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Expectations of Security Type and the Information Content of Debt and Equity Offers*

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This paper investigates how the market reaction to debt and equity offers is influenced by investors' expectations as to the type of security to be issued. We find a significantly positive 1% announcement day return for debt issues made by firms that would normally be expected to issue equity. In contrast, the market reacts negatively when firms that are expected to issue debt issue equity instead. These results suggest that the informational content of public security offerings is conditioned by investors' prior beliefs. Further, our results also support the prediction of asymmetric information theory that debt issues convey good news relative to equity issues. © 1991 Academic Press, Inc.

1. INTRODUCTION

A central focus of the asymmetric information models of Myers and Majluf (1984), Narayanan (1988), and Noe (1989) is the information re-

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vealed by a firm's choice of debt or equity financing. If investors possess little or no information about the firm, an equity issue signals that the firm's equity is overvalued, while a risky debt issue signals that the firm's debt is overvalued. In these models, the market reaction to a security offering is typically nonpositive and inversely proportional to the risk of the security. Since debt is less risky than equity, debt issues should generate less negative market reactions than equity issues.

While this "black box" approach naturally focuses on the information content of the signal (security type), it ignores other information available to investors which potentially affects their ability to interpret the firm's actions. Investors have substantial knowledge of the issuing firm, including financing history, recent performance, and current economic and market conditions. This knowledge is likely to condition investors' perceptions of whether a firm will issue debt or equity. Consequently, the market reaction observed at announcement of the issue depends on investors' prior beliefs for the issuer. For example, investors may perceive little informational content to debt issued in circumstances where it is less costly and therefore more anticipated. However, debt issued when debt is more costly and therefore less anticipated could signal that the firm's equity is undervalued. Thus, offers which conflict with investors' expectations of security type provide a direct test of the predictions of asymmetric information models and the signal revealed by security type.

Prior studies of the market reaction to security offerings have not attempted to formally incorporate the determinants of capital structure choice into the analysis of market reactions.[1] We incorporate these determinants by developing a logit model of debt and equity offer choice similar to that of Marsh (1982). The model assigns a probability to a particular firm for issuing debt or equity. A high probability of debt issue corresponds to circumstances in which the costs of debt should be low. Similarly, a low probability of debt issue, that is, a high probability of equity issue, corresponds to circumstances in which the cost of equity should be low. Thus, the logit prediction can be used to condition the market reaction for investors' expectations of security type.

The modified pecking-order model suggests that the market reaction to an equity issue is likely to be more negative, the greater the probability that investors assign to an issue being debt. Similarly, the market reaction to a debt issue is likely to be more positive, the greater the probability that investors assign to an issue being equity. For equity issues, we find that the 56 most "debt-like" issuers experienced average abnormal returns of -3.5%, while the abnormal returns of the 56 most "equity-like" issuers averaged -2.0%. For debt issues, the 66 most "debt-like" issuers experi-

[1] See, among others, Asquith and Mullins (1986), Masulis and Korwar (1986), Eckbo (1986) Mikkelson and Partch (1986), and Korajczyk *et al.* (1990).

enced abnormal returns of −0.4%, while the abnormal returns of the 66 most "equity-like" issuers averaged 1.0%. These results and additional regression analyses indicate that higher probabilities of debt issue are associated with lower announcement date abnormal returns for both debt and equity offers.

We interpret these results as indicating that firms which issue equity when investors are expecting debt, signal that the firm's equity is overvalued. Firms which issue debt when investors are expecting equity signal that the firm's equity is undervalued. Therefore, the results support a key prediction of Myers and Majluf (1984), Narayanan (1988), and Noe (1989), that debt issues convey good news relative to equity issues.

Earlier studies of debt issuance (e.g., Eckbo, 1986; Mikkelson and Partch, 1986) have heretofore documented only insignificant returns to debt issues.[2] However, we find that debt issued by equity-like firms generates a positive 1% abnormal return on average at announcement of the issue. Since Miller and Rock (1985) and John and Williams (1985) suggest that unanticipated security offerings convey "bad news," the positive returns experienced by these firms are not likely to be explained by investor surprise at the issue. Evidence is presented to show that the positive returns are consistent with these debt offers signaling that the firm's equity is undervalued. Other rationales for the positive announcement day abnormal returns, such as bond rating, maturity, and market timing factors, are investigated, but none explain the positive returns.

This paper proceeds as follows. In Section 2, a logit model of debt and equity offer choice is constructed from publicly available data. Section 3 examines the differences in abnormal returns between extreme groups of offers classified by investors' expectations of security type. Cross-sectional regressions of abnormal returns and investors' expectations are also presented. The conclusions follow in Section 4.

2. A MODEL OF DEBT AND EQUITY OFFER CHOICE

In this section we develop a logit model of offer choice to assign probabilities to a particular firm issuing debt or equity. Because the logit model is conditioned on an offer being made, the logit prediction does not contain information on whether a firm will issue or not. The market reaction to an issue, however, includes both the "surprise" at the decision to issue and the choice of security type. Thus, the logit model allows us to examine the market reaction to issue, holding expectations of security type constant.

