Cross-Market Timing in Security Issuance

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Abstract

The conventional view on market timing, based on the assumption that equity and debt markets are perfectly segmented, predicts a negative correlation between equity misvaluation and changes in leverage ratio. Specifically, firms with overvalued (undervalued) equity issue more (less) equity, and holding investment opportunities constant, less (more) debt. In this paper, we argue that this conventional view is incomplete. Using price pressure resulting from mutual funds' flow-induced trading to identify equity misvaluation, we show that when equity is overvalued, firms in the bottom tercile of external-finance dependence indeed issue more equity and less debt, resulting in a lower leverage ratio. In contrast, firms that are in the top tercile of external-finance dependence issue both more equity and debt to increase investment, leading to a slight (insignificant) increase in leverage ratio. In sum, this paper provides a comprehensive analysis of firms' equity and debt financing, as well as investment, decisions in response to non-fundamental movements in stock price.

Keywords: Market timing, Security issuance, Capital structure, Investment.

JEL Classification: G12, G14.

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1 Introduction

Market timing refers to the practice of issuing securities (equity or debt) at abnormally high prices, and repurchasing at abnormally low prices.[1] Prior studies on market time make the simplifying assumption, either implicitly or explicitly, that equity and debt markets are perfectly segmented; put differently, equity mispricing has no effect on the firm's cost of debt or debt capacity. Consequently, debt issues in the presence of equity misvaluation are simply to "take up the slack" between investment and equity issuance (e.g., Stein (1996)). For example, when equity is overvalued, firms should issue more equity, and holding investment opportunities constant, less debt. This conventional view on market timing predicts an unambiguous negative relation between equity misvaluation and changes in leverage ratio.

In this paper, we argue that the conventional view is incomplete. We start by questioning the basic assumption that equity misvaluation has no impact on a firm's cost of debt. Asset pricing theories maintain that the cost of (risky) debt is closely tied to the cost of equity, as both are risky claims on the same underlying assets. There are a number of channels through which temporary movements in stock price can lead to temporary fluctuations in debt yield. First of all, stock prices are an important ingredient to credit ratings, which in turn are a crucial determinant of debt yields. To the extent that credit rating agencies are unable to fully distinguish noise from value-relevant information, temporary shocks to stock prices can affect a firm's cost of debt. Relatedly, investors in the debt market may learn directly from stock prices (besides learning indirectly through credit ratings), which can cause a similar spillover effect. Second, a temporary rise (fall) in stock price can lower (increase) a firm's market leverage, and in turn its marginal cost of debt. This leverage effect is further amplified as firms issue overpriced equity or buy back underpriced equity. Third,

[1] Consistent with this market timing hypothesis, prior research finds that firms issuing both equity and debt underperform their peers subsequently. For example, Ritter (1991), Spiess and Affleck-Graves (1995), and Loughran and Ritter (1995, 2002) document lower abnormal stock returns after both initial and seasoned equity offerings. Lee and Loughran (1998), Dichev and Piotroski (1999), and Spiess and Affleck-Graves (1999) find that both straight and convertible debt issuers have lower subsequent stock returns. There is also supportive evidence of market timing at the market level. Baker and Wurgler (2000) document that a higher share of equity issues in total equity and debt issues forecasts lower stock market returns; Baker, Greenwood, and Wurgler (2003), Greenwood and Hansen (2010), and Greenwood, Hanson, and Stein (2010) show that the share of long-term and junk grade debt issues in total debt issues negatively predicts future excess bond returns. Baker and Stein (2004) argue that market timing does not necessarily require firm managers to have perfect knowledge of their firm value; managers can follow some simple rules of thumb, such as the liquidity of their debt and equity securities.

cross-market arbitrageurs, in their attempt to close the gap between a firm's cost of equity and its cost of debt, can also spread temporary shocks from one market to the other.

Given the spillover effect of misvaluation between equity and debt markets, there are potentially two types of market-timing strategies that involve issuing different amounts of equity and debt in response to equity misvaluation. First, as stated by the conventional view, since equity and debt are usually misvalued to different degrees, firms can issue the more overpriced security and use the proceeds to reduce the less overpriced security, so as to benefit from the *relative* mispricing between equity and debt. Alternatively, since equity and debt are claims on the same underlying assets and are likely to be misvalued in the same direction, firms can issue more of both when both are more overpriced, so as to exploit the *absolute* mispricing in the two securities. The two market-timing strategies have different implications for firms' capital structure: the first strategy unambiguously predicts a negative relation between equity mispricing and changes in leverage ratio, while the second strategy has no such implication. Consequently, to understand the impact of market timing incentives on firms' financial policy, we must first understand how the two forms of market timing incentives affect firms differentially in the cross-section.

Our empirical approach is motivated by the theoretical work of Stein (1996) and Baker, Stein, and Wurgler (2003), in which firms' issuance decisions are closely tied to their dependence on external financing. In particular, we argue that firms with sufficient internal resources act as "arbitrageurs" of their own securities to exploit *relative* mispricing between equity and debt. Specifically, we predict that these firms display a positive sensitivity of equity issues to equity misvaluation and yet a negative sensitivity of debt issues to equity misvaluation. For example, given a positive demand shock in the equity market, we expect these firms to issue more equity and all else equal less debt.

As firms become more dependent on external capital to finance their desired investments, we predict that these firms use less of the proceeds from issuing overpriced equity to reduce debt, and use more of the proceeds to increase investment. Put differently, we expect a rise in the sensitivity of debt issues to equity misvaluation as a function of external-finance dependence. For firms that are heavily dependent on external financing, we may even observe a positive sensitivity of debt issues to equity misvaluation. This is because as firms issue overpriced equity to finance their desired investments, their equity value goes down in issuance size (while their debt capacity increases); at some point, it becomes optimal to issue both overpriced equity and debt to increase investment.

To test these predictions, we need two key variables: a measure of equity misvaluation and a proxy for external-finance dependence. Our measure of price shocks in the equity market is motivated by prior research on mutual fund flows. A number of recent studies find that capital flows to individual mutual funds can have significant impacts on stock returns and that this return effect is gradually reversed (see, for example, Coval and Stafford (2007), Frazzini and Lamont (2008), and Lou (2010)). Compared to the extant measures used in prior literature on market timing, such as Tobin's Q, our measure based on mutual fund flows is less confounded by firms' investment opportunities.[2] Following Edmans, Goldstein, and Jiang (2010) and Lou (2010), we construct a measure of flow-induced price pressure ($FIPP$) for individual stocks by aggregating flow-induced trading – i.e., the part of mutual fund trading that is proportional to capital flows – across all mutual funds. Consistent with prior studies, we find that $FIPP$ is a significant and negative predictor of subsequent stock returns. Moreover, consistent with the notion that equity and debt are jointly (mis)priced, $FIPP$ also significantly predicts subsequent changes in credit spreads of publicly traded bonds: A one-standard-deviation increase in $FIPP$ measured over a year forecasts a rise in credit spread of 26 bp ($p < 0.05$) subsequently (or equivalently, a 1.3% drop in bond returns).

Building on the spillover effect of demand shocks in the equity market on the cost of debt, we then analyze firms' debt financing decisions in response to equity misvaluation. Following Lamont, Polk, and Saa-Requejo (2001) and Baker, Stein, and Wurgler (2003), we use one off-the-shelf measure of external finance dependence based on the work of Kaplan and Zingales (1997). The KZ index is simply a linear combination of a firm's cash holdings, dividend payout ratio, cash flows, and leverage ratio. In robustness checks, we also use individual components of the KZ index, as well as firm age, to gauge external finance dependence, and obtain similar results.

Our main results are as follows. First, the average firm in our sample issues both more equity and

[2]Frazzini and Lamont (2008), Khan, Kogan, and Serafeim (2009), and Edmans, Goldstein, and Jiang (2010) employ similar flow-based measures of equity mispricing to study corporate finance issues.

debt in response to the flow-induced price effect in the equity market. Second and more importantly, there is substantial variation in financing decision across firms with different external financing needs. On the one hand, non-external-finance-dependent firms issue more equity and less debt with higher flow-induced price pressure, leading to a significant drop in leverage ratio. On the other hand, external-finance-dependent firms issue both more equity and debt, and experience a slight (albeit insignificant) increase in leverage ratio. The difference in financing choice between external-finance dependent and non-dependent firms is both economically and statistically significant.[3]

Finally, to complement the results on financial policy, we examine firms' investment decisions in response to mutual fund flow-induced trading. Consistent with our prediction that non-external-finance-dependent firms act as arbitrageurs of their own securities, we find that these firms have a sensitivity of investment to equity misvaluation that is not different from zero. In contrast, firms that rely heavily on external financing have a significant and positive investment sensitivity to equity misvaluation. The finding that firms with sufficient internal resources do not change their investment in response to mutual fund flow-induced trading is inconsistent with the alternative, Q-theory based interpretation of our results. If mutual fund flows (thus flow-induced trading) reflect investment opportunities of underlying firms, we expect that non-external-finance-dependent firms exhibit a stronger sensitivity of investment to $FIPP$ than external-finance-dependent firms, as the former can more easily finance any additional investment projects.

Our results on debt issuance as a function of equity misvaluation indicate that the conventional view of market timing inducing a negative relation between equity misvaluation and the leverage ratio is incomplete. While this conventional view holds for non-external-finance-dependent firms, it is inconsistent with the data for external-finance-dependent firms. In addition, for the whole sample, there is no clear relation between equity misvaluation and changes in leverage ratio. Our results thus call into question the theoretical motivation for prior studies that try to test a linear relation between equity misvaluation and changes in capital structure.[4]

[3]The finding that debt issuance is more sensitive to equity mispricing among external-finance-dependent firms than among non-dependent firms can be also inferred from the last table in Baker, Stein, and Wurgler (2003). However, their focus is on a different question – how the sensitivity of investment to equity mispricing varies with equity dependence – and they do not discuss this particular finding in the paper.

