Financing Expectations and Firm Performance*

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Abstract

We study how market expectations shape the information content of corporate financing decisions. Using ex ante fundamentals and market information, we dynamically classify firms into types based on their predicted likelihood of issuing debt, issuing equity, repurchasing shares, or doing nothing. Conditioning firm-type, we find expected debt issuances are uninformative, while unexpected ones reveal financial strength. The market penalizes all equity issuances and does not distinguish market timing from capital needs. Internally financed repurchases generate strong but underrecognized positive reactions without operational crowd-out. Our expectations-aware framework documents when classic financing theories hold and when they fail.

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1 Introduction

Understanding how firms make financing decisions and how markets respond to those decisions has long been a central question in corporate finance. Classic capital structure theories, such as the Modigliani and Miller's irrelevance proposition, the pecking order theory, the trade-off theory, and the market timing theory, provide foundational frameworks for interpreting firm behavior.[1] However, several empirical studies have repeatedly challenged these models, particularly in explaining market reactions to financial activities that result in changes in a firm's capital structure, such as debt or equity issuances and share repurchases.

In this paper, we consider the market's expectations for a firm's financing activity, pairing this with ex post decisions. This expectations framework for firm financing decisions allows us to develop *firm-types* (equity-issuer type, debt-issuer type, etc.) and explore the market reaction to surprising and unsurprising issuance, as well as explore the signal in these decisions for long-run operating performance.[2] This perspective allows us to address two essential questions: Are managers making decisions consistent with optimal capital structure theories, or are their decisions driven by short-term misvaluations? And, does the market respond efficiently to those decisions? We posit that the observed market reactions are not solely a function of the actual financing decision but also of the firm's expected choice, which reflects its *firm-type*. We argue that who the firm is, in terms of how the market anticipates its financing decision, is as important as what the firm

[1]Some of the seminal capital structure and securities issuance theories include Ross (1977), Myers (1984), Myers and Majluf (1984), and Lucas and McDonald (1990), who focus on asymmetric information. Modigliani and Miller (1963), Jensen and Meckling (1976), Fischer et al. (1989), Stulz (1990), and Harris and Raviv (1990), focus on optimal capital structure. Stein (2005) and Baker and Wurgler (2002) propose market-timing explanations for capital structure choice.

[2]For instance, a debt-type firm is expected to issue debt, rather than issuing nothing, equity, or other securities. Otherwise, it's an unexpected issuance decision from the market's perspective.

actually does. By conditioning on *firm-type*, we uncover systematic differences in short-run and long-run market reactions to financing events, long-run operating performance, and document stylized facts about when classic theories hold and when they fail. Specifically, debt issuance by debt-type firms yields no short-run or long-run abnormal returns and modest improvements in long-run operating performance, consistent with Modigliani and Miller and an efficient market response. Market timing in equity issuance is evident only among equity-type firms, but the market underreacts to the subsequent longer-term price decline. Repurchase announcements, while met with positive short-run reactions across all *firm-types*, are underappreciated in the long run, with this underreaction most exaggerated for firms in opaque information environments. Repurchase activity is also associated with improved long-run operating performance, suggesting that it conveys credible signals of undervaluation that the market fails to fully incorporate.

Traditionally, security issuance choice is modeled as a managerial decision, under the assumption that insiders possess superior knowledge of the firm's future cash flows. However, investors also form expectations about a firm's financing decisions based on public information and adjust their valuations accordingly, thereby affecting the timing and strategy of issuance. For instance, a firm that is expected to issue debt and does so may not surprise the market, whereas a firm expected to repurchase shares but instead issues equity may trigger a strong negative reaction. Ignoring the surprising component of the decision risks misinterpreting firm financing behavior and underestimating the role of information flow. Yet, the three dominant theoretical frameworks (i.e., trade-off theory, pecking order theory, and market timing theory) do not explicitly incorporate market expectations into their models.

We examine the impact of expected and unexpected issuances on firms' stock and operating performances, and investigate the implications of firms making capital structure adjustments that align with expectations versus those that surprise the market. Our analyses highlight the relationship between the market's perception of "who you are" and its reactions to "what you do." This framing allows us to reinterpret existing anomalies in the literature as conditional phenomena that depend on the alignment (or misalignment) between market expectations and firm decisions. Essentially, deviations from market expectations constitute information events, and the market appears to interpret them as revealing private information about the firm's underlying risks.

We construct market expectations of financing decisions using both multinomial logistic regression and machine learning techniques. Given their ex ante characteristics and market conditions, firms are dynamically classified into *firm-types* according to the security with the highest predicted issuance probability, including issuing nothing. Then, we explore whether the same financing activity conveys different information across *firm-types*, and how an unexpected decision reveals insights into the firm's underlying risks. Using a sample of quarterly financing activities by U.S. public firms from 1985 to 2017, we examine different market reactions to debt and equity issuances and repurchases across *firm-types*. Our results provide strong support for asymmetric information and signaling effects, and perhaps surprisingly, strong support for market efficiency, at least conditionally.

First, we find that debt issuance is a unique case where capital structure theories and market efficiency generally hold. Debt-type firms, those for whom the market anticipates debt financing, show no abnormal returns around the announcement. Consistent with the announcement effect, we show that there is no long-run drift after expected debt issuances.

This is likely due to the nature of debt contracts: they are standardized, subject to regulatory oversight, and often involve third-party monitoring, resulting in less mispricing (Lemmon and Zender (2019) and Benmelech et al. (2025)). With more transparent information, expected debt issuance conveys no new information to investors, and the market efficiently incorporates the financing decision into firm valuation.

[Figure 1 about here]

In contrast, we find positive market reactions to unexpected debt issuance by equity-type, repurchase-type, and non-type firms. In the short-run event window (-1, +1), cumulative abnormal returns range from 35 bps to 96 bps for firms that are not debt-type, as shown in Figure 1. The market appears to interpret those debt financing surprises as signals of unexpected strength, such as better investment opportunities or additional certification of cash flow, leading to upward revisions in firm value. Further, firms with unexpected debt issuances outperform the benchmark in the long run. For example, non-type firms that issued debt exhibit an average buy-and-hold abnormal return of 12% over 48 months relative to the equal-weighted CRSP Index. Moreover, the positive signal of unexpected debt issuance by non-debt firms is associated with improvements in long-run operating performance, including operating margin and return on assets (ROA). Overall, our findings indicate that only unexpected debt issuance conveys new information. Although the market responds positively, the reaction appears incomplete, likely due to the opaque information environments these firms operate in, which even transparent debt disclosures cannot fully resolve. These opaque firms display classic features of firms facing a high level of asymmetric information: commonly younger, smaller, growth-oriented, and with limited institutional coverage. We discuss those characteristics in detail in Section 3.2.

Second, we show that equity issuance reveals significant market inefficiencies, particularly when undertaken by equity-type firms. These firms, expected by the market to issue equity, experience a significant pre-event price run-up, suggesting that managers time equity issuance to exploit temporary overvaluation, as discussed in Baker and Wurgler (2002). At the announcement, a strong negative market reaction is observed, consistent with the literature (Asquith and Mullins Jr (1986)). Importantly, we find that this negative reaction is not uniform across *firm-types*. We present new evidence that the market fails to distinguish market-timers from regular equity issuers. In the window prior to equity issuance (-10, -2), price run-up does not exist for non-type firms, debt-type firms, or repurchase-type firms, indicating not all equity issuers are market-timers. However, the market penalizes all equity issuances similarly at the announcement, failing to distinguish between opportunistic and non-market-timing equity issuers. In the long run, however, it appears the market underreacts to the negative signal embedded in equity issuance, leading to a persistent mispricing that unfolds over several years, as shown in Figure 2. The findings are more pronounced for opaque firms, highlighting the challenges faced by the market in interpreting equity issuance. For example, the long-run buy-and-hold abnormal returns (BHAR) of equity-type and repurchase-type firms significantly underperform compared to the benchmark following an equity issuance.

[Figure 2 about here]

Third, we show that repurchases convey a credible positive signal that the market underappreciates. Consistently for all *firm-types*, repurchase announcements are met with strong positive abnormal returns, with the largest price jumps observed for equity-type firms. Before the announcement, repurchasing firms typically experience downward price

pressure, suggesting that the decision is well-timed. The market's reaction, however, appears incomplete. Despite the initial positive response, repurchasing firms' long-run stock performance continues to outperform, indicating a persistent underreaction to the signal. Interestingly, this underreaction is echoed in operating performance, where repurchasing firms generally exhibit improvements in operating margins and returns on assets relative to the same-type firms that did not repurchase. It is worth noting that we show repurchases are not accompanied by a deterioration in investment or efficiency in the long run, thereby countering the concern that repurchases crowd out productive investment.[3] As shown in Figure 3, almost all *firm-types* exhibit increases in operating margin and return on assets post-repurchases with respect to the same *firm-type* that issued nothing. These findings suggest that repurchases are not merely opportunistic actions, but rather informative events that the market fails to fully price in.

[Figure 3 about here]

To the best of our knowledge, we are the first to explicitly incorporate market expectations into the capital structure literature. Previous studies that are related to our conceptual framework include Hennessy, Livdan, and Miranda (2010), who build a dynamic model of financing and investment under repeated hidden information (i.e., firm insiders having superior information that is only observed by the market with a lag), and Bayless and Chaplinsky (1991), who document that unexpected equity and debt issues have more negative abnormal stock return in absolute terms at announcement, as well as Jung, Kim, and Stulz (1996), who demonstrate that abnormal returns on equity (debt) issues are positively

[3]We require a repurchase event to be funded only by internal capital, without any financing activities in the same fiscal quarter of the announcement.

(negatively) associated with the probability of issuing equity.

Our paper differs substantially from these studies in that we incorporate all possible financing options in our predictive models. Most importantly, we treat the decision to issue nothing (i.e., to rely solely on internal capital) as a valid financing option alongside debt and equity. Unlike traditional capital structure models that assume financing needs are exogenous, our approach recognizes that managers may actively choose not to raise external funds.[4] This allows us to identify non-issuers that surprise the market when they choose to undertake a capital structure change, providing valuable insights into their underlying financial condition. A key empirical challenge, however, is the noisy cross-section of non-issuers, overwhelming the relatively informative cross-section of issuers. We mitigate the noise in the non-issuer sample by constructing 25 portfolios each quarter based on size and market-to-book quintiles of the non-issuing firms. Meanwhile, we use the full cross-section of issuers each quarter to exploit firm-specific information. This combined sample, appropriately weighted, is the basis for our capital structure choice model.

Our paper extends the information asymmetry literature by focusing on market reactions to the unexpected component of the securities issuance decision. Rather than testing the validity of existing theories, we draw on foundational concepts from asymmetric information and signaling models, optimal capital structure, and market timing to inform our empirical framework. A common theme across some of these theories is the assumption that managers possess superior information about the firm's intrinsic value relative to outsiders. This asymmetry can lead to mispricing, as markets may struggle to accurately approximate private

[4]Note that our paper assumes decisions are made considering all options simultaneously. Thus, we do not apply a nested logit model because it assumes that the decision to issue is primary, followed by the choice of security to issue.

information. Hence, securities issuance is often interpreted as a signal that reveals managerial insights, prompting stock price adjustments in response to perceived shifts in firm value.[5]

We posit that deviations from market expectations in firms' financing decisions convey critical information about their underlying risks. External financing decisions are motivated by both near-term investment shocks (DeAngelo et al. (2010); Huang and Ritter (2021)) and long-run needs from capital-intensive projects (McLean (2011); McLean and Palazzo (2018)). In addition, managerial knowledge and access to capital can influence the final choice (DeAngelo (2022)). Once a firm's actual issuance decision is observed, understanding the motivation behind it becomes essential. Intuitively, the market reacts more strongly to unexpected financing events, as they may signal private information embedded in managerial decision-making. Conversely, issuance decisions that align with expectations can serve as a certification role, reinforcing the market's prior beliefs. For instance, a surprising debt issuance by a firm typically expected to issue equity may suggest a more favorable financial position than previously assumed. However, such surprises could also reflect opportunistic behavior or transitory market conditions. Regardless of the cause, these deviations prompt the market to reassess firm value, potentially leading to long-term stock price adjustments.

Another contribution of this paper is to explore the structural link between capital structure and payout policy. By treating repurchases as a capital structure adjustment, rather than merely a payout choice, we uncover a richer narrative: internally financed repurchases convey a strong signal of undervaluation that is persistently underappreciated by the market. Traditional payout models suggest that managers should return excess,

[5] As well documented in Asquith and Mullins Jr (1986), investors view equity issuances as negative signals (i.e., overvaluation) and thus reduce demand for issuers' shares.

non-productive cash to shareholders, particularly when no positive NPV investment opportunities are available.[6] In recent years, repurchases have gained popularity due to their flexibility relative to sticky dividends and their potential signaling role. Farre-Mensa, Michaely, and Schmalz (2025) recently show that 31% of aggregate payouts are externally financed, and 43% of firms that raise capital also make payouts in the same year, highlighting the close interplay between payout and financing decisions. To address this complexity, we focus on repurchases that occur without concurrent external financing, or "independent repurchases." These cash-funded buybacks can, to some extent, be viewed as the inverse of equity issuance, particularly in the context of capital structure adjustments and information asymmetry (Fama and French (2005); Brav, Graham, Harvey, and Michaely (2005)). We find the market reacts more strongly to unexpected repurchase announcements, with the largest price responses observed among the most surprising issuers, equity-type firms.

Lastly, this study contributes to the literature that applies machine learning techniques to financial analysis. To construct market expectations of firms' financing decisions, we employ both multinomial logistic regression and the random forest algorithm. On the one hand, our results validate several findings from earlier studies conducted before the widespread adoption of machine learning. On the other hand, we demonstrate that the random forest model delivers superior predictive performance, as evidenced by higher predicted probabilities, tighter confidence intervals, and more distinct separation across financing choices. Our findings attribute these improvements primarily to the inclusion of 18 predictors grounded in corporate finance theory. Further, without theoretical guidance, we find that

[6]See DeAngelo, DeAngelo, and Skinner (2009) and Farre-Mensa, Michaely, and Schmalz (2014) for a thorough review of payout policy literature.

advanced machine learning models fail to generate economically meaningful predictions.

