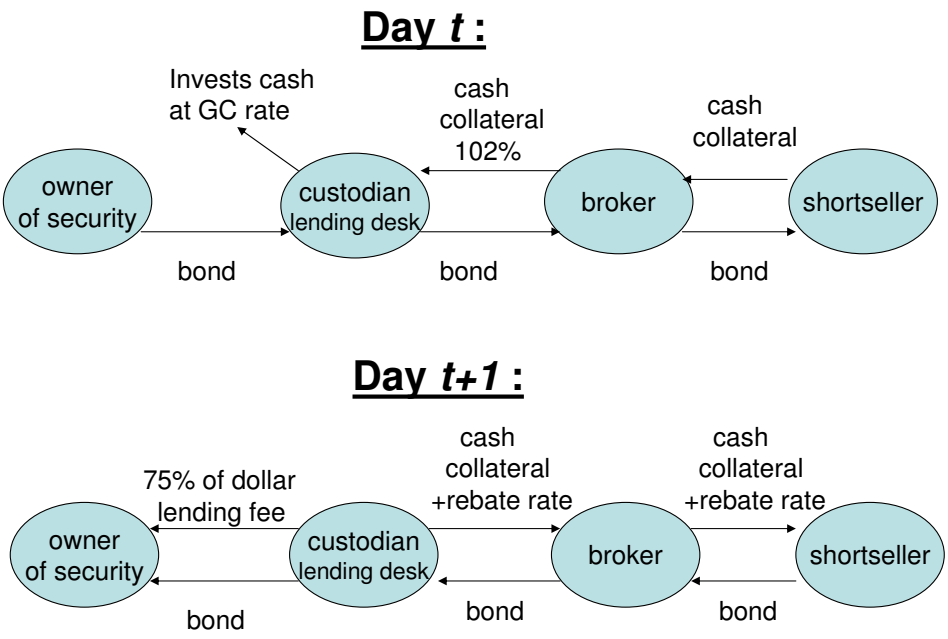

Figure 1: **The mechanics of securities lending.**

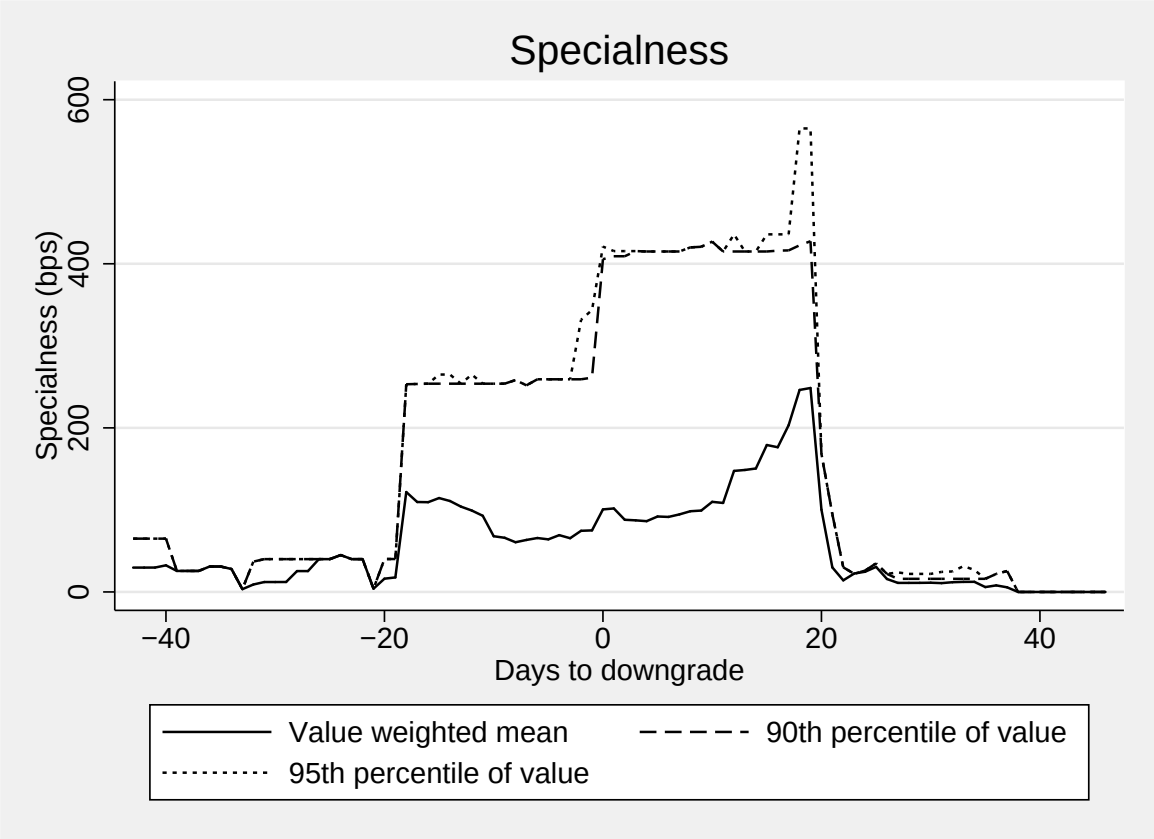

Figure 2: **Specialness around Downgrade to Speculative Grade.** This figure shows the value-weighted average specialness, and the 90th and 95th percentiles (by value of bonds shorted) of corporate bonds that are downgraded from investment grade to speculative grade, as a function of the number of trading days to the downgrade event. Investment grade bonds are defined by Moody's rating of Baa3 and above. A change in rating from investment grade to "Not Rated" is included as a downgrade. The sample consists of average values based on 396 downgrade events between September 2005 and June 2006.