[4]For example, our results provide an alternative explanation for the finding in Butler, Cornaggia, Grullon, and Weston (2010) that the composition of equity and debt issuance has no predictive power for future stock returns after

Moreover, our results have implications for the debate on the real effect of stock market (in)efficiency.[5] Baker, Stein, and Wurgler (2003) provide evidence that equity misvaluation can impact firm investment through a financing channel. In particular, the authors find that firms that are more dependent on external financing display a stronger sensitivity of investment to non-fundamental shocks to equity value. Our paper complements Baker, Stein, and Wurgler (2003) by suggesting a potential role of debt issuance in the financing channel. When equity is overvalued (and so is debt), firms that do not rely on external capital issue more equity to reduce debt without changing their investment, while firms heavily dependent on external finance issue both more equity and debt to increase investment. In a way, debt issues are more closely tied to the variation in investment across firms with different external financing needs.

The paper proceeds as follows. Section 2 describes the data sample and screening procedures. Section 3 examines the effect of mutual fund flow-induced trading on subsequent equity and bond returns. Sections 4 presents our main results of debt and equity financing decisions in response to equity misvaluation. Section 5 conducts further robustness checks. Finally, section 6 concludes.

2 Data and Main Variables

2.1 Stock and Bond Data

Transaction prices of publicly traded bonds are obtained from two sources.[6] The first data source is the National Association of Insurance Commissioners's (NAIC) bond transaction files, which cover all insurance companies' trading records of publicly traded bonds in the post-1994 period. The second data source is the Trade and Reporting Compliance Engine (TRACE) database that initiated coverage in 2002. Compared to NAIC transaction files, TRACE provides more comprehensive coverage of bond transactions by all market participants (rather than only insurance companies). Thus, whenever possible, we use pricing information provided by TRACE in our analyses. To reduce data errors in bond prices, we clean up NAIC transaction files following the procedures

controlling for total issuance.

[5]See, for example, Morck, Shleifer, and Vishny (1990); Gilchrist, Himmelberg, and Huberman (2005); Polk and Sapienza (2008).

[6]All analyses in this paper that involve bond prices and yields are based on transaction prices. This is to minimize the impact of stale bond prices.

outlined in Schultz (2001) and Campbell and Taksler (2003), and the TRACE database using the procedures suggested in Bessembinder, Kahle, Maxwell, and Xu (2008).

To minimize the impact of remaining data errors, we compute daily volume-weighted average bond prices, and use the last available daily price in each quarter as the quarter-end price. We then compute quarterly bond yields and durations by combining quarter-end bond prices with coupon information. Finally, for the benchmark rate that is needed to calculate credit spreads, we use a linear interpolation of the yields of the two on-the-run government bonds bracketing the corporate bond in terms of duration.

The detailed characteristics of individual bond issues (e.g., the coupon rate, maturity date, offering amount, and various special features) are obtained from the Mergent's Fixed Income Security Database (FISD). The time-series of credit ratings for each bond issue is extracted from FISD's rating files. If a bond has multiple ratings from different credit rating agencies, we take the average rating across all agencies. We also obtain from Moody's-KMV the historical Expected Default Frequencies (EDF) for nearly all public firms in our sample from January, 1994 to December, 2009.

We apply several filters to our sample to remove bonds with special features and apparent data errors. Specifically, we exclude all convertible bonds, pay-in-kind bonds, asset backed securities, Yankee bonds, Canadian bonds, bond denominated in non-U.S. currencies, floating-rate bonds, unit deals, puttable bonds, exchangeable bonds, perpetual bonds, agency bonds, and bonds issued by quasi-government agencies. Since removing callable bonds would reduce our sample size substantially, we keep them in the sample and correct for this feature in our regressions using a dummy variable. We only include bond-quarter observations for which at least one transaction price is reported by either TRACE or NAIC transaction files.

Finally, stock price, trading volume, and market capitalization are obtained from the Center for Research in Security Prices (CRSP). Accounting data, such as balance sheet, earnings, and cash flow information, is collected from Standard and Poor's COMPUSTAT database. Following the standard approach, we exclude utilities (SIC codes 4900 - 4999) and financial firms (SIC codes 6000 - 6999), as well as stocks priced below five dollars a share, from our analyses.

2.2 Mutual Fund Flow-Induced Price Pressure

Our measure of temporary shocks to equity prices is borrowed from the mutual fund literature. Following Edmans, Goldstein, and Jiang (2010) and Lou (2010), we construct a quarterly measure of flow-induced price pressure as

$$FIPP_{j,t} = \frac{\sum_i shares_{i,j,t-1} * percflow_{i,t}}{\sum_i shares_{i,j,t-1}}, \tag{1}$$

where $shares_{i,j,t-1}$ is the number of shares held by mutual fund i at the end of the previous quarter, and $percflow_{i,t}$ the capital flow to mutual fund i in quarter t as a fraction of its total net assets at the beginning of the quarter. We also use total shares outstanding or lagged trading volume in the denominator and the results are by and large unchanged. Next, we calculate annual $FIPP$ by aggregating quarterly $FIPP$ in four consecutive quarters. In all the following analyses, we use this annual $FIPP$ measure as our proxy for demand shocks in the stock market.

Mutual fund flow and return data are obtained from the CRSP survivorship-bias-free mutual fund database; quarterly stock holdings are obtained from the CDA/Spectrum 13-F mutual fund holdings database. We link the CRSP mutual fund dataset with the CDA/Spectrum holdings database using the MFLINK file. We exclude all international, fixed-income, and precious metal funds from the sample; equivalently, we only retain diversified domestic equity mutual funds in the construction of $FIPP$. Our results are robust to the inclusion or exclusion of sector funds.

2.3 External Finance Dependence

Based on the work of Kaplan and Zingales (1997), Lamont, Polk, and Saa-Requejo (2001) and Baker, Stein, and Wurgler (2003) construct a Kaplan and Zingales (KZ) index to measure external finance dependence. Specifically, the KZ index is defined as

$$KZ_{i,t} = -1.002\frac{CF_{i,t}}{A_{i,t-1}} - 39.368\frac{DIV_{i,t}}{A_{i,t-1}} - 1.315\frac{CASH_{i,t}}{A_{i,t-1}} + 3.139Lev_{i,t} + 0.283Q_{i,t}, \tag{2}$$

where $CF_{i,t}$ is the cash flow of firm i in fiscal year t, A the total assets, DIV the dividend, $CASH$ the cash balance, Lev the book leverage, and Q (i.e., Tobin's Q) the market value of equity plus the book value of debt divided by lagged total assets. All variables are winsorized at the 1st and 99th percentiles to mitigate the impact of outliers.

Following Baker, Stein, and Wurgler (2003), we exclude Tobin's Q from the construction, as we explicitly control for Q in all our regression specifications. Our results are robust to the individual components of the KZ index, as well as other commonly used proxies for extern finance dependence, such as firm size and age.

2.4 Summary Statistics

Table I shows the summary statistics of the main variables used in the paper.[7] Our sample spans the period of 1980-2009 (constrained by the availability of mutual fund data). Consistent with large capital inflows to equity mutual funds in our sample period, the average annual flow-induced price pressure ($FIPP$) is a positive 3.22% with a standard deviation of 9.12%. The average credit spread for an individual bond issue is 2.74%, while the average expected default frequency (EDF) is 0.74%.[8] In addition, consistent with the result in Fama and French (2005), we see in our sample that public bond issuance is less frequent than equity issuance, but has larger offering size than the latter (3.28% of lagged total assets vs. 2.62%).

Net equity and debt issues in each fiscal year are obtained from Compustat. The average cash flow from financing activities (as a fraction of lagged total assets) is 7.25%, slightly larger than the sum of average debt and equity issuance (2.71%+3.24%=5.95%). The difference between the two reflects cash dividends and other unclassified financing activities. The average cash flow from all investing activities is -12.91%.[9] It is not surprising that the magnitude of investment cash flows is larger than that of financing cash flows; the gap between the two is filled by cash flows generated by firm operations.

[7]More details about variable definitions and constructions, as well as data sources, are provided in Appendix A.

[8]The expected default frequency (EDF), as provided by Moody's KMV, is winsorized at 35%. However, there are very few firms with default probability (in the next one year) exceeding 35%.

[9]The negative sign is due to the accounting convention that investment represents cash outflows.

3 Return Effects of Fund Flow-Induced Trading

Our measure of demand shocks in the equity market is borrowed from the mutual fund literature. Recent studies find that mutual funds tend to expand or liquidate their existing holdings in response to capital flows, and that such flow-induced trading can cause significant price pressure on individual stocks (see, for example, Coval and Stafford (2007), Frazzini and Lamont (2008), and Lou (2010)). Compared to the measures of equity misvaluation used in prior literature on market timing, such as Tobin's Q and lagged (future) stock returns, our measure based on mutual fund flows is less related to firms' growth opportunities and can thus provide a cleaner test of the timing hypothesis.[10] Moreover, unlike many other price pressure measures, the flow-induced return effect is gradually reversed in the subsequent one to two years, leaving plenty of time for firm managers to adjust their financing policy.[11]

We start our analysis by replicating prior studies on the stock return effect of mutual fund flow-induced trading. At the end of each quarter, we sort all stocks into deciles based on the aggregate price pressure caused by mutual fund flow-induced trading in the previous year (labeled $FIPP$). We then form a self-financed portfolio that goes long in stocks experiencing the largest flow-induced purchases and goes short in stocks with the largest flow-induced sales in the previous year. We hold the long-short portfolio formed at the end of each quarter for the next eight quarters and report its average monthly returns over different holding periods.[12]

The results, shown in Table II, confirm the findings in prior research. $FIPP$ significantly and negatively forecasts monthly stock returns after quarter three. The long-short hedging portfolio generates equal-weighted monthly excess returns of -32 ($p > 0.1$) and -43 ($p < 0.05$) basis points in the subsequent two years, respectively. In other words, stocks in the top decile ranked by $FIPP$ underperform those in the bottom decile by 9.12% ($p < 0.01$) in the two years after portfolio formation. Adjusting these portfolio returns for the Fama-French three factor model only marginally

[10] In all subsequent analyses, we control for industry-fixed effects, the book-to-market ratio, and market capitalization to mitigate the impact of industry and style components in mutual fund flows. In robustness checks, we also use industry- and style-adjusted flows to compute flow-induced trading and obtain very similar results.

