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Taking stock or cashing in? Shareholder style preferences, premiums and the method of payment ☆

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ABSTRACT

We develop and test hypotheses on the impact of target shareholders' investment style preferences on the method of payment and premiums in acquisitions. Stock offers (unlike cash offers) allow target shareholders to defer capital gains taxes. This deferral value, however, depends on target shareholders' willingness to retain acquirer stock. The empirical findings support our hypotheses. Bid premiums in stock offers are negatively and jointly related to target shareholder tax liabilities and to variables proxying for target shareholder willingness to hold acquirer stock. Moreover, the difference between predicted cash and stock premiums due to these factors significantly explains the method of payment choice.

1. Introduction

The literature identifies a variety of factors that affect the choice between stock and cash as the method of payment in corporate acquisitions. These explanations, for the most part, are rooted in the circumstances and attributes of the bidder. For instance, prior literature finds that financing constraints faced by the bidder, the potential dilution of acquirer–shareholder control rights and asymmetric information between targets and acquirers influence the method of payment. The level of the overall stock market, and that of the acquirer's stock in particular, also seem to affect the method of payment, with stock-financed mergers more prevalent when stock values are higher.[3] Not only do acquirers paying stock have relatively high valuations, but their bids also tend to follow recent increases in their stock prices.[4]

In this paper we raise the question of whether bid premiums and the method of payment are influenced by the investment preferences of *target* shareholders, given that it is target shareholders that must ultimately accept the terms of any bid that succeeds. When trading frictions are small, the extent to which shareholders favor (or disfavor) the acquirer's stock should not

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[3] Other factors include managerial ownership, institutional ownership, block ownership, and capital gains tax rates. A partial list of relevant studies of U.S. mergers includes Hansen (1987), Amihud et al. (1990), Eckbo et al. (1990), Martin (1996), Ghosh and Ruland (1998), Ayers et al. (2004), and Gu and Lev (2008).

[4] See Jovanovic and Rousseau (2001) and Maksimovic and Phillips (2001) for evidence regarding overall merger activity and the economic climate or the general level of the stock market.

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materially affect the merger process because shareholders can exchange one form of payment for the other at little cost. However, when there is a significant wedge between cash and stock from the target-shareholder perspective, shareholder investment preferences may be important. We argue that capital gains taxes can create such a wedge, and that tax effects can distort the merger process and result in acquisitions that may not be welfare maximizing.

Although the notion that target-shareholder tax liabilities could affect the acquisition process is well recognized in the literature, the empirical evidence is mixed.[5] For instance, consistent with a tax disadvantage to cash-financed acquisitions, Ayers et al. (2007) find that cash-financed acquisition activity is lower when capital gains tax rates are higher. On the other hand, empirical studies (Auerbach and Reishus, 1988; Erickson, 1998) find that the target stock price run-up prior to the acquisition offer, which affects the capital gain received by target shareholders, has no significant effect on acquisition premiums and the method of payment. We argue that the lack of empirical evidence in the existing literature may be a consequence of not accounting for target shareholder preferences.

To see why preferences can matter in the presence of capital gains taxes, note that when target shareholders are strongly averse to owning acquirer stock, they will view payment in stock and cash as near substitutes. This is because, given their investment preferences, they expect to sell rather than retain any acquirer shares they receive in exchange for their holdings. Hence, even when the method of payment is stock, target shareholders will sell right away and recognize any capital gains received on their target shares. This makes stock and cash offers equivalent from a tax perspective. Conversely, when target shareholders are more willing to retain acquirer stock from an investment perspective, payment in stock is tax advantaged (relative to cash). This is because retention of the shares they receive allows target shareholders to defer the recognition of any capital gains in target stock.[6]

Keeping shareholder investment preferences fixed, larger capital gains and higher tax rates on capital gains will make stock offers relatively more attractive due to larger tax deferral values. As a result of such tax deferral benefits, we argue that acquirers may be able to offer lower premiums in stock deals in which target shareholders face larger capital gains tax liabilities relative to stock deals with smaller tax liabilities. This is because when capital gains tax liabilities are large, target shareholders will more highly value the tax deferral benefit that a stock offer provides.[7]

In our empirical analysis, we use the preference for growth vs. value stock by the target's institutional shareholder base, information that is readily available, as a way to identify the style preferences of the firm's shareholders as a whole. Our argument is that if growth-oriented institutions comprise a larger portion of a target's institutional ownership base, this also indicates that the overall target shareholder base is more likely to be growth-oriented. Because the literature reports that acquirers in stock-for-stock mergers are predominantly growth firms (as are the acquirers in our sample), we expect target firms with more growth-oriented ownership to be, on average, more receptive to stock offers. We develop and investigate two testable predictions. The first is that target stocks that are largely owned by growth-oriented investors and experience substantial capital gains are more likely to receive stock offers, rather than cash offers. The second is that, conditional on stock being offered, the bid-premium will be decreasing in the magnitude of the capital gains tax liabilities and the extent to which the target firm is owned by growth-oriented investors. In our tests we also develop alternative ways to match the characteristics of acquirer stock with the preferences of target shareholders and undertake a variety of robustness tests.

Our sample consists of 1881 completed and failed U.S. merger deals over the 1981–2006 period. To proxy for capital gains tax liabilities, we incorporate both the target's prior stock return and the variation in capital gains tax rates: for instance, the capital gains tax rates were at a high of 28% during 1989–1996 period and substantially lower at other times over the sample period. Consistent with our predictions, we find that stock bid premiums are negatively and jointly related to the portion of the target-shareholder base that consists of growth-oriented institutions and the capital gains in the target stock they own. This result holds both before and after controlling for a wide variety of factors including the level of dedicated vs. transient (i.e., long-term vs. short-term) institutional investors (Chen et al., 2007; Gaspar et al., 2005) and the endogeneity of the method of payment choice. In terms of economic significance, a one-standard deviation increase in our measure of capital gains for growth-oriented shareholders is associated with an 8% lower bid premium in absolute terms.

This result is somewhat stronger when we restrict the sample to stock deals that are completed (i.e., offers that target shareholders accept). Moreover, in robustness work we find the results are more striking when we redefine institutional ownership on the basis of the types of institutions that are more likely to care about capital gains (i.e., mutual funds and investment advisors). Results are also more pronounced when we focus on deals in which the acquirer would be more likely considered a growth firm. This robustness check strengthens our confidence that capital gains tax liabilities play their strongest role in the merger process when target shareholders are more likely to find acquirer stock acceptable from an investment perspective.