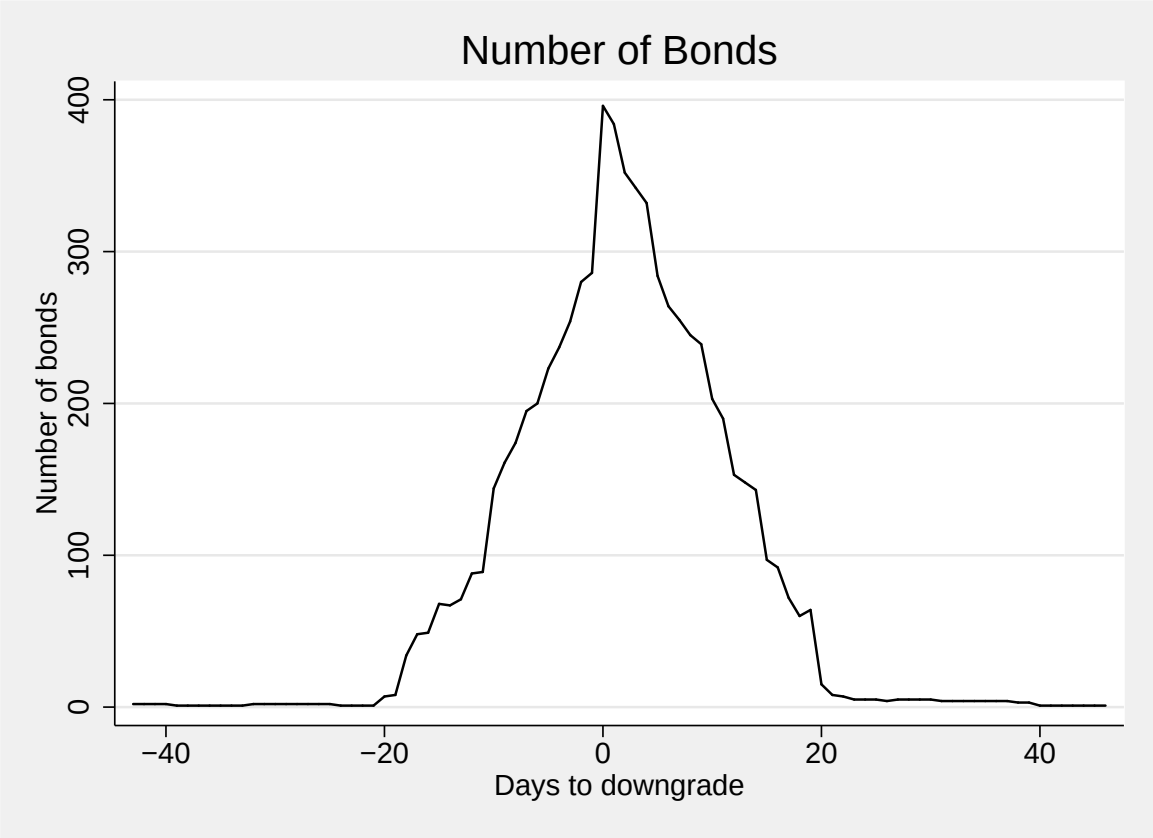

Figure 3: **Number of Bonds with Lending Activity.** This figure shows the number of corporate bonds with non-zero lending activity around a downgrade from investment grade to speculative grade, as a function of the week-days to the downgrade event.

