

Investment Horizon of the Bond Investor Base and the Leverage of the Firm*

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Abstract: We examine the effect of the investor horizon of institutional bondholders (e.g., mutual bond funds and insurance companies) on the leverage of the firm using a novel dataset. Our main finding is that the investment horizon of the firm's bond investor base (measured as functions of (i) the average portfolio turnover of investors holding the firm's bonds, or (ii) the prevalence of mutual funds among the firm's bondholders as opposed to insurance companies) has a positive and significant effect on the leverage of the firm. The investment horizon of the firm's bond investor base also has a positive and significant effect on the firm's probability of issuing bonds, and a negative and significant effect on the firm's probability of issuing equity and borrowing from banks. The results are robust to controlling for potential endogeneity of the investor-firm matching using geography-based instruments. Our results highlight the vulnerability of companies that depend on short-horizon mutual funds as primary bond investors.

JEL classification: G1, G2

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Introduction

In the last decade, bond financing has become one of the most important sources of external financing for (especially large) U.S. corporations. While debt financing has been the dominant source of external financing for U.S. firms for some years,¹ corporate bonds, valued at about \$5 trillion in outstanding amount, has accounted for nearly half of the corporate debt raised in the U.S. in recent years. For bond-issuing firms, reliance on bond financing is even greater, with about two-thirds of their total debt being attributable to corporate bonds and less than one-third to bank loans.² Institutional investors, such as mutual bond funds and insurance companies increasingly supply the majority of capital to these firms—either directly through bond financing, or indirectly through investing in securitized loans. Overall, institutional bond investors play an increasingly important role as primary creditors to the firms in the economy. Nevertheless, to the best of our knowledge there is scant evidence on the bond investor base of the firms, that is, on the holders of the firm’s bonds and effects their characteristics have on the firm’s financing choices. This paper aims to fill that gap using a novel dataset that links individual firm’s financing choices and leverage to the characteristics of investors who hold the firm’s bonds.

In particular, we analyze the firms’ bond investor bases, or clientele,³ and investigate whether the investment horizon of the bond investor bases affect the firm’s financing choices and the resulting leverage. In doing so, we aim to fill a gap in the extant literature, which offers conflicting views on the importance of bond investor bases and which provides scant, if any evidence on their makeup or their actual behavior. Specifically, the theory of the firm’s choice between bonds and bank loans often

¹ Rajan and Zingales (1995) report that external financing consisted entirely of debt for the U.S. companies in the period 1984-1991, with net equity issuance being slightly negative (due to repurchases).

² See Section 3.

³ Our use of the term “investor base” echoes that of “clientele” in the earlier literature, though our object of study is quite distinct. In the literature on the firm’s dividend payout policy (e.g., Elton and Gruber, 1970) the term “clientele effect” refers to that defined by Miller and Modigliani (1961). We eschew the use of the term “clientele” so as to avoid confusion with this literature. Namely we provide some of the first empirical evidence on the bond investor base, as opposed to the equity investor clientele based on tax rates. More recently, Kim and Stulz (1988) use the term “clientele” in the context of the Eurobond market in the 1980’s. Our study is more closely related to their work, with the emphasis on the firm’s existing bond investors.

characterizes bond investors as numerous, transient, and having arm's length transactions with firms that are based on publicly available information, while banks are characterized as having long-term relationships with firms, including access to private information, which lead to their uniqueness as monitors and information producers.⁴ In both theoretical and empirical studies,⁵ the bond investors are often outside the analysis and are implicitly treated as transient and homogenous. This view suggests that the firm's bond investor base has no bearing on the firm's bond issuance behavior and, therefore, no bearing on the overall leverage of the firm.

However, empirically corporate bonds rarely trade and are extremely illiquid compared to stocks and Treasuries.⁶ Infrequency of trades suggests that, contrary to the standard treatment in the theory, bond investors may not be all transient investors. Indeed, in practice there is significant heterogeneity among the bond investors. For example, mutual funds (both pure bond funds and blend funds) are subject to market sentiment and tend to experience large fluctuations in their assets under management, as end investors often chase performance and trade in and out of mutual funds frequently with relatively low transaction costs. They are also subject to market-based runs.⁷ The credit market turmoil of 2008 shows that runs can happen in bond funds as well. In contrast, insurance companies (pension funds) manage large bond portfolios backing their insurance policies (pension plans) and tend to have a longer horizon. The payouts to their policyholders are highly predictable and smooth, and their assets under management

⁴ Berlin and Loeys (1988), Diamond (1991), Chemmanur and Fulghieri (1994), and Bolton and Scharfstein (1996). For other works on the determinants of the firm's choice of type of debt, see James, 1987; Rajan, 1992; Houston and James, 1996; Carey, Post and Sharpe, 1998; Cantillo and Wright, 2000; Hovakimian, Opler, and Titman, 2001; Denis and Mihov, 2004; Gomes and Phillips, 2008.

⁵ Following these stylized facts emphasized in the theoretical literature, empirical studies such as Puri (1996), Gande et al. (1999), Yasuda (2005, 2007), Drucker and Puri (2005) and others examine the informational roles of banks as underwriters and find that banks improve their borrowers' access to capital markets by certifying their values as underwriters, especially for informationally opaque issuers. Faulkender and Petersen (2006) argue that the firm's access to bond markets itself is a significant determinant of the firm's leverage.

⁶ The daily trading volume for U.S. corporate bonds is about \$15 billions, compared to close to \$150 billions for U.S. equity. This is despite the larger outstanding size of the corporate bond markets (\$6.3 trillions bonds vs. \$5.3 trillions equity as of 2008). (Source: www.sifma.org) Goldstein, Hotchkiss, and Sirri (2007) also report that the introduction of TRACE in 2002 increased transparency and liquidity but not trading volumes in the corporate bond market.

⁷ Bernardo and Welch (2004) argue that any negative impact of runs is exacerbated by investor payoff complementarities, where some investors' decisions to withdraw funds first hurt the payoffs of those investors who remain. For a related empirical study of equity mutual funds, see Chen, Goldstein, and Jiang (2007). See also Diamond and Dybvig (1983) and Morris and Shin (1998).

are less volatile and less sensitive to performance. We posit that if investors are non-transient, market frictions exist,⁸ and the firms access the bond market regularly — either for refinancing or new financing needs — then the characteristics of the firm’s investor base may matter.⁹ Firms, aware that short-term investment horizon contributes to the instability of their investor bases, adjust their choices of financing and leverage policies.

We construct two alternative proxies for the investor horizon of the firm’s bond investor base: (i) the average portfolio turnover of investors holding the firm’s bonds, or (ii) the prevalence of mutual funds among the firm’s bondholders as opposed to insurance companies. We then use these proxies to relate the investment horizon of the firm’s bond investor base to the firm’s financing decisions, its overall leverage level, and its maturity choice.

We find that the investment horizon of the firm’s bond investor base is very important in determining the firm’s financing decisions and capital structure. First, we find that the investment horizon has positive and significant effects on the firm’s probability of issuing bonds and commercial paper (CP) while it has negative effects on the firm’s probability of issuing equity and borrowing from banks. We argue that firms respond to an increase in the horizon of their bond investor bases by substituting away from bonds into equity and bank loans.

Second, we find that the investment horizon of the firm’s bond investor base has significant and positive net effects on the leverage in the firm fixed-effect models. This net effect on leverage is quite robust and long lasting. These first two findings are not only statistically significant but also economically relevant. An increase of one standard deviation in the investment horizon increases (reduces) the probability of issuing bonds (equity) by 22% (17%). One standard deviation higher investment horizon is

⁸ Leary (2009) and Lemmon and Roberts (2010) provide evidence supportive of debt market segmentation by exploiting aggregate exogenous shocks to bank loan supply and junk bond supply, respectively.

⁹ If bond investors are transient and supply adjusts quickly, then the investor base of the firm’s outstanding bonds has no bearing on its future financing conditions. Also, if the firms access bond markets very infrequently (e.g., once every 20 years) to meet all their financing needs, then again the current investors’ conditions are unlikely to affect future financing decisions.

related to a reduction in leverage ranging from 1% to 2%. These results hold whether we use market leverage or book leverage as the dependent variable, and whether we use simple or dynamic leverage adjustment models. Furthermore, the results are robust to controlling for the potential endogeneity of the investor-firm matching using geography-based instruments and are in fact strengthened by it.

Third, we show that the impact of investor horizon on the firm's financing choices and leverage is entirely driven by firms with highly concentrated bond investor bases. Specifically, we sort firms based on three alternative dimensions measuring the concentration of investor bases, viz., (i) local bias (proximity of investors to firms), (ii) geographic concentration of investors themselves, and (iii) herding propensity of investors, and show that the investment horizon has significant effects on financing behavior and leverage only for those firms with above average concentration levels. Our interpretation is that bond financing is an especially unreliable source of financing for the firm when it not only faces short-horizon investors but also a narrow and undiversified pool of potential investors. In contrast, the limiting effect of the short investment horizon is mitigated when the firm's investor base is diversified and shocks to investors are not highly correlated.

Finally, we document that the investment horizon affects the firms' choice of debt maturity. Namely, conditional on issuing bonds, a firm faced with a potential demand in the long-maturity (short-maturity) segment characterized by short-horizon investors shortens (lengthens) the maturity of the bonds it issues. Conditional on borrowing from a bank, a firm faced with short bond investment horizon in the long-maturity (short-maturity) category lengthens (shortens) the maturity of the loan it takes out. These findings are consistent with the view that firms respond to a decrease in short-maturity investment horizon (relative to long-maturity horizon) by substituting into both long-term bonds *and* short-term loans.

We are not the first to investigate the role of credit supply and debt market segmentation in capital structure choice. Sufi (2009), Leary (2009), and Lemmon and Roberts (2010)), among others, show one-time aggregate shocks to bank loan or junk bond supply have differential effects on financing and

investment behaviors of affected and un-affected firms. Gan (2007) and Mian (2008) exploit cross-bank variation in exogenous shocks to bank credit supply and examine their effects on lending and firm investments. Neither set of these papers address institutional bond investors—the focus of our study—nor do they examine the effect of the investment horizon of bondholders on the firm’s capital structure choice. Faulkender and Petersen (2006) show that firms with access to bond markets have significantly higher leverage than firms without such access. Our contribution is to highlight the importance of the investment horizon of the firm’s bond investor base in affecting the firm’s *ease of* access to the bond market.¹⁰

Our results also have important policy implications. In the wake of the credit market disaster of the fall of 2008, corporations of all sizes and credit quality faced severe credit freezes in both loan and bond markets. This raised fear among even the largest and most solid firms that they would have difficulty completing new debt financing. Our findings suggest that the investment horizon of the firm’s investor base is an important determinant of the firm’s ease of access to the bond market. Namely, for firms with investor bases that are hit hard by the credit market turmoil and are subject to end-investor withdrawals (e.g., short-horizon mutual funds with heavy exposure to the securitized debt products), the bond market will likely remain an unreliable funding source.¹¹

The rest of the paper is organized as follows. Section 2 details our research questions and empirical approach. Section 3 discusses the data and presents summary statistics. Sections 4 present and discuss the main empirical results. Section 5 concludes.

¹⁰ In the behavioral finance literature, Baker and Wurgler (2000, 2002) and others argue that capital structure is the cumulative outcome of a series of financing decisions in which managers take advantage of temporary market misvaluations, while Welch (2004) argues that managers fail to counteract the mechanistic effects of stock returns on their capital structure and therefore capital structure is almost entirely determined by lagged stock returns. These studies focus on the equity/debt choice, thus not differentiating between distinct sources of debt, such as bank loans and bonds.

¹¹ Manconi, Massa and Yasuda (2010) document that short-horizon mutual funds with heavy exposure to securitized bonds sold corporate bond holdings to meet their liquidity needs at the onset of the financial crisis in 2007, thereby inducing the yields of those corporate bonds to widen.

2 Research Design

2.1 Hypotheses

Does the investment horizon of the firm's bond investors affect its corporate finance? We posit three sets of hypotheses regarding this central question. The first set of hypotheses is about the effect of the investment horizon on the firm's financing decisions and leverage; the second set is about whether the effect of the investment horizon on the firm's choice depends on the concentration of the firm's investor bases; and the third set is about the effects of the investment horizon on the firm's choice of debt maturity.

We first observe that the investment horizon of the firm's bond investors would *not* be a relevant measure of future financing conditions for the firm if it faces a perfectly elastic supply of capital from all (potential) bond investors. Thus, the null hypothesis is that the investment horizon has no effect on substitution patterns across bond, bank and equity financing decisions by the firm. This coincides with the standard assumptions made in the theory about transiency and homogeneity of bond investors. We call this the *Horizon Irrelevance hypothesis (Ho)*.

If, on the other hand, the bond investors are non-transient, heterogeneous *and* their supply of capital is not perfectly elastic in the short run, then, all else equal, a short investment horizon of the firm's bond investors makes the bond market less reliable as a funding source. For example, if the firm's bond investors are subject to market-based runs, or if their assets under management are sensitive to performance and therefore volatile, then they are less likely to provide the capital the firm needs in future financing and refinancing events. We hypothesize that this in turn makes the firm rely less on the bond market as a source of external financing, and by the same token rely more on the equity market and the bank loans.¹² We call this the *Security Substitution Hypothesis (H1a)*.

¹² A potential concern is that the matching between investors and firms is endogenous. We address this potential endogeneity in Section 4.4 with IV estimations.

On the effect of investment horizon on leverage, we similarly postulate the null and the alternative hypothesis. If bond investors are homogenous (with respect to a given firm) and have perfectly elastic supply of capital, then the investment horizon of the firm's bond investor base should not be a relevant measure of the firm's future leverage (*Horizon Irrelevance Hypothesis (H₀)*). In contrast, to the extent that firms respond to the rise in the investment horizon by substituting between bond, equity, and bank loans, the net effect of horizon on the firm's leverage should be positive for two reasons. First, the equilibrium level of substitution between bank loans and bonds may be less than perfect. Indeed, on the price side, the literature suggests that bank loans are more expensive than bond financing due to the cost of delegated monitoring (Diamond, 1991). Furthermore, on the quantity side, banks may ration the amount of loans they provide to a given borrower (Petersen and Rajan, 1994). If either mechanism is at work, a decrease in the horizon of the firm's bond investor base may result in less than one-to-one substitution towards loan markets, which implies reduced leverage. Second, to the extent that firms have relatively cheap access to equity financing, there may be an optimal level of substitution toward equity when the investment horizon of the firm's bond investors shortens, further reducing the leverage. We call this the *Net Leverage Effect Hypothesis (H_{1b})*. *H_{1a}* and *H_{1b}* are thus two tests of the same hypothesis about the horizon sensitivity of the firm's financing policy.

The effect of the bond investor horizon on the firm's financing choices and leverage depends on the diversity of the firm's investor base. When is the limiting effect of short horizon particularly costly to the firm? The short horizon of its bond investors exposes the firm to the risk of not being able to raise the funds it needs in the future, thus forcing it to either forgo profitable investment opportunities or, worse, default on outstanding debt and/or go bankrupt. This risk is mitigated to some extent if the shocks to individual institutions among the firm's investor base are not highly correlated. Then, while each investor may be volatile in their potential supply of capital, the firm benefits from diversifying across a pool of

investors whose idiosyncratic shocks offset each other in the aggregate. By the same token, the firm's exposure to investors' shocks is costlier when they are highly correlated among the firm's investor base.

This argument predicts that the firm's responsiveness to its bond investor horizon is positively related to the concentration of its bond investor base: firms with an undiversified pool of investors, whose supply of capital is likely to expand and contract at the same time, are expected to respond to the investment horizon of their bond investor bases the most, since they pay the highest cost by exposing themselves to short-horizon investors. For firms whose investor bases are diffuse, on the other hand, short horizon is not as costly, since one investor's negative shock is likely to be canceled out by another investor's positive shock. We call this the *Mitigating Effect of Diversification Hypothesis (H2)*. Note that this hypothesis applies to the horizon-sensitivity of both financing decisions and leverage.

The third set of hypotheses is related to the maturity structure of the firm's debt. We posit that, if firms respond to the bond investor horizon in making financing decisions, then the horizon is also a determinant of the firm's choice of debt maturity. If, for example, the firm faces a short horizon in the long-maturity category (relative to that in the short-maturity category), then it chooses jointly whether to issue a bond or take out a loan, and also at what maturity. If the firm decides to issue a bond, it then finds it optimal to substitute away from the long-maturity and into the short-maturity category. If the firm decides to borrow from a bank, on the other hand, the relative decrease in long-term bond horizon is expected to have a positive effect on the maturity of the loan. The literature has shown that bonds have longer maturities than private debt in general.¹³ Therefore, to the extent that a new bank loan is taken out to substitute for a bond due to a decrease in the bond investor horizon, the maturity of the loan should be longer than it would be otherwise. To summarize, conditional on issuing a bond, a decrease in the long-maturity bond horizon (relative to short-maturity bond horizon) shortens the bond maturity. Conditional on borrowing from a bank, a decrease in the long-maturity bond horizon (relative to short-maturity

¹³ For example, Guedes and Opler (1996) report that the mean maturity of corporate bonds in their sample is 12 years, and Berger, Espinosa-Vega, Frame, and Miller (2005) report that the mean maturity of loans in their sample is less than 2 years.

horizon) lengthens the loan maturity. We call this the *Maturity Substitution Hypothesis (H3)*. The null is again the *Horizon Irrelevance Hypothesis (H0)*, which predicts that maturity-specific bond investor horizon has no effects on the maturity of bonds or loans.

