Self-selection and stock returns around corporate security offering announcements

Marie Dutordoir and Laurie Simon Hodrick*

January 25, 2012

Abstract:

Stock returns around security offering announcements are conditional on firms' self-selection into a particular security type. We use a switching regression methodology on a data set of U.S. straight debt, convertible debt, and seasoned equity offerings to estimate counterfactual announcement returns that would be obtained had the same firms instead opted for alternative financing. Our evidence is consistent with firms choosing the financing type with the least negative expected announcement effect. Our results justify some observed pecking order behavior patterns better than do actual announcement effects, yet also suggest that for some firms equity-like financing may be preferred to debt-like financing.

Keywords: Corporate Security Offering Announcement Effects; Pecking Order; Security Choice; Self-Selection

JEL Descriptors: G14, G32

* The authors are from Manchester Business School, Manchester University (Marie Dutordoir) and from Columbia Business School, Columbia University (Laurie Hodrick). We thank Michael Brennan, Charles Calomiris, Ming Dong, Bob Hodrick, Peter Roosenboom, Matthew Spiegel, Norman Strong, Mathijs van Dijk, Patrick Verwijmeren, Neng Wang, and participants at seminars at Columbia Business School and Manchester Business School for their useful comments.
Address for correspondence: Laurie Hodrick, Columbia Business School, 3022 Broadway, 809 Uris Hall, New York, NY, 10027-6902. phone: 212-854-8755, fax: 212-662-8474, e-mail: lsh19@columbia.edu.

1. Introduction

According to the adverse selection theory of Myers and Majluf (1984), the issuance of equity or equity-linked securities provides a signal of equity overvaluation, thus resulting in negative announcement returns. To avoid or mitigate these negative stock returns, firms are predicted to adopt a pecking order of financing (Myers, 1984), in which they prefer internally-generated cash flows to external financing, and debt-like to equity-like security offerings.

Consistent with Myers and Majluf's adverse selection theory, a substantial literature documents that average security offering announcement effects are decreasing with the magnitude of the offering's equity component.[1] However, documented stock returns seem too small to have substantial impact on firms' security choices. Straight debt offerings induce insignificant announcement returns on average, convertible debt offerings induce negative announcement returns of about −1.5% on average, and seasoned equity offerings induce negative announcement returns of about −2% on average.

An important caveat to these observed announcement effects is that they are conditional on firms self-selecting into a particular security type. Eckbo, Maksimovic, and Williams (1990) argue that if a corporate event is voluntary and investors are rational, cross-sectional regressions that seek to explain the event's stock price effect should explicitly account for the self-selection of firms. To our knowledge, our study is the first to incorporate the endogenous nature of security choices into an analysis of their announcement effects. We analyze security choices and associated announcement effects in an integrated framework using a two-step switching regression model with endogenous switching as described in Li and Prabhala (2007). The first step involves estimating a security choice model conditioned on a firm's

[1] See Eckbo, Masulis, and Norli (2007) for an overview of empirical studies testing stock returns around security offering announcements.

decision to raise external financing through straight debt, convertible debt, or seasoned equity. The second step involves analyzing the associated announcement returns while controlling for the endogeneity of the security choice by including generalized residuals from the first-step analysis. Our data set contains 1,004 straight debt, 638 convertible debt, and 343 seasoned equity offerings made by U.S. corporations between January 1999 and December 2008.[2] Our event study results confirm the average announcement effects of straight debt, convertible debt, and equity offerings found by earlier studies.

When comparing actual and counterfactual announcement returns, our findings are consistent with firms choosing the external financing type with the least negative expected announcement return. Straight debt and convertible debt issuers would have encountered significantly more negative announcement returns had they instead chosen equity; returns even more negative than those observed for actual equity issuers. This finding can be explained as follows. Straight debt and convertible debt issuers tend to have characteristics that are negatively related to equity offering announcement returns, including higher long term leverage, larger firm size, and a smaller pre-announcement stock runup than equity issuers. Straight debt and convertible debt issuers would therefore fare significantly worse than actual equity issuers, in terms of announcement returns, when instead announcing equity.

Equity and convertible debt issuers, in turn, would have encountered significantly more negative announcement returns had they instead chosen straight debt. This finding can be explained as follows. Equity and convertible debt issuers tend to have characteristics that negatively affect straight debt offering announcement returns, including higher stock return volatility, a higher portion of intangible assets, and higher prevailing Treasury Bill yields than straight debt issuers. Equity and convertible debt issuers would therefore fare

[2] For brevity, we refer to seasoned equity offerings as equity offerings or SEOs in the remainder of the paper.

significantly worse than actual straight debt issuers, in terms of announcement returns, when instead announcing straight debt.

Our counterfactual results justify some observed pecking order behavior patterns better than do actual observed announcement effects. Consistent with Myers and Majluf's (1984) adverse selection theory, our findings indicate that equity issues by firms that look like they can access debt, such as firms with positive long term debt values in their balance sheets and large total assets, are sending a strong surprise signal of overvaluation. The counterfactual announcement returns for straight debt and convertible debt issuers instead announcing equity are, respectively, more than six times and more than twice as negative as those observed for actual equity issues. Such strongly negative returns are better able to explain why firms adopt pecking order behavior by choosing debt-like securities over equity than are actual equity announcement effects.

While we do not directly study the choice between internal and external financing, our findings are also consistent with the pecking order prediction that firms hoard cash in order to avoid external financing costs. Our evidence suggests that for some firm types even straight debt issues would be associated with significantly negative announcement effects, implying that firms may have strong incentives to abstain from external financing altogether.[3]

However, some of our findings are difficult to reconcile with the pecking order theory. In particular, inconsistent with the prediction that equity is only issued as a last resort when debt capacity is completely exhausted, we find that SEOs might actually be the preferred external financing form for firms with characteristics including high stock return volatility and a high portion of intangible assets, due to the negative relation of these characteristics with straight debt announcement returns. Our results suggest that such firms may prefer equity over debt

[3] Nonfinancial U.S. companies held a record $1.92 trillion of cash and short-term investments as of the end of Q3 2011 (Reuters, 8/18/2011).

even when they have not yet exhausted their debt capacity, since equity offerings are likely to result in a more favorable market reception.

Consistent with Graham and Harvey (2001), Leary and Roberts (2010), and others, we conclude that the pecking order theory is insufficient to fully explain security choices and their announcement returns.[4]

The organization of the paper is as follows. Section 2 briefly reviews the related literature. Section 3 describes the data. Section 4 develops the research methodology. Section 5 provides the empirical results. Section 6 concludes.

2. Related literature

The existing empirical literature on security choice broadly consists of two strands. A first, large body of research examines stock returns around security offering announcements. A common finding of these papers is that equity announcements induce negative abnormal stock returns, whereas straight debt announcements have an insignificant stock price effect (Asquith and Mullins, 1986; Eckbo, 1986; Masulis and Korwar, 1986; Mikkelson and Partch, 1986; Chaplinsky and Hansen, 1993). Stock price reactions to convertible debt announcements are significantly negative and intermediate in size between the stock price effects of equity and straight debt announcements (Dann and Mikkelson, 1984). Within the convertible debt security class, relatively more equity-like convertibles are associated with more negative announcement returns (Davidson, Glascock, and Schwarz, 1995). On the whole, these findings are consistent with the adverse selection theory of Myers and Majluf (1984), which predicts that security offerings with a larger equity component are more likely to be interpreted by the market as a signal of firm overvaluation.

[4] Even Myers (1984) (p. 10) acknowledges: 'of course the pecking order hypothesis can be quickly rejected if we require it to explain everything.'

A second body of research examines the determinants of firms' choices between different security types (Marsh, 1982; MacKie-Mason, 1990; Bayless and Chaplinsky, 1991; Jung, Kim, and Stulz, 1996; Lewis, Rogalski, and Seward, 1999). These security choice studies commonly find that firms' financing choices are somewhat predictable using proxies for firms' costs of accessing debt and equity financing. While most of the existing security choice studies include a separate analysis of stock price effects, none of these papers explicitly accounts for the non-random nature of the security choice decision in their announcement returns analysis.[5] In their survey on corporate security offerings, Eckbo, Masulis, and Norli (2007) conclude that: 'As a general matter, the field would benefit from further analysis of the endogeneity of the choice of security offered (…)'. Our paper responds to this call by controlling for the self-selection of external financing types in an analysis of security offering announcement returns.

Our integrated approach allows us to calculate counterfactual announcement returns that would be obtained had the same firm instead announced a different security type, and to consider whether firms issue the security type with the least negative predicted announcement return.

In addition to enhancing our understanding of security issuance behavior, our integrated approach enables us to obtain unbiased estimates of the impact of firm-specific and macroeconomic determinants of security offering announcement effects. Evidence on these determinants is limited and inconclusive (Eckbo, Masulis, and Norli, 2007). One challenge

[5] Bayless and Chaplinsky (1991) include the predicted probability of raising straight debt obtained from a security choice model in their analysis of straight debt and equity offering announcement effects. While enabling a more direct link between security choices and announcement returns than in other security choice studies (none of which includes this predicted probability in their announcement return analysis), their approach still does not control for unobservable determinants of the security choice, and therefore does not allow for the calculation of counterfactual announcement effects.

with the existing results is that the variables predicted to determine the security choice are the same as those predicted to determine cross-sectional differences in announcement returns. As such, the observed impact of these variables on stock returns around security offering announcements may be clouded by their effect on the anticipation of the offering (Guo and Mech, 2000). Our switching regression enables us to control for offering anticipation, thereby obtaining unbiased estimates of the impact of financing costs proxies on security offering announcement effects.

Billet, Flannery, and Garfinkel (2011) document that firms issuing multiple security types over a short window have more negative long term stock price performance following security offerings. Similar to our study, their findings highlight the potential bias associated with studies focusing on single security types. Our study complements their work by focusing on the magnitude and determinants of security offering announcement effects rather than on long term stock price performance.

3. Data

We retrieve straight debt, convertible debt, and equity offerings made by U.S. public firms between January 1999 and December 2008 from the Securities Data Company (SDC)'s Global New Issues Database. Our search algorithm excludes the following offerings:

- Mortgage- or asset-backed bonds;
- Equity offerings including a portion of shares offered by existing shareholders;
- Securities issued by utilities (SIC codes 4900-4999) and financial firms (SIC codes 6000-6999), as these firms tend to be heavily regulated;
- Privately-placed non-Rule 144a offerings;

  Our motivation for excluding these offerings is that the literature has uncovered fundamental differences in the underlying motivations for, and announcement effects

of, private and public security issues (Fields and Mais, 1991; Gomes and Phillips, 2007). For that same reason, our security choice model does not include bank loans. However, we include Rule 144A offerings in the sample, as these issues are more similar to public than to private offerings in terms of information and liquidity (Gomes and Phillips, 2007).[6]

- SEC Rule 415 shelf offerings.