[11] The gradual, rather than immediate, reversal of flow-induce price effects is likely due to the persistence in mutual fund flows. As flow-induced trading keeps pushing the stock price away from its fundamental value in the same direction, the reversal effect appears gradually as the persistence in capital flows dissipates.

[12] We follow Jegadeesh and Titman (1993) to compute equal-weighted average returns across overlapping holdings in each quarter.

reduces the return effect; the difference in cumulative three-factor alpha between the top and bottom deciles is -8.40% ($p < 0.05$) in the subsequent two years. In addition, consistent with the observation that mutual funds tilt their holdings toward large and liquid stocks, the return effect is stronger for the analogous value-weighted long-short portfolio. The difference in cumulative valued-weighted portfolio returns between the top and bottom $FIPP$ deciles is -12.72% ($p < 0.01$) and that in cumulative value-weighted three factor alpha is -12.00% ($p < 0.01$), in the subsequent two years.

We next analyze the spillover effect from equity mivaluation to the cost of debt. Since equity and debt are claims on the same underlying assets (with different payoff structures), they should be subject to the same price or demand shocks. There are a number of channels through which price pressure in the stock market can affect a firm's cost of debt. First, debt investors may attempt to incorporate information reflected in equity returns into debt prices but are unable to differentiate information from temporary demand shocks.[13] This learning mechanism can be either direct or indirect (e.g., through credit ratings, which are known to be affected by past stock returns). Second, equity overvaluation (undervaluation) lowers (increases) a firm's market leverage ratio, and in turn its marginal borrowing cost. Relatedly, market timing activities in the equity market can make the leverage constraint more or less binding, which can also affect the firm's marginal cost of debt. Finally, arbitrage trades, which are aimed at closing the gap between a firm's cost of equity and its cost of debt, can also spread price shocks across the two markets. While the spillover effect between the two markets is a crucial building block of our hypothesis and empirical tests, we remain agnostic as to the exact mechanism driving this spillover effect.

We test this spillover effect in a regression framework. At the end of each quarter, we calculate the yield-to-maturity of each individual publicly-traded corporate bond based on its last daily trading price in that quarter. We then compute its quarter-end credit spread by subtracting the interpolated yield of Treasury securities with the same duration. We conduct a panel OLS regression with the dependent variable being the quarter-to-quarter change in credit spread. We use a Panel OLS approach instead of a Fama-MacBeth regression because we are dealing with a very imbalanced panel: a substantial fraction of our observations are concentrated in the years

[13] Kwan (1996), Gebhardt, Hvidkjaer, and Swaminathan (2005), and Downing, Underwood, and Xing (2009) show that equity returns are on average more sensitive to firm-specific information and lead bond returns.

after 2004, with the availability of the TRACE bond database. The main independent variable of interest in the regression is $FIPP$ measured at various horizons. We use quarterly observations in our regressions because a) mutual fund holdings are reported at a quarterly frequency, and b) trading in many corporate bond issuance is rather infrequent, thus conducting the analysis at a higher frequency may result in too many missing observations. Our prediction is that $FIPP$ should positively forecast changes in credit spread in subsequent quarters (put differently, negatively forecast future bond returns).

We also include in our regression a host of control variables that are known to be related to (changes in) credit spread. These control variables can be roughly divided into three categories. The first category is firm characteristics: firm size, the book-to-market ratio, lagged stock returns, market (or book) leverage ratio, the share of tangible assets in total assets, sales growth, return to equity, idiosyncratic volatility of daily stock returns based on the Carhart four-factor model, and the average expected default frequency (EDF) provided by Moody's KVM. The second group of control variables captures bond related features: the issue size, issue duration (and maturity), and coupon rate, and an indicator function that equals one if the issue is callable and zero otherwise. The third and last category reflects general debt market conditions; for this purpose, we include the cumulative CRSP value-weighted return in the previous year, the term spread between 10-year and 3-month treasury securities, and the credit spread between Moody's AAA- and BAA-rated corporate bonds at the end of the previous quarter. We also control for year-fixed effects to absorb additional variations at different points in time. To account for possible correlations within each issuer, we report standard errors clustered at the firm level.

The result of the baseline regression is presented in Panel A of Table 3. In each column, we fix the timing of $FIPP$ at the end of quarter zero, and vary the timing of the dependent variable from quarters one through eight. It is clear from the table that $FIPP$ computed at quarter zero is positively related to credit spread changes in quarters from three to eight, and the relation is statistically significant except for quarter three. In particular, a one-standard-deviation increase in $FIPP$ at the end of quarter zero forecasts higher credit spreads of 2.2 ($p > 0.1$), 3.1 ($p < 0.1$), 4.8 ($p < 0.05$), 5.2 ($p < 0.01$), 5.0 ($p < 0.01$), 5.3 ($p < 0.01$) basis points in quarters three to eight, respectively. The cumulative increase in credit spread of 25.6 ($p < 0.01$) basis points over these six quarters is statistically significant. Taking the average corporate bond duration in our sample of around five years, a one-standard-deviation increase in $FIPP$ implies a 1.3% lower bond return in these six quarters. It should not come as a surprise that the effect of $FIPP$ on bond returns is weaker than that on equity returns, as debt is less sensitive to information or demand shocks than equity, simply due to their different payoff structures.

An immediate followup prediction is that the impact of $FIPP$ on bond returns (or credit spreads) should be more pronounced for bonds that are more sensitive to demand shocks. To test this prediction, we classify all publicly traded bonds into two groups: one that is issued by investment-grade issuers and the other by non-investment-grade issuers (including non-rated issuers). For robustness, we also classify bond issues based on issue-specific ratings, and obtain similar results. As shown in Panels B and C, the effect of $FIPP$ on subsequent credit spread changes is insignificant (positive) for the investment-grade sample, while that for the non-investment-grade sample is both economically and statistically significant. Specifically, a one-standard-deviation increase in $FIPP$ is associated with a 13.6 ($p > 0.1$) basis point increase in credit spread among investment-grade issuers, and a 58.5 ($p < 0.01$) basis point increase among non-investment-grade issuers. Based on the average bond duration in our sample of five years, a one-standard-deviation increase in $FIPP$ implies a lower bond return of 2.9% in quarters three to eight for non-investment-grade issuers.

Taken together, the results shown in this section suggest that mutual fund flow-induced trading in the equity market can affect both a firm's cost of equity and its cost of debt. Moreover, such flow-induced price pressure is only gradually reversed in the subsequent two years. Given the magnitude and long-lasting nature of the return effect, the mechanism of flow-induced price pressure offers us a relatively clean and powerful setting to test the market timing hypothesis.

4 Cross-Market Timing

Most prior studies on market timing make the simplifying assumption, either implicitly or explicitly, that equity and debt markets are perfectly segmented. Put differently, equity mispricing has no impact on a firm's cost of debt or debt capacity. Consequently, debt financing, in the presence of equity misvaluation, is simply to take up the slack between firm investment and equity issuance. For example, firms with overvalued equity should issue more equity, and holding investment opportunities constant, less debt. This conventional view on market timing predicts an unambiguous negative relation between equity mispricing and changes in leverage ratio.

In this paper, we argue that the conventional view on market timing is incomplete. In particular, given our result that demand shocks in the equity market also affect a firm's cost of debt, we propose two types of market timing strategies that involve issuing differential amounts of equity and debt in response to equity misvaluation. We then relate firms' market timing choices to their different needs for external financing. In particular, we argue that firms with sufficient internal resources act as "arbitrageurs" of their own securities to exploit *relative* mispricing between equity and debt. More specifically, we predict that these firms display a positive sensitivity of equity issues to equity misvaluation and yet a negative sensitivity of debt issues to equity misvaluation. For example, given a positive demand shock in the equity market, we expect these firms to issue more equity and all else equal less debt.[14]

As firms become more dependent on external capital to finance their desired investments, we predict that these firms use less of the proceeds from issuing overpriced equity to reduce debt, and use more of the proceeds to increase investment. Put differently, we expect a rise in the sensitivity of debt issues to equity misvaluation as a function of external-finance dependence. For firms that are heavily dependent on external financing, we may even observe a positive sensitivity of debt issues to equity misvaluation. This is because as firms issue overpriced equity to finance their desired investments, their equity value goes down in issuance size (while their debt capacity increases); if a firm needs a sufficiently large amount of capital from external sources, it can be optimal to issue both overpriced equity and debt to increase investment.

[14] An implicit assumption we make here is that keeping excessive cash in the firm is costly.

4.1 Net Debt and Equity Issues

Following Baker, Stein, and Wurgler (2003) and Baker, Greenwood, and Wurgler (2003), our main measures of net equity and debt issues are constructed from firms' financial statements, which reflect all public and private placements, as well as issues that are expired or repurchased. Specifically, we define net debt issuance as the change in book debt between two consecutive years, and net equity issuance as the change in book equity minus retained earnings between two consecutive years.

To test the cross-market-timing hypothesis, we need a proxy for external finance dependence. Following Lamont, Polk, and Saa-Requejo (2001) and Baker, Stein, and Wurgler (2003), we use an off-the-shelf measure based on the work of Kaplan and Zingales (1997). The KZ index is defined as a linear combination of the dividend payout ratio, cash flow, cash holdings, leverage ratio, and Tobin's Q, where the coefficients are estimated from a small sample of manufacturing firms. Similar to Baker, Stein, and Wurgler (2003), we exclude Tobin's Q from our definition of the KZ index as we explicitly control for growth opportunities in all our regression specifications. For robustness checks, we also use individual components of the KZ index (i.e., cash holdings and dividend payments), as well as firm age, as our proxies for external finance dependence, and obtain similar results.