To address the possibility that mergers with higher portions of growth-oriented target shareholders have smaller synergistic gains (and hence lower premiums) due to some sort of selection bias, we construct a variable that measures the relative values that target and acquirer shareholders receive while holding overall merger gains constant. We find that in stock deals, acquiring

[5] Among those papers recognizing or investigating the potential effect of taxes on acquisitions are Mandelker (1974), Huang and Walkling (1987), Brown and Ryngaert (1991), and Ayers et al. (2003, 2004, 2007).

[6] The US tax code provides that in a stock-for-stock acquisition, target shareholders transfer their target-share cost basis to the acquirer shares they receive. For example, suppose an investor has a $5000 cost basis in target shares for which he receives $9000 worth of acquirer stock at the close of a merger. The investor now has a $5000 cost basis in stock worth $9000 but does not have to recognize the capital gains and pay capital gains taxes as long as the acquirer shares are not sold. On the other hand, if the investor receives $9000 in a cash deal, this is treated as a sale of target stock for $9000. Thus, the investor must recognize (and pay taxes on) a capital gain of $9000–$5000 = $4000 that is assumed to be realized at the close of the merger.

[7] Later in the paper we illustrate these arguments with an intuitive model and simple numerical examples.

firms receive a relatively larger share of the total merger gains when a greater portion of target institutional owners prefer growth stock and there are larger capital gains tax liabilities.

Supporting our predictions, we find that expected premiums, estimated on the basis of target shareholder preferences and capital gains tax liabilities, tend to materially affect the probability of stock vs. cash financing. When a stock bid is expected to be less expensive from the acquirer's perspective due to capital gains tax liabilities and institutional shareholder preferences for growth stock, stock financing is significantly more likely.

Our findings have important implications for the efficiency of the overall merger process. For instance, the results indicate that acquirers may benefit by making stock offers when target shareholders are growth oriented and face substantial capital gains tax liabilities. It is possible that lower acquisition costs can enhance social welfare by facilitating value-creating mergers. On the other hand, tax effects can affect the choice of target and lead to mergers that may not be optimal from a social welfare perspective. This is because some potential mergers with greater social welfare benefits might not be chosen because there are other acquisitions that are favored due to tax benefits.

Further, our results have implications for capital gains tax policy in the context of the market for corporate control. In particular, consider a sustained period of strong stock market performance. Prior literature finds that stock-financed acquisitions are more prevalent in such an environment, potentially due to firms with overvalued equity using their stock as acquisition capital (Jensen, 2005; Moeller et al., 2005). While firms could, in principle, issue new stock and raise cash for acquisition and other purposes, it may be better for firms to make stock-based acquisitions. This allows the acquirer to exploit the tax deferral benefit of payment in stock, which is larger when potential target firms have had strong stock price performance (and target shareholders face larger capital gains liabilities). Thus, higher capital gains tax rates may exacerbate the incidence of firms with overvalued equity making value-destroying acquisitions, particularly during bull markets.

2. Background literature

In this section we briefly review three strands of the literature that relate to our study. First are papers on the method of payment and the use of stock as acquisition capital. As discussed in Ayers et al. (2004), empirical studies such as Auerbach and Reishus (1988) and Erickson (1998) fail to find a significant link between target-shareholder capital gains taxes, as measured by prior target returns, and the choice between payment in stock vs. cash. Ayers et al. (2004) speculate this may be due to the inherent noisiness in measuring capital gains tax liabilities with prior returns, and exploit variation in capital gains tax rates through time to find that higher tax rates increase the likelihood of payment in stock. Our results incorporate shareholder preferences to document a link between the method of payment and target shareholder capital gains tax liabilities.

There are also studies that link stock financing to the valuation of acquirer stock. Among these, Jovanovic and Rousseau (2001) and Maksimovic and Phillips (2001) explore how general stock market conditions influence the choice of payment. Dong et al. (2006) provide support for the view that stock financing tends to be offered by acquirers with high stock valuations. Rhodes-Kropf and Vishwanathan (2004) and Rhodes-Kropf et al. (2005) offer a rational markets perspective (both theoretical and empirical) on the high valuation of acquirers in stock-financed acquisitions. We add to this literature by investigating how target-shareholders' disposition toward growth firms (which usually have higher valuations) affects the merger process in concert with tax liabilities.

A second stream of the literature studies the magnitude of takeover premiums. Brown and Ryngaert (1991) present a model in which cash bids are higher than stock bids due to the tax disadvantage of a cash bid. Consistent with this, empirical studies such as Andrade et al. (2001) find that target announcement returns are higher in cash deals.[8] It is worth noting, however, that our focus is not on whether bid premiums are higher in cash deals compared to stock deals (even though our model delivers this result). Instead, our primary focus is on how target-shareholder preferences for the acquirer's stock (from an investment perspective) and capital gains tax liabilities jointly affect the method of payment, as well as how these factors affect premiums *conditional on* payment in stock. Ayers et al. (2003) find that within the cross-section of cash deals, premiums are positively associated with capital gains tax rates. This finding is presumably due to the compensation demanded by target shareholders when the tax liabilities associated with cash offers are greater. We provide evidence of a similar nature (but in the opposite direction) for stock deals once target-shareholder investment preferences are considered, using both capital gains tax rates and prior target-share returns to measure variation in capital gains tax liabilities.

Finally, our paper is related to the literature on shareholder preferences and the potential costs and benefits of shareholder targeting (Useem, 1996). In this regard, Bushee (2001) finds that transient institutional investors (those with short investment horizons) tend to steer their holdings toward firms with higher portions of value based on near-term earnings. Hotchkiss and Strickland (2003) find that greater ownership by institutional investors with aggressive growth or momentum strategies is associated with larger stock price reactions to negative earnings surprises. In the context of the market for corporate control, Bagwell (1991) finds that share repurchases may discourage the acquisition process by reducing the ownership of targets by shareholders most willing to dispose of their holdings. With respect to how the existing target shareholder base affects the market for corporate control, Gaspar et al. (2005) find that target firms with institutional shareholders that tend to have short-term investment horizons receive lower bid premiums. Our study examines how a different source of target-shareholder heterogeneity, investment preferences for the acquirer's stock, combined with tax liabilities, affect the merger process.

