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Why do public firms issue private and public securities?

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ABSTRACT

The market for public firms issuing private equity, debt, and convertible securities is large. Of the over 13,000 issues we examine, more than half are in the private market. Our results show asymmetric information plays a major role in the choice of security type within public and private markets and in the choice of market in which to issue securities. In the public market, firms' predicted probability of issuing equity declines and issuing debt increases with measures of asymmetric information. There is a weak reversal of this sensitivity in the private market. We also find a large sensitivity of the choice of public versus private markets to asymmetric information, risk and market timing for debt, convertibles, and in particular, equity issues.

1. Introduction

In this study we examine why public firms issue different security types within public and private security markets. We study both private and public issues of debt, convertibles, and common equity, a total of six different security-market choices. Our comprehensive database makes it possible to assess the factors that impact both security type and market choice.

Private security markets are increasingly important for public firms. Of the over 13,000 issues by public firms we examine, more than half are in the private market, comprising issuances of equity, debt, and convertible bonds and convertible preferred stock (henceforth, convertibles). Among the firms that choose to issue equity or convertibles, 51% of the issues are in the private market, and among small public firms (firms in the lowest size quartile) 73% of their equity and convertible issues are in the private markets.

Our study uses a methodology that allows us to determine whether firms use security issuance decisions of multiple types and in different markets as a mechanism to address asymmetric

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information and to mitigate risk and market timing problems. To examine issuance decisions in both private and public markets, we link a private equity and convertible database, a private debt database, and the SDC new-issue database, to Compustat and CRSP. We also link these databases to IBES so that we can use analyst earnings forecast data to construct measures of asymmetric information.

We have several main results on security issuance that contribute to the literature and our understanding of security issuance. First, our evidence is consistent with asymmetric information being a major determinant of security issuance decisions within private and public markets. If a firm issues in the public market, the probability that it will issue equity declines, and the probability that it will issue debt increases, with proxies for the degree of information asymmetry. However, the sensitivity of security issuance choice to asymmetric information is significantly lower in the private market than in public markets. In fact, the probability of a firm issuing private equity and convertibles versus private debt slightly increases with asymmetric information, a reversal of the ordering in the public markets. We call these results the "security issuance ranking."

Second, we examine choice of market in which public firms choose to issue securities. We find that the probability of public firms issuing private over public securities is positively related to our measures of asymmetric information for all security types: debt, equity, and convertibles. We also find that the sensitivity to asymmetric information of the public versus private market choice is highest for equity issues and lowest for debt issues.

Third, when we examine firms that issue securities multiple times, we find that the results on security issuance within markets are magnified. In particular, firms that issue public securities are even less likely to issue equity with increases in measures of asymmetric information. We also find that firms that switch from issuing public securities to private equity and convertibles have increases in our measures of asymmetric information, while firms that switch from issuing private securities to issue public equity have decreases in asymmetric information.

While our primary results show the importance of asymmetric information, risk and market timing are also important for the private–public security choice. We show that there is a fundamental difference in the market timing of security decisions in the public and private markets. Firms are more likely to issue public equity rather than private equity if their stock price has recently risen. The lack of timing for private security issuances is consistent with an information exchange occurring in private placements when the few investors acquiring securities (the median number of investors in private equity issuances is three) are likely to negotiate directly with the firm.

By considering all the security-market choices rather than a more limited choice set, we are also able to draw some novel implications on the influence of risk on security issuance. Firms with higher risk and investment opportunities and lower profitability are more likely to issue equity than debt in both private and public markets. Overall these firms are also more likely to issue privately, and the sensitivity of the equity-debt decision for these variables is less pronounced in the private markets.

Our results are consistent with private security markets functioning very differently than public markets vis à vis information asymmetry, either because private investors have better information or ability to evaluate firm quality. The likelihood that private investors have better information is high, in particular, given that security laws allow sharing of nonpublic information with private investors who sign nondisclosure agreements with the firm. The results are also consistent with Fulghieri and Lukin (2001) who argue that incentives for information production by private investors are higher the more information-sensitive the securities being issued are and predict private equity securities are more likely to be issued than debt securities with increases in asymmetric information.

Our first set of results on the impact of asymmetric information on security issuance within markets are new and have not been documented previously in the literature. While we do not test the traditional Myers and Majluf (1984) pecking-order theory of capital structure, our overall results on security issuance show that tests of theories of security issuance should take into account the market where the security is issued as well as the type of security. Our findings on security issuance conditional on issuing in the *public* markets provide support for the proposition that firms with high measures of asymmetric information are less likely to issue equity. However, overall, our study does not support the proposition that firms with high measures of asymmetric information avoid securities that are informationally sensitive. Instead, we find a slight positive sensitivity of the probability of equity and convertibles issuance in private markets to asymmetric information. By examining

multiple issuers within markets and firms that switch between public and private markets, we are also able to show how changes in asymmetric information and risk affect security issuance.

Our second set of results on the public versus private market choice for equity and debt adds to previous results on private securities by Hertzel and Smith (1993), Denis and Mihov (2003), and Wu (2004). Hertzel and Smith (1993) and Wu (2004) show private equity is chosen by firms with high asymmetric information and Denis and Mihov (2003) show firms with low credit quality and high measures of asymmetric information are more likely to choose private debt over public debt. In our study, we examine all three types of securities – debt, convertibles, and equity. By including all security types we are able to test for differential sensitivity of security issuance to asymmetric information across public versus private markets and show the effect of asymmetric information is greatest for equity. We show that firms are more likely to choose private securities over public securities with increases in asymmetric information – most strongly for equity but also for convertibles and debt.

More broadly, our study's separation of private from public securities can explain why previous results on the importance of asymmetric information and risk to security issuance for multiple security types have been mixed. Previous studies that combine and examining multiple types of security issuance do not distinguish the market in which equity, in particular, is sold by public firms.[1] In addition, Frank and Goyal (2003) and Fama and French (2005) find that smaller firms do issue substantial amount of equity, calling into question the importance of asymmetric information to security issuance and the findings of Shyam-Sunder and Myers (1999) who examine large firms. Given small firms are commonly believed to be more subject to asymmetric information, the findings of these two papers seem to contradict the conclusion that asymmetric information is important to security issuance. However, given we distinguish private security issuance from public security issuance, our conclusion is different. We also find small firms issue substantial amounts of equity but show that those issues of equity by small firms with high measures of information asymmetry are most often privately placed, which can significantly mitigate the impact of asymmetric information and adverse selection problems.

Our paper is organized as follows. In Section 2 we provide the theoretical background and present the hypotheses we test. This section also presents the empirical framework for security-market choice that we use in our tests. Section 3 gives the details on the data and variables we use in our tests. Section 4 discusses the results. Section 5 presents robustness tests and Section 6 concludes.

2. Theoretical background and framework for security-market choice

A substantial amount of theory has focused on the role of asymmetric information as a primary determinant of the choice of security and market. In this section we review the main predictions of these models, and derive their main testable hypotheses. We then formulate a reduced form econometric model that enables us to test these hypotheses and estimate the implied sensitivity of the firms' security issuance choices to proxies for asymmetric information. Our primary focus is on the impact of asymmetric information on security issuance decisions. In Section 2.3, we also consider alternative security issuance theories including the classic trade-off theory, agency problems and risk, market timing and corporate governance influences on security issuance.

There are several potentially important differences between private and public markets that guide our development of hypotheses from existing theory. First, in a private offering, the issuer can provide new selective information to investors. There are important exemptions that allow for such selective disclosure during a private placement. Securities disclosure laws, including Regulation FD, exempt communications by the firm from the disclosure restrictions when those communications are to investors who "have expressly agreed to maintain the communication in confidence pursuant to a confidentiality agreement" (Houston and Laitin (2000)). New information can be learned by investors if they have one-on-one meetings with the issuer's managers and employees and/or visit the issuer's facilities. Secondly, issuers in a private placement have more incentives to release information

[1] Papers by MacKie-Mason (1990) and Helwege and Liang (1996) do identify private debt issues but still do not identify private equity issues as one type of security. Hovakimian et al. (2001) as well as Leary and Roberts (2010) use the firm's statement of cash flows to identify security issuance and thus do not identify private equity issues. These papers do not find much support for the importance of asymmetric information to security issuance and capital structure.

privately if they know that this information is not going to be received and used by their competitors. Moreover, given the concentrated stakes taken by some investors in private placements they have more incentives to expend effort into producing valuable information. Finally, investors are likely to select to invest in industries in which they have expertise and thus are more able to process and interpret the information gathered during the due diligence process.

2.1. Asymmetric information and security-market issuance hypotheses

The classic article that focuses on asymmetric information is Myers and Majluf (1984). Myers and Majluf show that asymmetric information results in a pecking order for external finance – with less informationally sensitive securities such as debt being chosen first by undervalued firms with asymmetric information. Moreover, this adverse selection problem may result in underinvestment because undervalued firms may refrain from raising finance due to the dilution cost of selling underpriced securities. Several papers that follow study how security design mitigates or solves the adverse selection problem. In particular, Brennan and Schwartz (1987) and Brennan and Kraus (1987) demonstrate that convertible securities can be used to solve the adverse selection problem.

In these models, investors only learn information from the type of security being issued and cannot directly learn or receive information about the issuers' value. While this is a good approximation of securities offered publicly, in private placements of securities information is likely to be learned by the investors during the due diligence process. Therefore, the prediction of the models cited above are appropriate to public offerings of securities, leading to the following testable hypothesis.

Hypothesis 1. Conditional on a public offering, the probability of issuing equity and convertibles relative to debt will decrease with the degree of asymmetric information.

Our next two hypotheses consider private markets. The interaction between the security and market choice decisions and asymmetric information is explored in Fulghieri and Lukin (2001) (FL), in a context where investors can produce information on the firm's value – which is particularly the case in private placements. They show that incentives for information production by private investors depend on the information sensitivity of the securities being issued and the costs of information production (i.e., the cost the private investor has to expend to obtain information). Their two main results are the following: (i) There exists a critical value of the information production cost such that equity is preferred to debt for all cases where the cost of information production is below this threshold (FL proposition 3); (ii) The threshold information production cost is an increasing function of the degree of information asymmetry with outside investors (FL proposition 5). The first result implies that equity will be more likely to be chosen over debt in markets where the information production cost is lower – which seems likely in private markets given the ability of firms to disclose information directly to private investors. The second result implies that equity is more likely to be issued than debt for firms with a higher degree of information asymmetry.

The intuition for the results is that the issuance of more information-sensitive securities provide greater incentives for information production by private investors. Maintaining constant the cost of information production, Fulghieri and Lukin predict that increasing the degree of information asymmetry, firms are more likely to issue equity versus debt, especially in private markets where the cost of producing information for and by private investors is likely to be lower. The Fulghieri and Lukin model leads to the following testable hypothesis:

Hypothesis 2. Conditional on a private offering, holding constant the cost of information production, the probability of issuing equity and convertibles relative to debt will increase with the degree of asymmetric information.

In private placements more information is likely to be disclosed by the issuer to investors, as information can be selectively not disclosed to competitors (James and Wier, 1988), and investors in private placements have more incentives to produce information given less free-riding. Private

placements thus dampen or reduce the adverse selection cost of asymmetric information to investors - but do not necessarily switch the ordering. Therefore, the benefits of issuing debt over equity given asymmetric information are likely to be less pronounced in private markets than the benefits of issuing debt over equity in the public markets. Alternatively, the sensitivity of the security choice in private markets is lower than in public market. These articles lead to the following hypothesis:

Hypothesis 3. In private placements, the sensitivity of security choice to the degree of asymmetric information is less pronounced than the sensitivity of security choice in public markets.

Note that the Hypotheses 1 and 2 imply Hypothesis 3 but the converse is not true. Hypotheses 1 and 2 combined indicate that the sign of the coefficients for public and private issue are of opposite sign. However, Hypothesis 3 just indicates that the effect of an increase of asymmetric information will be less (potentially with the same sign) for private than public equity and convertible issuance.

Our final two hypotheses consider the choice between public and private markets, and how private placements to one or few investors can be another mechanism that directly resolves the adverse selection problem. In the context of debt offerings, this point has been made theoretically by Boyd and Prescott (1986) and Diamond (1991) who argue that intermediaries such as banks have a cost advantage in producing information because a public offering to dispersed investors leads to either duplication of effort or a free-rider problem. In the context of initial public offerings of equity, Chemmanur and Fulghieri (1999) and Maksimovic and Picher (1999) model how asymmetric information affects the choice between going public and private placements. Chemmanur and Fulghieri (1999) show that firms with significant information asymmetry may prefer a private placement than going public, because private investors can produce additional costly information, thereby reducing the informational disadvantage, while such incentives are not present when shares are sold to dispersed investors.

Not all firms will choose private offerings as the cost of private placements is that public offerings allow for better diversification of risks and more liquidity. Private offerings may also give private investors a costly information monopoly or too much bargaining power as modeled by Rajan (1992), which increases the severity of the hold up problem.

While there are benefits to placing securities privately when asymmetric information problems are severe, some costs are also higher, and it remains an empirical question which trade-offs will dominate.

Hypothesis 4. Conditional on the security type (debt, equity or convertibles), private placements securities of a given type are more likely to be issued than their public counterparts with increases in the degree of asymmetric information.

Lastly, we hypothesize that the benefits of private placements vis à vis public offerings are also likely to be increasing in the information-sensitiveness of the security being issued. Private investors' information production capabilities are likely to be more relevant for equity issues than debt issues, as private information learned during the due diligence process is more likely to impact the value of equity than debt. Therefore, we expect to see the difference in the likelihood of issuing private versus public equity will be larger than the likelihood of issuing private versus public debt as asymmetry of information becomes more severe. We formalize this conjecture in the following hypothesis:

Hypothesis 5. Conditional on the security type, the likelihood of switching from public to private markets is increasing with the information-sensitiveness of the security.

2.2. Reduced form models of security-market issuance

To test the predictions of our hypotheses, we estimate several different econometric models of security-market issuance decisions.

In our reduced-form econometric models we assume that the firm wants to raise external funds I to invest in a project with positive net present value (NPV). Let the NPV of a firm that is issuing security j be $V_j(x)$ net of direct and indirect issuance costs, where x is a vector of exogenous, observable firm characteristics, and $j = eq, conv, debt, Eq, Conv, Debt$ denotes, respectively, private equity, private convertibles, private debt, public equity, public convertibles, and public debt. The firm chooses the securities-market J that maximizes firm value. We model the (unobserved) value function as a linear function of the observed relevant firm characteristics plus a random noise. We consider several different specifications, both multinomial logit and nested logit models, for the security issuance decision based on different assumptions about the random noise or error.