[2] James (1987) finds a significant positive market reaction to privately placed debt which is consistent with differential information between public market and private market lenders.

The model of offer choice includes a number of variables found by Marsh (1982) to be significant determinants of debt–equity offer choice for UK firms. Additional variables are included to address recent developments in capital structure theory.

2.1. *Data*

The data consist of public offerings of debt or common stock made by U.S. industrial firms which are listed on both the Center for Research in Security Prices (CRSP) and Standard and Poor's COMPUSTAT tapes from 1974 to 1983. Offering data for 826 offerings, 489 debt issues, and 337 equity issues are provided by Securities Data Corporation (SDC). The SDC data include gross proceeds, issue date, offer yield, offer price, and the rating of the securities. The sample excludes preferred stock, convertible securities, serial issues, and private placements.

2.2. *Asymmetric Information Variables*

The following is a brief description of the variables included in the offer choice model. Three variables are used to capture the impact of asymmetric information on firms' offer choices: (1) RELSIZE, the dollar amount of the offer scaled by total assets; (2) ROA, pretax operating income divided by total assets in the year prior to issue; and (3) PRICE, average stock price for the 3 months prior to the issue divided by the mean stock price for the 36 months prior to the issue.

Krasker (1986) argues that the costs of adverse selection are directly related to the size of the issue. All else equal, larger offers increase the potential for shareholders' losses due to asymmetric information. Consequently, debt offers rather than equity offers are more likely to occur with larger relative offer size as measured by the variable RELSIZE.

In the Myers and Majluf (1984) model, an increase in financial slack increases the costs of adverse selection. Therefore, an increase in slack reduces the likelihood of an equity offering. However, since financial slack (i.e., cash flow in excess of all positive net present value projects) is unobservable, there is no completely satisfactory measure. Therefore, we used the variable ROA (return on assets) as a proxy for financial slack.[3]

Holding offer size constant, Myers and Majluf (1984) show that an increase in the firm's stock price increases the share of returns to an investment project retained by old stockholders and reduces the loss of

[3] Two other measures of slack were constructed by subtracting capital expenditures and the sum of capital expenditures and interest from operating income. These variations on ROA produced results similar to those reported.

existing firm value to new stockholders. Thus, we included PRICE in the model.[4]

2.3. *Other Determinants of Offer Choice*

To include other determinants of the debt–equity offer decision, variables intended to capture optimal capital structure and timing considerations are added to the model. These variables are summarized below, and a description of all of the logit variables is contained in Table I.

Other logit variables and empirical proxies:

Tax Benefit of Debt: TAXPAY is the ratio of taxes payable/total assets.

Firm Risk: RISK is the ratio of unsystematic variance to the total variance of the firm's equity returns.

Expected Bankruptcy Costs: PREM is the difference between the Moody's average Baa corporate bond yield and the 3-month bond-equivalent U.S. Treasury Bill yield.

Asset Composition: INTA is the average difference between the market value and the book value of equity divided by total assets for 10 years preceding the issue date of the security.

Target Debt Ratio: TARGET is the difference between the long-term debt to total assets ratio at the year end prior to issue and the 10-year average value of long-term debt scaled by the 10-year average value of total assets.

Firm Size: ASSETS is the book value of total assets.

Stock Market Performance: S&P500 is the arithmetic mean for the S&P500 stock index for the 3 months preceding the issue divided by the average for the 36 months preceding the issue.

Bond Market Performance: TBILL is the 3-month Treasury Bill rate for the month immediately prior to issue divided by the average of that rate in the 3 months prior to issue.

Flotation Costs: SIZE is the dollar amount of the offer.

Optimal capital structure theory suggests that a firm's leverage decision results from a balancing of tax benefits and leverage related costs.[5] DeAngelo and Masulis (1980) argue that the greater the level of nondebt tax shields, the lower the expected marginal corporate tax benefit of

[4] Marsh (1982) analyzes stock returns as a determinant of security choice. However, Bagnoli and Khanna (1990) argue that stock price rather than stock returns is the key determinant of equity issue.

[5] For a description of optimal capital structure theory, see, among others, Kim (1978), Brennan and Schwartz (1978), and Bradley *et al.* (1984). Marsh (1982), Mackie-Mason (1990), and Billingsley *et al.* (1988) also develop predictive models of debt and equity offer choice.

additional interest tax shield. Thus, all else equal, firms with lower expected marginal tax rates are more likely to issue equity than debt. The variable TAXPAY is included to measure differences in firms' marginal expected corporate tax rates.[6] Higher values of TAXPAY are predicted to result in a higher probability of debt issue.

Leverage-related costs are proxied by RISK, PREM, and INTA. RISK is the error sum of squares divided by the total sum of squares from a market model regression of issuer stock returns for 48 months prior to the security's issue date. Following Kale *et al.* (1988), we allow for nonlinearities when testing RISK. This variable is designated as RISKSQ. The variable PREM is motivated by Buser and Hess (1986), who suggest that the corporate default premium is a time-varying proxy for bankruptcy and distress costs. Higher values of RISK and PREM are expected to be associated with higher probabilities of equity issue.

