Financial Constraints and Corporate Disclosure: Evidence from Capital Market Segmentation*

Rustom M. Irani David Oesch

December 10, 2015

Abstract

The sharp distinction drawn between firms rated narrowly above (BBB–) and below (BB+) the investment-grade cutoff provides variation in debt financing availability unrelated to firm fundamentals. We exploit this market segmentation to identify an asymmetric effect of debt capital supply on voluntary disclosure: BB+ firms step up disclosure in response to high-yield bond mutual fund outflows. This effect is concentrated in periods of large fund outflows and among financially constrained firms. Conditional on greater disclosure, these firms increase equity issuance. Thus, disclosure may alleviate information-based financing frictions, allowing firms to smooth out temporary disruptions to the availability of finance.

JEL Classification: D82; G24; G32; M41

Keywords: Financial Constraints; Asymmetric Information; Disclosure; Market Segmentation

*Irani (rirani@illinois.edu) is with the College of Business at the University of Illinois at Urbana-Champaign and Oesch (david.oesch@business.uzh.ch) is with Department of Business Administration at the University of Zurich. We are grateful to Viral Acharya, Heitor Almeida, Terrence Blackburne, Paul Fischer, Carlo Gallimberti, Todd Gormley, Luzi Hail, Mirko Heinle, Robert Holthausen, Chris Ittner, Mauricio Laurrain (discussant), Jeremy Michels, Cathy Schrand, Dan Taylor, Robert Verrecchia, and participants at the University of Mannheim, University of Pennsylvania (Wharton), and the 2014 European Finance Association Meetings. We also thank Doug Richardson of the Investment Company Institute for sharing the mutual fund flows data used in this study.

1 Introduction

Information asymmetry between managers and outside suppliers of capital has the potential to affect the financing capacity of the firm, especially if it is funded with information-sensitive securities (Myers and Majluf, 1984). If investors are not symmetrically informed there could also be a loss of market liquidity (Diamond, 1985; Diamond and Verrecchia, 1991; Easley and O'Hara, 2004), particularly if retail investors are deterred from market participation (Balakrishnan et al., 2014a; Kelly and Ljungqvist, 2012). Ultimately, these frictions could lead to under-investment relative to the full information benchmark (Stein, 2003).[1] In this paper, we investigate whether firms' voluntary disclosure choices can alleviate information-based financing frictions, so that more transparent firms have greater access to finance (Lambert et al., 2007; Verrecchia, 2001).

Causal identification of the relation between financial constraints and corporate disclosure has proven challenging (Leuz and Wysocki, 2008). This is partly due to omitted variables problems whereby unobservable changes in firm fundamentals may jointly affect access to capital and corporate disclosure. We tackle this endogeneity problem by measuring how corporate disclosure responds to shocks to debt capital supply exogenous to firm fundamentals.

Our tests exploit the credit ratings-based capital market segmentation between investment- and noninvestment-grade firms. The investment-grade label is a salient feature of contracts and regulation that restrict important investors from holding noninvestment-grade ("high-yield") debt. Consequently, when high-yield mutual funds experience withdrawals, other suppliers of capital are unable to step in (Duffie and Strulovici, 2012; Mitchell et al., 2007), leading to a negative shock to the supply of debt capital for noninvestment-grade firms. Recent research finds that this market segmentation can affect firms' cost of debt capital (Kisgen and Strahan, 2010), and, ultimately, have real effects in terms of investment (Chernenko and

[1] By full information benchmark, we mean corporate investment rationally determined by growth opportunities with all positive net present value projects funded (e.g., Hayashi, 1982).

Sunderam, 2012). Noninvestment-grade firms, with limited access to debt financing, may therefore increase disclosure to offset some of the negative effects on investment. Since these firms will be unable to easily substitute funding, there will be relatively large benefits of disclosure to the extent that transparency improves access to finance. In particular, these firms may increase disclosure to cater to securities analysts and institutional investors to improve access to information-sensitive securities such as equity capital (Bird and Karolyi, 2015; Boone and White, 2015). This is the main hypothesis we test in this paper.

Our analysis of the effect of changes in financial constraints on corporate disclosure builds on the approach of Chernenko and Sunderam (2012). These authors estimate the differential sensitivity between noninvestment- and investment-grade firms' capital expenditures to high-yield bond mutual fund flows over the period from 1986 until 2010. We adapt their matching methodology to estimate the impact of high-yield fund flows on voluntary corporate disclosure, as measured by managerial earnings guidance (e.g., Armstrong et al., 2014). We form a matched sample of firms in close proximity to the investment-grade cutoff; in particular, for each nonvestment-grade (BB+) firm we find an investment-grade (BBB–) firm that is very close in terms of observable firm and industry attributes. The key difference between these groups of firms is that only the cost and availability of debt capital for the BB+ firms will be affected by outflows from high-yield bond funds. We then identify the effect of debt capital supply shocks on the voluntary disclosure of BB+ firms, assuming that matched firms close to the cutoff experience similar unobservable shocks.

Consistent with our main hypothesis, we find that BB+ firms' voluntary disclosure choices respond to shocks to the supply of debt capital from high-yield bond mutual funds. We find this effect to be asymmetric: BB+ firms only voluntarily disclose more information in response to fund outflows. In terms of economic magnitudes, our baseline estimates imply that switching from a period of nonnegative to negative fund flows leads to an increase in the frequency of earnings guidance among BB+ firms that constitutes one-third of its standard

deviation. We investigate the mechanism underlying this result, by examining changes in financing following high-yield fund outflows and how this interacts with disclosure. We document an increase equity issuance among BB+ firms stepping up voluntary disclosure in response to high-yield fund outflows, consistent with a substitution effect from debt to equity financing.

We perform several sensitivity analyses to confirm the robustness of our main results. We find these disclosure effects are only present among the set of BB+ firms most likely to be ex-ante financially constrained. This strengthens the interpretation that voluntary disclosure alleviates financing constraints. We find larger magnitudes when we examine periods of stronger high-yield fund outflows—times when we expect debt financing constraints to bind. We exclude periods characterized by large swings in high-yield mutual fund flows and show our results are not driven by these extreme events. This indicates that the adjustments in the disclosure behavior of BB+ firms are the result of ongoing shocks to access to financing. We also show our results are robust to the inclusion of several macroeconomic control variables, and are thus unlikely to reflect a greater responsiveness of lower-rated firms to recessions. We also conduct two falsification tests. First, we include investment-grade mutual fund flows as an independent variable and show neither BBB– nor BB+ firms respond to investment-grade fund flows. Second, we repeat our analysis at other ratings thresholds and find no differential effects. This final test gives us confidence that our results are not driven by unobservable characteristics used in credit ratings assignment that may be proxied for by high-yield mutual fund fund flows.

Overall, we provide robust evidence that negative shocks to high-yield mutual funds' capital supply induce increases in the disclosure of firms just below the investment-grade cutoff relative to the disclosure of similar firms just above. Our evidence suggests that firms with limited access to the high-yield bond market are able to reduce information asymmetry and substitute to alternative sources of funding. While this substitution is unlikely to offset

the negative effects of high-yield fund outflows for all BB+ firms—Chernenko and Sunderam (2012) show the typical BB+ firm reduces investment—it may help some firms smooth out temporary shocks to the cost and availability of debt finance.

Our paper primarily adds to the literature that examines the interaction between corporate finance and corporate disclosure policies. This research mostly focuses on the level of voluntary disclosure in the cross-section, for example, when firms tap capital markets (e.g., Lang and Lundholm, 2000) or change their payout policy (Brockman et al., 2008; Grullon et al., 2002; Kumar et al., 2008). Our paper advances this literature by highlighting financial constraints as a key determinant of managers' corporate disclosure and is therefore close in spirit to two recent papers. First, Balakrishnan et al. (2014b) which considers how recurring changes in financing capacity due to fluctuating real estate collateral values influences firms investment, financing, and disclosure policies. Second, Lo (2014) which uses the emerging-market financial crises in the late 1990s as large balance-sheet shocks for certain U.S. banks and finds that affected banks' U.S. borrowers increase disclosure. Our contribution is to demonstrate how *periodic shocks* to the capital of an important and predominantly *retail class of investors* interacts with market segmentation to affect disclosure practices.

We also contribute to recent work that tackles endogeneity problems to make credible inferences regarding the determinants of corporate disclosure and firms' information environments. Notably, using a quasi-experimental design focusing on exogenous reductions in analyst coverage, Balakrishnan et al. (2014a) find that managers respond to an exogenous reduction in the supply of public information by voluntarily disclosing more information (see also, Chen et al., 2015; Irani and Oesch, 2013). Boone and White (2015) and Bird and Karolyi (2015) provide evidence that disclosure quantity, form, and quality increase in response to discontinuous increases in institutional ownership around Russell index reconstitutions. Our study continues in this tradition by identifying shocks to debt capital supply induced by the interaction of high-yield bond mutual fund flows and credit-ratings

based market segmentation. In the spirit of a regression discontinuity design, we construct a matching estimator that allows us to estimate the causal impact of debt capital supply shocks on corporate disclosure.