  The exclusion of shelf offerings from our data set is a nontrivial decision. A large fraction of straight debt (38.67%) and equity (67.67%) issues are offered under Rule 415, with the portion of shelf offerings among convertible debt issues being smaller (14.56%). Consistent with prior studies of security offering announcement effects (e.g., Bayless and Chaplinsky, 1991; Autore, Bray, and Peterson, 2008), our exclusion of these offerings is motivated by the fact that more than two-thirds (67.07%) of the shelf issues are universal shelf offerings. This means that the company registers several security types at the same time, making it difficult to disentangle the announcement effects of the individual securities included in the registration. Moreover, even for single-security shelf offerings it is hard to capture the true announcement effect, as there are typically two separate announcements related to the offering (the announcement of the shelf registration and the announcement of the actual security offering).

Applying this search algorithm to the SDC database yields a data set of 1,847 straight debt, 969 convertible debt, and 1,370 equity offerings.

[6] Consistent with Huang and Ramirez (2010), we find no significant differences in the announcement effects associated with Rule 144A and public security offerings. Therefore, we do not further distinguish between these two placement types in the remainder of this paper. Results of robustness checks without tables discussed throughout the paper are available upon request.

We manually check this data set for security types that are formally classified as straight debt, convertible debt, or seasoned equity by SDC but that do not belong in our security choice model (such as pass-through securities, unit offerings, rights offerings, convertible preferred stock, and exchangeable bonds), and we remove these offerings from the list. We aggregate multiple tranches of the same (straight or convertible) bond offering issued by the same firm on the same day into one offering.[7] For the remaining security offerings, we require that company accounting variables are available from the Compustat Fundamentals Annual database, stock-price related data are available from the Center for Research in Security Prices (CRSP), and deal-specific information is available from SDC. We thus obtain a data set of 1,142 straight debt offerings, 659 convertible debt offerings, and 371 equity offerings.

Table 1 presents the number of security offerings per sample year and the corresponding percentage of offerings across time within each security type. Consistent with other studies (including Erel et al., 2011), we find that security offerings fluctuate substantially over time. For example, convertible and equity issuances drop substantially during the global financial crisis in 2008, while straight debt offerings are somewhat less affected. This observation is consistent with the theoretical model of Bernanke and Gertler (1989), which predicts that firms issue less information-sensitive securities during market downturns.

[Please insert Table 1 here]

[7] We define the coupon, maturity, and conversion premium of a composite bond as the weighted average of the coupons, maturities, and conversion premiums of its composing tranches, using the proceeds of each tranche relative to the total offering proceeds as weights.

4. Research methodology

In this section, we first replicate prior event study results for the stock returns around security offering announcements. We then develop a switching regression model to analyze the determinants of the security choice and of security offering announcement effects in an integrated framework. We use the parameter estimates obtained from this switching regression model to calculate counterfactual announcement returns had the same firm instead announced a different security type. We also discuss the proxy variables used to measure external financing costs.

4.1. Event study of security offering announcement returns

We measure abnormal stock returns by applying standard event study methodology as outlined in Brown and Warner (1985). We use the CRSP equally-weighted market index return to proxy for the market return and estimate the market model over the window (–300, –46) relative to the announcement date. For publicly-placed security offerings, we identify the announcement date as the earliest of the filing date mentioned in SDC and the hand-collected date at which the offering is first mentioned in the Factiva database.[8] For Rule 144A offerings, which do not have a filing date, we define the announcement date as the earliest of the issuance date mentioned in SDC and the date at which the offering is first mentioned in Factiva.

The extent of overlap between announcement dates in the SDC and Factiva databases differs across the three security types. For straight debt offerings, the SDC and Factiva announcement dates coincide for 27.69% of the observations. The SDC announcement date

[8] Factiva provides access to thousands of archived newspaper and magazine articles as well as to press releases appearing on newswires. Unlike SDC, it provides not only the date but also the exact time at which the announcement was released. We assign announcements made after stock market closure to the next trading day.

falls earlier (later) than the announcement date retrieved from Factiva for 46.38% (25.93%) of the straight debt issues, though the difference between the SDC-identified and Factiva-identified dates is typically only one trading day. For the majority of convertible debt offerings (63.80%) the announcement dates retrieved from SDC and Factiva are identical. For equity offerings, the SDC date falls earlier (later) than the date first mentioned on Factiva for 60.16% (34.52%) of the sample observations. Thus, it is not obvious which of the two sources, SDC or Factiva, is best at identifying the first mention of a security offering, leading us to incorporate both data sources to identify accurate announcement dates. The announcement date could not be retrieved from Factiva for 138 straight debt, 21 convertible debt, and 28 equity offerings, so we omit these offerings from further analyses. Our final data set thus consists of 1,004 straight debt, 638 convertible debt, and 343 equity offerings.

Our Factiva search also reveals that many announcements of security offerings (19.38% of straight debt, 38.97% of convertible debt, and 13.10% of equity offerings) are 'contaminated' by announcements of other important company-specific news. Most of the contaminated announcements of straight debt and equity offerings are combined with quarterly earnings disclosures, while 53.02% of the confounding announcements accompanying convertible debt offerings relate to stock repurchases. As shown by de Jong, Dutordoir, and Verwijmeren (2011), combinations of convertible debt issues and stock repurchases tend to be motivated by the convertible bond issuer's wish to reduce the potential adverse impact of arbitrage-related short-selling on their stock returns. We keep the contaminated observations in the data set and assess their impact on announcement returns directly in Section 5.

Table 2 reports announcement returns (AR) measured over several windows around the security offering announcement date (labeled event day 0).

[Please insert Table 2 here]

The Patell (1976) *Z*-test indicates that straight debt announcements result in a significantly positive AR of 0.11% on the announcement date, though the nonparametric Rank test finds this AR to be insignificantly different from zero. For convertible debt issues, we find significantly negative average ARs of −0.79% and −3.02% on day −1 and day 0, respectively. For equity issues, we obtain a significantly negative AR of −1.76% on the announcement date. The *t*-statistic for the day 0 difference between convertible and equity announcement returns is −5.90. The *t*-statistic for the day 0 difference between convertible and straight debt announcement returns is −12.40.

As documented by de Jong, Dutordoir, and Verwijmeren (2011), the highly negative announcement-period stock return for firms issuing convertibles is likely driven by extensive arbitrage-related short selling. Convertibles tend to be underpriced at issuance. Convertible arbitrageurs exploit this offering discount by buying convertibles and short-selling a portion of the underlying stock to make their position invariant to small stock price changes. This short-selling activity results in a temporary increase in the supply of the issuers' shares, which in turn causes a drop in the issuers' stock price. To illustrate the importance of convertible arbitrage-related short selling, Figure 1 compares average increases in monthly short interest around the issuance dates of the three security types. The change in short interest is calculated using monthly short interest data obtained from the Securities Monthly file of the CRSP-Compustat merged database, which are available from March 2003 until June 2008.

To match short interest data to security offerings, we apply the algorithm discussed in Bechmann (2004) and Choi, Getmansky, and Tookes (2009).[9] We scale the change in short interest by the number of shares outstanding, obtained from CRSP and measured at trading day −20 relative to the offering announcement date.

[Please insert Figure 1 here]

Consistent with there being substantial short-selling activity by convertible arbitrageurs, we find an average increase in short interest of 1.87% for convertibles, compared to only 0.11% for straight debt and 0.28% for equity. If demand curves for stock are only inelastic in the short run, then the stock price drop caused by arbitrage-related short-selling should be temporary. Consistent with this prediction, Table 2 shows a significant positive stock price reversal for convertible bond issues over the window (2, 10) after their announcement date, while we observe no such reversal for straight debt and equity issues.[10] We take the value of this reversal as a measure of the component of the announcement-period stock return that is unrelated to the information content of the offering itself, and therefore define the convertible bond announcement effect as the sum of the AR measured over the window (−1,0) and the cumulative AR measured over the window (2,10). We acknowledge that this operation relies on the implicit assumption that the stock price drop caused by the actions of arbitrageurs is completely reversed post-issuance, and that this assumption is subject to debate. Some studies

[9] If an offering is made before (after) the cutoff trade date for reporting short interest in a given month, we match the issue date with the short interest data filed for that month (the following month). As short interest is reported bi-monthly since September 2007, we adjust the algorithm to a two-monthly frequency from that month onwards.

[10] We also analyze cumulative abnormal stock returns over the window (2, 20) following convertible bond announcement dates and find no significant stock price movements from day 11 onwards.

report only a partial reversal (Bechmann, 2004; de Jong, Dutordoir, and Verwijmeren, 2011), while others find permanent price pressure effects (Dhillon and Johnson, 1991; Mazzeo and Moore, 1992) consistent with long term downward-sloping demand curves (Shleifer, 1986; Bagwell, 1992).

For straight debt and equity offerings, we only observe a significant abnormal stock return on the announcement date itself, so we use the AR measured on that day as a measure of the announcement effect associated with these offerings.

4.2. Switching regression model

The switching regression model consists of a self-selection equation reflecting the matching between firms and security offering types, and three outcome equations examining the announcement return determinants for each of the three security types.[11] The self-selection equation takes the following form (with *i* subscripts for individual observations suppressed):

$$Y^* = Z'\gamma + \varepsilon \qquad (1)$$

In Equation (1), Y^* is a latent variable, Z contains a set of potential security choice determinants, γ is a vector of coefficients to be estimated, and ε is a residual assumed to be normally distributed. More precisely, if

$Y^* \leq \mu_1$ the firm chooses straight debt,

[11] The switching regression model has been used in other finance studies. Dunbar (1995) uses the model to examine the relative costs of different underwriter compensations in IPOs, and Fang (2005) uses the model to analyze the impact of investment bank reputation on the yields and fees of public debt offerings.

$\mu_1 < Y^* \leq \mu_2$ the firm chooses convertible debt,

$\mu_2 < Y^*$ the firm chooses equity,

where the μs represent unknown threshold parameters. We map the unobservable variable Y^* into an ordinal variable Y, which takes the value zero if the firm chooses straight debt, one if the firm chooses convertible debt, and two if the firm chooses equity.

Our security choice model is conditioned on firms having decided to raise external financing. As outlined in MacKie-Mason (1990), such a restricted model will lead to consistent, unbiased estimates as long as there is stronger substitutability between the choice to raise straight debt, convertible debt, or equity than between either of these options and other choices that we assume to have been ruled out previously by the firm, such as financing through internal funds. Other security choice models in the literature (Marsh, 1982; Bayless and Chaplinsky, 1991; Jung, Kim, and Stulz, 1996; Lewis, Rogalski, and Seward, 1999) rely on a similar assumption.