2.2 Empirical Proxies

We now define the proxies we will use to test our hypotheses. The source of the data is described in the next section. We need empirical measures of (i) the investment horizon of the firm's bond investor base and (ii) investor base concentration. We construct two alternative measures of investment horizon: (i) the average turnover rate of the firm's bond investors and (ii) the share of mutual funds among the firm's bond investors. The first measure is based on turnover, which (inversely) captures the historical trading horizon of investors. Intuitively, long-term horizon investors are more stable in their potential supply of capital, whereas the supply of capital by short-horizon investors tends to fluctuate more due to their active trading styles.¹⁴ High turnover portfolios are also associated with high sensitivity of flows to performance and to market sentiment, which contributes to short horizon.¹⁵

Following the literature, we first measure a turnover at the institutional investor level *using all the bonds held by the investor*, not just the bond issued by the firm. We then aggregate the measures thus constructed across *all the investors* who own the firm's bond to arrive at the firm-specific measure of its investors' investment horizon. This two-step construction method alleviates the potential concern that the horizon measure picks up any firm-specific factors that affect the firm's demand for bonds. In other words, it is unlikely that a change in some unobserved characteristics of a single firm has a significant impact on this measure. The mean (median) number of bonds in investors' portfolios is 94 (47); the mean

¹⁴ By definition, a short-term investor buys and sells his investments frequently, while a long-term investor holds his positions unchanged for a longer period of time. This implies that bonds held primarily by short-term investors are more likely to experience higher turnover than bonds held mainly by long-term investors.

¹⁵ Carhart (1997), Barber and Odean (2000), Gaspar, Matos and Massa (2005), Chen, Harford and Li (2007), Derrien, Kecskes and Thesmar (2009).

(median) Herfindahl index of investors' portfolios is 8.5% (3.3%). Thus, investors' portfolios are on average well-diversified and an impact of single bond is negligible.

In the first step, we calculate for each institutional investor a measure of how frequently he rotates his positions on all the bonds in his portfolio ("churn rate"). It is measured as the aggregate purchases and sales of bonds divided by the average of bond holdings. If we denote by Q_j the set of bonds held by investor j , the churn rate of investor j at quarter t is:

$$CR_{j,t} = \frac{\sum_{i=1}^{Q_j} |V_{i,j,t} - V_{i,j,t-1}(1 + R_{i,t})|}{\sum_{i=1}^{Q_j} \frac{V_{i,j,t} + V_{i,j,t-1}}{2}}, \quad (1)$$

where $R_{i,t}$ and $V_{i,j,t}$ represent the total return and the par amount of bond i held by investor j at quarter t .¹⁶ In the second step, we use individual investors' churn rates to construct a measure of average investment horizon of bond investors for an issuing firm. Let S_i denote the set of investors which own bond i , and let $w_{i,j,t}$ denote the weight of investor j 's holding in the total percentage of bond i held by institutional investors at quarter t . The turnover of bond i is the weighted average of the total portfolio churn rates of its investors in the previous four quarters:

$$Turnover_{i,t} = \sum_{j \in S_i} w_{i,j,t} \left(\frac{1}{4} \sum_{r=1}^4 CR_{j,t-r+1} \right). \quad (2)$$

The second measure of investment horizon uses the information on the identity of individual bondholders and captures the prevalence of mutual funds among a given firm's existing bondholders. This is based on the idea that the investment horizon is related to the institutional arrangements between

¹⁶ In each quarter, we exclude investors entering the sample for the first time, since they will automatically have a churn rate of 2. If the return of a particular bond issue is missing, we replace it with the median return of similar bonds with the same maturity and credit ratings. We also excluded from the sample any bond-quarter observation where the turnover exceeds 2. Such high turnovers are likely caused by bonds reaching maturity or experiencing downgrades. If there are multiple outstanding bond issues for a firm in a given quarter, we use the median value to proxy for the firm's general bond investor turnover.

asset managers and end investors. Stronger withdrawal rights are related to more volatile fund flows and thus, in the equilibrium, to shorter the investment horizon. For example, mutual fund investors have more flexibility and face lesser penalties in withdrawing funds from their accounts compared to insurance contract holders. Also, employee-defined contribution plans usually have a long-term orientation, while retail open-ended mutual funds tend to be more short-term oriented (Jin and Kogan, 2005). Tactical reasons – i.e., frequent money inflows and outflows (Edelen, 1999) – also justify a shorter horizon. In unreported analysis, we study the impacts of Hurricane Katrina and the GM downgrade on end-investor withdrawal decisions and confirm that mutual funds’ bond portfolios are more sensitive to exogenous shocks than those held by insurance companies and pension funds. On the basis of these considerations, we define the second measure of investment horizon as:

$$\text{Mutual Fund Fraction}_{i,t} = \frac{\text{fi rm's bonds held by mutual funds}_t}{\text{fi rm's bonds held by all investors}_t}. \quad (3)$$

We use three empirical measures of the concentration of the firm’s bond investor base: (i) *local bias* (proximity of investors to firms), (ii) *investor herding* and (iii) *investor geographical clustering* (concentration). To define Local Bias, we begin by dividing the 50 U.S. states into seven areas. *Home area raw ownership*_{*i,t*} is the percentage of firm *i*’s bonds owned by the home area investors (Coval and Moskowitz, 1999, 2001). *Local bias* is defined as the difference between the *home area raw ownership* and the fraction that *would be* held by home area investors under the assumption that each investor holds the market portfolio. As reported in Table I, Panel A, home area investors hold on average 33% to 38% of the firm’s bonds: the home bias is on average 14% to 15%, and is highly significant. Thus the ownership of corporate bonds by institutional investors exhibits significant local bias.¹⁷

To define *investor herding*, let $B_{i,t}$ ($S_{i,t}$) denote the number of investors who buy (sell) bond *i* at quarter *t*. Then the herding measure (HM) is expressed as:

¹⁷ See Massa, Yasuda, and Zhang (2009), Becker (2007), and Mian (2006) for related evidence.

$$HM_{i,t} = |p_{i,t} - E[p_{i,t}]| - E|p_{i,t} - E[p_{i,t}]|, \quad (4)$$

where $p_{i,t} = B_{i,t}/(B_{i,t} + S_{i,t})$ is the proportion of all investors trading issue-quarter i, t that are buyers.¹⁸

In Panel B, we report statistics on (i) the degree to which home area investors herd with other home area investors on home area bonds and (ii) the degree to which non-home area investors herd with other non-home area investors on home area bonds. As shown in the first column, home area investors herd with each other (0.172).¹⁹ Non-home area investors also herd with each other (0.129), but home-area investors herd significantly more than the non-home area investors. In other words, within each home area, investors herd more when buying and selling their local area bonds.

Investor geographical clustering captures the proximity of institutional bond investors to each other. We apply clustering analysis (Hartigan, 1975) and measure the extent to which investors are concentrated in particular local clusters.²⁰

In Panel C, we use these measures of concentration to relate concentration of investor bases to the likelihood of buy-sell trade imbalances. We define the *buy-sell trade imbalance* $_{i,t}$ for firm i 's bond at period t as the difference between the sum of (the absolute values of) net position changes for buyer investors and seller investors divided by the total holdings of the bond by institutional investors. Intuitively, it captures how much net excess buying or net excess selling the firm's bond experiences as a

¹⁸ The construction of the variable follows Grinblatt, Titman and Wermers (1995). The first term represents the "extra" portion of investors buying a particular bond issue during a given quarter relative to the expected proportion of buyers. The second term is an adjustment factor allowing for random variation around the expected proportion of buyers under the null hypothesis of cross-sectional independence among trades by institutional investors.

¹⁹ Note that the degree of herding is measured here for a region (either a home area or a non-home area). Thus, for a given bond, it is possible that investors in a region are net buyers or sellers in a given period, since a buyer in a given trade is not necessarily matched to a seller within the same region.

²⁰ We take a set of investors investing in a given rating category (e.g., BBB) and partition them into 10 clusters based on their geographical distances from each other. For rating category k at quarter t , let $n_{m,t}^k$ be the number of investors within cluster m ($m=1, \dots, 10$) and $v_{m,t}^k$ be the total holdings value of cluster m investors. Then, the geographical clustering (GC) for bond i that belongs to rating category k at quarter t is defined as

$$GC_{i,t} = \sum_{m=1}^{10} \left(\frac{n_{m,t}^k}{\sum_{m=1}^{10} n_{m,t}^k} \right) * \left(\frac{v_{m,t}^k}{\sum_{m=1}^{10} v_{m,t}^k} \right)$$

fraction of the total bonds held by institutional investors. We expect that the higher the fraction, the higher the potential gap in capital supply.

The results indicate that the buy-sell trade imbalance is significantly higher when (i) there is more local ownership, (ii) investors are clustered geographically closer, and (iii) investors herd more with each other. These results are consistent with the notion that, for issuers with highly concentrated investor bases, there exist higher correlations of shocks among the investors and a higher chance that the credit provided by their existing investors deviates from the amount that the firm needs at future financing events.

3 The Data

Our data come from multiple sources. We construct the proxies for investment horizon using Lipper's eMAXX fixed income database. It contains details of fixed income holdings for nearly 20,000 U.S. and European insurance companies, U.S., Canadian and European mutual funds, and leading U.S. public pension funds. It provides information on quarterly ownership of more than 40,000 fixed-income issuers with \$5.4 trillion in total fixed income par amount (both public issues and private placements) from the first quarter of 1998 to the second quarter of 2005. We supplement the Lipper data with bond returns from Bloomberg. We merge the Lipper dataset with the CRSP/Compustat database. We only include firms with complete information on bond turnover and book assets for at least 5 years during the period from 1998 to 2005. We exclude financial firms with an SIC code between 6000 and 6999, firms with a book asset value of less than \$10 million, firms with market-to-book ratio larger than 10, and firms with market leverage or book leverage greater than 1. Our primary sample consists of 4,563 firm-year observations.

Our sample of public bond and equity issues is drawn from the SDC global new issues database for the years 1999-2005. We obtain individual loan-transaction data from Loan Pricing Corporation (LPC)'s Dealscan database for the years 1999-2005. We select only completed and confirmed transactions. The

majority of these deals consist of term loans and revolving lines (about 75% of the sample). Nearly 20% of the sample is 364-day facilities; importantly, most of them are used to back up the issuance of CP (i.e., LPC reports the primary purpose of these loans as CP backup). We refer to deals of this type as the CP backup line of credit and distinguish them from the rest of the deals.

In merging the Lipper data with the SDC and LPC data, we require the firm-year proceeds to be at least \$10 million for each type of financing; if one firm has multiple deals of the same type in a year, we aggregate the issuance amount and treat them as a single observation. This results in 600 firm-year observations for bonds, 341 firm-year observations for equity issues, 362 firm-year observations for CP backup lines of credit, and 1,124 firm-year observations for bank borrowing.²¹ Using this merged dataset we construct a number of firm characteristics (see Appendix for variable definitions).

Descriptive statistics are reported in Table II and Figure 1. As shown in Table II, the mean horizon (measured here as bond turnover), averaged over the 4,563 firm-year observations, is 0.31, which is much lower than the mean stock turnover (0.68). Since the turnover inversely captures horizon, this implies that on average bond institutional investors are longer-horizon investors than equity institutional investors. While the mean is low, this measure has a much higher standard deviation (0.15) than the stock turnover (0.06). The standard deviation reported here is for bond-quarters and thus reflects both cross-firm and within-firm (cross-time) variation. The average standard deviation of turnover in a cross section (average over time) is 0.14, or 47% of the mean. The average within-firm standard deviation of turnover (average across firms) is 0.06, or 18% of the mean. Thus, cross-section variation is about twice as large as the timer-series (within-firm) variation for the turnover measure. In contrast, cross-section variation is nearly four times as large as the timer-series (within-firm) variation for the mutual fund fraction measure. Thus, while the two measures of investment horizon are related, they are also different in that the variation in

²¹ If the firm taps multiple security types in a given period (e.g., firm A issues a bond *and* borrows from a bank), we count that firm-year as both a bond-issuance observation *and* a bank-borrowing observation. The results are robust to dropping these firm-years in which the firm taps multiple security types from our analysis; in fact, the results actually become stronger, which is consistent with these observations being noisier ones.

the mutual fund fraction measure is mostly cross-section driven, whereas the variation in the turnover measure is driven by both heterogeneity across firms and time-series changes within firms. These distinctions are important when we use geography-based instruments to address endogeneity (Section 4.3).

Figure 1-1 presents the turnover by funds type and year. Consistent with our construction of the mutual fund fraction as an alternative measure of the investment horizon, we find that mutual funds have much higher turnover than insurance companies. Figure 1-2 further shows that, among the sample investors, insurance companies hold approximately sixty percent of the par amounts, mutual funds about thirty percent, and pension funds about ten percent. This composition holds relatively steady over time. However, as shown in Figure 1-1, the turnover overall and that of mutual funds and pension funds decline over time. Figure 1-3 further plots the average turnover against the new corporate bond issue amount. As the aggregate turnover declines over time, the new issue amount increases significantly, which is broadly consistent with our hypothesis at the economy level. Figure 1-4 shows that the par amounts of bonds held by the sample institutional investors represent approximately half of the outstanding bonds. Table II also shows that the mean institutional bond-to-corporate debt ratio (bonds held by the sample institutional investors divided by *total* corporate debt — the sum of loans and bonds) is 0.33.²² These two numbers imply that on average these bond issuers' corporate debt consists of about two-thirds bonds and one-third bank loans. The mean market and book leverage is 0.33 and 0.32, respectively. The mean bond maturity (averaged over the 947 bonds in the sample) is 10.14 years, in contrast to the mean bank loan maturity (averaged over the 1,309 bank loans in the sample) of 3.5 years.²³

4. The Estimation Results

4.1 *The Firm's Financing Choice Model*

²² While a better measure would be the institutional investors' bond holdings divided by the total outstanding bond issue amounts, the latter amount is not available from Compustat. Compustat instead reports the total corporate debt.

²³ The shorter maturity of loans relative to bonds is consistent with previous findings reported in the literature. Note that the numbers of bond issues and bank loans reported here for the purpose of calculating average maturities are larger than the number of firm-years in which we report positive incidence of bond issuance and bank loans. This is because some firms issue multiple bonds (or receive multiple bank loans) in a given year.

We start our analysis with the firm’s financing choice model. To test the *Security Substitution Hypothesis (H1a)*, we estimate a series of binary probit models of the firm’s issuance choices, examining one security choice at a time.²⁴ To test the *Benefits of Diversification Hypotheses (H2)*, we split the sample into those with above average and below average levels of (i) local bias, (ii) herding propensity, and (iii) geographic clustering of investors, and estimate the model separately for the six subsamples.

4.1.1 The Firm’s Probability of Issuing Bonds

We model the firm’s decision to issue bonds as a function of the bond turnover (our baseline measure of horizon) and a set of control variables. The baseline model uses the following probit model specification:

$$\text{Bond Issue Choice}_{i,t} = \beta' X_{i,t-1} + \text{horizon}_{i,t-1} \delta_{bond} + \text{industry dummies}_{j_i} \beta_j + \text{year dummies}_t \beta_t + \text{credit dummies}_{k_i} \beta_k + \text{location dummies}_{l_i} \beta_l + \varepsilon_{i,t}, \quad (5)$$

where the dependent variable is a dummy taking the value of 1 if the firm is a new bond issuer in year t and 0 otherwise. The controls are: *Bond flow*, *institutional bond-to-corporate debt ratio*, *stock turnover*, *stock flow*, *stock holding fraction*, *abnormal return*, *Amihud’s illiquidity* (Amihud, 2002), *stock return volatility*, *asset tangibility*, *asset size*, *profitability*, *R&D expenditure*, *Altman’s z-score* (Altman, 1969), *asset maturity*, *capital expenditure*, *market-to-book ratio*, and *industry-average book leverage*. We also include credit rating dummies, year dummies, 2-digit SIC industry dummies, and location dummies.²⁵ The variables are measured as lagged values from the previous year. For a detailed description of their construction, we refer to the Appendix.

Equation (5) represents the baseline model for the firm’s bond issuance decisions; for alternative financing decisions, we replace the dependent variable with the corresponding bank borrowing dummy variable, equity issuance dummy variable, and CP issuance dummy variable.

²⁴ The results are robust to using a multinomial choice model framework. These are available upon request.

²⁵ We do not include macroeconomic variables in our regressions since they will be captured by the year dummy variables.

The bond issuance results are reported in Table III. Column (1) reports the full sample results; Columns (2)-(7) present the subsample results. All of the specifications include industry dummies, year dummies, location dummies, and credit rating dummies, and the errors are clustered at the firm level.

