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Journal of Financial Economics 71 (2004) 517–540

JOURNAL OF  
Financial  
ECONOMICS

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# Determinants of target capital structure: The case of dual debt and equity issues<sup>☆</sup>

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Received 16 August 2002; received in revised form 2 December 2002; accepted 6 January 2003

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## Abstract

We examine whether market and operating performance affect corporate financing behavior because they are related to target leverage. Our focus on firms that issue both debt and equity enhances our ability to draw inferences. Consistent with dynamic trade-off theories, dual issuers offset the deviation from the target resulting from accumulation of earnings and losses. Our results also imply that high market-to-book firms have low target debt ratios. On the other hand, consistent with market timing, high stock returns increase the probability of equity issuance but have no effect on target leverage.

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*JEL classification:* G32

*Keywords:* Capital structure; Target leverage; Equity market timing; Dual issues

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## 1. Introduction

Trade-off theories of corporate financing are built around the concept of target capital structure that balances various costs and benefits of debt and equity. These

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<sup>☆</sup>We would like to thank Jim Booth, Tom Chemmanur, Marcia Cornett, Wayne Ferson, Edie Hotchkiss, Ravi Jain, Ed Kane, Darius Palia, Jun Qian, Sheridan Titman, seminar participants at Baruch College, the Financial Management Association and the American Finance Association meetings, and an anonymous referee for valuable comments.

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include the tax benefits of debt and the costs of financial distress (Modigliani and Miller, 1963), various agency costs of debt and equity financing (e.g., Jensen and Meckling, 1976; Myers, 1977; Stulz, 1990; Hart and Moore, 1995), and the costs and benefits of signaling with capital structure (Ross, 1977).

In contrast, in the pecking order model of Myers and Majluf (1984), managers do not attempt to maintain a particular capital structure. Instead, corporate financing choices are driven by the costs of adverse selection that arise as a result of information asymmetry between better-informed managers and less-informed investors. Because these costs are incurred only when firms issue securities and are lower for debt than for equity, firms prefer internal financing and prefer debt to equity when external funds have to be raised.

Most of the empirical evidence on capital structure comes from studies of the determinants of corporate debt ratios (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; Graham, 1996) and studies of issuing firms' debt versus equity financing choice (e.g., Marsh, 1982; Jalilvand and Harris, 1984; Bayless and Chaplinsky, 1990; MacKie-Mason, 1990; Jung et al., 1996).<sup>1</sup> These studies have successfully identified firm characteristics such as size, research and development (R&D) intensity, market-to-book ratio of assets, stock returns, asset tangibility, profitability, and the marginal tax rate as important determinants of corporate financing choices. The effects associated with profitability and market-to-book ratio have been found to be especially important.

This study is a contribution to the ongoing debate about whether the profound effects of operating and market performance on firms' financing decisions are due to trade-off or to pecking order financing behavior. Recent work in this area starts with Shyam-Sunder and Myers (1999), who argue that the negative relation between profitability and leverage is consistent with the pecking order but not with the trade-off model. Fama and French (2002) agree that the negative effect of profitability on leverage is consistent with the pecking order model, but they also find an offsetting response of leverage to changes in earnings, implying that the profitability effects are in part due to transitory changes in leverage instead of changes in the target. Hovakimian et al. (2001) report that even though high profitability is associated with low leverage, it is also associated with a higher probability of issuing debt vis-à-vis issuing equity, which is consistent with dynamic trade-off models (e.g., Fischer et al., 1989; Leland, 1994). They also conclude that the negative effect of market-to-book ratios on both the observed debt ratios and the probability of debt versus equity issue choice is consistent with both the trade-off and the pecking order models. In contrast, Baker and Wurgler (2002) suggest that neither the trade-off nor the pecking order theory is consistent with the negative effect of long-past market-to-book ratios on firm leverage. They contend that the observed capital structures reflect the cumulative outcome of timing the equity market.

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<sup>1</sup>Other studies examine the maturity and the priority structure of corporate debt (e.g., Barclay and Smith, 1995a,b), the stock market reaction to security issues (e.g., Masulis, 1980; Masulis and Korwar, 1986), and the changes in operating performance around security issues (e.g., Loughran and Ritter, 1997).

Unlike earlier studies, this paper focuses on the instances when firms issue both debt and equity. Earlier studies either exclude such dual issues from their analysis (e.g., Marsh, 1982; Hovakimian et al., 2001) or use additional criteria to reclassify them as either debt or equity issues (MacKie-Mason, 1990).

One of our most striking findings is that the number of dual issues is fairly large and that the amount of capital raised tends to be very large relative to the size of the dual issuer. The average dual issue size is 61.5% of pre-issue total assets. This is almost double of an average equity issue size and more than triple of an average debt issue size. Thus, dual issues are important events that have a potential to induce substantial changes in the issuer's capital structure. This suggests that firms are likely to be deliberate in choosing the amounts of debt and equity and that the analysis of dual issues should help us identify the factors affecting the corporate capital structure choice.

Specifically, the analysis of dual issues allows us to extend the existing literature in the following two directions. First, the inference problem associated with the effects of profitability in regressions of observed debt ratios can be addressed. Even if firms have target capital structures, the observed debt ratios may deviate substantially from these targets. For example, Fischer et al. (1989) and Leland (1994) present dynamic trade-off models in which firms let their leverage fluctuate over time reflecting accumulated earnings and losses and do not adjust it toward the target as long as the adjustment costs exceed the value lost due to suboptimal capital structure. Such a behavior could induce a negative relation between profitability and leverage in samples with capital structure adjustments that are relatively infrequent. This implies that tests of such a relation have no power to reject the dynamic version of the trade-off hypothesis in favor of the pecking order model.

The analysis of dual issues offers an opportunity to test the effects of firm profitability on leverage in a setting where the trade-off and the pecking order theories do not share the same predictions. Limiting the sample to dual issuers eliminates observations with passive changes in leverage, so we do not have a leverage–profitability relation simply because of accumulation of earnings and losses. Furthermore, because these firms are able to issue both debt and equity, they have a rare opportunity to reset their capital structure at a relatively low cost.<sup>2</sup> Therefore, firms that follow a dynamic trade-off strategy will choose the amounts of new debt and equity so that the deviation from the target induced by accumulation of earnings and losses is offset and the resulting debt ratio is close to the target. As a result, the negative relation between profitability and leverage will no longer hold. In contrast, if firms follow pecking order, then the negative relation between profitability and leverage will persist because such firms have no incentive to offset the effects of profitability on leverage.

Second, dual issues can be incorporated as an additional issue type into the traditional debt versus equity choice analysis. Introducing dual issues into the

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<sup>2</sup>When the sole reason for issuing debt or equity is to adjust the capital structure, the resulting debt ratio can be expected to be close to the target. However, when firms issue to finance investment projects, the size of the issue is determined by their financing needs. In such a case, firms have to issue a mix of debt and equity for their post-issue debt ratio to be close to the target.

analysis improves our ability to discriminate between alternative interpretations of the effects of market-to-book on the debt versus equity choice. Studies of debt versus equity choice have found that the probability of issuing debt vis-à-vis issuing equity declines with the firm's market-to-book ratio (Hovakimian et al., 2001). This is consistent with the hypothesis that high-growth (high market-to-book) firms have low target debt ratios, while low-growth firms have high target debt ratios (Stulz, 1990). An alternative explanation of this result is that firms time equity issuance to the periods when their market-to-book ratios are high, e.g., because managers believe that shares of such firms are overvalued (Baker and Wurgler, 2002).