Specifically, we conduct the following panel OLS regression:

$$debt\_issue_{i,t} = \beta_0 + \beta_1 FIPP_{i,t-1} + \beta_2 KZ_{i,t-1} + \beta_3 KZ_{i,t-1} * FIPP_{i,t-1} + \Gamma * Control + \varepsilon_{i,t}. \quad (3)$$

The dependent variable is net debt issuance in fiscal year t. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. The set of control variables are identical to those in Table 3, except that here we replace the leverage ratio with leverage gap. The leverage gap, defined in Fama and French (2002) as the difference between a firm's current leverage ratio and its long-run average leverage ratio, reflects the firm's tendency to adjust its capital structure to its long-run mean.

Table 4 shows the regression results. Column one examines firms' overall debt financing decisions. After accounting for a host of predictors of debt issues, lagged $FIPP$ positively and significantly forecasts future debt issuance. A one-standard-deviation increase in $FIPP$ forecasts a 1.8 ($p < 0.1$) basis point increase in total debt issuance, as a fraction of lagged total assets, in the following fiscal year.

Column two conducts a similar analysis as that in column one, except that now we also include interaction terms between $FIPP$ and two indicator variables based on the KZ index. The first indicator variable, $MedianDependence$, takes the value of one if the firm in question is in the median KZ-index tercile, and zero otherwise; and the second indicator variable, $HighDependence$, takes the value of one if the firm is in the top KZ-index tercile. With the inclusion of these interaction terms, the coefficient on $FIPP$ reflects the sensitivity of debt issuance to equity misvaluation for non-external-finance-dependent firms, while the coefficients on $FIPP$ interacting with $MedianDependence$ and $HighDependence$ capture the difference in the sensitivity to $FIPP$ between the bottom and median KZ-index terciles, and that between the bottom and top KZ-index terciles, respectively.

The difference-in-sensitivity test yields an interesting pattern. Firms in the bottom tercile (i.e., firms that are least dependent on external finance) has a significantly negative sensitivity of debt issuance to $FIPP$, while firms in the median and top KZ terciles have a positive sensitivity. Specifically, a one-standard-deviation increase in $FIPP$ forecasts a 14.4 ($p < 0.01$) basis point reduction in debt issuance, as a fraction of lagged total assets, in the bottom tercile, a 6.5 (insignificant) basis point increase in debt issuance in the median tercile, and a 26.3 ($p < 0.01$) basis point increase in debt issuance in the top tercile in the following year. The difference in debt-issuance sensitivity to $FIPP$ between the bottom and median KZ-index terciles, and that between the bottom and top terciles are both economically and statistically significant (at the 1% level). These results provide support for our hypothesis that there exists substantial variation in debt financing decision across firms with different external financing needs.

To further understand the mechanism of cross-market timing, we conduct the same set of analyses on firms' long-term and short-term debt issuance decisions. Since long-term debt prices are more sensitive to changes in credit spread, we expect the cross-market timing behavior to be more pronounced in long-term than in short-term debt. The regression results of the two types of debt issuance are reported in columns three to six in Table 4.

As shown in columns three and four, a one-standard-deviation increase in $FIPP$ forecasts a 8.0 ($p < 0.05$) basis point increase in long-term debt issues in the following year, which is similar in magnitude to the coefficient reported in column one. There is also substantial cross-sectional variation in the sensitivity of long-term debt issues to equity misvaluation. Among the least external-finance-dependent firms, a one-standard-deviation increase in $FIPP$ is associated with a 11.6 ($p < 0.05$) basis point reduction in debt issuance in the next year. In contrast, a one-standard-deviation increase in $FIPP$ leads to a 27.1 ($p < 0.01$) basis point increase in debt issuance among the most external-finance-dependent firms. The difference between the coefficient estimates of the top and bottom KZ-index terciles is again statistically significant at the 1% level.

The last two columns of table 4 present the regression results of short-term debt issues. The coefficients have the right sign, but the magnitudes are much smaller. Specifically, $FIPP$ predicts a marginally significant reduction in short-term debt among the least external-finance-dependent firms, and yet has insignificant effect on short-term debt issues in the median and top terciles. Together, these results suggest that the cross-market timing behavior is almost exclusively concentrated in long-term debt issuance.

To draw a complete picture of firms' financing decisions in response to equity misvaluation, we next analyze their equity issues in the exact same setting. The regression specification is identical to that in equation (3), except that now the dependent variable is net equity issuance in fiscal year t. The regression results are shown in Table 5. As can be seen from column one, equity overvaluation has a large and significant effect on net issues in the following year across all firms; a one-standard-deviation increase in $FIPP$ forecasts a 13.3 ($p < 0.01$) basis point increase in equity issues in the following year.

In column two, we again classify firms into terciles based on their dependence on external capital, and examine the effect of equity misvaluation on subsequent equity issuance in these subsamples. In sharp contrast to the previously documented debt issuance patterns, equity issuance in response to $FIPP$ does not exhibit significant variation across terciles ranked by the KZ index. Specifically, A one-standard-deviation increase in $FIPP$ is associated with a 13.8 ($p < 0.01$), a 12.1 ($p < 0.01$), and a 14.0 ($p < 0.01$) basis point increase in equity issues in the following year in the least, median, and most external-finance-dependent terciles, respectively. The difference in the sensitivity of equity issuance to $FIPP$ between the bottom and median terciles, and that between the bottom and top terciles are statistically insignificant.

In addition, we conduct the same analysis using information from the cash flow statement. In columns three and four, the dependent variable is the net cash flow from all financing activities in fiscal year t, which is roughly equal to the sum of net equity issues and debt issues. A small residual term is cash flows from other (unspecified) financing activities. Consistent with our results on equity and debt issuance, equity misvaluation significantly and positively forecasts subsequent cash flows from all financing activities. As shown in column three, a one-standard-deviation increase in $FIPP$ forecasts a 35.9 ($p < 0.01$) basis points higher total cash flow from financing activities in the following year. There is also significant variation in the sensitivity of cash flows from financing activities to equity misvaluation across firms with different external financing needs. Specifically, a one-standard-deviation increase in $FIPP$ is associated with an insignificant 11.1 basis point increase in net cash flow from financing activities in the least external-finance-dependent tercile, a 27.2 ($p < 0.01$) basis point increase among median dependent firms, and a 61.6 ($p < 0.01$) basis point increase in the most dependent tercile in the following year.

Finally, we examine the effect of equity misvaluation on subsequent changes in leverage ratio. The results are shown in columns five and six, where the dependent variable is the change in leverage ratio between years t and t-1. Consistent with equity and debt issuance patterns in response to equity misvaluation, we find that while $FIPP$ is insignificantly related to subsequent changes in leverage ratio in the full sample, it negatively forecasts subsequent changes in leverage ratio among non-external-finance-dependent firms and yet positively so among external-finance-dependent firms. Specifically, a one-standard-deviation increase in $FIPP$ forecasts a 6.9 ($p < 0.05$) basis point decrease in leverage ratio in the bottom KZ-index tercile, and an insignificant 1.3 ($p > 0.1$) basis point increase in leverage ratio in the top KZ-index tercile. This result clearly contradicts the conventional view that market timing suggests an unambiguous negative correlation between equity misvaluation and subsequent changes in leverage ratio.

Combined, the results shown in this section describe how firms adjust both their equity and debt financing decisions in response to equity misvaluation. Specifically, firms that do not rely on external capital – i.e., those with sufficient internal resources – substitute between equity and debt to profit from the relative mispricing between the two markets. In contrast, firms that depend on external finance issue both overpriced equity and debt (or retire underpriced equity and debt) to benefit from the absolute mispricing.

4.2 Firm Investment

Our hypothesis that external-finance-dependent firms display a stronger sensitivity of debt financing to equity misvaluation than do non-external-finance-dependent firms is motivated by firms' differential needs for external capital to carry out desired investment projects. In this section, we explicitly examine firms' investment policy as a function of mutual fund flow-induced trading to provide further support for our hypothesis. Doing so not only helps further our understanding of the underlying driver of market timing behavior, but also allows us to complete the circle of the use of funds from issuing overpriced securities.

Following Baker, Stein, and Wurgler (2003), we start by analyzing the sensitivity of capital expenditures to lagged $FIPP$, and how this sensitivity varies across firms. Specifically, we conduct the same regression analysis as in equation (3) except that now the dependent variable is the capital expenditures in fiscal year t. The results, presented in columns one and two of Table 6, confirm the prior finding that firm investment is importantly determined by equity valuation, in particular for firms that depend on external finance. A one-standard-deviation increase in $FIPP$, on average, forecasts a 24.4 ($p < 0.01$) basis point increase in capital expenditures, as a fraction of lagged total assets, in the subsequent year. There is also substantial variation in the sensitivity of capital expenditures to equity misvaluation across firms. A one-standard-deviation increase in $FIPP$ leads to an insignificant change in capital expenditures among the least external-finance-dependent firms, and a significant 55.3 ($p < 0.01$) basis point increase in capital expenditures among the most external-finance-dependent firms.

Next, motivated by Shleifer and Vishny (2003), who argue that firms tend to engage in more (fewer) acquisition activities when their equity is overvalued (undervalued), we examine the sensitivity of firms' expenditures on all acquisition-related activities to equity misvaluation.[15] The results, shown in columns three and four, are similar qualitatively to those on capital expenditures. A one-standard-deviation increase in $FIPP$ forecasts 6.6 ($p < 0.1$) basis points higher spending on acquisition activities in the full sample. Sorting firms into terciles based on their dependence on external capital, we further show that a one-standard-deviation increase in $FIPP$ is associated with an insignificant change in acquisition spending in the bottom tercile, and a significant 21.6 ($p < 0.01$) basis point increase in acquisition spending in the top tercile in the following year.