2 Theory Implications for Predicting Financing Choice

Since the foundational work of Modigliani and Miller (1958), three major theoretical frameworks have emerged to explain corporate financing decisions: the trade-off theory, the pecking order theory, and the market timing theory. While this paper does not aim to evaluate or compare these theories, we draw on their core insights to identify conditioning variables for our predictive model of the market's expectations of firm financing decisions. Specifically, we consider how each theory informs the likelihood of a given financing choice and incorporate the most theoretically relevant variables to improve predictive accuracy.[7]

2.1 Implications from the Trade-off Theory

The central premise of static trade-off theory is that firms aim to achieve an optimal capital structure by balancing the benefits of debt against its costs. These trade-offs arise from market imperfections such as taxes, financial distress, and agency costs (Modigliani and Miller (1963); Jensen and Meckling (1976)). For instance, firms in higher tax brackets are more likely to issue debt to exploit tax shields (MacKie-Mason (1990)), which we proxy using total tax paid. Meanwhile, non-debt tax shields, such as depreciation and amortization, can offset the tax benefits of debt, reducing the incentive to borrow (DeAngelo and Masulis (1980); Titman and Wessels (1988)). Accordingly, we include conditioning variables inspired by those studies and expect the probability of debt issuance to increase with taxation and

[7]Some variables we incorporate may reflect implications from multiple theories. We do not attempt to disentangle these overlaps, as that provides limited value for predictive performance in our context.

decrease with depreciation and amortization. Measures of financial distress, such as financial leverage, Altman's Z-score, and stock price volatility, are used to account for the idea that riskier firms borrow less. We also include two common measures of profitability (i.e., the quarterly growth rate of retained earnings and the 4-quarter moving average of return on assets) as alternative proxies for risk. Following Rajan and Zingales (1995) and Leary and Roberts (2005), we consider tangibility (i.e., property, plant, and equipment), as firms with more tangible assets are better positioned to raise debt financing. Lastly, we incorporate cash holdings in a similar spirit to cash shortfalls in Huang and Ritter (2021) to consider the recent development in the funding-horizon theory (DeAngelo, DeAngelo, and Whited (2011)).[8]

2.2 Implications from the Pecking Order Theory

Pecking order theory emphasizes financing frictions arising from asymmetric information, where managers possess private knowledge about firm prospects.[9] In Myers (1984) and Myers and Majluf (1984), capital structure evolves to mitigate this inefficiency, implying a financing hierarchy: firms prefer internal funds over external financing, and among external sources, they favor debt over equity. Assuming that equity financing becomes more costly when information asymmetry is high, we include the Amihud illiquidity ratio, firm size, and asset tangibility to measure information asymmetry. We expect more profitable firms and those with high levels of cash or marketable securities to have fewer external financing activities, as they have ample internal funding resources based on pecking order theories.

[8]The funding-horizon theory describes securities issuance behavior as a result of anticipated near-term and long-run cash shortfalls.

[9]See seminal work in asymmetric information by Ross (1977) and Leland and Pyle (1977).

2.3 Implications from the Market Timing Theory

Baker and Wurgler (2002) argue that observed capital structures are merely the realization of management's past attempts to opportunistically capitalize on temporary market misvaluations. This view implies that financing decisions are path-dependent and shaped by historical market conditions and managerial beliefs about timing opportunities. We include the market-to-book ratio and the Consumer Sentiment Index as proxies for perceived timing windows, and use cumulative abnormal returns to reflect timing effects. We also incorporate path-dependent variables, such as stock volatility and liquidity (Lipson and Mortal (2009)), as well as a dummy for recent IPOs to account for the tendency to seek funds through seasoned offerings (Chemmanur (1993)). Finally, following Hovakimian (2006), we apply moving-average adjustments to profitability, liquidity, volatility, and financial distress to capture the persistent effects of past financing behavior.

Overall, these three prominent theoretical frameworks offer complementary insights into the determinants of corporate financing decisions. We incorporate variables primarily, but not exclusively, inspired by each to build a comprehensive predictive model of market expectations in later analysis.[10] This integrative approach reflects the multifaceted nature of financing behavior and enhances our ability to capture how firms are perceived by the market in terms of their likely financing choices.

[10]See Appendix A for detailed variable definitions.

3 Sample and Descriptive Summary

3.1 Securities Issuance Activities

Our sample comprises quarterly securities issuance activities by U.S. public firms from 1985 to 2017. Firm-level financial data are primarily obtained from the Compustat Quarterly database, supplemented with information from multiple sources, including the SDC New Issues Database, CRSP, Thomson Financial 13F, and the Consumer Sentiment Index.

We classify all issuances into five categories: bank loans, corporate bonds, convertible bonds, common equity, and share repurchases. Specifically, bank loans include term loans that are either closed or financially closed, excluding lines of credit and revolving credit facilities. Corporate bonds refer to coupon-bearing debt issued by public firms targeting the US market. Equity issuances include both initial public offerings (IPOs) and seasoned equity offerings (SEOs).[11] Convertible bonds and share repurchases are identified based on issue type descriptions in the SDC New Issues database. Finally, we consolidate bank loans and corporate bonds into a single Debt category, resulting in four security types: Debt, Convertible, Equity, and Repurchase.

In cases where a firm issues multiple types of securities within the same fiscal quarter, we do not attempt to compute a net effect on capital structure. Instead, we assign these observations to a separate Mixed category.[12] This classification allows us to isolate the effects of single-category issuances without contamination from concurrent financing activities.

[11] In untabulated tests, we exclude IPOs from equity issues as the decision-making process may be different to some extent. Since our predictive analysis of issuance type shows little change, we retain IPOs in the equity category for the final sample.

[12] Our results remain almost the same when we break up the Mixed category and assign each observation to one of the four security types with the largest amount of proceeds.

While the Mixed category is retained for completeness, our primary analysis focuses on firms that issue only one security type per quarter.

We also observe a substantial number of firm-quarter observations where no securities are issued. These cases are treated as a distinct category (Non-issuers) for two key reasons. First, managers actively choose whether to issue securities, reflecting their knowledge of internal cash flows. As noted by Huang and Ritter (2009), the decision to issue and the choice of security type are often made jointly. Frank and Goyal (2015) and Frank, Goyal, and Shen (2020) further suggest that some firms refrain from adjusting their capital structure due to the fixed costs associated with leverage changes. Second, non-issuers in our sample serve as the base category in our financing decision models, reinforcing the assumption that actual issuances are informative signals from the market's perspective. Those signals are particularly meaningful when external financing is not anticipated, and even more so given the type of financing the firm conducted (e.g., debt versus equity). Importantly, our identification strategy uses transaction-level data, ensuring that non-issuers in our sample are not confounded with firms that exhibit "net zero" changes in leverage due to offsetting financing activities. Thus, incorporating non-issuers enables us to gain insights into managers' private knowledge of the firm's financial conditions and underlying risks.

[Table 1 about here]

Overall, the final sample includes 499,310 firm-quarter observations spanning 1985–2017, categorized into six groups: 439,534 Non-issuers, 23,681 Debt-issuers, 1,606 Convertible-issuers, 16,202 Equity-issuers, 15,049 Repurchasers, and 3,238 Mixed-issuers. Table 1 reports the annual distribution of issuance activity based on actual transactions, including both counts and proportions for each category. On average, about 88% of

observations involve no security issuance, while 4.7% involve debt issuance and 3.2% involve equity issuance. Share repurchases have grown steadily since the early 1990s, coinciding with a more relaxed regulatory environment. Convertible issuances are relatively rare, averaging 0.3%, likely due to the complexity of the financial instrument.[13] Mixed issuances account for about 0.6% annually. We provide a detailed breakdown of the Mixed category in Appendix B, with the most common combinations being debt-repurchase (38%) and debt-equity (36%).

[Figure 4 about here]

Figure 4 illustrates the distribution of security types over time, excluding non-issuers. Debt financing appears to be the dominant form of external capital, with equity issuance also playing a significant role. Notably, equity issuance declines sharply during recessions, while convertible issuance remains consistently low.

3.2 Factors Influencing Financing Expectations

We model the ex ante market's expectations of firm financing decisions using a set of factors grounded in the capital structure theories discussed in Section 2. Specifically, we construct 18 predictive variables, including 13 firm-level characteristics and 5 market information-based indicators, each selected for its theoretical relevance and empirical support. The firm-level characteristics capture fundamental risks and include: financial leverage, firm size, cash holdings, bankruptcy risk, earnings growth, profitability, institutional ownership, market share, R&D expenditure, depreciation, tax burden, tangible assets, and IPO indicator. The market information-based indicators reflect path-dependent conditions and include: growth opportunities, adjusted stock returns, volatility, stock

[13] See Chemmanur, Nandy, Yan, and Jiao (2014) for a theoretical framework of issuing convertibles.

liquidity (Amihud Illiquidity), and market sentiment. Following prior literature, all variables are constructed with a two-quarter lag to mitigate look-ahead bias and ensure that only publicly available information is used in forming expectations. When appropriate, we normalize either by contemporaneous total assets or sales.

[Table 2 about here]

Table 2 Panel A presents summary statistics for these factors across four groups: non-issuers, debt issuers, equity issuers, and repurchasers. Panel B reports mean comparisons for each group relative to non-issuers, with statistically significant differences for nearly all variables.[14] The results indicate that firms making different financing choices have distinct risk profiles. We identify several patterns consistent with prior findings. Debt issuers tend to be mature firms that are larger in size, have greater tangible assets, hold higher market share, and exhibit higher levels of institutional ownership. On average, debt issuers show the highest financial leverage, while equity issuers (repurchasers) have slightly higher (lower) leverage than non-issuers. However, debt issuers retain the lowest average cash level prior to issuance, reflecting their near-term funding needs.

In contrast, equity issuers appear younger, more growth-oriented, and more risk-exposed. They have more cash on hand, consistent with the notion of liquidity preservation (McLean (2011)). As expected, larger R&D expenditures are found with equity issuers, suggesting long-lived cash needs and short-term profitability pressures. In terms of market information-based factors, equity issuers exhibit strong growth expectations, as measured by market-to-book ratios, but also show higher volatility. Firms that engage in share repurchases are generally larger and hold moderate levels of cash sufficient to fund buybacks without

[14]See Appendix C for the comparisons among all six categories.

external financing. In line with Grullon and Michaely (2004), repurchasers present limited growth opportunities, suggesting the role of mitigating agency costs by returning excess capital to shareholders. Moreover, as indicated by the lower Amihud illiquidity measure, the stocks of repurchasing firms are relatively more liquid, facilitating execution in the open market (Stephens and Weisbach (1998)).

We also observe patterns that allow us to characterize firms facing a high level of asymmetric information as those exhibiting traits commonly associated with greater uncertainty about firm value and future prospects. Compared with debt issuers, these firms tend to be younger, smaller in size, and hold fewer tangible assets. They are more growth-oriented and show higher R&D intensity, reflecting long-term investment needs and limited short-term cash flows. In addition, they often exhibit higher stock return volatility and lower institutional ownership and market share, suggesting less information dissemination and greater dispersion in investor beliefs. While we do not conduct formal tests on information asymmetry, these observable characteristics highlight a subset of firms for which external financing decisions may be particularly sensitive to informational frictions. In our context, those firms operating in opaque information environments are most notably equity issuers and, to a lesser extent, repurchasers.

4 Modeling Financing Expectations

We employ both traditional econometric models and machine learning techniques to predict the probability that a firm will make each type of financing decision in a given quarter. We establish a baseline specification ("Base") with 13 firm-characteristic factors,

whereas the full specification ("Full") includes an additional five market-information-based measures. All out-of-sample estimations are conducted using a 12-quarter rolling window with a 1-quarter step.[15] Based on the security type with the highest predicted probability, we assign a *firm-type* to each observation, serving as a proxy for market expectations of firm financing behavior. For example, a firm is classified as an equity-type in a quarter if the predicted probability of issuing equity exceeds that of issuing debt, convertibles, repurchases, or nothing.

The accuracy of our predictions is critical, as it directly influences the *firm-type* classifications. While multinomial logit models have been widely used in the literature to model discrete financing choices, recent advances in machine learning techniques offer promising alternatives. We incorporate random forest classifiers under various specifications and find notable improvements in predictive performance.

4.1 Interpretations from Logistic Regressions

Our multinomial logit models follow Equation 1, where the dependent variable $\Pr(Y_t = j)$ represents the probability of issuing decision j in quarter t: Nothing, Debt, Convertibles, Equity, Repurchases, and Mixed. We set issuing nothing as the base category ($Y_t = 0$) in our model and sort the others from the safest to the riskiest issue implied by the pecking order theory, with Repurchases and Mixed categories positioned arbitrarily. Hence, a positive coefficient on any factor implies that the likelihood of issuing a specific type increases relative to the default choice of issuing nothing.

[15] For example, we use information from 1985Q1 to 1987Q4 to estimate the probability of issuing various securities in 1988Q1. In total, there are 120 prediction rounds for the 132 quarters in our sample period.

$$\Pr(Y_t = j) = \frac{e^{\left(X'_{t-1}\beta_j\right)}}{\sum_{i=0}^{J} e^{X'_{t-1}\beta_i}}, \quad where\ Y_t \in \{0, 1, 2, ...j\} \tag{1}$$

Incorporating all 439,534 observations of non-issuers (88% of the sample) presents an empirical challenge. We address the overwhelming cross-section of non-issuers by adopting a portfolio-based approach inspired by Fama and French (1993). Specifically, we form 25 portfolios each quarter by sorting non-issuers on size and market-to-book quintiles, reducing idiosyncratic noise, mitigating over-sampling bias, and limiting heteroskedasticity through portfolio aggregation.[16]

We estimate issuance probabilities in two specifications within the logit framework: LG-Base, which includes only firm-level fundamental factors, and LG-Full, which includes additional market-information-based factors. Results from the in-sample prediction are reported in Table 4. Both the LG-Base and LG-Full models show improvements compared to previous studies. Our pseudo-R-square values in the LG-Base (20.6%) and the LG-Full (23.1%) are substantially higher than the 11.2% reported in Hovakimian, Opler, and Titman (2001) where non-issuers are not controlled, and 8.1% reported in Huang and Ritter (2009) where only three categories (i.e., equity, debt, and non-issuing) are considered. The improved predictive power likely stems from our unique empirical approaches: Using transaction-level data to capture actual issuance activity rather than changes in leverage ratios; and Modeling issuance decisions across more disaggregated categories, allowing for finer distinctions in financing behavior.

[Table 3 about here]

[16]For each of the 3,300 portfolio-level non-issuers (25×132 quarters), explanatory variables are appropriately weighted to ensure that probabilities are not overestimated due to smoothed firm-level characteristics.

Overall, our results align with the key predictions from the pecking order theory. A high cash-to-asset ratio significantly lowers the probability of debt issuance. This is particularly true when considering market conditions in the LG-Full model (Panel B), where firms with ample cash tend to avoid external financing altogether. Firms with strong profitability (ROA) are more likely to issue debt or repurchase shares, reflecting their ability to service debt or distribute excess cash without jeopardizing financial stability. Interestingly, R&D expenditure is negatively associated with all financing activities, given the default action of doing nothing, whereas the effect is less significant for equity issuance. This suggests that long-term, risky R&D investments are more likely to be funded through equity financing, consistent with Huang and Ritter (2021).

Adding market information-based factors reveals further insights. Panel B of Table 3 shows that firms with higher abnormal returns are more likely to raise external capital but less likely to repurchase shares. Similarly, growth opportunity, measured by the market-to-book ratio, is positively associated with both debt and equity issuance and negatively related to repurchases. In line with Friberg, Goldstein, and Hankins (2024), repurchases are more likely to happen when the firm's stock is less volatile and more liquid. In general, evidence in the LG-Full model supports the market-timing theory, suggesting firms exploit favorable market conditions to issue mispriced securities. However, conditioning on *firm-types*, we show in a subsequent analysis that the market is unable to identify true market-timers among regular equity issuances.