The rest of the paper is structured as follows. Section 2 details the empirical methodology. Section 3 describes our main results and sensitivity analysis. Section 4 concludes.

2 Data and Empirical Methodology

2.1 Identification Strategy

Changes in high-yield fund flows may impact access to debt capital for noninvestment-grade firms. To investigate the effects on the disclosure decisions of these firms, we adapt the empirical methodology of Chernenko and Sunderam (2012).

This identification strategy builds on two well-established facts related to credit ratings-based capital market segmentation. First, many important classes of investors are restricted from holding noninvestment-grade debt securities. These restrictions arise from regulations: commercial banks have been banned from holding debt securities rated below BBB– since 1936 (Harold, 1938); insurance companies face higher risk-based capital charges and portfolio limits of 20 percent on noninvestment-grade bonds (Ellul et al., 2011). In addition, explicitly-stated investment styles and corresponding charters of bond mutual funds place restrictions holdings of noninvestment-grade debt. Notably, investment-grade bond mutual funds typically have no more than 10 percent of assets allocated to noninvestment-grade bonds (Chernenko and Sunderam, 2012). In contrast, high-yield bond mutual funds—a class of investor that holds roughly 20 percent of noninvesmtent-grade bonds—have investment objectives that often specify minimum holdings of noninvestment-grade bonds. Taken together, it is plausible that shocks to the pool of funds available to investors able to hold noninvestment-grade debt matter for the cost and availability of debt financing for noninvestment-grade

firms. In our tests, we therefore proxy for noninvestment-grade firms' access to debt finance with high-yield bund mutual fund flows.

Second, credit ratings are coarse and slow-moving measures of credit quality. Inaccuracies in credit ratings may arise from agencies' organization structures. For example, loss of fee revenue may occur when a firm is upgraded or downgraded, creating incentives for analysts to be conservative. Analysts may therefore prefer to give firms a positive outlook instead of an upgrade, even though such firms often have considerably lower default rates (Cantor and Hamilton, 2005). Credit ratings tend to be slow-moving because agencies dislike volatility; that is, agencies are hesitant to change firms' ratings if the decision has to be reversed in the near future (Altman and Kao, 1992; Cantor and Mann, 2006). Moreover, agencies understand how their decisions affect market participants' willingness to hold certain bonds and the stability of ratings is therefore especially prominent around the investment-grade cutoff. As a consequence, there are subsets of investment- and noninvestment-grade firms that are similar in terms of fundamentals, i.e., observable characteristics and default rates.

Our empirical approach incorporates these two facts into a matching estimator (e.g., Abadie and Imbens, 2006). We match firms in close proximity to the investment-grade cutoff (BBB– and BB+ rated firms) based on firm and industry characteristics. Then we compare how the disclosure policies of the matched firms respond to high-yield bond mutual fund flows, which is our proxy for the availability of debt financing for noninvestment-grade firms.

We utilize a nearest-neighbor matching procedure, which we implement as follows. For each quarter and each BB+ rated firm, we find a BBB– firm that is nearest in terms of our matching variables. We match on the basis of the following firm fundamentals: size, Q, leverage, cash holdings, and measures of profitability (return-on-assets, ROA, and a negative earnings indicator variable).[2] We measure the distance between firms based on the Maha-

[2]We choose these matching variables because they have the most explanatory power in a regression of a

lanobis metric. Under this metric, the distance between matching variables incorporates information on both the variances of and covariances between these variables. To ensure high quality matches, we require the difference in each matching variable to be within one standard deviation.

To illustrate how our empirical approach works, let firm i have true, unobservable credit quality X_i and observed credit rating R_i. For simplicity, define HY Fund Outflows$_{t-1}$ to be an indicator variable equal to one if there were high-yield bond mutual fund outflows in the previous period, and zero otherwise. Then we may write the voluntary disclosure policy of firm i as a function of outflows as:

$$\text{Voluntary Disclosure}_{it} \;=\; \alpha_i \;+\; \beta(R_i) \cdot \text{HY Fund Outflows}_{t-1} \;+\; \mu_t(X_i) \;+\; \epsilon_{it}, \qquad (1)$$

under the following assumptions: first, that unobservable common shocks, μ_t, depend on the true credit quality (X_i); second, individual firms are too small for idiosyncratic shocks (ϵ_{it}) to be correlated with high-yield fund outflows; third, the dependence of disclosure on outflows, $\beta(R_i)$, is a function of the observed credit rating. This latter assumption follows naturally from the aforementioned institutional frictions, which may impact firms' disclosure policies through access to debt financing. If our matched BBB– firm is sufficiently close—that is, a firm j with underlying credit quality and common shock such that $\mu_t(X_i) = \mu_t(X_j)$—then differencing (1) across firms i and j gives:

$$\begin{aligned} \Delta\text{Vol. Disclosure}_{it} &= (\alpha_i - \alpha_j) + [\beta(\text{BB+}) - \beta(\text{BBB–})] \cdot \text{HY Fund Outflows}_{t-1} + (\epsilon_{it} - \epsilon_{jt}) \\ &= \alpha \;+\; \beta \cdot \text{HY Fund Outflows}_{t-1} \;+\; \nu_{it}, \qquad (2) \end{aligned}$$

where ΔVol. Disclosure$_{it}$ is the difference in voluntary disclosure between matched BB+

just-investment-grade indicator variable (equal to one if the firm is BBB– and zero if the firm is BB+) on firm characteristics.

and BBB– firms. Thus, differencing out the disclosure behavior of matched firms eliminates the correlation between the unobservable common shock and fund outflows, allowing us to identify the effect of high-yield fund flows on voluntary disclosure.

The coefficient of interest in (2) is β, which measures the differential sensitivity of noninvestment-grade firms' voluntary disclosure to high-yield bond mutual fund outflows. If firms increase disclosure to reduce information asymmetry and maintain access to capital markets, the coefficient β will be strictly positive. The null hypothesis is that high-yield fund outflows are irrelevant for noninvestment-grade firms' disclosure (because these firms can find substitute financing or disclosure does not depend on access to finance), which corresponds to expecting that β will be zero.

Our identifying assumption is that firms just above and below the investment-grade cutoff experience similar unobservable shocks. Under this assumption, the sensitivity of noninvestment-grade firms' disclosure to high-yield fund flows indicates that funding shocks and capital market segmentation matter for corporate disclosure. Our empirical approach ensures this assumption holds, however, it is subject to two important critiques. The first is that our matched firms may not experience similar unobservable shocks. A separate concern is that firms may manage credit ratings based on unobservable characteristics. While we cannot rule out either concern, we now discuss the nature of the potential bias for β and how our robustness tests alleviate these concerns.

While we show our matching procedure successfully finds similar pairs of firms in terms of observable characteristics, firms may still differ on the basis of unobservables. If these unobservables are both used to assign credit ratings and determine shocks to disclosure then our results may be biased. In this case, high-yield fund flows may proxy for differential shocks to noninvestment-grade firms. We use two robustness tests to address this concern. First, we analyze other ratings cutoffs and compare the responsiveness of disclosure to fund outflows. For example, we compare if the disclosure of BB+ rated firms is more responsive

to high-yield mutual fund flows than he disclosure of BB rated firms. If unobservables are used to assign credit ratings, then differences in disclosure behavior should be present around other ratings cutoffs. Second, we control for macroeconomic variables in our regressions to show that our estimate of β is unlikely to simply pickup differences in behavior through the business cycle between creditworthy and less creditworthy firms.

A remaining concern is that firms could be managing their credit ratings. This could be because firms select into different ratings, possibly, on the basis of unobservables. We believe it is plausible that firms with a greater reliance on unstable high-yield fund flows may have stronger incentives to obtain a BBB– rating. Under this assumption, the realized set of BB+ firms should display a lower responsiveness of disclosure to high-yield fund flows. However, under this plausible selection scenario we should expect our estimate of β to be biased towards zero. Alternatively, when BBB– firms fear downgrades they might have particularly strong incentives to alter their behavior—including disclosure—in order to keep their investment-grade status. While plausible, in order to threaten our identification, such downgrades would have to positively correlate with high-yield fund flows. However, in the data downgrades and high-yield fund flows negatively correlate. Thus, bias arising from firms managing existing ratings would also attenuate our estimate of β.

2.2 Sample Selection and Variable Construction

Our sample consists of U.S. firm-quarter level data from Standard and Poor's (S&P) Compustat for the period from 1986:Q1 until 2010:Q4. The unit of observation in our analysis is always a firm-quarter. Our choice of sample period reflects the availability of domestic long-term issuer credit ratings provided by S&P. We drop firms operating in the financial, insurance, real estate industries (SIC 60-69), and utilities (SIC 49). We use these data to construct measures of size, Q, leverage, cash holdings, and earnings (return-on-assets, ROA, and a negative earnings indicator variable), which are used in our matching scheme. These

variables are standard and defined precisely in the Appendix A. All continuous variables are winsorized at the 1 percent level to ensure that results are robust to outliers.