Myers (1977) and Stulz and Johnson (1985) argue that leverage-related costs depend on the composition of the firm's assets between tangible and intangible assets. Firms with higher proportions of firm value in tangible assets will experience lower leverage-related costs and thus use more debt. Thus, the variable INTA is expected to be positively related to the probability of equity issue.

Optimal capital structure theory also maintains that firms have target debt ratios. Because the costs of debt exceed the benefits of debt for debt ratios above the target, firms are predicted to be more likely to issue equity the further the firm's current debt ratio is above the target ratio. We proxy deviations from the target debt ratio with TARGET. Since Marsh (1982) includes firm size as an additional proxy for the target ratio, we also include total assets (ASSETS) in the model.

Marsh (1982) and Mackie-Mason (1990) find that aggregate market conditions at the time of issue have a significant influence on offer choice. Firms are more likely to issue equity following strong equity market performance and are more likely to issue debt following decreases in interest rates. Market conditions are proxied by the variables S&P500 and TBILL.

The final variable included in the model is in response to observations by Smith (1986) and Booth and Smith (1986) that there is a large fixed component to flotation costs. Given that fixed costs play a greater role in

[6] Several other variables, NDTS and TAXBLI, were also used as proxies for the firm's expected tax rate. NDTS is depreciation expense plus investment tax credits divided by total assets in the year prior to issue. TAXBLI is the sum of earnings before extraordinary items, minority interest, and federal, state, and local taxes less deferred taxes divided by 0.48. We also divided the numerators of TAXPAY and TAXBLI by pretax operating cash flow, but the results were similar to those specifications using total assets. None of the subsequent results is sensitive to the proxy used for the firm's tax position.

TABLE I

MEAN, MEDIAN, AND STANDARD DEVIATION OF LOGIT VARIABLES FOR EQUITY ISSUERS AND DEBT ISSUERS

Variable	Equity issuers (N = 337)			Debt issuers (N = 489)			Z statistic
	Mean	Median	SD	Mean	Median	SD	
RISK	0.67	0.68	0.15	0.63	0.63	0.15	3.16*
INTA	0.54	0.35	0.63	0.22	0.10	0.41	8.31*
ROA	0.17	0.16	0.07	0.16	0.16	0.06	0.95
TARGET	0.07	0.01	0.40	0.10	0.03	0.50	−0.98
TAXPAY	0.04	0.04	0.04	0.03	0.03	0.03	2.21*
RELSIZE	0.07	0.06	0.06	0.08	0.06	0.06	0.31
SIZE ($M)	$52.14	$33.55	$56.62	$104.44	$100.01	$77.93	−11.17*
ASSETS ($M)	$1051.66	$490.40	$1474.24	$2313.06	$1523.08	$2907.16	−8.19*
S&P500	1.15	1.17	0.12	1.03	1.07	0.16	11.95*
PRICE	1.44	1.34	0.72	1.01	0.95	0.40	9.92*
PREM	3.71	4.47	2.14	3.49	4.14	1.91	1.53
TBILL	1.01	1.02	0.07	0.97	0.97	0.10	7.51*

Note. Variable definitions:

RISK: error sum of squares divided by the total sum of squares from a market model regression on 48 monthly returns prior to issue;

INTA: the difference between the market and book values of equity divided by total assets, averaged for 10 years preceding issue;

ROA: pretax operating income divided by total assets;

TARGET: the difference between the long-term debt ratio in the year prior to the security offering, $(LTD/TA)_{-1}$, and the average value of the ratio in the 10 years prior to the security offering;

TAXPAY: income tax expense less deferred taxes, divided by total assets in the year prior to issue;

RELSIZE: the dollar size of the offering scaled by total assets;

SIZE: ($ millions) the dollar size of the offering;

ASSETS: ($ millions) total assets;

S&P500: mean of Standard and Poor's (S&P) 500 Index for the 3 months preceding the issue divided by the mean of the S&P500 index for the 36 months prior to issue;

PRICE: mean stock price for the 3 months preceding the issue divided by the mean stock price for the 36 months prior to issue;

PREM: the mean Baa corporate bond rate for 3 months preceding the issue less the mean of 3-month Treasury Bill rate for the 3 months prior to issue;

TBILL: the 3-month Treasury Bill rate during the month prior to issue divided by the average 3-month Treasury Bill rate during the 3 months prior to issue.

[a]Z statistics are computed as the mean of equity issuers minus the mean of debt issuers.