The multinomial logit model is one of the models we estimate. In this model, the random errors for each choice are independent and identically distributed with the extreme value distribution. The multinomial logit model, although appealing in its simplicity, turns out not to be a good model for security issue decisions.[2] In the multinomial logit model, it is assumed that choices between any two alternatives are independent of the others, i.e., the independence of irrelevant alternatives (IIA) assumption. The IIA assumption says that if one of the alternatives is removed from the model, the other alternatives will have a proportionate increase in their probability of being chosen. We test for whether the IIA assumption holds using a generalized Hausman test that allows for between model covariances of parameter estimates. It tests whether the results significantly change when one alternative is excluded. The Hausman tests show that the assumptions of the multinomial logit model do not hold for security issuance for the six security-market alternatives we examine.

Thus, we also estimate nested logit models which relax the IIA assumption within nests. Note that these models do *not* assume there is any timing or sequence of choosing market first or security first involved. Rather they allow us to estimate different *conditional* probabilities – allowing us to test different theories about security issuance. Our first three hypotheses (H1–H3) make predictions about issuance decision conditional on the market chosen, and our last two hypotheses (H4 and H5) make predictions about the market choice conditional on the security chosen. We estimate two different nested logit models: First, a nested logit model in which unobserved factors affect security choice conditional on the market, causing errors to be correlated across securities within markets. This model allows us to test our first three hypotheses (H1–H3). Second, a nested logit model in which unobserved factors affect market choice conditional on the security. This model allows us to test our last two hypotheses (H4 and H5). These models are estimated using the maximum likelihood estimation method.[3] Neither of these models make any assumption about the timing of security choice, rather they allow us to estimate different conditional probabilities of choosing different securities. In addition, we can transform the probabilities from one model into the other.

We analyze the goodness of fit for each model, comparing actual and predicted choices, and show later that both models fit the data well. In addition, in order to examine whether the nested logit is the 'right' model we evaluate the goodness-of-fit of the model. We first compute the Akaike information criterion (AIC) for the nested logit model and the multinomial logit model. The $AIC = 2K - 2\ln(L)$, where K is the number of parameters in the model and L is the maximized value of the likelihood function for the estimated models.[4] We find later that the AIC statistics are very close for the two nested logit models and significantly lower than the multinomial model. We also do not reject the assumption of IIA within the sub-nests for these nested logit models.

[2] We present the results of the simultaneous choice multinomial model in an earlier version. Examination of these results shows that our conclusions are similar and the results actually stronger than the results from the nested logit models.

[3] Another possibility is to use a multinomial probit model with a general correlation structure. We attempted to estimate this model, however it did not converge. Multinomial probit models are known to be computationally very intensive and become impractical when the number of choices is above three and there are a large number of observations.

[4] Burnham and Anderson (2002, p. 446) report that "as a rule of thumb" models having their AIC within 1–2 of the minimum have substantial support and should receive consideration in making inferences. Models having their AIC within about 4–7 of the minimum have considerably less support, while models with their AIC > 10 above the minimum have either essentially no support and might be omitted from further consideration or at least fail to explain some substantial structural variation in the data.

Model 1: Security choice conditional on market: In this model we estimate the unconditional sensitivity of the probability of choosing a market (public or private) to firm and market factors, and the sensitivity conditional on market type of the probability of choosing to issue debt, convertibles, or equity. Thus, we can use this model to test for a probability ordering of the conditional sensitivity of security issuance decisions to firm and market factors. In this logit model, we assume that the choice between security type conditional on the market (or nest) is correlated, and that the errors across markets are uncorrelated (see Train (2003)).[5] The value of each choice is given by:

		Market Choice	
		Private	Public
Security Choice (*Conditional on Market*)	Equity	$V_{eq} = b_{eq}x + b_{private}x + \varepsilon_e$	$V_{Eq} = b_{Eq}x + \varepsilon_E$
	Convertibles	$V_{conv} = b_{conv}x + b_{private}x + \varepsilon_c$	$V_{Conv} = b_{Conv}x + \varepsilon_C$
	Debt	$V_{debt} = b_{private}x + \varepsilon_d$	$V_{Debt} = \varepsilon_{Debt}$

In the above table b_jx is the additional value from choosing a particular security $j = eq, conv$, for private equity and convertibles relative to private debt, and $j = Eq, Conv$ for public equity and convertibles relative to public debt, with $b_{private}x$ the additional value a firm gets from making a decision to issue in the private markets.

A key property of the model, which involves estimating the predicted choice by using a nested logit specification, is that the odds ratio between grouped choices, say, public equity and public debt, conditional on the firm issuing publicly, is given by

$$\frac{P_{Eq}}{P_{Debt}} = \frac{\Pr[Y = Eq|public]}{\Pr[Y = Debt|public]} = e^{b_{Eq}x}. \quad (1)$$

Specifically, the coefficients from this model represent an increase in the log odds ratio relative to the base category. So if the coefficient b^k_{Eq} for public equity for variable x_k is positive (negative), then increases in this control variable x_k increase (decrease) the relative log odds ratio of issuing public equity over public debt, conditional on the firm issuing publicly, i.e., $\frac{d\ln\left(\frac{P_{Eq}}{P_{Debt}}\right)}{dx_k} = b^k_{Eq}$. Other similar relation hold for the relative odds of issuing different securities in the private markets.[6]

Using the coefficients of the nested logit model above, we can directly test Hypotheses 1–3 presented earlier in this section. Let $b^{ASY}_j (j = eq, conv, Eq, Conv)$ be the coefficients with respect to the asymmetric information variable. The tests of Hypotheses 1–3 can be written as:

$$\text{Hypothesis 1}: \quad b^{ASY}_{Eq} < b^{ASY}_{Conv} < 0$$
$$\text{Hypothesis 2}: \quad b^{ASY}_{eq} > b^{ASY}_{conv} > 0$$
$$\text{Hypothesis 3}: \quad b^{ASY}_{Eq} < b^{ASY}_{eq} \text{ and } b^{ASY}_{Conv} < b^{ASY}_{conv}$$

Model 2: Public versus private market choice conditional on security: Using this model we can estimate the sensitivity of market choice (public versus private) *conditional on security type*. This model thus allows for a test of how the probability of choosing private over public markets, conditional on the security sold, depends on firm and market specific factors such as asymmetric information.[7] The value of the choices is given in the following table:

[5] We assume that the errors have a generalized extreme value distribution (GEV) (see Train (2003)). For any two alternatives in two different nests, say, private debt and public convertibles, the errors are uncorrelated. But for two alternatives in the same nest, the errors are correlated.

[6] The nested logit model implies that the independence of irrelevant alternatives holds within each nest (security choice given the market). We find that when we estimate a conditional multinomial logit model using just private or public issues, the IIA assumption holds.

[7] Given that there are only two choices in each nest in this model, we do not have to worry about the IIA assumption within nests.

		Security Choice		
Mkt Choice		Equity	Convertibles	Debt
(*Cond. on Security*)	Priv.	$V_e = a_{priv,eq}x + a_{Eq}x + \varepsilon_e$	$V_c = a_{priv,conv}x + a_{Conv}x + \varepsilon_c$	$V_d = a_{priv,debt}x + \varepsilon_d$
	Pub.	$V_E = a_{Eq}x + \varepsilon_E$	$V_C = a_{Conv}x + \varepsilon_C$	$V_D = \varepsilon_D$

In the above table $a_{Eq}x$ and $a_{Conv}x$ are the values of choosing equity and convertibles irrespective of market, for a given characteristic x (debt is normalized to zero), and $a_{priv,j}x$ is the additional value from the private choice over the public choice for security choice j indexed by $j = eq, conv, debt$, respectively, for equity, convertibles and debt.

As in model 1, we can examine the coefficients from estimating the nested logistic model to examine the impact of an increase in specific variables on the relative log odds ratio. If the coefficient $a^k_{priv,eq}$ is positive (negative) then increases in the control variable x_k increases (decreases) the probability of issuing private equity over public equity, *conditional* on the firm issuing equity. Similar relations hold for convertible and debt securities. Our focus is on asymmetric information thus we examine the coefficients on the asymmetric information variable for private equity, $a^{ASY}_{priv,eq}$, private convertibles, $a^{ASY}_{priv,conv}$, and private debt, $a^{ASY}_{priv,debt}$. These coefficients represent changes in the relative odds ratio of issuing the private security relative to the public security of the same type, as the asymmetric information variable increases. Examining these coefficients allows us to test the Hypotheses 4 and 5 discussed in the previous section about the relevance of the market choice conditional on the security choice.

Specifically the tests of Hypotheses 4 and 5 can be written as:

$$\text{Hypothesis 4}: \quad a^{ASY}_{priv,eq} > 0, a^{ASY}_{priv,conv} > 0, a^{ASY}_{priv,debt} > 0$$

$$\text{Hypothesis 5}: \quad a^{ASY}_{priv,eq} > a^{ASY}_{priv,conv} > a^{ASY}_{priv,debt}$$

2.3. Alternative security issuance theories

While the focus of the paper is on the effect of information asymmetry we also consider other theories of capital structure, in particular, to motivate the choice of our control factors. These alternative theories, discussed in this section, can also be analyzed in the context of the nested logit models we propose in this paper, generalizing the analysis of previous papers to all market/security combinations.

2.3.1. Tradeoff theory

The tradeoff theory of capital structure predicts that firms choose their optimal capital structure by trading off the tax deduction benefits of debt financing against financial distress costs. The tradeoff theory thus predicts that profitable firms should be more highly levered, or be more likely to issue debt than equity, to offset corporate taxes (Frank and Goyal (2009)).

Moreover, incentives to use debt financing increase with a firm's marginal tax rate due to deductibility of interest expenses. We extend the tests of the tradeoff theory to both public and private markets, by including a profitability measure, a financial distress measure, and Graham's (1996) marginal tax rate in both nested logit models.

2.3.2. Agency problems between security holders

In another strand of the capital structure literature, agency problems between security holders are also extensively addressed. Research classifies two types of agency problems between security holders: the asset substitution problem (Jensen and Meckling, 1976) and the debt overhang or underinvestment problem (Myers, 1977).

The simplest solution to these debt-holder and equity-holder agency problems is to issue equity rather than debt. Moreover, Brennan and Schwartz (1988) proposes that convertibles can mitigate

agency costs of debt as convertibles provide incentives for managers not to undertake projects with excessive risk. These theories thus generate the testable hypothesis, using our model 2, that the likelihood of firms issuing equity and convertibles relative to debt increases with risk and investment opportunities, for both private and public markets.

2.3.3. Market timing

We also examine in our context the practice among firms of "equity market timing," i.e., firms issuing equity when their market values are high relative to past market values. We investigate whether the practice of market timing takes place among private equity issues. Given that private investors are likely to be more sophisticated and produce information, we expect that market timing by firms is less intense for private equity issues than is the market timing of public equity issues. We thus examine short-run security issue timing similar to Asquith and Mullins (1986).

2.3.4. Corporate governance

Agency problems between managers and shareholders can also create significant distortions and the security and market choice could be chosen to address corporate governance problems. For example, the importance of debt as a mechanism to mitigate agency problems has been argued by many, notably Jensen (1986).

The threat of takeover or loss of control is an alternative (or substitute) mechanism to the use of debt in curbing managerial distortions. Indeed Jensen and Ruback (1983) and Shleifer and Vishny (1989) argue that agency problems among shareholders and managers are particularly severe when managers can resist hostile takeovers.

In addition, monitoring by large investors is another mechanism to deal with managerial excess considered in the literature (e.g., Shleifer and Vishny, 1989; Kahn and Winton, 1998). A private placement of a block of shares to an investor that naturally becomes a large shareholder is a direct way to improve monitoring and concentrate ownership. We include corporate governance provisions in our specifications to examine empirically whether these provisions impact security issuance differentially in public and private markets.

3. Data and variables

3.1. Data

We study security issuance by public US corporations from January 1995 to December 2003. The data on securities issuance comes from three different databases: the PlacementTracker Database of Sagient Research Systems and the Securities Data Corporation (SDC) new-issues database, and the DealScan database of the Loan Pricing Corporation for debt issues.

We exclude secondary offerings in which the company is not issuing new shares, and short-term debt offerings, those offerings with a maturity of less than 1 year. We exclude short-term debt offerings because these are typically viewed as part of net working capital and not as part of capital structure. In the cases where there are multiple security issues of the same type in a given market within a 3 month period, we aggregate these issues into one observation for a given firm. In our dataset, this criteria only affects debt offerings which commonly have tranches or multiple loans in a three-month period. We do this aggregation over a three month period so all of our explanatory variables (described later) are for the quarter prior to the issue.

A private placement is a private sale of unregistered securities by a public company to a selected group of individuals or institutional investors without general investor solicitation. These sales are typically made to a small number of investors (the median (mean) number of investors in our private equity offerings is 3 (5.4)) and are generally conducted in accordance to the "safe harbor" provisions of Regulation D of the 1933 Securities Act.[8] Prior to negotiations leading up to the sale of securities

[8] Regulation D is an SEC Rule that allows public companies to issue stock privately, without the need for public registration prior to the sale, to an unlimited number of accredited investors and no more than 35 non-accredited investors.

privately, investor(s) conducting negotiations with the firm will sign a confidentially agreement that precludes them from trading on any information privately revealed. In fact, the mere fact that they sign the agreement and learn of the issue classifies them as an insider even if they do not purchase any securities until the issue has been publicly announced.

The PlacementTracker database is a comprehensive source for information on private placements of equity-linked securities are also commonly referred to as Private Investments in Public Equity, or PIPEs. We exclude from our sample a few transactions classified as common stock shelf sales and equity line arrangements, because they typically require a registration statement to be effective prior to the sale of the stock, technically making them public offerings. This source for private equity is more comprehensive than SDC having 2.5 times as many private equity issues for the same period as SDC.

After matching with Compustat and CRSP, and excluding financial companies and regulated firms, we have a total of 1377 private equity issues made by 838 companies and 1156 private convertible issues made by 748 companies.

Our sample of private corporate debt is from the DealScan database. We include in our sample only long-term commercial loans and revolving credit lines. We exclude short-term loans and credit lines as these are used frequently for working capital and also may not be drawn down. Thus, for example, we drop 364-day facilities and any other loan with less than 1 year of maturity. We also drop credit lines whose primary purpose is to back up commercial paper, since those credit lines are seldom used.

Companies often borrow by using multiple loans or tranches at the same time or close to the same time. As mentioned, we aggregate all tranches into a single transaction or deal, adding up the amount of all long-term loans and revolving credit lines of the same type of security over a 3 month period. Our final sample of private corporate debt involves 5609 deals by 2667 different companies over the 1995–2003 period (mean (median) number of 2.1 (2) private debt offerings per company). The most common type of private debt is revolving credit lines (78% of the deals) followed by term loans (18% of the deals). In case of multiple tranches we determine the deal type based on the type of the largest tranche.