Several findings are noteworthy. First, the results in column (1) indicate that there is a significantly positive relation between the firm's likelihood to issue bonds and the investment horizon of the firm's bond investors. An increase of one standard deviation in the horizon increases (the turnover decreases) the probability of issuing bonds by 22%.²⁶ This supports the *Security Substitution hypothesis (H1a)* and shows that the shorter horizon induces a shift away from bond finance. The signs of the other control variables are as expected: firms that have high stock turnover, high stock return volatility, or high z-score (distance from financial distress) are less likely to issue a bond, whereas firms that experience high abnormal return, or have large asset size, high asset tangibility, high capital expenditure, or high book leverage are more likely to tap the bond market. The coefficient on the *institutional bond-to-corporate debt ratio* is negative and significant.²⁷

Second, the results in columns (2)-(7) indicate that the effect of investor investment horizon on the firm's bond issuance choice is driven by firms with highly concentrated investor bases – i.e., firms with high local ownership (column (2)), firms whose investors herd more (column (4)), and firms whose investors are located close to each other (column (6)). These results support the *Benefits of Diversification Hypothesis (H2)*.²⁸

4.1.2 The Probability of Issuing Equity

²⁶ The marginal effect (dP/dX) of the turnover on the probability of bond issuance in the probit model is -0.106. Thus, one standard deviation change (0.15 from Table II) in the variable leads to a decrease in the issuance probability by $-0.106 \times 0.15 = -0.0159$ (-1.59%), which accounts for 22% (1.59%/7%) of the predicted probability at the sample mean (7%).

²⁷ Note that the fewer bank loans the firm has, the larger this measure would be, since its denominator is the firm's total debt outstanding. Thus, it is possible that this measure picks up the amount of slack the firm has in its bank borrowing capacity, thus causing its coefficient to be negative in the bond issuance decision model.

²⁸ In untabulated analysis, we examine the effects of the turnover on the ex ante yield of seasoned bond offerings (SBOs). We find that the offer yield spreads are significantly higher for firms with high turnover investors, while controlling for the standard bond and firm characteristics including size, maturity, ratings, and leverage. Results are consistent with the view that firms with long investment horizon investor bases enjoy low issuance cost while firms with short-horizon investor bases face higher issuance cost.

Table IV presents the results on the firm's choice of issuing equity, for which we used the same model specification and control variables as in the bond issuance model. First, the results reported in column (1) show a significantly negative relation between the decision to issue equity and the investment horizon of the firm's bond investors. The horizon coefficient is also economically significant: one standard deviation higher investor turnover (i.e., shorter horizon) is related to a 17% lower probability of issuing equity. Together with the findings in column (1) of Table III, this supports the *Security Substitution hypothesis (H1a)* and shows that an increase in the turnover (i.e., short horizon of bond investors) induces a substitution away from bond finance toward equity finance. The subsample results (columns (2)-(7)) are consistent with *H2* – i.e., the sensitivity of the firm's financing decisions to the bond investors horizon is higher for firms with more highly concentrated investor bases.

The signs of the other control variables are as expected but are also different from those reported in Table III in meaningful ways: firms that have high stock illiquidity, high profitability (and thus more retained earnings), or long distance to financial distress are less likely to issue equity, whereas firms that experience high stock flow or high abnormal returns, or have large asset size, high capital expenditure, high market-to-book ratio, or high book leverage are more likely to tap the equity market.

4.1.3 The Probability of Borrowing from Banks

We model the firm's choice of borrowing from banks as a function of bond investor horizon and a set of control variables. The results of the baseline models are reported in Panel A of Table V. For brevity, only the coefficient of interest, bond investor turnover (as an inverse measure of horizon), is reported; the model specification is the same as for the bond and equity decisions. In column (1), the coefficient on turnover is not significantly different from zero, indicating that there is no substitution between bonds and bank loans in response to an increase in the bond investor turnover. This specification, however, masks the cross-sectional variations among firms with high and low concentrations in their investor bases. In

columns (2)-(7), we find that the positive effect of turnover on the firm's bank borrowing choice is concentrated in subsamples with (i) high local ownership and (ii) high herding.²⁹

In Panel B, we report the results where we exclusively examine the firm's choice to take on term loans. The results are qualitatively similar to those reported in Panel A. In Panel C, we further focus on those cases (firm-years) in which the firm raises debt (i.e., either issues a bond or borrows from a bank) in a given period and examine the firm's choice of public bond versus bank loans. The dependent variable is equal to 1 if it is a bank loan and 0 if it is a bond. The baseline results (column (1)) show a significantly positive (negative) relationship between turnover (horizon) and bank borrowing. When we break down the results into the firm's choice between term loans vs. bonds and its choice between lines of credit vs. bonds (columns (2) and (3)), we find substitution away from bonds toward bank borrowing in both cases, though the coefficient is larger with term loans than with lines of credit.³⁰

In general, bonds are issued at longer maturities than bank loans. In order to make bank borrowing and bond issuing more comparable, we consider an alternative specification where the dependent variable is a dummy taking a value of 1 if the firm is borrowing from a bank with debt maturity longer than 3 years and 0 if the firm issues a bond with maturity longer than 3 years. The results are reported in columns (4)-(6) of Panel C. They show a stronger positive (negative) relationship between the probability of bank borrowing and the turnover (horizon) measure in the bond market. In particular, a one standard deviation increase in turnover (decrease in horizon) raises the probability of borrowing from banks by 9%. Taken together, the results in Panel C suggest that firms prefer to substitute for bonds with loans of

²⁹ The signs of other control variables (unreported but available upon request) are largely consistent with the theory: firms that experience high stock flow, or that have high R&D expenditures or long distance to financial distress are less likely to borrow from banks, whereas firms that have large asset size, or high profitability are more likely to borrow from banks. The negative and significant coefficient on the R&D expenditure in particular is interesting: one interpretation is that firms that engage heavily in R&D are risky firms that prefer arm's length financing to bank financing (e.g., Rajan (1992)).

³⁰ The signs of the control variables (unreported) are interesting. Larger firms are more likely to issue bonds than to borrow from banks, which is consistent with Diamond (1991) who argues that firms with higher reputation and longer credit history (both of which are picked up by the firm size) do not need bank monitoring and prefer cheaper bond finance. High R&D firms are more likely to issue bonds than to borrow from banks, which is again consistent with Rajan (1992). Firms with high stock return volatility are less likely to issue bonds than to borrow from banks, which is consistent with the negative coefficient on stock return volatility in the bond issuance choice model in Table III.

similar maturity; that is, the substitution effect of horizon could affect the firm's choice of maturity in a given debt instrument segment. We examine this question further in Section III.D.

To conclude, the overall results reported in Table V strongly support the *Security Substitution Hypothesis (H1a)* and the *Benefits of Diversification Hypothesis (H2)*: There is substitutability between bond and bank loans, and the effect of horizon is driven by firms with highly concentrated investor bases.

4.1.4 The Firm's Probability of Issuing CP

Since CP is a form of public debt, we posit that the effect of bond investor turnover (bond investment horizon) on the firm's probability of issuing CP is negative (positive) (*H1a*). While we do not directly observe CP issuances,³¹ we use a proxy for them that we obtain from the Dealscan loan database. Banks frequently provide what is known as CP backup lines of credit (Gatev and Strahan, 2006), a form of insurance to CP issuers. These lines of credit are used as liquidity insurance in case the firm is unable to refinance its CP upon maturity. We estimate equation (5) as it applies to the firm's choice of issuing CP. The dependent variable is a dummy taking a value of 1 if the firm acquires a CP backup line of credit during a year and 0 otherwise.

The results are reported in Table VI. There is a strong negative (positive) relationship between bond investor turnover (horizon) and CP issuance. In particular, one standard deviation increase in turnover (decrease in horizon) reduces the probability of issuing CP by 61%. Again, in columns (2)-(7), only firms with highly concentrated investor bases respond to an increase in turnover (decrease in horizon) by substituting away from CP markets.

4.2 The Firm's Capital Structure

Having examined in detail the effects of investment horizon on the firm's financing decisions, we now turn to our second central question, i.e., the net effect of bond investor horizon on the firm's leverage. We

³¹ See Kahl, Shivdasani, and Wang (2008) for analysis of the firms' decisions to enter the CP market.

examine the determinants of the firm's leverage using a firm fixed-effect regression approach. Following the literature, we consider both static and dynamic leverage specifications.

4.2.1 The (Static) Effect of Horizon on Leverage

We start with the static leverage specification. The baseline model is:

$$Leverage_{i,t} = \alpha_i + \beta' X_{i,t-1} + horizon_{i,t-1} \delta_{leverage} + \text{industry dummies}_{j_i}' \beta_j + \text{year dummies}_t' \beta_t + \text{credit dummies}_{k_i}' \beta_k + \text{location dummies}_{l_i}' \beta_l + \varepsilon_{i,t}, \quad (6)$$

where $Leverage_{i,t}$ is a measure of firm i 's leverage at period t ; α_i is the firm fixed effect; and $X_{i,t-1}$, $Horizon_{i,t}$, and the various dummy variables are as defined before. We examine both book leverage and market leverage and focus on coefficient $\delta_{leverage}$ in equation (6).

The results are reported in Table VII. For brevity we report only market leverage.³² The results with book leverage are consistent. We find a significantly positive (negative) link between leverage and horizon (turnover). That is, firms facing longer horizon (lower turnover) have higher leverage. The results are also economically significant: One standard deviation increase in horizon (decrease in turnover) results in a 1.6% increase in leverage.³³ Moreover, the impact of horizon is stronger for firms with more highly concentrated investor bases, i.e., with (i) higher local ownership, (ii) higher herding, and (iii) higher geographical clustering. These results are consistent with both the *Net Leverage Effect Hypothesis (H1b)* and the *Benefits of Diversification Hypothesis (H2)*.

While these results are in line with our predictions, the model used may not capture the full impact of horizon, because the model assumes that the firm fully adjusts each period to the fluctuations in its bond investors' horizon. Instead, today's leverage may be the result of a series of past decisions in which the past levels of investor horizon played a role. Therefore, following Baker and Wurgler (2002), we define

³² The results using book leverage is qualitatively similar and available upon request.

³³ Because there are firm fixed effects in the leverage models, we use the average within firm standard deviation, which is 0.057, to gauge economic significance. For example, one standard deviation increase leads to $-0.09 \times 0.057 = -0.5\%$ absolute reduction in leverage. Since the sample mean leverage is 33%, this translates to $0.51\% / 33\% = 1.55\%$ reduction relative to the sample mean.

an external finance-weighted horizon that allows us to account for the past cumulative effects of horizons on the current level of leverage. Specifically, for firm i , we construct a measure of External Finance-weighted Bond Turnover ($EFTurnover_{i,t}$):

$$EFTurnover_{i,t} = \frac{\sum_{s=0}^t \frac{e_s + d_s}{\sum_{r=0}^t (e_r + d_r)} Turnover_{i,s}}{\sum_{r=0}^t (e_r + d_r)}, \quad (7)$$

where e_s and d_s denote net equity and net debt issues during year s . Net debt issue is the change in book assets minus the change in book equity divided by book assets. Net equity issue is the change in book equity minus the change in retained earnings divided by book assets. $Turnover_{i,s}$ is the turnover during year s . We then use the lagged value of $EFTurnover$ in our second specification.

We report the results in Table VIII. As before, for brevity we report only market leverage.³⁴ We find a positive (negative) relation between current leverage and horizon ($EFTurnover$). Thus, today's leverage is a function of the bond and equity market conditions in the past. Firms that have experienced periods of short horizon (high turnover) in the bond market in the past have a relatively low leverage today. The result is not only statistically significant, but also economically relevant. An increase of one standard deviation in our measure of external finance-weighted turnover (decrease in horizon) reduces leverage by 1.3%. Moreover, the impact of $EFTurnover$ is concentrated in subsamples with (i) high local ownership, (ii) high herding, and (iii) high investor geographical clustering.³⁵

4.2.2 The Dynamic Impact of Horizon on Leverage

³⁴ The results with book leverage are consistent and available upon request.

³⁵ The signs of other control variables (unreported in case of Table VIII and available upon request) in the (static) leverage regressions are qualitatively similar across different specifications (Tables VII and VIII) and are largely as expected. Consistent with firms taking advantage of buoyant stock market conditions by issuing new equity, firms with high levels of stock flow or high abnormal returns have lower leverage, all else equal. Consistent with high profitability causing the market value of stock to rise, firms with high profitability have lower market leverage, but not lower book leverage. Firms with greater distance to financial distress (as measured by Altman's z-score) have lower leverage. Also, larger firms and firms with a high institutional holding ratio in the stock market have higher leverage. These firm characteristics may proxy for firm risk (or lack thereof). Finally, firms that belong to industries with high leverage (not surprisingly) have higher leverage, all else equal.

One concern with the above model is that firms may adjust leverage dynamically.³⁶ To address this concern, we also estimate the firm's dynamic leverage adjustment model. In particular, we estimate a firm fixed-effect regression of the change in market (book) leverage on the target market (book) leverage adjustments and the shocks to firm's turnover. The goal is to focus explicitly on the adjustment that the firm makes in response to the innovations in turnover. We therefore estimate:

$$\begin{aligned} \text{Change in leverage}_{i,t} = & \alpha_i + \text{Target leverage adjustment}_{i,t} \omega + \\ & \text{Turnover shock}_{i,t-1} \delta_{\text{leverage}} + \text{industry dummies}_{j_i} \beta_j + \text{year dummies}_t \beta_t + \text{credit dummies}_{k_i} \beta_k + \text{location dummies}_{l_i} \beta_l + \varepsilon_{i,t} \end{aligned} \quad (8)$$

where *Change in leverage*_{*i,t*} is firm *i*'s change in leverage from period *t-1* to *t*; our key variable of interest, *Turnover shock*_{*i,t*} is the unexpected component of turnover (defined as the difference between the predicted and actual turnover at *t-1*);³⁷ *Target leverage adjustment*_{*i,t*} is the predicted adjustment in leverage (defined as the difference between the expected level of leverage at *t* and the actual level of leverage at *t-1*).³⁸ The other indicator variables are as before. Since the second-stage model involves generated regressors, which are estimated with sampling errors, we adjust the standard errors using bootstrapping procedures.

We report the results in Table IX. As before, for brevity we report only market leverage. The results using book leverage are consistent. The results show that a positive shock to turnover (negative shock to horizon) reduces leverage. A shock equivalent to one standard deviation increase in (unexpected) turnover (decrease in horizon) reduces the leverage by 1%.³⁹ As expected, the sign on the target adjustment is positive and significant. Taken together, the results indicate that, over and above the usual dynamic

³⁶ See, for example, Leary and Roberts (2005), Hennessy and Whited (2005), and Flannery and Rangan (2006).

³⁷ The expected level of turnover is estimated as the fitted value of a firm fixed effect regression (unreported) of turnover on its previous value and the set of control variables used in the main specification (e.g., equation (7)).

³⁸ The expected level of leverage is constructed as the fitted value of a firm fixed effect regression (unreported) of leverage on the control variables used in the main specification.

³⁹ Since this is a firm fixed effect model, we use the standard deviation of within-firm variation in shocks to turnover, which is 0.037. $0.037 * 0.07 = -0.26\%$ (or $0.037 * 0.05 = -0.19\%$), i.e., a standard deviation increase in the shocks to turnover lowers the change in market (book) leverage by -0.26% (-0.19%). Since the average market (book) leverage is 33% (32%), -0.26% (-0.19%) accounts for 1% (1%) of the mean leverage.

adjustments firms make in order to move toward the target level of leverage, firms also adjust their current leverage levels in response to unexpected changes in horizon. Furthermore, the impact of horizon is concentrated in subsamples with (i) high local ownership, (ii) high herding, and (iii) high investor geographic clustering. These results provide further evidence in support of the hypotheses *H1b* and *H2*.

4.3 Results with an Alternative Measure of Investment Horizon

We now check the robustness of our central findings by replicating the analyses of Sections 4.1 and 4.2 using the *mutual fund fraction*, an alternative measure of horizon. Estimation results of the firm's financing choice and leverage models are presented in Table X. For brevity, only the coefficients and *t*-statistics (in parentheses) for the variable of interest, mutual fund fraction (and its variants), are reported. Though unreported, all the other control variables and dummy variables included in the baseline models (as in Tables III-VII) are also included in the estimations.

The estimation results indicate that our central findings are largely robust to using this alternative measure of horizon. We find that the higher the fraction of bonds held by mutual funds, the less likely the firm is to issue bonds and the more likely it is to issue equity and to borrow from banks. Consistent with the incremental financing results, the firm's market leverage is significantly lower when the fraction of its bonds held by mutual funds is higher. These results are consistent with *H1a* and *H1b*. Moreover, the results for incremental financing choices are driven by firms whose bond investor base is more concentrated. These results are consistent with *H2*. In contrast, the firm is only marginally (at best) less likely to issue CP as a result of higher fraction of bonds held by mutual funds, and its book leverage is not significantly affected by the fraction measure.⁴⁰

⁴⁰ We only indirectly observe CP issuance decisions by the firms through the CP backup line of credit flags, which may drive down the power of our model. As for firm fixed-effect leverage models, the mutual fund fraction measures may not have sufficient within-firm variations, and this may result in attenuation of the book leverage result.

In summary, our central findings with respect to the firm's corporate financing decisions and capital structure are robust to two alternative measures of bond investor horizon, one based on the portfolio turnover, and the other based on the share of mutual funds among the firm's investors.