For further robustness, instead of going through investment activities one at a time, we examine the sensitivity of net cash flows from all investing activities (including but not limited to capital and acquisition expenditures) to lagged equity misvaluation.[16] The results, shown in columns five and six, are consistent with those based on individual components of firm investment. A one-standard-deviation increase in $FIPP$ forecasts 35.5 ($p < 0.01$) basis points higher net cash flows from investing activities. Further, while $FIPP$ is unrelated to cash flows from investing activities among the least external-finance-dependent firms, a one-standard-deviation increase in $FIPP$ is associated with a 68.4 ($p < 0.01$) basis point increase in total cash flows from investing activities among the most external-finance-dependent firms.

These investment patterns as a function of lagged mutual fund flow-induced trading, complement the debt and equity issuance results shown in the previous section. For firms without immediate needs for external financing, they simply issue the more overpriced (less underpriced) security and retire the less overpriced (more underpriced) security, while leaving their investment level unaffected. In contrast, for firms that depend on external financing, when their equity is overvalued (undervalued), they issue both more (less) equity and debt, and adjust their investment accordingly.

[15]Acquisition spending for each fiscal year is obtained from the section titled "net cash flows from investing activities" in the cash flow statement.

[16]Since investment represents cash outflows, the sensitivity estimates will have a negative sign.

5 Alternative Explanations and Robustness Checks

5.1 Mutual Fund Flows and Firm Investment Opportunities

In this section, we discuss a couple alternative explanations of our results. The first alternative explanation is that capital flows to mutual funds capture the investment opportunities of individual firms. For example, when a sector experiences high growth, investors rationally channel more capital to mutual funds investing in that sector; in the meantime, firms in that sector rationally choose to increase investment and issue more securities to fund their investment. The positive correlations among flow-induced trading, firm investment, and security issuance reflect a common omitted variable – the underlying firm's growth opportunities.

To begin, we note that part of our identification comes from the substantial cross-sectional variation in market timing and investment decisions. In particular, if mutual fund flow-induced trading reflects growth opportunities, we expect non-external-finance-dependent firms – i.e., those with sufficient internal resources to carry out all desired investment projects – to exhibit stronger sensitivity of investment to flow-induced trading than do external-finance-dependent firms, as the former can more easily adjust their investment. The results, shown in Tables 4 through 6, indicate the opposite: Firms that depend on external finance exhibit a significantly more positive sensitivity of investment to $FIPP$ than do firms with ample internal resources.

In addition, as a more direct attempt to deal with this alternative interpretation, we purge out sector components from our measure of flow-induced price pressure. Specifically, we calculate industry-average flow-induced price pressure in each quarter based on the Fama-French 30 industry classification, and conduct the same set of analyses of financing and investment decisions using the industry-adjusted measure of flow-induced price pressure. The results (untabulated for brevity) are similar to those reported in Tables four through six, suggesting that the effect of mutual fund flow-induced trading on security issuance and firm investment is unlikely due to capital flows reflecting sector-wide growth opportunities.

One could further argue that non-external-finance-dependent firms anticipate their growth opportunities and carry out all necessary investments before retail investors shift their capital across mutual funds. To test this possibility, we examine firm investment in the years before (and contemporaneous to) the construction of $FIPP$. Consistent with the market timing hypothesis, non-external-finance-dependent firms do not change their investment in response to contemporaneous or future flow-induced trading. In sum, the evidence presented in this paper cannot be explained in its entirety by differential investment opportunities.

5.2 Rebalancing to the Target Leverage Ratio

A second alternative interpretation of our results is that the debt market timing pattern is driven by firms' equity market timing coupled with their desire to maintain some target leverage ratio. However, it is not ex-ante clear why non-external-finance-dependent firms would like to reduce their leverage ratio while external-finance-dependent firms would like to increase their leverage ratio. If anything, the latter group usually face more binding leverage constraints than the former.

To deal with this alternative interpretation, we start by noting that we explicitly control for the leverage gap (proposed by Fama and French (2002)) in all our regression specification. Leverage gap measures the deviation of a firm's current leverage ratio from its long-run average. If debt issuance in our sample merely reflects the tendency to adjust toward some target leverage ratio, we would expect the predictability of $FIPP$ on subsequent debt issuance to be largely subsumed by the leverage gap variable. The results presented thus far clearly reject this possibility.

We further rule out this alternative interpretation by conducting the same analysis as in Table 4 on a subset of firms that do not engage in equity issuance in adjacent years. While zero equity issuance is an endogenous choice, our goal here is to show that debt issuance in response to equity misvaluation is not driven by equity issuance in the adjacent period. Specifically, we only include in our sample firms that do not have significant changes in book equity in years t-5 to t. For example, for debt issues in fiscal year 2006, we only include firms that do not have any equity issues or repurchases in years 2001 to 2006.[17] This exercise helps us better isolate the direct effect of $FIPP$ on debt financing from the indirect effect that works through equity issuance.

[17] We define significant changes in book equity as those over 10% of lagged total assets in either direction. Our results are also robust to other cutoffs. We require no significant change in book equity in the previous 5 years, as prior literature (e.g., Leary and Roberts (2005); Alti (2006); Flannery and Rangan (2006); Kayhan and Titman (2007)) shows that it can take a long time for firms to adjust their leverage ratios back to their optimal level.

The results are shown in Table 7. Despite having a much smaller sample, the coefficient estimates are similar to those reported in Table 4. Firms on average issue more debt, in particular long-term debt, in response to equity misvaluation even in the absence of equity issuance. A one-standard-deviation increase in $FIPP$ forecasts 12.6 ($p < 0.01$) and 13.0 ($p < 0.01$) basis points higher debt and long-term debt issues in this sample, respectively. Moreover, while firms without immediate need for external financing do not change their debt financing policy in response to equity misvaluation, firms that are most external-finance-dependent substantially increase their debt issues, in particular long-term debt issues, when their equity is overvalued. A one-standard-deviation increase in $FIPP$ is associated with increases of 45.0 ($p < 0.01$) and 42.7 ($p < 0.01$) basis points higher debt and long-term debt issues in the top KZ-index tercile, respectively. These results imply that the documented debt issuance pattern is not driven by equity market timing coupled with the desire to maintain some target leverage ratio.

5.3 Public Bond and Equity Issuance

The paper has so far focused on net debt and equity issuance, which reflects both the amount of new securities that are issued and the amount of existing securities that are retired to repurchased. For further robustness, we focus on the issuance decision alone. Specifically, at the end of each quarter, we sum up all public bond or equity issues in that quarter (data from the SDC database), and test how security issues (without adjusting for expiration or repurchasing) are related to lagged mutual fund flow-induced trading.

We take two related empirical approaches for this purpose: i) a logistic regression, where the dependent variable is an indicator function that takes the value of one if the firm has at least one public bond (or equity) issue in that quarter, and ii) a pooled OLS regression where the dependent variable is the total amount of public bond (or equity) issues in the quarter, divided by lagged total assets.[18] The main independent variable of interest in both regression specifications is $FIPP$ measured in the previous four quarters. The control variables are identical to those in Table 4.

[18]To improve the power of our tests, we only consider firms with non-missing Standard and Poor's long-term issuer credit ratings as of the previous fiscal-year end in the bond issue analysis. This criterion effectively excludes all firms that have never issued a public bond or are very infrequent issuers.

The results of public bond and equity issuance decisions as a function of lagged $FIPP$ are shown in Table 8. The first two columns correspond to bond issuance. Consistent with our result based on Compustat data, $FIPP$ positively forecasts subsequent bond issuance. The point estimate from the logistic regression is 0.146; in addition, a one-standard-deviation increase in $FIPP$ leads to a 9.1 ($p < 0.01$) basis point increase in bond issue size, scaled by lagged total assets, in the subsequent quarter. The results of equity issues are shown in columns three and four. Similarly, mutual fund flow-induced trading positively predicts both the likelihood and size of equity issues in the following quarter. The point estimate on $FIPP$ in the logistic regression is 0.283 ($p < 0.01$), and a one-standard-deviation increase in $FIPP$ forecasts a 1.76 ($p < 0.01$) basis point increase in equity issue size (relative to lagged total assets) in the following quarter.

5.4 Credit Rating Changes

To complement our results on the impact of mutual fund flow-induced trading in the equity market on future changes in public bond yields, we examine changes in credit ratings in response to lagged $FIPP$. Specifically, we conduct a logistic regression, where the dependent variable is an indicator function that takes the value of one if the issue in question is downgraded in a particular quarter.[19] The independent variable of interest is lagged $FIPP$ constructed over four consecutive quarters. We then fix the timing of $FIPP$ at the end of quarter zero, and vary the timing of the dependent variable from quarters one through eight. The control variables are identical to those in Table 3.

The results, shown in Table 9, are consistent with those in Table 3. $FIPP$ measured at the end of quarter zero positively forecasts the likelihood of credit rating downgrades in each of the following eight quarters and the coefficient estimates are statistically significant in six out of the eight quarters. For example, the coefficient estimates on $FIPP$ in quarters three through eight are 1.2 ($p < 0.05$), 1.5 ($p < 0.01$), 1.8 ($p < 0.01$), 1.8 ($p < 0.01$), 1.5 ($p < 0.01$) and 1.0 ($p < 0.1$), respectively. These results provide support for the indirect learning channel underlying the demand-shock spillover effect: Credit rating agencies to a large extent rely on lagged stock returns in calculating the credit-worthiness of the firm. To the extent that credit rating agencies

[19] If a bond has credit ratings from multiple rating agencies, we use the average rating across all agencies.

are unable to fully differentiate noise from value-relevant information, they can spread temporary movements in stock price to bond price.

5.5 An Ex-post Return Test

Finally, we provide additional evidence for market timing by examining stock returns subsequent to security issuance. Specifically, we test whether equity and debt issues negatively predict future stock returns over and beyond mutual fund flow-induced price effects. Moreover, we introduce two interaction terms between security issuance (both equity and debt) and $FIPP$. The idea is that while $FIPP$ on average negatively predicts stock returns, it may sometimes reflect changes in firm fundamentals. If managers are indeed able to time the market in their issuance decisions, we expect a particularly strong reversal pattern associated with $FIPP$ when firms issue equity or debt.