4.2 Improvements from Random Forest Models

To explore methodological improvements, we employ random forest classifiers to predict market expectations, given their strong predictive performance and practical implementation. Random forest enhances robustness by incorporating randomness in both data sampling and predictor selection at each classification split. This dual-randomization helps mitigate bias and variance, making the model particularly effective for complex classification tasks (Breiman (2001)).

For consistency, we apply the random forest classifier using the same 18 factors and model specifications (i.e., RF-Base and RF-Full) as in the logit models. Following Probst, Wright, and Boulesteix (2019), we fine-tune four critical hyperparameters using a grid search strategy to maximize out-of-sample prediction accuracy, including tree depth, number of predictors, splitting criterion, and number of trees.[17] Additionally, we construct an RF-Naive model with default hyperparameter settings using 80 accounting-based predictors directly obtained from the Compustat database. This way, we can compare and assess the contribution of theory-driven factor selection with that of a purely data-driven approach.

[Table 4 about here]

Table 4 presents predicted probabilities of financing decisions using both multinomial logit and random forest models. For ease of comparison, results are grouped by model specification: Base models with only firm characteristics (Panel A) and Full models with additional market-information-based factors (Panel B). We discuss market expectations for four primary types of actual issuers by comparing the mean, median, and standard deviation of predicted probabilities.

[17] Grid search evaluates 180 combinations of hyperparameter values. We report details in Appendix D.

The results reveal several important patterns and improvements. First, predicting the exact type of financing activity a firm will take remains challenging. However, both models perform exceptionally well in identifying non-issuers, regardless of specification. This likely reflects the large proportion of non-issuers in the sample. Second, incorporating market information enhances predictions. For logit models, the predicted probability of correctly identifying debt-issuers increases slightly from 36% in the LG-Base model to 37% in the LG-Full model. More notable increases are found for equity-issuers and repurchasers, where the probability improves from 10% to 14% and from 19% to 21%, respectively. This suggests market information is more relevant to managers when issuing and repurchasing shares, supporting the notion of market timing. Moderate improvements are observed in random forest models when incorporating market information, with meaningful reductions in the standard deviations of predicted probabilities for all types.

Third, random forest models considerably outperform logit models in predicting all four types of financing decisions. For example, in Base specifications (Panel A), the mean predicted probability of debt issuance, equity issuance, and repurchases rises by 22 percentage points, 14 percentage points, and 25 percentage points, respectively. Most importantly, random forest models almost always correctly predict the actual type when using the highest probability as the expected financing choice (*firm-type*). The only exception is equity-issuers, where the prediction with the highest probability (41%-46%) is issuing nothing compared to the second-highest (20%-24%) of issuing equity.

Lastly, we demonstrate that the improvements from the random forest algorithm are primarily driven by the factors with theoretical foundations. As shown in Panel C of Table 4, using 80 accounting-based predictors in the RF-Naive model fails to yield informative

predictions. The issuing type with the highest predicted probability is constantly the issuing-nothing category. It seems that the RF-Naive model tends to classify based on the sample distribution, rather than learning from those factors.

We further compare model performance across several metrics in line with the machine learning literature, including precision, recall, F_1 score, and the confusion matrix. More discussions can be found in Appendix E. Given that our primary objective is to explore the link between market expectations (i.e., predicted financing choices) and subsequent firm performance, we emphasize model performance over causal inferences at this stage. Therefore, we present our analysis based on market expectations constructed using the RF-Full model in Section 5.

5 Market Reactions Conditional on Expectations

This section investigates how the market responds when firms make financing decisions that align with or deviate from expectations (i.e., *firm-types*). We document heterogeneous market reactions across debt, equity, and repurchase events, both at announcement and in post-issuance performance, and assess the real effects on long-run operating outcomes.

5.1 Debt Issuance by Firm-type

Table 5 presents the announcement effects and long-run stock performances of debt issuances across *firm-types*. Panel A reports the cumulative abnormal returns (CAR) for pre-, during-, and post-event windows, using non-issuers that issued nothing as the benchmark. In Column (2), we find no significant market reaction to debt issuance by debt-type firms, with

an average of 3 basis points in the event window (-1, +1). It seems the market does not view an expected debt issuance as informative, aligning with Modigliani and Miller's irrelevance proposition. This result is particularly interesting, as it suggests a perfect market reaction even in the presence of market frictions. Unlike other financing activities, debt contracts are more transparent in nature. They are often standardized and subject to regulatory oversight, contributing to this efficient reaction. This efficient reaction persists over the long run, as shown in Panel B. Compared to an equal-weighted CRSP Index, there is no significant difference in buy-and-hold abnormal returns (BHAR) over periods from 6 months to 5 years following an expected debt issuance.

[Table 5 about here]

However, non-debt-type firms experience considerably different market reactions. Although the type of financing activity is the same (debt), the market appears to react in line with its expectations. For example, equity-type firms experience an average 96-basis-point jump at the announcement. Similar, but less pronounced, positive reactions are also observed for non-type (75 bps) and repurchase-type firms (35 bps). In both cases, the firm is expected to have robust internal cash flows to support near-term operations or share buybacks. It seems that the market interprets those debt-financing surprises as a signal of unexpected strength. This is likely due to the creditor's certification effect on cash flow as discussed in Benmelech, Kumar, and Rajan (2025). Interestingly, this positive signal appears underappreciated by the market, as those firms continue to outperform the benchmark for up to five years in the long run, as shown in Table 5 Panel B. In contrast, the positive signal from equity-type firms is quickly priced in, suggesting that the market can fully incorporate this surprising yet favorable news within a short period.

Debt issuance by debt-type firms, the largest group of firms undertaking capital structure changes, stands out as a case where both capital structure theories and market efficiency appear to hold. However, unexpected debt issuance carries a positive signal that is often underappreciated over time.

5.2 Equity Issuance by Firm-type

Conditioning on ex ante expectations, Table 6 presents our findings on different market reactions to equity issuance, highlighting significant market inefficiencies, particularly when undertaken by firms with high levels of asymmetric information. Across all *firm-types*, we observe strong negative announcement effects, with CARs ranging from -130 to -205 basis points in the event window (-1, +1). The severity of the reaction appears to be correlated with the level of asymmetric information, supporting the pecking order theory. For instance, debt-type firms experience the least decline, while equity-type firms face the steepest drop.

Baker and Wurgler (2002) provides an explanation for the negative reaction, suggesting that managers issue equity when shares are overvalued. However, our results provide additional perspective on this well-established marketing timing behavior. In the pre-issuance window (-10, +2), we find no price run-ups for non-type and repurchase-type firms, and only modest abnormal returns (28 bps) for debt-type firms. In contrast, equity-type firms show a substantial 249 bps run-up, supporting the notion of opportunistic issuance within this group. These findings suggest that the market struggles to distinguish between intrinsic capital needs and opportunistic behavior. As a result, the market treats all equity issuances as market timing and thus takes strong reactions to penalize all equity

issuances, regardless of the *firm-type* expectations.

[Table 6 about here]

Long-run stock performance in Panel B further reveals persistent inefficiencies. If repurchase-type firms, expected to signal undervaluation through buybacks, surprise the market by doing the opposite (i.e., issuing equity), we observe negative one-, two-, and three-year BHARs as large as those for equity-type (market-timing) firms. Equity-type firms, while aligned with expectations, disappoint investors by confirming the market's pessimistic view of risk-taking. In both cases, the market appears to underreact, failing to fully incorporate the negative signal embedded in equity issuance. As shown in Columns (3) and (4), repurchase-type and equity-type firms remain underperformed for up to five years, with equity-type firms experiencing a -26% BHAR relative to the benchmark.

Interestingly, the market seems to correct its initial reactions more efficiently for non-type and debt-type firms, with reversals occurring within a few days post-announcement and in six months. One potential explanation is that these firms face lower levels of asymmetric information, making their equity issuance decisions easier for investors to interpret. Debt-type firms, for instance, are typically associated with more transparent financial reporting and greater external monitoring. Non-type firms, by definition, do not exhibit strong signals of any specific external financing need, which may lead the market to treat their issuance as more neutral or context-dependent. Overall, the findings underscore the importance of conditioning market reactions on financing expectations, highlighting the connection between market efficiency and information asymmetry.

5.3 Repurchases by Firm-type

In addition to traditional external financing activities, we examine market reactions to internally financed repurchases. We find repurchase announcements consistently generate strong positive abnormal returns across all *firm-types*, reinforcing the notion that share buybacks convey a credible signal of undervaluation. In Table 7 Panel A, we show that the immediate market response is economically and statistically significant. The average CAR in the three-day window surrounding the announcement is significantly positive, with the largest price jumps observed for equity-type firms (378 bps).

This pattern aligns with the classic signaling hypothesis in repurchase literature, which posits that managers use repurchases to share private information about undervaluation (Vermaelen (1981); Comment and Jarrell (1991)). Our results in the pre-announcement window provide evidence supporting the market timing behavior. For instance, all *firm-types* experience downward price pressure, suggesting that managers time repurchases when they perceive their stock to be undervalued. Similarly to equity issuance, we find that the magnitude of the announcement effect appears to be related to information asymmetry. Equity-type firms exhibit the most significant pre-announcement price decline, as well as the most substantial positive support.

[Table 7 about here]

While the initial reaction is strong, the market appears to underreact to the information conveyed by repurchases. As shown in Panel B, we document a persistent outperformance of repurchasing firms relative to the equal-weighted CRSP Index over subsequent periods. For example, non-type firms and equity-type firms exhibit five-year BHARs exceeding

40% relative to the benchmarks. Although Fu and Huang (2016) argue that such anomalies have weakened in more efficient markets post-2003, our evidence suggests that long-run underreaction persists, but varies across *firm-types* following internally financed repurchases.[18]

In sum, these findings support the view that repurchases serve as an informative financing event, particularly for firms facing high information asymmetry. The combination of strong short-term reactions and sustained long-run outperformance suggests that the market does not fully incorporate the positive signal at the time of announcement.[19]

5.4 Post-Issuance Operating Performance

Lastly, we assess how different financing decisions will impact real operating outcomes conditional on market expectations. Simply put, are managers making the best financing decisions, given their information set? How will the firm operate compared to issuing nothing? Results are summarized in Table 8. Each panel reports post-issuance long-run operating performance for a given *firm-type*. To isolate the incremental real effects, we report the excess operating margin and return on assets (ROA) relative to those of same-type firms that issued nothing.

For non-type firms, any financing activity appears to have a meaningful impact on subsequent operations. Compared to doing nothing, both debt issuance and share repurchases are followed by persistent improvements in operating performance. However, equity financing by non-type firms is associated with substantial declines in operating

[18]In untabulated results, we find that the long-run abnormal returns are still significant for a subsample of observations from 2003 to 2017.

[19]This underreaction may reflect skepticism about actual completion or limited investor attention to open-market execution, which is beyond the scope of this study.

margin (around –50%) and ROA (about –10%). Issuing debt by non-type firms, which are expected to remain inactive as far as raising capital goes, appears to signal future operating outperformance, perhaps through funding low-risk projects. Similarly, when such firms return cash to shareholders, it may indicate improved future cash flows driven by current investments. Both actions appear to signal management's confidence in strong future cash flows. In contrast, equity financing may reflect more aggressive strategies, such as pursuing R&D-intensive, long-horizon projects.

[Table 8 about here]

Panel B shows that the financing choice has the smallest operational impact on debt-type firms, with average improvements of less than 5 percentage points. Even when these firms take no action, they exhibit solid long-run operating performance. Issuing debt as expected leads to slight gains in operating margin (about 4 p.p.) and ROA (around 3 p.p.). Interestingly, equity issuance also positively affects operations for debt-type firms. This finding echoes prior evidence suggesting that markets often fail to distinguish non-market-timing, productive equity financing from opportunistic market timing. It appears that debt-type firms may have reasonable capital needs that can be met effectively through equity financing.

Unlike debt-type firms, any financing activity undertaken by equity-type firms produces the most drastic changes in operations, as shown in Panel C. Issuing equity as expected reinforces market concerns that the continued pursuit of high-risk projects can lead to operational inefficiency, even worse than doing nothing. However, financing decisions that surprise the market, such as debt issuance, signal stronger-than-anticipated operational cash flows. Likewise, returning cash to shareholders improves operational efficiency, particularly

for firms with high information asymmetry.

For repurchase-type firms, the operating results in Panel D present interesting evidence. Across all financing choices, operating margins decline relative to non-repurchasers, while ROA improves. This divergence likely reflects mechanical effects: repurchases reduce the asset base, boosting ROA even when operating efficiency weakens. Importantly, this does not necessarily imply that repurchases come at the expense of operations. Prior research suggests that buybacks often serve as a capital rebalancing tool rather than a substitute for productive investment (Almeida, Fos, and Kronlund (2016)). In this context, the deteriorated margins may indicate slower revenue growth or temporary cost pressures rather than structural inefficiency. Meanwhile, the positive ROA signals that these firms maintain profitability relative to their streamlined asset base. Overall, for repurchase-type firms, financing decisions seem more focused on optimizing balance sheet structure than on driving operational gains, consistent with the view that repurchases can coexist with disciplined capital allocation.

Together, these results highlight that the real effects of financing decisions are highly contingent on *firm-types*. While some choices reinforce operational strengths, others exacerbate inefficiencies. Either way, financing decisions convey informative signals, emphasizing that their interpretation depends not only on the actions firms take but also on the characteristics of the firms undertaking them.

6 Additional Analyses and Robustness

We conduct additional analyses and tests to ensure our results are robust to various sample restrictions and alternative model specifications or identification strategies.[20]

First, we exclude IPOs from the equity issuance category, since their decision-making process may differ from that of seasoned offerings, as discussed in Chemmanur (1993). Our results in predictive analysis remain mostly unchanged. We decided to keep IPOs in the equity issuance activity in the final sample and include the IPO Status variable to account for recent IPOs.

Second, we assign observations in the Mixed category to one of the four security categories (debt, equity, convertibles, repurchases) based on the largest amount of capital associated. As reported in Appendix B, the most common combinations of concurrent issuances are debt-repurchases (38%) and debt-equity (36%). Since the Mixed category accounts for less than 1% annually throughout our sample period, the assignment introduces negligible changes to the sample distribution. As a result, our findings remain the same.

Third, we verify that long-run abnormal returns persist when restricting the sample to the 2003–2017 period. This addresses concerns about weakened anomalies arising from more stringent disclosure requirements imposed by new regulations since 2002 (e.g., the Sarbanes–Oxley Act and Reg FD).

Fourth, we have reconstructed the conditioning variables used in the predictive models with one-quarter, three-quarter, and one-year lags to ensure that our findings are free of look-ahead bias. Increasing the lag of those variables generally decreases their predictive

[20] Details of these analyses are available from the authors upon request.

power. We decide to use a two-quarter lag because it balances timeliness and predictive stability, whereas longer lags may dilute predictive power or introduce noise from structural changes.

Finally, we conduct subsample tests focusing on micro-cap firms to assess whether our results are largely driven by firm size. Splitting the sample by the lowest 20% of market capitalization, we find that the main patterns in short- and long-run abnormal returns are preserved, with even stronger effects among these micro-cap firms. The results remain consistent when we further restrict the sample to the lowest 10%, reinforcing that our findings are not solely attributable to size but are more pronounced for firms operating in environments with greater informational frictions.