The announcement return equations take the following form (*i* subscripts suppressed):

$$AR_0 = X_0\beta_0 + u_0 \quad (2a)$$

$$AR_1 = X_1\beta_1 + u_1 \quad (2b)$$

$$AR_2 = X_2\beta_2 + u_2 \quad (2c)$$

where AR_j represents the announcement return for the chosen security offering, X_j is a matrix of determining variables, β_j represents the coefficients to be estimated, and u_j is the error term. The subscripts j = 0, 1, and 2 stand for straight debt, convertible debt, and equity, respectively.

The endogeneity of the security choice is modelled by allowing the residuals u_j of the abnormal returns in Equations (2a) through (2c) to correlate with the residual ε of the selection Equation (1). As a consequence of this correlation between error terms, the conditional expectations of the residuals u_j are non-zero. Consistent Ordinary Least Squares (OLS) estimators can be obtained by estimating a straightforward extension of the classic binary two-step Heckman (1979) regression procedure (Idson and Feaster, 1990). A first step involves estimating Equation (1) using an ordered probit regression, thus obtaining consistent estimates for the parameter vector γ. In a second step, Equations (2) through (4) are augmented with the generalized residuals obtained from the probit regression. The generalized residuals are defined as follows:

$$\lambda_m = \frac{f(\hat{\mu}_m - Z'\hat{\gamma}) - f(\hat{\mu}_{m+1} - Z'\hat{\gamma})}{F(\hat{\mu}_{m+1} - Z'\hat{\gamma}) - F(\hat{\mu}_m - Z'\hat{\gamma})} \qquad (3)$$

With $\mu_0 = -\infty$ and $\mu_3 = +\infty$ this formula translates into the following generalized residuals for each of the three announcement return equations:

$$\lambda_0 = \frac{-f(\hat{\mu}_1 - Z'\hat{\gamma})}{F(\hat{\mu}_1 - Z'\hat{\gamma})} \qquad \text{for straight debt,} \qquad (3a)$$

$$\lambda_1 = \frac{f(\hat{\mu}_1 - Z'\hat{\gamma}) - f(\hat{\mu}_2 - Z'\hat{\gamma})}{F(\hat{\mu}_2 - Z'\hat{\gamma}) - F(\hat{\mu}_1 - Z'\hat{\gamma})} \qquad \text{for convertible debt,} \qquad (3b)$$

$$\lambda_2 = \frac{f(\hat{\mu}_2)}{1 - F(\hat{\mu}_2 - Z'\hat{\gamma})} \qquad \text{for equity,} \qquad (3c)$$

where f and F are the standard normal density and cumulative distribution function, respectively. The $\hat{\mu}$ and $\hat{\gamma}$ parameters are obtained from estimating Equation (1) using

maximum likelihood estimation. Generalized residuals, which are usually called inverse Mills ratios in the context of a two-level probit analysis, represent estimates of the means of the residuals u_j conditional on the observed outcome Y. In the context of our research, they can be interpreted as representing managers' private information influencing a particular security choice (Li and Prabhala, 2007). Their inclusion allows the abnormal return equations to be consistently estimated with OLS. We adjust the standard errors obtained for the abnormal return regressions for both heteroscedasticity and the use of predicted selectivity variables using the correction suggested by Greene (2008).

4.3. Counterfactual analysis

We are interested in the following 'what if' question: for a security issuer with particular characteristics, what would have been the announcement effect if the firm had, instead, chosen another security type? To infer the abnormal stock return a straight debt issuer i would have obtained if it had instead issued another security type, we compute the following counterfactuals:

$$E(AR_{1i}|Y_i = 0) \quad (4a)$$

$$E(AR_{2i}|Y_i = 0) \quad (4b)$$

Equation (4a) characterizes the announcement return that the straight debt issuer would have realized if that same firm had instead announced a convertible offering, while Equation (4b) characterizes the announcement return that the straight debt issuer would have realized if that same firm had instead announced an equity offering. As shown by Fang (2005), the counterfactual returns in Equations (4a) and (4b) can be calculated by evaluating the issuer attributes using the parameter estimates obtained for the relevant outcome equation.

Counterfactual outcomes for convertible debt and equity issuers are computed in an analogous manner.

4.4. Measuring external financing costs

As components of the vectors *Z* and *X* in Equation (1) and Equations (2a) through (2c), we use a set of security choice and announcement return determinants suggested by trade-off, pecking order, and market timing capital structure theories that have been widely used in existing empirical studies. The Appendix includes a detailed description of all explanatory variables.

The explanatory variables can broadly be subdivided into three groups. One group of variables, which we label 'debt-related financing costs', captures those costs and benefits associated with debt financing proposed by trade-off theories of capital structure.[12] Debt is assumed to be more costly for firms with higher financial distress costs, agency costs resulting from asset substitution (Jensen and Meckling, 1976), and debt overhang costs (Myers, 1977), and less costly for firms with a large tax shield resulting from the tax deductibility of interest payments (Modigliani and Miller, 1958). To capture these debt-related financing costs and benefits, we borrow heavily from existing empirical studies (Marsh, 1982; MacKie-Mason, 1990; Bayless and Chaplinsky, 1991; Jung, Kim, and Stulz, 1996; Lewis, Rogalski, and Seward, 1999, 2003). We use the ratio of long term debt to total assets (Leverage) to measure financial distress, asset substitution, and debt overhang costs, and we use stock return volatility (Volatility) to measure financial distress and asset substitution costs. The ratio of earnings before interest and taxes to total assets (EBIT), and the ratio of tangible assets (measured with plant, property and equipment) to total assets

[12] We label the benefits associated with debt financing as 'inverse costs' for ease of interpretation of proxy variables.

(PPE) act as inverse measures of financial distress costs. The ratio of taxes to total assets (Taxes) captures the potential interest tax shield associated with debt financing. In addition to these trade-off variables, we also control for market-wide movements in debt-related financing costs by including the U.S. Treasury Bill yield prevailing close to the date of issuance (TB Yield). Higher yields should be associated with higher economy-wide costs of raising debt financing.

A second group of variables, which we label 'equity-related adverse selection costs', captures the extent to which the firm may suffer from the adverse selection costs described by Myers and Majluf (1984). As a first measure, we use the ratio of cash and marketable securities to total assets (Slack). Firms with a larger amount of financial slack are more likely to be perceived as overvalued when raising equity or equity-like financing, since they could have used internal funds for investing (Myers and Majluf, 1984). Lucas and McDonald (1990) argue that the adverse selection problem will be less severe for firms perceived to have profitable investment projects, such as when firms experience a large stock run-up prior to the offering announcement and when the economy is in a growth stage. We therefore also include the pre-offering average daily stock return (Stock Run-up) and the 6-month leading indicator for the U.S. economy (Leading Indicator) as inverse proxies for equity-related financing costs. Krasker (1986) extends the Myers and Majluf (1984) analysis to allow the offering size to be variable and shows that firms with overpriced stock will have greater incentives to choose larger offers. We thus include the offering proceeds relative to the market value of equity (Relative Proceeds) as a proxy for the level of equity-related adverse selection costs associated with a security offering.

In addition, we include firm size, measured as LN(Total Assets), and the market to book ratio (MB). These two variables act as proxies for both debt-related and equity-related financing costs. Larger firms tend to have lower levels of asymmetric information relating to

their risk and value, resulting in smaller debt-related and equity-related financing costs (MacKie-Mason, 1990). MB may act as a proxy for a wide range of capital structure determinants. It may measure the availability of profitable growth opportunities and as such be associated with lower external financing costs. However, it may also measure the potential for underinvestment or serve as a signal of opportunistic timing to firm overvaluation, and as such be associated with higher financing costs.

All explanatory variables are measured prior to the announcement date with the exception of Relative Proceeds. As argued by Bayless and Chaplinsky (1991), the security offering size could be determined together with the security choice, which could lead to a simultaneity bias in the coefficients of the security choice model when including offering proceeds as an explanatory variable. We verify the potential for such bias by applying a procedure proposed by Lee and Masulis (2009). In a first step, we regress Relative Proceeds on the following potential offering size determinants: Leverage, Volatility, LN(Total Assets), MB, trading volume in the firm's shares (Trading Volume), growth in capital expenditure (Capital Expenditure Growth), and the amount of long term debt maturing over the next year divided by total assets (Debt Maturing in One Year). We also include year dummy variables and industry dummy variables based on Fama-French 12-industries obtained from Kenneth French' online library. The results of this unreported regression analysis indicate that Relative Proceeds are significantly negatively influenced by Leverage (*t*-statistic of −1.97) and significantly positively influenced by LN(Total Assets) and Trading Volume (*t*-statistics of 12.75 and 2.17, respectively). The adjusted R^2 of the regression is 28.41%. In a second step, we replace Relative Proceeds in the security choice and announcement return analyses by the predicted offering proceeds obtained from this regression and use a two-stage least squares estimation procedure. Our results are robust to this instrumental variable specification of Relative Proceeds, suggesting that the inclusion of offering proceeds does not bias our

findings due to its potential simultaneity with the security choice decision. We therefore include Relative Proceeds as such in the security choice and announcement return analyses.

Pairwise Pearson correlations between the explanatory variables are all below 0.40, except for EBIT and Slack, which have a correlation of 0.59, so we conclude that our findings are not likely to be affected by multicollinearity.

Table 3 provides descriptive statistics for the explanatory variables for straight debt, convertible debt, and equity issuers, as well as the results of pairwise *t*-tests comparing the means of the variables across the three subsamples. According to trade-off models of capital structure, debt-related financing costs should have a positive influence on issuers' propensity to choose more equity-like financing. Accordingly, we find that equity issuers have significantly higher Volatility than convertible debt issuers, which in turn have significantly higher Volatility than straight debt issuers. EBIT and Taxes, which act as inverse debt-related costs proxies, are significantly smaller for equity issuers than for convertible debt issuers, and EBIT, PPE, and Taxes are significantly smaller for convertible debt issuers than for straight debt issuers. However, inconsistent with trade-off predictions, equity issuers have significantly lower Leverage than convertible debt issuers, which in turn have significantly lower Leverage than straight debt issuers. One plausible explanation for this finding is that many equity-type security issuers do not have the possibility to take on long term debt, as they are small, unrated companies.[13] TB Yield is significantly higher for equity issuers than it is for the convertible and straight debt sub-samples, but significantly lower for convertible debt than for straight debt issuers.

Theory also predicts that firms' propensity to choose more equity-like securities is decreasing in their equity-related adverse selection costs. Consistent with this prediction,

[13] In line with this explanation, we find that 19.95% of the equity issuers have zero Leverage, compared with 12.25% of the convertible bond issuers and a mere 0.60% of the straight debt issuers.

Stock Run-up and Leading Indicator (both acting as inverse equity-related adverse selection costs proxies) are decreasing from equity to convertible debt to straight debt issuers. However, inconsistent with this prediction, Slack decreases from equity to convertible debt to straight debt issuers, and Relative Proceeds are significantly higher for equity issues than for the other two security types.