Our main dependent variable is voluntary corporate disclosure, which we measure using earnings guidance as issued by management. A large literature has used management-issued earnings forecasts to measure voluntary disclosure (Armstrong et al., 2014). The voluntary disclosure literature has demonstrated that this form of communication is perceived as credible and informative by the market (Rogers and Stocken, 2005). In particular, it is associated with analysts' own earnings forecast revisions (Lang and Lundholm, 1996), as well as changes in stock prices and trading activity (Balakrishnan et al., 2014a). Moreover, improvements in firm-level transparency have been attributed to earnings forecasts issued by management, especially when such forecasts occur frequently and with accuracy (Kim and Verrecchia, 1994; Skinner, 1994).[3]

We extract firm level earnings guidance data from the Company Issued Guidelines of the Thomson Reuters' First Call Historical Database. For each firm-quarter, we count the number of forecasts and pre-announcements of earnings per share provided by management for the firms common shares. Precisely, in a given quarter, we record a voluntary disclosure event if management provides earnings guidance before the end of a fiscal period or after the end of a fiscal period but before the actual earnings announcement. If there is no guidance event in a given firm-quarter, then we assume the firm is a non-discloser in that period.

To measure firms' access to bond markets, we use the senior secured credit rating. This is usually the highest rating a firm can obtain on a new debt issuance. Firms with BB+ senior secured ratings will be unable to issue investment-grade debt when noninvestment-grade debt funding is limited. Compustat provides long-term issuer credit ratings assigned

[3]Alternatively, we could measure disclosure at the firm-level using the frequency or content of SEC filings (Leuz and Schrand, 2009; Li, 2008), or external ratings of disclosure policy (Botosan and Plumlee, 2002; Lang and Lundholm, 1993, 1996). However, as argued by Balakrishnan et al. (2014a), these measures may have lower power in our setting as managers may lack the ability to immediately change financial statements, given mandatory disclosure requirements, accounting standards, and auditor scrutiny.

to firms by S&P, which proxy for the senior secured rating.[4]

Data on bond mutual fund flows come from the Investment Company Institute (ICI), a leading global association of regulated funds. As of 2010, the ICI covered nearly 9,000 mutual funds with assets under management in the neighborhood of $10 trillion, including $200 billion of assets held by high-yield bond mutual funds. They provide quarterly data on high-yield corporate bond fund flows expressed in dollar terms and aggregated across funds. The ICI also provide data on investment-grade fund flows that we use in robustness tests.

We use this flows data to construct measures of high-yield bond fund flows, which we use as independent variables in our regressions. We first scale flows in each quarter by the capital (measured by plants, property, and equipment, PPE) of investment- and noninvestment-grade firms close to the ratings cutoff (firms rated between BBB+ and BB–) to capture their economic importance. We then cumulate flows from quarters $t-4$ until $t-1$ to allow for a time lag between fund flows and changes in firm behavior, such as bond issuance. Figure 1 indicates that high-yield fund flows vary considerably over time and are large in magnitude when compared to the PPE of firms around the investment-grade ratings cutoff. In addition to using scaled high-yield bond mutual flows as an independent variable in our tests, we also consider an indicator variable equal to one if there were cumulative fund outflows from quarters $t-4$ until $t-1$, and zero otherwise.

2.3 Summary Statistics

Table I presents firm characteristics across credit rating groupings. We report averages of firm-quarter data for investment- and noninvestment-grade firms, as well as the difference in means between these groups. We do this three ways: for the full sample; separately for BBB– and BB+ firms, i.e., around the investment-grade cutoff; and, for matched firms around the

[4]See `www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352`. Also notice that if firms with BB+ senior secured ratings are can issue investment-grade debt, this will bias us against finding an effect of high-yield fund flows on noninvestment-grade firms' behavior.

investment-grade cutoff.

Columns [1] to [3] present summary statistics for all investment- and noninvestment-grade firms, i.e., those rated from AAA to BBB– and BB+ to CCC, respectively. Lower-rated firms are generally smaller, more levered, and have more cash on hand. Q varies from about 2 for the most highly rated firms to 1.5 for noninvestment-grade firms. Firms with higher credit ratings typically earn higher profits, as can be seen from operating margins, ROA or an indicator variable for negative earnings. Investment-grade firms appear to provide more voluntary disclosure, on average.

Columns [4] to [6] zone in on the investment-grade cutoff and we can see that most of these differences no longer show up. BB+ firms are smaller by around 18.2 percent, on average, and have market leverage 8.8 percent higher than BBB– firms, however, the difference in size is not statistically significant. BB+ firms have lower Q, although the magnitude of this difference is very small. Profitability is very similar across the two groups. The frequency of voluntary disclosure for both BB+ and BBB- firms is around 30 percent.

Columns [7] to [9] report the characteristics of BB+ and BBB– matched firms. Of the 2,585 firm-quarter observations rated BB+ in our sample, our matching procedure yields 1,958 matches to 238 unique observations rated BBB– on the basis of the characteristics shown in the table aside from voluntary disclosure. Overall, the matching procedure succeeds in selecting BB+ firms closer to the investment-grade cutoff than the unmatched, as we can see from the lack of differences in observable characteristics. Matched BB+ and BBB– firms are essentially the same in terms of size and leverage, in contrast to the large differences observed in the full sample. The remaining differences are neither statistically nor economically significant, including Q and the measures of profitability. This reassures us that our matching estimator will adequately control for differences in firms around the investment-grade cutoff, at least in terms of fundamentals such as size, leverage, and performance.

3 Empirical Results

This section provides estimates of the impact of high-yield bond mutual fund flows on the voluntary disclosure decisions of corporations. In Section 3.1.1, we conduct the baseline firm-level analysis, as well as falsification and robustness tests. In Sections 3.1.2 and 3.1.3 we show our results are robust when we control for business cycle effects and use alternative measures of flows, respectively. In Section 3.2, we examine how the relation between fund flows and disclosure varies with measures of firm-level financial constraints. Section 3.3 investigates whether additional disclosures relate to equity issuance behavior.

3.1 High-Yield Fund Flows and Corporate Disclosure

3.1.1 Baseline Analysis

We begin by estimating the relation between voluntary disclosure and high-yield mutual fund flows based on equation (2). We regress the difference in disclosure of matched BB+ and BBB– firms on flows using ordinary least squares (OLS):

$$\Delta\text{Voluntary Disclosure}_{it} = \alpha_k + \alpha_j + \beta \cdot \text{HY Fund Outflows}_{t-1} + \epsilon_{it}, \tag{3}$$

where i indexes firms, t indexes quarters, k indexes years, and j indexes industries. The unit of observation is a firm-quarter. The dependent variable, ΔVol. Disclosure$_{it}$, is the difference in voluntary disclosure between matched BB+ and BBB– firms. The main independent variable, HY Fund Outflows$_{t-1}$, is an indicator variable equal to one if there were cumulative outflows from high-yield funds over the previous four quarters. The α_k and α_j denote year and industry (based on 48 Fama-French industries) fixed effects, respectively. The industry fixed effects control for time-invariant differences between industries and the year fixed effects control for aggregate economic shocks at the annual frequency. ϵ_{it} is the error term, which

is assumed to be correlated within firm and potentially heteroskedastic (Petersen, 2009).

Table II shows the baseline regression results. Column [1] shows the results from the estimation of (3). The coefficient on high-yield fund outflows is equal to 0.156 and significant at the 5 percent confidence level. The direction of this estimate is consistent with noninvestment-grade firms increasing disclosure more relative to investment-grade firms when the pool of funds available to high-yield mutual funds declines. This effect is large in terms of economic magnitudes: the estimate implies that switching from a period of non-negative to negative fund flows leads to 0.156 increase in the frequency of earnings guidance among BB+ firms, which constitutes about one-third of its standard deviation (0.470). This finding is consistent with economic models of capital structure, information asymmetry, and corporate disclosure behavior (e.g., Verrecchia, 2001). In such models, information released by firms can mitigate the potentially large financing costs associated with information asymmetry. In our context, a lower availability of funds from a key provider of capital increases the potential benefits of information disclosure, and noninvestment-grade firms respond accordingly.