[8] This finding may be sensitive to how bid premiums are measured. In particular, Betton et al. (2009) find in some cases that premiums are *lower* in cash deals.

3. Hypotheses development and empirical predictions

In this section we use a simple model to develop hypotheses about the potential impact of stockholder preferences on the method of payment and acquisition premiums in stock offers. We draw on the familiar notion that stock-financed acquisitions, unlike cash-financed acquisitions, allow target shareholders to defer capital gains taxes (or in the case of institutional investors, defer passing such gains to taxable retail clients). As noted earlier, in a stock-for-stock acquisition, the US tax code allows target shareholders to transfer their target-share cost basis to the acquirer shares they receive. Any capital gains are recognized only when the target shareholder sells the acquirer shares he has received. If, on the other hand, the target shareholder receives cash for his holdings, the transaction is treated as equivalent to a stock sale: the target shareholder is required to immediately recognize any capital gains. We argue that the tax deferral advantage of payment in stock is increasing in target-shareholders' willingness to receive and retain acquirer stock. This, in turn, predicts that a stronger target-shareholder preference for acquirer stock will make payment in stock more likely and, in stock deals, will tend to lower the premiums offered. We subsequently illustrate the argument with a simple numerical example that helps to quantify the potential magnitude of this effect.

Our argument is based on two primary sources of heterogeneity that affect target-shareholder tax deferral benefits in a stock offer. The first is that investors are likely to have different portfolio requirements and (non-tax-related) investment preferences that affect their willingness to retain acquirer stock. For expositional ease, we use a parameter $\lambda \in [0, 1]$ to denote target shareholder preferences for the acquirer stock from an investment perspective. The notion is that $\lambda = 1 (\lambda < 1)$ corresponds to the case in which retaining acquirer shares is equivalent to investing in the best (less than the best) alternative investment available to the target shareholder. Specifically, the shareholder values retention of $\$x$ in acquirer shares as equivalent to owning a $\$\lambda x$ investment in the best alternative investment. This means that $\lambda = 1$ implies the shareholder is indifferent (from an investment preference standpoint) between $100 invested in the stock of the acquirer and $100 invested in the best alternative investment, whereas $\lambda = 0.60$, for example, implies the shareholder values $100 invested in the acquirer's stock the same as $60 invested in the best alternative.

We assume that if the target shareholder chooses to retain acquirer shares in a stock-for-stock offer, he expects to retain the shares for β periods ($\beta \geq 0$). We denote $\delta < 1$ as the per-period discount factor, so that a cash flow of $1 that is expected β periods hence has a present value of δ^{β}. For simplicity, we will assume that β is not directly affected by λ.[9]

The second source of target-shareholder heterogeneity is the magnitude of target-share capital gains tax liabilities. We use P_0 to denote the stock price basis for the target shareholder's holdings (i.e., the price at which the shares were initially acquired), while P_1 represents the price received in a stock offer. If the capital gains tax is τ, then $T_m = \tau[P_1 - P_0]$, represents the capital tax obligation that would accrue to the marginal shareholder upon immediately selling acquirer shares received in a stock offer, which is the same tax liability accrued with payment in cash of P_1.[10]

We can now obtain an expression for the benefit to the marginal shareholder from retaining acquirer shares and hence deferring capital gains taxes. Let us consider the case in which the expected shareholder horizon is $\beta > 0$. We denote the expected price of the acquirer shares at the time the target shareholder liquidates his holdings by $E(P_\beta)$. Taking account of investor preferences (λ) and the tax rate (τ), the present value (per share) that the target shareholder places on acquirer shares assuming retention can be expressed, in terms of the value of the best alternative investment, as:

$$V_R = \delta^{\beta}\lambda\left[E\left(P_\beta\right) - \tau\left(E\left(P_\beta\right) - P_0\right)\right],$$

where the quantity $E(P_\beta) - P_0$ refers to the expected capital gain at liquidation at a horizon of β. By adding and then subtracting $\delta^{\beta}\lambda\tau P_1$, we can further express V_R in terms of the offer price P_1 as:

$$V_R = \delta^{\beta}\lambda\left[E\left(P_\beta\right) - \tau\left(E\left(P_\beta\right) - P_1\right)\right] - \delta^{\beta}\lambda\tau(P_1 - P_0).$$

The first term $\delta^{\beta}\lambda[E(P_\beta) - \tau(E(P_\beta) - P_1)]$ represents the value the target shareholder places on an investment of $\$\lambda P_1$ in the best alternative investment. This is because the present value of the expected after-tax payoff from an investment of $\$P_1$ in the target shareholder's best alternative investment is $\delta^{\beta}[E(P_\beta) - \tau(E(P_\beta) - P_1)]$. Hence, recognizing that $P_1 = \delta^{\beta}[E(P_\beta) - \tau(E(P_\beta) - P_1)]$, we can rewrite V_R as follows:

$$V_R = \lambda P_1 - \delta^{\beta}\lambda\tau(P_1 - P_0).$$

To determine the benefit of deferring capital gains, we compare V_R, which assumes share retention and deferral, to the anticipated value V_{NR} when there is no retention and hence no deferral. In the latter case, the assumption is that a non-retaining target shareholder will immediately invest the proceeds of selling acquirer shares in the best alternative investment. Hence, the shareholder will assign a value for acquirer shares of:

$$V_{NR} = P_1 - \tau[P_1 - P_0].$$

[9] We note that the key predictions of our model would continue to hold if β were assumed to be increasing in λ.

[10] See footnote 6 for a brief example of how the U.S. tax code treats acquisitions for cash vs. stock.