7 Conclusion

We introduce *firm-types* as ex ante proxies for the market's expectations of firms' financing choices. This expectations-based framework helps reconcile seemingly conflicting evidence in the issuance and payout literature, clarifying when classic capital structure theories hold and when they fail. Our findings reveal that expected debt issuances are largely uninformative, whereas unexpected debt issuances signal credible financial strength that the market only partially incorporates, even five years after the event. Market reactions to expected debt issuances align with market efficiency and do not predict abnormal long-run operating performance, while unexpected debt issuances anticipate both long-run price and operating outperformance for certain *firm-types*. In contrast, equity issuance announcements exhibit uniformly negative short-run reactions and mostly negative

long-run price performance, which in turn anticipates deteriorating operating performance for issue-nothing-type and equity-type firms. Internally financed repurchases convey a strong undervaluation signal that remains underappreciated over the long run, but does not crowd out productive investment. Lastly, our evidence shows that the real effects of financing decisions are highly contingent on *firm-type*, offering an "expectations-aware" perspective that links firm fundamentals, financing decisions, and market beliefs.

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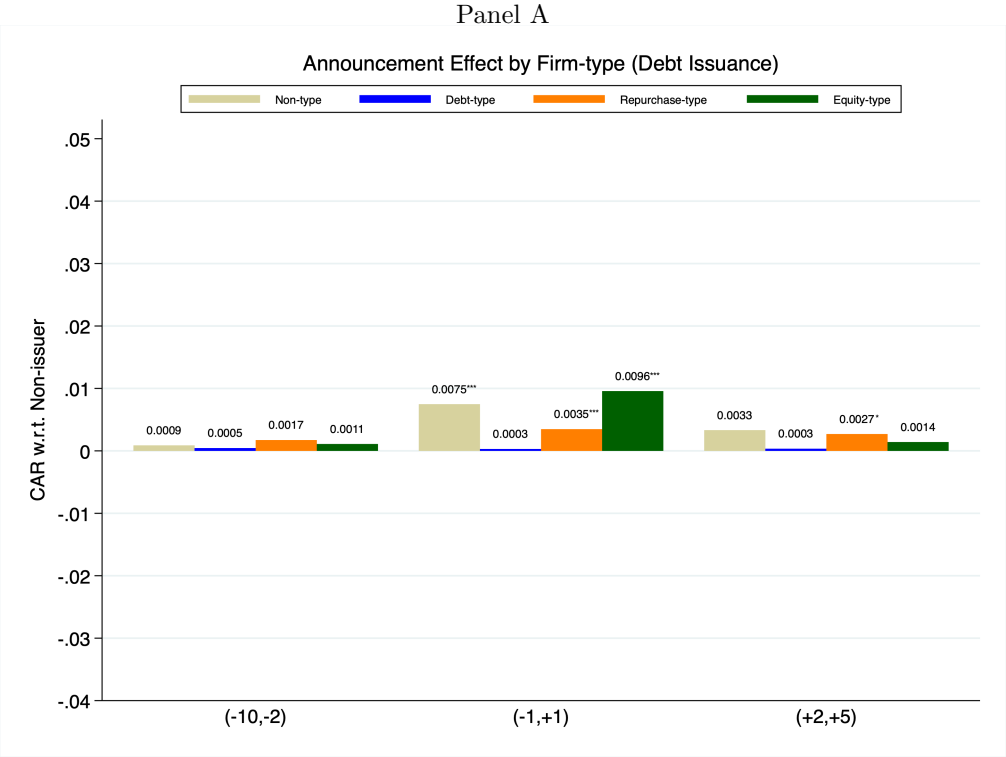
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Figure 1: Issuance Announcement Effect by Firm-type

Figure 1 reports the announcement effects of debt issuance, equity issuance, and repurchases in respective panels. For each financing activity, we plot the cumulative abnormal returns (CAR) for pre-, during-, and post-event windows by *firm-type*, defined as the market expectation of financing choice using random forest predictive models with ex ante firm characteristics and market information. The benchmark is non-issuers that align with market expectations (i.e., actually issued nothing). ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A



Panel B

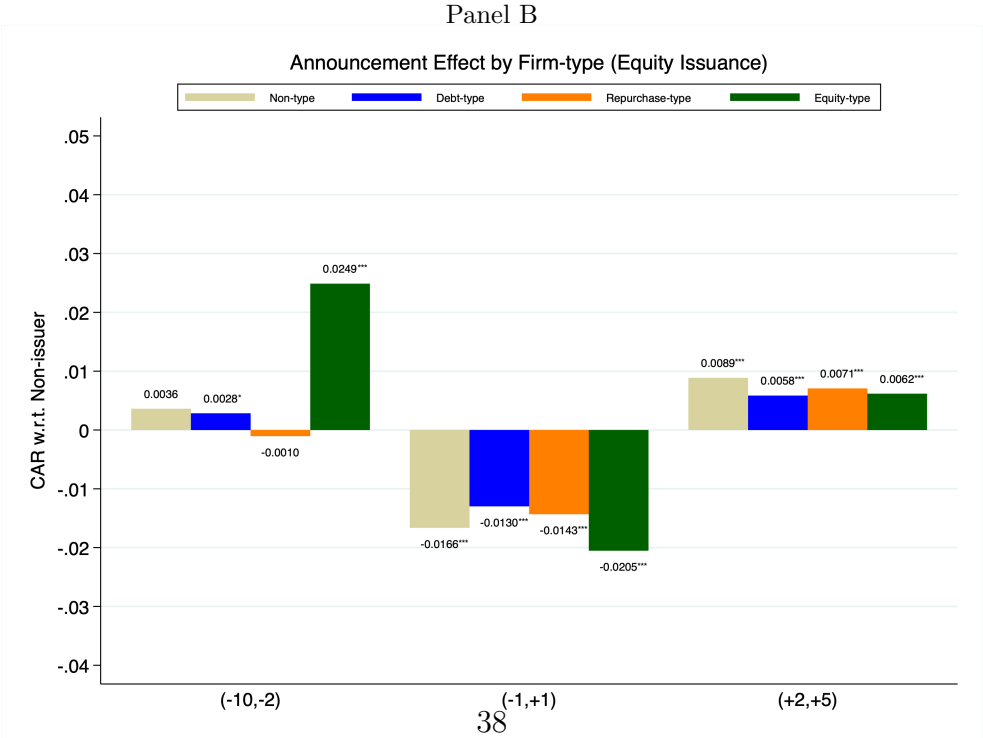


Figure 1: Issuance Announcement Effect by Firm-type

Panel C

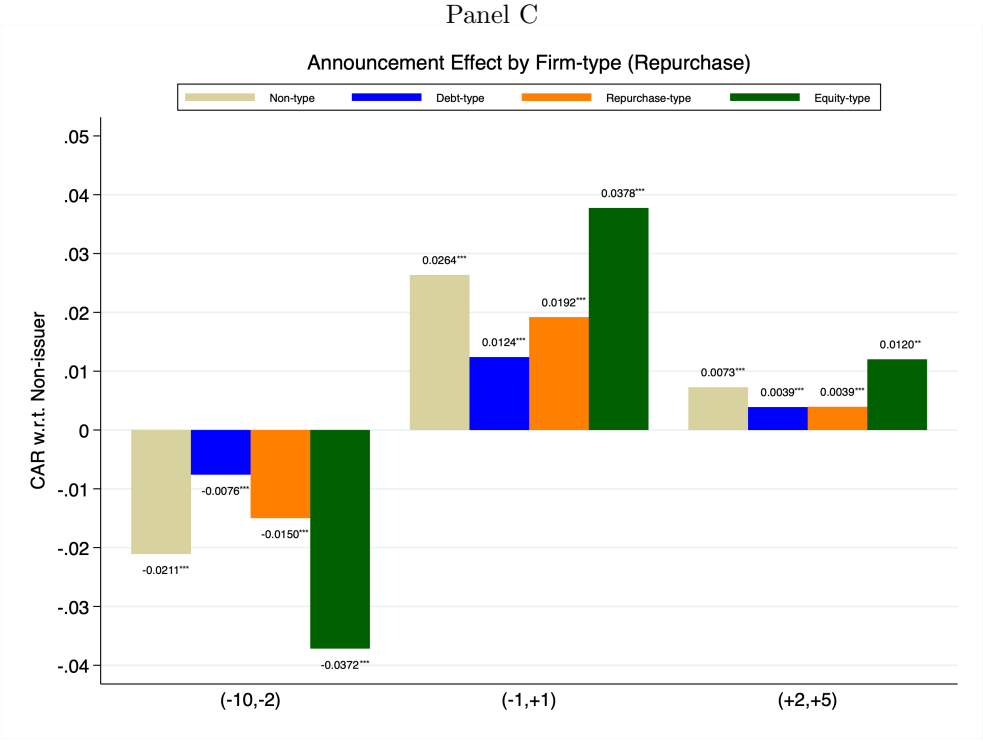
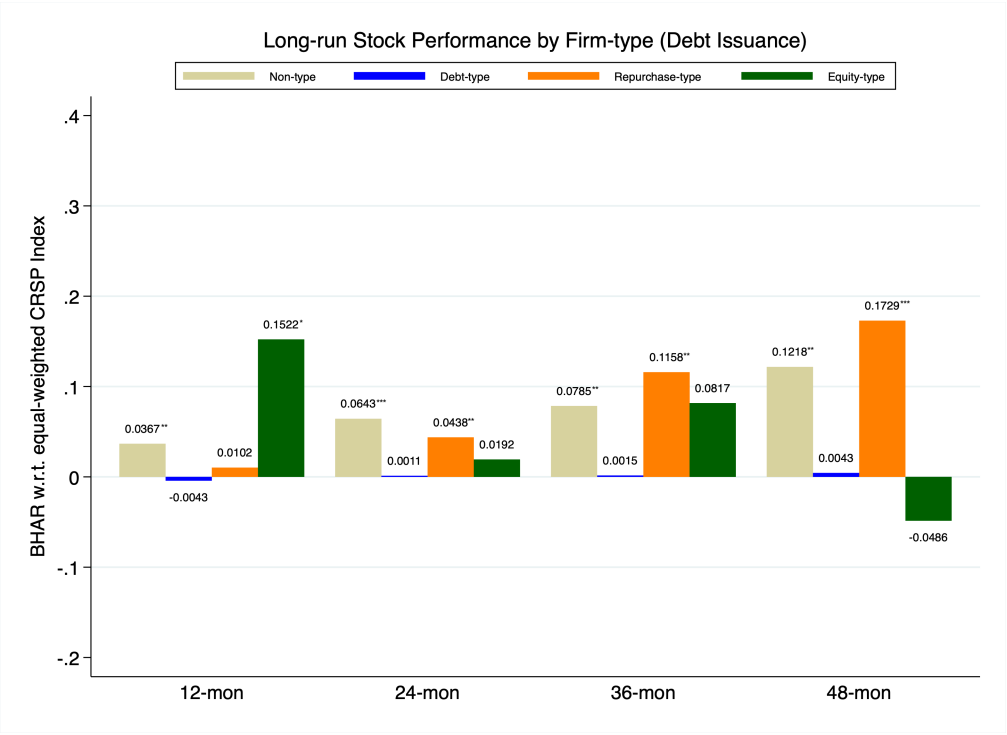


Figure 2: Long-run Stock Performance by Firm-type

Figure 2 reports the long-run stock performance following debt issuance, equity issuance, and repurchases in respective panels. For each financing activity, we plot the buy-and-hold abnormal returns (BHAR) for up to four years by *firm-type*, defined as the market expectation of financing choice using random forest predictive models with ex ante firm characteristics and market information. The benchmark is the equal-weighted CRSP Index. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A