By comparing dual issuers to debt issuers and, separately, to equity issuers, we are able to discriminate between these alternative hypotheses. The pecking order and the market timing hypotheses imply that firms issue equity when their market performance is high. This prediction applies to dual issues as well, given that dual issues are defined as issues of both debt and equity. Because both equity issuers and dual issuers are expected to time the market by issuing in the periods of high market performance, market timing effects should be insignificant in the dual versus equity issue regressions.<sup>3</sup> In other words, dual versus equity issue regressions allow us to examine the effect of market performance on the choice of the form of financing while holding market timing constant.<sup>4</sup> Therefore, differences in market performance observed between dual issuers and equity issuers can be attributed to the trade-off hypothesis.

Our main results are as follows. We find that the importance of market-to-book ratio in corporate financing decisions is, at least partially, due to the negative relation between growth opportunities and target leverage predicted by trade-off theories. High market-to-book firms have low target debt ratios and, therefore, are more likely to issue equity and are less likely to issue debt. We also find evidence of market timing. Holding market-to-book ratio constant, the most recent increases in share price are associated with a higher probability of equity issuance even though these recent increases are not associated with a lower target debt ratio.

We find that profitability has no effect on the firm's post-dual issue leverage ratio. This is consistent with the dynamic trade-off hypothesis that the negative effect of profitability on observed debt ratios reflects the deviation from the target, which is offset when firms reset their capital structures.

Consistent with the findings of earlier studies, the probability of debt versus equity issuance increases with the firm's profitability. Further analysis shows that, although the likelihood of equity issuance declines with profitability, the likelihood of debt issuance is not affected by profitability. Neither the trade-off nor the pecking order hypothesis can fully explain all of our profitability results. However, the results are consistent with a hybrid hypothesis that firms have target debt ratios but also prefer internal financing to external funds. Only when unprofitable do such firms raise

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<sup>3</sup> If firms time not only the event of issuance but also the amount issued, then this argument holds only if the issue size is controlled for.

<sup>4</sup> Analysis of the time series of median market-to-book ratios around the issue year confirms that no significant difference in market timing exists between equity issuers and dual issuers.

external financing. Furthermore, because unprofitable firms are likely to be overlevered, they issue equity rather than debt. On the flip side, the propensity to issue debt when the firm is underlevered because of high profitability is neutralized by the firms' preference for and availability of internally generated funds.

The paper proceeds as follows. Section 2 describes the sample. Section 3 discusses the hypotheses about the effects of market and operating performance on capital structure. Section 4 examines the determinants of target capital structure using leverage regressions. Section 5 presents the univariate and the multivariate analyses of the choice of the form of financing. Section 6 summarizes our findings and concludes the paper.

## 2. The sample

Following MacKie-Mason (1990) and Hovakimian et al. (2001), security issues are identified using annual firm level data from the Compustat Industrial, Full Coverage, and Research files. A firm is defined as issuing equity (debt) when net equity (debt) issued exceeds 5% of the pre-issue book value of total assets.<sup>5</sup> Dual issues are defined as instances when firms issue both debt and equity in the same fiscal year.<sup>6</sup> This balance sheet-based approach allows us to include in our sample debt and equity raised from both private and public sources. This is especially important for debt issues because private debt is considerably more common than public debt.

We exclude financial firms because their capital structures are likely to be significantly different from the capital structures of other firms in our sample. Firms with missing values of relevant variables are also excluded.<sup>7</sup> Using these criteria, we identify 1,689 firm-years when both debt and equity are issued, 10,216 instances of debt issuance not accompanied by equity issuance or repurchase, and 2,082 instances of equity issuance not accompanied by debt issuance or redemption.<sup>8</sup> The sample covers corporate financing behavior from 1982 to 2000.<sup>9</sup>

<sup>5</sup>Net equity issued is defined as the proceeds from sale of common and preferred stock (Compustat Annual Item 108)—amount of common and preferred stock repurchased (Item 115)—change in the value of preferred stock (Item 10). Net debt issued is calculated as the change in the book value of total debt (Item 9 + Item 34). The procedure is identical to the one used in Hovakimian et al. (2001).

<sup>6</sup>The annual period used to aggregate the issue data is driven by the annual frequency of accounting data available from Compustat.

<sup>7</sup>To minimize the influence of outliers, we trimmed the sample from which the issue-type subsamples are drawn at the highest 1% and, for some variables, lowest 1% of values of variables used in the paper. This resulted in a loss of 392 equity issues, 351 debt issues, and 300 dual issues. The relatively large number of issues lost is mainly due to the exclusion of observations with very large issue size (more than 2.9 times the pre-issue total assets).

<sup>8</sup>Hovakimian (2002) reports that the time series profile of debt ratios of firms that issue debt (equity) depends on whether they use the proceeds to repurchase equity (debt) or retain the proceeds. Because the proceeds from dual issues are, by definition, retained, comparable issues of debt (equity) are the ones in which the proceeds are not used to repurchase equity (debt).

<sup>9</sup>One year of the 20-year Compustat sample is lost because some of our variables are scaled by the previous year's total assets.

Table 1

Distribution of sample security issues from 1982 to 2000. The sample includes only issues for which the net amount issued divided by the book value of assets exceeds 5%

Year	Dual issue	Equity issue	Debt issue
1982	56	57	476
1983	122	150	402
1984	74	61	560
1985	103	77	545
1986	125	95	522
1987	95	73	526
1988	54	57	600
1989	61	67	591
1990	52	77	504
1991	61	96	335
1992	66	104	398
1993	91	143	416
1994	95	141	571
1995	107	170	682
1996	138	160	613
1997	110	161	660
1998	108	118	777
1999	104	157	606
2000	67	118	432
Total	1,689	2,082	10,216

Table 1 presents the distribution of observations in our sample by form of financing and by year. Though the number of security issues varies considerably over time, the distribution of security issues suggests that the results reported in the subsequent sections of the paper are unlikely to be specific to a narrow time period. Also, in its distribution over time, the sample described in Table 1 is similar to the samples used in earlier debt/equity choice studies (e.g., Hansen and Crutchley, 1990).

### 3. How market performance and profitability affect corporate financing: theory and prior evidence

In this section, we summarize the existing empirical evidence and discuss the predictions of the trade-off, pecking order, and market timing hypotheses about the effects of profitability and market performance on corporate financing.

#### 3.1. The trade-off hypothesis

According to the trade-off hypothesis, a firm's performance affects its target debt ratio, which in turn is reflected in the firm's choice of securities issued and its observed debt ratios. High market performance, for example, is often associated

with the presence of good growth opportunities (Hovakimian et al., 2001). As shown by Myers (1977), one of the costs of financial leverage is that excessively levered firms could pass up some valuable investment projects. To minimize the expected costs of future underinvestment, firms with valuable growth opportunities must have relatively low target debt ratios. This implies that the effect of market performance on both the probability of debt versus equity issue choice and the observed leverage ratios should be negative.