Finally, we find that Total Assets decrease with the equity component of the security offering. Recall that firm size can proxy for both debt-related costs and equity-related adverse selection costs.

[Please insert Table 3 here]

The literature suggests highly similar determinants of security choices and of security offering announcement returns (Lewis, Rogalski, and Seward, 1999, 2003). Thus, the explanatory variables constituting the matrix X in Equations (2a) through (2c) are essentially the same as the explanatory variables constituting the matrix Z in Equation (1). As argued by Li and Prabhala (2007), this overlap in explanatory variables should not cause an identification problem, as the outcome equations include generalized residuals that are a non-linear function of the variables Z, in addition to the variables X. However, Li and Prabhala (2007) acknowledge that the generalized residuals may be a linear function of Z in at least some areas of their domain. We therefore include Debt Maturing in One Year as an additional variable in the security choice analysis. This variable is motivated by Chaplinsky and Hansen (1993), who argue that a large portion of straight debt offerings are triggered by the fact that a previous debt offering is close to maturity. As a result, we expect the likelihood of a debt-type offering to be higher for firms that have a higher amount of long term debt maturing in the near future. A priori we do not expect this variable to have a significant impact on stock

price reactions to security offering announcements, making it a suitable instrument in our research design.[14]

5. Empirical results

In this section, we present the results obtained in the switching regression framework. We first provide the results of the first-stage ordered probit estimation and then present the second-stage announcement return regression results. We compare findings obtained with and without correction for the self-selection of firms into a particular security type. We conclude with a discussion of the differences between actual announcement effects and the counterfactual announcement effects that would have been obtained had the same firm instead announced a different security type.

5.1. Determinants of the choice of security type

Column (1) of Table 4 presents the results of the first-stage ordered probit analysis with the dependent variable equal to zero for straight debt, one for convertible debt, and two for equity. Since the dependent variable has three levels, the regression output includes two intercepts. The results are largely consistent with the univariate results discussed earlier. With respect to debt-related financing costs proxies, we again find a significant positive impact of Volatility, and a significant negative impact of Leverage, EBIT, PPE, and Taxes on firms' propensity to issue more equity-like securities. With the exception of the result on Leverage, these findings are consistent with the prediction that firms with higher debt-related costs resort to more equity-like financing types.

[14]This intuition is confirmed by our findings. When including Debt Maturing in One Year in the announcement return regressions for straight debt, convertible debt, and equity, it never has a significant regression coefficient.

With respect to equity-related adverse selection costs proxies, we find a significant positive effect of Stock Run-up and Leading Indicator, and a significant negative effect of Relative Proceeds. These findings are all consistent with the pecking order prediction that firms with high equity-related adverse selection costs are less likely to resort to equity-like financing types. We also find significant negative coefficients on LN(Total Assets), in line with the univariate results, and on Debt Maturing in One Year, consistent with the predicted impact of this variable. The marginal probabilities obtained for the probit analysis evaluated at the variable means (unreported) reveal that LN(Total Assets) is the independent variable with by far the largest marginal impact. This finding is consistent with earlier studies reporting that firm size is the most important determinant of security choices (Bayless and Chaplinsky, 1991; Faulkender and Petersen, 2006).

A subset of the security issuers offer two or more different security types in the same fiscal year: 56 firms issue both straight debt and convertible debt, 17 issue both convertible debt and equity, 53 issue both straight debt and equity, and two issue all three security types. In Column (2) of Table 4, we assess whether excluding these dual and triple security issuers leads to different probit results. We find that this is not the case, with the results in Column (2) very similar to those in Column (1). We thus continue with the full security offering sample in the remainder of the analyses.

In a third regression specification, we model the security choice as a continuous variable, instead of as a discrete one, by estimating a tobit regression analysis with a dependent variable equal to zero for straight debt, equal to the convertible debt delta (Delta) for convertible debt, and equal to one for equity. Delta measures the convertible debt's sensitivity to stock price movements. Under Black and Scholes (1973) assumptions, Delta can be calculated as:

$$Delta = e^{-\delta T} N(d_1) = e^{-\delta T} N\left\{ \frac{ln(\frac{S}{X}) + (r - \delta + \frac{\sigma^2}{2})T}{\sigma\sqrt{T}} \right\}, \qquad (5)$$

where δ is the continuously-compounded dividend yield, *N(.)* is the cumulative probability under a standard normal distribution, S is the price of the underlying stock measured at trading day −5 (obtained from CRSP), X is the conversion price (obtained from SDC), r is the yield on a 10-year U.S. Treasury Bond (obtained from Datastream), σ is the annualized stock return volatility estimated from daily stock returns over trading days −240 to −40 relative to the announcement date (obtained from CRSP), and T is the maturity of the convertible bond measured as of its issuance date (obtained from SDC). We have sufficient data to calculate Delta for all but three of the convertible bond issues in our data set. Consistent with Lewis and Verwijmeren (2011), we find that the majority of recent convertible bond issues are structured to be highly equity-like. The average (median) Delta of the offerings in our sample is 79.12 (84.82)%.

Column (3) of Table 4 provides the results of the tobit regression. These results are similar to the findings reported in the other two columns. The results of the announcement return regressions are also similar when using the specification in Column (3) to correct for endogeneity (unreported).[15] We therefore use the regression specification presented in Column (1) as the first-stage model in the remainder of the paper.

Using a within-sample classification test, Bayless and Chaplinsky (1991) and Jung, Kim, and Stulz (1996) obtain a percentage of correctly classified observations in the order of 75%

[15] The abnormal return estimation and counterfactual analysis proceed as described earlier under this continuous security choice specification. The only difference is that, instead of generalized residuals, we now include the estimated value of the residual from the selection regression in the abnormal return regressions (Li and Prabhala, 2007).

for models incorporating straight debt and equity as potential security choices. It is not possible to calculate percentages of correctly classified observations for probit analyses incorporating more than two security choices. To compare the goodness of fit of our security choice analysis with these previous models, we therefore re-estimate the probit analysis in Column (1) as a binary analysis with a dummy variable equal to one for equity and equity-like convertibles (with a Delta higher than the median value), and equal to zero for straight debt and debt-like convertibles (with a Delta lower than or equal to the median value) as dependent variable. Despite this imperfect classification criterion, the within-sample percentage of correctly classified observations of this binary probit model is 80.52%. We thus conclude that the performance of our security choice analysis is in line with that of existing studies, indicating that security choices are at least partially predictable using pre-offering firm-specific and macroeconomic information.

[Please insert Table 4 here]

5.2. Determinants of security offering announcement effects

Table 5 presents the results of a cross-sectional analysis of straight debt announcement effects. In Column (1), we correct for the fact that straight debt issuers are not randomly selected from the population of security issuers by including the generalized residual obtained from the first-step probit regression (Residual). Consistent with the literature (such as Chaplinsky and Hansen, 1993), we find that the regression analysis has a low R^2. The commonly low explanatory power of regressions of daily abnormal stock returns is likely caused by the large noise to signal ratio of event day returns (Wurgler and Zhuravskaya, 2002).

Trade-off theories predict that shareholders react more negatively to straight debt announcements made by firms with high debt-related financing costs. In addition, straight debt announcement returns may be negatively affected by equity-related adverse selection costs, to the extent that risky debt value partly depends on firm value (Myers and Majluf, 1984). Consistent with these predictions, we find a significant negative impact of Volatility and TB Yield, and a significant positive impact of PPE. Surprisingly, announcement returns are significantly more positive for firms with higher Leverage. A similar explanation as for the probit regression results may hold: as long as debt levels do not become excessively high, higher Leverage may actually serve as an indicator of the firm's access to long term debt financing, and as such serve as a measure of inverse debt-related costs.[16] Inconsistent with predictions, we find a significant positive effect of Slack and a significant negative effect of Stock Run-up and Leading Indicator (which both act as inverse equity-related financing costs proxies) on straight debt announcement effects. Apparently, the market perceives a straight debt offering by a firm with high equity-related adverse selection costs as a positive signal. With respect to the control variables (for which there is no prediction), we find a significant positive effect of LN(Total Assets) and a significant negative effect of MB.

The coefficient on Residual is statistically significant, with its negative sign indicating that there is a negative correlation between the error terms in the first-stage probit regression and the error terms in the OLS announcement return regression. Thus, unobservable private information increasing the likelihood of a more equity-like security offering (a positive error term in the self-selection equation) is associated with more negative stock returns around straight debt offering announcements (a negative error term in the announcement return

[16] We test whether the impact of Leverage becomes negative for very high long term debt ratios by including its squared value in the regression analysis and find that the coefficient is insignificant.

regression). This unobservable information may for example relate to management's private opinion about likely evolutions in firm risk.

By construction in Equation (3a), the generalized residuals for straight debt offerings are all negative. The negative coefficient on the generalized residual thus implies that there is so-called 'positive selection'. That is, security issuers opting for a straight debt offering have characteristics that invite a more favorable conditional announcement return than would be the case if instead straight debt offerings were randomly distributed over security offering firms.

In Column (2), we assess the extent to which the explanatory power and individual test results are affected by not controlling for endogeneity by leaving out the Residual variable. We find that the explanatory power of the regression, as measured by the adjusted R^2, reduces by 9.05% [(2.10−1.91)/2.10]. Leverage, Volatility, Leading Indicator, and LN(Total Assets) now have insignificant regression coefficients, while they have a significant impact in the regression in Column (1).

In the regression reported in Column (3), we add a dummy variable equal to one for announcements of straight debt offerings combined with other firm-specific news (Confounding). We find that this dummy variable has no significant effect and that its inclusion does not materially affect the findings on the other coefficients. We verify whether we obtain a higher explanatory power for the announcement return regressions when omitting the offerings with confounded announcements altogether and find this not to be the case.

[Please insert Table 5 here]

In Table 6, we conduct a similar analysis for announcements of convertible bond offerings. A number of theories predict that convertibles are used as sweetened debt financing

by firms with high costs of issuing straight bonds (Green, 1984; Brennan and Schwartz, 1988; Mayers, 1998). The backdoor-equity model of Stein (1992), in turn, predicts that convertibles are used by firms that combine high equity-related adverse selection costs with high financial distress costs. Together, these theories imply that convertibles are most valuable for firms with high costs of issuing non-hybrid financing types. If shareholders recognize convertible bonds' ability to mitigate certain external financing costs, then we should observe a positive impact of proxies for these costs on convertible debt announcement returns.

Consistent with this prediction, we find that announcement returns are significantly positively affected by TB Yield and Slack. To the extent that the MB ratio captures a range of costs associated with standard financing instruments, its significant positive coefficient is also in line with the prediction based on convertible bond issuance rationales. However, we also find a significant positive effect of both PPE and LN(Total Assets), both inverse financing costs measures, on convertible bond announcement returns. We thus obtain only mixed evidence that shareholders value convertible bonds' potential to alleviate the costs associated with traditional financing options. The coefficient on Residual is negative but not statistically significant (*t*-statistic equals −1.58).