This is simply the after-tax dollar value of the investment made in the alternative investment. Hence, the decision by the marginal target shareholder to retain or to liquidate his position will depend on the relative values of V_R and V_{NR}. We can express the benefit of the deferral for a marginal shareholder as:

$$\begin{aligned} D_m &= max\{V_R - V_{NR}, 0\} \\ &= max\left\{P_1(\lambda - 1) + \tau(P_1 - P_0)\left(1 - \delta^{\beta}\lambda\right), 0\right\}. \end{aligned}$$

For a low value of λ (the extreme case is $\lambda = 0$), there is no tax deferral benefit because any acquirer shares are immediately sold (and tax liabilities are realized). On the other hand, as λ approaches 1, the tax deferral advantage approaches $T_m(1-\delta^{\beta})$, where $T_m = \tau(P_1 - P_0)$, representing the tax liability to the marginal shareholder from a cash offer of P_1. If β is very large, the tax deferral benefit approaches the tax liability T_m, because the sale of acquirer shares and hence capital gains taxes are deferred indefinitely.

We now illustrate the possible impact of tax deferral benefits on bid premiums. To begin, we denote by P_{NR} a stock bid that is just acceptable to the marginal target shareholder assuming the shareholder has a sufficiently low value of λ such that $D_m = 0$. In other words, P_{NR} is the minimally acceptable stock bid in the case of undesirable acquirer stock, such that acquirer stock will be liquidated immediately. Note that P_{NR} also equals the minimally acceptable cash bid.

In comparison, holding all else equal, now assume instead that the marginal shareholder finds the acquirer's stock sufficiently desirable from an investment perspective and has a sufficiently large capital gains liability, such that there is a positive deferral benefit, $D_m > 0$. In light of the tax deferral benefit, the marginal shareholder should be just willing to accept a stock offer of P_R such that:

$$P_R = P_{NR} - D_m. \tag{1}$$

As implied by Eq. (1), the stock offer bid that target shareholders will find just acceptable (on a pre-tax basis) is lower when they face tax liabilities ($T_m > 0$) and the acquirer's stock better matches their investment preferences, i.e., λ is closer to 1. Hence, so long as the acquirer has some bargaining power, factors that increase D_m will also lower the stock premium.

The tax deferral benefit could also affect the method of payment, i.e., the choice of cash vs. stock. In the case of a cash offer there is no tax deferral benefit. Hence, ceteris paribus, it is relatively less expensive for the acquirer to offer stock when there are material tax deferral benefits ($D_m > 0$). Larger values of D_m will increase the likelihood of payment in stock instead of cash.

Based on the above discussion and Eq. (1) we can now state our two main empirical predictions:

Prediction 1. *The likelihood of payment in stock is increasing in the marginal target shareholder's tax deferral benefit from stock, D_m, which is itself jointly increasing in his investment preference for acquirer stock λ and target-share capital gains tax liability (T_m).*

Prediction 2. *Conditional on a stock offer, the acquisition premium is jointly decreasing in the marginal shareholder's preference for acquirer stock λ and the marginal shareholder's capital gains tax liability (T_m), as long as $D_m > 0$.*

In Appendix A we illustrate the main implications of the model in order to help motivate the empirical work we perform later. The example shown there incorporates variation in target-shareholder capital gains tax liabilities based on the two different capital gains tax rates observed during our sample period, 20% and 28%. The illustration also considers both a cash and stock offer for two limiting case assumptions of shareholder preferences: one in which the marginal investor perceives the acquirer's stock as a poor investment fit and will therefore immediately liquidate acquirer stock received as acquisition payment ($\lambda = 0$), and the opposite limiting case in which the investor finds the acquirer stock the most acceptable ($\lambda = 1$). In this case, we also assume the extreme case in which the investor will hold acquirer stock indefinitely.

Panel A shows a baseline case in which the target and acquirer agree to a cash bid of $120 for each share of target stock, which has a pre-offer market price of $100. Depending on the tax rate, this offer results in after-tax wealth (item iv) of $108.00 or $103.20, and the measured bid premium (item v) is $120–$100 = $20 in both cases.

Given the assumed acquirer stock price of $40, in Panel B, we show that when the target investor finds the acquirer stock undesirable from an investment standpoint ($\lambda = 0$), the acquirer must offer the investor three shares of acquirer stock for each target share in order to make the investor indifferent between stock and cash offers. Offering the investor three shares once again results in after-tax wealth of $108.00 or $103.20, depending on the tax rate regime. Note the acquirer is indifferent between cash and stock offers as well, paying either $120 in cash (Panel A) or $120 in stock (Panel B), and the measured bid premium thus remains $20 in all cases. The main point here is that when acquirer stock is unacceptable from an investment perspective, tax rates affect neither the method of payment nor the measured bid premium.

Panel C shows that these implications change dramatically when the target shareholder finds the acquirer's stock the most acceptable from an investment perspective ($\lambda = 1$). In this example, we alter the number of acquirer shares offered so that, as item (iv) shows, the target investor remains indifferent between cash (Panel A) and stock (Panel C). The acquirer, however, strongly prefers the stock offer, as item (ii) shows lower acquisition costs in Panel C (stock, with $\lambda = 1$) relative to those in Panel A (cash). Moreover, note that the advantage to stock over cash increases (i.e., the acquirer acquisition cost decreases) as the tax rate increases. And although our illustration varies the tax liability only due to variation in the tax rate, it is easy to see how changing the cost basis would have the same effect. Regardless of whether tax liabilities differ due to the differences in

the tax rate (as shown) or the cost basis (which is not shown), payment in stock is more likely when tax liabilities are larger once the acquirer's stock is desirable from an investment perspective. This result illustrates Prediction 1.

We also observe that measured bid premiums in a stock offer range from a high of $20 when acquirer stock is unacceptable to the target investor (Panel B, $\lambda = 0$) to a low of $3.20 as acquirer stock becomes acceptable (Panel B vs. Panel C) and capital gains tax liabilities become progressively higher (the first vs. second column). This result illustrates Prediction 2.

Thus far we have assumed that all of the bargaining power resides with the acquirer. The empirical implications above are, for the most part, not affected by this assumption. The choice between cash and stock bids (Prediction 1) is not affected because the payment method selected will be that which maximizes the joint surplus between the acquirer and target. The split of merger gains, however, will be affected by the relative bargaining power of the target. If the target has stronger bargaining power, it should be able to extract premiums that exceed the marginal target shareholder's reservation prices, raising premiums across all types of deals. However, as long as there are capital gains tax liabilities and the acquirer retains at least some bargaining power, Panel C in the numerical example would still show that *both* the acquirer and target shareholder prefer payment in stock (with target shareholder wealth in item iv showing higher values than currently shown), and bid premiums would continue to decline in capital gains tax liabilities. Prediction 2 will continue to hold.