Theories of target leverage also suggest that high profitability could be associated with high target debt ratio. Such association may arise for a number of reasons. For example, other things equal, higher profitability implies potentially higher tax savings from debt, lower probability of bankruptcy, and potentially higher overinvestment, all of which imply a higher target debt ratio. If target leverage is important, then firms with high profitability will issue debt rather than equity and will have higher observed debt ratios.

In addition, the dynamic version of the trade-off theory (e.g., Fischer et al., 1989) implies that firms passively accumulate earnings and losses, letting their debt ratios deviate from the target as long as the costs of adjusting the debt ratio exceed the costs of having a suboptimal capital structure. If so, firms that were highly profitable in the past are likely to be underlevered, while firms that experienced losses are likely to be overlevered. This implies that profitability will be negatively related to observed debt ratios in samples dominated by firms that do not issue but will have a positive effect on the probability of debt versus equity issuance.

Under the dynamic trade-off hypothesis, the negative relation between profitability and observed leverage arises not because profitability affects target leverage, but because it affects the deviation from the target. Therefore, the negative relation should not hold for firms that offset the deviation from the target by resetting their capital structure.

### 3.2. *The pecking order hypothesis*

According to the pecking order hypothesis of Myers and Majluf (1984), the costs and the benefits that might lead to the emergence of a target debt ratio are second order. Firms' financing choices are driven by the costs of adverse selection that arise as a result of information asymmetry between better-informed managers and less-informed investors. These costs are incurred only when firms issue securities. Furthermore, they are lower for debt than for equity. As a result, firms prefer internal financing and prefer debt to equity when they have to raise external funds. This implies that profitable firms will retain earnings and become less levered, while unprofitable firms will borrow and become more levered, thus creating a negative relation between profitability and observed leverage and between profitability and the probability that external financing is raised. The effect of profitability on the probability of debt versus equity issue choice is not clear.

In the original pecking order model of Myers and Majluf (1984), firms never issue equity. The dynamic version of the pecking order hypothesis (Lucas and McDonald, 1990) implies that managers issue equity following periods of high market

performance. Therefore, both the probability of a debt versus equity issue and the observed debt ratios are expected to decline with market performance.

### 3.3. The market timing hypothesis

The market timing hypothesis is empirically motivated and states that firms time equity issuance to periods of high market performance. The underlying reasons for this behavior could be related to the costs of adverse selection as in the pecking order or to some other phenomenon (Baker and Wurgler, 2002). The predictions of the market timing hypothesis regarding the effects of market performance coincide with the predictions of the pecking order hypothesis. The market timing hypothesis makes no predictions regarding the effects of profitability.

### 3.4. Prior evidence

The prior findings and the predictions of the hypotheses are summarized in Table 2. The predicted effects of market performance are the same under all of the hypotheses and the results reported in earlier studies are consistent with these predictions. The positive effect of profitability on the debt versus equity choice documented in earlier studies is consistent with the trade-off hypothesis. The negative effect of profitability on leverage is consistent with the pecking order theory. The effect is also consistent with the dynamic version of the trade-off hypothesis but not with the static version. On balance, earlier findings do not allow us to discriminate between the pecking order and the trade-off hypotheses.

## 4. Determinants of the target leverage ratio

To directly test whether market performance and profitability affect the target leverage ratio, we follow the tradition of debt ratio studies and estimate a model in

Table 2  
How market performance and profitability affect corporate financing: hypotheses and prior evidence

Model	Variable	Prior findings	Hypothesis			
			Trade-off (static)	Trade-off (dynamic)	Pecking order	Market timing
Debt vs. equity choice	Market performance	Negative	Negative	Negative	Negative	Negative
	Profitability	Positive	Positive	Positive	No prediction	No prediction
Leverage regression	Market performance	Negative	Negative	Negative	Negative	Negative
	Profitability	Negative	Positive	Negative	Negative	No prediction

which leverage is regressed on a set of potential determinants of target capital structure.

$$\text{Leverage}_t = \alpha + \beta Z_{t-1} + \xi_t. \quad (1)$$

In samples dominated by firms that do not adjust their capital structure, both the dynamic trade-off and the pecking order theories predict that the effect of profitability in regression Eq. (1) will be negative, making it impossible to test one theory against the other.

In contrast, dual issues offer an opportunity to reset the firm's capital structure. Firms that follow the dynamic trade-off strategy will choose the amounts of new debt and equity so that the accumulated deviation from the target is offset and the resulting debt ratio is close to the target. As a result, the negative relation between profitability and leverage should no longer hold when regression Eq. (1) is estimated using post-issue debt ratios of dual issuers. Firms that follow pecking order of financing, on the other hand, have no incentive to offset the effects of profitability on leverage. Therefore, the negative relation between profitability and leverage should continue to hold for dual issuers as well.

The dependent variable in regression Eq. (1), *Post-Issue Leverage*, is calculated as the [(Pre-Issue Debt + Net Debt Issued)/(Pre-Issue Assets + Net Debt Issued + Net Equity Issued)].<sup>10</sup> In effect, the *Post-Issue Leverage* is equal to the pre-issue debt ratio plus the change in the debt ratio induced by the issue. This ratio is unaffected by changes in leverage due to earnings accumulated between the issue and the end of the issue year.

The explanatory variables in Eq. (1) include market performance and profitability, as well as a set of control variables identified in earlier empirical studies (Rajan and Zingales, 1995; Hovakimian et al., 2001) as possible determinants of target capital structure. We use market-to-book ratio of assets and stock return in the pre-issue year as measures of market performance.<sup>11</sup> Past profitability is measured by return on assets (ROA) in the pre-issue year and net operating loss carryforwards (NOLC).<sup>12</sup>

Our other variables are firm size, tangible assets ratio, research and development (R&D) expenses, and selling and administrative expenses.<sup>13</sup> Large firms may have high target leverage because they tend to have less volatile cash flows and are less likely to become financially distressed (Rajan and Zingales, 1995). Firms with high proportions of tangible assets that can be collateralized are likely to have relatively

<sup>10</sup> In all leverage calculations, debt is defined as [short-term debt (Item 34) + long-term debt (Item 9)] and assets are defined as book value of total assets (Item 6).

<sup>11</sup> Market-to-book is calculated as [total assets (Item 6) – book value of equity (Item 60) + market value of equity (Item 25 × Item 199)]/total assets (Item 6).

<sup>12</sup> Return on assets is calculated as EBITDA (Item 13)/total assets (Item 6) at the beginning of the period. NOLC is Item 52, scaled by total assets. NOLC could also proxy for the firm's nondebt tax shields, which were shown to reduce the tax advantage of debt financing and, therefore, lower the firm's target debt ratio (DeAngelo and Masulis, 1980).