4.4 Potential Endogeneity of Horizon Measures and IV Estimations

Our specifications include a variety of observed firm characteristics that are relevant demand-driven determinants of the firm's financing choices and leverage, such as R&D expenditure, Altman's measure of distance from distress, credit rating dummies, as well as industry fixed effects, in all of our estimations. We also employ a two-step construction method for the turnover variable, which alleviates the reverse causation concern. Still, there may be some unobserved risk characteristics of the firm that are correlated with our horizon measures and that also affect the firm's financing decisions. In other words, our horizon measure is potentially endogenous.

The direction of the bias depends on the nature of unobserved risk that the horizon measures may proxy for. On the one hand, high-growth firms (e.g., tech firms) are risky and have low leverage. If they are more likely to be held by short-horizon investors, the potential endogeneity biases us *towards* finding our results, so it is a serious concern. In this case, correcting for endogeneity should move the horizon coefficient towards zero. On the other hand, distressed firms are also risky, but tend to be overleveraged. If they are more likely to be held by short-horizon investors, then endogeneity biases us *away* from finding our results, so it is a less serious concern. Moreover, controlling for endogeneity in this case should move the coefficient away from zero and strengthen our results.

To address this endogeneity concern, we estimate our financial choices and leverage models (equations (5), (6) and (8)) using IV specifications. Our choices of instruments are guided by the economic considerations and, in particular, local bias results in Massa, Yasuda, and Zhang (2009). Since bond holdings are significantly locally biased, the relative prevalence of short-horizon investors (e.g.,

mutual bond funds) in the firm's local region is likely to exogenously affect the firm's bond investor base. However, these local investor characteristics have no relation to the firm's demand for credit and thus are uncorrelated with the error terms in the main equation.

Based on this idea, we construct two geography-based instruments and use them in our IV estimations of the main models. Our first instrument is the *high local mutual fund fraction dummy*, which captures the prevalence of mutual funds among all the local investors.⁴¹ If the firm is located in an area that is heavily populated by mutual funds (relative to other institutional bond investors), the firm is more likely to be held by mutual funds, all else equal. Thus we expect this variable to be correlated with the investment horizon of the firm's bond investors overall, but not correlated with the firm's demand for debt.

Figure 2 plots how the prevalence of mutual funds among local bond investors varies geographically within the contiguous U.S. states. The fractions of mutual funds among local investors are categorized into high, low, and medium for a given local area. Mutual funds are relatively prevalent (as fractions of all local investors) in the Northeast, Coastal California, as well as pockets of midland America, and are comparatively less important as sources of local funds in the South, Northwest, and in many of the Midwestern states. We exploit this geographic variation in the prevalence of mutual funds, which have shorter investment horizon than insurance companies, to instrument for our firm-level horizon measure.⁴²

The necessary identifying restriction for this variable to be a valid instrument is that the firms' choice of headquarters location is not correlated with prevalence of certain types of investors in the home area. Since firms typically do not start issuing bonds until they are quite mature, we think it is reasonable to assume that firms do not consider proximity to bond institutional investors when choosing where to locate at the time of founding.⁴³ We find that not only is this instrument significantly correlated with the firm's horizon measures, but also that it is a "strong" instrument in the sense of Staiger and Stock (2005), i.e., its

⁴¹ See the Appendix for the detailed definitions of each of the instrument variables.

⁴² See Becker et al. (forthcoming) and Becker et al. (forthcoming) for use of geographic variation as instruments in other studies.

⁴³ This is in sharp contrast to, for example, start-ups' location choices relative to locations of VCs (they often explicitly choose to be located within driving distance of each other).

first-stage F -statistic exceeds the rule-of-thumb threshold of 10 (reported in Table XI). We thus use this instrument in the MLE estimation of the IV probit model for equation (5).

This instrument, however, varies relatively little over time for a given firm, so it has only weak correlation with within-firm variation in the turnover measure in the firm fixed-effect leverage models of equation (6). In particular, its first-stage F -statistic is less than 10.⁴⁴ Similarly, the makeup of local investors (mutual funds vs. insurance companies) varies relatively little over time, so while it is a good instrument for capturing the predominantly cross-sectional variation of the turnover measure in the bond-quarters pooled regression of Equation (5), it is not a sufficiently strong instrument for capturing the within-firm, time-series variation of the turnover measure in the fixed-firm regression of Equation (6).

Thus, in the firm fixed-effect leverage models, we employ a second instrument, *local turnover*, in conjunction with the *high local mutual fund fraction* dummy, to meet the strong-instrument criteria. This second instrument captures the value-weighted average of the turnover among all the local investors and has more significant variations over time. These two instruments are significantly correlated with the within-firm variation of the turnover (across time), and their joint first-stage F -statistic exceeds 10. Thus, they are strong instruments for the firm fixed-effect models of equation (6). Moreover, they also meet the overidentification criteria in the leverage models (p -values reported in Table XI, Panel B).

The IV estimation results are presented in Table XI. Standard errors are adjusted for estimation errors and reported with the degrees of freedom adjustment for fixed effects (in cases of leverage models). Not only horizon retains its effect on the firm's financing choices and the overall leverage, but also the size of the coefficient increase by a factor of between 4 and 10. We rule out the possibility that this is due to weak instruments by aforementioned first-stage F -statistics exceeding 10. A likely explanation for the difference in the coefficient is that our horizon measure is a noisy measure of the true investment horizon of the firm's bond investors and the increase in the coefficient is the result of a reduction in the standard

⁴⁴ Recall from Section 3 that the variation in the mutual fund fraction measure is chiefly cross-sectional, whereas the variation in the turnover measure is driven by both cross-section as well as time-series variation within firms.

attenuation bias present when variables are measured with error. If this is the case, the true economic effect is closer to the IV estimates, which suggests a much larger result. For example, the IV results suggest that one standard deviation increase in the horizon (0.057 for the within firm average) leads to -4% (-2%) absolute reductions in the market (book) leverage, as compared with the only -0.5% (-0.3%) absolute reductions that the non-instrumented models (Table VII) suggest.

Alternatively, it is possible that — test of overidentifying restrictions notwithstanding — our instruments (local investor attributes) are not orthogonal to the firm’s financing and leverage decisions, but pick up some local economic conditions that affect the firm’s capital structure. Though we view this as a highly remote possibility, we acknowledge that we cannot definitively rule it out and thus regard the IV estimates as upper bounds.

In sum, we conclude that the baseline model results reported in Tables III-X form the lower bounds, and the IV model results reported in Table XI form the upper bounds for the effects of bond investors’ investment horizon on the firm’s financing choices and leverage.

4.5 The Choice of Debt Maturity

In this section we consider the effects of horizon on the firm’s choice of debt maturity (*H3*). We estimate a series of two-stage switching regression models (Maddala, 1983) of bond and bank loan maturities on the horizon measure and a set of control variables. In particular, we construct two different measures of turnover based on the maturity of the debt: the long-term bond turnover and the short-term bond turnover.

We specify the baseline model as follows:

$$Maturity_{n,i,t} = \beta' X_{i,t-1} + Turnover(long - short)_{k_i,t-1} \delta_{maturity} + \text{industry dummies}_{j_i} \beta_j + \text{year dummies}_t \beta_t + \text{credit dummies}_{k_i} \beta_k + \text{location dummies}_{l_i} \beta_l + \varepsilon_{i,t} \quad (9)$$

$Maturity_{n,i,t}$ is the maturity of the bond or bank loan n issued by firm i in year t ; $X_{i,t-1}$ is the control firm and debt characteristics, measured in the fiscal period immediately prior to the debt issue date;

$Turnover(long - short)_{k_i, t-1}$ is the difference between the turnover of long-term bonds and that of short-term bonds in firm i 's rating category k_i , measured in the period immediately prior to the debt issue date; and the various dummy variables are as defined before.

Since not all firms have both long and short-term bonds outstanding in a given period, we are not able to construct these maturity-specific horizon measures at the firm level. Instead, we calculate the value-weighted average of bond turnover across all the institutional investors with holdings in each rating-maturity level. “Short-term bond turnover” is the median of these rating-specific turnovers for bonds with maturity less than 3 years for each rating category from AAA to NR (10 categories total). “Long-term bond turnover” is the median of these turnovers for bonds with maturity longer than 5 years for each rating category. Our key variable, $Turnover(long-short)$, is the difference between the two measures in a given rating category. To address the potential endogeneity of debt instrument choice, we run an (unreported) first-stage regression of bank loan vs. bond binary probit choice model and include the inverse Mill's ratio (Heckman's lambda) in the second-stage regression. The second-stage model is specified as in equation (9). To see whether horizon affects the firms' choice of debt maturity, we will focus on the coefficients $\delta_{maturity}$ in equation (9).

The results are reported in Table XII. Panel A reports the maturity choice model estimation results for the bond sample; Panel B reports the maturity choice estimation results for the bank loan sample (both term loans and lines of credit included); Panel C reports the maturity choice estimation results for the bank loan sample where only term loans are included.

The results show that an increase in the long-term bond turnover (relative to the short-term bond turnover) shortens the maturity of bonds issued, whereas it lengthens the maturity of bank loans borrowed. The results are not only statistically significant, but also economically relevant: An increase of one standard deviation in $Turnover(long-short)$ (decrease in horizon) shortens the bond maturity by 10% and lengthens the loan maturity by 8% (12% for the term-loan only sample in Panel C). The larger magnitude

of the turnover coefficient in the bond sample (Panel A) is consistent with the generally longer maturity of bonds relative to bank loans (see Table II): There is a wider range of maturity to choose from when the firm considers the optimal maturity length for a bond. By the same token, the coefficient on *Turnover(long-short)* is larger in Panel C than in Panel B, since term loans vary more in their maturities than lines of credit. As in the previous specifications, the impact of horizon on maturity is stronger for firms with highly concentrated investor bases.

The signs of the control variables are interesting. Firms with higher stock return volatility (a measure of risk) issue shorter-maturity bonds, whereas firms with higher asset tangibility or larger firm size issue longer-maturity bonds. In the bank loan sample, firms with high profitability and higher book leverage borrow at longer maturity, whereas high R&D firms borrow at shorter maturity. These results suggest that better credit quality (i.e., lower default and higher loss recovery rate) is generally associated with longer maturity in the sample. Somewhat surprisingly, a higher institutional holding ratio in the stock market is positively associated with loan maturity, whereas asset maturity is negatively associated with it.

To summarize, the results of the debt maturity choice model estimations are generally consistent with hypotheses *H3*. The signs of the effects are opposite in the two markets, which suggests that when the long-term bond turnover increases (relative to the short-term bond turnover), the firm avoids the exposure either by issuing short-term bonds (thus shortening the maturity of bonds issued) or by borrowing from banks at long maturity (thus lengthening the maturity of the loans taken).

4.6 Discussion

We now consider four alternative explanations for the main results (both leverage and financing choice results). One possibility is that the investment horizon merely captures overall capital market conditions. To rule out this interpretation, we include time fixed-effects (year dummies) in all model specifications to

capture overall market conditions. Furthermore, our results using the mutual fund fraction measure of investment horizon are hard to reconcile with this interpretation.

Second, it is possible that the horizon measures capture fund flows in/out of institutional investors (and firms respond to them as market-timers). We rule out this explanation by including both bond (signed) flows and stock flows as control variables in all of our specifications to capture the effects of capital flows on the firm's financing behavior (the *Market-timing hypothesis*). We find that inflows to institutional investors' holdings of bonds do not increase the firm's probability of issuing bonds (Table III).⁴⁵ This suggests that a simple market-timing story is not sufficient to explain the firm's response to our bond turnover and mutual fund fraction measures.

Next, we consider the possibility that the horizon measures capture the liquidity of the firm's overall securities. To rule out this possibility, we separately include measures of liquidity for the firm's equity. It has a positive effect on the probability of issuing equity, but no effect on the probability of issuing bonds. Our horizon measure affects all three instruments in different directions, so it is a distinct measure from the overall liquidity measure. Thus, this result is inconsistent with this interpretation.

Finally, it is possible that the horizon measures capture the liquidity of the firm's bonds. The liquidity literature has proposed using a turnover measure similar to ours as a latent liquidity measure (Mahanti et al., 2008). They find that, *for relatively frequently traded bonds*, the high turnover bonds are associated with low transaction costs.⁴⁶ Most corporate bonds do not trade frequently, however, and highly rated bonds (which face the lowest financing cost) often trade less frequently than lower-rated bonds. Thus, lower trading costs for bond investors in the secondary markets need not imply lower financing costs for issuers in the primary market.⁴⁷ Thus, the liquidity interpretation of the turnover measure leads to no predictions as to its effects on the firm's financing choices and the capital structure. In contrast, our

⁴⁵ Likewise, inflows to institutional investors holding equity do not increase the firm's probability of issuing equity (Table IV).

⁴⁶ This is quite intuitive and can be thought of as products of complementary two-way causation: on the one hand, high-turnover funds are attracted to low transaction cost bonds; on the other hand, market makers demand lower bid-ask spreads for bonds that are held by high-turnover funds, since they are easier to obtain than those bonds held by low-turnover investors.

⁴⁷ Indeed, investor turnover is not monotonically increasing in credit ratings, while financing cost is lower for higher-rated bonds.

interpretation of the turnover measure as the investment horizon of bondholders has distinct implications for the firm's financing behavior and its leverage and is consistent with the reported results. Finally, our results are equally robust using the alternative measure of horizon, i.e., the mutual fund fraction measure. To conclude, we find that our overall results are not consistent with any of these alternative explanations.

Conclusion

We examine the effects of investment horizon of the firm's bond investor base on the capital structure of the firm. We exploit a novel dataset of institutional investors' quarterly bond holdings between 1998-2005 to examine whether investment horizon of firm-specific bond investor bases affects the firm's financing decisions, leverage, and its debt maturity choice.

We posit that bond investors are non-transient and heterogeneous, and the supply of capital is not perfectly elastic in the short run. Subsequently, the longer the investment horizon of the firm's bond investors, the more the firm relies on bond financing, and the higher its leverage. We provide evidence in support of this hypothesis by showing that an investor base characterized by long-term investor horizon is related to higher leverage, a higher probability of issuing bonds (and CP), and a lower probability of issuing equity and borrowing from banks. These results are robust to controlling for the potential endogeneity of the horizon measures.

We also argue that bond financing is an especially unreliable source of financing when the firm's investor base has a short horizon and is poorly diversified. In contrast, the limiting effect of short horizon should be mitigated if the investor base is diversified and shocks to investors are not highly correlated. We provide supporting evidence of this second hypothesis, by showing that the impact of investment horizon on the firm is entirely driven by firms with highly concentrated bond investor bases.

Finally, we argue that firms respond to an increase in long-maturity turnover (relative to short-maturity turnover) by substituting into both short-term bonds *and* long-term loans. We provide supporting

evidence of this third hypothesis by examining how investor horizon affects the firm's choice of debt maturity. Conditional on issuing a bond, when faced with short horizon in the long-maturity (short-maturity) bond category, the firm shortens (lengthens) the maturity of the bond it issues. Conditional on borrowing from a bank, when faced with short horizon in the long-maturity (short-maturity) bond category, the firm lengthens (shortens) the maturity of the loan it takes out.

Overall, our evidence shows that, contrary to the standard treatment in the theory, the supply conditions of the firm's bond investor base is very important in affecting the firm's financing policy. Firms are rationally sensitive to their bond investors' investment horizon in their financing decisions and leverage choice, relying less on bond financing when their investor bases consist primarily of short-horizon investors and therefore unreliable future funding sources. This effect is not uniformly distributed among firms. Rather, horizon sensitivity of the firm is positively related to the concentration of their investor bases. Thus, those that respond most strongly to horizon are firms with investor bases that exhibit strong local bias, high geographic clustering, or high herding propensity. Moreover, the firms' maturity choice is also a function horizon: Firms lengthen the maturity of bonds they issue when faced with short horizon in the short-maturity bond category.

References

- Altman, E., 1969, Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, *Journal of Finance* 23, 589-609.
- Amihud, Y., 2002, Illiquidity and Stock Returns: Cross-section and Time-series Effects, *Journal of Financial Markets* 5, 31-56.
- Baker, M., and J. Wurgler, 2000, The equity share on new issues and aggregate stock returns, *Journal of Finance* 55, 2219-2258.
- Baker, M., and J. Wurgler, 2002, Market timing and capital structure, *Journal of Finance* 57, 1-32.
- Barber, B. and T. Odean, 2000, Trading is Hazardous to Your Health: The Common Stock Investment Performance of Individual Investors, *Journal of Finance* 55, 773-806.
- Becker, B., 2007, Geographic Segmentation of U.S. Capital Markets, *Journal of Financial Economics* 85, 151-178.
- Becker, B., H. Cronqvist, and R. Fahlenbrach, Estimating the Effects of Large Shareholders Using a Geographic Instrument, forthcoming in the *Journal of Financial and Quantitative Analysis*.
- Becker, B., Z. Ivkovic, and S. Weisbenner, Local Dividend Clientele. forthcoming in *Journal of Finance*.
- Berger, A., Espinosa-Vega, M., Frame, S., and N. Miller, 2005, Debt Maturity, Risk, and Asymmetric Information, *Journal of Finance* 60, 2895-2923.
- Berlin, M. and J. Loeys, 1988, Bond Covenants and Delegated Monitoring. *Journal of Finance* 43, 397-412.
- Bernardo A. E. and I. Welch, 2004, Liquidity and Financial Market Runs, *The Quarterly Journal of Economics* 119, 135-157.
- Bolton, P., and D. Scharfstein, 1996, Optimal Debt Structure and the Number of Creditors, *Journal of Political Economy* 104, 1-25.
- Cantillo, M., and J. Wright, 2000, How Do Firms Choose Their Lenders? An Empirical Investigation, *Review of Financial Studies* 13, 155-189.
- Carey, M., M. Post, and S. Sharpe, 1998, Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting, *Journal of Finance* 53, 845-878.
- Carhart, Mark, 1997, On Persistence in Mutual Fund Performance, *Journal of Finance* 52, 57-82.
- Chemmanur, Thomas, and Paolo Fulghieri, 1994, Reputation, Renegotiation, and the Choice Between Bank Loans and Publicly Traded Debt, *Review of Financial Studies* 7, 475-506.
- Chen, X., Harford, J., Li, K., 2007. Monitoring: Which institutions matter? *Journal of Financial Economics* 86, 279-305.
- Chen, Q., I. Goldstein, and W. Jiang, 2007, Payoff Complementarities and Financial Fragility: Evidence from Mutual Fund Outflows, Unpublished Working Paper, University of Pennsylvania.
- Coval, J.D. and T. Moskowitz, 1999, Home bias at home: Local equity preference in domestic portfolios, *Journal of Finance* 54, 2045-2073.
- Coval, J.D. and T. Moskowitz, 2001, The geography of investment: Informed trading and asset prices, *Journal of Political Economy* 109, 811-841.