4. Empirical design

The empirical analysis proceeds as follows. We first estimate regressions that explain bid premiums on the basis of target (institutional) shareholder preferences, variables that measure capital gains tax liabilities, and various control variables, while allowing for endogenous selection of the method of payment. This allows us to investigate whether stock premiums are lower when the value of tax deferral is expected to be higher, i.e., when both capital gains tax liabilities are larger and target shareholders are more likely to retain acquirer stock. We also estimate similar regressions that explain the share of merger gains between the acquirer and target firms. Next, we estimate probit regressions that explain the method of payment choice on the basis of the difference in predicted cash and stock premiums for each deal, where predicted premiums are based on tax liabilities, target-shareholder investment preferences and control variables.

4.1. Regressions explaining premiums

As we have discussed, we wish to investigate whether stock deal premiums are smaller when target shareholders are more receptive to owning acquirer stock and target-shareholder capital gains tax liabilities are larger. Since the premium and choice of payment method are interrelated, we employ the endogenous switching methodology developed in Lee (1978, 1979). This approach has been employed in the finance literature, for instance, by Goyal (2005) and discussed in a survey by Li and Prabhala (2005).

We begin by representing an acquirer's choice of payment method in the form of a probit model. The choice is modeled as being determined, in part, by the difference in premium that the acquirer expects to pay for a cash-vs. stock-financed acquisition: a relatively higher anticipated premium for a cash vs. stock offer makes a stock offer more likely. For offer i we use the following empirical model for the method of payment choice:

$$I_i = \beta_0(P_{ci} - P_{si}) + \beta_\eta Z_{i\eta} + \epsilon_i, \tag{2}$$

where I_i equals one for a stock offer and zero for a cash offer. P_{ci} and P_{si} are the expected cash and stock premiums, respectively, and $Z_{i\eta}$ contains various target and acquirer control variables in addition to industry and time dummies.

In the empirical analysis we specify cash and stock premiums as a function of a vector of explanatory variables X_i, which includes the variables of interest in our study (proxies for tax deferral benefits and shareholder preferences) and various control variables. Hence, we have the following for cash and stock premiums:

$$P_{ci} = \beta_c X_i + u_{ci}, \tag{3}$$

$$P_{si} = \beta_s X_i + u_{si}. \tag{4}$$

Eq. (3) is a premium regression for cash offers, while Eq. (4) is for stock offers. The empirical model represented by Eqs. (2)–(4) cannot be estimated directly because observed premiums are conditional outcomes and depend on the mode of payment. Also, the error terms u_{ci} and u_{si} may be correlated with ϵ_i, which could bias the premium regression estimates. The endogenous selection methodology developed in Lee (1978) corrects for these biases and is sketched below.

The first step of the procedure, applied to our context, is to substitute Eqs. (3) and (4) into choice Eq. (2). This gives us a reduced form model of the following form:

$$I_i = \Omega X_i + \beta_\eta Z_{i\eta} + \psi_i, \tag{5}$$

where $\Omega = \beta_0(\beta_c - \beta_s)$ and $\psi_i = \beta_0(u_{ci} - u_{si}) + \epsilon_i$. The reduced-form Eq. (5) is estimated using a probit maximum likelihood procedure. As we discuss later, $Z_{i\eta}$ also includes a variable not included in Eqs. (3) and (4) so as to identify the model.

The next step is to augment the premium regression Eqs. (3) and (4) with Heckman's Lambda obtained from the selection model in Eq. (5) to correct for method of payment choice. Using ordinary least squares to estimate the augmented regression

for the two sub-samples provides consistent estimates of β_c and β_s, because the addition of Heckman's Lambda corrects for a non-zero expected error term.

To investigate how the merger gains are shared, we use the same methodology but replace the dependent variable with *Relative Rank*, which measures target-shareholder gains relative to those of the acquirer. We discuss this variable in more detail later.

4.2. Regressions explaining the method of payment

The second main question we wish to investigate is whether the method of payment chosen reflects, in part, the expected cash and stock premiums which are a function of shareholder investment preferences and tax liabilities. Hence, in our empirical analysis of the method of payment choice we include the difference in the anticipated cash and stock premiums from the premium regression models. For each offer in the sample, the difference in predicted premiums, $P_{ci} - P_{si}$, is obtained using the premium equations estimated for cash and stock offers (Eqs. (3) and (4) corrected for selection). This difference in predicted premiums is then added to the structural probit Eq. (2) specification to obtain a consistent estimate of β_0 (for a proof of the consistency of the structural probit estimates, see Lee, 1979).

4.3. Measuring target-shareholder preferences

Although it is not possible to directly measure the investment preferences of taxable shareholders, we argue that the percentage of institutional ownership by growth-oriented vs. value-oriented investors should help identify the extent to which the target is held by investors with similar style preferences. A preference for growth vs. value is a common dimension along which investors sort themselves, and for institutional investors it is readily measurable via the classification scheme outlined in Abarbanell et al. (2003).[11] With respect to retail investors, even those that do not explicitly follow a growth or value strategy may sort themselves on the basis of other stock characteristics that correlate well with growth or value styles. For example, Graham and Kumar (2006) find strong support for retail-investor dividend clienteles, and firms with low (high) dividend yields are more likely to be viewed as growth (value) stocks.

Acquirers paying in stock tend to have higher valuation ratios than cash acquirers (see Dong et al., 2006; Shleifer and Vishny, 2003, and the evidence we provide further below). Hence, we argue that when target shareholders are more favorably disposed toward growth stock, they will also be more likely to retain acquirer stock based on their investment preferences. In robustness work, we also motivate and confirm an expectation that the stock premium results will hold more strongly in the subset of stock deals in which acquirers are more likely to be regarded as growth firms.

5. Data and descriptive statistics

5.1. Data construction

To construct our sample, we first obtain all acquisition announcements between 1981 and 2006 in Thomson Financial's SDC Platinum database (SDC). Using data available in SDC, we then restrict the sample to merger deals involving publicly traded U.S. acquirer and target firms. We further require that the acquirer not own more than 20% of the target before the merger announcement and that SDC provides the final outcome of the merger (either completed or withdrawn). When there are multiple bids for the same target, we include the first bid in the sample. Subsequent bids are included only if the bids are announced at least one year after the prior bid already included in the sample (results are robust to including only the first bid for each target).