We also include in our data set Rule 144-A convertible and debt issues, which are also private placements of unregistered securities. The key distinction we explore between publicly and privately placed securities is that in the latter there are fewer investors purchasing securities and the private (unregistered) securities they acquire are less liquid. Private placement investors are then likely to have more incentives to produce information and to monitor. The institutional details and our data indicate that 144-A issues and public issues are similar, but 144-A and private offerings are quite different (see, for example, our results in Table 3). Thus, throughout most of our analysis, we aggregate 144-A and public offerings. We also consider a full eight-choice model in which we look separately at the choice of 144-A convertibles and debt, and find similar results.

We match the data obtained from these sources to Compustat and CRSP, to obtain information on firm financials and stock prices. Following standard practice in the literature, we excluded from our sample financial firms (SICs 6000–6999) and regulated utilities (SICs 4900–4999). Matching to CRSP and Compustat yields a total of 17,634 transactions during the 1995–2003 period. We drop observations with insufficient stock price information in CRSP (1506) and without information in Compustat on assets, debt, or earnings at the fiscal year ending before the issue date (1851). Note that we need data from Compustat for 2 years prior to the security issue given the lagged debt ratio is computed as debt ratio divided by lagged assets. These requirements give us 13,419 transactions. For these transactions, there are 11,770 observations with data on the marginal tax rate, 10,523 observations with data on corporate governance and 11,209 observations with IBES analyst data. The intersection of these databases yields 8346 security issues by 2472 distinct firms used in the regressions. The median (mean, maximum) number of security issues per firm is 2 (3.38, 34) issues. In our tables, each observation is a security issue and thus there are firms with multiple issues combined with single issuer firms in our tables. We do separate out the firms that are repeat issuers and examine them separately in two of our later tables.

3.2. The variables

We consider several different proxy variables to examine the impact of asymmetric information and also include additional variables to examine the impact of risk, investment opportunities, market timing, corporate governance and market conditions. These variables are obtained and calculated as follows:

3.2.1. Asymmetric information

We match our dataset to IBES to use analyst earnings forecasts as our main proxy variables for asymmetric information. The main idea is that dispersion among analysts' forecasts and analysts' earnings surprises are two measures that are positively correlated with information asymmetry (between managers and investors). Lang and Lundholm (1996) show that both analysts' forecast accuracy and dispersion significantly decrease when firms make more informative disclosures about future earnings (see also Ajinkya et al. (1991)). Better firm disclosure reduces information asymmetry and thus we expect a positive relation between both dispersion and earnings surprise and information asymmetry. Note that information disclosure can also be costly (or not credible because firms want to increase their share price). For example, competitors are also able to observe publicly disclosed information, so public disclosures can potentially reduce firm value (James and Wier (1988)).

In our study we use analysts' forecasts for the company's upcoming quarterly earnings release in the IBES summary history database. We compute a quarterly *analyst earnings surprise* as the absolute value of the difference between the median quarterly earnings estimate and the actual quarterly earnings per share, normalized by the stock price at the fiscal quarter end (we also consider the robustness to alternative normalizations based on the book value of equity per share and earnings per share). A similar approach is used to construct the quarterly*analyst earnings dispersion* measure: it is the standard deviation of outstanding earnings forecasts normalized by the stock price. Note that this measure is only available if there are at least two outstanding earnings forecasts.

Even though all firms in our sample are public, they may have incentives to disclose more information prior to a public issue than prior to a private issue. To control for this endogeneity and potential change in firms' disclosure policy prior to a financing round, when we build our measures for forecast accuracy and dispersion we drop the most recent quarter before the issue date, and we use the average of the last four quarters ending a quarter before the issue date. Thus the earnings surprise and dispersion measure used for each deal is the mean quarterly earnings surprise and dispersion for the last four quarters ending a quarter before the issue date. The surprise and dispersion measures are trimmed to remove the most extreme 1% observations. This serves to remove outliers and potentially misrecorded data.

For robustness we also examine three other measures of asymmetric information. The first of these is the insider trading measure used by Lakonishok and Lee (2001). For each issue we compute the net purchase ratio calculated as the number of shares purchased minus shares sold by insiders in the last six months before the issuance month divided by the number of shares purchased and sold during the same period.

The second measure of asymmetric information is the abnormal stock return to lagged earnings announcements. We compute for each issue the average of the absolute value of the abnormal cumulative return (using a market model) 2 days around the earnings announcement day for the last four quarters prior to the security issuance.

The third measure is a composite measure and comes from stock returns and the volume of stock trading relative to shares outstanding. We calculate this measure following Bharath et al. (2009).[9] The different stock return and volume measures we use from Bharath et al. (2009) include the following: Roll's (1984) measure using the serial correlation of stock returns, a stock's turnover measured as the

[9] We do not use the PIN measure that is used in addition to these measures by Bharath et al. (2009) as this measure captures asymmetric information among outside shareholders and, more importantly, is not available for smaller stocks traded on the NASDAQ. The Bharath, Pasquariello and Wu study thus focuses on larger firms than the firms in this study and they do not examine private securities. This omission may not affect their results as the larger firms in their sample are less likely to be private security issuers.

inverse of a stock's average trading volume divided by the number of shares outstanding, and a stock's return autocorrelation using the methodology of Llorente et al. (2002). We form a quintile ranking for these different stock return and volume measures and then average the resulting quintiles. Quintiles are formed for each of these measures with quintile one containing stocks with the lowest values of each measure and then we average the quintile measures over these three volume and return based measures to form an aggregate measure of asymmetric information.

3.2.2. Tradeoff theory variables

We describe how we calculate the main control variables included in our regressions.

Profitability is operating cash flow before depreciation divided by lagged assets (data13/lagged data6). All variables are computed for the last fiscal year ending before the transaction date. We also include a *financial distress* indicator variable equal to one if Altman's *Z*-score is less than 1.81 and zero otherwise. Altman (2000) shows that a *Z*-score below 1.81 is a good predictor of corporate distress.

Other control variables include a firm's *debt/asset ratio*, calculated as long term debt divided by book value of assets (Compustat data numbers: data9/lagged data6), the *log of firm value* (*log firm size*) which is equal to market value of equity plus book values of preferred stock and total debt (Compustat data numbers: data24 $*$ data25 + data9 + data34 + data39), and a firm's marginal tax rate. The data on a firm's *marginal tax rate* was kindly provided to us by John Graham and is described in more detail in Graham (1996) and Graham and Lemmon (1998). For our transactions, there are 11,770 observations with data on the marginal tax rate.[10]

3.2.3. Risk, investment alternatives, taxes and a firm's need for funds

Risk is measured by the firm's *cash flow volatility* calculated as the standard deviation of cash flow (operating income before depreciation, Compustat data number: data13) using up to twenty fiscal quarters prior to the deal date. We require a minimum of four quarters prior to the deal issue date for this measure to be calculated.

Investment opportunities is measured by the *Tobin's q*, which is calculated as the market value of the firm divided by the book value of assets (data6), R&D divided by lagged property plant and equipment, which is defined as the total of R&D plus advertising (Compustat data numbers ((data45 + data46)/lagged data8)).

We also include an instrumented measure of a firm's "need for funds" (its internal funding deficit). This measure is constructed for the year prior to the issue and is calculated as capital expenditures (Compustat data number: data128) plus the change in net working capital (−data302 −data303 −data304 −data305 −data307 +data274 −data312 −data301) less a firm's cash flow from operations (data13). We include this measure to control for the possibility that a firm may go to the private market, not because of asymmetric information or risk, but because it only needs a smaller amount of funds given the private markets may have a smaller fixed cost of raising capital. We also recognize that this measure may be endogenous as a small calculated "need" or deficit may not be indicative of actual need as the firm may also have been constrained in the past. Thus we instrument the measure of a firm's financial need with industry instruments and lagged firm instruments and use the predicted value in our regressions.[11] We use as instruments median industry Tobin's *q*, median industry capital intensity (capital expenditures divided by sales), lagged firm size (total assets), lagged firm size squared, and lagged profitability. These instruments follow from Maksimovic and Phillips, 2008 prediction of external financial dependence.

For all firm-specific constructed variables except Tobin's *q*,marginal tax rate and firm size we eliminate outliers by dropping the top and bottom 1% of the sample in each year.[12] Given correlation of variables, this screen affects only approximately 3% of the sample (in addition many of these observations would be dropped given missing values for some variables). We also eliminate firms whose

[10] Like Graham (1996), we use the marginal tax rate *after* deductions for depreciation, interest and leasing expenses.

[11] Note including predicted financial need or deficit is meant to capture the same idea of the fixed cost of raising capital that the issue size would capture without the endogeneity problems that would arise from including a choice variable.

[12] Instead of eliminating these observations, we also winsorized observations. We set positive (negative) outliers to the 99th (1st) percentile. Results were unaffected by this change.

lagged book value of assets are less than 1 million dollars and whose Tobin's *q* is in the 99th percentile or above.

3.2.4. Market-timing and market conditions

Using CRSP data we calculate a firm's *cumulative abnormal return*250 days prior to the deal minus the excess return relative to a benchmark portfolio of firms in the same size decile at the end of the year previous to the transaction (we also used risk-adjusted beta decile portfolios for robustness). For each deal we also compute the abnormal excess return using a 10 trading-day window around each issue- the parameters of the market model were estimated in the prior 250 trading days ending at the beginning of the event window.

We include four market variables in our regressions to capture aggregate market conditions in the public markets. We include the *Aaa bond yield*, a *credit spread* to capture a distress risk premium, measured as the Baa less the Aaa bond yield- we use the value of these variables as of the end of the previous month before the issue date. To capture conditions in the public equity markets we include the *cumulative market return* over the 250 days prior to the security issue date. Third, we include the market implied volatility, the VIX, which is Chicago Board Options Exchange volatility index from options on the S& P 500 index. We include the value from the day the security issue is announced. Finally to control for industry-specific factors we include Fama and French industry dummies (17 industry categories) in all regressions we estimate.

3.2.5. Corporate governance

Our proxy for the degree of agency costs of equity is the quality of corporate governance as reflected by the provisions adopted by firms in their charters and bylaws. We follow the approach used by Daines and Klausner (2001) to build a corporate governance measure. They focus on four key anti-takeover provisions on the charter and bylaws that erect significant barriers to a hostile acquisition: (1) dual-class shares; (2) a classified (or staggered) board; (3) prohibition of shareholders voting by written consent; and (4) prohibition of shareholders calling a special shareholder meeting. Daines and Klausner (2001) argue that (2) and (3) are almost perfect substitutes so there is a shareholder voting restriction if and only if (3) and (4) are both in place.

We construct a rank level ordering measuring the *quality of corporate governance* following Daines and Klausner (2001, p. 116): (1) (worst), if the firm has dual-class shares or has a classified board and a shareholder voting restriction; (2) if the firm has a classified board but no shareholder voting restriction or dual-class shares; (3) if there is a shareholder voting restriction but not a classified board or dual class shares; and (4) (best) if the firm has none of the restrictive provisions above.[13]

Our data on corporate governance provisions are from three different sources: the Investor Responsibility Research Center (IRRC) dataset on takeover defenses, SharkRepellent.net dataset, and, for a randomly selected sample of 2000 deals not matched to any of the two datasets, we hand collected the information from the firm's charter and bylaws. We find the information on a firm's charters and bylaws on the SEC Edgar web site typically in a firm's S-1 registration statement at IPO or in a later 8-K or 10-K filing if there have been any amendments to the charter or bylaws. The information we use to construct the governance measure is based on the provisions prevailing in the charters and bylaws before the deal date.[14] The use of takeover defenses in our sample is similar to the results reported in Daines and Klausner (2001), Field and Karpoff (2002), and Gompers et al. (2003). The distribution of the corporate governance measure is, in increasing order, 31% (worst), 29%, 6%, and 34% (best), for the 10,523 deals with complete information.

[13] Daines and Klausner (2001) also make a further refinement based on whether the charter require a 90 days or more advance notice for the nomination of board candidates. We chose not to use this provision because it is not available in the IRRC dataset (also we believe this provision is not as relevant as the other ones).

[14] IRRC data is available for 1990, 1993, 1995, 1998, 2000, and 2002. SharkRepellent.net does not record historical information, so we used the current information for 2700 deals matched to SharkRepellent.net. However, since firms seldom change provisions in charters and bylaws, we believe that this procedure is not likely to introduce significant measurement errors.

Table 1
Number and gross proceeds of securities issued by year.

Year		Public			144-A		Private			Total
		Debt	Convertibles	Equity	Debt	Convertibles	Debt	Convertibles	Equity	
1995	*N*	210	25	217	46	21	500	30	50	1099
	$MM	38,735	3277	13,791	6328	2480	154,573	456	656	220,295
	%FV	8%	27%	24%	36%	18%	33%	17%	13%	25%
1996	*N*	233	32	274	71	41	659	108	64	1482
	$MM	53,354	6053	16,943	11,643	5397	198,719	1660	628	294,398
	%FV	10%	19%	26%	45%	45%	32%	21%	16%	26%
1997	*N*	224	26	224	186	69	729	155	66	1679
	$MM	59,355	3792	14,011	37,009	11,433	246,692	2560	1135	375,987
	%FV	8%	21%	24%	32%	26%	32%	13%	13%	25%
1998	*N*	289	18	146	181	46	640	130	78	1528
	$MM	89,008	4496	14,509	49,079	10,776	142,502	1020	664	312,054
	%FV	6%	11%	20%	31%	15%	37%	14%	11%	24%
1999	*N*	184	21	173	118	36	603	148	170	1453
	$MM	69,356	11,265	22,442	46,908	9808	131,33	4534	2211	297,855
	%FV	8%	9%	22%	22%	15%	37%	16%	14%	25%
2000	*N*	139	22	174	40	64	602	178	221	1440
	$MM	58,039	11,723	30,893	32,320	20,287	172,31	9690	7121	342,383
	%FV	4%	11%	24%	19%	24%	34%	15%	13%	23%
2001	*N*	191	29	136	140	91	619	154	250	1610
	$MM	104,940	13,557	16,434	69,197	39,370	146,627	3873	5878	38,735
	%FV	5%	7%	14%	19%	31%	31%	16%	14%	20%
2002	*N*	190	11	129	88	50	613	136	209	1426
	$MM	82,772	8030	16,256	24,446	17,299	145,998	4320	3012	302,134
	%FV	4%	6%	11%	20%	20%	29%	12%	11%	18%
2003	*N*	160	17	169	147	179	644	117	269	1702
	$MM	80,685	10,165	18,484	44,040	42,627	154,405	2574	4296	357,275
	%FV	5%	7%	21%	19%	18%	29%	19%	20%	22%
Total	*N*	1820	201	1642	1017	597	5609	1156	1377	13,419
	$MM	636,245	72,357	163,762	320,968	159,477	1,493,159	30,686	25,601	2,902,255
	%FV	7%	14%	22%	27%	17%	33%	15%	15%	23%
%FV	(med)	3%	9%	15%	16%	13%	22%	9%	9%	13%

This table shows the number of issues, the total gross proceeds raised in millions of dollars, and the mean amount raised as a percent of firm value (%FV) for each year and security-market choice. We obtain our information on all public issues and 144-A debt issues from SDC, on private debt from DealScan, and on private equity and convertibles and 144-A convertibles from PlacementTracker. We include securities if the issuing company is matched to Compustat and CSRP. We exclude financials and regulated utilities.