- Denis, D. J. and V. T. Mihov, 2003, The choice among bank debt, non-bank debt, nonblank private debt and public debt, *Journal of Financial Economics* 70, 3-28.
- Diamond, D. W., 1991, Monitoring and Reputation: The Choice Between Bank Loans and Directly Placed Debt, *Journal of Political Economy* 99, 689-721.
- Diamond, D., and P. Dybvig, 1983, Bank Runs, Deposit Insurance, and Liquidity, *Journal of Political Economy* 91, 401-419.
- Dittmar, A. and A. Thakor, 2007, Why Do Firms Issue Equity?, *Journal of Finance* 62, 1-54.
- Drucker, S. and M. Puri, 2005, On the Benefits of Concurrent Lending and Underwriting, *Journal of Finance* 60, 2763-2799.
- Edelen, R.M., 1999. Investor flows and the assessed performance of open-end mutual funds. *Journal of Financial Economics* 5, 439–466.
- Elton, E. and M. Gruber, 1970, Marginal Stockholder Tax Rates and the Clientele Effect, *The Review of Economics and Statistics* 52, 67-74.
- Fama, E. and K. French, 2002, Testing trade-off and pecking order predictions about dividends and debt, *Review of Financial Studies* 15, 1-33.
- Faulkender, M., and M. Petersen, 2006, Does the Source of Capital Affect Capital Structure? *Review of Financial Studies* 19, pp. 45-79.
- Flannery, M., and K. Rangan, 2006, Partial Adjustment Toward Target Capital Structure, *Journal of Financial Economics* 79, 469-506.
- Frank, M., and V. Goyal, 2003, Testing the pecking-order theory of capital structure, *Journal of Financial Economics* 67, 305–350.
- Gan, J., 2007, Collateral, Debt Capacity, and Corporate Investment: Evidence from a Natural Experiment, *Journal of Financial Economics* 85, 709-734.
- Gande, A., M. Puri, and A. Saunders, 1999, Bank Entry, Competition, and the Market for Corporate Securities Underwriting, *Journal of Financial Economics* 54, 165-95.
- Gaspar, J., Massa, M., Matos, P., 2005. Shareholder investment horizons and the market for corporate control, *Journal of Financial Economics* 76, 1 135-165.
- Gatev, E. and P. Strahan, 2006, Bank's advantage in hedging liquidity risk: theory and evidence from the commercial paper market, *Journal of Finance* 61, 867-892.
- Goldstein, M., E. Hotchkiss, and E. Sirri, 2007, Transparency and Liquidity: A Controlled Experiment on Corporate Bonds, *Review of Financial Studies* 20, 235-273.
- Gomes, A. and G. Phillips, 2008, **Private and Public Security Issuance by Public Firms: The Role of Asymmetric Information**, Working Paper.
- Guedes, J., and T. Opler, 1996, The Determinants of the Maturity of Corporate Debt Issues, *Journal of Finance* 51, 1809-1833.
- Graham, J. R., and C. R. Harvey, 2001, The theory and practice of corporate finance: Evidence from the field, *Journal of Financial Economics* 60, 187–243.
- Grinblatt, M., S. Titman and R. Wermers, 1995, Momentum Investment Strategies, Portfolio Performance, and Herding: A Study of Mutual Fund Behavior, *American Economic Review* 85, 1088-1105.

- Hartigan, John, 1975, *Clustering Algorithms*, Wiley, New York.
- Hennessy, C. and T. Whited, 2005, Debt Dynamics, *Journal of Finance* 60, 1129-1165.
- Hong, H., Kubik, J. D. and J. C. Stein, 2005, Thy neighbor's portfolio: word-of-mouth effects in the holdings and trades of money managers, *Journal of Finance* 60, 2801-24.
- Houston, J., and C. James, 1996, Bank Information Monopolies and the Mix of Private and Public Debt Claims, *Journal of Finance* 51, 1863-1889.
- Hovakimian, A., T. Opler, and S. Titman, 2001, The debt-equity choice, *Journal of Financial and Quantitative Analysis* 36, 1-24.
- Ivashina, V. and Z. Sun, 2008, Loan Demand Pressure and Cost of Corporate Debt, Working paper.
- James, C., 1987, Some Evidence on The Uniqueness of Bank Loans, *Journal of Financial Economics*, 19, 217-236.
- Jin L. and Kogan L., 2005, Managerial Career Concern and Mutual Fund Short-termism, working paper.
- Ju, N., R. Parrino, A. Poteshman, and M. Weisbach 2005, "Horses and Rabbits? Trade-off Theory and Optimal Capital Structure", *Journal of Financial and Quantitative Analysis* 40, 1- 23.
- Kahl, M., Shivdasani, A., and Y. Wang, 2008, Do Firms Use Commercial Paper to Enhance Financial Flexibility?, Working paper.
- Kim, Y.C., and R. Stulz, 1988, Eurobond Market and Corporate Financial Policy: A Test of the Clientele Hypothesis, *Journal of Financial Economics* 22, 189-205.
- Lakonishok, J, Shleifer, A., and R. Vishny, 1992. "The Impact of Institutional Trading on Stock Prices." *Journal of Financial Economics* 32, 23-43.
- Leary, M., 2009, Bank Loan Supply, Lender Choice, and Corporate Capital Structure, *Journal of Finance* 64, 1143-1185.
- Leary, M. and M. Roberts, 2005, Do firms rebalance their capital structures?, *Journal of Finance* 60, 2575-2619.
- Lemmon, M., and M. Roberts, 2010, The Response of Corporate Financing and Investment to Changes in the Supply of Credit, *Journal of Financial and Quantitative Analysis* 45, 555-587.
- Maddala, G. S., 1983, *Limited-Dependent and Qualitative Variables in Econometrics* (Cambridge University Press, Cambridge, UK).
- Mahanti, S, Nashikkar, A., Subrahmanyam, M., Chacko, G., and Gaurav M., 2008, Latent liquidity: A new measure of liquidity, with an application to corporate bonds, *Journal of Financial Economics* 88, 272-298.
- Manconi, A., M. Massa, and A. Yasuda, 2010, The Behavior of Intoxicated Investors: The Role of Institutional Investors in Propagating the Financial Crisis of 2007-2008, Working paper.
- Massa, M., A. Yasuda, and L. Zhang, 2009, Local Bias in Corporate Bond Holdings, Working Paper.
- Mian, A., 2006, Distance Constraints: The Limits of Foreign Lending in Poorer Economies, *Journal of Finance* 61, 1465-1505.
- Mian, A., 2008, Tracing the Impact of Bank Liquidity Shocks: Evidence from Emerging Market, *American Economic Review* 98, 1413-42.

- Miller, M. and F. Modigliani, 1961, Dividend Policy, Growth, and the Valuation of Shares, *The Journal of Business* 34, 411-433.
- Morris, S., and H. S. Shin, 1998, Unique Equilibrium in a Model of Self-fulfilling Currency Attacks, *American Economic Review* 88, 587-597.
- Myers, S. C., 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5, 147-176.
- Myers, S. C., 1984, The capital structure puzzle, *Journal of Finance* 39, 575-592.
- Myers, S. C., and N. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.
- Ng, S., and K. Haywood, 2009, Rates Low, Firms Race to Refinance Their Debts, *The Wall Street Journal*, June 26.
- Nini, G., 2008, How Non-Banks Increased the Supply of Bank Loans: Evidence from Institutional Term Loans, Working Paper.
- Petersen, M. and R. G. Rajan, 1994, The Benefits of Lending Relationships: Evidence from Small Business Data, *Journal of Finance*, 49 (1), 3-37.
- Puri, M., 1996, Commercial banks in investment banking: conflict of interest or certification role?, *Journal of Financial Economics* 40, 373-401.
- Rajan, R.G., 1992. Insiders and outsiders: the choice between informed and arm's-length debt, *Journal of Finance* 47, 1367-1399.
- Shyam-Sunder, L., and S.C. Myers, 1999, Testing static tradeoff against pecking order models of capital structure, *Journal of Financial Economics* 51, 219-244.
- Staiger, D., and J. Stock, 1997, Instrumental Variables Regression with Weak Instruments, *Econometrica* 65, 557-586.
- Sufi, A., 2009, The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings, *Review of Financial Studies* 22, 1659-1691.
- Titman, S., and R. Wessels, 1988, The determinants of capital structure, *Journal of Finance* 43, 1-19.
- Welch, I., 2004, Capital structure and stock returns, *Journal of Political Economy* 112, 106-131.
- Wermers, R., 1999, Mutual Fund Herding and the Impact on Stock Prices, *Journal of Finance* 54, 581-622.
- Yasuda, A., 2005, Do bank relationships affect the firm's underwriter choice in the corporate-bond underwriting market?, *Journal of Finance* 60, 1259-1292.
- Yasuda, A., 2007, Bank relationships and underwriter competition: evidence from Japan, *Journal of Financial Economics* 86, 369-404.

Appendix: Variable Definitions

Abnormal Return: Cumulative abnormal return measured relative to a CRSP value-weighted market model regression and estimated using the second year prior to the forecast year.

Altman's Z-Score: $3.3 * \text{pre-tax income (data170)} + \text{sales (data12)} + 1.4 * \text{retained earnings (data36)} + 1.2 * (\text{current assets (data4)} - \text{current liabilities (data5)}) / \text{book assets (data6)}$

Amihud's Illiquidity: The annual average of $1000 * \frac{|R_{i,t}|}{DVOL_{i,t}}$ where $R_{i,t}$ is the return and $DVOL_{i,t}$ is the dollar volume of stock i at day t . Downloaded from Joel Hasbrouck's website.

Asset Maturity: $\text{Gross PPE (data7)} / \text{Depreciation and Amortization (data14)}$

Asset size: $\log(\text{sales (data12)})$

Asset tangibility: $\text{net PPE (data8)} / \text{book assets (data6)}$

Bond Flow: Let S_i denote the set of investors holding bond i , and let $R_{i,t}$ and $V_{i,j,t}$ denote the return and the par amount of bond i held by investor j at quarter t . The bond flow is then

$$\sum_{j=1}^{S_i} (V_{i,j,t} - V_{i,j,t-1}(1 + R_{i,t})) / \sum_{j=1}^{S_i} V_{i,j,t-1}. \quad (\text{A1})$$

Book Equity: $\text{total assets (data6)} - \text{total liabilities [data181]} - \text{preferred stock [data10]} + \text{deferred taxes [data35]} - \text{convertible debt [data79]}$ (following Baker and Wurgler (2000)).

Book leverage: $\text{total debt} / \text{book assets (data6)}$

Capital Expenditure: $\text{Capital Expenditures (data128)} / \text{book assets (data6)}$

Credit Rating: senior long-term debt rating (data280). We further synthesize data280 into ten rating categories: AAA, AA, A, BBB, BB, B, CCC, CC, C, NR (not rated).

Credit Rating Dummies: One dummy variable for each rating category from AAA to NR. For example, $AAA\ dummy_{i,t} = 1$ if $credit\ rating_{i,t} = AAA$, and 0 otherwise.

High Local Mutual Fund Fraction Dummy: For each firm-quarter, we locate a (longitude-5, longitude+5), (latitude-5, latitude+5) region, then find all the mutual funds, pension funds and insurance companies located in the region. We then calculate the total bond holdings of each rating category (above investment grade/below investment-grade/non-rated) by each fund and the fund-firm distance. Then we define weight: $w_{ij} = (1/d_{ij}) / (\sum (1/d_{ij}))$. Suppose the firm belongs to rating category R, then the variable is defined as:

$$Frac_i = \frac{\sum_{j \in MUT} w_{ij} H_{jR}}{\sum_{j \in MUT} w_{ij} H_{jR} + \sum_{j \in INS} w_{ij} H_{jR} + \sum_{j \in PEN} w_{ij} H_{jR}}, \quad (\text{A2})$$

where MUT, INS and PEN refer to mutual funds, insurance companies and pension funds. Then "High Local Mutual Fund Fraction Dummy" equals 1 if Frac is above the sample median and 0 otherwise.

Industry Book Leverage: Median book leverage at 4-digit SIC level.

Institutional Bond-to-Corporate Debt Ratio: The total sum of the par amounts of bond i held by all institutional investors included in the Lipper database divided by the total debt outstanding for the issuer of bond i in a given year.

Local Fund Turnover: For each firm-quarter, we first locate the (longitude-5, longitude+5), (latitude-3, latitude+3) region, then find all the mutual funds, pension funds and insurance companies located in the region. The distance between firm i and fund j is defined as:

$$d_{ij} = \log(10 + 3963 * \cos(\sin(\text{lat1}) * \sin(\text{lat2}) + \cos(\text{lat1}) * \cos(\text{lat2}) * \cos(\text{long2} - \text{long1}))).$$

Then we define weight:

$$w_{ij} = \frac{\frac{1}{d_{ij}}}{\sum_{j \in A} \frac{1}{d_{ij}}}$$

the funds located at that region: $LocalTurn_i = \sum_j w_{ij} Churn_j$.

Location Dummies: We divide the 50 U.S. states into seven areas: area1 (Northwest), area2 (West), area3 (Midwest), area4 (the Gulf states), area5 (East), area6 (South), and area7 (Hawaii and Alaska). We create a dummy variable for each one of them. For example, $area1\ dummy_{i, (j), t} = 1$ if the issuer of bond i (held by investor j) at time t is headquartered in the Northwest area, and 0 otherwise.

Market value of assets: stock price (data199) * shares outstanding (data25) + short term

debt(data34) + long term debt(data9) + preferred stock liquidation value (data10) – deferred taxes and investment tax credits (data35).⁴⁸

Market-to-Book Ratio: market value of assets/book assets (data 6)

Market leverage: total debt/Market value of assets

Profitability: operating income before depreciation (data13)/book assets (data6)

Research and development: R&D expenditures (data46)/book assets (data6). The missing values are replaced with 0.

R&D dummy: 1 if R&D expenditures (data46) is missing and 0 otherwise

Stock Return Volatility: 12-month rolling sample deviation of monthly stock returns.

Stock turnover: A firm's stock turnover is calculated in the same manner as equation (2). Investor-level equity portfolio information comes from CDA/Spectrum, a database of quarterly 13-F filings of money managers to the U.S. Securities and Exchange Commission.

Stock Flow: A firm's stock flow is calculated in the same manner as equation (A1). Investor-level equity portfolio information comes from CDA/Spectrum.

Stock Holding Fraction: The total number of common shares of a given firm that is held by all the institutional investors included in the CDC/Spectrum database divided by the total number of shares outstanding (of the same firm).

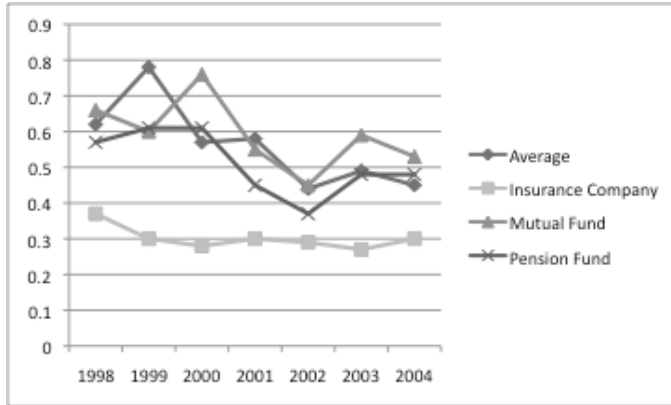
Total debt: long term debt (data9)+short term debt (data34) (data# = Compustat data item number)

⁴⁸ Following Lemmon and Roberts (2007).