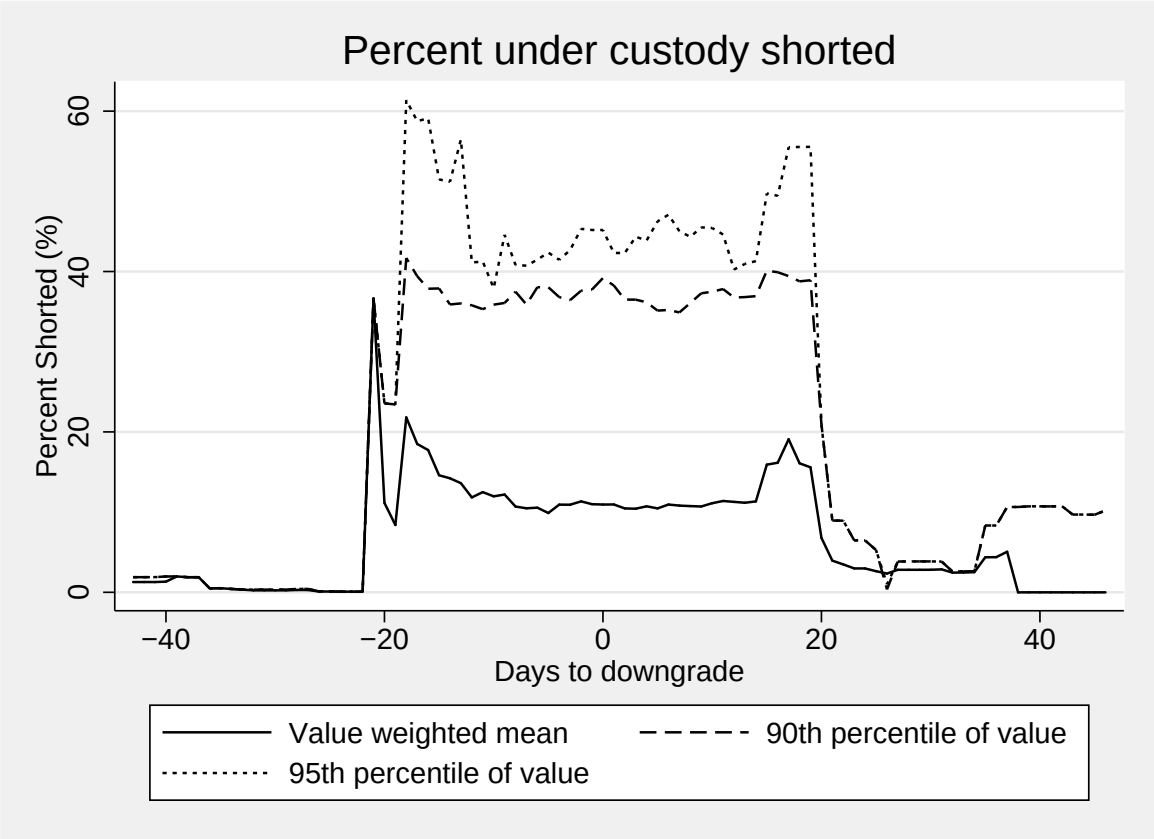

Figure 4: **Fraction Shorted around Downgrade to Speculative Grade.** This figure shows the value weighted average and the 90th percentile and 95th percentile (by value of bonds shorted) , of the fraction of bonds under the custody of a major custodian that are lent out around a rating downgrade from investment grade to speculative grade. This sample consists only of bonds with non-zero lending activity. (Figure 3 above shows the number of such bonds.)

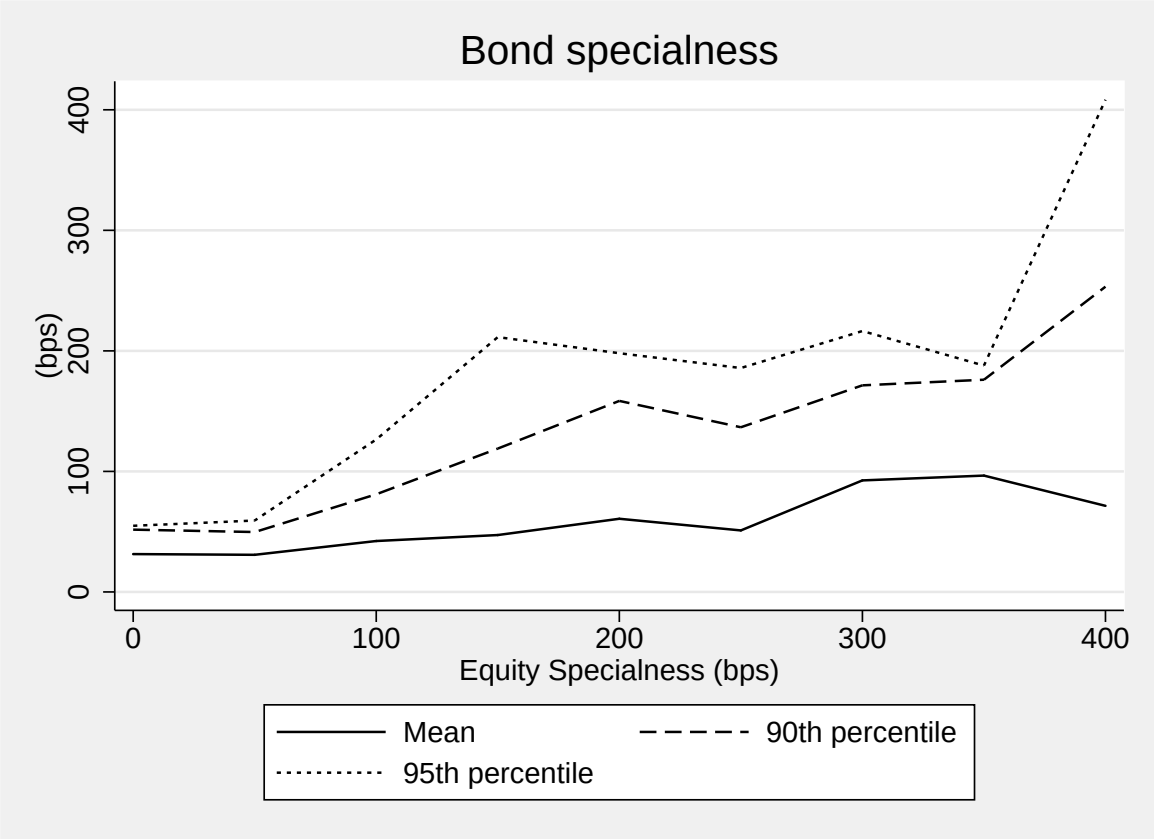

Figure 5: **Bond Specialness given Equity Specialness.** This figure shows the relationship between specialness in the bond and specialness in the equity of its issuer. We compute the average specialness in every bond and the corresponding equity over each month of the sample. We then group bond loans by the equity specialness, compute the distribution of bond specialness in each group, and finally take the time series mean of the distribution. The data consists of all repurchase transactions arranged by a major custodian between September 2005 and June 2006.