Panel B

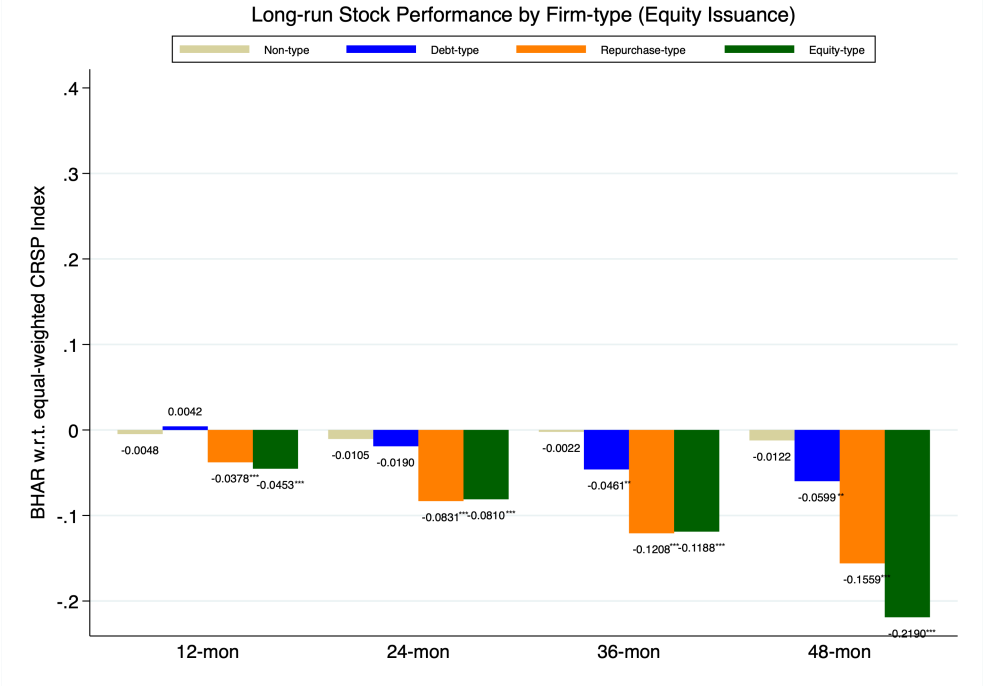


Figure 2: Long-run Stock Performance by Firm-type

Panel C

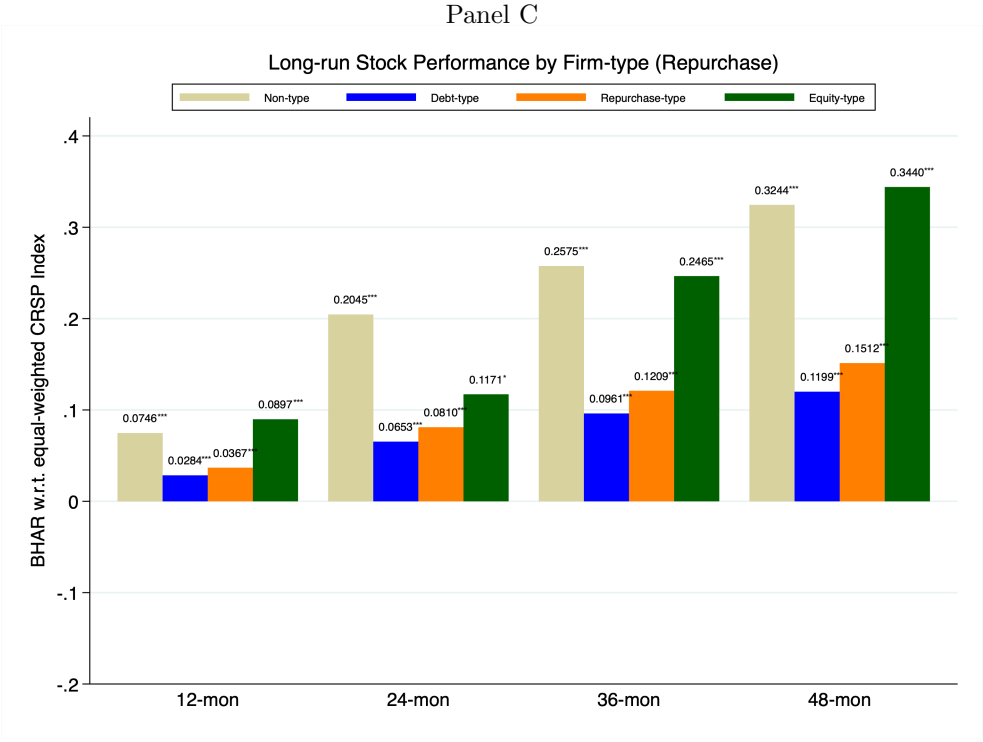
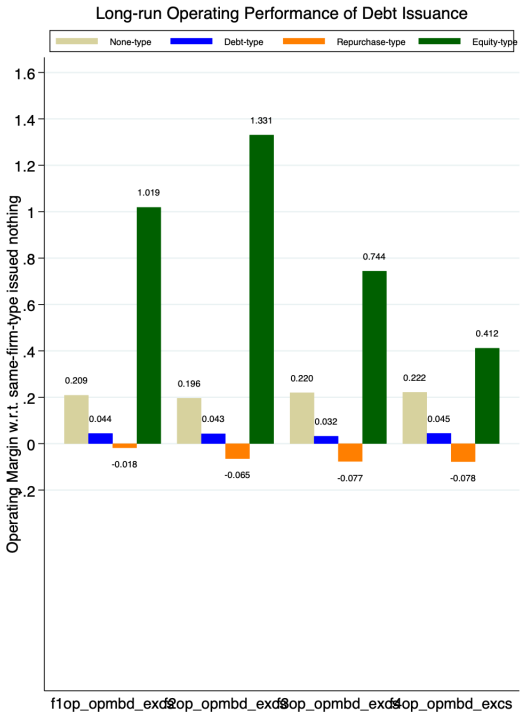


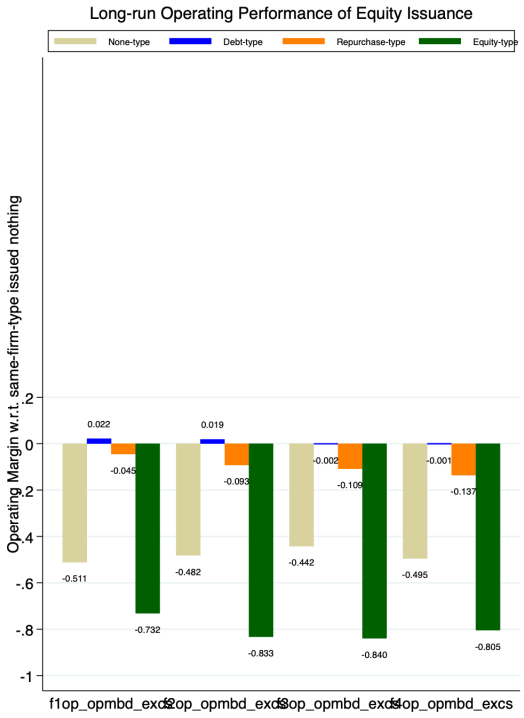
Figure 3: Long-run Operating Performance by Issuance

Figure 3 reports the long-run operating performance following debt issuance, equity issuance, and repurchases in respective panels. For each financing activity, we plot the Operating Margin and Return on Assets for up to four years by *firm-type*, defined as the market expectation of financing choice using random forest predictive models with ex ante firm characteristics and market information. The benchmark is firms with the same *firm-type* that issued nothing. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A



Panel B



Panel C

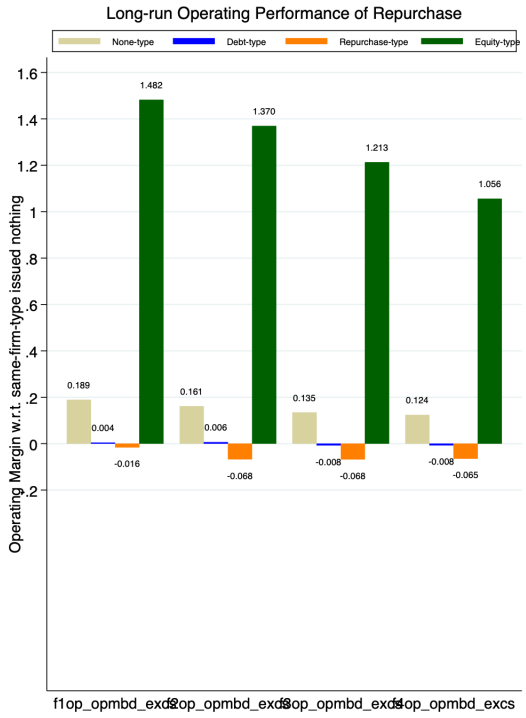


Figure 3: Long-run Operating Performance by Firm-type

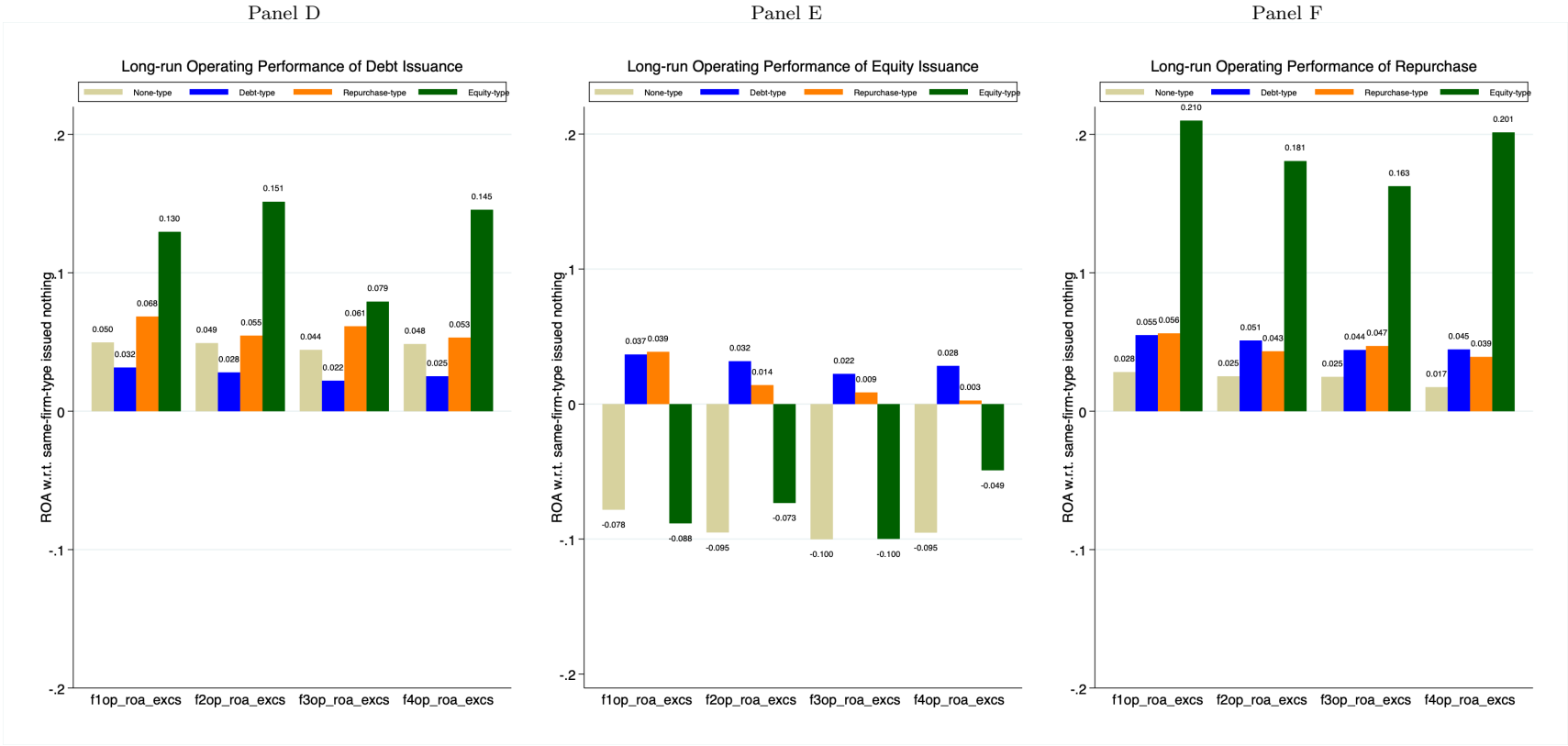


Figure 4: Securities Issuance Activity, Fiscal Year 1985-2017

Figure 4 presents the distribution of securities issuance activities in our sample from fiscal year 1985 to 2017. For each year, we report the proportion of firm-quarter observations that issued debt, convertibles, equity, conducted share repurchases, and issued multiple securities, respectively.

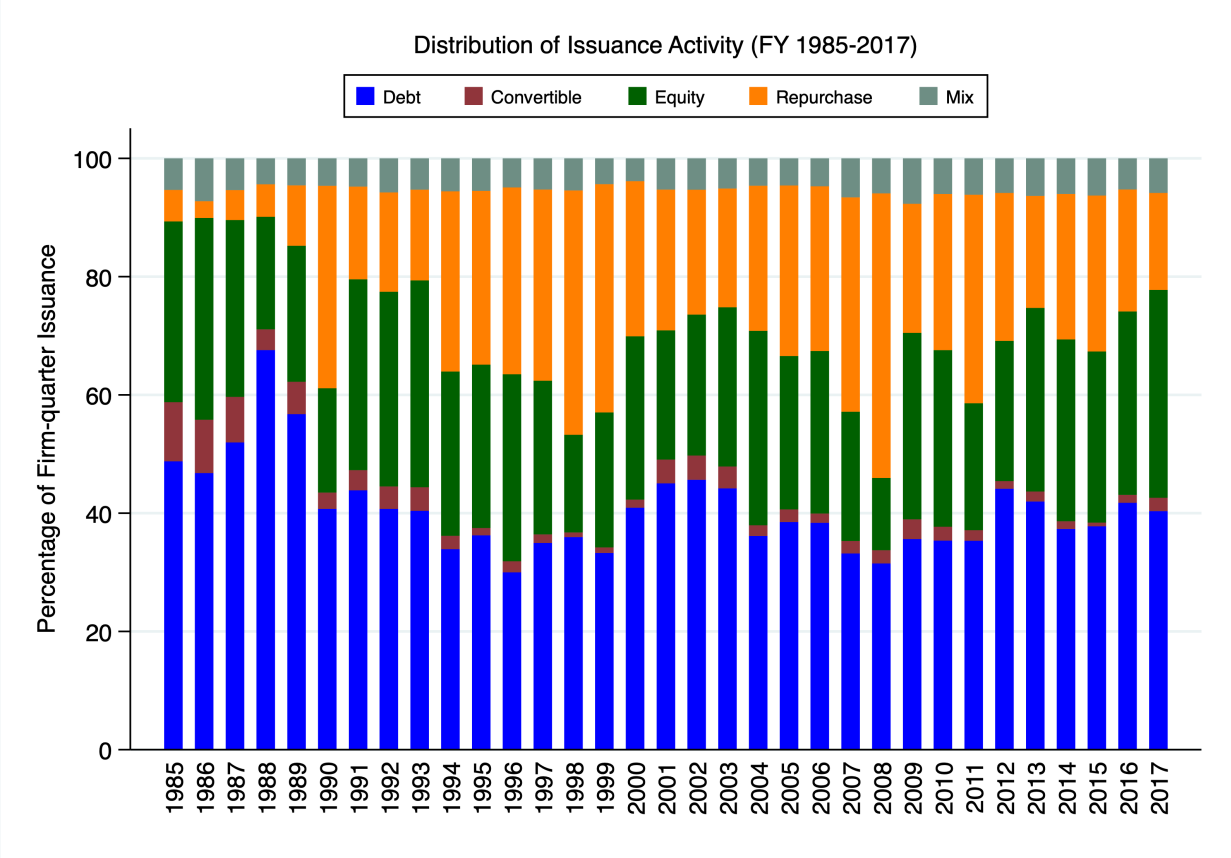


Table 1: Firm Financing Activity, Fiscal Year 1985-2017

Table 1 presents the distribution of firm-quarter observations in our sample from 1985 to 2017, categorized as non-issuer or a specific type of issuer, including debt, convertible, equity, share repurchases, and mixed. We report the annual percentage share of each issuer type, alongside the corresponding counts.