Results in Column (2) (unadjusted for self-selection) differ somewhat. The coefficients on PPE and Slack are no longer significant, and Leading Indicator now has a significant positive effect. The explanatory power of the regression, as measured by the adjusted R^2, reduces by 7.50% [(2.22−2.40)/2.40]. In Column (3), we repeat the analysis with the Confounding dummy variable added and find a significant positive effect for this variable. Most of the confounding information accompanying convertible bond offerings are stock repurchase announcements, which may signal firm undervaluation and as such positively affect stock returns. The other findings remain unchanged.

[Please insert Table 6 here]

In Table 7 we analyze the announcements of equity offerings. Trade-off theories predict these returns to be positively affected by firms' costs of raising debt financing. We also predict a negative impact of equity-related adverse selection costs on equity offering announcement returns.

Consistent with predictions, we find that announcement returns are significantly more favorable for firms with lower equity-related adverse selection costs, as proxied by a higher Stock Run-up. Inconsistent with predictions, we find a significant negative effect of Leverage, which acts as a proxy for debt-related financing costs. We also find a significant negative impact of LN(Total Assets). One plausible explanation for the latter two results is that the market realizes that firms with positive long term debt ratios and a larger size could have instead issued more debt-like securities. As such, shareholders may interpret equity offering announcements by such companies as a signal of opportunistic market timing.

Since the generalized residuals for equity offerings are by construction in Equation (3c) all positive, the significant positive impact of Residual implies that the conditional expectations of abnormal returns for equity issuers are less negative than their unconditional expectations. In other words, the self-selection of particular firm types into issuing equity leads to abnormal stock returns that, while negative, are more favorable than the equity offering announcement effects that would be obtained if equity offerings were randomly distributed across the security issuer population. This finding is consistent with the interpretation of the negative effect of Leverage and LN(Total Assets) on SEO announcement returns: stock returns around announcements of equity offerings are more negative for firms that seem like they could have instead issued debt.

In Column (2), we run the regression unadjusted for self-selection and find that, of the variables significant in Column (1), only Stock Run-up keeps its significant effect. Volatility now has a significant negative impact, while it did not have a significant coefficient in the regression corrected for self-selection in Column (1). The explanatory power of the regression, as measured by the adjusted R^2, drops by 10.93% [(1.06−1.19)/1.19].

In Column (3), we find a significant negative effect for the Confounding dummy variable. As mentioned earlier, most of the confounding information around equity offerings consists of quarterly earnings announcements. The nature of the information released during these announcements seems to adversely affect stock prices.

[Please insert Table 7 here]

5.3. Analysis of actual versus counterfactual announcement effects

Table 8 presents the counterfactual abnormal stock returns that would have been obtained had the same firm at the same point in time instead announced a different security type. The numbers in Cells (I) through (III) represent actual announcement effects calculated as outlined earlier, while the numbers in italics in the other cells represent counterfactual announcement effects. The counterfactual announcement effect for straight debt issuers if they had instead issued convertible debt [displayed in the Row (a), Column (2)] is estimated by multiplying the coefficients in Column (1) of Table 6 with the values of the corresponding explanatory variables for straight debt issuers.[17] Counterfactual effects for other hypothetical security choices are estimated analogously. Although the R^2s of the abnormal return

[17] We do not use the specifications including Confounding dummy variables for the announcement effect prediction, since the coefficients obtained for these dummy variables likely depend on the nature of the confounding information provided for that particular security type.

regressions reported in Tables 5 through 7 are low, *F*-statistics of the joint significance of the regression coefficients are significant at less than 5% for all of the reported regressions, indicating that the regressions can be used for predictive purposes. We assess the statistical significance of the differences between average actual and counterfactual announcement returns by means of a cross-sectional *t*-test, but obtain similar results when using a non-parametric Wilcoxon test.

Table 8 allows us to compare the actual and counterfactual announcement effects had security issuers instead issued an alternative security type (comparison within security issuer types, found by comparing within a row) as well as had a specific security type instead been issued by other security issuer types (comparison within security types, found by comparing within a column).

Row (a) indicates that, if straight debt issuers had instead opted to issue convertible debt or equity, they would on average have encountered significantly more negative announcement returns, −8.60% and −11.02%, respectively, compared with +0.11%. A comparison across Columns (2) and (3) shows that the counterfactual announcement returns estimated for straight debt issuers are on average even more negative than the actual average announcement returns of convertible debt and equity issuers, −2.75% and −1.76%, respectively. We argue that this pattern can be explained by the fact that the market knows that straight debt issuers have characteristics that enable them to raise debt financing. If firms with these characteristics instead would have announced a more equity-like offering (convertible debt or equity), the market would interpret these announcements as strong surprise signals of firm overvaluation, resulting in a substantial downwards movement in the firm's stock price. In a similar vein, Row (b), Column (3) shows that, if convertible debt issuers had, instead, opted for an equity offering, they would also have encountered significantly more negative announcement returns, −4.57% compared with −2.75%.

Row (c) shows that, if equity issuers, had, instead, opted to issue straight debt, they would on average have encountered significantly more negative announcement returns, −5.24% compared with −1.76%. A comparison within Column (1) indicates that this counterfactual announcement effect is significantly more negative than the average announcement return realized by actual straight debt issuers (+0.11%). The finding that SEO issuers would experience significantly more negative announcement returns when issuing straight debt is inconsistent with the pecking order intuition that announcement returns decrease with the magnitude of offerings' equity component. This pattern can be explained by the fact that equity issuers have high values on debt-related costs proxies that negatively affect straight debt announcement returns, such as Volatility and TB Yield. In a similar vein, Row (b) indicates that, had convertible debt issuers, instead, announced a straight debt offering, they would on average have encountered significantly more negative announcement returns, −3.25% on average compared with an actual announcement effect of −2.75% on average. Finally, Row (c) also indicates that, if equity issuers, had, instead, opted to issue convertible debt, they would on average have encountered no significant difference in announcement returns. This result is consistent with the earlier observation that recent U.S. convertible bond issues are highly equity-like in nature.

Overall, the results in Table 8 are consistent with firms selecting the security type with the least negative predicted announcement effect.

[Please insert Table 8 here]

One concern is that the actual announcement returns presented in Cells (I) through (III) may be substantially different from the returns predicted for these security choices. If that is the case, then our conclusion that firms seem to choose the security type with the least

negative expected announcement effect may be flawed. To deal with this concern, we randomly split each security sample into an estimation and a holdout sample, each accounting for half of the observations. We then re-estimate the announcement return regressions reported in Tables 5 through 7 on the estimation samples, and use the coefficients obtained for these regressions to predict straight debt, convertible debt, and equity announcement effects for the holdout samples. Reassuringly, the results of this robustness check indicate that, for all three security types, the predicted announcement return is not significantly different from the actually realized announcement return. More particularly, we find an expected return of 0.43% for straight debt issues, −2.22% for convertible debt issues, and −1.82% for equity issues.

The counterfactual results generate a number of important implications with regards to security choices. First, the results suggest that firms have a strong incentive to avoid issuing equity if they risk being perceived by the market as having access to debt-type financing. Consequently, the SEO universe should mainly be populated by firms for which it is difficult to access (convertible) bond markets. Consistent with this intuition, DeAngelo, DeAngelo, and Stulz (2010) document that the SEO population mainly consists of firms with a genuine need for cash, rather than of market timers.

One rare example of an actual equity issuer that may have been perceived by the market as having access to straight debt is auto parts supplier Tower Automotive Inc. On April 3th 2002, after stock market closure, this company filed with the S.E.C. to sell 15 million common shares. The offering announcement was met with a highly negative abnormal stock return of −5.09% on April 4th 2002. This stock price reaction is consistent with our conclusion drawn from the counterfactual results in Table 8. Specifically, with Total Assets of 2,533 million USD at the end of 2001, Tower Automotive seems to have a straight debt issuer rather than a SEO issuer profile (given that Total Assets size is the most important

security choice determinant, with a highly negative impact on firms' propensity of issuing equity-type securities). In fact, over the sample period, Tower has effectively issued straight bonds in 2000 and 2003, and convertible bonds in 2004. As such, the market is likely to interpret an SEO announcement by this firm as a strong signal of firm overvaluation.

We could of course question why Tower did not opt instead for a straight or convertible debt offering, thereby avoiding a highly negative SEO announcement effect. A look at pre-announcement stock prices suggests a plausible explanation: Tower realized a stock price increase of 38.25% over the 75 trading days prior to the offering announcement, compared with an S&P 500 market index return of −1.28%. Thus, for a very limited subset of companies with a straight debt issuer profile, the benefits of cashing in on a huge stock run-up might outweigh the prospects of a highly negative stock price reaction at the announcement of the offering.

A second implication of our counterfactual results is that, contrary to the classic pecking order intuition, equity may yield more favorable announcement returns than straight and convertible debt for firms with high values on debt-related financing costs measures such as Volatility and TB Yield, and with low values on tangible assets as captured by PPE.

Finally, and more generally, the magnitude of the counterfactual results indicates that the negativity of security offering announcement returns is truncated by firms' self-selection into particular security types. In other words, the announcement returns that firms try to avoid by choosing particular security types (or by refraining from issuing external financing altogether) are far more negative than the announcement returns documented by event studies focusing on single security types. In particular, for some firm types, even issuing straight debt is predicted to lead to highly negative abnormal stock returns, which is consistent with firms' documented tendency to hoard cash in order to avoid having to resort to external financing.

6. Conclusion

Observed security offering announcement returns are truncated by firms' self-selection into a particular security type. To our knowledge, our study is the first to incorporate the non-random nature of security choices into the analysis of stock returns around announcements of security offerings. Our approach allows us to calculate counterfactual announcement returns that would be obtained had the same firm instead announced a different security type. As such, we are able to better understand the potential magnitude of security offering announcement returns, and the impact of expected announcement returns on firms' security choices.

We find that average counterfactual announcement returns for issuers of debt-like securities instead announcing a more equity-like security type are significantly more negative than their actual announcement returns. In turn, average counterfactual announcement returns for issuers of equity-like securities instead announcing a more debt-like security type are significantly more negative than their actual announcement returns. Together, these results are consistent with firms issuing the security type with the least negative expected announcement effect.

Our cross-sectional regression analysis of announcement returns uncovers substantial differences in announcement return determinants across the three security types. Stock returns around straight debt announcements are negatively related to proxies for debt-related financing costs, and positively related to proxies for equity-related adverse selection costs. Stock returns around SEO announcements are more negative for firms that are perceived to have access to debt, and more positive for firms with larger pre-announcement stock runups. Consistent with extant theories of convertible debt (Green, 1984; Brennan and Schwartz, 1988; Stein, 1992; Mayers, 1998), we obtain some evidence that convertible debt

announcement effects are more positive for firms with larger costs of attracting debt or equity financing.