<sup>13</sup> Firm size is measured as the natural logarithm of net sales (Item 12). Tangible assets ratio is measured as net property, plant, and equipment (Item 8)/total assets (Item 6). R&D expenses is Item 46, scaled by net sales (Item 12). Selling and administrative expenses is Item 189, scaled by net sales (Item 12).

low bankruptcy costs and, therefore, high target debt ratios (Titman and Wessels, 1988). Firms with unique assets and products (high R&D expenses and high selling expenses) could have high bankruptcy costs and, therefore, low leverage targets (Titman, 1984).<sup>14</sup> To mitigate the problem of omitted variables, we also include the industry median debt ratio, where the industry is identified using three-digit Standard Industrial Classification (SIC) codes.<sup>15</sup>

Table 3 reports two sets of results from ordinary least squares regressions with robust *t*-statistics reflecting standard errors adjusted for heteroskedasticity and clustering.<sup>16</sup> The first regression is estimated on our sample of dual issuers. Six independent variables have a statistically significant impact. Post-dual issue leverage declines with market-to-book ratio, selling expenses, and R&D, and it increases with stock returns, tangible assets, and industry leverage. The insignificance of ROA and NOLC in this regression suggests that dual issuers choose the amounts of new debt and equity so that they offset the deviation from the target, accumulated as a result of past earnings and losses.

The negative effect of market-to-book is consistent with the hypothesis that firms with high growth opportunities have low target debt ratios. An alternative explanation is that managers are reluctant to issue equity when their firm's market-to-book ratio is low because they believe that the stock is undervalued. However, given that dual issuers issue both debt and equity, factors that prevent a firm from issuing equity, such as possible undervaluation, are less likely to have a significant impact on post-issue leverage ratios. Furthermore, our results on profitability suggest that dual issuers offset the accumulated deviation from the target capital structure and, therefore, are close to the target. This leads us to believe that the significantly negative effect of market-to-book is likely to be due to its negative association with target debt ratios.

The positive effect of the stock return is unexpected. Further analysis shows that the pre-issue stock return becomes insignificant when the pre-issue market-to-book ratio is replaced by its first lag in the target leverage regression. One possible explanation for this result is that firms are timing their security issues to the market conditions. If so, the most recent changes in stock prices could reflect market misvaluation, not genuine changes in investment opportunities. For example, after a period of exceptionally high returns, the growth opportunities could be more modest and the target debt ratio could be higher than implied by the inflated pre-issue market-to-book. Therefore, holding market-to-book constant, the relation between the target debt ratio and the pre-issue return should be positive.

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<sup>14</sup>R&D has also been used as proxy for growth opportunities.

<sup>15</sup>Numerous studies (e.g., Bradley et al., 1984) have documented strong industry effects in the cross-sectional variation of firms' leverage ratios. Industry leverage could, therefore, capture the effects of the omitted variables on the target.

<sup>16</sup>The results do not change when the Fama and MacBeth (1973) method based on year-by-year regressions is used or when the dual issuers' regression is estimated using a truncated regression model or the nonissuers' regression is estimated using a censored regression (Tobit) model.

Table 3

Determinants of post-issue leverage. The sample covers corporate financing behavior from 1982 to 2000. The market-to-book ratio is defined as (total assets – book value of equity + market value of equity)/total assets. The stock return is defined as the split- and dividend-adjusted return over the last pre-issue year. Return on assets, ROA, is the earnings before interest, taxes, depreciation, and amortization divided by the book value of assets. NOLC is the net operating loss carryforwards scaled by total assets. Firm size is the log of net sales. Tangible assets ratio is measured as (net property, plant, and equipment)/total assets. Selling expenses is (selling and administrative expenses)/sales. R&D expenses is (research and development expenses)/sales. Industry leverage is the median leverage ratio of firms in the same three-digit standard industrial classification (SIC) industry group. Leverage is (long-term debt + short-term debt)/total assets. Post-issue leverage is (pre-issue debt + net debt issued)/(pre-issue assets + net debt issued + net equity issued). Firms are defined as issuing a security when the net amount issued exceeds 5% of total assets. Dual issuers are firms issuing both debt and equity in the same fiscal year. Passive firms do not issue or repurchase securities. Robust *t*-statistics are based on standard errors adjusted for heteroskedasticity and clustering

Independent variable	Dual issuers		Passive firms	
	Coefficient	<i>t</i> -Statistic	Coefficient	<i>t</i> -Statistic
Constant	0.275**	14.5	0.059**	6.1
Market-to-book	–0.013**	–4.4	–0.016**	–9.8
Stock return	0.014*	2.5	–0.003	–1.6
ROA	–0.041	–1.8	–0.159**	–11.6
NOLC	0.005	0.5	0.034**	4.4
Firm size	0.001	0.5	0.012**	10.2
Tangible assets	0.069**	3.5	0.127**	10.0
Selling expenses	–0.053**	–3.7	–0.053**	–4.8
R&D expenses	–0.089*	–2.2	–0.102**	–3.8
Industry leverage	0.463**	12.4	0.456**	19.3
R <sup>2</sup>	0.212		0.253	
Observations	1,679		21,823	

\*,\*\* Significantly different from zero at 5% and 1% levels, respectively.

For comparison, Table 3 also reports the results of a similar regression estimated on a subsample of passive firms; i.e., firms that do not issue or repurchase securities. Unlike in the dual issues regression, both variables measuring profitability, ROA and NOLC, are highly significant in this regression. The negative sign of ROA and the positive sign of NOLC are consistent with the dynamic trade-off hypothesis that debt ratios are allowed to fluctuate around the target, reflecting the accumulated earnings and losses.

To summarize, our results imply that the negative effect of profitability on observed debt ratios is due to the tendency of firms to passively accumulate earnings and losses. The resulting deviation from target leverage is fully offset as a result of a dual issue. Our results also suggest that the negative effect of market-to-book ratio on corporate debt ratios is likely to be due to the negative relation between growth opportunities and target leverage predicted by trade-off theories.

## 5. Determinants of the form of financing

In this section, we examine how firms that raise external funds choose the form of financing. The firm's choice of the form of financing is modeled as follows:

$$D_t^* = \alpha + \beta X_{t-1} + \varepsilon_t. \quad (2)$$

In Eq. (2), the dependent variable,  $D_t^*$ , is a latent continuous variable with an observable binary counterpart,  $D_t$ . Earlier studies use regression Eq. (2) to model the choice between debt issues ( $D_t = 1$ ) and equity issues ( $D_t = 0$ ). In addition to the traditional debt versus equity choice, we will model the choice between debt issues and dual issues and between dual issues and equity issues.

Trade-off theories of capital structure imply that firms have target debt ratios. If maintaining a target debt ratio is important, then firms should choose the form of financing that offsets the accumulated deviation from their target. To test this hypothesis, the set of independent variables,  $X$ , includes the firm's pre-issue debt ratio, the determinants of target debt ratio that we used earlier in regression (1), two indicator variables from Hovakimian et al. (2001), and the issue size.

The two indicator variables are the book value dilution dummy and the earnings per share (EPS) dilution dummy. These variables are included because managers appear to be reluctant to issue equity if it dilutes the accounting measures of performance or value (Graham and Harvey, 2001). The book value dilution dummy is set equal to one when the firm's market-to-book ratio is greater than one. The EPS dilution dummy is equal to one when issuing equity dilutes the firm's earnings per share more than issuing debt does.<sup>17</sup> The final control variable is the issue size, measured relative to the pre-issue total assets. The overall issue size of dual issuers is much larger than that of debt issuers and equity issuers. Therefore, unless we control for the issue size, the effects of some variables on the right-hand side could result from their association with the size of external financing needed.

### 5.1. The hypotheses

The expected effects of market performance and profitability on debt versus equity issue choice were discussed earlier and summarized in Table 2. The expected effects of market performance and profitability on debt versus dual issue choice and on dual versus equity issue choice are summarized in Table 4.