* p value ≤ 0.05.

the flotation costs of debt issues than in equity issues, the flotation cost advantage of debt will increase with offer size. To control for this, we include the dollar amount of the offering, SIZE, as an explanatory variable.[7]

The use of SIZE as a proxy for transactions costs or in RELSIZE raises several potential problems. First, the amount offered is not known until the issue is announced. By design, we want the logit model to provide a summary of public information available at the time of issue concerning offer choice. To the extent that investors make rational forecasts of the amount offered, the use of SIZE in the logit model should not bias the coefficients. Second, debt offerings are typically twice the size ($100 million), on average, of equity offerings. This suggests that the amount of funding required and the type of security issued may be jointly determined. Therefore, several versions of the logit model, which differed in their treatment of SIZE, were estimated.

2.4. *Offer Choice Model Results*

Table I compares the characteristics of firms issuing debt with those of firms issuing equity. On average, debt and equity issuers are indistinguishable based on the amount of the offer relative to firm size, RELSIZE, or by return on assets, ROA. However, equity issuers enjoy significantly better stock price performance prior to the issue than do debt issuers (PRICE). Equity issuers also appear to have a greater proportion of firm value in growth opportunities than do debt issuers, as proxied by INTA. Interestingly, the TARGET variable indicates that both debt and equity issuers are above their long-run average debt ratios when they issue.

Table II presents the logit model of offer choice. The dependent variable in the analysis is defined as "0" for equity offerings and "1" for debt offerings. Significance tests of the logit coefficients are conducted using asymptotic t statistics.

The results in column (1) of Table II show that firms experiencing exceptional stock performance prior to the issue (PRICE) are more likely to issue equity.[8] Higher levels of ROA are associated with less likelihood of an equity offer, suggesting that greater slack adds to the cost of equity issue. Each of these findings supports predictions of asymmetric information theory.

With the exception of the negative coefficient for TAXPAY, all of the

[7] Underwriting fees cannot be used in the offer choice model as a proxy for transactions costs because underwriting compensation itself is conditional on offer type. Thus, we use AMT as a proxy for transactions costs.

[8] Lucas and McDonald (1990) provide an explanation of why equity issues "cluster" in business cycle expansions. Their model, however, does not include debt offers.

TABLE II
LOGIT ANALYSIS OF PROBABILITY OF DEBT OR EQUITY ISSUE FOR 489 DEBT OFFERS AND 337 EQUITY OFFERS

Variable	(1)	(2)
INTERCEPT	15.07*	15.56*
	(7.89)	(7.70)
RISK	−10.85**	−12.39*
	(2.54)	(2.77)
RISKSQ	8.46**	9.64*
	(2.56)	(2.76)
INTA	−1.71*	−2.10*
	(7.13)	(7.78)
TARGET	−0.34***	−0.28
	(1.89)	(1.47)
TAXPAY	−7.96**	−11.47**
	(1.84)	(2.42)
ASSETS*(10^{-2})	0.02*	
	(4.00)	
RELSIZE		10.77*
		(5.47)
SIZE*(10^{-2})		1.37*
		(7.21)
PRICE	−1.36*	−1.64*
	(5.67)	(6.07)
ROA	4.99**	6.55**
	(2.07)	(2.45)
PREM	−0.15*	−0.13*
	(3.00)	(2.60)
TBILL	−2.89*	−3.79*
	(2.54)	(3.11)
S&P500	−6.07*	−6.38*
	(7.31)	(7.17)
Pseudo R^2[a]	0.54	0.60
log likelihood ratio[b]	769.15	690.58

Note. Dependent variable is debt issue = 1 and equity issue = 0; independent variables are firm risk (RISK), intangible assets (INTA), return on assets (ROA), deviation from long-run debt ratio (TARGET), taxes payable (TAXPAY), dollar size of issue (SIZE), issue size as percentage of assets (RELSIZE), total assets (ASSETS), prior to issue stock performance (PRICE), prior to issue equity market performance (S&P500), 3-month change in interest rates (TBILL), and corporate default premium (PREM).

[a] Pseudo R^2 is (model $\chi^2 - 2p)/-2L(0)$, where p is the number of variables in the model excluding the intercept and $L(0)$ is the maximum log likelihood with only the intercept in model.

[b] The log likelihood ratio is $-2 \log L(0)/L(1)$, where $L(1)$ is the value of likelihood function for the full model; asymptotic t statistics are given in parentheses

* Coefficient is significant at 1% level.

** Significance at 5% level.

*** Significance at 10% level.

other variables considered impact the firm's choice of financing in ways consistent with optimal capital structure theory. The negative coefficient for RISK suggests that firms with greater risk are more likely to issue equity. Likewise, the variable PREM suggests that increases in the corporate default premium result in higher probabilities of equity issue. As indicated by the negative coefficient for INTA, firms with a larger fraction of firm value in intangible assets are more likely to issue equity. The TARGET variable indicates that the further a firm is above its long-run historic debt ratio, the more likely the firm is to issue equity. Thus, these results uniformly suggest that as leverage-related costs increase, firms are more likely to issue equity.

Finally, the market condition variables, S&P500 and TBILL (as well as PRICE and PREM), are highly significant, indicating that market conditions play an important role in determining offer choice. Consistent with Marsh's (1982) findings, firms are more likely to issue equity following increases in equity market performance and decreases in interest rates.