4. Results

4.1. The sample

Table 1 summarizes our sample of public firms and their issue decisions by year and for the entire period. We present data for eight different security types: public equity, convertibles and debt, private equity, convertibles and debt, and Rule 144-A debt and convertibles. The total amount raised from 1995 to 2003 was over $2.9 trillion and the mean (median) amount raised by each deal is also large, representing 23% (13%) of the total firm value. The median firm financed two times during the period (most of the multiple issues are multiple debt offerings by the same company). There are 13,419 issues in total. As described in the data section earlier, we are able to get a full set of control variables with no missing data for 8346 issues which we use in the later regressions.

Table 1 shows that private equity and private convertible issues are a substantial fraction of securities issued by public companies. This fraction has also been increasing over time with the number of private equity issues exceeding public equity issues from the year 2000 to 2003, the last year of our database. Second, the number of private convertibles is greater than the number of public convertibles for all years since 1995. The table shows that while private debt issues are larger than public debt issues, private equity issues are smaller and represent a smaller fraction of firm value. Third, the size of private equity issues and the size of issuers has also grown sharply in the later years. In later years the size of private equity issues on average is almost 25% of the size of an average public equity issue. Finally, Table 1 shows that Rule 144-A debt and convertible issues are closer in size to public debt and convertible issues than private issues.

Table 2 summarizes the sample by firm size. We split firms into quartiles by the amount of their lagged pre-issue assets. Overall, 51% of the issues by public firms are in the private markets. The table also shows that small public firms disproportionately issue private equity and private debt. The table shows that 98.8 (97.7, 62.6) percent of the debt (convertible, equity) securities issued by smallest firms are in the private market. The private debt statistics are probably not that surprising given that our sample includes bank loans. However, we view the comparison between the private equity and public issues as very striking. Combining the equity and convertible issues, 73% of the equity and convertible issues by small public firms (firms in the lowest size quartile) are in the private markets, with 27% of the equity and convertibles being issued in the public and 144-A markets. Firms in the second size quartile also issue more public equity and less private equity than the first size quartile but more private equity than firms in the third or fourth quartiles. Comparing across all size groups, the firms in the smallest size quartile issue 67.8% of the private convertibles and 68.6% of the private equity issues. Public firms issuing private securities are disproportionately in the first and second size quartiles.

Table 3 summarizes the major firm- and market-specific variables that we examine. In Panel A, we present summary statistics in this table for the whole sample and also for each of the eight security categories. We present means, standard deviations and the number of observations for each variable. Panel B of Table 3 presents *t*-statistics testing whether the means and Mann-Whitney tests of whether the medians from Panel A are different across issue types.

Table 3 show several interesting and significant patterns across the variables. First, columns one and two of Panel A show our measures of asymmetric information, analyst earnings surprise and dispersion, are both significantly higher (test statistics for significant differences in means and medians are presented in Panel B) for securities issued in the private market than in the public market, consistent with the view that there is more asymmetric information for companies involved in private deals. Note that the surprise measure is available for 11,209 of the transactions (85% of total) and the dispersion measure for 9793 (75% of total). The dispersion measure is available for fewer deals as we require at least two earnings forecasts for this measure.

Table 3 also shows that public firms that issue privately are smaller, have higher cash flow volatility (our measure of risk), higher R&D ratios and higher Tobin's *q*s versus private securities of the same security type. Firms that issue in the private market, however, have lower profitability and higher measure of financial distress despite having less debt. While private convertible issuers are sharply different from public issuers, issuers of convertibles in the 144-A market are not significantly different

Table 2
Security issuance by size quartiles.

Size quartiles (by lagged assets)	Public			144-A		Private		
	Debt	Convertibles	Equity	Debt	Convertibles	Debt	Convertibles	Equity
Smallest firms								
Number of issues	11	18	564	51	44	938	784	945
% of issues of security type	0.60%	8.96%	34.35%	5.01%	7.37%	16.72%	67.82%	68.63%
% of issues of total issues	0.08%	0.13%	4.20%	0.38%	0.38%	6.99%	5.84%	7.04%
% Issues Private/(Public + Private in size quartile)						98.84%	97.76%	62.62%
Second size quartile								
Number of issues	42	36	574	211	152	1,773	257	310
% of issues of security type	2.31%	17.91%	34.96%	20.75%	25.46%	22.51%	22.51%	22.51%
% of issues of total issues	0.31%	0.27%	4.28%	1.57%	1.13%	13.21%	1.92%	2.31%
% Issues Private/(Public + Private in size quartile)						97.69%	87.71%	35.07%
Third size quartile								
Number of issues	295	56	369	412	225	1,819	92	87
% of issues of security type	16.21%	27.86%	22.47%	40.51%	37.69%	32.43%	7.96%	6.32%
% of issues of total issues	2.20%	0.42%	2.75%	3.07%	1.68%	13.56%	0.69%	0.65%
% Issues Private/(Public + Private in size quartile)						86.05%	62.16%	19.08%
Largest firms								
Number of issues	1472	91	135	343	176	1,079	23	35
% of issues of security type	80.88%	45.27%	8.22%	33.73%	29.48%	19.24%	1.99%	2.54%
% of issues of total issues	10.97%	0.68%	0.17%	2.56%	1.31%	8.04%	0.17%	0.26%
% Issues Private/(Public + Private in size quartile)						42.30%	20.18%	20.59%
Total issues	1820	201	1642	1017	597	5609	1156	1377

This table shows the number of issues and the percentage of issues by size category. Size categories are quartiles based on lagged assets. The percentage of issues of security type is the number of issues of a particular security type for a size quartile divided by total issues of that same type. The percentage of issues of total issues is the number of security issues of a particular type for a size quartile divided by total number of issues. The percentage issues of Private divided by Public plus Private is the number of private security issues of a particular security type divided by the public and private issues of that same security type for a given size quartile.

Table 3
Summary statistics.

Security/market		Analyst earnings surprise	Analyst earnings dispersion	Cash flow volatility	R&D lagged PPE	Tobin's *q*	Debt/ asset ratio	Marginal tax rate (%)	Profitability (OCF/lagged assets)	Financial distress	Cumulative abnormal return prior 250 days	Corporate governance	Firm value ($ millions)
Panel A: Summary statistics by security-market choice													
Public debt	Mean	0.7%	1.2%	2.4%	13.3%	1.6	26.8%	25.1%	18.0%	10.1%	6.8%	3.3	24,561
	Med	0.3%	0.2%	1.9%	2.5%	1.3	25.2%	35.0%	17.4%	0.0%	1.4%	3.0	7841
	Stdev	1.9%	5.3%	2.8%	29.5%	1.1	14.9%	14.5%	8.2%	30.2%	42.3%	1.2	45,161
	N	1756	1717	1820	1820	1820	1820	1705	1820	1820	1820	1712	1820
Public convertibles	Mean	18.3%	1.9%	4.2%	32.6%	2.0	27.5%	1.4%	1.4%	21.4%	43.4%	3.2	8152
	Med	0.6%	0.4%	2.4%	0.0%	1.4	27.0%	17.7%	14.2%	0.0%	18.0%	3.0	2346
	Stdev	4.5%	4.7%	5.5%	102.2%	2.0	17.4%	16.0%	18.9%	41.1%	101.4%	1.3	19,600
	N	187	180	201	201	201	201	180	201	201	201	175	201
Public equity	Mean	1.9%	1.1%	8.0%	110.4%	2.7	22.4%	13.1%	13.1%	13.1%	83.5%	3.4	1449
	Med	0.6%	0.3%	4.5%	4.3%	1.8	17.6%	21.2%	16.0%	0.0%	44.7%	3.0	367
	Stdev	5.4%	3.3%	13.4%	233.5%	2.3	22.2%	16.1%	26.8%	33.7%	134.1%	1.2	5358
	N	1491	1326	1642	1642	1642	1642	1337	1642	1642	1642	1167	1642
144-A convertibles	Mean	2.9%	2.0%	3.9%	n2.9%	1.4	37.6%	17.9%	15.3%	30.9%	18.8%	3.2	5340
	Med	0.7%	0.5%	2.5%	0.0%	1.1	35.8%	18.3%	14.6%	0.0%	4.0%	3.0	1162
	Stdev	10.0%	5.9%	4.9%	44.1%	1.21	22.0%	15.8%	%46.2%	46.2%	75.2%	1.2	17,638
	N	930	851	1017	1017	1017	1017	915	1017	1017	1017	814	1017
144-A debt	Mean	2.4%	17.8%	6.2%	100.6%	2.4	23.5%	15.1%	17.8%	17.8%	50.9%	3.5	4258
	Med	0.5%	0.3%	3.7%	12.2%	1.6	20.3%	3.7%	12.2%	0.0%	17.5%	3.0	1255
	Stdev	9.2%	4.7%	10.6%	216.9%	2.4	21.2%	15.8%	38.2%	38.2%	152.9%	1.2	9413
	N	571	551	597	597	597	597	502	597	597	597	524	597
Private debt	Mean	3.6%	1.7%	4.8%	29.5%	1.5	23.6%	20.5%	14.0%	14.0%	4.9%	3.3	2777
	Med	0.7%	0.4%	3.1%	5.9%	1.1	20.7%	%0.9%	15.1%	0.0%	−5.9%	3.0	468
	Stdev	11.7%	5.4%	7.1%	89.8%	1.2	89.8%	15.6%	34.7%	34.7%	66.5%	1.2	10,934
	N	4784	4166	5609	5609	5609	5609	4993	5609	5609	5609	4058	5609
Private convertibles	Mean	16.2%	5.8%	17.0%	161.9%	2.7	16.5%	4.5%	−22.0%	32.9%	1.8%	3.8	374
	Med	5.6%	1.8%	11.5%	56.7%	1.7	7.5%	0.7%	−17.3%	0.0%	−30.4%	4.0	65
	Stdev	27.4%	10.5%	21.3%	255.0%	2.7	21.3%	47.0%	34.4%	47.0%	131.4%	1.2	1752
	N	638	428	1156	1156	1156	1156	976	1156	1156	1156	905	1156

(*continued on next page*)

Table 3 (*continued*)

Security/market		Analyst earnings surprise	Analyst earnings dispersion	Cash flow volatility	R&D lagged PPE	Tobin's *q*	Debt/ asset ratio	Marginal tax rate (%)	Profitability (OCF/lagged assets)	Financial distress	Cumulative abnormal return prior 250 days	Corporate governance	Firm value ($ millions)
Private equity	Mean	13.4%	5.3%	17.6%	244.7%	3.0	12.3%	4.5%	−25.1%	26.2%	24.5%	3.8	486
	Med	3.9%	1.5%	11.3%	111.6%	2.1	1.4%	0.8%	−21.4%	0.0%	−10.6%	4.0	79
	Stdev	24.8%	10.3%	22.6%	333.5%	2.8	18.6%	9.8%	35.8%	44.0%	131.2%	1.2	3234
	N	852	574	1377	1377	1377	1377	1162	1377	1377	1377	1168	1377
Total	Mean	4.2%	1.9%	7.2%	72.7%	1.9	23.2%	17.5%	7.6%	17.8%	20.2%	3.4	5468
	Med	0.7%	0.4%	3.5%	3.7%	1.3	20.0%	15.1%	13.6%	0.0%	0.9%	3.0	520
	Stdev	13.5%	6.0%	%6.0%	187.2%	1.9	20.6%	13.0%	26.4%	38.3%	99.2%	1.2	20,590
	N	11,209	9793	13,419	13,419	13,419	13,419	11,770	13,419	13,419	13,419	10,523	13,419

Statistics for difference in market	Analyst earnings surprise	Analyst earnings dispersion	Cash flow volatility	R&D/ lagged PPE	Tobin's *q*	Debt/ assets	Marginal tax rate	Profitability (OCF/lagged assets)	Financial distress	Cumulative abnormal return prior 250 days	Corporate governance	Firm value ($ millions)
Panel B: Tests of differences in markets[A]												
Debt												
Private debt vs. public debt	10.3[a]	2.9[a]	14.0[a]	7.6[a]	−3.3[a]	−6.4[a]	−10.5[a]	−6.9[a]	4.3[a]	−1.1	2.3[b]	−33.2[a]
	22.0[a]	13.0[a]	25.2[a]	−2.0[b]	−8.6 [a]	−10.1[a]	−11.1[a]	−9.3[a]	4.3[a]	−7.6[a]	1.8[c]	−49.2[a]
Private debt vs. 144-A debt	1.5[b]	−1.7	4.2[a]	5.8[a]	1.2	−20.4 [a]	4.6[a]	0.5	−13.5[a]	−6.0[a]	2.6[a]	−6.2[a]
	0.7	−3.9[a]	7.5[a]	5.5[a]	−0.1	−19.3 [a]	4.2[a]	1.2	−13.3[a]	−6.9[a]	2.7[a]	−16.9[a]
144-A debt vs. public debt	9.1[a]	3.5[a]	9.8[a]	−0.3	−3.6[a]	15.5[a]	−11.6[a]	−6.6[a]	14.4[a]	5.5[a]	−0.8	−13.0[a]
	15.0[a]	12.4[a]	11.1[a]	−6.9[a]	−6.4 [a]	13.3[a]	−10.7[a]	−8.0[a]	13.9[a]	1.8[a]	−1.3	−27.3[a]
Convertibles												
Private convertibles vs. public convertibles	7.1[a]	4.9[a]	8.4[a]	7.1[a]	3.2[a]	−6.9[a]	−15.3[a]	−13.9[a]	3.3[a]	−4.3[a]	5.8[a]	−13.2[a]
	14.3[a]	9.0[a]	16.7[a]	9.8[a]	3.1 [a]	−9.2[a]	−11.3[a]	−15.8[a]	3.2[a]	−9.7[a]	5.7[a]	−18.9[a]
Private convertibles vs. 144-A convertibles	11.4[a]	8.3[a]	11.6[a]	5.0[a]	2.3[b]	−6.5[a]	−15.7[a]	−21.2[a]	6.8[a]	−7.0[a]	4.9[a]	−13.6[a]
	20.6[a]	13.6[a]	21.1[a]	6.2[a]	1.8[c]	−7.8[a]	−14.9[a]	−21.5[a]	6.7[a]	−14.6[a]	4.8[a]	−29.7[a]