The results, shown in Table 10, are consistent with the market timing theory. After controlling for $FIPP$, equity issues and debt issues significantly and negatively predict future stock returns. More importantly, the coefficient on the interaction term between lagged $FIPP$ and equity issues is also significantly negative, suggesting that firms issue equity precisely when the reversal effect to $FIPP$ is particularly strong. The coefficient on the interaction term between lagged $FIPP$ and debt issues is also negative and has marginal statistical significance.

6 Conclusion

Using price pressure resulting from mutual fund flow-induced trading as a measure of temporary shocks to stock prices, this paper analyzes both equity and debt market timing decisions in response to equity misvaluation. We further examine this cross-market timing effect across firms with different needs for external financing. We find that for the group of least external-finance-dependent firms, when their equity is overvalued, they issue more equity and less debt to benefit from the relative mispricing between the two markets. In contrast, among the group of firms that are most external-finance-dependent, they issue (retire) both overpriced (underpriced) equity and debt to take advantage of the absolute mispricing in both markets and adjust their investment. Our paper contributes to the literature on market timing by providing a comprehensive analysis of firms' equity, debt financing and investment decisions when equity is misvalued.

Our results also have implications for prior studies on the real effect of market inefficiency. Baker, Stein, and Wurgler (2003) test a financing channel of equity misvaluation impacting firm investment, and show that more external-finance-dependent firms exhibit a stronger investment-to-mispricing sensitivity. Our results suggest a potential role of debt financing. In response to mutual fund flow-induced trading, firms without external financing needs issue more equity but less debt, and leave their investment unchanged, while those dependent on external financing issue both equity and debt to increase investment. In a way, the difference in investment-to-mispricing sensitivity between more and less external-finance-dependent firms, as documented in Baker, Stein, and Wurgler (2003), can be largely accounted for by the variation in the sensitivity of debt issuance to equity mispricing.

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Table 1: Summary Statistics

This table provides summary statistics of the main variables used in the study. Details of variable definitions, as well as data sources, are provided in Appendix A.

Variable Names	Q1	Mean	Std. Dev.	Median	Q3
FIPP (annual)	-0.0258	0.0322	0.0912	0.0184	0.0809
Basic Bond Characteristics (FISD)					
Bond Yield Spread	0.0110	0.0274	0.0301	0.0181	0.0316
Log(Issue Size)	11.9184	12.3287	1.0105	12.4292	12.8992
Log(Duration)	1.1034	1.4621	0.7961	1.6031	1.9611
Basic Stock Information (CRSP)					
Expected Default Frequency (EDF)	0.0500	0.7413	2.2381	0.1495	0.4450
Return, Past 1 Year	-0.1750	0.1836	0.7402	0.0831	0.3679
Industry Return, Past 1 Year	0.0019	0.1316	0.2170	0.1316	0.2571
Idiosyncratic Volatilities	0.0474	0.0729	0.0384	0.0639	0.0858
Firm Fundamentals (Compustat)					
Sales Growth	0.0104	0.1556	1.5100	0.0787	0.1856
Tangibility	0.1448	0.3091	0.2185	0.2497	0.3983
B/M	0.3204	0.6876	0.6186	0.5699	0.9200
Size (Relative)	0.0007	0.0210	0.0773	0.0028	0.0111
Log(Total Asset)	8.5939	9.9165	1.9125	9.7956	10.9712
Leverage Gap	-0.1053	0.0110	0.2769	0.0294	0.1675
Leverage	0.0345	0.2488	0.2415	0.1837	0.4002
Equity Issuance (Compustat)					
Net Equity Issuance	-0.0040	0.0271	0.1082	0.0008	0.0126
Equity Issuance, Past 3-year	-0.0130	0.1329	0.3430	0.0087	0.1325
Equity Issuance, Past 5-year	-0.0190	0.1921	0.4104	0.0247	0.3201
Debt Issuance (Compustat)					
Total Debt Issuance	-0.0249	0.0324	0.1758	0.0000	0.0375
Long-term Debt Issuance	-0.0193	0.0314	0.1677	0.0000	0.0268
Short-term Debt Issuance	0.0000	0.0013	0.0353	0.0000	0.0000
Investment and Acquisition Activities (*Compustat*)					
Capital Expenditures	0.0239	0.0868	0.1205	0.0507	0.1009
Acquisition Spending	0.0000	0.0404	0.1331	0.0000	0.0120
Sources and Uses of Funds (Compustat)					
Net Cash Flow of Financing	-0.0527	0.0725	0.3599	-0.0036	0.0619
Net Cash Flow of Investment	-0.1538	-0.1291	0.2482	-0.0688	-0.0231

Table 2: The Price Effect of Mutual Fund Flow-Induced Trading

This table reports calendar-time returns to the self-financed portfolio that goes long in stocks in the top decile ranked by flow-induced price pressure ($FIPP$) and goes short in stocks in the bottom decile. $FIPP$ is calculated as the aggregate mutual fund flow-induced trading scaled by the total shares held by all mutual funds at the beginning of the period, summed over four consecutive quarters. The portfolios are rebalanced every quarter and held for two years. Both equal- and value-weighted monthly returns are reported. To deal with overlapping portfolios in each holding month, we follow Jegadeesh and Titman (1993) to take the equal-weighted average return across portfolios formed in different quarters. Three different monthly returns are reported: the return in excess of the risk-free rate, the CAPM alpha, and the Fama-French three-factor alpha. The sample period is from 1980 to 2009. Standard errors, shown in parenthesis, are adjusted for Newey-West corrections with 12 lags. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Equal Weighted			Value Weighted		
	excess return	1-factor alpha	3-factor alpha	excess return	1-factor alpha	3-factor alpha
Qtr 1	-0.15%	-0.25%	-0.14%	-0.32%	-0.48%	-0.20%
	(0.0023)	(0.0026)	(0.0023)	(0.0029)	(0.0032)	(0.0029)
Qtr 2	-0.29%	-0.39%	-0.23%	-0.48%*	-0.64%*	-0.51%
	(0.0023)	(0.0026)	(0.0023)	(0.0029)	(0.0033)	(0.0032)
Qtr 3	-0.40%*	-0.50%**	-0.32%	-0.70%**	-0.88%***	-0.61%*
	(0.0022)	(0.0025)	(0.0024)	(0.0030)	(0.0034)	(0.0031)
Qtr 4	-0.40%*	-0.49%**	-0.49%**	-0.72%**	-0.87%***	-0.66%**
	(0.0021)	(0.0023)	(0.0022)	(0.0029)	(0.0031)	(0.0031)
Qtr 5	-0.41%**	-0.49%**	-0.52%**	-0.65%**	-0.78%***	-0.80%***
	(0.0021)	(0.0022)	(0.0022)	(0.0028)	(0.0028)	(0.0029)
Qtr 6	-0.51%***	-0.57%***	-0.45%**	-0.69%***	-0.81%***	-0.50%**
	(0.0019)	(0.0020)	(0.0020)	(0.0027)	(0.0026)	(0.0023)
Qtr 7	-0.48%***	-0.55%***	-0.36%*	-0.42%*	-0.49%**	-0.30%
	(0.0019)	(0.0020)	(0.0020)	(0.0022)	(0.0023)	(0.0021)
Qtr 8	-0.37%**	-0.43%**	-0.22%	-0.25%	-0.31%	-0.33%
	(0.0019)	(0.0019)	(0.0020)	(0.0022)	(0.0022)	(0.0021)
Qtrs 1-4	-0.32%	-0.41%*	-0.29%	-0.55%**	-0.71%**	-0.50%*
	(0.0020)	(0.0023)	(0.0020)	(0.0026)	(0.0030)	(0.0026)
Qtrs 5-8	-0.43%**	-0.50%***	-0.39%**	-0.49%**	-0.59%***	-0.49%**
	(0.0017)	(0.0017)	(0.0017)	(0.0021)	(0.0022)	(0.0019)
Qtrs 1-8	-0.38%***	-0.45%***	-0.35%**	-0.53%***	-0.65%***	-0.50%***
	(0.0014)	(0.0015)	(0.0014)	(0.0019)	(0.0020)	(0.0018)

Table 3: Spillover of Temporary Price Movements from the Equity to Debt Market

This table reports the spillover of temporary price movements from the equity market to debt market. The dependent variable in all regressions is the quarterly change in duration-adjusted corporate bond yield spread. Columns 1 through 8 report the regression results for quarters Q+1, Q+2, Q+3, Q+4, Q+5, Q+6, Q+7, and Q+8. The main independent variable of interest is the flow-induced price pressure ($FIPP$) measured in the previous year (which ends in quarter Q). Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, idiosyncratic volatility in the previous year, leverage ratio, expected default frequency (EDF), sales growth, profitability, and tangibility. Bond-level controls include the callable dummy, issue size, bond duration (months, in logarithm), and coupon rate. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All control variables are constructed at the time the bond yield is calculated. All regression specifications include quarter-fixed effects. Panel A reports coefficient estimates for the full sample. Panel B reports coefficient estimates for all bonds issued by investment grade issuers. Panel C reports coefficient estimates for all bonds issued by non-investment-grade issuers. The sample period is from 1995 to 2009. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Panel A: Full Sample							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q+1	Q+2	Q+3	Q+4	Q+5	Q+6	Q+7	Q+8
FIPP(Q)	-0.00346	3.86e-05	0.00245	0.00337*	0.00525**	0.00573***	0.00551***	0.00579***
	(0.00246)	(0.00232)	(0.00219)	(0.00202)	(0.00213)	(0.00207)	(0.00203)	(0.00200)
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bond Characteristics Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macroeconomic Control	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES
Observations	112,368	112,410	112,310	112,050	111,674	111,259	110,832	110,417
Adjusted R^2	0.127	0.127	0.127	0.127	0.127	0.127	0.127	0.126