In column (2) of Table II ASSETS is replaced by SIZE and RELSIZE. The inclusion of these variables assumes that investors make unbiased forecasts of the issuing firm's need for funds, and that they utilize this information in forming expectations of the type of security the firm is likely to issue. Both SIZE and RELSIZE have positive and significant coefficients, indicating that larger issues tend to be debt. However, the coefficients for other variables are not materially different from the first specification. Since it is unclear which model best represents how investors form expectations of security type, both logit models are retained in subsequent analyses.

The specifications reported in Table II are arrived at after examining alternative proxies for RISK, INTA, TARGET, and TAXPAY. For example, the standard deviation of operating cash flows was used as an alternative to RISK (see Bradley *et al.*, 1984) and a measure of nondebt tax shield was used as an alternative to TAXPAY. In addition, stock returns rather than prices were used in lieu of PRICE and S&P500. Finally, an instrumental variable was constructed for offer size and used as a substitute for SIZE.[9] The performance of these alternative proxies was similar to those reported in Table II and are therefore not reported.

2.5. *Accuracy of Debt-Type and Equity-Type Classification*

Given the importance of the logit predictions in the following tests, it is important that the models in Table II yield accurate and robust classifica-

[9] An instrumental variable for offer size was constructed from a regression with SIZE as the dependent variable and all of the other logit variables in Table II except RELSIZE as the independent variables. The predicted values of this regression were used as an instrument for offer size.

tions of offer type. Similar to that in Marsh (1982) and Palepu (1986), a cutoff point which minimizes the sum of the Type I (predict equity when debt) and Type II (predict debt when equity) errors is used to classify firms into two groups: debt-type issuers and equity-type issuers. In other words, a cutoff point which maximizes the classification accuracy of the model is estimated for each model. For both models in Table II a firm is classified as an equity-type firm if the logit prediction is less than 0.60, while firms with logit predictions greater than or equal to 0.60 are classified as debt-type issuers.

To determine the accuracy of the debt-type and equity-type classifications, within-sample classification tests and holdout sample tests are conducted for logit models (1) and (2). In Table III, within-sample classification tests show that the models classify greater than 78% of the issues correctly, which is comparable to the 75% reported by Marsh (1982).

Both models are reestimated for the period 1974–1982, with 1983 offerings excluded for a holdout analysis. The holdout sample consists of 121 equity offers and 32 debt offers. For the holdout sample, model (1) correctly classifies more than 69% of the offers, while model (2) correctly classifies more than 75% of the offers. Marsh's model correctly predicted 71% of the out-of-sample offers.

In all, a large number of tests were conducted to assess the accuracy of the debt-type and equity-type issuer classifications. All suggest that the classifications are accurate and robust to changes in the model specifications. In subsequent tests, logit predictions generated from the models are denoted by the variable ITYPE. Higher values of ITYPE indicate greater probability of debt issue.

3. MARKET REACTION TO DEBT-TYPE AND EQUITY-TYPE ISSUERS

The modified pecking-order model predicts that the greater the probability that investors assign to an issue being debt, the more negative the market reaction at the announcement of an equity issue will be. Likewise, the greater the probability that investors assign to an issue being equity, the more positive the market reaction at the announcement of a debt issue is predicted to be.

3.1. *Measuring Market Returns*

Event-study methodology is used to measure the market reaction to announcements of security offerings. The public announcement date of each debt and common stock offering is obtained from the *Wall Street Journal Index*. Offerings are eliminated from the analysis if: (1) no an-

TABLE III

WITHIN-SAMPLE AND HOLDOUT SAMPLE ACCURACIES (PERCENTAGE AND NUMBER OF OFFERS CORRECTLY AND INCORRECTLY CLASSIFIED) FOR LOGIT PREDICTIONS GENERATED FROM MODELS IN TABLE II

	Within-sample accuracy[a]		Holdout sample accuracy[b]	
	Predictions of model (1)	Predictions of model (2)	Predictions of model (1)	Predictions of model (2)
%Sample accuracy	78.2%	79.1%	69.3%	75.0%
(Correct, incorrect)	(646,180)	(653,123)	(106,47)	(114,39)
%Debt accuracy	88.3%	84.3%	59.4%	66.0%
(Correct, incorrect)	(432,57)	(412,77)	(19,13)	(21,11)
%Equity, accuracy	63.5%	73.3%	71.9%	77.0%
(Correct, incorrect)	(214,123)	(247,90)	(87,34)	(93,28)

Note. Issues are classified as debt issue if logit prediction is greater than 0.60 for models (1) and (2).

[a] Within-sample accuracy is determined for the total sample of 826 offers, 489 debt offers, and 337 equity offers.