Fiscal	Non-issuer		Debt-issuer		Convertible-issuer		Equity-issuer		Repurchaser		Mixed-issuer		Total
Year	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.
1985	12410	91.0	595	4.4	122	0.9	373	2.7	65	0.5	65	0.5	13630
1986	12344	88.4	757	5.4	146	1.0	552	4.0	46	0.3	117	0.8	13962
1987	13048	90.3	728	5.0	108	0.7	419	2.9	71	0.5	75	0.5	14449
1988	12787	92.4	711	5.1	37	0.3	200	1.4	58	0.4	46	0.3	13839
1989	12165	91.3	661	5.0	64	0.5	268	2.0	119	0.9	53	0.4	13330
1990	11406	89.0	573	4.5	39	0.3	248	1.9	482	3.8	65	0.5	12813
1991	11488	87.5	719	5.5	56	0.4	529	4.0	257	2.0	78	0.6	13127
1992	12362	86.3	800	5.6	75	0.5	647	4.5	330	2.3	113	0.8	14327
1993	13840	85.9	918	5.7	91	0.6	795	4.9	349	2.2	120	0.7	16113
1994	16847	88.7	730	3.8	49	0.3	598	3.1	656	3.5	120	0.6	19000
1995	16802	87.1	903	4.7	31	0.2	688	3.6	732	3.8	137	0.7	19293
1996	17128	85.7	860	4.3	54	0.3	907	4.5	906	4.5	141	0.7	19996
1997	17734	86.9	931	4.6	39	0.2	692	3.4	861	4.2	140	0.7	20397
1998	16898	86.0	991	5.0	22	0.1	455	2.3	1139	5.8	149	0.8	19654
1999	16183	85.8	888	4.7	25	0.1	609	3.2	1030	5.5	116	0.6	18851
2000	16296	88.9	830	4.5	28	0.2	560	3.1	532	2.9	78	0.4	18324
2001	14800	89.2	804	4.8	72	0.4	390	2.4	425	2.6	94	0.6	16585
2002	13775	89.8	714	4.7	64	0.4	373	2.4	330	2.2	83	0.5	15339
2003	13517	89.5	704	4.7	59	0.4	429	2.8	320	2.1	81	0.5	15110
2004	13423	88.7	620	4.1	31	0.2	564	3.7	421	2.8	79	0.5	15138
2005	13402	89.4	613	4.1	34	0.2	413	2.8	459	3.1	73	0.5	14994
2006	13186	88.9	634	4.3	26	0.2	454	3.1	460	3.1	78	0.5	14838
2007	12716	87.6	595	4.1	38	0.3	392	2.7	650	4.5	118	0.8	14509
2008	12233	88.7	490	3.6	35	0.3	190	1.4	749	5.4	92	0.7	13789
2009	11823	89.8	478	3.6	45	0.3	423	3.2	293	2.2	103	0.8	13165
2010	11758	88.7	529	4.0	35	0.3	447	3.4	395	3.0	90	0.7	13254
2011	11433	88.0	553	4.3	28	0.2	336	2.6	552	4.2	96	0.7	12998
2012	11135	87.3	718	5.6	21	0.2	386	3.0	407	3.2	95	0.7	12762
2013	11045	86.1	749	5.8	30	0.2	554	4.3	338	2.6	113	0.9	12829
2014	11482	86.2	684	5.1	24	0.2	563	4.2	451	3.4	110	0.8	13314
2015	11456	85.9	709	5.3	12	0.1	543	4.1	495	3.7	118	0.9	13333
2016	11335	86.5	739	5.6	24	0.2	549	4.2	365	2.8	93	0.7	13105
2017	11277	85.8	753	5.7	42	0.3	656	5.0	306	2.3	109	0.8	13143
Total	439534	88.0	23681	4.7	1606	0.3	16202	3.2	15049	3.0	3238	0.6	499310

Table 2: Factors Influencing Firm Financing Decisions

Table 2 Panel A reports descriptive statistics for factors derived from firm characteristics and market information across four issuer categories: Non-issuers, Debt-issuers, Equity-issuers, and Repurchasers. Panel B presents the differences in means between each issuer category and Non-issuers, with standard errors clustered by firm and date. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Summary Statistics

	(1) Non-issuer					(2) Debt-issuer					(3) Equity-issuer					(4) Repurchaser				
	Mean	SD	25th	Median	75th	Mean	SD	25th	Median	75th	Mean	SD	25th	Median	75th	Mean	SD	25th	Median	75th
Financial Leverage	0.32	0.12	0.23	0.33	0.41	0.51	0.24	0.37	0.54	0.64	0.33	0.26	0.18	0.28	0.44	0.31	0.26	0.06	0.28	0.48
Firm Size	6.02	1.90	4.34	5.86	7.45	8.80	1.91	7.48	8.99	10.36	5.64	1.76	4.34	5.34	6.67	6.89	1.85	5.62	6.78	8.10
Cash Holdings	0.17	0.11	0.09	0.14	0.23	0.07	0.09	0.01	0.04	0.08	0.23	0.24	0.07	0.16	0.29	0.15	0.18	0.03	0.08	0.22
Bankruptcy Risk	0.48	0.72	0.38	0.61	0.88	0.56	0.61	0.22	0.47	0.89	-0.03	1.91	-0.00	0.52	0.87	0.75	0.91	0.23	0.77	1.32
Earnings Growth	0.03	0.04	0.01	0.03	0.06	0.03	0.30	-0.00	0.02	0.06	0.04	0.31	0.01	0.04	0.07	0.04	0.32	-0.00	0.03	0.07
Profitability	0.00	0.02	-0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.01	-0.01	0.06	-0.01	0.00	0.01	0.01	0.02	0.00	0.01	0.02
Institutional Ownership	0.42	0.19	0.27	0.40	0.55	0.53	0.22	0.38	0.53	0.70	0.41	0.21	0.26	0.38	0.54	0.50	0.25	0.31	0.48	0.70
Market Share	0.06	0.05	0.02	0.05	0.09	0.14	0.19	0.02	0.06	0.17	0.04	0.09	0.00	0.02	0.04	0.08	0.15	0.00	0.01	0.07
R&D Expenditure	0.13	0.22	0.01	0.04	0.16	0.01	0.12	0.00	0.00	0.00	0.35	1.04	0.00	0.03	0.16	0.04	0.23	0.00	0.00	0.02
Depreciation	0.07	0.02	0.06	0.06	0.08	0.07	0.07	0.03	0.05	0.08	0.09	0.13	0.05	0.06	0.08	0.05	0.06	0.02	0.04	0.06
Tax Burden	0.03	0.02	0.01	0.03	0.04	0.04	0.04	0.01	0.03	0.05	0.02	0.04	0.01	0.02	0.03	0.04	0.05	0.01	0.03	0.06
Tangible Assets	0.24	0.06	0.20	0.23	0.28	0.31	0.26	0.07	0.24	0.50	0.24	0.20	0.10	0.21	0.30	0.20	0.21	0.03	0.14	0.29
Recent IPO Status	0.15	0.11	0.06	0.12	0.22	0.12	0.08	0.06	0.10	0.17	0.17	0.10	0.08	0.15	0.23	0.15	0.09	0.07	0.13	0.21
Growth Opportunity	2.71	2.15	1.31	2.03	3.44	2.32	3.50	1.28	1.86	2.68	3.30	4.32	1.65	2.54	4.07	2.64	3.28	1.26	1.95	3.12
Abnormal Returns	0.01	0.01	0.00	0.00	0.01	0.00	0.01	-0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	-0.00	0.00	0.01
Stock Returns Volatility	0.13	0.04	0.10	0.12	0.16	0.09	0.05	0.06	0.08	0.11	0.15	0.07	0.10	0.13	0.17	0.10	0.06	0.06	0.09	0.13
Amihud Illiquidity	0.11	0.19	0.01	0.03	0.11	0.01	0.10	0.00	0.00	0.00	0.06	0.16	0.00	0.02	0.05	0.03	0.14	0.00	0.00	0.01
Consumer Sentiment	88.83	10.75	82.23	91.32	94.74	88.93	11.05	82.10	91.30	95.60	88.20	10.74	81.15	91.00	94.70	89.48	11.52	82.50	91.20	96.50

Panel B: Comparison by Actual Financing Decision

	(1) Non-issuer	(2) Debt-issuer		(3) Equity-issuer		(4) Repurchaser	
	Mean	Mean	Differences	Mean	Differences	Mean	Differences
Financial Leverage	0.323***	0.514	0.191***	0.331	0.008*	0.309	-0.014***
Firm Size	6.021***	8.798	2.778***	5.635	-0.385***	6.887	0.866***
Cash Holdings	0.175***	0.070	-0.105***	0.230	0.056***	0.154	-0.020***
Bankruptcy Risk	0.477***	0.558	0.082***	-0.033	-0.510***	0.750	0.274***
Earnings Growth	0.033***	0.027	-0.006***	0.044	0.011***	0.035	0.002
Profitability	0.000	0.009	0.009***	-0.015	-0.015***	0.013	0.012***
Institutional Ownership	0.415***	0.535	0.119***	0.405	-0.010**	0.498	0.082***
Market Share	0.061***	0.140	0.078***	0.041	-0.020***	0.076	0.014***
R&D Expenditure	0.130***	0.012	-0.118***	0.346	0.215***	0.042	-0.089***
Depreciation	0.070***	0.066	-0.004**	0.094	0.025***	0.051	-0.019***
Tax Burden	0.026***	0.035	0.009***	0.022	-0.004***	0.039	0.013***
Tangible Assets	0.240***	0.307	0.067***	0.242	0.002	0.200	-0.040***
Recent IPO Status	0.155***	0.118	-0.037***	0.165	0.011***	0.148	-0.007*
Growth Opportunity	2.706***	2.315	-0.391***	3.299	0.593***	2.642	-0.064
Abnormal Returns	0.006***	0.003	-0.002***	0.008	0.002***	0.006	0.001***
Stock Returns Volatility	0.129***	0.092	-0.037***	0.146	0.018***	0.104	-0.025***
Amihud Illiquidity	0.107***	0.013	-0.094***	0.059	-0.047***	0.028	-0.078***
Consumer Sentiment	88.835***	88.927	0.092	88.200	-0.635*	89.480	0.645

Table 3: Modeling Market Expectations of Issuance Choice (Multinomial Logistic Regression)

Table 3 reports the results of in-sample multinomial logistic regressions examining the ex-ante determinants of firms' financing decisions. We estimate two specifications: LG-Base (Panel A), which excludes market information variables, and LG-Full (Panel B), which incorporates additional market-based factors that may influence financing decisions. In both models, Non-issuers serve as the base category; thus, each coefficient reflects the effect of a factor on the likelihood of choosing a given financing type relative to issuing nothing. ***,** and * denote significance at the 1%, 5%, and 10% level, respectively, with standard errors clustered by date.

	Panel A: LG-Base					Panel B: LG-Full				
	Debt	Convertible	Equity	Repurchase	Mixed	Debt	Convertible	Equity	Repurchase	Mixed
Financial Leverage	2.74***	0.22	1.16***	-6.57***	1.75***	3.59***	1.04**	2.62***	-6.19***	2.79***
Firm Size	0.83***	0.39***	0.16***	0.27***	0.83***	0.78***	0.22***	-0.18***	0.07***	0.77***
Cash Holdings	-9.26***	-0.34	1.97***	-1.07**	-4.67***	-10.69***	-2.99***	-0.56	0.41	-7.12***
Bankruptcy Risk	-1.38***	-0.54***	0.29***	-1.13***	-2.43***	-1.45***	-0.20	0.78***	-0.97***	-2.29***
Earnings Growth	0.05	0.83*	0.60***	-0.62***	0.33	0.08	0.69	0.30*	-0.66***	0.31
Profitability	41.91***	-24.74***	-20.63***	42.48***	24.02***	20.53***	-27.85***	-25.34***	36.13***	4.93
Institutional Ownership	1.27**	0.17	1.35***	0.75*	0.79	0.49	-2.70***	-2.18***	-0.10	-0.47
Market Share	-0.96***	-1.21	-14.13***	-2.27***	0.01	-1.22***	-0.68	-12.87***	-1.33***	-0.37
R&D Expenditure	-9.37***	-2.09***	-1.25***	-11.49***	-1.43	-12.21***	-2.60***	-1.89***	-11.85***	-3.49***
Depreciation	-2.93***	3.74***	3.70***	-11.91***	0.28	-2.24***	4.55***	4.80***	-8.54***	0.57
Tax Burden	-5.40***	-11.27***	-1.91	0.69	-5.14***	-7.09***	-11.37***	-5.38***	-1.22	-7.04***
Tangible Assets	1.89***	1.92***	1.07***	-5.71***	0.86**	1.76***	1.19**	0.12	-5.85***	0.62*
Recent IPO Status	11.76***	2.97***	-0.02	5.03***	10.62***	13.35***	3.21***	-1.22*	5.17***	12.13***
Growth Opportunity						0.54***	0.07	0.25***	-0.36***	0.48***
Abnormal Returns						18.48***	21.65***	12.21**	5.20	25.20***
Stock Returns Volatility						-1.18	7.53***	3.97**	-8.74***	0.13
Amihud Illiquidity						-2.53**	-9.91***	-12.19***	-7.78***	-8.22***
Consumer Sentiment						-0.03***	-0.03***	-0.02**	0.01	-0.03***
Constant	-10.71***	-8.90***	-5.17***	-1.30***	-12.04***	-7.89***	-4.39***	0.12	0.78	-8.51***
Pseudo R^2	0.209					0.234				
Observations	457269					457269				
Chi-squared	6535					6262				
Log-likelihood	-191418.12					-185329.29				

Table 4: Comparison of Predicted Probability (Random Forest Models)

Table 4 reports financing decision probabilities estimated from logistic models (LG) and random forest models (RF). Panel A presents results under the Base specification, which includes only firm characteristics, while Panel B shows the Full specification incorporating additional market information-based factors. Panel C presents an additional Naive specification where only accounting variables are used. For each actual financing decision, we report the mean, standard deviation, and median of predicted probabilities, along with the number of observations. Predictions that match the actual decision are highlighted.

Panel A: Base Specification (Logit vs Random Forest)

	(1) LG-Base				(2) RF-Base			
	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median
Non-issuer								
Pr(none)	401732	0.91	0.07	0.93	401732	0.93	0.16	0.98
Pr(debt)	401732	0.03	0.05	0.01	401732	0.02	0.08	0.00
Pr(convertibles)	401732	0.00	0.00	0.00	401732	0.00	0.01	0.00
Pr(equity)	401732	0.03	0.02	0.03	401732	0.03	0.05	0.02
Pr(repurchase)	401732	0.02	0.02	0.02	401732	0.01	0.05	0.00
Pr(mix)	401732	0.00	0.01	0.00	401732	0.00	0.01	0.00
Debt-issuer								
Pr(none)	21601	0.49	0.27	0.49	21601	0.04	0.16	0.00
Pr(debt)	21601	0.36	0.28	0.32	21601	0.58	0.23	0.61
Pr(convertibles)	21601	0.01	0.02	0.00	21601	0.02	0.03	0.01
Pr(equity)	21601	0.04	0.07	0.01	21601	0.10	0.10	0.06
Pr(repurchase)	21601	0.07	0.13	0.02	21601	0.19	0.16	0.14
Pr(mix)	21601	0.04	0.04	0.03	21601	0.07	0.04	0.06
Equity-issuer								
Pr(none)	14858	0.74	0.26	0.87	14858	0.41	0.47	0.01
Pr(debt)	14858	0.07	0.15	0.00	14858	0.15	0.20	0.03
Pr(convertibles)	14858	0.01	0.04	0.00	14858	0.03	0.04	0.01
Pr(equity)	14858	0.10	0.18	0.04	14858	0.24	0.28	0.14
Pr(repurchase)	14858	0.06	0.14	0.01	14858	0.15	0.19	0.05
Pr(mix)	14858	0.01	0.03	0.00	14858	0.03	0.03	0.01
Repurchaser								
Pr(none)	14867	0.62	0.25	0.67	14867	0.05	0.19	0.00
Pr(debt)	14867	0.13	0.20	0.04	14867	0.29	0.20	0.24
Pr(convertibles)	14867	0.01	0.02	0.00	14867	0.02	0.03	0.02
Pr(equity)	14867	0.04	0.07	0.02	14867	0.16	0.12	0.12
Pr(repurchase)	14867	0.19	0.23	0.09	14867	0.44	0.23	0.44
Pr(mix)	14867	0.02	0.03	0.00	14867	0.04	0.03	0.04

Panel B: Full Specification (Logit vs Random Forest)