We next limit the sample to mergers for which we can match the acquirer and target to the Center for Research in Security Prices (CRSP), Standard and Poor's COMPUSTAT and the CDA/Spectrum 13F database, which results in 3,969 merger announcements. We further limit the sample to targets with a market capitalization of at least $30 million (measured 20 trading days prior to the deal's announcement) and those with aggregate institutional ownership in the 13F database of 5% or more of outstanding common shares. These restrictions reduce the sample to 3110 merger announcements. We also exclude 1198 deals in which the acquirer or target is in the financial services industry or is a regulated utility, and an additional 31 deals due to missing data. This results in a final sample of 1881 merger deals, 1545 (82%) of which are completed according to SDC. Our sample's deal completion rate is similar to the 85% rate in Gaspar et al. (2005).

5.2. Descriptive statistics

Panel A of Table 1 characterizes the merger deals in the overall sample. *Premium* denotes the bid premium, which following Schwert (2000), is measured as the cumulative abnormal return of the target firm over trading days −63 to +126 surrounding the merger announcement (we define this and all other variables in Appendix B). The mean and median values of *Premium* are

[11] Abarbanell et al. (2003) classify an institution's overall investment preference for growth vs. value firms on the basis of various characteristics of an institution's holdings including market capitalization, earnings-to-price ratios, price-to-book ratios, dividend yield, beta, the standard deviation of returns, credit ratings, size, firm maturity, earnings growth, sales growth, share price, and leverage. After each institution's portfolio is scored along these metrics, a factor analysis is used to identify four factors and then a cluster analysis is used to separate institutions into groups based on their style preference. We thank Brian Bushee for providing updated, yearly style preferences for the institutions in our sample.

Table 1
Descriptive statistics of firms and mergers.
This table reports descriptive statistics for the sample firms and mergers. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, and are not regulated utilities. Panel A reports the following merger and firm characteristics: *Premium* is the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. *Non-Diversifying* is an indicator variable set to 1 if the acquirer and target share the same three-digit SIC code. *P/B* is the price-to-book ratio of equity, which is the ratio of the market value of equity to the book value of equity. Book equity is measured at the end of the fiscal year immediately preceding the announcement date, and the market value of equity is measured 20 trading days prior to the merger announcement. *Acquirer P/B* is winsorized at the 1% and 99% levels. *Acquirer MA/BA* is the ratio of the market value of equity (measured 20 trading days prior to the merger announcement date) plus the book value of liabilities (measured at the end of the fiscal year immediately preceding the merger announcement date), to the book value of assets (measured at the same time as the book value of liabilities), winsorized at the 1% and 99% levels. *Acquirer Size* and *Target Size* are measured as the market value of equity 20 trading days prior to the merger announcement date. *Acquirer Relative Size* is *Acquirer Size* divided by *Target Size*. Panel B reports descriptive statistics on the same set of variables but restricts the sample to mergers where the deal consideration (proposed or completed) comprises more than 50% stock. Panel C reports the yearly breakdown of the mergers and the Fama–French 48 Industry Group Classification for the acquirers.

Panel A: Merger and firm characteristics

	All deals				Completed deals only			
	Mean	Median	St. dev.	*N*	Mean	Median	St. dev.	*N*
Premium	30%	31%	53%	1881	33%	33%	51%	1545
Non-Diversifying	50%	0%	50%	1881	51%	100%	50%	1545
Acquirer P/B	5.6	3.2	7.4	1881	5.8	3.4	7.4	1545
Acquirer MA/BA	3.1	2.0	3.5	1881	3.3	2.0	3.5	1545
Acquirer Size ($billion)	11.2	1.5	35.1	1881	12.4	1.7	35.1	1545
Target Size ($billion)	1.0	0.2	3.6	1881	0.9	0.2	3.7	1545
Acquirer Relative Size	50.1	5.3	236	1881	58.8	6.6	259	1545

Panel B: Merger and firm characteristics – stock deals

	All stock deals				Completed stock deals only			
	Mean	Median	St. dev.	*N*	Mean	Median	St. dev.	*N*
Premium	22%	22%	55%	830	27%	27%	52%	712
Non-Diversifying	54%	100%	50%	830	56%	100%	50%	712
Acquirer P/B	6.3	3.7	7.9	830	6.2	3.7	7.4	712
Acquirer MA/BA	3.6	2.2	3.8	830	3.5	2.2	3.6	712
Acquirer Size ($billion)	9.4	1.3	36.5	830	8.7	1.4	27.1	712
Target Size ($billion)	1.2	0.2	4.2	830	1.2	0.2	4.3	712
Acquirer Relative Size	28.1	4.1	174	830	30.2	4.5	186	712

Panel C: Yearly breakdown of mergers and acquirer Fama–French (FF) industry groups

Year	Percentage ($N=1881$)	FF Group	Percentage ($N=1881$)	FF Group	Percentage ($N=1881$)
1981	1.3	1	0.3	27	0.4
1982	1.3	2	1.9	28	0.3
1983	1.4	3	0.2	29	0.0
1984	2.3	4	0.3	30	6.4
1985	3.1	5	0.3	31	0.0
1986	2.9	6	0.8	32	0.0
1987	2.9	7	1.6	33	0.7
1988	2.6	8	1.0	34	18.1
1989	2.1	9	3.2	35	6.8
1990	1.3	10	0.8	36	8.3
1991	1.6	11	4.1	37	1.9
1992	1.4	12	5.5	38	1.6
1993	2.4	13	5.1	39	0.4
1994	3.9	14	2.8	40	0.0
1995	4.9	15	0.6	41	3.5
1996	6.9	16	0.5	42	5.5
1997	8.8	17	2.2	43	2.3
1998	9.6	18	0.9	44	0.0
1999	8.5	19	2.2	45	0.0
2000	7.7	20	0.0	46	0.0
2001	4.7	21	3.8	47	0.0
2002	3.2	22	0.6	48	1.4
2003	3.6	23	2.0		
2004	3.9	24	1.3		
2005	3.7	25	0.3		
2006	4.2	26	0.4		

30% and 31%, respectively. Half of the deals in the sample are non-diversifying, defined as deals in which the acquirer and target firms share the same three-digit SIC code.