While controlling for self-selection does not dramatically improve the explanatory power of the announcement return regressions, we find that it does affect certain inferences on the impact of debt-related and equity-related financing costs on security offering announcement returns. The self-selection correction terms are almost always statistically significant. As such, our results suggest that event studies that do not control for the endogenous nature of security choices may obtain biased results.

Overall, our findings help explain some pecking order behavior patterns, yet they also suggest that equity-related adverse selection costs are not the sole determinant of stock returns around security offering announcements. Debt-related financing costs also seem to play an important role, explaining why for some firms equity may be the preferred security choice in terms of expected announcement returns.

Appendix: Detailed descriptions of explanatory variables

Variables are discussed in the order in which they appear in the paper. All firm characteristics are measured at fiscal year-end preceding the security offering announcement date, unless specified otherwise. All balance sheet and income statement data are obtained from Compustat Fundamentals Annual. # refers to a data item in the Compustat Fundamentals Annual database. Stock price data are obtained from CRSP.

Variable name	Calculation
Leverage	Long term debt (#LTD) divided by total assets (#AT).
Volatility	Daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date.
EBIT	Earnings before interest and taxes (#EBIT) divided by total assets (#AT).
PPE	Plant, property and equipment (#PPENET) divided by total assets (#AT).
Taxes	Total income tax (#TXT) divided by total assets (#AT).
TB Yield	Three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month.
Slack	Cash and marketable securities (#CHE) divided by total assets (#AT).
Stock Run-up	Average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window.
Leading Indicator	Logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance.
Relative Proceeds	Offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT).
LN(Total Assets)	Natural logarithm of the book value of total assets (#AT).
MB	Market value of equity (#MKVALT) divided by the book value of equity (#CEQ).
Trading Volume	Volume of shares traded (obtained from CRSP), measured at trading day −20 prior to the offering announcement date.
Capital Expenditure Growth	Percentage growth in capital expenditures (#CAPX) from fiscal year-end −2 to fiscal year-end −1 prior to the announcement date.
Debt Maturing in One Year	Amount of long term debt maturing over the next year (#DD1) divided by total assets (#AT).
δ	Dividend yield, calculated as dividends per share over the previous fiscal year (#DVPSP_F) divided by the share price at fiscal year-end (#PRCC_F).

References

Asquith, P., Mullins, D., 1986. Equity issues and offering dilution. Journal of Financial Economics 15, 61-89.

Autore, D., Bray, D., Peterson, D., 2009. Intended use of proceeds and the long-run performance of seasoned equity issuers. Journal of Corporate Finance 15, 358-367.

Bagwell, L., 1992. Dutch auction repurchases: an analysis of shareholder heterogeneity. Journal of Finance 47, 71-105.

Bayless, M., Chaplinsky, S., 1991. Expectations of security type and the information content of debt and equity offers. Journal of Financial Intermediation 1, 195-214.

Black, F., Scholes, M., 1973. The pricing of options and corporate liabilities. Journal of Political Economy 81, 637-659.

Bechmann, K., 2004. Short sales, price pressure, and the stock price response to convertible bond calls. Journal of Financial Markets 7, 427-451.

Bernanke, B., Gertler, M., 1989. Agency costs, net worth, and business fluctuations. American Economic Review 79, 14-31.

Billett, M., Flannery, M., Garfinkel, J., 2011. Frequent issuers' influence on long-run post-issuance returns. Journal of Financial Economics 99, 349-364.

Brennan, M., Schwartz, E., 1988. The case for convertibles. Journal of Applied Corporate Finance 1, 55-64.

Brown, S., Warner, J., 1985. Using daily stock returns: the case of event studies. Journal of Financial Economics 14, 3-31.

Chaplinsky, S., Hansen, R., 1993. Partial anticipation, the flow of information and the economic impact of corporate debt sales. Review of Financial Studies 6, 709-732.

Choi, D., Getmansky, M., Tookes, H., 2009. Convertible bond arbitrage, liquidity externalities and stock prices. Journal of Financial Economics 91, 227-251.

Dann, L., Mikkelson, W., 1984. Convertible debt issuance, capital structure change and financing-related information: some new evidence. Journal of Financial Economics 13, 157-186.

Davidson, W., Glascock, J., Schwarz, T., 1995. Signaling with convertible debt. Journal of Financial and Quantitative Analysis 30, 425-440.

DeAngelo, H., DeAngelo, L., Stulz, R., 2010. Seasoned equity offerings, market timing, and the corporate lifecycle. Journal of Financial Economics 95, 275-295.

de Jong, A., Dutordoir, M., Verwijmeren, P., 2011. Why do convertible issuers simultaneously repurchase stock? An arbitrage-based explanation. Journal of Financial Economics 100, 113-129.

Dhillon, U., Johnson, H., 1991. Changes in the Standard and Poor's 500 list. Journal of Business 64, 75-85.

Dunbar, C., 1995. The use of warrants as underwriter compensation in initial public offerings. Journal of Financial Economics 38, 59-78.

Eckbo, B., 1986. Valuation effects of corporate debt offerings. Journal of Financial Economics 15, 119-151.

Eckbo, B., Maksimovic, V., Williams, J., 1990. Consistent estimation of crosssectional models in event studies. Review of Financial Studies 3, 343-365.

Eckbo, B., Masulis, R., Norli, O., 2007. Security offerings. In: Eckbo, B. (ed.), Handbook of Corporate Finance: Empirical Corporate Finance. North Holland, Elsevier, Amsterdam, pp. 233-373.

Erel, I., Julio, B., Kim, W., Weisbach, M., 2011. Macroeconomic conditions and capital raising. Unpublished working paper. Ohio State University, London Business School, Seoul National University, and NBER.

Fang, L., 2005. Investment bank reputation and the price and quality of underwriting services. Journal of Finance 60, 2729-2761.

Faulkender, M., Petersen, M., 2006. Does the source of capital affect capital structure? Review of Financial Studies 19, 45-79.

Fields, L., Mais, E., 1991. The valuation effects of private placements of convertible debt. Journal of Finance 46, 1925-1932.

Gomes, A., Phillips, G., 2007. Why do public firms issue private and public securities? Unpublished working paper. Washington University and University of Maryland.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics 60, 187-243.

Green, R., 1984. Investment incentives, debt, and warrants. Journal of Financial Economics 13, 115-136.

Greene, W. 2008. Econometric Analysis. Prentice Hall, New Jersey.

Guo, L., Mech, T., 2000. Conditional event studies, anticipation, and asymmetric information: the case of seasoned equity issues and pre-issue information releases. Journal of Empirical Finance 7, 113-141.

Heckman, J., 1979. Sample selection bias as a specification error. Econometrica 47, 153-161.

Huang, R., Ramirez, G., 2010. Speed of issuance, lender specialization, and the rise of the 144A debt market. Financial Management 39, 643-673.

Idson, T., Feaster, D., 1990. A selectivity model of employer-size wage differentials. Journal of Labor Economics 8, 99-122.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-329.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behavior, agency costs, and capital structure. Journal of Financial Economics 3, 305-360.

Jung, K., Kim, Y.-C., Stulz, R., 1996. Timing, investment opportunities, managerial discretion, and the security issue decision. Journal of Financial Economics 42, 159-185.

Krasker, W., 1986. Stock price movements in response to stock issues under asymmetric information. Journal of Finance 41, 93-105.

Leary, M., Roberts, M., 2010. The pecking order, debt capacity, and information asymmetry. Journal of Financial Economics 95, 332-355.

Lee, G., Masulis, R., 2009. Seasoned equity offerings: quality of accounting information and expected flotation costs. Journal of Financial Economics 92, 443-469.

Lewis, C., Rogalski, R., Seward, J., 1999. Is convertible debt a substitute for straight debt or for common equity? Financial Management 28, 5-27.

Lewis, C., Rogalski, R., Seward, J., 2003. Industry conditions, growth opportunities and market reactions to convertible debt financing decisions. Journal of Banking and Finance 27, 153-181.

Lewis, C., Verwijmeren, P., 2011. Convertible security design and contract innovation. Journal of Corporate Finance 17, 809-831.

Li, K., Prabhala, N., 2007. Self-selection models in corporate finance. In: Eckbo, B. (ed.), Handbook of Corporate Finance: Empirical Corporate Finance. North Holland, Elsevier, Amsterdam, pp. 37-86.

Lucas, D., McDonald, R., 1990. Equity issues and stock price dynamics. Journal of Finance 45, 1019-1043.

MacKie-Mason, J., 1990. Do taxes affect corporate financing decisions? Journal of Finance 45, 1471-1493.

Marsh, P., 1982. The choice between equity and debt: an empirical study. Journal of Finance 37, 121-144.

Masulis, R., Korwar, A., 1986. Seasoned equity offerings: an empirical investigation. Journal of Financial Economics 15, 91-118.

Mayers, D., 1998. Why firms issue convertible bonds: the matching of financial and real investment options, Journal of Financial Economics 47, 83-102.

Mazzeo, M., Moore, W., 1992. Liquidity costs and stock price response to convertible security calls. Journal of Business 65, 353-369.

Mikkelson, W., Partch, M., 1986. Valuation effects of security offerings and the issuance process. Journal of Financial Economics 15, 31-60.

Modigliani, F., Miller, M., 1958. The cost of capital, corporation finance, and the theory of investment. American Economic Review 48, 261-297.

Myers, S., 1977. Determinants of corporate borrowing. Journal of Financial Economics 5, 147-175.

Myers, S., 1984. The capital structure puzzle. Journal of Finance 39, 575-592.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-221.

Patell, J., 1976. Corporate forecasts of earnings per share and stock price behavior: empirical tests. Journal of Accounting Research 14, 246-276.

Shleifer, A., 1986. Do demand curves for stocks slope down? Journal of Finance 41, 579-590.

Stein, J., 1992. Convertible bonds as backdoor equity financing. Journal of Financial Economics 32, 3-21.

Wurgler, J., Zhuravskaya, E., 2002. Does arbitrage flatten the demand curves for stocks? Journal of Business 75, 583-608.