[b] The Logit model is reestimated from 1974 to 1982 for use in the holdout test. The holdout sample is the 153 offers issued in 1983, 32 debt offers and 121 equity offers.

nouncement date was found or there was any discrepancy in the amount of security issued between the *Wall Street Journal Index* and the SDC data; (2) the offer was part of a swap, combination, shelf registration, or secondary offering. The final sample consists of 475 observations: 252 debt offers and 223 equity offers.[10] The market model is used to calculate the abnormal returns (AR) for each offering firm.[11]

3.2. *Market Reactions for Quartiles of Issues Ranked by ITYPE*

The magnitude of ITYPE's influence on the market reaction to new issues is examined by comparing two extreme groups of offers which differ in investor expectations of security type. To create the groups, debt and equity offers are separated, ranked by ITYPE [from logit model (1)], and divided into quartiles. Table IV reports mean values of the 2-day abnormal returns (CAR) and selected logit variables for all debt and equity offers, and those offers falling in the highest and lowest quartiles based on ITYPE.

For equity offers, ITYPE, the average probability of debt issue, is 0.37 for all equity issuers compared to 0.08 for the low ITYPE group and 0.68 for the high ITYPE group. The mean of the 2-day announcement period abnormal returns for the low ITYPE quartile is −2.0% compared with −3.5% for the high ITYPE quartile. Therefore, ITYPE can be used to identify groups of equity offers that differ in their average announcement day abnormal returns by 150 basis points. Offers where the firm had a small (0.08) probability of issuing debt have a significantly less negative announcement day reaction than offers where the firm had a high (0.68) probability of debt issue.

For all debt offers ITYPE averaged 0.74 compared to 0.42 for the low ITYPE group and 0.95 for the high ITYPE group. The mean of the 2-day announcement period abnormal returns for the low ITYPE quartile is a positive 1% (0.01), which is 1.4% higher than the mean of 2-day announcement period returns for the high ITYPE quartile (−0.004). The difference in means is statistically significant at the 5% level.

[10] The logit models in Table II are re-estimated for the sample of 475 offers with similar results.

[11] The abnormal return (AR) for offering firm j's common stock is calculated as

$$AR_{jt} = R_{jt} - (a_j + b_j R_{mt}), \tag{1}$$

where R_{jt} is the daily percentage return on common stock for offering firm j for day t, R_{mt} is the daily percentage return on the CRSP equally weighted index for day t, and a_j and b_j are ordinary least-squares estimates of the firm's market model parameters. The market model parameters are estimated over the period $t = -136$ to $t = -16$, where $t = 0$ is defined as the announcement date of the offering. Abnormal returns are computed for each firm's stock for the period $t = -15$ to $t = +15$.

TABLE IV

2-DAY ANNOUNCEMENT PERIOD RETURNS [CAR(−1,0)] AND MEAN VALUES OF SELECTED LOGIT VARIABLES[a] FOR HIGHEST AND LOWEST QUARTILES OF ISSUES RANKED BY ITYPE

	Equity issues			Debt issues		
Variable	All equity (N = 223)	Low ITYPE quartile	High ITYPE quartile	All debt debt (N = 252)	Low ITYPE quartile	High ITYPE quartile
CAR(−1,0)	**−0.029**	**−0.020**	**−0.035**	**0.001[b]**	**0.010**	**−0.004[b]**
***t* statistic**	**(−13.01)**	**(−4.73)**	**(−8.40)**	**(0.48)**	**(0.21)**	**(0.12)**
ITYPE	**0.372**	**0.083**	**0.678**	**0.739**	**0.429**	**0.954**
RISK	0.656	0.684	0.607	0.634	0.668	0.602
INTA	0.542	1.117	0.323	0.172	0.324	0.085
TARGET	0.050	0.054	0.063	0.062	0.110	0.076
TAXPAY	0.049	0.051	0.035	0.034	0.041	0.027
ASSETS ($billion)	$1.025	$0.348	$1.959	$2.206	$1.162	$3.524
ROA	0.166	0.187	0.159	0.165	0.173	0.152
PRICE	1.470	1.974	1.091	1.021	1.398	0.707
S&P500	1.146	1.174	1.072	1.046	1.147	0.912
PREM	3.443	3.679	3.140	3.145	3.507	3.219
TBILL	1.009	1.031	0.966	0.960	0.996	0.910

Note. Higher values of ITYPE indicate greater probability of debt issue.

[a] Logit variables are firm risk (RISK), intangible assets (INTA), return on assets (ROA), deviation from long-run debt ratio (TARGET), taxes payable (TAXPAY), total assets (ASSETS), prior to issue stock performance (PRICE), prior to issue equity market performance (S&P500), 3-month change in interest rates (TBILL), and corporate default premium (PREM).

[b] The difference in CAR's between low and high ITYPE groups is significant at the 5% level.

Note that for both equity and debt issues the market reaction is smaller in absolute value when firms issue securities in line with investors' prior beliefs about the firm. The average market reactions to expected equity issues (low ITYPE equity issues) and expected debt issues (high ITYPE debt issues) are significantly smaller on average than for high ITYPE equity issues and low ITYPE debt issues, respectively. This suggests that the information asymmetry between investors and managers is reduced when firms issue securities in line with investors' prior beliefs for the firm.