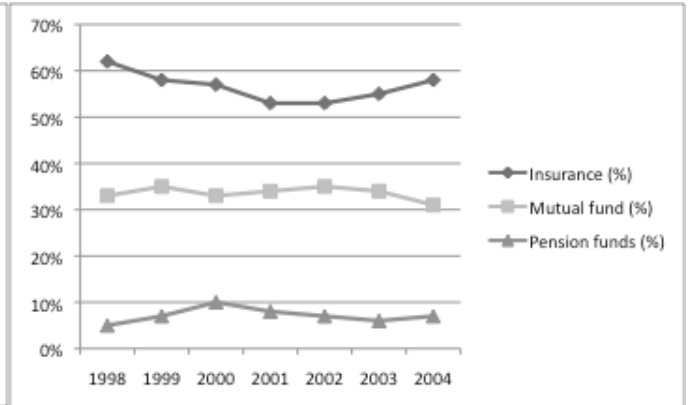
Figure 1: Turnover by Fund Class and Year

The figures present some summary statistics. Figure 1-1 reports the average turnover by year and by fund type (insurance companies, mutual funds, and pension funds). Figure 1-2 presents the composition of the bond holdings in the sample by year and by fund type. Figure 1-3 plots the average turnover and new corporate bonds (primary issues) by year. Figure 1-4 plots the par amount of corporate bonds held by the sample investors as % of the total outstanding amount for the corresponding bonds.

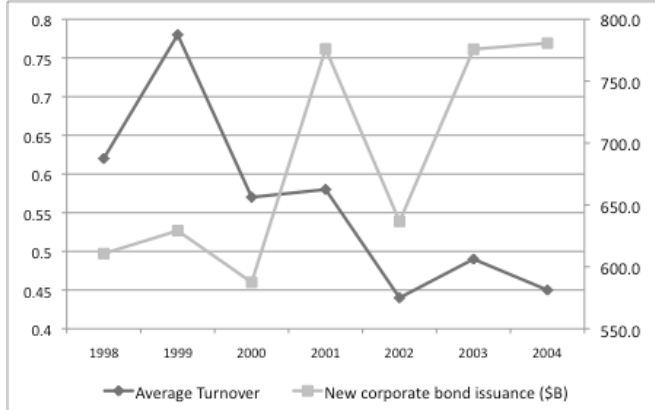
1-1: Turnover by year and fund class



1-2: Composition of amount held, by fund class



1-3: Turnover and New Corporate Bond Issues (\$B)



1-4: Amount held / Total Outstanding Amount

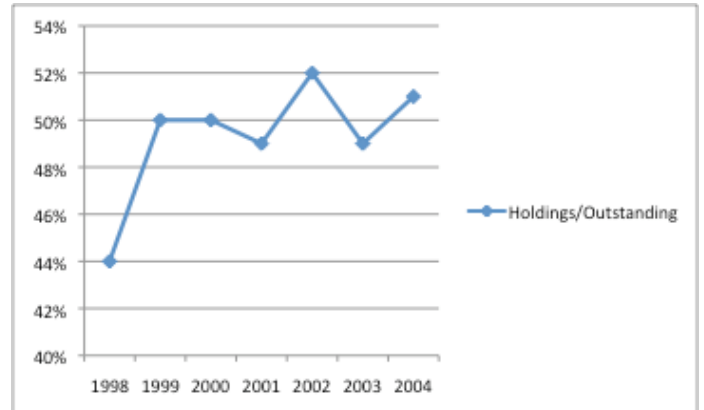


Figure 2: Prevalence of Mutual Funds among Local Bond Investors

This figure plots how the prevalence of mutual funds among local bond investors varies geographically within the contiguous U.S. states. The fractions of mutual funds among local investors are categorized into large, small, and medium for a given local area.

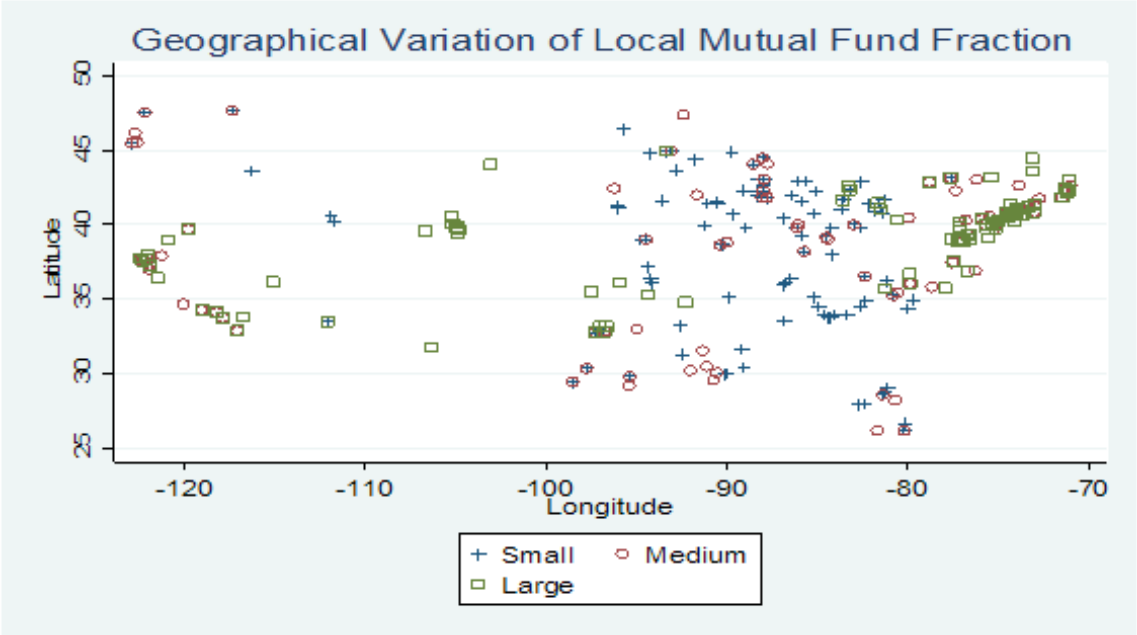


Table I
Concentration of Bond Investor Bases

This table presents sample summary statistics on investor base concentration measures. Panel A presents the results on home bias in bond ownership; panel B presents the results on investor herding of local bonds; and panel C shows the relationship between investor base concentration measures and capital supply imbalances. A bond i held by investor j is said to be owned by a home area investor if investor j and the issuer of bond i are headquartered in the same region (the U.S. 50 states are divided into 7 regions). Home area raw ownership $_{i,t}$ is the percentage of firm i 's bonds owned by the home area investors. *Local bias* is defined as the difference between the *home area raw ownership* and the fraction that would be held by home area investors under the assumption that each investor holds the market portfolio. Investor herding is defined by equation (4) in the text. For each bond we calculate the herding measure separately for home area investors as well as non-home area investors. Holdings are aggregated at the fund family level. Note that, in order to compute these home bias measures in a meaningful way, we need to require that there be at least some minimum number of investors in home areas and non-home areas each holding a given bond. We set this minimum number of investors at 10; results are qualitatively similar for cutoffs at 3 and 5. The number of firm-year observations for each cutoff level appears in parentheses. Panel C presents the univariate test results of the null hypothesis that there is no correlation between the measures of investor base concentrations and the net capital supply imbalances. For each bond i , the buy-sell trade imbalance $_i^t$ is defined as follows:

$$\text{Trade Imbalance}_i^t = \left| \frac{\sum_{j \in B_i^t} |N_{i,j}^t| - \sum_{j \in S_i^t} |N_{i,j}^t|}{\sum_{j \in All} V_{i,j}^t} \right|,$$

where $V_{i,j}^t$ and $N_{i,j}^t$ are the par amount and the net change in the par amount of bond i held by investor j during quarter t , and B_i^t and S_i^t denote the set of investors which are net buyers and sellers of bond i in quarter t , respectively. The number of firm-year observations for each subsample appears in parentheses. The symbols *, **, and *** indicate statistical significance of the test at the 10%, 5%, and 1% level, respectively.

Panel A: Home Bias in Bond Ownership

Minimum number of investors holding each bond	Mean Home Area Raw ownership	Mean Local Ownership	t -test	Wilcoxon
>=10 Home Area Investors & >=10 Non-Home Area Investors	37.7% (3,545)	15.3% (3,545)	75.04***	49.74***

Panel B: Investor Herding on Home Area Bonds

Minimum number of investors holding each bond	Mean Home Area Investors' Herding Measure on Home Area Bonds	Mean Non-Home Area Investors' Herding Measure on Home Area Bonds	t -test	Wilcoxon
>=10 Home Area Investors & >=10 Non-Home Area Investors	0.172 (1,138)	0.129 (1,138)	13.30***	13.02***

Panel C: Investor base concentrations and Trade Imbalances

Sorting Criteria	Mean Trade Imbalance		t -test	Wilcoxon
	High (\geq median)	Low ($<$ median)		
Home Area Raw Ownership	0.209 (2,339)	0.192 (2,224)	1.88*	2.88***
Herding Measure (HM)	0.244 (2,299)	0.156 (2,264)	9.70***	10.34***
Geographic Clustering (GC)	0.268 (2,315)	0.131 (2,248)	15.27***	18.34***

Table II
Summary Statistics

This table presents summary statistics for the 4,563 firm-year observations in the 1998-2005 period. Variable definitions are provided in the Appendix.

Variables	Data Source	N	Mean	Median	Std. Dev.
Bond Turnover	Lipper/Bloomberg	4,563	0.31	0.26	0.15
Mutual Fund Fraction	Lipper	4,563	0.30	0.10	0.36
Bond Flow	Lipper/Bloomberg	4,563	-0.06	-0.03	0.13
Institutional Bond-to- Corporate Debt ratio	Lipper	4,563	0.33	0.29	0.23
Stock Turnover	13F	4,563	0.68	0.68	0.06
Stock Flow	13F	4,563	-0.00	-0.00	0.03
Stock Holding Fraction	13F	4,563	0.48	0.46	0.21
Market Leverage	Compustat	4,563	0.33	0.28	0.23
Book Leverage	Compustat	4,563	0.32	0.30	0.16
Abnormal Return	CRSP	4,563	0.01	0.01	0.39
Amihud's Illiquidity	CRSP	4,563	36.05	24.73	36.32
Stock Return Volatility	CRSP	4,563	0.13	0.11	0.07
Asset Tangibility	Compustat	4,563	0.36	0.31	0.23
Asset Size	Compustat	4,563	7.32	7.25	1.56
Profitability	Compustat	4,563	0.12	0.12	0.08
Altman's Z-Score	Compustat	4,563	1.57	1.59	1.13
Research and Development	Compustat	4,563	0.02	0.00	0.04
Capital Expenditure	Compustat	4,563	0.02	0.03	0.09
Market-to-Book Ratio	Compustat	4,563	1.34	1.05	0.98
Asset Maturity	Compustat	4,563	13.22	14.15	6.78
Bond Maturity (years)	SDC New Issue	947	10.14	10.38	7.44
Bank Debt Maturity (years)	LPC DealScan	1,309	3.50	3.67	2.01

Table III
Estimation Results of the Firm's Bond Issuance Choice Model

This table presents the estimation results of the firm's bond issuance choice model. The dependent variable is a binary variable equaling one if the firm is a new bond issuer in a given year and 0 otherwise. All the independent variables are defined in the Appendix. Column (1) presents the baseline model; columns (2)-(7) present the results of the model for various subsamples. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

	Full	Home Area		Investor		Geographic	
	Sample	Ownership		Herding		Clustering	
	(1)	High	Low	High	Low	High	Low
	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bond Investor Turnover	-0.79** (-2.56)	-1.56*** (-3.39)	-0.20 (-0.39)	-1.17*** (-2.82)	-0.44 (-0.89)	-1.17** (-2.46)	-0.56 (-1.25)
Bond Flow	-0.20 (-0.84)	-0.44 (-1.20)	-0.16 (-0.45)	0.38 (1.07)	-0.73* (-1.93)	0.18 (0.57)	-0.62* (-1.72)
Bond-to- Corporate Debt Ratio	-0.33** (-2.06)	-0.61*** (-2.88)	-0.08 (-0.28)	-0.45* (-1.92)	-0.36 (-1.59)	-0.41 (-1.64)	-0.34 (-1.60)
Stock Turnover	-0.85 (-1.40)	-1.89** (-2.12)	-0.46 (-0.54)	-1.11 (-1.21)	-0.97 (-1.16)	-1.23 (-1.42)	-0.79 (-0.88)
Stock Flow	0.03 (0.02)	-1.28 (-0.45)	1.44 (0.63)	-2.18 (-0.92)	1.69 (0.63)	0.17 (0.07)	-0.33 (-0.12)
Stock Holding Fraction	0.10 (0.52)	-0.20 (-0.69)	0.04 (0.14)	0.12 (0.47)	0.09 (0.35)	0.25 (0.96)	-0.15 (-0.58)
Abnormal Return	0.21** (2.33)	0.42*** (3.14)	0.11 (0.82)	0.36** (2.58)	0.09 (0.72)	0.13 (1.03)	0.29** (2.26)
Amihud's Illiquidity	0.00 (1.37)	0.00 (0.69)	0.00** (2.01)	0.00 (0.95)	0.00 (0.48)	-0.00 (-1.11)	0.00** (2.12)
Stock Return Volatility	-2.42*** (-2.97)	-3.53** (-2.58)	-1.12 (-1.14)	-0.61 (-0.63)	-3.92*** (-3.17)	-0.78 (-0.81)	-5.09*** (-4.05)
Asset Tangibility	0.47 (1.60)	-0.68 (-1.43)	0.78** (2.04)	-0.35 (-0.82)	1.00*** (2.88)	0.97** (2.42)	-0.14 (-0.36)
Firm Size	0.32*** (7.40)	0.33*** (5.40)	0.30*** (5.23)	0.33*** (5.30)	0.36*** (5.50)	0.30*** (4.80)	0.32*** (5.22)
Profitability	0.32 (0.46)	0.57 (0.52)	0.26 (0.30)	1.09 (1.11)	0.40 (0.36)	0.87 (0.97)	0.44 (0.44)
R&D	-1.82 (-1.27)	-0.02 (-0.02)	-6.79 (-1.64)	-1.80 (-0.83)	0.19 (0.08)	-0.67 (-0.32)	-2.81 (-1.29)
R&D Dummy	0.19** (2.04)	0.19 (1.47)	0.12 (0.81)	0.13 (0.92)	0.29** (2.19)	0.14 (1.10)	0.20 (1.42)
Altman's z-Score	-0.14** (-2.40)	-0.18** (-1.98)	-0.09 (-1.17)	-0.13* (-1.70)	-0.13 (-1.52)	-0.05 (-0.59)	-0.20** (-2.47)
Asset Maturity	0.00 (0.32)	0.02** (1.96)	-0.01 (-0.69)	0.01 (0.68)	0.00 (0.29)	-0.00 (-0.39)	0.01 (0.70)
Capital Expenditure	2.01** (2.11)	5.66*** (3.12)	1.62 (1.44)	1.57 (1.24)	2.15 (1.54)	-0.59 (-0.49)	5.09*** (3.64)
Market-to-Book	-0.01 (-0.36)	-0.02 (-0.38)	-0.08 (-1.60)	-0.01 (-0.23)	-0.04 (-0.71)	0.02 (0.66)	-0.07 (-1.23)
Book Leverage	0.50* (1.67)	-0.10 (-0.23)	1.00** (2.24)	0.76** (2.06)	0.27 (0.55)	0.83** (2.13)	0.36 (0.79)
Year, location, industry & ratings dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.2465	0.2683	0.2999	0.2678	0.2697	0.2489	0.2464
Number of Observations	4563	2266	2297	2299	2263	2315	2248