	(1) LG-Full				(2) RF-Full			
	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median
Non-issuer								
Pr(none)	401732	0.92	0.07	0.93	401732	0.94	0.10	0.97
Pr(debt)	401732	0.03	0.05	0.00	401732	0.02	0.05	0.00
Pr(convertibles)	401732	0.00	0.00	0.00	401732	0.00	0.00	0.00
Pr(equity)	401732	0.03	0.03	0.02	401732	0.02	0.03	0.02
Pr(repurchase)	401732	0.02	0.02	0.01	401732	0.01	0.03	0.00
Pr(mix)	401732	0.00	0.01	0.00	401732	0.00	0.01	0.00
Debt-issuer								
Pr(none)	21601	0.47	0.27	0.48	21601	0.08	0.18	0.02
Pr(debt)	21601	0.37	0.29	0.33	21601	0.54	0.21	0.56
Pr(convertibles)	21601	0.01	0.03	0.00	21601	0.02	0.02	0.01
Pr(equity)	21601	0.04	0.09	0.01	21601	0.10	0.08	0.08
Pr(repurchase)	21601	0.07	0.13	0.02	21601	0.20	0.13	0.17
Pr(mix)	21601	0.04	0.05	0.03	21601	0.06	0.02	0.07
Equity-issuer								
Pr(none)	14858	0.70	0.28	0.82	14858	0.46	0.44	0.24
Pr(debt)	14858	0.08	0.17	0.00	14858	0.15	0.19	0.05
Pr(convertibles)	14858	0.01	0.05	0.00	14858	0.02	0.02	0.01
Pr(equity)	14858	0.14	0.20	0.06	14858	0.20	0.22	0.13
Pr(repurchase)	14858	0.06	0.15	0.01	14858	0.15	0.17	0.09
Pr(mix)	14858	0.01	0.03	0.00	14858	0.02	0.02	0.02
Repurchaser								
Pr(none)	14867	0.58	0.26	0.62	14867	0.11	0.21	0.03
Pr(debt)	14867	0.13	0.20	0.03	14867	0.30	0.18	0.26
Pr(convertibles)	14867	0.01	0.03	0.00	14867	0.02	0.02	0.02
Pr(equity)	14867	0.06	0.11	0.02	14867	0.16	0.09	0.14
Pr(repurchase)	14867	0.21	0.25	0.10	14867	0.37	0.18	0.37
Pr(mix)	14867	0.02	0.03	0.00	14867	0.04	0.02	0.04

Table 4: Comparison of Predicted Probability (Random Forest Models)

Panel C: Various Specifications of Random Forest Model

	(1) RF-naive				(2) RF-Base				(3) RF-Full			
	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median	Obs.	Mean	SD	Median
Non-issuer												
Pr(none)	401732	0.86	0.14	0.91	401732	0.93	0.16	0.98	401732	0.94	0.10	0.97
Pr(debt)	401732	0.04	0.09	0.01	401732	0.02	0.08	0.00	401732	0.02	0.05	0.00
Pr(convertibles)	401732	0.00	0.02	0.00	401732	0.00	0.01	0.00	401732	0.00	0.00	0.00
Pr(equity)	401732	0.04	0.08	0.02	401732	0.03	0.05	0.02	401732	0.02	0.03	0.02
Pr(repurchase)	401732	0.04	0.07	0.02	401732	0.01	0.05	0.00	401732	0.01	0.03	0.00
Pr(mix)	401732	0.01	0.02	0.00	401732	0.00	0.01	0.00	401732	0.00	0.01	0.00
Debt-issuer												
Pr(none)	21601	0.60	0.29	0.68	21601	0.04	0.16	0.00	21601	0.08	0.18	0.02
Pr(debt)	21601	0.28	0.27	0.17	21601	0.58	0.23	0.61	21601	0.54	0.21	0.56
Pr(convertibles)	21601	0.00	0.02	0.00	21601	0.02	0.03	0.01	21601	0.02	0.02	0.01
Pr(equity)	21601	0.03	0.06	0.01	21601	0.10	0.10	0.06	21601	0.10	0.08	0.08
Pr(repurchase)	21601	0.05	0.07	0.02	21601	0.19	0.16	0.14	21601	0.20	0.13	0.17
Pr(mix)	21601	0.04	0.08	0.01	21601	0.07	0.04	0.06	21601	0.06	0.02	0.07
Equity-issuer												
Pr(none)	14858	0.79	0.17	0.83	14858	0.41	0.47	0.01	14858	0.46	0.44	0.24
Pr(debt)	14858	0.04	0.08	0.01	14858	0.15	0.20	0.03	14858	0.15	0.19	0.05
Pr(convertibles)	14858	0.01	0.02	0.00	14858	0.03	0.04	0.01	14858	0.02	0.02	0.01
Pr(equity)	14858	0.13	0.13	0.08	14858	0.24	0.28	0.14	14858	0.20	0.22	0.13
Pr(repurchase)	14858	0.03	0.04	0.02	14858	0.15	0.19	0.05	14858	0.15	0.17	0.09
Pr(mix)	14858	0.01	0.03	0.00	14858	0.03	0.03	0.01	14858	0.02	0.02	0.02
Repurchaser												
Pr(none)	14867	0.83	0.16	0.87	14867	0.05	0.19	0.00	14867	0.11	0.21	0.03
Pr(debt)	14867	0.06	0.11	0.02	14867	0.29	0.20	0.24	14867	0.30	0.18	0.26
Pr(convertibles)	14867	0.00	0.01	0.00	14867	0.02	0.03	0.02	14867	0.02	0.02	0.02
Pr(equity)	14867	0.03	0.05	0.01	14867	0.16	0.12	0.12	14867	0.16	0.09	0.14
Pr(repurchase)	14867	0.08	0.09	0.04	14867	0.44	0.23	0.44	14867	0.37	0.18	0.37
Pr(mix)	14867	0.01	0.03	0.00	14867	0.04	0.03	0.04	14867	0.04	0.02	0.04

Table 5: Market Reactions to Debt Issuance by Firm-type

Table 5 reports the market reactions to debt issuance across *firm-types*, defined by the market expectation of financing decisions using random forest predictive models with ex ante firm characteristics and market information. Panel A presents announcement effect, measured as cumulative abnormal returns (CAR) relative to non-type firms that actually issued nothing. Panel B presents post-issuance long-run stock performance, measured as buy-and-hold abnormal returns (BHAR) relative to the equal-weighted CRSP Index. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Announcement Effect

CAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
(-10,-2)	0.0009	0.0005	0.0017	0.0011
(-1,+1)	0.0075***	0.0003	0.0035***	0.0096**
(+2,+5)	0.0033	0.0003	0.0027*	0.0014

Panel B: Long-run Stock Performance

BHAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
06-month	0.0104	-0.0020	0.0114	0.0669
12-month	0.0367**	-0.0043	0.0102	0.1522*
24-month	0.0643***	0.0011	0.0438**	0.0192
36-month	0.0785**	0.0015	0.1158**	0.0817
48-month	0.1218**	0.0043	0.172***	-0.0486
60-month	0.1552**	0.0029	0.2240***	0.1129

Table 6: Market Reactions to Equity Issuance by Firm-type

Table 6 reports the market reactions to equity issuance across *firm-types*, defined by the market expectation of financing decisions using random forest predictive models with ex ante firm characteristics and market information. Panel A presents announcement effect, measured as cumulative abnormal returns (CAR) relative to non-type firms that actually issued nothing. Panel B presents post-issuance long-run stock performance, measured as buy-and-hold abnormal returns (BHAR) relative to the equal-weighted CRSP Index. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Announcement Effect

CAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
(-10,-2)	0.0036	0.0028*	-0.0010	0.0249***
(-1,+1)	-0.0166***	-0.0130***	-0.0143***	-0.0205***
(+2,+5)	0.0089***	0.0058***	0.0071***	0.0062***

Panel B: Long-run Stock Performance

BHAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
06-month	0.0149**	0.0103*	0.0072	-0.0045
12-month	-0.0048	0.0042	-0.0378***	-0.0453***
24-month	-0.0105	-0.0190	-0.0831***	-0.0810***
36-month	-0.0022	-0.0461**	-0.1208***	-0.1188***
48-month	-0.0122	-0.0599**	-0.1559***	-0.2190***
60-month	0.1012	-0.0495	-0.0784	-0.2602***

Table 7: Market Reactions to Repurchases by Firm-type

Table 7 reports the market reactions to repurchase across *firm-types*, defined by the market expectation of financing decisions using random forest predictive models with ex ante firm characteristics and market information. Panel A presents announcement effect, measured as cumulative abnormal returns (CAR) relative to non-type firms that actually issued nothing. Panel B presents post-issuance long-run stock performance, measured as buy-and-hold abnormal returns (BHAR) relative to the equal-weighted CRSP Index. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Announcement Effect

CAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
(-10,-2)	-0.0211***	-0.0076***	-0.0150***	-0.0372***
(-1,+1)	0.0264***	0.0124***	0.0192***	0.0378***
(+2,+5)	0.0073***	0.0039***	0.0039***	0.0120**

Panel B: Long-run Stock Performance

BHAR	(1) Non-type Mean	(2) Debt-type Mean	(3) Repurchase-type Mean	(4) Equity-type Mean
06-month	0.0564***	0.0127***	0.0150***	0.0590***
12-month	0.0746***	0.0284***	0.0367***	0.0897***
24-month	0.2045***	0.0653***	0.0810***	0.1171*
36-month	0.2575***	0.0961***	0.1209***	0.2465***
48-month	0.3244***	0.1199***	0.1512***	0.3440***
60-month	0.4147***	0.1417***	0.1860***	0.4458**

Table 8: Post-issuance Long-run Operating Performance by Firm-type

Table 8 reports post-issuance long-run operating performance across *firm-types*. Each panel compares excess operating margin and return on assets (ROA) with respect to the same-type firm issued nothing up to the fourth year after a given financing activity. Operating Margin is defined as operating income before depreciation and amortization divided by sales, while ROA is divided by total assets. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Non-type Firm

	Did Nothing Mean	Issued Debt Diff.	Issued Equity Diff.	Repurchased Diff.
Operating Margin				
Year 1	-0.0588	0.2088***	-0.5114***	0.1890***
Year 2	-0.0447	0.1959***	-0.4820***	0.1614***
Year 3	-0.0354	0.2201***	-0.4423***	0.1349***
Year 4	-0.0229	0.2217***	-0.4954***	0.1238***
Return on Assets				
Year 1	0.0597	0.0497***	-0.0782***	0.0282***
Year 2	0.0629	0.0491***	-0.0951***	0.0251***
Year 3	0.0657	0.0442***	-0.1002***	0.0248***
Year 4	0.0686	0.0485***	-0.0952***	0.0173**

Panel B: Debt-type Firm

	Did Nothing Mean	Issued Debt Diff.	Issued Equity Diff.	Repurchased Diff.
Operating Margin				
Year 1	0.1892	0.0442***	0.0221**	0.0045
Year 2	0.1889	0.0429***	0.0186**	0.0065
Year 3	0.1978	0.0322***	-0.0015	-0.0080*
Year 4	0.1940	0.0450***	-0.0011	-0.0078
Return on Assets				
Year 1	0.0744	0.0315***	0.0367***	0.0549***
Year 2	0.0769	0.0280***	0.0317***	0.0511***
Year 3	0.0813	0.0220***	0.0223***	0.0442***
Year 4	0.0797	0.0252***	0.0283***	0.0446***

Panel C: Equity-type Firm

	Did Nothing Mean	Issued Debt Diff.	Issued Equity Diff.	Repurchased Diff.
Operating Margin				
Year 1	-1.7920	1.0189***	-0.7316***	1.4824***
Year 2	-1.6557	1.3307***	-0.8328***	1.3697***
Year 3	-1.3412	0.7438***	-0.8395***	1.2130***
Year 4	-1.3376	0.4117	-0.8046***	1.0559***
Return on Assets				
Year 1	-0.2136	0.1295***	-0.0883***	0.2099***
Year 2	-0.2210	0.1513***	-0.0732***	0.1807***
Year 3	-0.1729	0.0792	-0.0999***	0.1625***
Year 4	-0.2117	0.1455***	-0.0491***	0.2014***

Panel D: Repurchase-type Firm

	Did Nothing Mean	Issued Debt Diff.	Issued Equity Diff.	Repurchased Diff.
Operating Margin				
Year 1	0.1924	-0.0182**	-0.0451**	-0.0163***
Year 2	0.2323	-0.0652***	-0.0928***	-0.0678***
Year 3	0.2368	-0.0771***	-0.1086***	-0.0681***
Year 4	0.2385	-0.0778***	-0.1366***	-0.0650***
Return on Assets				
Year 1	0.0553	0.0683***	0.0386***	0.0562***
Year 2	0.0621	0.0546***	0.0140**	0.0433***
Year 3	0.0586	0.0614***	0.0086	0.0470***
Year 4	0.0680	0.0531***	0.0026	0.0392***

Appendix A: Variable Definitions

Appendix A reports the definitions of variables used in estimating firm financing decisions, including 13 firm characteristics-based variables and 5 market information-based variables.

Firm Characteristics-based Variables

Variable Name	Definition
Financial Leverage	Calculated as the sum of short-term and long-term debt divided by the sum of short-term debt, long-term debt, and the book value of common equity.
Firm Size	Calculated as the natural logarithm of total book assets.
Cash Holdings	Calculated as cash and short-term investments divided by total book assets.
Bankruptcy Risk	Calculated as the four-quarter moving average of a modified Altman Z-score, where the component based on market capitalization is excluded.
Earnings Growth	Calculated as the growth rate of the ratio of retained earnings to total book assets.
Profitability	Calculated as the four-quarter moving average of the ratio of net income to total book assets.
Institutional Ownership	Calculated as the percentage of total shares outstanding held by institutional investors.
Market Share	Calculated as the firm's annual sales divided by the total sales of all firms in the same industry, defined by the 3-digit SIC code.
R&D Expenditure	Calculated as the ratio of R&D expenditure to sales, with missing values set to zero.
Depreciation	Calculated as the ratio of depreciation expense to sales.
Tax Burden	Calculated as the ratio of income taxes paid to sales.
Tangible Assets	Calculated as the ratio of new property, plant, and equipment to total book assets.
Recent IPO Status	Equals 1 if the firm went public within the past three years.

Market Information-based Variables

Variable Name	Definition
Growth Opportunity	Calculated as the ratio of the market value of equity to the book value of common equity.
Abnormal Returns	Calculated as the trailing 60-month abnormal return estimated using the Fama-French/Carhart four-factor model.
Stock Return Volatility	Calculated as the standard deviation of daily stock returns over the trailing 12 months.
Amihud Illiquidity	Calculated as the Amihud illiquidity measure over the trailing 3 months.
Market Sentiment	Measured using University of Michigan Consumer Sentiment Index.

Appendix B: Mixed-issuers Breakdown

Appendix B Panel A reports the distribution of observations for mixed-issuers that engage in more than one type of financing activity within a fiscal quarter. We group these mixed-issuers based on both the number of security types involved and the specific combinations used. Panel B presents the distribution of mixed-issuer observations across *firm-types*, assuming each observation is assigned to a single category based on the security type with the largest proceeds.