Given the insignificant price reactions reported for the total sample of debt issues in Table IV, we attempted to determine why low ITYPE debt offers generated positive returns on average. One explanation for the positive price reaction is that a debt issue may signal that the firm's stock price is undervalued in management's opinion. As shown in the mean values reported for the logit variables in Table IV, low ITYPE debt issues occur in periods following strong stock price run-ups and favorable economic conditions, as measured by PRICE and S&P500. For example, low ITYPE debt issues have an average stock price run-up prior to the issue of 1.398 compared to 0.707 for high ITYPE issues. According to asymmetric information arguments, if management thinks the firm's stock price has peaked, it would issue equity. Thus, the absence of an equity issue in these circumstances could signal that management expects the firm's stock price to continue rising.

The positive market reaction observed for low ITYPE debt offers is unlikely to be explained by the surprise news that a firm makes an offer for several reasons. First, unexpected security offerings in Miller and Rock (1985) and John and Williams (1985) are predicted to have negative, rather than positive, market reactions. Second, no significant reaction occurs for the high ITYPE offers—the observed reaction of −0.004 is not significantly different from zero. Thus, when investors' expectations of security type are confirmed, no news is conveyed by the decision to offer or by the security issued. This suggests that the difference in market reaction between the high and the low ITYPE debt offers is due to the choice of security type.

Several other explanations for the positive market reaction for low ITYPE debt offers were also examined. In particular, we investigated whether the positive reaction was due to favorable debt timing conditions, the maturity or rating of the debt, or other events preceding the 66 low ITYPE debt offers. Note in Table IV that low ITYPE debt issues occur in periods of relatively high interest rates (TBILL) and large default risk premiums (PREM) compared to high ITYPE debt issues. Consequently, debt offers by equity-type firms generate a positive market reaction despite conditions normally considered unfavorable for debt issuance.

The low ITYPE debt group has a larger portion of its issues rated BBB

or lower than the high ITYPE debt group, but this difference is not significant.[12] No significant differences in maturity between the bonds issued by the low and high ITYPE groups are found.

Finally, a search of the *Wall Street Journal Index* for the 3 months prior to issue produced no evidence of any systematic disclosures by the 66 low ITYPE debt offerings which could account for the positive market reaction. Thus, we conclude that the positive market reaction observed for low ITYPE debt offerings is consistent with these offers signaling favorable private information about the firm.

3.3. *Regression Analysis of Abnormal Returns*

Further analysis of the effect of investors' expectations on the price reaction to issues is shown in Tables VA and VB where cross-sectional regressions of 2-day announcement period abnormal returns and the logit prediction, ITYPE, are presented. The logit predictions used in the regressions correspond to logit model (1) in Table II in columns (1) and (1′) and to logit model (2) in Table II in columns (2) and (2′). The results in both Tables VA and VB are consistent with the findings reported in Table IV.

In Table VA equity offers have negative and significant coefficients for ITYPE which indicate that as the probability of a debt offering increases, the reaction to an equity offering is more negative. Thus, the results suggest that investors disapprove more of equity offers when a debt offer had been expected.

In Table VB, debt offers have negative and significant coefficients for ITYPE which indicate that a greater likelihood of debt issue results in a more negative abnormal return for *debt* issues. Stated differently, the more likely a firm is perceived to issue equity, the less negative (more positive) is the abnormal return associated with a debt issue. This suggests that a debt issue conveys good news for firms expected to issue equity. This would be the case, for example, if investors felt the firm avoided an equity issue because it was currently undervalued.

Previous studies of announcement day abnormal returns for security offerings have included variables similar to the logit variables, PRICE, S&P500, and TBILL, to condition for the ex ante uncertainty of issue. (See, for example, Masulis and Korwar, 1986; Asquith and Mullins, 1986; Choe *et al.*, 1990; Eckbo, 1986. However, as the logit analysis showed, these variables are also significant determinants of issue type. By includ-

[12] Interestingly, Eckbo (1986) finds that the announcement day abnormal returns for low-rated bonds are positive or higher than the returns for AAA–AA bonds, but the differences are not significantly different.

TABLE VA

WEIGHTED LEAST-SQUARES REGRESSIONS OF TWO-DAY ANNOUNCEMENT PERIOD RETURNS FOR PROBABILITY OF DEBT ISSUE (ITYPE), DOLLAR SIZE OF ISSUE (SIZE OR LOGSIZE), PRIOR TO ISSUE STOCK PERFORMANCE (PRICE), POST ISSUE STOCK PERFORMANCE (LPRICE), PRIOR TO ISSUE EQUITY MARKET PERFORMANCE (S&P500), 3-MONTH CHANGE IN TREASURY BILL RATES (TBILL), AND CORPORATE DEFAULT PREMIUM (PREM)

	Equity issues (N = 223)			
	(1)	(2)	(1′)	(2′)
INTERCEPT	−0.040	−0.044	−0.001	0.001
	(−6.30)	(−7.34)	(0.07)	(0.08)
ITYPE[a]	−0.019	−0.013	−0.019	−0.018
	(−2.61)	(−1.85)	(−2.30)	(−1.99)
LOGSIZE			0.002	0.003
			(0.55)	(0.87)
PRICE			−0.023	−0.022
			(−3.07)	(−3.00)
LPRICE			0.019	0.019
			(3.27)	(3.26)
S&P500			−0.024	−0.030
			(−2.02)	(−2.46)
Adj. R^2	0.03	0.01	0.13	0.13

Note. t statistics are in parentheses.