Table IV
Estimation Results of the Firm's Equity Issuance Choice Model

This table presents the estimation results of the firm's equity issuance choice model. The dependent variable is a binary variable equaling one if the firm is a new bond issuer in a given year and 0 otherwise. All the independent variables are defined in the Appendix. Column (1) presents the baseline model; columns (2)-(7) present the results of the model for various subsamples. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bond Investor Turnover	0.55** (2.12)	0.87** (2.36)	0.03 (0.08)	0.87** (2.54)	0.10 (0.23)	0.66** (2.10)	0.28 (0.52)
Bond Flow	0.20 (1.03)	0.22 (0.73)	0.32 (1.13)	0.65** (2.36)	-0.33 (-0.98)	0.22 (0.97)	0.27 (0.65)
Bond-Corporate Debt Ratio	-0.32* (-1.82)	-0.75*** (-2.80)	-0.08 (-0.35)	-0.13 (-0.53)	-0.69** (-2.43)	-0.13 (-0.59)	-0.56* (-1.86)
Stock Turnover	0.83 (1.11)	0.82 (0.85)	0.79 (0.65)	-0.79 (-0.79)	2.72** (2.43)	1.06 (1.05)	0.68 (0.59)
Stock Flow	2.37 (1.42)	0.11 (0.04)	4.29** (2.02)	2.32 (1.02)	2.93 (1.13)	2.81 (1.44)	1.72 (0.48)
Stock Holding Fraction	-0.06 (-0.33)	-0.36 (-1.34)	-0.01 (-0.05)	0.27 (1.11)	-0.15 (-0.57)	0.09 (0.40)	-0.21 (-0.69)
Abnormal Return	0.38*** (4.97)	0.53*** (4.30)	0.29*** (2.76)	0.46*** (4.48)	0.37*** (2.76)	0.36*** (3.97)	0.49*** (2.96)
Amihud's Illiquidity	-0.00*** (-3.45)	-0.01*** (-3.49)	-0.00** (-2.15)	-0.01** (-2.60)	-0.01*** (-3.26)	-0.00 (-1.42)	-0.01*** (-3.93)
Stock Return Volatility	-0.44 (-0.82)	-1.45* (-1.87)	0.55 (0.71)	0.98 (1.36)	-2.00** (-2.32)	-0.28 (-0.42)	-1.19 (-1.08)
Asset Tangibility	-0.03 (-0.12)	-0.16 (-0.38)	0.31 (0.98)	-0.36 (-1.00)	0.14 (0.37)	0.41 (1.37)	-0.55 (-1.26)
Firm Size	0.07** (2.01)	0.13** (2.58)	0.05 (0.90)	0.07 (1.33)	0.13** (2.26)	0.04 (0.85)	0.15** (2.60)
Profitability	-1.18** (-2.20)	-3.51*** (-4.12)	-0.27 (-0.44)	-1.42* (-1.73)	-0.60 (-0.74)	-0.92 (-1.54)	-2.63** (-2.29)
R & D	-0.10 (-0.11)	0.34 (0.29)	-1.33 (-0.76)	-0.14 (-0.13)	1.04 (0.51)	0.82 (0.81)	-4.51* (-1.89)
R&D Dummy	0.19** (1.98)	0.01 (0.05)	0.39*** (3.02)	0.12 (0.94)	0.38*** (2.72)	0.22* (1.83)	0.19 (1.32)
Altman's z-Score	-0.14*** (-2.83)	0.01 (0.11)	-0.17** (-2.56)	-0.08 (-1.14)	-0.21** (-2.51)	-0.10 (-1.56)	-0.19** (-2.20)
Asset Maturity	0.00 (0.17)	0.01 (1.48)	-0.01 (-1.06)	-0.00 (-0.33)	0.00 (0.07)	-0.01 (-0.83)	0.02 (1.63)
Capital Expenditure	1.62* (1.83)	-0.08 (-0.05)	1.77 (1.64)	2.61** (2.01)	0.75 (0.63)	0.99 (0.96)	2.68 (1.65)
Market-to-Book	0.12*** (4.20)	0.12*** (3.08)	0.12*** (2.83)	0.11*** (3.52)	0.13** (2.05)	0.09*** (2.93)	0.22*** (3.83)
Book Leverage	0.65*** (2.68)	0.81** (2.30)	0.52 (1.41)	0.99*** (2.98)	0.47 (1.11)	0.66** (2.17)	0.83* (1.95)
Year, location, industry & ratings dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.1449	0.1947	0.1621	0.1771	0.2049	0.1368	0.2224
Number of Observations	4563	2266	2297	2299	2263	2315	2248

Table V
Estimation Results of the Firm's Bank Borrowing Choice Model

This table presents the estimation results of the firm's bank borrowing choice model. Panel A reports the results of the baseline model. The dependent variable is a binary variable equaling one if the firm borrows from a bank in a given year and 0 otherwise. In Panel B the dependent variable is a binary variable equaling one if the firm takes a term loan from a bank during a given year and 0 otherwise. Panel C presents the results of the firm's bank loan vs. bond debt choice model conditional on issuing debt. In column (1), conditioning on issuing debt, the dependent variable takes a value of 1 if the firm borrows from banks (either in the form of a term loan or a line of credit) and 0 if it issues a bond. In column (2), conditioning on either taking a term loan or issuing a bond, the dependent variable takes a value of 1 if the firm takes a term loan from banks and 0 if it issues a bond. In column (3), conditioning on either taking a line of credit or issuing a bond, the dependent variable takes a value of 1 if the firm takes a line of credit from banks and 0 if it issues a bond. Columns (4)-(6) are defined similarly but for bank loans and bonds with maturities longer than 3 years. To address the potential self-selection issue, we run a first-stage probit regression (unreported) where the dependent variable equals one if the firm issues debt and 0 otherwise and include the corresponding inverse Mill's ratio in the second stage regression. All of the specifications include year-, industry-, location- and credit rating dummies. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

Panel A: Full-Sample Baseline Model

	Full	Home Area		Investor		Geographic	
	Sample	Ownership		Herding		Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bond Investor Turnover	0.31 (1.47)	0.46* (1.68)	0.14 (0.46)	0.54** (2.14)	-0.26 (-0.70)	0.27 (1.07)	0.09 (0.24)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.12	0.11	0.18	0.11	0.13	0.12	0.14
Number of Observations	4,563	2,266	2,297	2,299	2,263	2,315	2,248

Panel B: Term Loan Choice Model

	Full	Home Area		Investor		Geographic	
	Sample	Ownership		Herding		Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bond Investor Turnover	0.42* (1.68)	0.86*** (2.75)	-0.57 (-1.45)	0.67** (2.20)	-0.16 (-0.42)	0.49* (1.69)	-0.37 (-0.80)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.1236	0.1474	0.1568	0.1554	0.1447	0.1313	0.1630
Number of Observations	4,563	2,266	2,297	2,299	2,263	2,315	2,248

Panel C: Bank Loan vs. Bond Choice Model

	Bank/Bond Choice			Bank/Bond Choice: Conditioning on Maturity		
	Bank/Bond	Term/Bond	Line/Bond	Bank/Bond	Term/Bond	Line/Bond
	(1)	(2)	(3)	(4)	(5)	(6)
Bond Investor Turnover	1.08** (2.22)	1.38** (2.17)	0.83* (1.75)	1.26** (2.47)	1.54** (2.25)	1.07** (2.05)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.3462	0.4464	0.3396	0.2398	0.4751	0.2335
Number of Observations	1225	860	1178	1033	805	988

Table VI
Estimation Results of the Firm's CP Issuance Choice Model

This table presents the estimation results of the firm's CP issuance choice model. The dependent variable is a binary variable equaling one if the firm receives a CP backup line of credit during a given year and 0 otherwise. All the independent variables are defined in the Appendix. Column (1) presents the baseline model; columns (2)-(7) present the subsample results. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

	Full	Home Area		Investor		Geographic	
	Sample	Ownership		Herding		Clustering	
	(1)	High	Low	High	Low	High	Low
Bond Investor Turnover	-1.46** (-2.38)	-1.92*** (-3.06)	-1.33 (-1.34)	-2.08** (-2.53)	-1.31* (-1.66)	-2.46*** (-2.78)	-0.97 (-1.19)
Bond Flow	0.86** (2.05)	0.28 (0.45)	1.07* (1.90)	0.89 (1.48)	0.59 (0.91)	0.35 (0.75)	0.87 (1.41)
Bond-Corporate Debt Ratio	0.15 (0.61)	-0.07 (-0.25)	0.49 (1.17)	-0.23 (-0.55)	0.03 (0.11)	-0.77 (-1.57)	0.72** (2.14)
Stock Turnover	0.31 (0.30)	3.16** (2.19)	-3.12** (-2.42)	-3.37** (-2.44)	2.24* (1.76)	-0.39 (-0.26)	-0.11 (-0.07)
Stock Flow	-3.67 (-1.54)	-0.14 (-0.04)	-2.51 (-0.76)	-5.68 (-1.59)	0.12 (0.04)	-5.29 (-1.49)	-3.55 (-1.02)
Stock Holding Fraction	0.10 (0.40)	0.13 (0.38)	0.52 (1.30)	0.24 (0.60)	0.79** (2.56)	1.14** (2.20)	-1.07*** (-3.21)
Abnormal Return	-0.07 (-0.60)	-0.07 (-0.43)	-0.07 (-0.42)	-0.03 (-0.14)	-0.14 (-0.84)	0.01 (0.07)	-0.03 (-0.17)
Amihud's Illiquidity	0.00 (1.34)	-0.00 (-0.71)	0.01** (2.52)	0.00 (1.01)	0.00* (1.81)	-0.00 (-0.32)	0.00 (1.64)
Stock Return Volatility	-3.28** (-2.45)	-1.47 (-0.89)	-1.83 (-1.12)	-3.80** (-2.02)	1.07 (0.76)	-5.63*** (-2.67)	-1.54 (-0.82)
Asset Tangibility	-0.65 (-1.31)	-0.63 (-0.87)	-1.33** (-2.07)	-0.91 (-1.43)	-0.56 (-0.99)	-1.29* (-1.76)	-0.40 (-0.63)
Firm Size	0.41*** (7.67)	0.41*** (6.26)	0.35*** (4.24)	0.47*** (5.34)	0.34*** (4.40)	0.41*** (4.20)	0.52*** (8.13)
Profitability	0.71 (0.65)	0.08 (0.05)	0.84 (0.64)	1.98 (1.42)	0.47 (0.33)	2.25 (1.31)	1.65 (1.01)
R&D	-1.78 (-0.77)	-3.23 (-1.15)	2.83 (0.93)	1.75 (1.18)	-5.49* (-1.75)	-1.83 (-0.53)	-3.35 (-0.99)
R&D Dummy	-0.01 (-0.06)	-0.02 (-0.10)	-0.08 (-0.45)	-0.00 (-0.01)	-0.06 (-0.36)	0.30 (1.46)	-0.13 (-0.68)
Altman's z-Score	-0.05 (-0.60)	-0.05 (-0.37)	0.00 (0.04)	-0.27** (-2.61)	0.22** (2.09)	-0.15 (-1.31)	-0.15 (-1.20)
Asset Maturity	0.01 (0.90)	0.01 (0.61)	0.02 (1.48)	-0.01 (-0.59)	0.01 (0.66)	0.04** (2.35)	-0.02 (-1.17)
Capital Expenditure	0.62 (0.38)	-1.75 (-0.57)	2.44 (1.45)	-2.40 (-0.98)	3.13* (1.72)	-4.50* (-1.68)	3.99* (1.83)
Market-to-Book	-0.10 (-1.55)	-0.01 (-0.17)	-0.17* (-1.88)	0.00 (0.06)	-0.14* (-1.69)	0.00 (0.04)	-0.20** (-2.24)
Book Leverage	-0.52 (-1.14)	-0.34 (-0.57)	1.03 (1.50)	-0.14 (-0.23)	0.13 (0.22)	-0.68 (-0.97)	-0.82 (-1.32)
Year, location, industry & ratings dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Pseudo R-squared	0.4293	0.3850	0.4350	0.5200	0.3330	0.5230	0.4095
Number of Observations	4563	2266	2297	2299	2263	2315	2248

Table VII
Estimation Results of the Firm's Leverage: Baseline Model

This table reports the firm fixed-effect model estimation results of the firm's leverage. All the independent variables are defined in the Appendix. Column (1) presents the full sample results; columns (2)-(7) present the subsample results. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
	(1)	High (2)	Low (3)	High (4)	Low (5)	High (6)	Low (7)
Bond Investor Turnover	-0.09*** (-3.55)	-0.10*** (-2.92)	-0.06 (-1.55)	-0.12*** (-3.46)	-0.05 (-1.29)	-0.09*** (-2.73)	-0.09** (-2.20)
Bond Flow	0.03* (1.95)	0.04 (1.58)	0.03 (1.56)	0.01 (0.74)	0.04* (1.72)	0.05** (2.43)	-0.01 (-0.35)
Bond-Corporate Debt Ratio	-0.01 (-0.72)	-0.02 (-0.70)	-0.01 (-0.40)	-0.02 (-0.90)	0.00 (-0.01)	-0.03 (-0.93)	-0.00 (-0.07)
Stock Turnover	-0.05 (-1.04)	-0.10 (-1.47)	-0.04 (-0.48)	-0.03 (-0.45)	-0.08 (-1.11)	-0.09 (-1.18)	-0.06 (-0.85)
Stock Flow	-0.30*** (-2.65)	-0.19 (-1.26)	-0.37** (-2.22)	-0.32* (-1.95)	-0.29* (-1.72)	-0.29* (-1.80)	-0.24 (-1.66)
Stock Holding Fraction	0.05*** (3.16)	0.05** (2.07)	0.05** (2.32)	0.04* (1.67)	0.07*** (3.00)	0.08*** (3.12)	0.02 (0.95)
Abnormal Return	-0.05*** (-7.52)	-0.06*** (-6.50)	-0.04*** (-4.37)	-0.05*** (-6.26)	-0.04*** (-3.98)	-0.04*** (-4.91)	-0.05*** (-5.91)
Amihud's Illiquidity	0.00 (-0.32)	0.00 (-0.46)	0.00 (0.24)	0.00 (0.39)	0.00 (0.04)	0.00 (-0.71)	0.00 (-0.65)
Stock Return Volatility	0.04 (0.55)	0.16* (1.88)	-0.11 (-1.12)	0.03 (0.29)	0.04 (0.37)	-0.06 (-0.81)	0.11 (1.02)
Asset Tangibility	0.10* (1.80)	0.03 (0.39)	0.10 (1.29)	0.08 (1.02)	0.05 (0.65)	0.04 (0.51)	0.15* (1.72)
Firm Size	0.04*** (2.77)	0.01 (0.61)	0.06*** (3.99)	0.02 (0.94)	0.06*** (4.22)	0.03 (1.61)	0.05*** (2.83)
Profitability	-0.23*** (-3.26)	-0.34*** (-3.14)	-0.12 (-1.23)	-0.17* (-1.74)	-0.29*** (-2.82)	-0.12 (-1.26)	-0.36*** (-3.28)
R&D	-0.17 (-1.07)	-0.14 (-0.68)	0.03 (0.12)	-0.17 (-1.09)	-0.10 (-0.25)	-0.07 (-0.53)	-0.46 (-1.61)
R&D Dummy	-0.03 (-1.37)	-0.00 (-0.02)	-0.05** (-2.18)	-0.01 (-0.32)	-0.04* (-1.71)	-0.03 (-0.98)	-0.03 (-1.23)
Altman's z-Score	-0.02** (-2.30)	-0.00 (-0.32)	-0.04*** (-2.95)	-0.02* (-1.67)	-0.01 (-1.12)	-0.02 (-1.64)	-0.02 (-1.66)
Asset Maturity	0.00 (-0.39)	-0.00* (-1.85)	0.00 (0.83)	-0.00 (-0.68)	0.00 (0.34)	0.00 (-0.19)	0.00 (-0.36)
Capital Expenditure	-0.04 (-0.48)	0.09 (0.64)	-0.10 (-0.98)	-0.01 (-0.09)	-0.02 (-0.22)	-0.11 (-1.00)	0.05 (0.47)
Market-to-Book	-0.01** (-2.02)	-0.01 (-1.58)	-0.01* (-1.86)	-0.00 (-1.23)	-0.02*** (-2.94)	-0.01 (-1.39)	-0.01* (-1.82)
Book Leverage	0.17*** (4.15)	0.12** (2.06)	0.20*** (3.54)	0.15** (2.49)	0.16*** (2.72)	0.15** (2.58)	0.15** (2.56)
Year, location, industry & ratings dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R-squared	0.8067	0.8265	0.7937	0.8185	0.8038	0.7820	0.8434
Number of Observations	4563	2266	2297	2299	2263	2315	2248

Table VIII: The Firm's Leverage: Modified Model with the EF Turnover

This table presents the estimation results of an alternative leverage model where the external finance-weighted turnover measure is used as the key variable of interest. The EF (external-financing-weighted) turnover is defined as:

$$EF\text{Turnover}_{i,t} = \sum_{s=0}^t \frac{e_s + d_s}{\sum_{r=0}^t (e_r + d_r)} \text{Turnover}_{i,s}$$

where e_s and d_s denote net equity and net debt issues during year s . Net debt issue is the change in book assets minus the change in book equity divided by book assets. Net equity issue is the change in book equity minus the change in retained earnings divided by book assets. All the independent variables, including $EF\text{Turnover}$, are lagged values measured in the previous year; their definitions are found in the Appendix. Column (1) presents the full sample results; columns (2)-(7) present the results of the model for various subsamples. All of the specifications include year dummies, location dummies and credit rating dummies. The symbols *, **, and *** indicate statistical significance of the test that the coefficient is different from 0 at the 10%, 5%, and 1% level, using heteroscedasticity-robust standard errors with t -statistics given in parentheses.

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EF Turnover	-0.14*** (-3.44)	-0.12** (-2.25)	-0.12** (-1.98)	-0.18*** (-3.03)	-0.09 (-1.55)	-0.18*** (-3.25)	-0.09 (-1.34)
<i>Control Variables</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year&Location&Rating Dum.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R-squared	0.8068	0.8260	0.7941	0.8184	0.8040	0.7830	0.8429
Number of Observations	4,563	2,266	2,297	2,299	2,263	2,315	2,248

Table IX: The Firm's Leverage: Dynamic Adjustment Model

This table presents the firm fixed-effect model estimation results of the change in market and book leverage on the target market (book) leverage adjustments and the shock to the firm's bond turnover in the bond market. The dependent variable is the change in market (book) leverage, $L_t - L_{t-1}$, from year $t-1$ to year t . *Turnover shock* is defined as $\text{Turnover}_{t-1} - E(\text{Turnover}_{t-1})$ where $E(\text{Turnover}_{t-1})$ is estimated as the fitted value of the firm fixed-effect model estimation results (unreported) of turnover on its lagged value and the set of control variables used in the main specification (e.g., Table VIII). *The target (leverage) adjustment*, i,t , is defined as the difference between the leverage at time $t-1$ and the expected level of leverage at time t . The expected level of leverage is constructed as the fitted value of the firm fixed-effect model estimation results (unreported) of leverage on the control variables used in the main specification. Column (1) is based on the full sample. Columns (2)-(7) present the results of the model for various subsamples. All of the specifications include year dummies, location dummies and credit rating dummies. Standard errors are heteroscedasticity-robust and adjusted for estimation errors using bootstrapping procedures. The symbols *, **, and *** indicate statistical significance of the test that the coefficient is different from 0 at the 10%, 5%, and 1% level.