We next consider a key auxiliary test that will give us further confidence in our identification strategy. We check whether the effects on disclosure are more pronounced for periods of large high-yield fund outflows. It is natural to expect that noninvestment-grade firms increase disclosure more strongly in response to severe outflows, since access to debt capital will be most limited in such periods. To test this idea, we define a quarter to have "Strong" outflows when high-yield fund outflows are above-median and "Weak" otherwise. We re-estimate equation (3) replacing our main independent variable with two interaction terms:

$$\begin{aligned}\Delta\text{Voluntary Disclosure}_{it} = \; & \alpha_k \; + \; \alpha_j \; + \; \beta_1 \cdot \text{HY Fund Outflows}_{t-1} \times \text{Strong}_{t-1} \\ & + \; \beta_2 \cdot \text{HY Fund Outflows}_{t-1} \times \text{Weak}_{t-1} \; + \; \epsilon_{it}, \qquad (4)\end{aligned}$$

We therefore allow for a differential sensitivity of disclosure among noninvestment-grade firms in response to fund outflows of different magnitudes, as measured by the difference between β_1 and β_2.

Column [2] shows the results of splitting high-yield fund outflows according to whether the outflow is large or small in magnitude. The coefficient on strong high-yield fund outflows is positive and remains statistically significant at the 5 percent confidence level. Importantly, the point estimate is larger in magnitude than the estimated effect from column [1] (0.197 versus 0.156). In contrast, the coefficient on weak fund outflows is half the size of the average effect and statistically insignificant. Thus, noninvestment-grade firms' voluntary disclosure increases sharply relative to investment-grade firms only when high-yield fund outflows are large.

We next include investment-grade mutual fund flows as an independent variable in our baseline regression. This allows us to conduct a falsification test of our results, since we expect neither investment- nor noninvestment-grade firms to respond to investment-grade fund flows. This expectation follows from our discussion of the institutional setting in Section 2.1. In particular, investment-grade firms have access to multiple sources of funding and therefore are unlikely to depend on investment-grade fund flows. Likewise, noninvestment-grade firms should not respond, as they are unable to tap investment-grade mutual funds' capital due to institutional restrictions.

In column [3], we include investment-grade mutual fund flows. These data are available from 2001:Q1 and therefore reduces the number of firm-quarter observations by about 300. We see that the coefficient on investment-grade fund flows is statistically insignificant, whereas the coefficient on high-yield fund flows remains positive (0.167) and statistically significant at the 5 percent confidence level. This give us further confidence that our estimator is correctly measuring the response of noninvestment-grade firms to debt financing constraints.

Our next test excludes the period immediately following the dotcom bust (2001–2002) and the financial crisis (2008–2010). These periods were characterized by large swings in high-yield mutual fund flows, as shown in Figure 1. This suggests our main results may be driven by these one-off events or may simply reflect the differential behavior of less creditworthy firms during downturns. In columns [4] and [5], we see that the coefficients on high-yield outflows are unchanged in magnitude and still statistically significant at conventional levels. Thus, our baseline results are not driven by these severe episodes. Instead, the adjustments in the disclosure behavior of noninvestment-grade firms are the result of ongoing shocks to access to debt financing.

We continue to examine the robustness of the baseline estimates in Table III.

Our matching procedure only allows for BBB– and BB+ firms to enter the estimation. This allows us to estimate the effect of high-yield fund flows in the spirit of a sharp regression discontinuity design. We now investigate whether our results change when we include additional firms around the investment-grade cutoff. In particular, we adopt a wider bandwidth, including firms rated BBB+, BBB, or BBB- in the investment-grade and firms rated BB+, BB, or BB- in the noninvestment-grade groups, and repeat our baseline estimation of equation (3). Column [1] of Table III shows the coefficient on high-yield fund flows attenuates when we use a wider bandwidth and larger sample of firm-quarters: the estimate of β reduces from 0.156 to 0.096. This is most likely due to our matching procedure becoming less effective and differences in unobservable and observable firm characteristics playing a bigger role.[5]

One remaining concern is our estimates may be affected by unobservable firm characteristics known by the ratings agency and used in ratings assignments. As a consequence, BB+ firms may differ from their BBB– matches along unobservable dimensions correlated with both high-yield fund flows and disclosure behavior. To address this issue, we conduct

[5]What does the matched sample look like here? Show this in an appendix?

falsification tests using matched firms around other close by rating cutoffs to check if lower-rated firms' disclosure around other rating cutoffs is more responsive to fund flows relative to higher-rated firms. We use our baseline matching procedure and compare firms rated BBB– with firms rated BBB and firms rated BB with firms rated BB+, i.e., one notch above and one notch below.

Columns [2] and [3] present the results from alternative cutoffs. We find that there is no differential sensitivity of disclosure to high-yield mutual fund flows for lower-rated firms at either cutoff. This suggests that our main results do not reflect differences in unobservable characteristics used in credit ratings assignment. However, it is important to note that unobservable information might only be relevant at the investment-grade cutoff. While these falsification tests do not eliminate this possibility, our tests in coming sections alleviate this concern.

In our baseline tests, we use an indicator variable to measure the extensive margin change in voluntary disclosure by firms in response to high-yield fund flows. We now consider an alternative, intensive margin measure of voluntary disclosure based on the number of earnings forecasts issued by management in the current quarter. Such a measure might be informative, especially if the decision to start or stop guiding is particularly costly (Chen et al., 2011). Column [4] shows the result of re-estimating our baseline regression model (3) now using the difference in the number of earnings forecasts between BB+ and matched BBB– firms as the dependent variable. The coefficient on high-yield fund outflows is equal to 0.287 and significant at the 5 percent confidence level. In terms of economic magnitudes, the estimate implies that switching from a period of nonnegative to negative fund flows leads to 0.287 additional earnings forecasts in the current quarter among BB+ firms. This effect is large and constitutes about 35 percent of its standard deviation (0.820).

To summarize, we document the corporate disclosure effects of changes in the financing capacity resulting from capital market segmentation. Our results in Tables II and III indicate

an economically meaningful and statistically significant impact of high-yield fund flows on the voluntary disclosure of BB+ firms as compared to similar firms with a BBB– rating. These findings are consistent with theoretical research emphasizing a link between disclosure, information asymmetry, and the cost of capital (Lambert et al., 2007; Verrecchia, 2001). They also confirm findings in recent empirical work that connects measures of transparency with the cost of debt and equity finance (e.g., Bharath et al., 2008; Lee and Masulis, 2009).

3.1.2 Controlling for Business Cycle Effects

In this section, we investigate the alternative hypothesis that the behavior of less creditworthy firms is more responsive to the business cycle and that high-yield mutual fund flows are proxying for this greater responsiveness.

We use two approaches to address this concern. First, note that we have already shown our main results are robust to dropping the two most recent recessions from our sample. Here, we use a complementary approach which is to include several macroeconomic indicators in our baseline regression model. The macroeconomic variables are each included individually or we simultaneously control for them all at once. We measure these variables with a one-quarter lag, i.e., contemporaneously with the high-yield mutual fund flows. Table IV reports the results.

Column [1] uses the Chicago Board Options Exchange Volatility Index (VIX), averaged over end-of-month values during quarter $t-1$. Column [2] uses credit spread, which is the yield spread between Baa- and Aaa-rated bonds, averaged over end-of-month values during quarter $t-1$, based on data from the Federal Reserve. Column [3] uses data from Kenneth French's website to calculate the value-weighted excess market return on NYSE, AMEX, and NASDAQ stocks minus the one-month Treasury Bill rate, averaged over monthly values during quarter $t-1$. Column [4] uses data from the Federal Reserve to calculate the yield spread between constant maturity Treasuries and three-month T-bills, averaged over end-

of-month values during quarter $t-1$, i.e., the term spread. Finally, column [5] includes the percentage change in the seasonally-adjusted real GDP during quarter $t-1$, based on data from the Bureau of Economic Analysis. The final column controls for macroeconomic indicators all at once.

In each column, we find the coefficient on high-yield fund outflows is positive and statistically significant at at least the 10 percent level. Moreover, the size of the coefficient on flows is stable across all specifications and similar to the baseline estimate in column [1] of Table II. Thus, it seems unlikely that the greater responsiveness of BB+ firms' disclosure to high-yield fund outflows simply reflects differences in disclosure behavior over the business cycle.

3.1.3 Alternative Measurement of Fund Flows

In this section, we examine whether our results are robust to an alternative construction of high-yield fund flows.

The main independent variable in our baseline analysis is an indicator variable that identifies periods of fund outflows from the high-yield bond market. As an alternative, we consider a continuous measure of flows equal to the dollar value of flows cumulated from quarters $t-4$ until $t-1$ and scaled by the PPE of firms rated between BBB+ and BB– (see Figure 1). This captures both inflows and outflows, as well as their economic importance relative to the capital of investment- and noninvestment-grade firms close to the ratings cutoff. We incorporate this alternative measure of flows into our main estimating equation (3) and repeat the estimation for our baseline matched sample. Table V shows the results.