Our discussion of the trade-off hypothesis implies that the probability of a firm choosing a more levered form of financing declines with market performance and increases with profitability. Given that dual issues include both debt and equity, they are less leverage-increasing than debt issues but are more leverage-increasing than equity issues, other things equal. Therefore, the predicted signs in both the debt

<sup>17</sup> Following Hovakimian et al. (2001), the dilution dummy is set to one when  $E/P > r_d(1 - T_c)$ , where  $E/P$  is the firm's earnings/price ratio [Item 172/(Item 199 × Item 25)],  $r_d$  is the yield on Moody's Baa rated debt, and the corporate tax rate,  $T_c$ , is assumed to be 50% before 1987 and 34% afterward. Because the dilution dummies are derived from the market-to-book ratio and the earnings/price ratio, they could proxy for other factors, such as growth opportunities, as well.

Table 4

Determinants of the form of financing: summary of the hypotheses

Model	Variable	Hypothesis		
		Trade-off	Pecking order	Market timing
Debt vs. dual issue	Market performance	Negative	Negative	Negative
	Profitability	Positive	No prediction	No prediction
Dual vs. equity issue:	Market performance	Negative	No effect	No effect
	Profitability	Positive	No prediction	No prediction

versus dual and the dual versus equity issue models are negative for market performance and positive for profitability.

The pecking order and the market timing hypotheses imply that firms issue equity when their market performance is high. This prediction applies to dual issues as well, because dual issues are defined as issues of both debt and equity. Debt issuers' market performance, on the other hand, is expected to be relatively low. As a result, market timing would cause the probability of debt versus dual issue to decline with market performance.

In contrast, the dual versus equity issue regression allows us to examine the effect of market performance on the choice of the form of financing while holding market timing constant. Because both equity issuers and dual issuers are expected to time the market by issuing in the periods of high market performance, market timing effects should be insignificant. Furthermore, because we control for issue size, this argument holds even if firms time not only the event of issuance but also the amount issued. Therefore, differences in market performance observed between dual issuers and equity issuers can be attributed to the trade-off hypothesis.

According to the pecking order hypothesis, low profitability increases the likelihood that internal sources of funds will be exhausted and that outside financing will be used as a substitute. Therefore, issuance of any security could be expected to be associated with relatively low profitability. However, the effect of profitability on the choice of the form of financing is not clear.

## 5.2. Univariate results

Table 5 describes the sample firms by issue type. Dual issuers' market-to-book ratio (2.304) is significantly higher than debt issuers' ratio (1.595) but is lower than equity issuers' ratio (2.861). Dual issuers' stock return (0.372) is significantly higher than debt issuers' return (0.184) but is not significantly different from equity issuers' return (0.352).

Dual issuers tend to be significantly less profitable in the pre-issue years than debt issuers. The return on assets (ROA) of an average dual issuer is 0.088. The ROA of

Table 5

Sample characteristics by transaction type. The sample covers security issuance behavior from 1982 to 2000. The market-to-book ratio is defined as (total assets – book value of equity + market value of equity)/total assets. The stock return is defined as the split- and dividend-adjusted return over the last pre-issue year. Return on assets, ROA, is the earnings before interest, taxes, depreciation, and amortization divided by the book value of assets. NOLC is the net operating loss carryforwards scaled by total assets. Firm size is the log of sales. Tangible assets ratio is measured as (property, plant, and equipment)/total assets. Selling expenses is (selling and administrative expenses)/sales. R&D expenses is (research and development expenses)/sales. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage is the median leverage ratio of firms in the same three-digit standard industrial classification (SIC) industry group. Post-issue leverage is (pre-issue debt + net debt issued)/(pre-issue assets + net debt issued + net equity issued). EPS dilution dummy is set to one if issuing equity dilutes the firm's earnings per share (EPS) more than issuing debt does. M/B > 1 dummy is set to one if the market-to-book ratio exceeds one. The net equity issued is (proceeds from sale of common and preferred stock – amount of common and preferred stock repurchased – change in the value of preferred stock)/total assets. The net debt issued is (change in the book value of total debt)/total assets. The issue size is the sum of the net debt and net equity issued. Firms are defined as issuing a security when the net amount issued exceeds 5% of total assets. Dual issues are issues of both debt and equity

Variable	Dual issuers	Equity issuers	Debt issuers	Passive firms
Market-to-book	2.304	2.861**	1.595**	1.576**
Stock return	0.372	0.352	0.184**	0.114**
ROA	0.088	0.080	0.148**	0.139**
NOLC	0.204	0.246*	0.072**	0.069**
Firm size	3.767	3.706	4.737**	4.826**
Tangible assets	0.323	0.273**	0.331	0.310*
Selling expenses	0.364	0.451**	0.246**	0.273**
R&D expenses	0.044	0.090**	0.020**	0.033**
Industry leverage	0.227	0.175**	0.237**	0.214**
Leverage	0.264	0.166**	0.254*	0.193**
Post-issue leverage	0.357	0.138**	0.367*	0.191**
EPS dilution dummy	0.250	0.200**	0.445**	0.431**
M/B > 1 dummy	0.933	0.934	0.805**	0.738**
Issue size	0.615	0.315**	0.208**	–0.002**
Net equity issued	0.280	0.318**		0.000**
Net debt issued	0.335		0.207**	–0.002**
Net debt issued/issue size	0.530			
Observations	1,689	2,082	10,216	21,863

\*,\*\* Significantly different from the value for dual issues at 5% and 1% level, respectively.

an average debt issuer is 0.148, and the ROA of an average equity issuer is 0.080. The difference in profitability of dual issuers and equity issuers is not significant. Equity issuers have net operating loss carryforwards (NOLC) of 0.246. The average NOLC of dual issuers is 0.204. The NOLC of debt issuers is 0.072. The differences in NOLCs are statistically significant.

Dual issuers do not differ significantly from equity issuers in size, but they are significantly smaller than debt issuers. Dual issuers' tangible assets ratio is 0.323. It is significantly larger than equity issuers' ratio (0.273) but is not significantly different

from debt issuers' ratio (0.331). Dual issuers' selling and administrative expenses as well as their research and development expenses are significantly higher than those for debt issuers but are significantly lower than the corresponding values for equity issuers.

An average dual issuer's pre-issue leverage ratio is 0.264 and its post-issue leverage ratio is 0.357. An average debt issuer's pre-issue leverage ratio is 0.254 and its post-issue leverage ratio is 0.367. Though the differences between debt issuers' and dual issuers' ratios are economically small, they are statistically significant. Equity issuers' pre- and post-issue leverage ratios are significantly lower at 0.166 and 0.138, respectively.<sup>18</sup> Dual issuers belong to industries that are, on average, significantly less levered than debt issuers' industries and more levered than equity issuers' industries. Dual issuers and debt issuers are significantly more levered than their industry counterparts. Equity issuers are significantly underlevered relative to their industry peers.

Concerns about dilution of accounting measures of value and performance also appear to be important. For 44.5% of debt issuers, issuing equity would dilute the earnings per share more than issuing debt would. The same is true for only 25.0% of dual issuers and 20.0% of equity issuers. All the differences are statistically significant at 1%. Similarly, for some 93% of dual and equity issuers, issuing equity would not dilute the book value per share. The same is true for 80.5% of debt issuers.