144-A	0.9	−0.5	2.6[a]	4.3[a]	1.8	−2.3[b]	−2.4[b]	−1.2	−1.1	0.6	2.4[b]	−3.7[a]
convertibles	−0.2	−0.8	5.5[a]	6.1[a]	2.1[c]	−3.7[a]	−1.7[c]	−1.9[c]	−1.1	0.0	2.7[a]	−3.2
public convertibles												
Equity												
Private equity vs.	17.2[a]	13.2[a]	14.4[a]	13.0[a]	3.9[a]	−13.4[a]	−25.2[a]	−31.7[a]	9.3[a]	−12.2[a]	7.8[a]	−5.8[a]
public equity	23.7[a]	17.4[a]	23.8[a]	18.1[a]	2.1 [a]	−13.9[a]	−21.3[a]	−30.7[a]	9.1[a]	−21.1[a]	7.6[a]	−26.6[a]

Panel A of this table shows summary statistics by security-market choice in the year prior to the issue. Panel B tests for differences across and within markets. Analyst earnings surprise is the absolute value of actual earnings less median analyst forecast divided the price per share. Analyst earnings dispersion is the standard deviation of analyst earnings estimates divided the price per share. We scale corporate governance, where one equals worst and four equals best, based on whether the firm has dual-class voting stock, classified board, restrictions on shareholders to call special meeting, or on action by written consent. We divide R&D by lagged property, plant, and equipment. Cash flow volatility is the standard deviation of operating cash flow using up to 20 quarters prior to the issue. Profitability is operating income before depreciation divided by lagged assets. Financial distress is Altman's *Z*-score less than 1.81. Tobin's q is market-to-book value. Cumulative abnormal return (CAR) is the excess return relative to a portfolio of firms in the same size decile. Debt-to-asset ratio is long-term debt divided by book value of assets. The corporate marginal tax rate is from Graham (1996). Firm value is market value of equity plus The first row presents the *t*-statistics "for the equality of means of each variable in Table 2A by market, and the second row presents the Mann-Whitney two-sample statistics.

[A] The first row presents the *t*-statistics for the equality of means of each variable in Table 2A by market, and the second row presents the Mann-Whitney two-sample statistics.

[a] Significance level of 1%.

[b] Significance level of 5%.

[c] represent significance levels of ten percent.

for most variables from public issuers. They are also closer to public debt issuers than they are to private debt issuers.

The picture that emerges from these summary statistics is that public firms issuing in the private market are smaller, highly valued, and less profitable versus public issuers. They also have higher measures of our proxies for asymmetric information than do firms issuing in the public markets. This conclusion holds irrespective of the security type. With respect to our other control variables, issuers in the public equity and convertible markets issue after a period of high cumulative abnormal returns – reinforcing the conclusions of Asquith and Mullins (1986) about market timing. Abnormal returns prior to private security issues are much lower than the abnormal returns prior to public security issues. Also interesting, and consistent with the classic trade-off theory, issuers of debt are more profitable – especially when we compare issuers of private debt to issuers of private equity and private convertibles.

4.2. Does the public–private distinction matter?

Before we present our models which recognize the public–private market explicitly, we first examine results where we do not control for the market. In Table 4 we present results of a logit model where we combine the private and public equity and also the private and public debt. In this model the dependent variable is equal to one if the firm issues equity and zero if the firm issues debt. We also combine the convertible preferred stocks into the equity category and the convertible bonds into the debt category. Standard errors are adjusted for clustering at the issuer level. This approach closely resembles what one would get using the firm's statement of cash flows to infer security issuance when one does not know the market in which the security is sold.

Examination of the results in Table 4 shows that when we combine public and private equity and public and private debt, neither of our two asymmetric information variables is significant. The finding of insignificance for the asymmetric information variables when we do not identify whether securities are sold in the public or private market is consistent with the results of previous studies including Frank and Goyal (2003) and Fama and French (2005).

4.3. Security choice within markets

In this section we present and discuss our nested models of security issuance which explicitly identify the market in which the security is sold. Table 5 presents the results of our nested logit model, which allows correlation within security type (debt, convertibles, equity). Standard errors are also adjusted for clustering at the issuer level. Using this model, we test our hypotheses on the security choice conditional on the private or public market. The model also gives us unconditional estimates of the value of issuing in the private and public market for all security types. Table 5 uses analyst earnings surprise as our measure of asymmetric information.[15]

The results on market choice reported in column 1 of Table 5 show that firms with a high degree of asymmetric information and high cash flow volatility are more likely to sell securities in the private market. Small firms, with high Tobin's q, with high R&D, with lower 1 year abnormal returns and low profitability are also more likely to choose to issue securities privately.

Columns 2–5 report the results conditional on the market. We see that conditional on issuing in the public market, the probability of issuing public debt (equity) increases (decreases) with asymmetric information. We test Hypothesis 1 formally and find that the coefficient for public equity (which shows the sensitivity versus public debt) is significantly greater than zero and also significantly lower than public convertibles. Our results show that firms' probability of issuing informationally sensitive securities decreases with asymmetric information in the public market.

[15] Examining the coefficients of the multinomial logit model and comparing them to the nested logit model (in Table 5), we find that while there are differences in magnitude between the multinomial and the nested logit models (the coefficients and marginal effects from the multinomial model are actually larger in magnitude than the ones from the nested logit model), the signs and significance across models are similar.

Table 4
Choice of security: debt versus equity.

Explanatory variables	Analyst earnings surprise	Analyst earnings dispersion
Measures of asymmetric information	0.001	−0.027
	(.030)	(−.800)
Control variables		
Risk, investment opportunities and taxes		
Cash flow volatility	0.128 [a]	0.180[a]
	(2.510)	(2.870)
R&D/lagged PPE	0.104 [b]	0.088 [c]
	(2.360)	(1.840)
Tobin's *q*	0.383[a]	0.360[a]
	(7.820)	(6.930)
Debt/asset ratio	0.089[a]	0.106[a]
(Industry adjusted)	(2.500)	(2.730)
Marginal tax rate	−0.155[a]	−0.128[a]
	(−3.750)	(−2.920)
Profitability	−0.357[a]	−0.370[a]
(Operating cash flow/lagged assets)	(−6.850)	(−6.180)
Financial distress	0.226[b]	0.234[b]
(*Z*-score< 1.81)	(2.210)	(2.120)
Size and corporate governance		
Predicted financial need	0.104	0.078
	(1.310)	(.860)
Log firm size	−0.888[a]	−0.923[a]
(Firm value)	(−16.070)	(−14.480)
Corporate governance	0.027	0.017
	(.800)	(.480)
Market timing & market characteristics		
Cumulative abnormal stock return	0.288[a]	0.301[a]
(250 prior days)	(7.250)	(6.710)
Cumulative market return	0.089[a]	0.037
(Prior year)	(2.450)	(.910)
Aaa bond rate	0.187[a]	0.232[a]
	(4.860)	(5.560)
Credit spread: Baa − Aaa	0.206[a]	0.217[a]
	(4.900)	(4.770)
VIX market volatility	−0.002	−0.006
	(−.420)	(−1.000)
Number of issues	8343	7536
Pseudo *R*-squared	27.7%	25.6%

Debt and equity aggregated across markets. This table presents the coefficient estimates from binomial logit regressions that combine security issues into equity and debt groups with no indication of choice of market or choice of convertible securities. The dependent variable equals one for equity issues and zero for debt issues. All firm-specific variables are lagged. All market-specific variables represent three months prior to the security issuance. For the measure of asymmetric information, column 1 uses the analyst earnings forecast surprise calculated as the absolute value of the median forecast less the actual earnings divided by the price per share. Column 2 uses analyst earnings dispersion calculated as the standard deviation of the analyst forecasts divided by price per share. Predicted financial need (internal funding deficit) is the instrumented amount of capital expenditures plus increase in net working capital less operating income before depreciation. All other explanatory variables are as defined in Table 3. We normalize all variables (except the dummy variable for financial distress) by their standard deviation. The table includes industry fixed effects (Fama–French 17 industries). Robust *Z*-statistics that correct for issuer clustering appear in parentheses.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

Table 5
Security choice conditional on public versus private markets.

Explanatory variables	Market choice	Security choice conditional on market			
	Private (vs. public market)	Public equity (vs. public debt)	Public convertibles	Private equity (vs. private debt)	Private convertibles
Asymmetric information measure					
Analyst earnings surprise	0.194 [a]	−0.773[a]	−0.017	0.056	0.114[a]
	(3.080)	(−4.860)	(−.190)	(1.330)	(2.780)
Control variables					
Risk, investment opportunities and taxes					
Cash flow volatility	0.266[a]	0.558[a]	0.461[a]	0.319[a]	0.343[a]
	(2.120)	(4.930)	(3.780)	(4.570)	(4.840)
R&D/lagged PPE	0.450[b]	0.709[a]	0.719[a]	0.219[a]	0.131[b]
	(2.440)	(4.740)	(4.730)	(3.530)	(1.960)
Tobin's *q*	0.590[a]	1.025[a]	0.904[a]	0.657[a]	0.637[a]
	(5.500)	(12.280)	(10.690)	(9.860)	(9.130)
Debt/asset ratio	−0.049	0.129[a]	−0.017	0.108[c]	0.174[a]
(Industry adjusted)	(−1.300)	(2.650)	(−.330)	(1.890)	(2.920)
Marginal tax rate	0.024	−0.003	−0.142[b]	−0.437[a]	−0.385[a]
	(.640)	(−.060)	(−2.460)	(−5.440)	(−4.710)
Profitability	−0.209[b]	−0.661[a]	−0.789[a]	−0.933[a]	−0.805[a]
(Operating cash flow/lagged assets)	(−2.050)	(−6.850)	(−7.740)	(−11.780)	(−9.880)
Financial distress	−0.439[a]	−0.185	−0.074	0.429[a]	0.575[a]
(*Z*-score < 1.81)	(−4.150)	(−1.230)	(−.470)	(2.680)	(3.520)
Size and corporate governance					
Predicted financial need	−0.011	0.245[a]	0.183[a]	−0.805[a]	−0.458
	(−.190)	(2.890)	(3.800)	(−5.300)	(−1.600)
Log size	−1.467[a]	−1.712[a]	−0.467[a]	−1.407[a]	−1.500[a]
(Firm value)	(−15.480)	(−20.580)	(−6.280)	(−13.660)	(−13.760)
Corporate governance	0.028	0.006	0.068	0.155[a]	0.090
	(.810)	(.130)	(1.320)	(2.810)	(1.550)
Market timing & market characteristics					
Cumulative abnormal stock return	−0.319[a]	0.377[a]	0.316[a]	0.310[a]	0.040
(250 prior days)	(−5.510)	(6.820)	(5.410)	(5.480)	(.560)
Cumulative market return	−0.079[b]	0.045	−0.042	0.217[a]	0.021
(Prior year)	(−1.980)	(.850)	(−.710)	(3.670)	(.330)

Aaa bond rate	0.299[a]	0.329[a]	−0.149[b]	0.149[b]	0.225[a]
	(6.960)	(5.610)	(−2.450)	(2.220)	(2.990)
Credit spread: Baa − Aaa	0.336[a]	0.398[a]	0.187[b]	0.464[a]	0.123
	(6.930)	(5.950)	(2.570)	(6.730)	(1.620)
VIX market volatility	−0.050	−0.252[a]	−0.232[a]	0.238[a]	0.144[b]
	(−1.300)	(−4.840)	(−4.010)	(3.810)	(2.210)

This table presents coefficient estimates from a nested logit regression that tests the impact of explanatory variables on public and private security choice by public firms. Column 1 presents market choice coefficients representing sensitivity relative to the public market. Columns 2–5 present security choice conditional on market, with coefficients representing sensitivity versus debt issuance. All firm-specific variables are lagged. Explanatory variables are as defined in Table 2A. We normalize the explanatory variables (except for the dummy variable financial distress) by their standard deviation. Analyst earnings surprise is the absolute value of actual earnings less median analyst forecast divided the price per share. Predicted financial need (internal funding deficit) is the instrumented amount of capital expenditures plus increase in net working capital less operating income before depreciation. The chi-squared statistic for test of overall significance is 11,686 (p-value 0.001). Our sample comprises 8343 security issues. The table includes industry fixed effects for each security type. Robust Z-statistics that correct for issuer clustering and heterskedasticity appear in parentheses.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

Conditional on issuing in the private market we see a partial reversal of this sensitivity of security issuance to asymmetric information. In addition, firms' issuance decisions are much less sensitive overall to asymmetric information. Hypothesis 2 predicting a *reversal*of the sensitivity to asymmetric information for the private market is partially supported, as coefficients for asymmetric information for both private convertibles and equity are statistically greater than zero – however there is a larger coefficient for private convertibles versus private equity. We do find that Hypothesis 3 is supported as there is significantly less sensitivity to asymmetric information in the private market than in the public market.

With respect to other control variables in Table 5, the sensitivity of security issuance to distress shows a different pattern for public and private markets. Firms issuing privately are more likely to issue equity and convertibles if they have high measures of financial distress and a lower marginal tax rate. There is no significant sensitivity of security issuance in the public markets to distress. In the public market, we also find that the sensitivity to cash flow volatility is highest for equity, next highest for convertibles, and lowest for debt and the differences are statistically significant. In the private market both equity and convertibles have a higher sensitivity to risk versus the benchmark of private debt, but the sensitivities of private equity and private convertibles are not statistically different from each other.

Table 6A presents the economic significance of the results in Table 5. To compute the economic effects we use the estimated model and associated coefficients from our results in Table 5. We first present the marginal significance of our primary nested logistic specifications and then we graphically show the overall significance of our results in the next subsection. For each variable, we compute the predicted probability of each of the six firm-level choices at two points, one-half standard deviation above and below, around each individual sample values. All other variables are held at their observation values. We then average these probabilities over all firms in the sample.