<i>Independent Variables</i>	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover Shock	-0.07*** (-3.62)	-0.09*** (-2.75)	-0.03* (-1.77)	-0.10*** (-4.54)	-0.02 (-1.13)	-0.06** (-2.43)	-0.07** (-2.23)
Target Adjustments	0.75*** (32.37)	0.81*** (21.14)	0.72*** (20.57)	0.78*** (23.43)	0.75*** (20.50)	0.81*** (23.44)	0.71*** (15.56)
Intercept	0.05 (0.79)	0.01 (0.40)	-0.03 (-0.99)	-0.01 (-0.31)	0.05*** (2.78)	0.10** (2.17)	0.05 (1.25)
Year&Location&Rating Dum.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Adjusted R-squared	0.3488	0.4008	0.3058	0.3706	0.3443	0.3641	0.3492
Number of Observations	4,563	2,266	2,297	2,299	2,263	2,315	2,248

Table X
Results with an Alternative Measure of Investment Horizon

This table presents estimation results of the financing choice and leverage models with an alternative measure of horizon. The variable *mutual fund fraction*_{*i,t*} is defined as: (the fraction of firm *i*'s bonds owned by mutual funds)/(the fraction of firm *i*'s bonds owned by mutual funds + the fraction of firm *i*'s bonds owned by insurance companies + the fraction of firm *i*'s bonds owned by pension funds) (all in period *t*). The lagged value of this variable is included as a measure of investment horizon. For brevity, only the coefficients and *t*-statistics (in parentheses) for the variable of interest, *mutual fund fraction*, are reported. Though unreported, all the other independent variables included in the baseline models (as in Tables III- V) are also included in the estimations.

<i>Independent Variables</i>	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
	(1)	High	Low	High	Low	High	Low
Panel A: Financing Choice Models							
Panel A-1: Bond Issuance Choice							
Mutual Fund Fraction	-0.38** (-2.48)	-0.76*** (-3.20)	-0.12 (-0.58)	-0.35* (-1.73)	-0.45* (-1.84)	-0.58*** (-2.91)	-0.13 (-0.55)
Panel A-2: Equity Issuance Choice							
Mutual Fund Fraction	0.24* (1.76)	0.34 (1.63)	0.02 (0.12)	0.34** (1.97)	0.19 (0.98)	0.27* (1.78)	0.10 (0.39)
Panel A-3: Bank Borrowing Choice							
Panel A-3-1: Full Sample Baseline Model							
Mutual Fund Fraction	0.28*** (2.65)	0.43*** (3.03)	0.15 (0.97)	0.38** (2.57)	0.18 (1.15)	0.28** (2.23)	0.24 (1.33)
Panel A-3-2: Term Loan Choice							
Mutual Fund Fraction	0.39*** (2.89)	0.69*** (3.92)	0.01 (0.05)	0.48*** (2.70)	0.23 (1.22)	0.46*** (2.77)	0.08 (0.34)
Panel A-3-3: Bank/Bond Choice							
Mutual Fund Fraction	0.67*** (2.83)	0.99** (2.41)	0.58 (1.62)	0.35 (1.00)	0.87** (2.18)	1.04*** (3.13)	0.23 (0.46)
Panel A-4: CP Issuance Choice							
Mutual Fund Fraction	-0.38 (-1.18)	-0.32 (-0.88)	-0.67 (-1.40)	-0.57 (-1.31)	-0.69* (-1.79)	-0.55 (-1.34)	-0.60 (-1.18)
Panel B: Leverage Models							
Mutual Fund Fraction	-0.04*** (-2.62)	-0.04** (-2.07)	-0.03* (-1.88)	-0.03 (-1.36)	-0.05** (-2.09)	-0.04** (-2.30)	-0.02 (-1.06)

Table XI
IV Estimation Results

This table presents the IV estimation results of the firm's financing choice and leverage models. Panel A presents the MLE estimation results of IV probit models to analyze the firm's incremental finance choices such as bond, equity, bank loan, and CP backup line of credit. For the bank loans vs. bond choice analysis, we further disaggregate the bank loan choice into term loans and (non-CP) line of credit. We use the *Local mutual fund fraction dummy* as our instrument for Panel A. Panel B presents the linear IV estimation results of the leverage models; We use the *High local mutual fund fraction dummy* and *Local Turnover* as our instruments for Panel B. See Appendix for the definitions of the instrument variables. For the sake of brevity, only the coefficients and *t*-statistics (in parentheses) for the variable of interest, *the instrumented Horizon*, are reported. We also report the first-stage *F*-statistics and *p*-values for overidentification tests (in panel B).

Panel A: IV Probit Models for the Firm's Financing Choices

<i>Independent Variables</i>	Bond	Equity	Bank	CP	Bond vs. Bank	Bond vs. Term Loan	Bond vs. Line of Credit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Horizon (Instrumented)	-6.88*** (-3.41)	6.37*** (2.62)	1.25 (0.37)	-7.10*** (-2.84)	7.22*** (3.59)	7.14*** (2.79)	7.87*** (4.76)
Control Variables	Y	Y	Y	Y	Y	Y	Y
Year Dummies	Y	Y	Y	Y	Y	Y	Y
Rating Dummies	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	Y	Y	Y	Y	Y	Y	Y
Location Dummies	Y	Y	Y	Y	Y	Y	Y
Clustering at	Firm	Firm	Firm	Firm	Firm	Firm	Firm
No. of Obs.	4101	4101	4101	4101	1166	816	1121
First-stage <i>F</i> -stat	18.20	18.20	18.20	18.20	10.93	12.24	9.14

Panel B: Linear IV Models for Leverage

<i>Independent Variables</i>	Market Leverage	Book Leverage	Market Leverage (Dynamic Adjustment)	Book Leverage (Dynamic Adjustment)
	(1)	(2)	(3)	(4)
Horizon(Instrumented)	-0.70*** (-2.68)	-0.36** (-2.12)	-0.68** (-2.48)	-0.30* (-1.74)
Control Variables	Y	Y	Y	Y
Year Dummies	Y	Y	Y	Y
Rating Dummies	Y	Y	Y	Y
Industry Dummies	Y	Y	Y	Y
Location Dummies	Y	Y	Y	Y
Firm Fixed Effects	Y	Y	Y	Y
Clustering at	Firm	Firm	Firm	Firm
No. of Obs.	4098	4098	4061	4061
First-stage <i>F</i> -stat	14.31	14.31	11.89	11.89
Overidentification				
Hansen (<i>p</i> -value)	0.55	0.92	0.51	0.25

Table XII
Debt Maturity

This table presents the estimation results of the firm's debt maturity choice model. Panel A reports the results for the bond sample; Panel B reports the results for the bank loan sample; Panel C is based on the term loan sample. The dependent variable is debt maturity in number of years. For each rating category, *Long-term Bond Turnover* is defined as the value-weighted average turnover across all investors with holdings in long-term bonds (maturity of more than 5 years). *Short-term Bond Turnover* is defined similarly for bonds with maturity of less than 3 years. *Turnover(Long-Short)* is the difference between the two. To address the potential endogeneity of debt instrument choice, we run a first-stage regression (unreported) of bank loan vs. bond binary probit model and include the inverse Mill's ratio (Heckman's lambda) in the second-stage regression (reported below). For Panel A, the first-stage dependent variable is 1 if it is a bond and 0 if it is a loan; For Panel B and C the first-stage dependent variable is 1 if it is a loan and 0 if it is a bond. All of the specifications include year-, industry-, location- and credit rating dummies. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively, using heteroscedasticity-robust standard errors with *t*-statistics given in parentheses.

Panel A: Bond Maturity

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover(Long-Short)	-25.04** (-2.13)	-41.40** (-2.45)	-10.97 (-0.60)	-40.67*** (-2.75)	-10.18 (-0.46)	-37.96** (-2.43)	-28.60 (-1.63)
Bond Flow	-1.38 (-0.54)	-3.52 (-0.89)	-0.74 (-0.22)	-4.40 (-1.10)	0.10 (0.03)	-3.08 (-0.69)	-1.74 (-0.55)
Bond-Corporate Debt Ratio	2.15 (1.35)	4.69** (2.11)	0.32 (0.12)	2.35 (0.88)	1.48 (0.72)	3.91 (1.36)	2.59 (1.26)
Stock Turnover	-4.06 (-0.54)	-22.23* (-1.93)	7.56 (0.75)	18.11 (1.40)	-21.31** (-2.24)	-13.82 (-1.11)	-6.49 (-0.66)
Stock Flow	13.20 (0.76)	18.91 (0.73)	22.62 (0.91)	-6.37 (-0.21)	44.27** (1.98)	63.69** (2.44)	13.99 (0.59)
Stock Holding Fraction	-0.29 (-0.19)	-2.80 (-1.15)	0.07 (0.03)	-1.75 (-0.69)	0.26 (0.13)	3.85 (1.49)	-1.46 (-0.71)
Abnormal Return	0.31 (0.34)	1.29 (0.90)	-0.42 (-0.35)	0.38 (0.26)	0.80 (0.66)	0.89 (0.62)	-0.36 (-0.30)
Amihud's Illiquidity	0.00 (0.55)	0.01 (0.61)	0.02 (1.57)	-0.01 (-1.24)	0.01 (0.90)	0.00 (0.30)	0.00 (0.51)
Stock Return Volatility	-13.07 (-1.64)	-13.23 (-1.22)	-12.76 (-1.08)	-17.46 (-1.47)	-22.13* (-1.79)	-15.69 (-1.54)	-11.89 (-0.92)
Asset Tangibility	6.81*** (2.99)	6.49 (1.55)	4.27 (1.46)	12.36*** (3.25)	3.32 (1.09)	6.23* (1.67)	8.82*** (2.72)
Firm Size	0.25 (0.63)	1.18* (1.93)	-0.35 (-0.57)	0.78 (1.04)	0.78 (1.44)	1.40* (1.82)	0.42 (0.78)
Profitability	1.00 (0.15)	-18.27 (-1.57)	8.15 (0.96)	-1.83 (-0.17)	12.16 (1.36)	-5.40 (-0.64)	8.86 (0.83)
Research & Development	2.72 (0.20)	2.16 (0.12)	-21.36 (-0.77)	-11.97 (-0.60)	-12.57 (-0.60)	17.23 (0.93)	-16.50 (-0.79)
R&D Dummy	-0.81 (-1.20)	-0.53 (-0.49)	-1.70* (-1.78)	-2.13* (-1.89)	-1.13 (-1.19)	0.59 (0.55)	-1.89** (-1.96)
Altman's z-Score	-1.10** (-2.16)	-0.40 (-0.49)	-1.56** (-2.14)	-0.81 (-1.01)	-1.94** (-2.52)	-0.78 (-1.07)	-1.91** (-2.33)
Asset Maturity	0.02 (0.44)	-0.10 (-1.03)	0.15** (2.06)	-0.19** (-2.20)	0.18** (2.31)	0.20** (1.98)	-0.03 (-0.36)
Capital Expenditure	-8.34 (-1.10)	23.86 (1.40)	-9.79 (-1.07)	6.08 (0.47)	-8.93 (-0.90)	-5.64 (-0.49)	-12.86 (-1.18)
Market-to-Book	-0.22 (-0.58)	0.15 (0.27)	-1.19** (-2.08)	0.18 (0.31)	-1.25** (-2.28)	0.12 (0.22)	-0.73 (-1.32)
Book Leverage	-1.46 (-0.59)	3.60 (1.02)	-1.78 (-0.49)	-5.26 (-1.40)	-0.81 (-0.22)	0.61 (0.15)	-2.84 (-0.89)
Inverse Mill's Ratio	-2.33** (-1.98)	-5.89*** (-3.08)	-0.23 (-0.14)	-2.58 (-0.99)	-4.28*** (-2.76)	-6.14* (-1.84)	-2.97** (-1.96)
Adjusted R-squared	0.0179	0.0305	0.0284	0.0369	0.0245	0.0361	0.0221
Number of Observations	947	490	457	375	572	291	656

Table XII (Cont'd)
Panel B: Bank Debt Maturity (Term Loan and Line of Credit)

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover (Long-Short)	4.43** (2.61)	7.49*** (3.27)	1.58 (0.62)	4.34** (2.07)	2.66 (0.84)	6.52*** (3.08)	6.71** (1.96)
Bond Flow	0.19 (0.40)	-0.19 (-0.30)	0.47 (0.68)	-0.17 (-0.30)	0.41 (0.48)	-0.48 (-0.86)	1.44* (1.72)
Bond-Corporate Debt Ratio	0.40 (1.40)	0.57 (1.42)	0.37 (0.89)	1.12*** (2.84)	-0.63 (-1.55)	-0.20 (-0.49)	0.43 (1.06)
Stock Turnover	1.67 (1.55)	1.64 (1.17)	1.03 (0.63)	3.08** (2.19)	-0.78 (-0.47)	2.69** (2.11)	-0.07 (-0.04)
Stock Flow	2.28 (0.76)	4.91 (1.02)	0.90 (0.23)	7.61* (1.83)	-2.57 (-0.59)	3.57 (0.94)	1.50 (0.30)
Stock Holding Fraction	0.69** (2.37)	1.00** (2.28)	0.53 (1.31)	0.72* (1.83)	0.54 (1.23)	0.76** (2.05)	0.52 (1.07)
Abnormal Return	0.11 (0.75)	0.31 (1.38)	0.02 (0.10)	-0.05 (-0.28)	0.12 (0.56)	0.03 (0.20)	0.24 (0.96)
Amihud's Illiquidity	0.00 (1.29)	0.00 (0.90)	0.00 (0.95)	0.00 (0.69)	0.00 (1.17)	-0.00 (-1.01)	0.00 (1.07)
Stock Return Volatility	-0.90 (-0.78)	-2.20 (-1.21)	0.63 (0.42)	0.38 (0.24)	-1.58 (-0.92)	-1.17 (-0.89)	0.02 (0.01)
Asset Tangibility	0.29 (0.73)	-0.22 (-0.33)	0.59 (1.15)	1.15** (2.08)	-0.54 (-0.91)	-0.29 (-0.59)	0.78 (1.11)
Firm Size	0.06 (0.78)	0.12 (0.92)	-0.04 (-0.31)	0.03 (0.24)	0.13 (1.09)	-0.01 (-0.06)	0.28** (2.34)
Profitability	4.23*** (4.04)	4.42** (2.39)	4.17*** (3.19)	4.91*** (3.13)	3.49** (2.35)	3.35*** (2.66)	6.44*** (3.16)
Research & Development	-6.97** (-2.59)	-7.67* (-1.80)	-6.09* (-1.69)	-4.99 (-1.41)	-10.50** (-2.41)	-3.12 (-0.95)	-13.28*** (-2.76)
R&D Dummy	-0.08 (-0.59)	0.05 (0.24)	-0.15 (-0.85)	0.03 (0.19)	-0.23 (-1.20)	-0.13 (-0.80)	0.08 (0.36)
Altman's z-Score	-0.13 (-1.40)	-0.00 (-0.02)	-0.19 (-1.50)	-0.21 (-1.56)	-0.02 (-0.12)	-0.02 (-0.20)	-0.21 (-1.43)
Asset Maturity	-0.03** (-2.40)	-0.05*** (-2.73)	-0.01 (-0.55)	-0.05*** (-2.99)	-0.01 (-0.66)	0.01 (0.50)	-0.05*** (-2.78)
Capital Expenditure	-1.37 (-0.95)	5.37* (1.95)	-4.36** (-2.59)	-3.59* (-1.82)	0.79 (0.36)	-2.84* (-1.68)	1.18 (0.41)
Market-to-Book	-0.10 (-1.21)	-0.10 (-0.68)	-0.12 (-1.15)	-0.17 (-1.56)	-0.04 (-0.31)	0.03 (0.24)	-0.23 (-1.66)
Book Leverage	1.24*** (2.89)	1.83*** (2.85)	0.83 (1.39)	1.49*** (2.65)	0.38 (0.54)	1.70*** (2.99)	0.47 (0.71)
Inverse Mill's Ratio	-1.35** (-2.03)	-2.53** (-2.35)	-0.11 (-0.13)	-0.62 (-0.62)	-2.53*** (-2.73)	0.09 (0.09)	-3.01*** (-3.28)
Adjusted R-squared	0.0611	0.0815	0.0615	0.0784	0.0675	0.0743	0.0785
Number of Observations	1309	660	649	699	610	708	601

Panel C: Bank Debt Maturity (Term Loan)

	Full Sample	Home Area Ownership		Investor Herding		Geographic Clustering	
		High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Turnover (Long-Short)	7.59** (2.55)	6.54* (1.72)	8.75* (1.71)	7.43** (2.08)	2.96 (0.47)	12.01*** (3.24)	8.16 (1.23)
Adjusted R-squared	0.0938	0.1134	0.1028	0.1241	0.1053	0.0968	0.1388
Number of Observations	487	268	219	300	187	305	182