At 61.5% of pre-issue total assets, overall issue size is the largest for dual issuers.<sup>19</sup> Dual issuers issue significantly more debt than pure debt issuers (0.335 versus 0.207) do. However, the amount of equity raised by dual issuers (0.280) is significantly less than the amount of equity raised by pure equity issuers (0.318). Finally, 53.0% of the financing raised in an average dual issue is in the form of debt. This is significantly higher than the median pre-issue debt ratio of these firms.

To summarize, based on characteristics presented in Table 5, dual issuers generally fall between debt issuers and equity issuers. Nevertheless, based on market performance, operating performance, and firm size, dual issuers are closer to equity issuers, which suggests that these characteristics could play a more important role in the decision to issue equity than in the decision to issue debt. On the other hand, based on pre- and post-issue leverage, industry leverage, and tangible assets, dual issuers look very much like debt issuers, suggesting that these characteristics could be more important for the decision to issue debt than for the decision to issue equity.

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<sup>18</sup> Leverage ratios in our sample are lower than those in Baker and Wurgler (2002) because their measure of debt includes other liabilities (e.g., accounts payable). In addition, the debt ratios of equity issuers are lower than in other studies (e.g., Hovakimian et al., 2001) because we exclude equity issues that are accompanied by debt reductions, which have substantially higher debt ratios (0.357).

<sup>19</sup> This value is relatively large, but it is not driven by a few outliers. The median dual issue size is 44.3% of total assets. The minimum size is 10.2%. The maximum size is 2.9 times the total assets. More than 16% of dual issues exceed in size the pre-issue value of total assets. Also, the sample of 1,689 dual issues excludes observations with issue size exceeding the 99th percentile value in the sample of all firms (issuers and nonissuers).

### 5.3. Regression results

Most of the univariate results reported in the Section 5.2 hold when we examine the effects of these variables simultaneously in probit regressions estimating Eq. (2). Table 6 reports the results of the probit analysis of the choice between debt and dual issues and between dual issues and equity issues. As a reference point and for comparison with earlier studies, the results of the debt versus equity issue choice regression are also presented. In addition to coefficient estimates and *t*-statistics, a measure of economic significance,  $\Delta Prob$ , is also reported for each independent variable.  $\Delta Prob$  is the change in the probability of, e.g., a debt versus equity issue when the independent variable changes from  $-1$  standard deviation to  $+1$  standard deviation around its mean, holding other variables constant at their respective means. All the regressions are statistically significant at conventional levels and demonstrate nontrivial explanatory power. The pseudo- $R^2$  varies from 0.218 to 0.239.

The results for market and operating performance are as follows. First, consistent with the results of prior studies of the debt versus equity issue choice (Marsh, 1982; Jung et al., 1996; Hovakimian et al., 2001), the coefficient estimates for market-to-book ratio and stock return are significantly negative in the debt versus equity issue regression. This result is consistent with each of the three hypotheses summarized in Table 2.

The analysis of the debt versus dual issue and the dual versus equity issue regressions allows us to discriminate between the trade-off hypothesis and the pecking order–market timing hypothesis. The coefficient estimates for market-to-book ratio are significantly negative in both regressions. These results are consistent with the hypothesis that firms with high market-to-book ratios have low target debt ratios and, therefore, tend to choose less levered forms of financing. The significantly negative coefficient in the dual versus equity issue model is not consistent with the pecking order–market timing hypothesis. Because both the dual issuers and the equity issuers issue equity, factors associated with timing the equity market must be insignificant.

The coefficient estimate for stock return is significantly negative in the debt versus dual issue regression. The estimate is insignificant in the dual versus equity issue regression. Thus, recent increases in share price are associated with a higher probability of issuing equity (with or without an accompanying debt issue) but are not associated with a lower probability of issuing debt. These results are inconsistent with the hypothesis that high-return firms have low target debt ratios but are consistent with the hypothesis that firms attempt to issue overvalued equity by timing the issuance to the periods of exceptionally good market returns (see Table 4).

Consistent with the static trade-off hypothesis, the coefficient estimate for ROA is positive significant and the coefficient estimate for NOLC is negative significant in the debt versus equity issue and the debt versus dual issue models. However, the results of the dual versus equity issue regression are not consistent with the static trade-off hypothesis. The effects of ROA and NOLC are insignificant. Thus, highly

Table 6

Determinants of the form of financing. The sample covers security issuance behavior from 1982 to 2000. The market-to-book ratio is defined as (total assets – book value of equity + market value of equity)/total assets. The stock return is defined as the split- and dividend-adjusted return over the last pre-issue year. Return on assets, ROA, is the earnings before interest, taxes, depreciation, and amortization divided by the book value of assets. NOLC is the net operating loss carryforwards scaled by total assets. Firm size is the log of sales. Tangible assets ratio is measured as (property, plant, and equipment)/total assets. Selling expenses is (selling and administrative expenses)/sales. R&D expenses is (research and development expenses)/sales. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage is the median leverage ratio of firms in the same three-digit standard industrial classification (SIC) industry group. EPS dilution dummy is set to one if issuing equity dilutes the firm's earnings per share (EPS) more than issuing debt does. M/B > 1 dummy is set to one if the market-to-book ratio exceeds one. The net equity issued is (proceeds from sale of common and preferred stock – amount of common and preferred stock repurchased – change in the value of preferred stock)/total assets. The net debt issued is (change in the book value of total debt)/total assets. The issue size is the sum of the net debt and net equity issued. Firms are defined as issuing a security when the net amount issued exceeds 5% of total assets. Dual issues are issues of both debt and equity. Time effects are accounted for via year-specific intercepts (not reported)

Independent variable	Debt issue vs. dual issue			Dual issue vs. equity issue			Debt issue vs. equity issue		
	Coefficient	<i>t</i> -Statistic	$\Delta Prob$	Coefficient	<i>t</i> -Statistic	$\Delta Prob$	Coefficient	<i>t</i> -Statistic	$\Delta Prob$
Market-to-book	–0.088**	–5.7	–0.059	–0.080**	–5.4	–0.102	–0.179**	–13.6	–0.183
Stock return	–0.143**	–5.4	–0.054	0.012	0.3	0.006	–0.093**	–3.8	–0.046
ROA	0.554**	4.5	0.052	–0.146	–1.1	–0.022	0.312**	2.7	0.039
NOLC	–0.138**	–2.9	–0.026	–0.016	–0.4	–0.006	–0.190**	–4.7	–0.053
Firm size	0.041**	4.1	0.049	0.020	1.3	0.025	0.058**	6.2	0.090
Tangible assets	–0.081	–1.1	–0.011	–0.123	–1.2	–0.019	–0.157*	–2.1	–0.028
Selling expenses	–0.025	–0.3	–0.004	–0.019	–0.2	–0.005	–0.133	–1.9	–0.028
R&D expenses	–1.038**	–4.0	–0.040	–0.913**	–4.1	–0.083	–2.130**	–9.6	–0.138
Industry leverage	0.303	1.8	0.020	0.882**	3.7	0.068	1.108**	6.7	0.098
Leverage	–0.539**	–5.5	–0.059	1.348**	9.7	0.170	0.387**	4.0	0.055
EPS dilution dummy	0.168**	4.4	0.050	0.051	0.9	0.014	0.218**	6.1	0.084
M/B > 1 dummy	–0.360**	–6.4	–0.083	0.032	0.3	0.005	–0.307**	–6.0	–0.091
Issue Size	–1.524**	–32.9	–0.294	1.174**	20.3	0.349	–0.178**	–3.4	–0.038
Pseudo-R <sup>2</sup>	0.239			0.218			0.228		
Dep. variable = 1	10,216			1,689			10,216		
Dep. variable = 0	1,689			2,082			2,082		