	Panel B: Investment Grade Issuers							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q+1	Q+2	Q+3	Q+4	Q+5	Q+6	Q+7	Q+8
FIPP	-0.00238	0.000204	0.00134	0.00206	0.00325*	0.00294	0.00260	0.00270
	(0.00205)	(0.00182)	(0.00164)	(0.00168)	(0.00189)	(0.00198)	(0.00204)	(0.00211)
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bond Characteristics Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macroeconomic Control	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES
Observations	87,520	87,539	87,485	87,357	87,180	86,992	86,798	86,608
Adjusted R^2	0.119	0.119	0.119	0.119	0.119	0.119	0.119	0.118

	Panel C: Non-investment Grade Issuers							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q+1	Q+2	Q+3	Q+4	Q+5	Q+6	Q+7	Q+8
FIPP	-0.00699*	-0.000398	0.00525	0.00752**	0.0111***	0.0135***	0.0135***	0.0133***
	(0.00411)	(0.00388)	(0.00373)	(0.00344)	(0.00359)	(0.00331)	(0.00316)	(0.00316)
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bond Characteristics Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macroeconomic Control	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES
Observations	24,848	24,871	24,825	24,693	24,494	24,267	24,034	23,809
Adjusted R^2	0.226	0.226	0.226	0.226	0.230	0.232	0.232	0.231

Table 4: Net Debt Issuance and Non-Fundamental Stock Price Movements

This table reports firms' debt issuance decisions in response to non-fundamental stock price movements. The dependent variable in columns 1 and 2 is net debt issuance in fiscal year t as reported by Compustat. We then separate total debt issuance into long-term debt (columns 3 and 4) and short-term debt (columns 5 and 6). All issuance variables are scaled by total firm assets at the beginning of fiscal year t-1. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, cumulative stock return in previous years two and three, leverage-gap, sales growth, profitability, and tangibility. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All regression specifications include industry and year-fixed effects. In columns 2, 4, and 6, the Median Dependence dummy takes the value of one if the firm is in the middle 40% of the KZ-index distribution, and zero otherwise; the High Dependence dummy takes the value of one if the firm is in the top 30% of the KZ-index distribution, and zero otherwise. The sample period is from 1982 to 2009. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Total Debt Issuance		LT Debt Issuance		ST Debt Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)
FIPP	0.00843*	-0.0158**	0.00879**	-0.0127**	-0.000287	-0.00266*
	(0.00464)	(0.00617)	(0.00443)	(0.00589)	(0.000989)	(0.00149)
FIPP x Median Dependence		0.0229***		0.0178**		0.00355*
		(0.00860)		(0.00819)		(0.00208)
FIPP x High Dependence		0.0446***		0.0424***		0.00285
		(0.0113)		(0.0110)		(0.00219)
Median Dependence		0.0112***		0.0114***		0.000219
		(0.00162)		(0.00157)		(0.000364)
High Dependence		0.0318***		0.0309***		0.000548
		(0.00251)		(0.00239)		(0.000448)
Industry Returns	YES	YES	YES	YES	YES	YES
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES
Macroeconomics Controls	YES	YES	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES
Observations	55,273	55,273	55,273	55,273	55,273	55,273
Adjusted R^2	0.067	0.072	0.065	0.070	0.008	0.008

Table 5: Net Equity Issuance, Leverage Ratio, and Non-Fundamental Stock Price Movements

This table reports equity issuance and leverage ratio changes in response to non-fundamental stock price movements. The dependent variable in columns 1 and 2 is net equity issuance, that in columns 3 and 4 is the net cash flow from all financing activities, and that in columns 5 and 6 is the change in leverage ratio, all measured in fiscal year t as reported by Compustat. Both equity issuance and net cash flows from financing are scaled by total firm assets at the beginning of fiscal year t-1. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, cumulative stock return in previous years two and three, leverage-gap, sales growth, profitability, and tangibility. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All regression specifications include industry and year-fixed effects. In columns 2, 4, and 6, the Median Dependence dummy takes the value of one if the firm is in the middle 40% of the KZ-index distribution, and zero otherwise; the High Dependence dummy takes the value of one if the firm is in the top 30% of the KZ-index distribution, and zero otherwise. The sample period is from 1982 to 2009. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Total Equity Issuance		Net CF from Financing		Leverage Ratio Change	
	(1)	(2)	(3)	(4)	(5)	(6)
FIPP	0.0146***	0.0151***	0.0393***	0.0122	0.000209	-0.00758**
	(0.00253)	(0.00399)	(0.00980)	(0.0133)	(0.00208)	(0.00306)
FIPP x Median Dependence		-0.00180		0.0176		0.0123***
		(0.00522)		(0.0173)		(0.00417)
FIPP x High Dependence		0.000300		0.0553**		0.00904*
		(0.00608)		(0.0240)		(0.00493)
Median Dependence		0.00452***		0.0236***		-0.00535***
		(0.00114)		(0.00313)		(0.000739)
High Dependence		0.0144***		0.0671***		-0.00912***
		(0.00151)		(0.00480)		(0.000988)
Industry Returns	YES	YES	YES	YES	YES	YES
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES
Macroeconomics Controls	YES	YES	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES
Observations	62,640	62,640	55,412	55,412	54,631	54,631
Adjusted R^2	0.228	0.230	0.170	0.172	0.043	0.044

Table 6: Firm Investment and Non-Fundamental Stock Price Movements

This table reports firms' investment decisions in response to non-fundamental stock price movements. The dependent variable in columns 1 and 2 is the capital expenditure, that in columns 3 and 4 is the total expenditure involved in acquisition activities, and that in columns 5 and 6 is the net cash flow from all investing activities, measured in fiscal year t as reported by Compustat. All three variables are scaled by total firm assets at the beginning of fiscal year t-1. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, cumulative stock return in previous years two and three, leverage-gap, sales growth, profitability, and tangibility. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All regression specifications include industry and year-fixed effects. In columns 2, 4, and 6, the Median Dependence dummy takes the value of one if the firm is in the middle 40% of the KZ-index distribution, and zero otherwise; the High Dependence dummy takes the value of one if the firm is in the top 30% of the KZ-index distribution, and zero otherwise. The sample period is from 1982 to 2009. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Capital Expenditure		Acquisitions		Net CF from Investment	
	(1)	(2)	(3)	(4)	(5)	(6)
FIPP	0.0267***	-5.51e-05	0.00721*	-0.00312	-0.0389***	-0.00716
	(0.00663)	(0.00465)	(0.00371)	(0.00688)	(0.00725)	(0.0104)
FIPP x Median Dependence		0.0164***		0.00198		-0.0197
		(0.00635)		(0.00831)		(0.0135)
FIPP x High Dependence		0.0606***		0.0268***		-0.0678***
		(0.0212)		(0.00964)		(0.0176)
Median Dependence		0.0259***		0.00338*		-0.0241***
		(0.00215)		(0.00188)		(0.00299)
High Dependence		0.0327***		0.00425*		-0.0309***
		(0.00273)		(0.00219)		(0.00393)
Industry Returns	YES	YES	YES	YES	YES	YES
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES
Macroeconomic Controls	YES	YES	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES
Observations	62,025	62,025	55,412	55,412	55,412	55,412
Adjusted R-squared	0.242	0.255	0.072	0.072	0.170	0.172

Table 7: Net Debt Issuance and Non-Fundamental Stock Price Movements: A Subsample without Equity Issuance

This table reports firms' debt issuance decisions in response to non-fundamental stock price movements. The dependent variable in columns 1 and 2 is net debt issuance in fiscal year t as reported by Compustat. We then separate total debt issuance into long-term debt (columns 3 and 4) and short-term debt (columns 5 and 6). All issuance variables are scaled by total firm assets at the beginning of fiscal year t-1. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, cumulative stock return in previous years two and three, leverage-gap, sales growth, profitability, and tangibility. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All regression specifications include industry and year-fixed effects. In columns 2, 4, and 6, the Median Dependence dummy takes the value of one if the firm is in the middle 40% of the KZ-index distribution, and zero otherwise; the High Dependence dummy takes the value of one if the firm is in the top 30% of the KZ-index distribution, and zero otherwise. The sample period is from 1982 to 2009, *excluding* all firm-year observations where the equity issuance is greater than 5% of firm asset, or the aggregate equity issuance in the previous five years is greater than 10% of firm assets. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Total Debt Issuance		LT Debt Issuance		ST Debt Issuance	
	(1)	(2)	(3)	(4)	(5)	(6)
FIPP	0.0138***	-0.00670	0.0143***	-0.00444	-0.000501	-0.00226
	(0.00537)	(0.00707)	(0.00523)	(0.00684)	(0.00122)	(0.00169)
FIPP x Median Dependence		0.0120		0.0111		0.000958
		(0.00980)		(0.00952)		(0.00248)
FIPP x High Dependence		0.0560***		0.0512***		0.00483*
		(0.0138)		(0.0135)		(0.00285)
Median Dependence		0.0121***		0.0121***		-7.38e-06
		(0.00186)		(0.00180)		(0.000441)
High Dependence		0.0285***		0.0279***		0.000620
		(0.00295)		(0.00288)		(0.000634)
Industry Returns	YES	YES	YES	YES	YES	YES
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES
Macroeconomics Controls	YES	YES	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES
Observations	33,420	33,420	33,420	33,420	33,420	33,420
Adjusted R^2	0.062	0.069	0.055	0.062	0.013	0.013

Table 8: Public Bond and Equity Issuance (SDC) and Non-Fundamental Stock Price Movements