Column [1] performs the baseline estimation with the continuous measure of flows as the main independent variable. The point estimate has the expected sign (-3.882), but is statistically insignificant. This suggests that noninvestment-grade firms' disclosure is not more sensitive than that of investment-grade firms when high-yield mutual fund flows in-

crease or decrease. An alternative interpretation is that there is an asymmetric effect on disclosure and firms are less responsive to positive shocks to the supply of capital. Theoretically, information problems usually bind on the lower side (Verrecchia, 2001). Moreover, recent empirical work uncovers a large negative stock market reaction to stopping giving earnings guidance (Chen et al., 2011; Houston et al., 2010). Thus, it is more likely for firms to increase disclosure when faced with a negative shock than reduce disclosure when faced with a positive shock.

We investigate this possibility by splitting the measure of high-yield fund flows into periods of inflows and periods of outflows. In particular, we replace the main fund flows variable with two interaction terms—HY Fund Flows$_{t-1}\times$ Inflows$_{t-1}$ and HY Fund Flows$_{t-1}\times$ Outflows$_{t-1}$—which allow us to measure how the disclosure behavior of noninvestment-grade firms differs when flows are positive and negative. In column [2], we see a sharp contrast between the coefficients on the two interaction terms: the coefficient on fund inflows is statistically indistinguishable from zero and the coefficient on fund outflows is negative (-18.031) and significant at the 1 percent confidence level. This provides clear evidence that noninvestment-grade firms respond only to negative shocks to debt capital supply through an increase in disclosure, but not to positive shocks. Column [3] goes one step further and breaks out the high-yield fund outflows into quarters where cumulative flows are above- and below-median, which we label "Strong" and "Weak" respectively. We find that noninvestment-grade firms' information disclosure response is concentrated in quarters where the outflows are particularly strong, which is when debt financing constraints are likely to be tightest.

Columns [4] to [6] repeat three robustness tests from Table II. First, we include investment-grade fund flows and show the coefficient on high-yield fund outflows is unchanged both in terms of size and significance. This suggest that neither investment- nor noninvestment-grade firms to respond to investment-grade fund flows. Next, we exclude the two most recent recessions from the sample in turn and repeat the estimation on the smaller sample.

In both cases the main result is robust, which indicates it is not driven by one-off swings in fund flows but instead reflects recurrent negative shocks to capital. Moreover, last finding suggests the high-yield fund outflows variable is not merely picking up a greater sensitivity of noninvestment-grade firms' disclosure to recessions.

3.2 Role of Ex-Ante Financial Constraints

In this section, we examine whether ex-ante financially constrained firms—those firms with access to few alternative sources of funding—adjust their corporate disclosure more in response to high-yield fund outflows.

Theory predicts that information asymmetry between corporate insiders and outside investors can give rise to moral hazard and adverse selection problems (Myers and Majluf, 1984), which may negatively impact access to external funding and, ultimately, investment. Our central hypothesis is that corporate disclosure can alleviate such information-related financing frictions, so that more transparent firms will have greater access to market-based financing (Lambert et al., 2007; Verrecchia, 2001). In our context, in the presence of information-based financing frictions the choice of internal versus external funding (e.g., debt versus equity) will depend upon relative cost of each of these sources of capital. In periods when debt capital from high-yield bond mutual funds is scarce, the cost of accessing bond funding increases both in absolute terms and relative to other sources. Noninvestment-grade firms, with limited access to internal funds or other capital markets, may therefore increase disclosure to offset some of the negative effects of high-yield fund outflows on investment (Chernenko and Sunderam, 2012). Since these firms will be unable to easily substitute funding, there will be relatively large benefits of disclosure and transparency in terms improving access to outside sources of capital. In particular, such firms may increase disclosure to cater to securities analysts and institutional investors to improve their access to equity capital (Bird and Karolyi, 2015; Boone and White, 2015).

These arguments suggest that the increases in voluntary disclosure in response to high-yield fund outflows will be concentrated among the constrained subset of noninvestment-grade firms. We examine this hypothesis based on three measures of ex-ante financial constraints commonly used in the empirical corporate finance literature (e.g., Giroud and Mueller, 2015). First, we consider the KZ index of Kaplan and Zingales (1997). The KZ-index loads negatively on cash flow, cash holdings, and dividends, and positively on leverage and Q. Second, the WW-index of Whited and Wu (2006), which captures the shadow value of capital. Finally, the SA-index of Hadlock and Pierce (2010), which is a simple combination of size and age.[6] By construction, these indexes are higher for firms that are financially more constrained. For each measure, we therefore partition the set of BB+ firm-quarters and their matched BBB– pair according to whether they are above (constrained) or below (unconstrained) the median value among the set of BB+ firms. We then re-estimate equation (3) separately on the groups of financially constrained and unconstrained matched BB+ firms.[7]

Table VI reports the results. The point estimates indicate that there are substantial differences in the responsiveness of corporate disclosure to high-yield fund outflows between the constrained and unconstrained groups. In particular, the size of the coefficient of interest, β, is estimated to be large and statistically significant for the constrained group for all three measures. Furthermore, the point estimate is between 50 to 100 percent larger in magnitude

[6]We calculate the KZ-index based on data from Compustat following Lamont et al. (2001): KZ-index = -1.001909 × cash flow/PPE + 0.2826389 × Q + 3.139193 × debt/(debt + equity) – 39.3678 × dividends/PPE – 1.314759 × cash/PPE, where: cash flow is income before extraordinary items plus depreciation and amortization; debt/(debt + equity) is long-term debt plus debt in current liabilities divided by long-term debt plus debt in current liabilities plus stockholders equity; and dividends are dividends on common stocks plus dividends on preferred stocks. We compute the WW-index as follows: WW-index = -0.091 × cash flow/assets – 0.062 × positive dividend + 0.021 × long-term debt/assets – 0.044 × log(assets) + 0.102 × industry sales growth – 0.035 × sales growth, where: positive dividend is an indicator variable equal to one if cash dividend is positive; and industry sales growth is sales growth in the firm's three-digit SIC industry. The SA-index is calculated as: -0.737 × assets + 0.043 × assets^2 – 0.040 × age.

[7]Similar results obtain regardless of whether we use contemporaneous or lagged measures of financial constraints. The use of lagged values mitigates concerns that the classification might be contaminated by contemporaneous high-yield fund flows.

than the corresponding estimate for the full sample (see column [1] of Table II). In contrast, the sensitivity to flows for the unconstrained subgroup of noninvestment-grade firms is always statistically indistinguishable from zero. This finding suggests that financially constrained noninvestment-grade firms increase information disclosure in response to high-yield fund outflows.

To summarize, we find that the differential sensitivity of corporate disclosure to flows into high-yield mutual funds is more pronounced among ex-ante financially constrained firms. We observe no adjustment in information disclosure behavior among financially unconstrained firms. Our interpretation is that noninvestment-grade firms with a limited ability to substitute away from the high-yield bond financing increase disclosure to accommodate investors and improve access to alternative sources of financing. In the next section, we show that additional equity issuance is a plausible channel through which noninvestment-grade firms' disclosures achieve this outcome.

3.3 Flows, Corporate Disclosure, and Equity Issuance

Under the assumption that additional managerial disclosures alleviate information-based financing frictions (Diamond, 1985; Lambert et al., 2007; Verrecchia, 2001), reducing information asymmetry through credible voluntary disclosure may allow noninvestment-grade firms to raise equity at lower financing costs (Lang and Lundholm, 2000; Lee and Masulis, 2009; Myers and Majluf, 1984). In this section, we examine the financing effects of the change in disclosure among noninvestment-grade firms and find evidence consistent with this channel: firms increasing voluntary disclosure in response to high-yield fund outflows increase equity issuance.

We estimate the relation between high-yield mutual fund flows, voluntary disclosure, and equity issuance based using a slight modification of our baseline empirical methodology. In particular, for our matched sample of BB+ and BBB– firms, we regress the difference in

equity issuance on flows via OLS:

$$\begin{aligned}\Delta\text{Equity Issuance}_{it} = \ & \alpha_k \ + \ \alpha_j \ + \ \beta_1 \cdot \text{HY Fund Outflows}_{t-1} \times \text{Disclosure}_{it} \\ & + \ \beta_2 \cdot \text{HY Fund Outflows}_{t-1} \times \text{No Disclosure}_{it} \ + \ \epsilon_{it}, \qquad (5)\end{aligned}$$

where i indexes firms, t indexes quarters, k indexes years, and j indexes industries. The unit of observation is a firm-quarter. The dependent variable, ΔEquity Issuance$_{it}$, is the difference in common equity scaled by (lagged) total assets between matched BB+ and BBB– firms. The main independent variable, HY Fund Outflows$_{t-1}$, is now interacted with variables indicating whether firm i provided disclosure or not in quarter t.

The coefficients of interest in (5), β_1 and β_2, capture the differential sensitivity of the equity issuance of noninvestment-grade firms that do and do not provide additional disclosures to high-yield bond mutual fund outflows. If firms increase disclosure to reduce information asymmetry—and this has a meaningful impact on equity issuance—then β_1 will be strictly positive and greater than β_2. The null hypothesis is that high-yield fund outflows are irrelevant for noninvestment-grade firms' equity issuance behavior, which corresponds to β_1 and β_2 equal to zero.