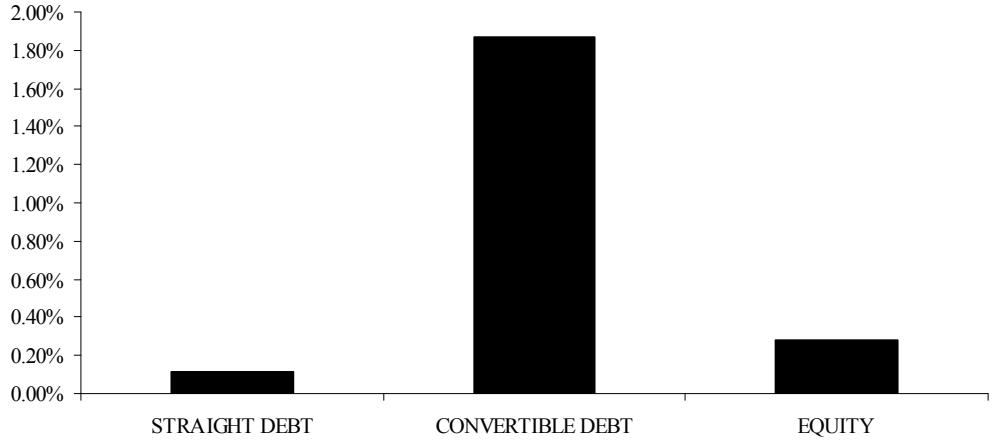

Figure 1: Increase in short-selling activity around security offerings

We calculate the increase in short-selling as the change in monthly short interest divided by the number of shares outstanding. The change in short interest is calculated based on monthly short interest data obtained from the Securities Monthly file of the CRSP-Compustat merged database. These data are available from March 2003 until June 2008. To match short interest data to security offerings, we apply the algorithm discussed in Bechmann (2004) and Choi et al. (2009). The number of shares outstanding is obtained from CRSP, and measured at trading day −20 relative to the offering announcement date.

Table 1: Temporal dispersion of security offerings

This table represents the number (N) of straight debt, convertible debt, and seasoned equity offerings per sample year and the corresponding percentage of offerings across time within the sample. The security offering samples are retrieved from SDC.

Year	Straight debt		Convertible debt		Seasoned equity	
	N	%	N	%	N	%
1999	136	11.91%	31	4.70%	75	20.22%
2000	74	6.48%	43	6.53%	85	22.91%
2001	171	14.97%	98	14.87%	37	9.97%
2002	120	10.51%	44	6.68%	47	12.67%
2003	156	13.66%	155	23.52%	43	11.59%
2004	168	14.71%	100	15.17%	25	6.74%
2005	118	10.33%	40	6.07%	16	4.31%
2006	74	6.48%	53	8.04%	17	4.58%
2007	76	6.65%	71	10.77%	19	5.12%
2008	49	4.29%	24	3.64%	7	1.89%
Total	1,142	100%	659	100%	371	100%

Table 2: Abnormal stock returns (AR) around announcements of corporate security offerings

This table reports abnormal stock returns around announcements of straight debt, convertible debt, and seasoned equity offerings. Event days are measured relative to the announcement date, which is defined as the earliest of the filing date mentioned by SDC and the date at which the offering is first mentioned in the Factiva database for public offerings, and as the earliest of the issue date mentioned by SDC and the date at which the offering is first mentioned in the Factiva database for Rule 144A offerings. Abnormal returns are calculated using standard event study methodology, as outlined in Brown and Warner (1985). We use the window −300 to −46 prior to the announcement date as the estimation window, and the CRSP equally-weighted index as the market index proxy. The significance of the % Negative AR is assessed by means of a Rank test. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Event day(s)	Straight debt (N = 1,004)		
	Mean AR	% Negative AR	Patell *Z*-statistic
−1	0.04%	50.82%	−0.12
0	0.11%	50.27%	2.15**
1	0.07%	47.46%	1.00
(2,10)	−0.13%	51.18%	−0.29
Event day(s)	Convertible debt (N = 638)		
	Mean AR	% Negative AR	Patell *Z*-statistic
−1	−0.79%	55.54%**	−5.93***
0	−3.02%	73.44%***	−23.02***
1	−0.24%	54.02%	−0.61
(2,10)	1.06%	46.43%*	2.45**
Event day(s)	Seasoned equity (N = 343)		
	Mean AR	% Negative AR	Patell *Z*-statistic
−1	0.10%	51.92%	1.13
0	−1.76%	65.55%**	−12.44***
1	0.06%	50.43%	0.40
(2,10)	−0.64%	53.04%	−1.35

Table 3: Univariate comparison of potential security choice determinants

This table reports the results of a univariate comparison of potential determinants of the choice between straight debt, convertible debt, and seasoned equity offerings. All balance sheet data are obtained from Compustat Fundamentals Annual and measured at the end of the fiscal year prior to the announcement date, unless otherwise noted. All stock price data are obtained from CRSP. Leverage is long term debt (#LTD) divided by total assets (#AT). Volatility is the daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date. EBIT is Earnings before Interest and Taxes (#EBIT) divided by total assets. PPE is Plant, Property and Equipment (#PPENET) divided by total assets. Taxes is total income tax (#TXT) divided by total assets. TB Yield is the three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month. Slack is cash and marketable securities (#CHE) divided by total assets. Stock Run-up is the average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window. Leading Indicator is the logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance. Relative Proceeds are offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT). Total Assets is the book value of total assets (#AT), expressed in millions of U.S. Dollars. MB is the market value of equity (#MKVALT) divided by the book value of equity (#CEQ). *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Variables	Mean (median)			*t*-statistics for difference in means		
	Straight debt (N= 1,004)	Convertible debt (N = 638)	Seasoned equity (N = 343)	Convertible vs. Straight debt	Seasoned equity vs. Convertible	Seasoned equity vs. Straight debt
Leverage	24.38 (21.31)%	37.42 (34.14)%	18.11 (11.39)%	11.55^{***}	-4.32^{***}	-14.67^{***}
Volatility	2.92 (2.59)%	3.54 (3.09)%	4.66 (4.25)%	7.20^{***}	7.89^{***}	13.97^{***}
EBIT	13.52 (12.76)%	6.25 (10.20)%	−7.87 (6.66)%	-9.37^{***}	-7.13^{***}	-11.50^{***}
PPE	35.64 (35.05)%	25.00 (17.24)%	24.87 (16.43)%	-12.53^{***}	−0.09	-10.15^{***}
Taxes	2.41 (1.81)%	2.15 (1.04)%	1.37 (0.05)%	-1.80^{*}	-4.80^{***}	-7.38^{***}
TB Yield	2.99 (2.78)%	2.82 (2.16)%	3.56 (4.34)%	-2.01^{**}	6.69^{***}	5.59^{***}
Slack	6.48 (3.25)%	23.92 (15.79)%	29.75 (18.82)%	17.97^{***}	3.24^{***}	14.88^{***}
Stock Run-up	−0.05 (−0.05)%	0.03 (0.01)%	0.24 (0.21)%	4.34^{***}	7.89^{***}	11.31^{***}
Leading Indicator	0.00 (−0.03)%	0.35 (0.30)%	0.39 (0.45)%	5.22^{***}	0.57	4.88^{***}
Relative Proceeds	23.98 (15.55)%	20.35 (17.44)%	27.28 (21.73)%	-3.94^{***}	5.52^{***}	2.48^{***}
Total Assets ($ Million)	7,768 (2,253)	2,656 (975)	1,259 (134)	-8.10^{***}	-2.72^{***}	-8.57^{***}
MB	4.51 (1.96)	6.24 (5.42)	5.98 (3.49)	1.41	−1.29	1.55

Table 4: Determinants of the choice between straight debt, convertible debt, and equity

Columns (1) and (2) of this table report the results of an ordered probit analysis of the choice between straight debt, convertible debt, and seasoned equity. The dependent variable is a categorical variable taking the value zero for straight bonds, one for convertible bonds, and two for seasoned equity. Column (1) contains all observations, while Column (2) excludes firms that issue multiple security types in the same year (but not on the same date – such dual offerings are removed from the sample). Column (3) reports the results of a tobit regression in which the dependent variable equals zero for straight debt, one for seasoned equity, and the convertible bond Delta for convertible debt. All balance sheet data are obtained from Compustat Fundamentals Annual and measured at the end of the fiscal year prior to the announcement date, unless otherwise noted. All stock price data are obtained from CRSP. Leverage is long term debt (#LTD) divided by total assets (#AT). Volatility is the daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date. EBIT is Earnings before Interest and Taxes (#EBIT) divided by total assets. PPE is Plant, Property and Equipment (#PPENET) divided by total assets. Taxes is total income tax (#TXT) divided by total assets. TB Yield is the three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month. Slack is cash and marketable securities (#CHE) divided by total assets. Stock Run-up is the average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window. Leading Indicator is the logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance. Relative Proceeds are offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT). LN(Total Assets) is the natural logarithm of the book value of total assets (#AT). MB is the market value of equity (#MKVALT) divided by the book value of equity (#CEQ). We multiply its coefficient by 1,000 for ease of exposition. Debt Maturing in One Year is the amount of long term debt maturing over the next year (#DD1) divided by total assets. *z*-statistics are based on Huber-White robust standard errors. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Variables	Parameter values (*z*-statistic)		
	(1)	(2)	(3)
Intercept 1	−3.981*** (−16.05)	−4.351*** (−13.57)	0.768*** (31.73)
Intercept 2	−2.498*** (−10.46)	−2.795*** (−9.17)	NA
Leverage	−0.855*** (−6.22)	−0.825*** (−5.11)	−0.658*** (−6.21)
Volatility	12.476*** (7.04)	12.107*** (4.21)	9.960*** (5.35)
EBIT	−0.556** (−2.24)	−0.494** (−2.00)	−0.299* (−1.92)
PPE	−0.385*** (−2.95)	−0.412*** (−2.64)	−0.335*** (−3.29)
Taxes	−3.205*** (−2.60)	−3.419*** (−2.79)	−2.187*** (−2.66)
TB Yield	1.794 (0.96)	2.738 (1.28)	−3.373 (−0.26)
Slack	−0.291 (−1.50)	−0.271 (−1.42)	−0.033 (−0.27)
Stock Run-up	71.395*** (8.00)	76.641*** (5.58)	51.065*** (5.81)
Leading Indicator	14.212*** (4.90)	12.451*** (3.55)	10.389*** (4.62)
Relative Proceeds	−2.114*** (−11.30)	−2.172*** (−9.93)	−1.622*** (−10.81)
LN(Total Assets)	−1.070*** (−17.29)	−1.191*** (−14.54)	−0.732*** (−14.21)
MB	−0.002 (−0.01)	0.020 (0.54)	0.010 (0.34)
Debt Maturing in One Year	−1.238* (−1.72)	−1.124* (−1.72)	−0.806* (−1.70)
Pseudo R^2	29.86%	33.73%	28.58%
Likelihood ratio statistic	1,196.94***	1,187.79***	1,466.12***
N	1,982	1,875	1,982

Table 5: Determinants of abnormal stock returns around straight debt announcements