Panel A: Breakdown by Combinations

Type of Security Mix	Debt-issuer		Convertible-issuer		Equity-issuer		Repurchaser		Total	
	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)
Two-security Mix: C+E	0	0.0	167	57.6	115	15.1	0	0.0	282	8.7
Two-security Mix: C+R	0	0.0	9	3.1	0	0.0	4	0.5	13	0.4
Two-security Mix: D+C	125	8.9	101	34.8	0	0.0	0	0.0	226	7.0
Two-security Mix: D+E	698	49.4	0	0.0	478	62.8	0	0.0	1176	36.3
Two-security Mix: D+R	538	38.1	0	0.0	0	0.0	709	91.5	1247	38.5
Two-security Mix: E+R	0	0.0	0	0.0	128	16.8	52	6.7	180	5.6
Three-security Mix: C+E+R	0	0.0	3	1.0	2	0.3	1	0.1	6	0.2
Three-security Mix: D+C+E	37	2.6	9	3.1	24	3.2	0	0.0	70	2.2
Three-security Mix: D+C+R	1	0.1	1	0.3	0	0.0	0	0.0	2	0.1
Three-security Mix: D+E+R	12	0.8	0	0.0	14	1.8	9	1.2	35	1.1
Four-security Mix: D+C+E+R	1	0.1	0	0.0	0	0.0	0	0.0	1	0.0
Total	1412	100.0	290	100.0	761	100.0	775	100.0	3238	100.0

Panel B: Distribution without Mixed-issuers

Issuer Type	Non-issuer	Debt-issuer	Convertible-issuer	Equity-issuer	Repurchaser	Total	
	Obs.	Obs.	Obs.	Obs.	Obs.	Obs.	Pct.(%)
Non-issuer	439534	0	0	0	0	439534	88.0
Debt-issuer	0	23681	0	0	0	23681	4.7
Convertible-issuer	0	0	1606	0	0	1606	0.3
Equity-issuer	0	0	0	16202	0	16202	3.2
Repurchaser	0	0	0	0	15049	15049	3.0
Mixed-issuer	0	1412	290	761	775	3238	0.6
Total	439534	25093	1896	16963	15824	499310	100.0

Appendix C: Summary Statistics of Firm Characteristics

Appendix C Panel A reports descriptive statistics for factors derived from firm characteristics and market information across all six issuer categories: Non-issuers, Debt-issuers, Convertible-issuers, Equity-issuers, Repurchasers, and Mixed-issuers. Panel B presents the differences in means between each issuer category and Non-issuers, with standard errors clustered by firm and date. ***,** and * denote significance at the 1%, 5%, and 10% level respectively.

Panel A: Summary Statistics

	(1) Non-issuer			(2) Debt-issuer			(3) Convertible-issuer			(4) Equity-issuer			(5) Repurchaser			(6) Mixed-issuer		
	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
Financial Leverage	0.32	0.12	0.33	0.51	0.24	0.54	0.40	0.30	0.36	0.33	0.26	0.28	0.31	0.26	0.28	0.50	0.26	0.52
Firm Size	6.02	1.90	5.86	8.80	1.91	8.99	6.41	2.05	6.32	5.64	1.76	5.34	6.89	1.85	6.78	8.56	2.10	8.67
Cash Holdings	0.17	0.11	0.14	0.07	0.09	0.04	0.17	0.21	0.08	0.23	0.24	0.16	0.15	0.18	0.08	0.09	0.12	0.06
Bankruptcy Risk	0.48	0.72	0.61	0.56	0.61	0.47	0.13	1.68	0.48	-0.03	1.91	0.52	0.75	0.91	0.77	0.45	0.84	0.44
Earnings Growth	0.03	0.04	0.03	0.03	0.30	0.02	0.05	0.41	0.03	0.04	0.31	0.04	0.04	0.32	0.03	0.03	0.35	0.03
Profitability	0.00	0.02	0.00	0.01	0.02	0.01	-0.01	0.06	0.00	-0.01	0.06	0.00	0.01	0.02	0.01	0.01	0.02	0.01
Institutional Ownership	0.42	0.19	0.40	0.53	0.22	0.53	0.41	0.23	0.39	0.41	0.21	0.38	0.50	0.25	0.48	0.53	0.23	0.51
Market Share	0.06	0.05	0.05	0.14	0.19	0.06	0.07	0.15	0.01	0.04	0.09	0.02	0.08	0.15	0.01	0.13	0.19	0.05
R&D Expenditure	0.13	0.22	0.04	0.01	0.12	0.00	0.20	0.81	0.00	0.35	1.04	0.03	0.04	0.23	0.00	0.04	0.34	0.00
Depreciation	0.07	0.02	0.06	0.07	0.07	0.05	0.10	0.15	0.06	0.09	0.13	0.06	0.05	0.06	0.04	0.07	0.09	0.05
Tax Burden	0.03	0.02	0.03	0.04	0.04	0.03	0.02	0.05	0.02	0.02	0.04	0.02	0.04	0.05	0.03	0.03	0.04	0.03
Tangible Assets	0.24	0.06	0.23	0.31	0.26	0.24	0.29	0.24	0.22	0.24	0.20	0.21	0.20	0.21	0.14	0.27	0.25	0.22
Recent IPO Status	0.15	0.11	0.12	0.12	0.08	0.10	0.15	0.08	0.14	0.17	0.10	0.15	0.15	0.09	0.13	0.12	0.08	0.10
Growth Opportunity	2.71	2.15	2.03	2.32	3.50	1.86	2.70	4.55	1.98	3.30	4.32	2.54	2.64	3.28	1.95	2.43	4.02	1.97
Abnormal Returns	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00
Stock Returns Volatility	0.13	0.04	0.12	0.09	0.05	0.08	0.14	0.08	0.13	0.15	0.07	0.13	0.10	0.06	0.09	0.10	0.06	0.09
Amihud Illiquidity	0.11	0.19	0.03	0.01	0.10	0.00	0.05	0.20	0.00	0.06	0.16	0.02	0.03	0.14	0.00	0.02	0.16	0.00
Consumer Sentiment	88.83	10.75	91.32	88.93	11.05	91.30	88.62	10.30	91.50	88.20	10.74	91.00	89.48	11.52	91.20	88.03	10.95	90.89

Panel B: Comparison by Actual Financing Decision

	(1)	(2)		(3)		(4)		(5)		(6)	
	Non-issuer	Debt-issuer		Convertible-issuer		Equity-issuer		Repurchaser		Mixed-issuer	
	Mean	Mean	Diff.	Mean	Diff.	Mean	Diff.	Mean	Diff.	Mean	Diff.
Financial Leverage	0.32	0.51	0.19***	0.40	0.07***	0.33	0.01***	0.31	-0.01***	0.50	0.18***
Firm Size	6.02	8.80	2.78***	6.41	0.39***	5.64	-0.39***	6.89	0.87***	8.56	2.54***
Cash Holdings	0.17	0.07	-0.10***	0.17	-0.01	0.23	0.06***	0.15	-0.02***	0.09	-0.09***
Brankruptcy Risk	0.48	0.56	0.08***	0.13	-0.34***	-0.03	-0.51***	0.75	0.27***	0.45	-0.02
Earnings Growth	0.03	0.03	-0.01***	0.05	0.01	0.04	0.01***	0.04	0.00	0.03	0.00
Profitability	0.00	0.01	0.01***	-0.01	-0.01***	-0.01	-0.01***	0.01	0.01***	0.01	0.01***
Institutional Ownership	0.42	0.53	0.12***	0.41	-0.00	0.41	-0.01***	0.50	0.08***	0.53	0.11***
Market Share	0.06	0.14	0.08***	0.07	0.01***	0.04	-0.02***	0.08	0.01***	0.13	0.07***
R&D Expenditure	0.13	0.01	-0.12***	0.20	0.07***	0.35	0.22***	0.04	-0.09***	0.04	-0.09***
Depreciation	0.07	0.07	-0.00***	0.10	0.03***	0.09	0.02***	0.05	-0.02***	0.07	0.00
Tax Burden	0.03	0.04	0.01***	0.02	-0.01***	0.02	-0.00***	0.04	0.01***	0.03	0.01***
Tangible Assets	0.24	0.31	0.07***	0.29	0.05***	0.24	0.00	0.20	-0.04***	0.27	0.03***
Recent IPO Status	0.15	0.12	-0.04***	0.15	-0.00	0.17	0.01***	0.15	-0.01***	0.12	-0.03***
Growth Opportunity	2.71	2.32	-0.39***	2.70	-0.01	3.30	0.59***	2.64	-0.06**	2.43	-0.27***
Abnormal Returns	0.01	0.00	-0.00***	0.01	0.00*	0.01	0.00***	0.01	0.00***	0.00	-0.00***
Stock Returns Volatility	0.13	0.09	-0.04***	0.14	0.02***	0.15	0.02***	0.10	-0.03***	0.10	-0.03***
Amihud Illiquidity	0.11	0.01	-0.09***	0.05	-0.05***	0.06	-0.05***	0.03	-0.08***	0.02	-0.09***
Consumer Sentiment	88.83	88.93	0.09	88.62	-0.21	88.20	-0.63***	89.48	0.65***	88.03	-0.80***

Appendix D: Hyperparameter Tuning

Appendix D presents the setup and tuning process for the random forest model as discussed in Shannon (2001). Panel A details the range of values used for hyperparameter tuning, along with default settings. Panel B reports the results of an exhaustive grid search using 5-fold cross-validation to optimize four hyperparameters simultaneously: Tree Depth, Number of Predictors, Criterion, and Number of Trees. *Tree Depth* controls the number of levels in each decision tree, with deeper trees offering better in-sample fit but increasing the risk of overfitting. Number of Predictors and Number of Trees are central to the random forest algorithm, introducing randomness to enhance model diversity and reduce overfitting. The *Number of Predictors* determines how many features are randomly selected at each split, and we evaluate all three standard settings for completeness. The *Number of Trees* affects ensemble size, with diminishing returns as the number increases; we test five values ranging from 100 to 1000 to balance performance and computational cost. The *Criterion* parameter specifies the objective function used to evaluate splits—either Gini Impurity or Entropy Information Gain—both of which measure split quality, with Entropy focusing on information gain and Gini assessing node purity. In total, the grid search explores 180 combinations ($6 \times 3 \times 2 \times 5$) of hyperparameter values.

Panel A: Hyperparameter Tuning Set-up

Hyperparameters	**Range of Values**	**Package Default**
Max Tree Depth	3, 5, 10, 25, 50, Max	Max
Number of Predictors	$\sqrt{Max}$, $\log_2(Max)$, Max	$\sqrt{Max}$
Criterion	Gini , Entropy	Gini
Number of Trees	100, 200, 300, 500, 1000	100

Panel B: Hyperparameter Tuning Results

Hyperparameters	**RF-base**	**RF-full**
Max Tree Depth	10	5
Number of Predictors	$\sqrt{Max}$	$\sqrt{Max}$
Criterion	Gini	Gini
Number of Trees	300	300

Appendix E: Performance Comparison

Appendix E compares the performance of random forest and logistic regression models in predicting financing decisions. The random forest model includes three specifications (naive, base, and full), while the logistic model includes base and full specifications.

Panel A reports three performance measures across models and specifications. We focus on the non-, debt-, and equity-issuer categories, which are most distinct. All models perform well in identifying non-issuers, largely due to their prevalence in the sample. However, RF-Naive, using 80 accounting variables without refinement, shows weak predictive power, especially for equity issuance. We find that adding market information-based factors improves performance: both RF-Full and LG-Full outperform their base specifications in F1 scores, though RF-Full slightly underperforms RF-Base for equity type. Moreover, random forest models generally achieve higher recall, while logistic models excel in precision. We prioritize balanced performance, and F1 scores suggest RF-Full dominates across categories. Overall, random forest models outperform logistic models—except when applied naively—and full specifications consistently yield better results. These findings hold under both equal and distribution-weighted metrics; for example, RF-Full achieves 92% precision and 94% recall when weighted by sample distribution.

Panels B and C examine the confusion matrix of the RF-Full model. In terms of precision, 97.5% of predicted non-issuers were correctly classified, reflecting strong performance for this dominant category. Debt and equity issuances are more challenging to predict, though the model's top predictions generally align with actual outcomes. Notably, many misclassifications involve firms conducting share repurchases—13% of predicted equity issuers and 17% of predicted debt issuers were actually repurchasing shares. Panel C focuses on recall: the model identifies 81% of actual debt issuers but only 18% of equity issuers, with 46% of the latter misclassified as non-issuers. This difficulty in forecasting equity issuance is consistent with prior literature, which attributes such surprises to factors like market timing (Baker and Wurgler, 2002), investor alignment (Dittmar and Thakor, 2007), project horizon matching (Huang and Ritter, 2021), or managerial misjudgment (DeAngelo, 2022).

Panel A: Comparison of Precision and Recall

Issue Type	Measure	(1) RF-naive	(2) RF-base	(3) RF-full	(4) LG-base	(5) LG-Full
None	Precision	0.892	0.980	0.975	0.912	0.916
	Recall	0.981	0.966	0.994	0.999	0.999
	F_1 score	0.934	0.973	0.984	0.954	0.956
Debt	Precision	0.525	0.491	0.591	0.684	0.693
	Recall	0.258	0.810	0.807	0.390	0.402
	F_1 score	0.346	0.611	0.682	0.497	0.509
Equity	Precision	0.174	0.395	0.620	0.727	0.620
	Recall	0.033	0.248	0.184	0.065	0.090
	F_1 score	0.055	0.305	0.284	0.119	0.157
All Types (Equal-weighted)	Precision	0.294	0.440	0.461	0.528	0.513
	Recall	0.217	0.435	0.421	0.267	0.279
	F_1 score	0.250	0.437	0.440	0.355	0.361
All Types (Distribution-weighted)	Precision	0.818	0.916	0.923	0.878	0.879
	Recall	0.875	0.914	0.935	0.903	0.906
	F_1 score	0.846	0.915	0.929	0.890	0.892

Panel B: Confusion Matrix in RF-Full model: Precision

	Actual Issue Type							
	Issued Nothing		Issued Debt		Issued Equity		Repurchased	
Market Expectations	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)
Non-issuer	399251	97.5	1647	5.6	553	12.6	281	2.0
Debt-issuer	1343	0.3	17440	59.1	275	6.3	2543	18.4
Convertible-issuer	255	0.1	494	1.7	242	5.5	239	1.7
Equity-issuer	6893	1.7	2849	9.6	2727	62.0	2389	17.3
Repurchaser	1444	0.4	4902	16.6	502	11.4	8019	58.1
Mixed-issuer	351	0.1	2200	7.4	99	2.3	331	2.4
Total	409537	100.0	29532	100.0	4398	100.0	13802	100.0

Panel C: Confusion Matrix in RF-Full model: Recall

	Actual Issue Type									
	Issued Nothing		Issued Debt		Issued Equity		Repurchased		Total	
Market Expectations	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)	Obs.	Pct.(%)
Non-issuer	399251	99.4	1647	0.4	553	0.1	281	0.1	401732	100.0
Debt-issuer	1343	6.2	17440	80.7	275	1.3	2543	11.8	21601	100.0
Convertible-issuer	255	20.7	494	40.2	242	19.7	239	19.4	1230	100.0
Equity-issuer	6893	46.4	2849	19.2	2727	18.4	2389	16.1	14858	100.0
Repurchaser	1444	9.7	4902	33.0	502	3.4	8019	53.9	14867	100.0
Mixed-issuer	351	11.8	2200	73.8	99	3.3	331	11.1	2981	100.0