The first two columns of Table 6A show that the marginal probability of issuing in the private market is 8.8 percentage points higher as our measure of asymmetric information increases. This pattern are also stronger for firms that have less than the median market capitalization, as shown in the second row of the table. The subsequent columns of Table 6 shows that the sensitivity of security issuance to asymmetric information is highest in the public markets, where the probability of issuing firms issuing public equity (debt) declines (increases) with our measure of asymmetric information. If we increase our measure of asymmetric information, analyst earnings surprise, by one standard deviation, the predicted probability of issuing public debt rises by 6.8 percentage points and the probability of issuing public equity declines by 11 percentage points.

We see a *weak* reverse ordering of probabilities in the private market. Conditional on issuing in the private market the probability of issuing convertibles and equity increases slightly with asymmetric information and decreases for debt. However, the magnitudes are much smaller than the probabilities in the public market (as is predicted by Hypothesis 3) and show a markedly different pattern consistent with information being revealed to private investors or with private investors having better information before the issue. This table thus shows support for Hypothesis 1 and partial support for Hypothesis 2. The decreased sensitivity of security issuance in the private market than in the public market supports Hypothesis 3.

Security choice is also highly sensitive to cash flow volatility and investment opportunities. Risk, R&D to net fixed assets and Tobin's q have a large effect on the predicted probabilities, especially in the public markets. If we increase our risk and investment opportunity measures by one standard deviation, the predicted probability of issuing public debt declines by 7.4 as risk increases one standard deviation and declines by 14 percentage points as Tobin's q increases one standard deviation.

Market timing, measured by the cumulative abnormal stock return, also has a large effect on market choice and security issuance in the public markets but less so in the private markets. The first two columns of Table 7 show that firms are 8.9 percentage points more likely to issue in the public markets (and 8.9 percentage points *less* likely to issue in the private markets) after a one standard deviation increase in the firm's cumulative abnormal stock return. The effect is magnified in the public markets for public equity. Public equity is an additional 3.7 percentage points more likely to be issued versus a decline of 5.4 percentage points for public debt after a one standard deviation increase in the firm's cumulative abnormal stock return. This relation is weaker in the private markets, with a 1.9

Table 6A
Economic significance: changes in predicted probability of security issuance.

	Prob. of issuing in		Conditional on public market			Conditional on private market		
	Public market	Private market	Probability of issuing			Probability of issuing		
			Debt	Convertibles	Equity	Debt	Convertibles	Equity
Asymmetric information measure								
Analyst earnings surprise: all firms	−9.0%	9.0%	6.7%	4.3%	−11.1%	0.5%	0.5%	0.1%
Firms <= median market value	11.4%	11.4%	8.2%	6.8%	−15.0%	−0.9%	0.9%	0.0%
Firms > median market value	−6.6%	6.6%	5.3%	1.9%	−7.2%	−0.3%	0.2%	0.1%
Control variables								
Risk, investment opportunities and taxes								
Cash flow volatility: all firms	−0.9%	0.9%	−7.7%	2.3%	5.4%	2.3%	1.2%	1.2%
Firms <= median market value	0.8%	−0.8%	−7.8%	1.1%	6.8%	−3.5%	1.8%	1.6%
Firms > median market value	−2.6%	2.6%	−7.5%	3.6%	3.9%	−1.2%	0.5%	0.7%
R&D/lagged PPE	−2.1%	2.1%	−10.6%	4.6%	6.0%	−1.3%	0.2%	1.1%
Tobin's *q*	−3.5%	3.5%	−14.4%	5.0%	9.4%	−4.6%	2.0%	2.6%
Debt/asset ratio	1.3%	−1.3%	−1.0%	−1.0%	2.0%	−1.0%	0.7%	0.2%
Marginal tax rate	0.3%	−0.3%	2.9%	−1.7%	0.8%	2.9%	−1.1%	−1.8%
Profitability	−0.3%	0.3%	10.6%	−5.7%	−4.9%	6.2%	−2.3%	−3.9%
Financial distress	5.3%	−5.3%	2.0%	0.2%	0.2%	−3.8%	2.5%	1.3%
Market timing & corporate governance								
Cumulative abnormal stock return	9.0%	−9.0%	−5.2%	1.6%	3.6%	−0.6%	−0.6%	1.9%
Corporate governance	−0.7%	0.7%	−0.5%	0.8%	−0.3%	−0.9%	0.1%	0.8%

Economic significance of our results using the coefficients from the nested logit model of Table 5. We vary each specific variable by ±1/2 of its standard deviation, and evaluate the change in each predicted probability of security issuance, keeping all other variables fixed at their actual observation values. For the asymmetric information and risk variables, we also compute these predicted marginal effects for firms above and below the median market value of all firms issuing securities in our sample.

percentage point increase for private equity and 1.3 percentage point decline for private debt. Thus the overall effect is that public equity is more that 10 percentage points more likely to be issued after a one standard deviation increase in the firm's cumulative abnormal stock return.

Trade-off variables (debt, taxes and profitability) have a significant economic impact in both public and private security markets. We see a fairly large effect of these variables on the probability of security issuance in private markets with increases in profitability and the marginal tax rate and decreases in financial distress making firms more likely to issue private debt. Typically, in capital structure regressions firm profitability and leverage ratio are negatively related, which is widely regarded as a serious problem of the tradeoff theory (Myers (1993)). Note that our results are consistent with the tradeoff theory, similar to the recent findings in Frank and Goyal (2009). Two distinctions are likely to drive our opposite results to most of the literature. First, like Frank and Goyal (2009), we focus on issuance decisions as opposed to leverage, and second that we control for the market and for asymmetric information effects in our model.

Corporate governance has a limited economic impact on security issuance. These results are consistent with the view that managers have discretion over security and market choice decisions are not likely to choose debt or a private monitor in order to improve corporate governance.[16] Lastly, perhaps not surprisingly, market volatility has a large influence on security issuance. Firms are more likely to issue private equity and private convertibles over private debt when market volatility is high (measured by the VIX market volatility). This ranking is reversed in the public markets.

Empirically, Hertzel and Smith (1993) and Wu (2004) do not find evidence that private placements are motivated by monitoring. Recently, Barclay et al. (2007) examine long-run equity returns following private placements and find evidence consistent with the conclusion that discounts to private equity are compensation to private blockholders for passively allowing management to become more entrenched. Our interpretation of the current theory and evidence is that the predictions for security and market issuance are mixed depending on whether managers with poor current governance have discretion over the security-market choices.

The overall message that emerges from these tables is that effect of asymmetric information is quite different in the public and private markets. The results reinforce the conclusion that in order to gauge the effect of information on security issuance decisions, it is crucial that one does not combine private and public security issues.

Table 6B contains measures of goodness of fit of our model. It shows how well the nested logit model from Table 5 does in predicting the actual observed choice. The table contains the observed choice in the rows and the predicted choice in each column. For each observation, the predicted choice is the choice with maximum probability among the six choices using the coefficient estimates from Table 5. The first row of each cell gives the number predicted to choose the security given in the column header. The second row gives the percentage predicted to choose that security versus the actual choice. The third row gives the percentage of observed, predicted pairs divided by the overall number predicted to issue that security.

Table 7 shows that the model from Table 5 does very well in predicting security issues for most securities. The model does very well in predicting public debt (61% predicted correctly), private debt (78% predicted correctly) and private equity (53% predicted correctly). Perhaps not surprisingly the model does less well in predicting convertible securities as they are a blend of equity and debt.

4.4. Market choice for type of security

Table 7 presents the results of the security-market nested logit model (Model 2). The results presented in Table 7 show that in the first stage when firms choose securities, firms probability of choosing equity over debt decreases with asymmetric information. Similar to the results by Asquith and Mullins (1986), the positive significant coefficient on a firm's past year abnormal returns shows that a firm is more likely to issue equity when the firm's stock price has risen recently. The overall results

[16] The leverage decisions and the use of debt or monitoring itself may be plagued by agency conflicts. The more antitakeover defenses the firm has the lower can the debt level and the lower the probability of issuing debt securities as modeled by Zwiebel (1996). Similar considerations are likely also to impact the likelihood of using a monitor.

Table 6B
Goodness of fit. Actual versus predicted choices.

Observed choice	Public debt	Public convertibles	Public equity	Private debt	Private convertibles	Private equity	Observed count
Public debt	1378	18	24	846	2	1	2269
	61%	1%	1%	37%	0%	0%	
	62%	15%	5%	18%	1%	0%	
Public convertibles	153	41	71	305	0	13	583
	26%	7%	12%	52%	0%	2%	
	7%	34%	16%	7%	0%	2%	
Public equity	83	23	222	516	5	78	927
	9%	2%	24%	56%	1%	8%	
	4%	19%	49%	11%	2%	12%	
Private debt	582	26	74	2622	31	43	3378
	17%	1%	2%	78%	1%	1%	
	26%	21%	16%	57%	12%	7%	
Private convertibles	11	4	25	173	129	176	518
	2%	1%	5%	33%	25%	34%	
	0%	3%	6%	4%	50%	27%	
Private equity	17	9	38	165	92	347	668
	3%	1%	6%	25%	14%	52%	
	1%	7%	8%	4%	36%	53%	
Predicted count	2224	121	454	4627	259	658	8343

For each choice made by firms, this table shows the observed and predicted choices made using the model and coefficients of Table 5. The predicted choice is the maximum probability over the six possible choices in Table 6. For each type of security issued, the first row gives the number predicted to choose the security given in the column header. The second row gives the percentage predicted to choose that security versus the actual choice. The third row gives the percentage of observed, predicted pairs divided by the overall number predicted to issue that security.

Table 7
Choice of security issuance in public and private markets.

Explanatory variables	First stage security choice		Second stage: public versus private		
	Convertibles (vs. Debt)	Equity	Private equity (vs. Pu. Eq.)	Private convertibles (vs Pu. Conv.)	Private debt (vs.Pu. Debt)
Asymmetric information measure					
Analyst earnings surprise	0.003	−0.541[a]	1.041[a]	0.391[a]	0.196[a]
	(.040)	(−3.230)	(6.280)	(3.550)	(3.220)
Control variables					
Risk, investment opportunities and taxes					
Cash flow volatility	0.431[a]	0.493[a]	−0.003	0.131	0.222[b]
	(3.860)	(4.620)	(−.050)	(1.390)	(2.000)
R&D/lagged PPE	0.602[a]	0.616[a]	−0.110[b]	−0.231[a]	0.411[a]
	(4.170)	(4.400)	(−2.200)	(−2.890)	(2.700)
Tobin's *q*	0.833[a]	0.942[a]	0.152[a]	0.283[a]	0.543[a]
	(7.610)	(8.390)	(2.590)	(3.510)	(2.590)
Debt/asset ratio	−0.007	0.133[a]	−0.087	0.214[b]	−0.051
(Industry adjusted)	(−.150)	(2.940)	(−1.250)	(2.400)	(−1.400)
Marginal tax rate	−0.174[a]	−0.024	−0.409[a]	−0.243[b]	0.022
	(−3.230)	(−.490)	(−4.390)	(−2.150)	(.600)
Profitability	−0.734[a]	−0.641[a]	−0.518[a]	−0.299[a]	−0.152[c]
(Operating cash flow/lagged assets)	(−7.500)	(−6.940)	(−6.970)	(−2.740)	(−1.780)
Financial distress	0.002	−0.142	0.268	0.357	−0.442[a]
(*Z*-score < 1.81)	(.010)	(−.950)	(1.290)	(1.390)	(−4.250)
Size and corporate governance					
Predicted financial need	0.171[a]	0.238[a]	−1.181[a]	−0.950[a]	0.004
	(3.600)	(3.140)	(−5.040)	(−3.200)	(.070)
Log size	−0.395[b]	−1.476[a]	−1.115[a]	−2.934[a]	−1.411[a]
(Firm value)	(−2.100)	(−6.520)	(−8.140)	(−13.510)	(−21.820)
Corporate governance	0.077[b]	0.011	0.206[a]	0.021	0.033
	(1.660)	(.250)	(3.000)	(.240)	(.980)
Market Timing & Market Characteristics					
Cumulative abnormal stock return	0.330[a]	0.428[a]	−0.422[a]	−0.651[a]	−0.310[a]
(250 prior days)	(4.760)	(6.010)	(−7.450)	(−7.280)	(−5.810)
Cumulative market return	−0.017	0.067	0.105	−0.064	−0.074[c]
(Prior year)	(−.320)	(1.320)	(1.510)	(−.650)	(−1.870)
Aaa bond rate	−0.155[b]	0.273[a]	0.108	0.874[a]	0.288[a]
	(−2.340)	(3.800)	(1.330)	(7.090)	(6.900)
Credit spread: Baa − Aaa	0.137[c]	0.368[a]	0.422[a]	0.344[a]	0.331[a]
	(1.720)	(4.810)	(4.880)	(2.850)	(4.880)
VIX market volatility	−0.209[a]	−0.222[a]	0.523[a]	0.448[a]	−0.046
	(−3.880)	(−4.410)	(6.270)	(4.120)	(−1.320)

This table presents coefficient estimates from a nested logit regression testing the impact of explanatory variables on public and private security choice by public firms. First stage is the choice of security type with coefficients representing sensitivity relative to debt. Second stage is the choice of market conditional on security type, with coefficients representing sensitivity versus public issuance. All firm-specific variables are lagged. Explanatory variables are as defined in Table 2A and they have all been normalized by their standard deviation (except the dummy variable financial distress). Analyst earnings surprise is the absolute value of actual earnings less median analyst forecast divided the price per share. (Robust *Z*-statistics are presented in parentheses.) Predicted financial need (internal funding deficit) is the instrumented amount of capital expenditures plus increase in net working capital less operating income before depreciation. Chi-squared statistic for test of overall significance is 11,700 (*p*-value .001). Sample is 8343 security issues. Industry fixed effects are included for each security type. Robust *Z*-statistics that correct for issuer clustering and heteroskedasticity are in parentheses.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

are consistent with decreases in asymmetric information causing firms to be more likely to issue equity.

Examining, the choice between public and private in the second stage, we see that our measure of asymmetric information is positively related to the decision to issue private securities - especially so for equity. This result is consistent with Hypothesis 4. The ordering of the coefficients also statistically satisfies Hypothesis 5 which states that as the extent of information asymmetry increases the firm is more likely to issue private securities that are more information-sensitive. The coefficient on analyst earnings surprise for private equity is 1.06 which is statistically greater than .388, the coefficient for private convertibles, which in turn is statistically greater than the coefficient for private bank debt of .201.

Examining the other control variables in the table, we can see that firms are more likely to issue privately with increases in Tobin's *q* for all security types, and firms likelihood of issuing private equity and convertibles relative to their public counterparts decreases with profitability and the marginal tax rate. Finally, firms that have had higher abnormal returns over the past year are more likely to issue stock publicly – consistent with a market timing explanation for public equity security issuance. Given that this result holds for public and not private equity it seems convincing evidence of market timing. Conditional on security type, firms are less likely to issue privately if they have had lower abnormal returns in the past year. Thus the picture that emerges is that smaller, highly valued firms whose stock market performance recently have not been good and whose cash flows are low are more likely to choose to issue privately.