Table VII reports the results. Column [1] estimates a simplified version of (5) that only includes the high-yield bond fund outflows main effect on the full matched sample. The point estimate indicates noninvestment-grade firms' equity issuance is more responsive to high-yield fund outflows than investment-grade firms' issuance. In column [2], we break out this average effect and allow for a differential sensitivity of equity issuance to fund outflows for noninvestment-grade firms that increase disclosure versus those that do not. We find a positive effect of high-yield fund outflows on equity issuance only for firms increasing disclosure. In particular, the estimate of β_1 is positive (0.032) and statistically significant at the 5 percent confidence level. In contrast, β_2 is statistically indistinguishable from

zero. In line with the theory, this suggests that noninvestment-grade firms providing more information to investors are able to substitute from the high-yield bond market to equity financing. The remaining columns of Table VII confirm this finding is robust to controlling for investment-grade fund flows and excluding the two most recent recessions. Finally, in column [6] we show that this result is robust to controlling for macroeconomic factors.

To summarize, the results of this section suggest that increased disclosure plays an important role in allowing noninvestment-grade firms to maintain access to finance when funding through the high-yield bond financing becomes limited.

4 Conclusion

We provide evidence that binding financial constraints lead managers to increase voluntary disclosure. Our tests exploit the sharp distinction between investment- and noninvestment-grade firms that exposes them to variation in access to debt financing unrelated to firm fundamentals. This market segmentation allows us to measure how shocks to high-yield mutual funds cause the voluntary disclosure of BB+ firms to diverge from the disclosure of BBB- firms in close proximity to the investment-grade cutoff.

We have two main results. First, we show that firms respond to negative shocks to their supply of debt capital by voluntarily disclosing more information. Further analysis indicates that this effect is concentrated in periods of strong high-yield bond mutual fund ouflows and among firms that are most likely to be financially constrained ex-ante. We find no such effects around other ratings cutoffs nor do we find firms decrease disclosures in response to high-yield fund inflows. This latter effect is consistent with an asymmetric effect of shocks to the supply of capital on corporate disclosure with firms less responsive on the positive side.

Second, we document an increase in equity issuance among noninvestment-grade firms

stepping up voluntary disclosure in response to high-yield fund outflows. This suggests that firms with limited access to the high-yield bond market are able to reduce information asymmetry and substitute to alternative sources of funding. While this substitution is unlikely to offset the negative effects of high-yield fund outflows—Chernenko and Sunderam (2012) show the typical noninvestment-grade firm reduces investment—it may help noninvestment-grade firms smooth out temporary shocks to the cost and availability of debt finance.

Overall, our work supports theoretical research on the impact of disclosure on corporate policies that explicitly assumes that reporting practices and, consequently, the information environment of the firm are endogenously determined (e.g., Lambert et al., 2007; Verrecchia, 2001).

References

Abadie, A., Imbens, G. W., 2006. Large Sample Properties of Matching Estimators for Average Treatment Effects. Econometrica 74, 235–267.

Altman, E. I., Kao, D. L., 1992. The Implications of Corporate Bond Ratings Drift. Financial Analysts Journal 48, 64–75.

Armstrong, C. S., Core, J. E., Guay, W. R., 2014. Do Independent Directors Cause Improvements in Firm Transparency? Journal of Financial Economics 113, 383–403.

Balakrishnan, K., Billings, M. B., Kelly, B., Ljungqvist, A., 2014a. Shaping Liquidity: On the Causal Effects of Voluntary Disclosure. Journal of Finance 69, 2237–2278.

Balakrishnan, K., Core, J. E., Verdi, R. S., 2014b. The Relation Between Reporting Quality and Financing and Investment: Evidence from Changes in Financing Capacity. Journal of Accounting Research 52, 1–36.

Bharath, S. T., Sunder, J., Sunder, S. V., 2008. Accounting Quality and Debt Contracting. Accounting Review 83, 1–28.

Bird, A., Karolyi, S. A., 2015. Do Institutional Investors Demand Public Disclosure? Working Paper, Carnegie Mellon University.

Boone, A. L., White, J. T., 2015. The Effect of Institutional Ownership on Firm Transparency and Information Production. Journal of Financial Economics 117, 508 – 533.

Botosan, C. A., Plumlee, M. A., 2002. A Re-Examination of Disclosure Level and the Expected Cost of Equity Capital. Journal of Accounting Research 40, 21–40.

Brockman, P., Khurana, I. K., Martin, X., 2008. Voluntary Disclosures Around Share Repurchases. Journal of Financial Economics 89, 175–191.

Cantor, R., Hamilton, D. T., 2005. Rating Transitions and Defaults Conditional on Rating Outlooks Revisited: 1995–2005. Discussion Paper, Moody's.

Cantor, R., Mann, C., 2006. Analyzing the Trade-off Between Ratings Accuracy and Stability. Discussion Paper, Moody's.

Chen, S., Matsumoto, D., Rajgopal, S., 2011. Is Silence Golden? An Empirical Analysis of Firms that Stop Giving Quarterly Earnings Guidance. Journal of Accounting and Economics 51, 134–150.

Chen, T., Harford, J., Lin, C., 2015. Do Analysts Matter for Governance? Evidence From Natural Experiments. Journal of Financial Economics 115, 383–410.

Chernenko, S., Sunderam, A., 2012. The Real Consequences of Market Segmentation. Review of Financial Studies 25, 2041–2069.

Diamond, D. W., 1985. Optimal Release of Information By Firms. Journal of Finance 40, 1071–1094.

Diamond, D. W., Verrecchia, R. E., 1991. Disclosure, Liquidity, and the Cost of Capital. Journal of Finance 46, 1325–1359.

Duffie, D., Strulovici, B., 2012. Capital Mobility and Asset Pricing. Econometrica 80, 2469–2509.

Easley, D., O'Hara, M., 2004. Information and the Cost of Capital. Journal of Finance 59, 1553–1583.

Ellul, A., Jotikasthira, C., Lundblad, C. T., 2011. Regulatory Pressure and Fire Sales in the Corporate Bond Market. Journal of Financial Economics 101, 596–620.

Frederickson, J. R., Hilary, G., 2010. Disclosure Quality and Capital Investment. Working Paper, INSEAD.

Giroud, X., Mueller, H. M., 2015. Capital and Labor Reallocation within Firms. Journal of Finance 70, 1540–6261.

Grullon, G., Michaely, R., Swaminathan, B., 2002. Are Dividend Changes a Sign of Firm Maturity? Journal of Business 75, 387–424.

Hadlock, C. J., Pierce, J. R., 2010. New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. Review of Financial Studies 23, 1909–1940.

Harold, G., 1938. Bond Ratings as an Investment Guide: An Appraisal of Their Effectiveness. New York: Ronald Press.

Hayashi, F., 1982. Tobin's Marginal Q and Average Q: A Neoclassical Interpretation. Econometrica pp. 213–224.

Houston, J. F., Lev, B., Tucker, J. W., 2010. To Guide or Not to Guide? Causes and Consequences of Stopping Quarterly Earnings Guidance. Contemporary Accounting Research 27, 143–185.

Irani, R. M., Oesch, D., 2013. Monitoring and Corporate Disclosure: Evidence from a Natural Experiment. Journal of Financial Economics 109, 398–418.

Kaplan, S. N., Zingales, L., 1997. Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints? The Quarterly Journal of Economics 112, 169–215.

Kelly, B. T., Ljungqvist, A., 2012. Testing Asymmetric-Information Asset Pricing Models. Review of Financial Studies 25, 1366–1413.

Kim, O., Verrecchia, R. E., 1994. Market Liquidity and Volume around Earnings Announcements. Journal of Accounting and Economics 17, 41–67.

Kisgen, D. J., Strahan, P. E., 2010. Do Regulations Based on Credit Ratings Affect a Firm's Cost of Capital? Review of Financial Studies 23, 4324–47.

Kumar, P., Sorescu, S. M., Boehme, R. D., Danielsen, B. R., 2008. Estimation Risk, Information, and the Conditional CAPM: Theory and Evidence. Review of Financial Studies 21, 1037–1075.

Lambert, R., Leuz, C., Verrecchia, R. E., 2007. Accounting Information, Disclosure, and the Cost of Capital. Journal of Accounting Research 45, 385–420.

Lamont, O., Polk, C., Saa-Requejo, J., 2001. Financial Constraints and Stock Returns. Review of Financial Studies 14, 529–554.

Lang, M., Lundholm, R., 1993. Cross-Sectional Determinants of Analyst Ratings of Corporate Disclosures. Journal of Accounting Research pp. 246–271.

Lang, M. H., Lundholm, R. J., 1996. Corporate Disclosure Policy and Analyst Behavior. Accounting Review 71, 467–492.