Among the control variables we use is the acquirer's price-to-book ratio (*P/B*), which is the market value of equity divided by the book value of equity prior to the merger's announcement.[12] Panel A also reports the statistics for the 1545 deals in our sample that are completed, because our empirical analysis focuses not only on all deals but also on the subset of completed deals. For all deals, *AcquirerP/B* has a mean and median of 5.6 and 3.2, respectively, while for the subset of completed deals the mean and median are slightly higher at 5.8 and 3.4. Premiums also appear to be slightly higher in completed deals, which is not surprising, but other variables have distributions that are fairly similar to the broader sample.

In panel B we report descriptive statistics for the subsample of 830 stock-financed deals on which we primarily focus in the premium regressions. These are deals in which the consideration offered by the acquirer is at least 50% stock. It is notable that the mean and median of *Premium* for the stock deals (22%) are substantially smaller than the values for the broader sample, implying smaller premiums in stock deals compared to cash deals. This finding is consistent with prior literature (e.g., Andrade et al., 2001).

We also observe that acquirer valuation ratios (*AcquirerP/B* and *AcquirerMA/BA*) in stock deals have higher averages than in the broader sample. This is consistent with the prior literature (e.g., Dong et al., 2006), and indicates that acquirers in stock deals are more likely to be growth firms, at least as measured by valuation ratios.

Admittedly, not *all* stock acquirers in the sample have high values of price-to-book and hence not all would be classified as having growth stock according to this measure. Therefore, in our empirical work we use *AcquirerP/B* to investigate whether the model's prediction regarding premiums in stock deals holds more strongly when acquirers have higher price-to-book values. As explained later, we also investigate this issue using a more general approach in which acquirers are stratified based on the portion of institutional ownership that prefers growth stock (where institutional style preferences are classified according to Abarbanell et al. (2003)).

In Panel C we report the distribution of the sample mergers across time and 48 Fama–French industries for the acquirer. As can be seen, the mergers are not distributed evenly across years or across industries. Therefore, we control for year and industry effects in the analysis by including year and industry indicator variables. Note that by including year indicator variables, we also control for any general shift in the method of payment for exogenous reasons such as changes in merger accounting rules.

5.3. Institutional holdings in target firms and capital gains tax liability measures

Table 2 reports descriptive statistics for the target stock's institutional ownership and capital gains tax liability variables we use. Our main goal here is to provide background information on the key variables in our analysis. To measure institutional ownership we use the CDA/Spectrum 13F database to construct the percent of shares held by institutions at the latest quarter-end prior to the merger announcement. As reported in Panel A, the mean and median values of *All_Agg*, the aggregate percentage of target shares owned by all institutions, are 43.6% and 41.7%, respectively. The shareholders owning target but not acquirer stock may be more sensitive to the terms of the merger since, unlike shareholders with positions in both the acquirer and target, they do not participate on both sides of the transaction. It is therefore possible that the empirical support for our predictions will be stronger for ownership by shareholders that do not own acquirer stock. We define *Tonly_Agg* as the portion of overall ownership in the target due to institutions that do not own acquirer shares. This variable has a mean and median of 20.4% and 17.6%, respectively, implying that on average, slightly less than half of institutional ownership is due to those owning target but not acquirer shares.

To classify institutions in terms of style preferences we use the classifications described in Abarbanell et al. (2003) that are based on an analysis of each institution's prior portfolio holdings.[13] *All_GrPro* is the proportion of institutionally-owned target shares that are held by growth-oriented institutions, and has a mean of 55.3% and a median of 56.7%. This implies that of all target shares held by institutions, an average of around 55% are owned by institutions preferring growth stocks. *Tonly_GrPro*, the portion of institutional ownership in the target due to growth-oriented shareholders that do not own acquirer shares, has a mean of 28.5% and a median of 24.4%.[14]

The two main capital gains tax liability variables we use are *All_GrProReturn* and *Tonly_GrProReturn*. For each growth-oriented institution invested in the target in the quarter before the announcement date (either all, or those only invested in the target, depending on the variable being constructed), we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the holdings data, we assume the institution's initial investment is made in the middle of the quarter and then calculate the institution's target-stock pre-announcement holding period return.[15] We then calculate the average holding period return and interact this average with the proportion of the target held by growth-oriented institutions (either

[12] For robustness we also use the market-to-book ratio of assets (*MA/BA*) instead, and find that results are robust to either measure.

[13] Please see footnote 11 for details.

[14] To clarify how the ownership variables are constructed, consider a target firm with 100 shares, 50 of which are owned by institutions and of these 50 shares, 20 are owned by institutions that own target but not acquirer stock. The values of *All_Agg* and *Tonly_Agg* in this example are 50% and 20%, respectively. Now suppose that of the 50 shares held by institutions, 28 are held by growth-oriented institutions and of these 28 shares, 11 are owned by growth-oriented institutions that own target but not acquirer stock. We thus calculate *All_GrPro*, the portion of total institutional shares owned by growth oriented institutions, as 28/50 = 56% and *Tonly_GrPro*, the portion of total institutional shares owned by growth oriented institutions owning target but not acquirer stock, as 11/50 = 22%.

[15] Our model implies that higher prior target returns will be associated with lower bid premiums in stock offers (as long as λ is sufficiently large to preclude liquidation) due to larger tax liabilities. A contrary view, however, is that greater prior target returns makes acquiring the target more desirable and, in effect, strengthens the target's bargaining position vis-a-vis the acquirer. In this case, the prediction that follows is that higher target prior returns (irrespective of target-shareholder investment preferences) will be associated with *higher* premiums. Note that if *All_GrProReturn* and *Tonly_GrProReturn* proxy for bargaining power through the holding period return component, this would bias against finding support for the model's predictions.