The overall conclusions that emerge from Table 7 are consistent with the summary statistics presented earlier. There are sharp differences between public and private issuers in all markets – and an especially sharp distinction between issuers of public and private equity. Firms probability of issuing private equity increases with asymmetric information.

Table 8A examines the economic significance of our results and Table 8B contains measures of goodness of fit by security – showing how well the model predicts actual observed choices. We compute the economic effects similar to the method used for Table 6A.

Table 8A
Economic significance: changes in predicted probabilities by security type.

	Probability of issuing			Conditional on issuing		
	Debt	Convertibles	Equity	Debt	Convertibles	Equity
Asymmetric information measure						
Analyst earnings surprise: all firms	3.7%	1.1%	−4.8%	3.0%	4.0%	11.5%
Firms <= median market value	4.5%	1.9%	−6.3%	1.9%	5.6%	13.3%
Firms > median market value	3.0%	0.3%	−3.3%	4.0%	2.4%	9.7%
Control variables						
Risk, investment opportunities and taxes						
Cash flow volatility: all firms	−5.0%	2.1%	2.9%	3.4%	1.3%	0.0%
Firms <= median market value	−5.5%	1.9%	3.6%	2.2%	1.9%	0.0%
Firms > median market value	−4.4%	2.3%	2.1%	4.5%	0.8%	0.0%
R&D/lagged PPE	−5.1%	2.0%	3.1%	6.2%	−2.3%	−1.2%
Tobin's *q*	−8.9%	3.6%	5.3%	8.2%	2.9%	1.7%
Debt/asset ratio	−1.4%	0.2%	1.2%	−0.8%	2.2%	−1.0%
Marginal tax rate	2.2%	−1.7%	−0.5%	0.3%	−2.5%	−4.5%
Profitability	9.2%	−4.4%	−4.9%	−2.3%	−3.0%	−5.7%
Financial distress	−2.7%	2.4%	0.3%	−6.8%	3.7%	3.1%
Market timing & corporate governance						
Cumulative abnormal stock return	−6.2%	1.4%	4.7%	−4.7%	−6.6%	−4.7%
Corporate governance	−0.6%	0.4%	0.2%	0.5%	0.2%	2.3%

This table illustrates the economic significance of our results using the coefficients from the nested logit model of Table 7. We vary each specific variable by ±1/2 of its standard deviation, and evaluate the change in each predicted probability of security issuance, keeping all other variables fixed at their actual observation values. For the asymmetric information and risk variables, we also compute these predicted marginal effects for firms above and below the median market value of all firms issuing securities in our sample.

Table 8B
Goodness of fit actual versus predicted choices.

Observed choice	Predicted choice						Observed count
	Public debt	Public convertibles	Public equity	Private debt	Private convertibles	Private equity	
Public debt	1377	18	27	844	3	0	2269
	61%	1%	1%	37%	0%	0%	
	62%	15%	6%	18%	1%	0%	
Public convertibles	152	39	70	308	1	13	583
	26%	7%	12%	53%	0%	2%	
	7%	33%	16%	7%	0%	2%	
Public equity	82	24	217	523	4	77	927
	9%	3%	23%	56%	0%	8%	
	4%	20%	48%	11%	2%	12%	
Private debt	585	25	71	2622	32	43	3378
	17%	1%	2%	78%	1%	1%	
	26%	21%	16%	57%	13%	6%	
Private convertibles	13	4	25	177	120	179	518
	3%	1%	5%	34%	23%	35%	
	1%	3%	6%	4%	49%	27%	
Private equity	18	9	38	164	84	355	668
	3%	1%	6%	25%	13%	53%	
	1%	8%	8%	4%	34%	53%	
Predicted count	2227	119	448	4638	244	667	8343

For each observed choice made by firms, this table shows the predicted choices made using the model and coefficients of Table 7. The predicted choice is the maximum probability over the six possible choices in Table 7. For each type of security issued, the first row gives the number predicted to choose the security given in the column header. The second row gives the percentage predicted to choose that security versus the actual choice. The third row gives the percentage of observed, predicted pairs divided by the overall number predicted to issue that security.

Table 8A shows there is significant variation in the predicted probability of security issuance as we vary each variable. Table 8A shows that if we increase our measure of asymmetric information, analyst earnings surprise, by one standard deviation, the predicted probability of issuing equity decreases by 5.7 percentage points. Moreover, conditional on issuing equity, the probability of issuing in the private market increases by 12 percentage points with a one standard deviation increase in our measure of asymmetric information. For all securities, we find that the predicted probability of issuing in the private market, conditional on the security type, increases with our measure of asymmetric information.

With respect to the control variables included in the regressions, security choice is also highly sensitive to risk and investment variables, such as R&D to net fixed assets and Tobin's *q*. The table also shows that after a one standard deviation movement in the one-year cumulative abnormal stock return the probability of an equity issue increases by 4.7 percentage points, while the probability of issuing debt decreases by 6.2 percentage points. Interestingly, the probability of issuing in the private market decreases with a firm's cumulative abnormal return for all security types. This result is consistent with market timing of equity issues to the public market versus timing of both private and public equity issues after market runups. Finally, the table also shows that corporate governance is not economically important to security issuance decisions.

Table 8B contains measures of goodness of fit of our model as it shows how well the nested logit model from Table 7 does in predicting the actual observed choice. The table contains the observed choice in the rows and the predicted choice in each column. The predicted choice is the one with maximum probability among the six choices using the coefficient estimates from Table 7. The first row of each cell gives the number predicted to choose the security given in the column header. The second row gives the percentage predicted to choose that security versus the actual choice. The third row gives the percentage of observed, predicted pairs divided by the overall number predicted to issue that security.

Table 8B shows that the model presented in Table 7 does very well in predicting security issues for most securities. The results are very similar to Table 6B. The model does very well in predicting public debt (61% predicted correctly), private debt (78% predicted correctly) and private equity (53% predicted correctly). Perhaps not surprisingly the model does less well in predicting convertible securities as they are a blend of equity and debt.

Table 9
Multiple issuers.

Prior issue	Subsequent issue						Total
	Public debt	Public conv.	Public equity	Private debt	Private con.	Private equity	
Public debt	943 −0.01	72 −0.11	94 0.02	524 0.08	16 0.89	9 0.12	1658 0.02
Public conv.	60 0.05	64 0.17	31 −0.28	145 −0.04	5 0.96	12 0.54	317 0.03
Public equity	98 −0.06	101 −0.09	145 −0.23	390 −0.07	46 0.17	39 0.22	819 −0.08
Private debt	606 0.03	155 0.14	312 −0.1	1571 0.07	108 0.46	122 0.68	2874 0.05
Private conv.	15 −0.18	14 0	32 −0.22	98 0.17	265 0.41	139 0.68	563 0.3
Private equity	7 0.02	19 −0.05	60 −0.06	108 0.25	116 0.08	336 0.11	646 0.09
Total	1729 −0.01	425 0.02	674 −0.08	2836 0.05	556 0.3	657 0.32	6877

This table contains security issues of firms that issued securities two or more times over the sample period. Rows represent the prior security issue. Columns contain the subsequent issue that follows the initial issue in the row. The first number for each security is the number of issues and the second number for each security is the median percentage change in analyst earnings surprise. Analyst earnings surprise is the absolute value of difference between the actual analyst earnings estimate and the median analyst earnings forecast scaled by the firm stock price at the time of the earnings estimate.

In order to present further evidence on goodness of fit, we compute AIC statistics for both nested logit models are 18,490 for Model 1 and 18,486 for Model 2 and is 19,108 for the multinomial logit model (log likelihood −9364). We can see that the AIC for the nested logit are close to each other and significant lower than the AIC of the multinomial logit. While this does not prove that the nested logit are the 'right' model is does show that it significantly improves upon the multinomial logit model. While Model 2 has the lowest AIC, they are close. However based on the percent of choice correctly predicted by the models presented in on the evidence in Tables 6B and 8B, we see that Model 1 does slightly better on this criteria. We conclude that both Models 1 and 2 are informative.

4.5. Repeat issuers

Our dataset contains many firms that issue securities in multiple years. Tables 9 and 10 examine these repeat issuers. In Table 9 we construct a transition matrix where the columns represent the subsequent (second or greater) security issue and the rows represent the prior security issue. Table 9 presents both the number of issues and also the median change in analyst earnings surprise, our main measure of asymmetric information. There are 6877 security issues by firms that have issued previously, as seen in the total numbers in Table 9. Table 10 examines these repeat issuers using our first nested logit model. We have a full set of data with no missing values for all of our control variables for 4988 of these issues.

Examination of Table 9 shows that firms that issue in the private markets typically choose the same market and the same security on their next issue. This is also true for firms that issue public debt. However, firms that issue public convertibles and public equity are most likely to issue private debt on their subsequent issue. This is most likely because of the size of the private debt market and given that bank debt is a major source of financing for all firms.

When examining the change in analyst earnings surprise across issues, we find several interesting patterns. For firms that issue public securities after issuing public equity – thus not switching markets – there is a decrease in the change in the median analyst earnings surprise in all three cases. This decrease is significant in all three cases using a nonparametric rank sum test. For firms that issue private securities after previously issuing private securities, there is an increase in median analyst earnings surprise in all nine cases, significantly so in eight of the nine cases.

Examining firms that switch from private to public markets or vice versa, we also find some significant interesting patterns. For firms that switch from public securities to private convertibles and private equity there is an increase in the median analyst earnings surprise prior to their subsequent issue. This increase is significantly different from zero in four of the six cases. In two of the cases there are too few observations – only five firms switch from public convertibles to private ones and nine firms from public debt to private equity. In addition, firms that switch into public equity from private securities experience a decrease in the median analyst earnings surprise, with the decrease significant in two of the three cases. Our other measure of asymmetric information, the dispersion in analyst earnings estimates, also shows similar patterns.

In order to examine these switchers further, we compare firms that always issue in the public market with those public firms that switch to private markets and those firms that issue in the private market and then switch to the public market. Table 10 presents the coefficient estimates from binomial logit regressions that examine what factors impact the decision to switch issuance market from public to private or private to public on subsequent issues. In column 1 (column 2) the dependent variable equals one for firms that switch from a public (private) issue to a private (public) issue and zero for non-switching firms whose subsequent issue is in the same market. All variables represent changes from their values at the time of the prior issue. Given the results are estimated in changes, these regressions thus control for any firm specific unmeasured effects. All market-specific variables represent three months prior to the security issuance.

We find that firms that have previously issued in the public market that experience increases in asymmetric information or risk are more likely to switch to issuing in the private market. Conversely, we also find that firms that have issued in the private market and then experience decreases in measures of asymmetric information or risk are more likely to switch to issue in the public market.

Table 10
Analysis of the decision to switch security markets.

Explanatory variables	Likelihood of switching From *Public* to *Private*	Likelihood of switching From *Private* to *Public*
Measures of asymmetric information		
Change (analyst earnings surprise)	0.205 [b]	−0.103 [a]
	(1.940)	(−2.630)
Control variables		
Risk, investment opportunities and taxes		
Change (cash flow volatility)	0.229[b]	−0.135[b]
	(2.000)	(−2.400)
Change (R&D/lagged PPE)	−0.066	0.008
	(−1.340)	(.230)
Change (Tobin's *q*)	−0.108 [c]	0.109[c]
	(−1.820)	(1.850)
Change (debt/asset ratio)	−0.009	0.004
(Industry adjusted)	(−.180)	(.100)
Change (marginal tax rate)	−0.038	0.080[c]
	(−.800)	(1.870)
Change (profitability)	0.007	0.018
(Operating cash flow/lagged assets)	(.110)	(.540)
Financial distress	0.006	−0.073
(*Z*-score < 1.81)	(.050)	(−.590)
Size and corporate governance		
Change (predicted financial need)	0.042	−0.588
	(.850)	(−1.540)
Change (log firm size)	0.023[a]	0.262[a]
(Firm value)	(.390)	(4.330)
Change (corporate governance)	0.010	0.071
	(.200)	(1.730)
Market Timing & Market Characteristics		
Change (cumulative abnormal stock return)	−0.301[a]	0.160[a]
(250 prior days)	(−5.820)	(3.490)
Change (cumulative market return)	−0.027	0.069
(Prior year)	(−.530)	(1.500)
Change (Aaa bond rate)	0.155[a]	−0.047
	(3.070)	(−1.170)
Change (credit spread: Baa − Aaa)	0.045	−0.062
	(.870)	(−1.440)
Change (VIX market volatility)	0.132[a]	−0.112[a]
	(2.790)	(−2.600)
Number of issues	2426	2467
Pseudo *R*-squared	2.3%	2.8%

This table presents the coefficient estimates from binomial logit regressions that examine what factors impact the decision to switch issuance market from public to private or private to public on subsequent issues. In column 1 (column 2) the dependent variable equals one for firms that switch from a public (private) issue to a private (public) issue and zero for non-switching firms whose subsequent issue is in the same market. All variables represent changes from their values at the time of the prior issue. All market-specific variables represent three months prior to the security issuance. The analyst earnings forecast surprise calculated as the absolute value of the median forecast less the actual earnings divided by the price per share. Predicted financial need (internal funding deficit) is the instrumented amount of capital expenditures plus increase in net working capital less operating income before depreciation. All other explanatory variables are as defined in Table 3. We normalize all variables (except the dummy variable for financial distress) by their standard deviation. Robust *Z*-statistics that correct for issuer clustering appear in parentheses.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

Likewise we find differences in the effects of cash flow volatility and Tobin's q. Firms are more likely to switch to private markets when cash flow volatility goes up and valuation (measured by Tobin's q) goes down. The reverse is true for firms switching from private to public markets. Lastly we find that when market volatility goes up (measured by the VIX market volatility) firms are more likely to switch to a private market issue and firms are more likely to switch to a public issue when market volatility goes down.

5. Robustness of results

5.1. Alternative measures of asymmetric information

We examine the robustness of our results to alternative measures of asymmetric information. Table 11 presents results from reestimating the nested logit model of Table 5 with different measures of asymmetric information. In this table, we just present the coefficient estimates on the alternative measures of asymmetric information and do not report the coefficient estimates on the other variables, as the results were very similar to those of Table 5. We also do not present any results for the specification of Table 7 as the conclusions from this model with these new measures of asymmetric information are very similar to the conclusions made from Table 7.