\*, \*\* Significantly different from zero at 5% and 1% level, respectively.

profitable firms tend not to issue equity. But profitability does not seem to affect the decision to issue debt.<sup>20</sup>

Our results on profitability could be reflecting an interaction of trade-off and pecking order considerations. Specifically, if firms have target debt ratios but also prefer internal funds to external financing, then the tendency to issue debt when operating performance is high, as implied by the target leverage hypothesis, will be tempered by the preference for (and availability of) internal financing. The tendency to issue equity when operating performance is poor will be reinforced by the lack of internal funds, forcing the firm to seek external equity financing.

Other results are as follows. The coefficient estimate for pre-issue leverage is negative in the debt versus dual issue regression, but it is positive in the other two models. This is consistent with our univariate results that debt issuers and dual issuers are more levered, while equity issuers are less levered than their industry counterparts. However, the positive coefficient estimates are not consistent with the trade-off hypothesis. Perhaps the coefficient estimates come out positive because our proxies for target leverage fail to fully explain the very high debt targets of firms that issue debt.

The coefficient estimates for industry leverage and firm size are positive in all regressions but are not always statistically significant. Industry leverage is insignificant in the debt versus dual issue model, and size is insignificant in the dual versus equity issue model. The coefficient estimates for tangible assets and uniqueness (selling expenses and R&D expenses) are negative in all regressions. However, only the coefficient estimates for R&D are significant in the debt versus dual and the dual versus equity issue regressions.<sup>21</sup> This is consistent with the hypothesis that high R&D firms have unique products and high growth opportunities and, therefore, low target debt ratios. The EPS dilution and the book value dilution dummies are significant (negative) only in the debt versus dual and debt versus equity issue models, suggesting that managers are concerned about EPS and book value dilution when they issue equity. The issue size results are consistent with our univariate findings that dual issues are larger than equity issues, which, in turn, are larger than debt issues.

#### 5.4. Sensitivity analysis

We check the robustness of our findings in a number of ways. First, the test statistics in Table 6 may be overstated because multiple appearances of the same firms in our sample could induce time series dependence in the error term. To see whether this affects our results, we reestimate our regressions keeping only the first appearance of the firm in the sample. The results in the debt versus dual issue and the

<sup>20</sup> A quick look at our univariate results in Table 5 confirms that the difference in ROAs of dual issuers and debt issuers is statistically and economically significant, while the difference between dual issuers and equity issuers is not.

<sup>21</sup> The negative sign for tangible assets is unexpected and is inconsistent with our theoretical priors. However, the variable becomes insignificant in the sensitivity tests that follow.

dual versus equity issue regressions remain qualitatively unchanged with the following two exceptions. In the debt versus dual issue regression, industry leverage becomes significant (positive) while NOLC loses its significance.

The total amount of financing raised by firms that issue both debt and equity is substantially higher than the financing raised by either debt issuers or equity issuers. Therefore, the subsample of dual issuers could contain disproportionately larger number of firms that issue these securities to finance a merger or an acquisition. If so, the results in Table 6 could reflect the differences in the characteristics of firms that pursue different investment strategies (acquisitions versus investment projects) instead of the differences between firms that use different forms of financing. Therefore, we reestimate the regressions in Table 6 excluding the observations that we identify as mergers using the Security Data Company's Mergers and Acquisitions database. Our qualitative results do not change, except the industry leverage becomes statistically significant in the debt versus dual issue regression.

Controlling for the issue size is important for our ability to interpret our results. Therefore, we conduct the following sensitivity experiment. By definition, the size of a debt or an equity issue is at least 5% of pre-issue assets, while the size of a dual (debt + equity) issue is at least 10% of assets. As a robustness check, we reestimate the debt versus dual and the dual versus equity models, changing the screen for simple debt and equity issues to 10% of total assets without changing the definition of dual issues. The results in Table 6 remain qualitatively unchanged, except the industry leverage in the debt versus dual model and the size in the dual versus equity model become significantly positive.

Our finding that operating performance affects the choice of equity but does not affect the choice of debt financing is startling. However, this could be a pure dual issue phenomenon. To see whether this conclusion can be generalized, we estimate a multinomial logistic regression that models the debt, the equity, and the dual issue decisions against a no-issue alternative.<sup>22</sup> The results (see the appendix) confirm that the probability of equity issuance declines with operating performance, but that the probability of debt issuance is not affected by operating performance.

Thus, the sensitivity analysis leaves our main conclusions unchanged: The market-to-book ratio affects both the decision to issue equity (positively) and the decision to issue debt (negatively), while the stock return and the operating performance affect only the decision to issue equity (negatively).

### 5.5. *Is market timing neutralized in dual versus equity issue choice regressions?*

Though the dual versus equity issue choice model enhances our ability to control for equity market timing relative to the debt versus equity issue choice model, one

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<sup>22</sup>Such a regression suffers from significant inference problems. Similar to debt-equity choice regressions, independent variables could have significant effects either because they affect target debt ratios or because they explain the deviation from the target. Furthermore, because each issue type is compared with the no-issue alternative, variables related to the firm's investment decision could also be significant in these tests.

Table 7

Time series profiles of market-to-book ratios from year  $-3$  to  $+3$  relative to the issue year. The sample covers security issuance behavior from 1982 to 2000. The market-to-book ratio is defined as (total assets – book value of equity + market value of equity)/total assets. Firms are defined issuing a security when the net amount issued exceeds 5% of total assets. The net equity issued is (proceeds from sale of common and preferred stock – amount of common and preferred stock repurchased – change in the value of preferred stock). The net debt issued is (change in the book value of total debt). Dual issues are issues of both debt and equity

Issue type	Levels							Changes	
	-3	-2	-1	0	+1	+2	+3	-3 to -1	-1 to 3
Equity issue	1.938**	1.930**	2.099**	2.060**	1.727**	1.612**	1.554**	0.057**	-0.197**
Dual issue	1.568	1.670	1.735	1.583	1.460	1.352	1.315	0.069**	-0.254**

\*\* Changes significantly different from zero and equity issuers' market-to-book ratios significantly different from those of dual issuers at 1% level.

could still argue that firms experiencing a very large stock price run-up issue equity, those experiencing a medium run-up issue debt and equity, and those with small increases or declines in stock prices issue debt. To make sure that the importance of market-to-book in dual versus equity issue choice regression does not simply reflect equity market timing, we examine the changes in market-to-book ratios around these events. Table 7 presents the time series of median market-to-book ratios of dual issuers and equity issuers between years  $-3$  and  $+3$  relative to the year of the issue. (The results for means are similar.)