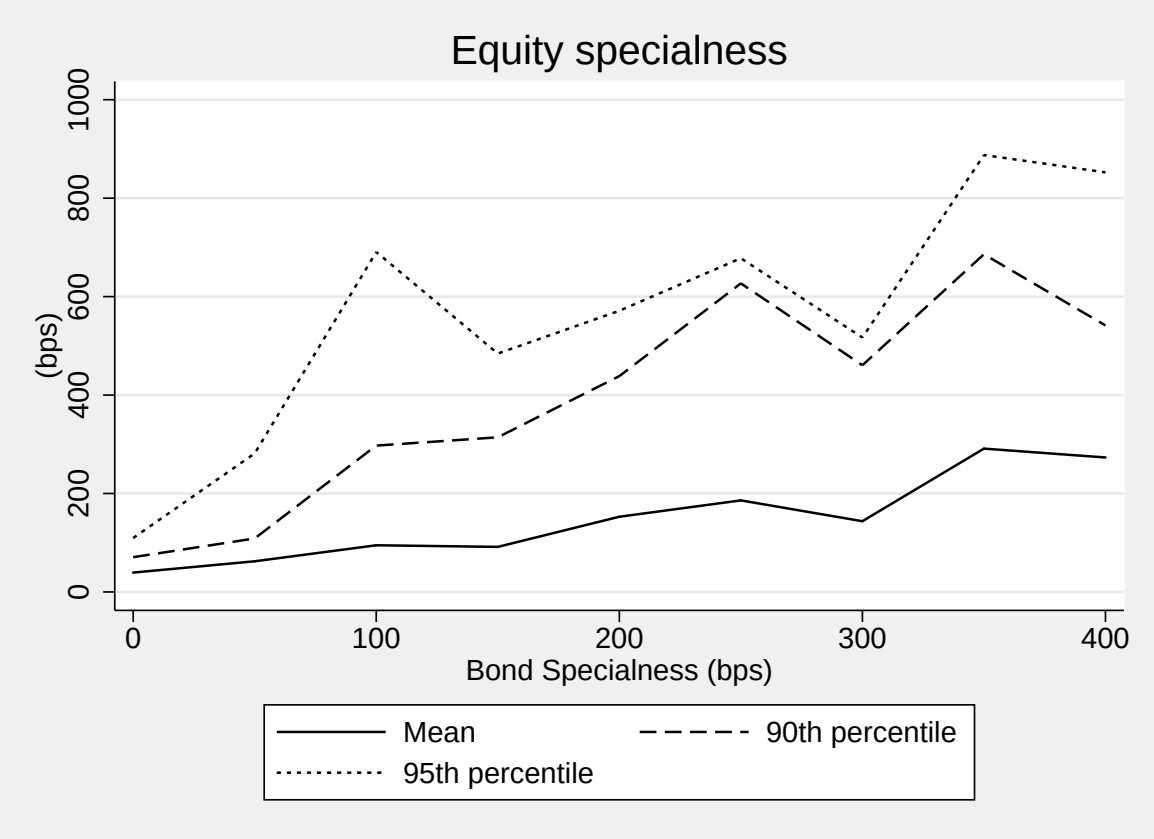

Figure 6: **Equity Specialness given Bond Specialness.** This figure shows the relationship between the specialness in the equity of an issuer and the specialness in its bond. We compute the average specialness in every bond and the corresponding equity over each month of the sample. We then group equity loans by the bond specialness, compute the distribution of equity specialness in each group, and finally take the time series mean of the distribution. The data consists of all repurchase transactions arranged by a major custodian between September 2005 and June 2006.