This table reports the results of a regression analysis of the determinants of abnormal stock returns around 1,004 straight debt announcements. The dependent variable is the cumulative abnormal stock return measured on the announcement date of the offering. Residual is the generalized residual obtained from the probit analysis in Column (1) of Table 4. Confounding is a dummy variable equal to one if the company releases other material company-specific news on the announcement date. All balance sheet data are obtained from Compustat Fundamentals Annual and measured at the end of the fiscal year prior to the announcement date, unless otherwise noted. All stock price data are obtained from CRSP. Leverage is long term debt (#LTD) divided by total assets (#AT). Volatility is the daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date. EBIT is Earnings before Interest and Taxes (#EBIT) divided by total assets. PPE is Plant, Property and Equipment (#PPENET) divided by total assets. Taxes is total income tax (#TXT) divided by total assets. TB Yield is the three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month. Slack is cash and marketable securities (#CHE) divided by total assets. Stock Run-up is the average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window. Leading Indicator is the logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance. Relative Proceeds are offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT). LN(Total Assets) is the natural logarithm of the book value of total assets (#AT). MB is the market value of equity (#MKVALT) divided by the book value of equity (#CEQ). We multiply its coefficient by 1,000 for ease of exposition. *z*-statistics are based on Huber-White robust standard errors. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Variables	Parameter values (*z*-statistic)		
	(1)	(2)	(3)
Intercept	−0.085 (−1.63)	0.010 (0.83)	−0.083 (−1.61)
Residual	−0.037* (−1.95)		−0.036* (−1.93)
Confounding			−0.004 (−0.73)
Leverage	0.018* (1.67)	0.001 (0.16)	0.018* (1.67)
Volatility	−0.311** (−2.05)	−0.063 (−0.59)	−0.308** (−2.04)
EBIT	0.014 (0.43)	0.004 (0.13)	0.014 (0.43)
PPE	0.016*** (2.47)	0.010* (1.89)	0.016*** (2.44)
Taxes	0.004 (0.04)	−0.067 (−0.68)	0.002 (0.02)
TB Yield	−0.181** (−2.08)	−0.155* (−1.89)	−0.185** (−2.11)
Slack	0.035** (2.01)	0.033* (1.92)	0.034* (1.98)
Stock Run-up	−2.333** (−2.45)	−1.231** (−2.50)	−1.490** (−2.34)
Leading Indicator	−0.345 (−1.72*)	−0.068 (−0.49)	−0.344 (−1.72*)
Relative Proceeds	0.029 (1.43)	−0.008 (−0.97)	0.029 (1.42)
LN(Total Assets)	0.016* (1.64)	−0.001 (−0.49)	0.016 (1.62)
MB	−0.058*** (−3.01)	−0.057*** (−2.85)	−0.055*** (−2.79)
R^2	3.46%	3.15%	3.55%
Adjusted R^2	2.10%	1.91%	2.09%

Table 6: Determinants of abnormal stock returns around convertible debt announcements

This table reports the results of a regression analysis of the determinants of abnormal stock returns around 638 convertible debt announcements. The dependent variable is the cumulative abnormal stock return measured over the window (−1,0) relative to the offering's announcement date, plus the cumulative stock return over window (2,10) relative to the announcement date. Residual is the generalized residual obtained from the probit analysis in Column (1) of Table 4. Confounding is a dummy variable equal to one if the company releases other material company-specific news on the announcement date. All balance sheet data are obtained from Compustat Fundamentals Annual and measured at the end of the fiscal year prior to the announcement date, unless otherwise noted. All stock price data are obtained from CRSP. Leverage is long term debt (#LTD) divided by total assets (#AT). Volatility is the daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date. EBIT is Earnings before Interest and Taxes (#EBIT) divided by total assets. PPE is Plant, Property and Equipment (#PPENET) divided by total assets. Slack is cash and marketable securities (#CHE) divided by total assets. Taxes is total income tax (#TXT) divided by total assets. TB Yield is the three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month. Stock Run-up is the average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window. Leading Indicator is the logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance. Relative Proceeds are offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT). LN(Total Assets) is the natural logarithm of the book value of total assets (#AT). MB is the market value of equity (#MKVALT) divided by the book value of equity (#CEQ). We multiply its coefficient by 1,000 for ease of exposition. *z*-statistics are based on Huber-White robust standard errors. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Variables	Parameter values (*z*-statistic)		
	(1)	(2)	(3)
Intercept	−0.441** (−2.09)	−0.105*** (−2.78)	−0.402* (−1.84)
Residual	−0.122 (−1.58)		−0.103 (−1.29)
Confounding			0.017** (2.00)
Leverage	0.080 (1.49)	−0.004 (−0.22)	0.070 (1.26)
Volatility	−1.531 (−1.57)	−0.278 (−1.11)	−1.259 (−1.40)
EBIT	0.036 (0.74)	−0.017 (−0.53)	0.021 (0.43)
PPE	0.068* (1.96)	0.028 (1.27)	0.065* (1.85)
Taxes	0.208 (0.64)	−0.121 (−0.75)	0.174 (0.53)
TB Yield	0.600** (2.02)	0.745*** (2.65)	0.632** (2.14)
Slack	0.055* (1.72)	0.024 (0.94)	0.052 (1.62)
Stock Run-up	−6.700 (−1.32)	0.693 (0.53)	−5.348 (−1.02)
Leading Indicator	−0.555 (−0.56)	0.823* (1.81)	−0.311 (−0.30)
Relative Proceeds	0.154 (1.06)	−0.062 (−1.76)	0.118 (0.78)
MB	0.027** (2.24)	0.027** (1.96)	0.027** (2.04)
LN(Total Assets)	0.127* (1.84)	0.018* (1.78)	0.111 (1.55)
R^2	4.53%	4.18%	5.08%
Adjusted R^2	2.40%	2.22%	2.80%

Table 7: Determinants of abnormal stock returns around seasoned equity announcements

This table reports the results of a regression analysis of the determinants of abnormal stock returns around 343 seasoned equity announcements. The dependent variable is the cumulative abnormal stock return measured on the announcement date of the offering. Residual is the generalized residual obtained from the probit analysis in Column (1) of Table 4. Confounding is a dummy variable equal to one if the company releases other material company-specific news on the announcement date. All balance sheet data are obtained from Compustat Fundamentals Annual and measured at the end of the fiscal year prior to the announcement date, unless otherwise noted. All stock price data are obtained from CRSP. Leverage is long term debt (#LTD) divided by total assets (#AT). Volatility is the daily stock return volatility, estimated using daily stock returns over the window −240 to −40 prior to the announcement date. EBIT is Earnings before Interest and Taxes (#EBIT) divided by total assets. PPE is Plant, Property and Equipment (#PPENET) divided by total assets. Taxes is total income tax (#TXT) divided by total assets. TB Yield is the three-month Treasury Bill yield obtained from Datastream, measured in the month prior to the announcement month. Slack is cash and marketable securities (#CHE) divided by total assets. Stock Run-up is the average daily stock return over the window −76 to −2 prior to the announcement date, minus the average return over the CRSP equally-weighted market index over that same window. Leading Indicator is the logarithmic growth in the composite leading indicator for the U.S. economy (obtained from Datastream) over month −4 to −1 prior to issuance. Relative Proceeds are offering proceeds (obtained from SDC) divided by the market value of equity (#MKVALT). LN(Total Assets) is the natural logarithm of the book value of total assets (#AT). MB is the market value of equity (#MKVALT) divided by the book value of equity (#CEQ). We multiply its coefficient by 1,000 for ease of exposition. *z*-statistics are based on Huber-White robust standard errors. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. N denotes the number of observations.

Variables	Parameter values (*z*-statistic)		
	(1)	(2)	(3)
Intercept	0.036 (0.95)	−0.005 (−0.18)	0.035 (0.93)
Residual	0.043* (1.71)		0.043* (1.71)
Confounding			−0.022* (−1.77)
Leverage	−0.048* (−1.72)	−0.022 (−1.03)	−0.050* (−1.80)
Volatility	−0.192 (−0.75)	−0.484* (−1.91)	−0.185 (−0.73)
EBIT	0.019 (0.95)	0.024 (1.22)	0.016 (0.86)
PPE	−0.008 (−1.05)	0.004 (0.27)	−0.008 (−0.46)
Taxes	−0.024 (−0.15)	0.090 (0.66)	−0.012(−0.07)
TB Yield	−0.036 (−0.16)	−0.052 (−0.23)	−0.030 (−0.13)
Slack	0.014 (0.73)	0.024 (1.26)	0.012 (0.65)
Stock Run-up	2.987** (2.06)	1.577* (1.63)	3.011** (2.07)
Leading Indicator	0.221 (0.56)	−0.161 (−0.48)	0.221 (0.56)
Relative Proceeds	−0.047 (−1.05)	0.006 (0.27)	−0.049 (−1.10)
MB	−0.131 (−0.22)	0.235 (0.40)	−0.132 (−0.22)
LN(Total Assets)	−0.032* (−1.67)	−0.001 (−1.16)	−0.030 (−1.57)
R^2	5.30%	4.82%	6.43%
Adjusted R^2	1.19%	1.06%	2.08%

Table 8: Counterfactual announcement returns analysis

This table compares the actual announcement effects of straight debt, convertible debt, and seasoned equity offerings with the counterfactual announcement effects had the same firm at that moment chosen instead to announce the offering of a different security type. The numbers in cells (I) through (III) represent actual announcement effects, defined as the abnormal stock return on the announcement date for straight debt and seasoned equity issuers, and the cumulative abnormal stock return over the window (−1,0), plus the cumulative abnormal stock return over window (2,10) for convertible debt issuers. The numbers in italics in the other cells represent counterfactual announcement effects. The counterfactual announcement effect for straight debt issuers if they had issued convertibles instead is calculated by multiplying the coefficients in Column (1) of Table 6 with the values of the corresponding explanatory variables for straight debt issuers. Announcement effects for other counterfactual security choices are calculated analogously. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Security type		
Security issuer type	Straight debt (1)	Convertible debt (2)	Seasoned equity (3)
Straight debt issuer (a)	0.11% (I)	*−8.60%*	*−11.02%*
		t-stat. for difference with (II): -7.66^{***}	*t*-stat. for difference with (III): -27.55^{***}
		t-stat. for difference with (I): -54.81^{***}	*t*-stat. for difference with (I): -84.77^{***}
Convertible debt issuer (b)	*−3.25%*	−2.75% (II)	*−4.57%*
	t-stat. for difference with (I): -21.18^{***}		*t*-stat. for difference with (III): -18.11^{***}
	t-stat. for difference with (II): -2.78^{***}		*t*-stat. for difference with (II): -10.13^{***}
Seasoned equity issuer (c)	*−5.24%*	*−1.61%*	−1.76% (III)
	t-stat. for difference with (I): -32.17^{***}	*t*-stat. for difference with (II): 4.24^{***}	
	t-stat. for difference with (III): -4.52^{***}	*t*-stat. for difference with (III): 0.31	