Comparing the results with the different measures of asymmetric information to the results of Table 5, we see that the qualitative results are similar. This result is perhaps not surprising as our measures of asymmetric information are significantly positively correlated. The correlation between analyst earnings surprise (our main measure) and analyst earnings dispersion is .446 and is the

Table 11
Alternative measures of asymmetric information.

Coefficient estimates on different measures of asymmetric information				
Market choice vs. public	Security choice conditional on market			
	Public equity (vs. public debt)	Public convertibles	Private equity (vs. private debt)	Private convertibles
Analyst earnings estimate dispersion				
0.103[a]	−0.350[a]	−0.009	0.129[a]	0.189[a]
(3.430)	(−3.74)	(−0.15)	(2.530)	(3.890)
Insider trading (signed) prior to security issuance				
0.109[a]	−0.291[a]	−0.148[a]	0.026	0.054
(3.970)	(−5.15)	(−2.47)	(0.460)	(0.930)
Abnormal stock return to earnings announcements				
0.101	−0.124[a]	−0.078	0.038	0.129[a]
(3.750)	(−3.19)	(−1.61)	(0.880)	(2.800)
Volume and return based measure				
0.025	−0.120[a]	−0.028	0.002	0.030
(0.770)	(−2.48)	(−0.53)	(−0.53)	(0.570)

This table presents the coefficient estimates using different measures of asymmetric information using the same specification as Table 6. The variables used for other variables are the same as Table 6. We replace the asymmetric information variable with the alternative measure indicated. We do not present the coefficient estimates from other variables. Analyst earnings dispersion is the standard deviation of outstanding earnings forecasts normalized by the stock price for the quarter prior to the security issuance. We calculate insider trading prior to security issuance as the number of buys less the number of sells in the past year divided by shares outstanding. Abnormal stock return to lagged earnings announcements is the abnormal stock return using a market model averaged over the past four quarterly earnings announcements. The volume and return based measure is the average of quintiles of the Roll (1984) measure, the Llorente et al. (2002) measure, and the inverse of trading volume divided by the number of shares outstanding.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

highest correlation between the various proxies for asymmetric information. The correlation between analyst earnings surprise and abnormal stock return to earnings announcements is next highest at .285. The correlation between analyst earnings surprise and the signed measure of insider trading is .145. Lastly, the correlation between analyst earnings surprise and our composite Roll/Llorente/market liquidity measure is .109. These are all significantly different from zero at the 1% level.

For three of these four measures of asymmetric information, the coefficient on private market choice versus public market in column 1 is positive and significant. The one case where this coefficient on the private versus public choice is insignificant is the volume and return based measure (one that ex ante we consider a worse measure of asymmetric information as it is also a possible proxy for liquidity. It also has the lowest correlation between it and our main measure). Examining the coefficients for security choice conditional on market in columns 2–5, we see that the coefficient in column 2 for public equity is negative and significant for all measures of asymmetric information. This result reinforces the conclusion that probability of issuing public equity versus public debt declines with asymmetric information as predicted by Hypothesis 1. For analyst earnings dispersion we also find positive significant coefficients for private equity and convertibles, indicating that firms probability of issuing equity-type securities increases with asymmetric information. However the results within the private market are generally not significant for the other three measures of asymmetric information (with the exception of private convertibles for the abnormal stock return to earnings announcements). These results are again consistent with Hypothesis 3 that conditional on the market in which the firm chooses to issue, asymmetric information plays a limited role in security issuance in the private markets but a large role in the public markets.

Overall the probability of issuing in the private market increases for three of the four measures of asymmetric information. Looking at specific security issuance within markets, the probability of public equity decreases with all four measures of asymmetric information. Thus our conclusion is that the result of decreased probability of issuing informationally sensitivity securities in public markets as asymmetric information increases is very robust. Examining the coefficients for private markets, we also note that the sensitivity of security issuance to asymmetric information in the private markets is generally flat with low or limited sensitivity to the measures of asymmetric information. Our previous conclusions remain unchanged. We conclude that asymmetric information impacts security choice in the public market and impacts choice of public versus private markets but does not have a large impact on security choice within private markets.

5.2. Stock market response

The asymmetric information theories also have implications for the stock price market reaction around issues, depending on the security-market choice: a positive (negative) stock market returns around private (public) equity offerings. Empirically, early studies that examine stock returns around offerings are consistent with theory predictions.[17]

Table 12 presents the results from cross-sectional regressions of the cumulative abnormal returns on issue type and issuer characteristics. We run regressions for equity, convertibles and debt separately to examine the differences across markets, conditional on security type.

Inspection of Table 12 models (1), (3), and (5) reveals results consistent with previous event studies. We regress the 10 trading-day CAR around the issue on the private and public dummies and other control variables. The market reaction to public equity, convertibles and debt are negative while the market reaction to private equity is significantly positive, consistent with Wruck (1989), Hertzel and Smith (1993), and Allen and Phillips (2000). For private convertibles and private debt coefficients are insignificantly different from zero.

We add to the existing empirical results on abnormal returns by examining whether the predicted relations between information asymmetry and returns in *each* market hold. In models (2), (4), and (6)

[17] Wruck (1989), Hertzel and Smith (1993), Allen and Phillips (2000), Chaplinsky and Haushalter (2010), and Brophy et al. (2009) find positive stock market returns around traditional private placements of equity and convertibles. These results are in contrast to the negative returns around public offerings of securities found in Asquith and Mullins (1986), Masulis and Korwar (1986), and Masulis and Korwar (1986), Mikkelson and Partch (1986).

Table 12
Market reaction to security issuance.

	Equity issues		Convertible issues		Debt issues	
	(1)	(2)	(3)	(4)	(5)	(6)
Public market	−1.62%[b]	−1.60%[c]	−2.31%[a]	−2.53%[a]	−0.89%[b]	−0.95%[c]
	−2.54	−1.82	−2.65	−2.65	−1.97	−1.83
Private market	2.77%[b]	1.76%	−0.35%	1.83%	−0.07%	−0.02%
	2.16	1.29	−0.24	1.14	−0.19	−0.06
Measures of asymmetric information						
Earnings surprise public market		−3.60%		−3.68%[a]		−0.22%
		−1.25		−4.15		−0.20
Earnings surprise private market		0.96%[c]		−0.81%		1.10%
		1.80		−1.10		1.25
Risk measure						
Cash flow volatility	0.06%	0.26%	−0.19%	−0.68%	0.65%	0.72%
	0.11	0.50	−0.21	−0.69	1.31	1.32
Investment opportunities measures						
R&D/lagged PPE	0.49%	0.12%	0.81%	1.12%	−1.14%	−1.11%
	0.94	0.20	1.09	1.25	−1.36	−1.25
Tobin's *q*	−0.18%	−0.27%	0.57%	0.06%	−0.54%	−0.48%
	−0.30	−0.48	0.76	0.08	−1.42	−1.22
Debt, taxes and profitability						
Debt/asset ratio	−0.40%	−0.59%	−0.56%	−1.65%[b]	0.31%	0.24%
(Industry adjusted)	−0.78	−1.19	−0.78	−2.26	1.44	1.07
Marginal tax rate	−0.55%	−0.07%	0.35%	−0.02%	−0.11%	−0.06%
	−0.91	−0.11	0.46	−0.02	−0.58	−0.30
Profitability	−0.40%	−1.53%[b]	−0.55%	−1.43%	−0.31%	−0.19%
(Operating cash flow/lagged assets)	−0.60	−2.13	−0.60	−1.33	−0.61	−0.36
Financial distress	3.43%[c]	2.98%[c]	6.21%[a]	4.08%	1.09%	0.89%
(*Z*-score < 1.81)	1.90	1.66	2.90	1.63	1.53	1.30
Market timing						
Cumulative abnormal stock return	−1.69%[a]	−1.38%[a]	−0.79%	0.70%	−2.36%[a]	−2.50%[a]
(250 prior days)	−3.66	−2.81	−1.05	0.77	−6.50	−6.92
Cumulative market return	0.84%	0.77%	−1.10%	−0.54%	−0.41%[b]	−0.48%[b]
(Prior year)	1.20	1.13	−1.63	−0.69	−1.97	−2.26
Size and corporate governance						
Corporate governance	0.50%	0.16%	−0.07%	0.07%	0.07%	0.01%
	0.87	0.28	−0.10	0.09	0.38	0.08
Log size	−0.23%	0.74%	−1.30%	−0.90%	0.12%	0.14%
(Firm value)	−0.26	0.90	−1.18	−0.77	0.44	0.50
Number of observations	1959	1593	1374	1102	5305	4981
F-value	5.85	4.01	2.47	2.94	4.90	4.65
Adjusted R^2	4.40%	4.51%	2.74	3.38%	2.14%	2.70%

This table presents regression of 10 trading-day cumulative abnormal returns around security issues on the variables defined in Table 2A. The forecast error variable appears interacted with the public and private market dummy. All explanatory variables (except the dummy variables) have been normalized by their standard deviation. *t*-Statistics are denoted below the coefficients. We include industry fixed effects (Fama and French 17 industry categories) in all regressions.

[a] Significantly different from zero at the 1% level of significance.
[b] Significantly different from zero at the 5% level of significance.
[c] Significantly different from zero at the 10% level of significance.

we add the earnings surprise interacted with the private-public dummies. The significant positive interaction variable between earnings surprise and private issues in the equity markets is consistent with the hypothesis that the abnormal return around issues is negatively (positively) related to the

degree of information asymmetry for public (private) offerings of information sensitive securities such as equity.

Finally, the results also show that firms that issue equity after a large runup in the stock price suffer a negative reaction, consistent with the market believing that equity issuers are timing the market.

5.3. Rule 144-A market

We examine the robustness of our results to the categorization of 144-A debt and convertible issues as public securities and create additional categories for these types of securities. We expand the number of markets to estimate separate coefficients for Rule 144-A debt and convertibles issues. The results for previous security categories are overall very similar to those presented in Table 5. The results for the new security categories based on the 144-A market show that there are not many significant differences in factors that impact the decision to issue 144-A convertibles and 144-A straight debt securities.

5.4. Floating and fixed rate convertibles

Chaplinsky and Haushalter (2010) and Brophy et al. (2009) also examine separately price-protected or floating rate convertibles from traditional private securities without price-protection conversion features. Price-protected security issues provide investors with additional securities if the stock price decreases after the closing. In floating rate issues, the conversion price is reduced and investors receive more common shares upon conversion, while in the traditional or fixed rate convertibles the conversion rate is fixed. They find the excess returns to these price-protected issues are negative.

All results reported in the paper include both floating and fixed rate convertibles. For robustness we perform all tests excluding floating rate convertible issues. In the sample of firms we matched to Compustat and CRSP there were 487 floating rate issues. Of the final sample in our regression tables with a complete set of data on all control variables, there were 175 issues out of 8346 total issues. When dropping these 175 issues, the key results on the security and market choice do not change significantly.[18] We did find that stock market reactions (unreported) do change and become more positive for private equity and convertible issues when we exclude floating rate convertibles from the sample: the reaction to fixed rate convertible issues is now positive and significant at the 1% level. This result is consistent with the findings of Chaplinsky and Haushalter (2010) and Brophy et al. (2009), which indicate that the market reaction to announcements of floating (fixed) rate or price protected issues is negative (positive).

5.5. Other robustness checks

The most common type of private debt is revolving credit lines followed by term loans (respectively, 78% and 18%). It may be argued that the revolving credit lines do not represent actual loans given that the firm does not have to borrow under these lines. Thus, we also examine the robustness of our results to the exclusion of revolving credit lines. After excluding revolving credit lines from our final sample, we are left with 5722 issues out of 8346 originally. Our results do not change significantly when we exclude revolving credit lines from the analysis.

6. Conclusions

In this paper we analyze public and private security issuance decisions by public companies. Using a comprehensive database of public and private security issues we examine the impact of asymmetric information, risk and market timing on security issuance decisions. Our results show that private

[18] The reason that there are only 175 issues of these types of securities is that issuers of price-protected securities are smaller and frequently do not have analyst coverage. For conciseness we do not report those results but they are available from the authors upon request.

equity and private convertible issues are a substantial fraction of equity and convertibles issued by public companies. Private equity and convertibles issued by public firms comprise 51% of their equity and convertibles issues. We show that private equity issues by public firms are especially significant for smaller firms. 73% of small public firms (firms in the lowest size quartile) issuing equity and convertibles choose to issue privately.

We analyze the factors that are related to the probability of a firm issuing public and private securities. We have three main results on the impact of asymmetric information on security issuance:

1. Asymmetric information measures affect firm issuance decisions differently in the public and private markets. Conditional upon issuing in the public market, we find support for a probability ordering of security issuance: the predicted probability of issuing public equity declines with asymmetric information, while it increases for public debt. However, conditional on issuing in the private security market, we find a partial reversal of this ordering: firms' predicted probability of issuing debt decreases with measures of asymmetric information and increases slightly for convertibles and equity. When we do not distinguish between the market in which securities are sold, we find no evidence that asymmetric information is important to security issuance.
2. When we examine choice of market in which to issue securities, we find that the probability of firms issuing private over public securities is positively related to our measures of asymmetric information for all security types. We also find that the sensitivity of the public versus private market choice is highest for equity issues and lowest for debt issues.
3. Examining firms that issue securities multiple times, we find that firms that issue public securities are particularly less likely to issue public equity with increases in asymmetric information. We also find that firms that switch from issuing public securities to private equity and convertibles have increases in our measures of asymmetric information, while firms that switch from issuing private securities to issue public equity have decreases in asymmetric information.

We have two main results on the impact of risk and market timing on private and public security issuance:

1. Our findings show that firms' likelihood of issuing equity and convertibles in both public and private markets increases with risk and Tobin's *q*.We show that these relations are significantly stronger in the public security markets than they are in the private security markets – consistent with agency problems being mitigated when securities are sold to private investors.
2. Our results on market timing indicate that the probability of firms issuing public equity strongly increases with a firm's stock return in the past year relative to a benchmark portfolio. There is a much lower level of security issuance sensitivity to a firm's stock return in the private security market. These results are consistent with limited market timing of security issues to private investors as they have more information or better access to information than public investors.

Our results establish that private security markets are quite different from public markets on many different dimensions. In particular, the sensitivity of security issuance by public firms to asymmetric information, risk and market timing is fundamentally different in public and private markets. Economic significance of the results indicates that asymmetric information is one of the most significant and economically important factors that influences security issuance decisions. The results are consistent with several explanations that emphasize the difference of public and private investors and how information is conveyed to and analyzed by these investors. The explanations include private issues being sold to investors with better ability or access to information to evaluate firm prospects or stronger incentives for information production. The results also point to a potentially important unexplored dimension of capital structure – the public–private funding ratio in addition to the debt-equity ratio.

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