[a] ITYPE is generated from logit model 1 in Table II for Eqs. (1) and (1′) and from logit model 2 in Table II for Eqs. (2) and (2′).

TABLE VB

ORDINARY LEAST-SQUARES REGRESSIONS OF 2-DAY ANNOUNCEMENT PERIOD RETURNS FOR PROBABILITY OF DEBT ISSUE (ITYPE), DOLLAR SIZE OF ISSUE (SIZE OR LOGSIZE), PRIOR TO ISSUE STOCK PERFORMANCE (PRICE), POST ISSUE STOCK PERFORMANCE (LPRICE), PRIOR TO ISSUE EQUITY MARKET PERFORMANCE (S&P500), 3-MONTH CHANGE IN TREASURY BILL RATES (TBILL), AND CORPORATE DEFAULT PREMIUM (PREM)

	Debt issues (N = 252)			
	(1)	(2)	(1′)	(2′)
INTERCEPT	0.017	0.016	0.040	0.034
	(2.45)	(2.15)	(1.82)	(1.56)
ITYPE[a]	−0.021	−0.019	−0.028	−0.026
	(−2.42)	(−2.10)	(−2.88)	(−2.57)
SIZE*(10^3)			0.029	0.034
			(1.05)	(1.16)
PREM			−0.002	−0.002
			(−1.73)	(−1.70)
TBILL			−0.016	−0.011
			(−0.84)	(−1.57)
Adj. R^2	0.02	0.02	0.03	0.02

Note. t statistics are in parentheses.

[a] ITYPE is generated from logit model 1 in Table II for Eqs. (1) and (1′) and from logit

ing PRICE and S&P500 in the regressions the influence of these variables on the ex ante uncertainty of issue is held constant, freeing the coefficient on ITYPE to capture the effect of security type. In addition to PRICE and S&P500, we also include the variable LPRICE, which is the issuer firm's average stock price in the 3 months following the issue divided by the average stock price in the 36 months prior to issue. LPRICE provides a proxy for investors' future expectations for the firm at the time of issue.

Columns (1′) and (2′) in Tables VA and VB present regressions that control for the uncertainty of issue and other factors, such as transaction costs (SIZE or LOGSIZE). The additional variables, however, do not materially alter the estimated coefficients for ITYPE in any of the specifications. This suggests that investors' expectations regarding security type exert an independent influence on the market reaction to new issues, notwithstanding consideration of the uncertainty of issue.

For equity offerings in Table VA, the negative coefficient for PRICE and the insignificant coefficient for LOGSIZE are consistent with earlier studies (see Masulis and Korwar, 1986; Barclay and Litzenberger, 1988). The coefficient for LPRICE is significantly positive, suggesting that when investors have favorable expectations of future firm stock performance the market reaction to equity issues is less negative.[13]

The negative and significant coefficient for the performance of the overall market (S&P500) contrasts with results reported in Masulis and Korwar (1986) and Choe *et al.* (1990). Although not reported, the difference in results is not due to the inclusion of ITYPE or LPRICE in the regressions, as the negative coefficient for S&P500 persists even when ITYPE and/or LPRICE is eliminated from the specification.

For debt issues the inclusion of SIZE, PREM, and TBILL increases the estimated size and significance of the coefficient for ITYPE. With the exception of ITYPE, the only variable in columns (1′) and (2′) that is marginally significant is the corporate default premium, PREM. The negative coefficient suggests that investors are more surprised or more disapproving of debt issues when default risk premiums are high.

4. CONCLUSIONS

The evidence presented in this paper documents substantial variation in the market reaction to new debt and equity issues depending on whether the firm's choice of security conforms to investors' prior beliefs as to the type of security to be issued. Debt issues made when the probability of

[13] Another interpretation of this result is that higher CAR's may lead to higher values of LPRICE. However, the correlation coefficient between LPRICE and CAR(−1,0) is not significant.

equity issue is high generate significant positive announcement day abnormal returns of 1%. These positive abnormal returns result, on average, despite the fact that these issues generally occur during periods of high interest rates and high default risk premia, conditions normally considered unfavorable for debt issue.

At the announcement of equity offerings, the market reaction is significantly more negative, the higher the probability that investors assign to the firm issuing debt. These effects persist after controlling for issue size and the issuer's and market's stock performance around the issue.

The results for equity issues suggest reductions in the level of asymmetric information when investors' prior beliefs of the issuer are confirmed by the firm's choice of security. However, the results for debt are difficult to explain unless debt issues convey good news relative to equity issues. This would be the case, however, if investors felt equity-type firms issued debt because their equity was currently undervalued.

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