Lang, M. H., Lundholm, R. J., 2000. Voluntary Disclosure and Equity Offerings: Reducing Information Asymmetry or Hyping the Stock? Contemporary Accounting Research 17, 623–662.

Lee, G., Masulis, R. W., 2009. Seasoned Equity Offerings: Quality of Accounting Information and Expected Flotation Costs. Journal of Financial Economics 92, 443–469.

Leuz, C., Schrand, C., 2009. Disclosure and the Cost of Capital: Evidence from Firms Responses to the Enron Shock. Working Paper, University of Chicago.

Leuz, C., Wysocki, P., 2008. Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research. Working Paper, University of Chicago.

Li, F., 2008. Annual Report Readability, Current Earnings, and Earnings Persistence. Journal of Accounting and Economics 45, 221–247.

Lo, A. K., 2014. Do Declines in Bank Health Affect Borrowers Voluntary Disclosures? Evidence from International Propagation of Banking Shocks. Journal of Accounting Research 52, 541–581.

Mitchell, M., Pedersen, L. H., Pulvino, T., 2007. Slow Moving Capital. American Economic Review 97, 215–220.

Myers, S. C., Majluf, N. S., 1984. Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have. Journal of Financial Economics 13, 187 – 221.

Petersen, M. A., 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. Review of Financial studies 22, 435–480.

Rogers, J. L., Stocken, P. C., 2005. Credibility of Management Forecasts. Accounting Review 80, 1233–1260.

Skinner, D. J., 1994. Why Firms Voluntarily Disclose Bad News. Journal of Accounting Research 32, 38–60.

Stein, J. C., 2003. Agency, Information and Corporate Investment. Handbook of the Economics of Finance 1, 111–165.

Verrecchia, R. E., 2001. Essays on Disclosure. Journal of Accounting and Economics 32, 97–80.

Whited, T. M., Wu, G., 2006. Financial Constraints Risk. Review of Financial Studies 19, 531–559.

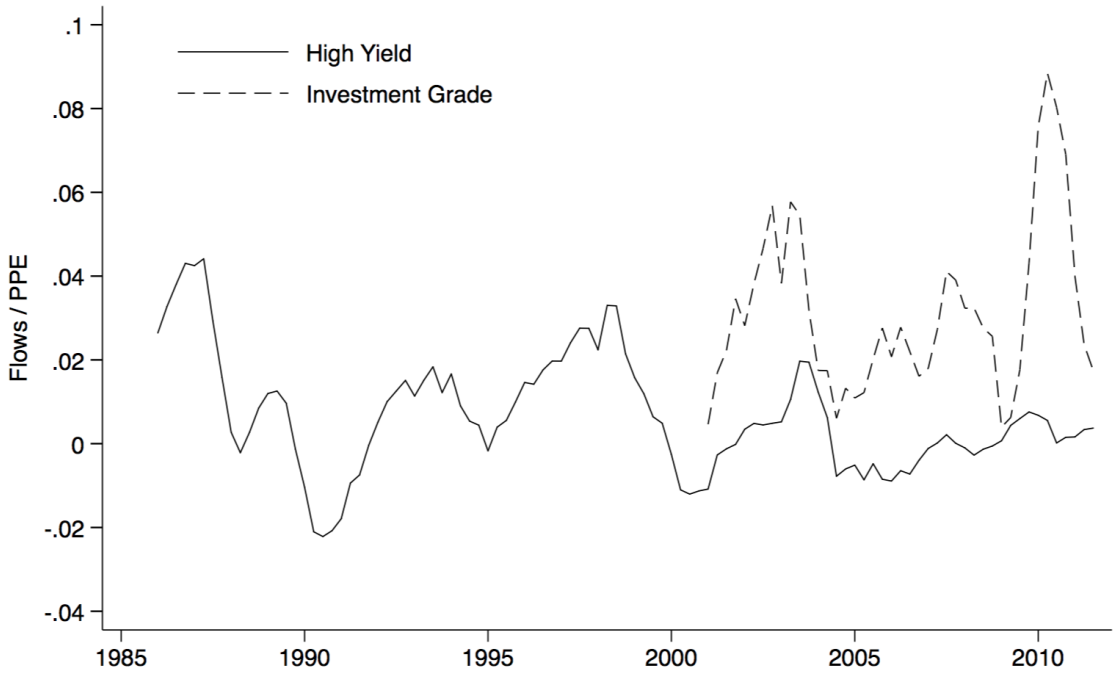

Figure 1: High-Yield and Investment-Grade Mutual Fund Flows. This figure plots the time series of quarterly high-yield and investment-grade mutual fund flows. The sample period is from 1986:Q1 until 2010:Q4. Flows are cumulated over four quarters and scaled by total PPE over four quarters of nonfinancial firms rated between BBB+ and BB-.

Table I
Summary Statistics for Unmatched and Matched Samples

This table shows sample averages for various characteristics for the sample of firms used in the empirical analysis. The unit of observation is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4. Columns [1] and [2] reports averages for the full sample of investment-grade ("IG") and noninvestment-grade ("IG^C") firms. Columns [3] and [4] report reports averages for BBB- and BB+ rated firms. Columns [5] and [6] reports averages for the matched sample of BBB- and BB+ rated firms. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels, respectively, based on a two-tailed difference-in-means test with unequal variances. All variables are defined in Appendix A.

	Full Sample			IG Cutoff (Unmatched)			IG Cutoff (Matched)		
	IG	IG^C	Diff.	BBB-	BB+	Diff.	BBB-	BB+	Diff.
Variable:	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Market Cap	15710.250	1737.733	13972.517***	4597.989	3759.108	838.881	3156.331	3121.485	34.846
Q	1.917	1.490	0.427***	1.549	1.541	0.008**	1.365	1.334	0.031
Leverage	0.375	0.568	-0.193***	0.406	0.442	-0.036**	0.418	0.425	-0.007
Cash	0.071	0.093	-0.022***	0.074	0.073	0.001	0.061	0.056	0.004
ROA	0.064	0.005	0.059***	0.043	0.042	0.001	0.040	0.039	0.001
Loss Indicator	0.079	0.306	-0.228***	0.137	0.155	-0.018	0.131	0.131	0.000
Voluntary Disclosure	0.275	0.199	0.076***	0.300	0.267	0.033	0.327	0.356	-0.029

Table II
Difference in Voluntary Disclosure and High-Yield Fund Flows

This table presents the estimated effect of high-yield bond fund flows on the difference in voluntary disclosure of matched BB+ and BBB- firms. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4 unless otherwise indicated. The dependent variable is the difference in voluntary disclosure between the matched BB+ and BBB- firms. HY Fund Outflows is an indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters. Column [1] shows the regression for the matched sample. Column [2] splits HY Fund Outflows according to whether the outflow is strong or weak. A quarter is defined to have "Strong" outflows when high-yield fund outflows are above-median and "Weak" otherwise. Column [3] includes investment-grade fund flows as a control variable. Column [4] restricts the sample to exclude the years from 2001 until 2002. Column [5] restricts the sample to exclude the years from 2008 until 2010. All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔVoluntary Disclosure					
				Exclude 2001-02	Exclude 2008-10
	[1]	[2]	[3]	[4]	[5]
HY Fund Outflows	0.156**		0.167**	0.162**	0.149*
	(2.035)		(2.103)	(2.104)	(1.913)
HY Fund Outflows × Strong		0.197**			
		(2.437)			
HY Fund Outflows × Weak		0.078			
		(0.963)			
IG Fund Flows			0.565		
			(0.348)		
Year Fixed Effects	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y
Observations	1,958	1,958	1,657	1,657	1,525
R^2	0.090	0.092	0.106	0.106	0.097

Table III
Difference in Voluntary Disclosure and High-Yield Fund Flows: Robustness Checks

This table presents various robustness checks for the estimated effect of high-yield mutual fund flows on the difference in voluntary disclosure of matched BB+ and BBB- firms. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4. The dependent variable is the difference in voluntary disclosure between the matched BB+ and BBB- firms. HY Fund Outflows is an indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters. Column [1] considers firms rated BBB+, BBB, or BBB- as just above and firms rated BB+, BB, or BB- are considered just below the investment-grade cutoff. Columns [2] and [3] shows placebo tests that examine the differential sensitivity in voluntary disclosure of matched firms on high-yield mutual fund flows around the BBB/BBB- and BB+/BB credit rating cutoffs, respectively. Column [4] uses the number of earnings forecasts issued by management as an alternative measure of voluntary disclosure. All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔVoluntary Disclosure				
	Wider	Placebo Test		Alt. Disclosure
	Bandwidth	BBB/BBB-	BB+/BB	Definition
	[1]	[2]	[3]	[4]
HY Fund Outflows	0.096**	-0.036	-0.075	0.287**
	(2.270)	(-0.620)	(-1.230)	(2.066)
Year Fixed Effects	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y
Observations	4,948	2,800	2,562	1,958
R^2	0.065	0.081	0.114	0.111