This table reports firms' decisions to issue public bond and equity in response to non-fundamental stock price movements. The dependent variable in column 1 is a binary variable that takes the value of one if there is at least one public bond issuance in quarter q, and zero otherwise (logit regression); and that in column 2 is the total dollar amount of bond issuance in quarter Q, normalized by firm assets at the beginning of the fiscal year. Both variables are constructed from the FISD database, and are available for the period of 1995 to 2009. The dependent variable in column 3 is a binary variable that takes the value of one if there is at least one public equity issuance in quarter q, and zero otherwise (logit regression); and that in column 4 is the total dollar amount of equity issuance in quarter Q, normalized by firm assets at the beginning of the fiscal year. Both variables are constructed from the SDC database, and are available for the period of 1982 to 2009. The main independent variable of interest is flow-induced price pressure ($FIPP$) measured in the previous year. Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, cumulative stock return in previous years two and three, leverage-gap, sales growth, profitability, and tangibility. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All regression specifications include industry and quarter-fixed effects. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Bond Issuance Decisions	Bond Issue Size	Equity Issuance Decision	Equity Issue Size
	(1)	(2)	(3)	(4)
FIPP	0.146	0.0100***	0.283***	0.00193***
	(0.177)	(0.00306)	(0.0888)	(0.000567)
Industry Returns	YES	YES	YES	YES
Firm Fundamental Controls	YES	YES	YES	YES
Macroeconomics Controls	YES	YES	YES	YES
Industry Fixed Effect	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES
Observations	45,206	45,206	272,225	272,225
Pseudo R^2 / *Adjusted* R^2	0.0617	0.025	0.0769	0.018

Table 9: Credit Rating Changes and Non-Fundamental Stock Price Movements

This table reports credit rating changes in response to temporary stock price movements. The dependent variable in all regressions is a dummy variable that takes the value of one if the bond issue experiences a credit rating downgrade and zero otherwise (logit regression). If an issue has ratings from multiple rating agencies, the average rating is used. Columns 1 through 8 report the regression results for quarters Q+1, Q+2, Q+3, Q+4, Q+5, Q+6, Q+7, and Q+8. The main independent variable of interest is the flow-induced price pressure ($FIPP$) measured in the previous year (which ends in quarter Q). Firm-level control variables include firm size, book-to-market ratio, cumulative stock return in the previous year, idiosyncratic volatility in the previous year, leverage ratio, expected default frequency (EDF), sales growth, profitability, and tangibility. Bond-level controls include the callable dummy, issue size, bond duration (months, in logarithm), and coupon rate. Macroeconomic control variables include the past one year CRSP value-weight index return, term spread, and default spread. All control variables are constructed at the time the credit rating downgrade is calculated. All regression specifications include quarter-fixed effects. The sample period is from 1995 to 2009. Standard errors, reported in parenthesis, are adjusted for heteroskedasticity and are clustered at the firm level. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

	Dependent Variable: Credit Rating Downgrade							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Q+1	Q+2	Q+3	Q+4	Q+5	Q+6	Q+7	Q+8
FIPP	0.4386	0.8233	1.2016**	1.5091***	1.7713***	1.8255***	1.4919***	0.9534*
	(0.6709)	(0.6214)	(0.5339)	(0.5120)	(0.5041)	(0.5016)	(0.5039)	(0.4925)
Bond Yield	5.8951***	5.8864***	5.7996***	5.7543***	5.7361***	5.7191***	5.7162***	5.7628***
	(1.3763)	(1.3781)	(1.3749)	(1.3766)	(1.3792)	(1.3812)	(1.3870)	(1.3915)
Firm Fundamental Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bond Characteristics Controls	YES	YES	YES	YES	YES	YES	YES	YES
Macroeconomic Controls	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effect	YES	YES	YES	YES	YES	YES	YES	YES
Number of Observations	117,606	117,590	117,432	117,153	116,844	116,504	116,172	115,799
Pseudo-R^2	0.1777	0.1779	0.1790	0.1800	0.1809	0.1815	0.1812	0.1801

Table 10: Return Predictability of Security Issuance

This table reports Fama-MacBeth forecasting regressions of stock returns. The dependent variable is the monthly stock return in year t. The explanatory variables include flow-induced price pressure ($FIPP$) in year t-2, net equity issues (as a fraction of lagged assets) in year t-1, and net long-term debt issues (as a fraction of lagged assets) in year t-1. We also include interaction terms between $Equity\ Issue$ ($Debt\ Issue$) and $FIPP$. Other control variables include the firm size, book-to-market ratio, cumulative stock return, average share turnover, idiosyncratic return volatility (based on the Carhart four factor model), institutional ownership, all measured in the previous year (t-1). The sample period is from 1980 to 2009. Standard errors, shown in parenthesis, are adjusted for Newey-West corrections with 12 lags. ***, **, and * indicate a two-tailed test significance level of less than 1%, 5%, and 10%, respectively.

Dep Variable	Monthly stock returns in year t						
*100	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$FIPP_{t-2}$	-0.47***			-0.36**	-0.35*	-0.42**	-0.33*
	(0.17)			(0.17)	(0.20)	(0.19)	(0.20)
$Equity\ Issue_{t-1}$		-1.05***		-0.97***	-1.06***		-1.03***
		(0.37)		(0.37)	(0.39)		(0.39)
$Debt\ Issue_{t-1}$			-1.96***	-1.89***		-1.92***	-1.88***
			(0.24)	(0.24)		(0.27)	(0.28)
$Equity\ Issue_{t-1}$					-2.05**		-2.05**
$X\ FIPP_{t-2}$					(0.90)		(0.94)
$Debt\ Issue_{t-1}$						-1.58*	-1.49
$X\ FIPP_{t-2}$						(0.91)	(0.94)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.04	0.04	0.04	0.04	0.04	0.04	0.04
No. Months	360	360	360	360	360	360	360

Appendix A: Main Variables Definitions and Constructions

This table describes the definition and construction of the main variables used in this study, followed by the source of the data. When possible, the data items or mnemonics are provided as well.

Variable Name	Variable Definitions and Constructions	Source of Data
FIPP	Mutual fund flow induced price pressure. See the data section for the construction of the variable.	CRSP, CDA/Spectrum 13F and MFLINK
Bond Yield Spread	Corporate bond's yield computed from the trade price minus the corresponding duration matched treasure yield.	FISD, NAIC transaction files, TRACE and CRSP Treasure files
Issue Size	The issue size of the bond	FISD
Duration	The duration of the bond	FISD
Expected Default Frequencies (EDF)	The expected default frequency computed and calibrated to actual defaults by the Moody's KMV. See Crosbie and Bohn (2003) for details.	Moody's-KMV
Idiosyncratic Volatility	Residual standard deviations estimated using the Carhart four-factor model, based on daily stock returns over the past one year.	CRSP
Profitability	Operating Income Before Depreciation (t) / Total Assets (t-1)	COMPUSTAT
Tangibility	[PPENT(t) + INVT (t)]/AT(t-1)	COMPUSTAT
Size	The total dollar value of sales divided by aggregated sales across all firms in the same year reported in COMPUSTAT.	COMPUSTAT
Leverage Ratio	Leverage Ratio = [DLTT(t) + DLC(t)]/[DLTT(t) + DLC (t) + BE(t)]	COMPUSTAT
Leverage Gap	Leverage Gap = Estimated long-term leverage ratio – Current leverage ratio, following the procedure in Fama and French (2002)	COMPUSTAT
BE	Book value of equity, BE(t) = total assets (AT) – liabilities (LT) + balance sheet deferred taxes and investment tax credit (if available) (TXDITC) –	COMPUSTAT

	preferred stock	
Book Value of Preferred Stock	The book value of preferred stock is computed as preferred stock's liquidation value (PSTKL) if available, else redemption value (PSTKRV) if available, else carrying value (PSTK).	COMPUSTAT
ME	Market value of equity, ME(t) = SHROUT * PRC	CRSP
B/M	Market value of equity (BE) / book value of equity (ME)	CRSP/ COMPUSTAT
Equity Issuance	We consider two definitions of equity issuance. In the first definition, following Baker, Stein and Wurgler (2003), Equity Issuance = [CEQ(t) – CEQ(t-1)] + [TXDB(t) – TXDB(t-1)] – [RE(t) – RE(t-1)], normalized by total assets (AT) at the beginning of fiscal year (t-1). In the second definition, following Fama and French (2002), Equity Issuance = SSTK (t) – PRSTKC (t), normalized by total assets at the beginning of fiscal year (t-1).	COMPUSTAT
Short-Term Debt Issuance	Following Baker, Greenwood and Wurgler (2002), short-term debt issuance is defined as note payable (NP), normalized by total assets (AT) at the beginning of fiscal year (t-1).	COMPUSTAT
Long-Term Debt Issuance	Following Baker, Greenwood and Wurgler (2002), long-term debt issuance is defined as change in the level of long-term debt (DLTT(t) – DLTT(t-1)) plus debt due in one year (DD1(t) – DD1(t-1))., normalized by total assets at the beginning of fiscal year (t-1).	COMPUSTAT
Total Debt Issuance	Total debt issuance = short-term debt issuance + long-term debt issuance	COMPUSTAT
Capital Expenditure	CAPX(t), normalized by total assets (AT) at the beginning of fiscal year (t-1).	COMPUSTAT
Acquisition	ACQ(t) from the statement of cash flows (SCF), normalized by total assets (AT) at the beginning of fiscal year (t-1).	COMPUSTAT
Net Cash Flow of Financing	FINCF(t) from the statement of cash flows (SCF), normalized by total assets (AT) at the beginning of fiscal year (t-1).	COMPUSTAT
Net Cash Flow of Investment	IVNCF(t) from the statement of cash flows (SCF), normalized by total assets (AT) at the beginning of fiscal year (t-1).	COMPUSTAT

Seasoned Equity Offering Decision	A binary variable takes the value of one if the firm issues equity in the secondary market during quarter (q)	Security Data Corporation
Seasoned Equity Offering Amount	The dollar value of seasoned equity offerings, normalized by the most recent fiscal year's total asset (AT) before the equity offering.	Security Data Corporate/ CRSP
Bond Issuance Decision	A binary variable takes value of one if the firm issues bond on the secondary market during quarter (q)	Security Data Corporation
Bond Issuance Amount	The dollar value of bond offerings, normalized by the most recent fiscal year's total asset (AT) before the bond offering	Security Data Corporate/ CRSP
Term Spreads	The difference between 10-year treasury yield and 3-month treasury yield	Federal Reserve
Default Spreads	The difference between the Moody's BAA corporate bond index yield and Moody's AAA corporate bond index yield	Federal Reserve
CFNAIC	Chicago Fed National Activity Index	Federal Reserve Bank of Chicago