The results demonstrate that, in each of the seven years around the event, equity issuers' market-to-book ratios are higher than dual issuers' ratios. The differences are significant, both statistically and economically. For example, in year  $-3$ , the equity issuers' market-to-book is 1.938, while the dual issuers' market-to-book is only 1.568. This implies that the differences in market-to-book ratios of equity issuers and dual issuers are not solely due to market timing. The results are consistent with the hypothesis that dual issuers are firms with growth opportunities that are generally lower than those of equity issuers.

The results also demonstrate that both equity issuers and dual issuers exhibit patterns that are consistent with timing the issues to the periods when equity market conditions are most favorable. Specifically, both types of firms show an increase in market-to-book ratios between years  $-3$  and  $-1$  and a decrease between years  $-1$  and  $+3$ . These changes are statistically and economically significant. Furthermore, the difference in pre-issue run-up in market-to-book between dual issuers (0.069) and equity issuers (0.057) is statistically insignificant. The post-issue drop in market-to-book of dual issuers ( $-0.254$ ) is significantly larger than that of equity issuers ( $-0.197$ ). These results are inconsistent with the hypothesis that firms with larger stock price run-ups issue equity while those with lower run-ups issue both debt and equity. The results also suggest that dual versus equity issue analysis is unlikely to be affected by market timing.

To summarize, the results in [Table 7](#) imply that equity issuers have generally higher market-to-book ratios and that no significant difference in market timing exists between equity issuers and dual issuers. These results support our interpretation of the results in [Table 6](#) as consistent with the hypothesis that firms with higher market-to-book ratios have lower target leverage.

## 6. Conclusions

Empirical studies of corporate financing have been successful in identifying firm characteristics that are important determinants of corporate financing choices. At the same time, financial economists have been unable to reach consensus in interpreting these empirical results. In particular, the importance of firm profitability and stock market performance in explaining corporate debt ratios and the financing choices of firms that raise external funds has been subject to alternative interpretations.

The focus of this paper on firms that raise both debt and equity capital improves our ability to draw unambiguous inferences about the reasons that market performance and profitability are so important. The paper derives its conclusions from two sets of regressions. First, the determinants of the post-issue leverage ratio of firms that issue both debt and equity are analyzed. If maintaining the target capital structure is important, then we expect that these firms choose the amounts of debt and equity being issued so that the deviation from the target is offset and the resulting capital structure is close to the target.

Next, probit regressions predicting the choice between debt financing and dual (debt and equity) financing and the choice between dual financing and equity financing are estimated. By comparing dual issuers to equity issuers, we are able to examine the effect of market performance on the choice of the form of financing while holding market timing constant. Therefore, differences in market performance observed between dual issuers and equity issuers can be attributed to the trade-off hypothesis.

Our results are consistent with the hypothesis that high market-to-book firms have good growth opportunities and, therefore, have low target debt ratios. The probability of an equity issue increases while the probability of a debt issue declines with market-to-book. On the other hand, while high stock returns are associated with higher probability of equity issuance, the probability of debt issuance is not affected by stock returns. We conclude that the importance of stock returns in studies of corporate financing choices is unrelated to target leverage and is likely to be due to pecking order–market timing behavior.

We also find that profitability has no effect on target leverage. Unprofitable firms issue equity to offset the excess leverage due to accumulated losses. On the flip side, profitable firms do not seem to be offsetting the accumulated leverage deficit by issuing debt. We suggest that the tendency to issue debt when operating performance

Table 8

A multinomial logistic regression that models the debt, the equity, and the dual issue decisions against a no-issue alternative. The sample covers security issuance behavior from 1982 to 2000. The market-to-book ratio is defined as (total assets – book value of equity + market value of equity)/total assets. The stock return is defined as the split- and dividend-adjusted return over the last pre-issue year. Return on assets, ROA, is the earnings before interest, taxes, depreciation, and amortization divided by the book value of assets. NOLC is the net operating loss carryforwards scaled by total assets. Firm size is the log of sales. Tangible assets ratio is measured as (property, plant, and equipment)/total assets. Selling expenses is (selling and administrative expenses)/sales. R&D expenses is (research and development expenses)/sales. Leverage is (long-term debt + short-term debt)/total assets. Industry leverage is the median leverage ratio of firms in the same three-digit standard industrial classification (SIC) industry group. EPS dilution dummy is set to one if issuing equity dilutes the firm's earnings per share (EPS) more than issuing debt does. M/B > 1 dummy is set to one if the market-to-book ratio exceeds one. The net equity issued is (proceeds from sale of common and preferred stock – amount of common and preferred stock repurchased – change in the value of preferred stock)/total assets. The net debt issued is (change in the book value of total debt)/total assets. The issue size is the sum of the net debt and net equity issued. Firms are defined as issuing a security when the net amount issued exceeds 5% of total assets. Dual issues are issues of both debt and equity. Time effects are accounted for via year-specific intercepts (not reported)

Independent variable	Equity issue vs. no issue			Debt issue vs. no issue			Dual issue vs. no issue		
	Coefficient	<i>t</i> -Statistic	$\Delta Prob$	Coefficient	<i>t</i> -Statistic	$\Delta Prob$	Coefficient	<i>t</i> -Statistic	$\Delta Prob$
Market-to-book	0.311**	18.2	0.190	0.038*	2.3	0.018	0.255**	12.5	0.124
Stock return	0.370**	10.0	0.105	0.203**	8.3	0.055	0.526**	13.7	0.129
ROA	-0.792**	4.6	-0.058	0.082	0.7	0.005	-1.139**	5.9	-0.071
NOLC	0.367**	6.6	0.058	0.061	1.2	0.008	0.320**	5.0	0.041
Firm size	-0.202**	13.1	-0.204	-0.096**	13.2	-0.092	-0.257**	15.4	-0.226
Tangible assets	0.327*	2.5	0.034	-0.067	1.1	-0.007	0.114	0.9	0.010
Selling expenses	0.004	0.0	0.000	-0.191*	2.4	-0.020	-0.080	0.7	-0.008
R&D expenses	0.996**	4.0	0.042	-3.085**	10.3	-0.098	-0.430	1.2	-0.014
Industry leverage	-1.073**	3.8	-0.058	0.738**	5.4	0.039	1.150**	4.3	0.054
Leverage	0.896**	5.6	0.079	1.766**	22.6	0.151	2.703**	18.0	0.206
EPS dilution dummy	-0.405**	6.4	-0.099	0.061*	2.2	0.015	-0.268**	4.1	-0.057
M/B > 1 dummy	1.095**	11.5	0.231	0.376**	11.1	0.078	1.310**	12.6	0.242
Dep. variable = 1	2,082			10,216			1,689		
Dep. variable = 0	21,863			21,863			21,863		

\*, \*\* Significantly different from zero at 5% and 1% level, respectively.

is high is tempered by the firms' preference for and the availability of internally generated funds.

To summarize, the evidence we develop supports the hypothesis that firms have target capital structures. At the same time, our results suggest that the preference for internal financing and the temptation to time the market by selling new equity when the share price is relatively high interfere with the tendency to maintain the firm's debt ratio close to its target.

## Appendix

The results of a multinomial logistic regression that models the debt, the equity, and the dual issue decisions against a no-issue alternative is given in [Table 8](#).

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