Table IV
Difference in Voluntary Disclosure and High-Yield Fund Flows: Macro Controls

This table presents the estimated effect of high-yield mutual fund flows on the difference in voluntary disclosure of matched BB+ and BBB- firms controlling for macroeconomic variables. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4. The dependent variable is the difference in voluntary disclosure between the matched BB+ and BBB- firms. HY Fund Outflows is an indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters. Columns [1] to [5] includes (one-quarter lagged) macroeconomic control variables. Column [6] includes all of the these controls at once. All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔVoluntary Disclosure						
	[1]	[2]	[3]	[4]	[5]	[6]
HY Fund Outflows	0.150*	0.150*	0.156**	0.150*	0.155**	0.131*
	(1.952)	(1.950)	(2.030)	(1.931)	(2.013)	(1.680)
VIX	-0.002					-0.003
	(-0.765)					(-0.480)
Credit Spread		-0.066				-0.480
		(-1.058)				(-0.600)
Stock Market Return			0.000			-0.004
			(0.051)			(-0.690)
Term Spread				-0.038		-0.044
				(-1.144)		(-1.330)
GDP Growth					0.005	0.005
					(0.803)	(0.590)
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	1,870	1,870	1,870	1,870	1,870	1,870
R^2	0.093	0.093	0.093	0.093	0.093	0.095

Table V
Difference in Voluntary Disclosure and High-Yield Fund Flows: Continuous Flows

This table presents the estimated effect of high-yield bond fund flows on the difference in voluntary disclosure of matched BB+ and BBB- firms. The fund flows variable is now measured continuously. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4 unless otherwise indicated. The dependent variable is the difference in voluntary disclosure between the matched BB+ and BBB- firms. HY Fund Flows are cumulated over four quarters and scaled by total PPE over four quarters of nonfinancial firms rated between BBB+ and BB-. Column [1] shows the regression for the matched sample. Column [2] splits HY Fund Flows into its positive ("Inflows") and negative ("Outflows") components and interacts these variables with flows. Column [3] further separates Outflows into quarters that are below-median ("Strong") and above-median ("Weak") and interacts these variables with outflows. Column [4] includes investment-grade fund flows as a control variable. Columns [5] and [6] restricts the sample to exclude the years from 2001 until 2002 and from 2008 until 2010, respectively. All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔVoluntary Disclosure						
					Exclude 2001-02	Exclude 2008-10
	[1]	[2]	[3]	[4]	[5]	[6]
HY Fund Flows	-3.882					
	(-1.189)					
HY Fund Flows × Inflows		2.847	2.359	2.326	2.849	5.457
		(0.669)	(0.550)	(0.443)	(0.642)	(1.223)
HY Fund Flows × Outflows		-18.031**		-20.357**	-17.132**	-19.657***
		(-2.553)		(-2.337)	(-2.006)	(-2.761)
HY Fund Flows × Outflows × Strong			-15.064**			
			(-2.013)			
HY Fund Flows × Outflows × Weak			1.197			
			(0.061)			
IG Fund Flows				0.587		
				(0.354)		
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	1,958	1,958	1,958	1,657	1,657	1,525
R^2	0.089	0.091	0.091	0.102	0.106	0.097

Table VI
Difference in Voluntary Disclosure and High-Yield Fund Flows: Financial Constraints

This table shows how the estimated effect of high-yield bond fund flows on the difference in voluntary disclosure of matched BB+ and BBB- firms interacts with access to other sources of financing. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4 unless otherwise indicated. The dependent variable is the difference in voluntary disclosure between the matched BB+ and BBB- firms. HY Fund Outflows is an indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters. The regressions are run separately for subsamples of matched BB+ firms classified as financially constrained ("Yes") or unconstrained ("No") using three indexes of financial constraints. Columns [1] and [2] use the KZ-Index of Kaplan and Zingales (1997). Columns [3] and [4] use the WW-Index of Whited and Wu (2006). Columns [5] and [6] use the SA-Index of Hadlock and Pierce (2010). All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔVoluntary Disclosure						
	KZ-Index		WW-Index		SA-Index	
Constrained Firm?	Yes	No	Yes	No	Yes	No
	[1]	[2]	[3]	[4]	[5]	[6]
HY Fund Outflows	0.305**	0.119	0.248**	0.017	0.250**	0.062
	(2.475)	(1.015)	(2.136)	(0.138)	(2.225)	(0.633)
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	822	817	917	917	976	976
R^2	0.157	0.180	0.173	0.117	0.108	0.147

Table VII
Difference in Equity Issuance, Voluntary Disclosure, and High-Yield Fund Flows

This table presents the estimated effect of high-yield bond fund flows on the difference in equity issuance of matched BB+ and BBB- firms. The unit of observation in each regression is a firm-quarter. The sample period is from 1986:Q1 until 2010:Q4 unless otherwise indicated. The dependent variable is the difference in equity issuance between the matched BB+ and BBB- firms. HY Fund Outflows is an indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters. Column [1] shows the regression for the matched sample. Column [2] interacts HY Fund Outflows with our measure of voluntary disclosure. Disclosure (No Disclosure) is an indicator equal to one if a firm issues (does not issue) earnings guidance in the current quarter. Column [3] includes investment-grade fund flows as a control variable. Column [4] restricts the sample to exclude the years from 2001 until 2002. Column [5] restricts the sample to exclude the years from 2008 until 2010. Column [6] controls for the full set of macroeconomic variables shown in Table IV. All columns include controls for industry and year fixed effects. Standard errors are adjusted for clustering by firm. ***, **, * denote statistical significance at the 1, 5, and 10 percent confidence levels (t-statistics in parentheses). All variables are defined in Appendix A.

Dependent Variable: ΔEquity Issuance						
				Exclude 2001-02	Exclude 2008-10	Macro Controls
	[1]	[2]	[3]	[4]	[5]	[6]
HY Fund Outflows	0.024*					
	(1.929)					
HY Fund Outflows × Disclosure		0.032**	0.039**	0.032**	0.031*	0.034**
		(2.112)	(2.535)	(2.009)	(1.929)	(2.140)
HY Fund Outflows × No Disclosure		0.018	0.023	0.016	0.019	0.021
		(1.337)	(1.620)	(1.126)	(1.419)	(1.440)
IG Fund Flows			0.481			
			(1.334)			
Macro Control Variables	N	N	N	N	N	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Industry Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	1,937	1,937	1,641	1,641	1,505	1,849
R^2	0.189	0.190	0.231	0.197	0.223	0.197

Appendix A: Variable Definitions

This appendix presents the definitions for the variables used throughout the paper.

Variable	Definition
Panel A. Disclosure and Equity Issuance Variables	
Voluntary Disclosure	Indicator equal to one if management issues earnings forecast in the current quarter (t) and zero otherwise
Voluntary Disclosure (Alt.)	Number of earnings forecasts management issues in the current quarter (t)
Equity Issuance	Common equity scaled by (lagged) total assets
Panel B. Fund Flow Variables	
HY Fund Flows	Aggregate flows into high-yield mutual funds over the previous four quarters ($[t-4, t-1]$) scaled by total PPE of firms rated BBB+ through BB- in the previous quarter ($t-1$)
HY Fund Outflows	Indicator equal to one if high-yield mutual funds experienced outflows over the previous four quarters
IG Fund Flows	Aggregate flows into investment-grade mutual funds over the previous four quarters ($[t-4, t-1]$) scaled by total PPE of firms rated BBB+ through BB- in the previous quarter ($t-1$)
Panel C. Matching Variables	
Market Cap	Market value of equity
Q	Market value of equity plus assets minus book equity divided by assets
Leverage	Book value of debt divided by sum of book debt plus market value of equity
ROA	Income before extraordinary items divided by assets
Cash	Cash and short-term securities divided by assets
Loss Indicator	Indicator equal to one if income before extraordinary items is negative and zero otherwise
Panel D. Macro Variables	
VIX	Chicago Board Options Exchange Volatility Index, averaged over end-of-month values during quarter t
Credit Spread	Yield spread between Baa- and Aaa-rated bonds, averaged over end-of-month values during quarter t
Stock Market Return	Value-weighted return on NYSE, AMEX, and NASDAQ stocks minus the one-month T-bill rate, averaged of monthly values during quarter t
Term Spread	Yield spread between constant maturity Treasuries and three-month T-bills, averaged over end-of-month values during quarter t
GDP Growth	Percentage change in the seasonally-adjusted real GDP during quarter t
Panel E. Financial Constraints Measures	
KZ Index	Kaplan-Zingales index of financial constraints calculated following Kaplan and Zingales (1997)
WW Index	Whited-Wu index of financial constraints calculated following Whited and Wu (2006)
SA Index	Size-age index of financial constraints calculated following Hadlock and Pierce (2010)