Table 2
Descriptive statistics for institutional ownership in target firms and capital gains tax variables.
This table reports descriptive statistics for institutional ownership in target firms and capital gains tax variables. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, and are not regulated utilities. Percentage ownership in the target firms by institutions on the CDA/Spectrum 13F database is reported as of the last quarter-end prior to the merger announcement, where institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). Panel A reports the following institutional ownership and capital gains tax variables. *All_Agg* is the total institutional stock ownership in the target. *Tonly_Agg* is similarly defined but restricted to institutions that own target stock but not acquirer stock as of the last quarter-end prior to the merger announcement. *All_GrPro* is the aggregate ownership by all growth-oriented institutions of the target divided by the aggregate ownership of all institutional owners of the target (i.e. divided by *All_Agg*). *Tonly_GrPro* is similarly defined but restricted to institutions that own target stock but not acquirer stock as of the last quarter-end prior to the merger announcement. *All_AggReturn* is the average holding period return of all institutions invested in the target as at the quarter before the merger announcement. More specifically, for each institution invested in the target in the quarter before the merger announcement, we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the holdings data, we assume the institution's initial investment in the target is made in the middle of a quarter and calculate the institution's target-stock pre-announcement holding period return. *All_GrProReturn* is computed in an analogous manner but restricts the institutions to growth-oriented institutions and we interact this average with the proportion of the target held by growth-oriented institutions. *Tonly_AggReturn* and *Tonly_GrProReturn* are computed in an analogous manner to *All_AggReturn* and *All_GrProReturn*, but are based only on institutions owning target but not acquirer stock. *TaxRate* is the corporate tax rate and *Target Return* is the target firm's return over the year prior to the merger announcement. Panel B reports descriptive statistics on the same set of variables but restricts the sample to mergers where the deal consideration (proposed or completed) comprises more than 50% stock.

Panel A: Institutional ownership and capital gains tax dummy variables – all deals

Variable	All deals				Completed deals only			
	Mean	Median	St. dev.	*N*	Mean	Median	St. dev.	*N*
All_Agg	43.6%	41.7%	23.8%	1881	43.4%	41.4%	24.0%	1545
All_AggReturn	105.0%	60.1%	117.0%	1881	111.0%	62.9%	123.0%	1545
Tonly_Agg	20.4%	17.6%	13.8%	1881	19.8%	16.8%	13.7%	1545
Tonly_AggReturn	83.3%	52.1%	116.0%	1881	87.4%	55.3%	120.0%	1545
All_GrPro	55.3%	56.7%	22.0%	1881	55.8%	57.3%	22.1%	1545
All_GrProReturn	62.9%	30.9%	65.3%	1881	66.1%	31.7%	67.1%	1545
Tonly_GrPro	28.5%	24.4%	21.5%	1881	28.2%	23.5%	21.8%	1545
Tonly_GrProReturn	28.3%	14.9%	41.0%	1881	32.9%	18.9%	46.0%	1545
Tax Rate	22.4%	20.0%	3.7%	1881	22.2%	20.0%	3.6	1545
Target Return	26.6%	10.8%	109.0%	1881	30.6%	14.7%	117.0%	1545

Panel B: Institutional ownership and capital gains tax dummy variables – stock deals

Variable	All stock deals				Completed stock deals only			
	Mean	Median	Std. dev.	*N*	Mean	Median	Std. dev.	*N*
All_Agg	44.3%	42.1%	23.9%	830	44.3%	42.3%	23.8%	712
All_AggReturn	108.0%	58.0%	137.0%	830	116.0%	62.9%	145.0%	712
Tonly_Agg	20.0%	17.2%	13.6%	830	19.5%	16.6%	13.4%	712
Tonly_AggReturn	80.1%	53.3%	90.4%	830	87.2%	56.8%	95.1%	712
All_GrPro	58.4%	60.0%	21.2%	830	58.5%	60.0%	21.0%	712
All_GrProReturn	66.3%	32.0%	72.2%	830	68.9%	33.3%	75.4%	712
Tonly_GrPro	29.3%	25.2%	21.7%	830	28.7%	24.4%	21.5%	712
Tonly_GrProReturn	27.1%	14.0%	45.2%	830	31.9%	18.4%	49.3%	712
TaxRate	22.4%	20.0%	3.7%	830	22.3%	20.0%	3.6%	712
Target Return	30.8%	12.0%	129.0%	830	34.6%	15.1%	137.0%	712

All_GrPro or *Tonly_GrPro* depending on the variable being constructed). Although the levels of these variables do not have an obvious interpretation (e.g., the mean of *All_GrProReturn* for all deals is 63%), they nonetheless measure cross-sectional variation in the magnitude of capital gains tax liabilities faced by growth-oriented shareholders.

We also interact *All_GrPro* and *Tonly_GrPro* with *Tax*Δ, which is the change in the capital gains tax rate from the baseline of 20% (*Tax*Δ equals 8% during the years 1989–1996, during which 31% of the sample deals occur, and equals 0% during 1981–1985 and 1997–2006). We label the interaction variables *(All_GrPro)(Tax*Δ*)* and *(Tonly_GrPro)(Tax*Δ*)*, respectively. For completeness, in the table we report the mean and median tax rates across all deals, which are 22.4% and 20.0%, respectively. We also report the mean and median for the target's return over the year prior to the merger announcement, which are 26.6% and 10.8%, respectively, for all deals.

Panel B reports the distributions of these variables for stock deals only. Compared to all deals, the stock deals in our sample have a somewhat higher concentration of growth-oriented shareholders in the target-shareholder base, and higher mean target returns over the pre-offer year. In the analysis that follows, we examine the effects of these growth ownership and tax variables on premiums and the method of payment choice while controlling for other factors.

6. The effect of target shareholder growth preferences and taxes on premiums

We now proceed to cross-sectional regressions to test the model's predictions on acquisition premiums in stock-financed bids. As discussed in the model and hypothesis section, we expect premiums to be smaller when there are both larger capital gains tax

liabilities and stronger target-shareholder preferences for the acquirer's stock. Our main interest in the analysis is, therefore, on variables that interact institutional style preferences with capital gains tax liabilities. However, as long as there are sufficient target-shareholder capital gains tax liabilities (or other frictions), we would also expect target-shareholder preferences for acquirer stock, on their own, to affect premiums. As discussed earlier, we measure capital gains tax liabilities on the basis of prior target-share returns and holding periods, jointly measured by either *All_GrProReturn* or *Tonly_GrProReturn,* and also the interaction of either *All_GrPro* or *Tonly_GrPro* with *Tax*Δ, which measures the capital tax rate regime in effect.

6.1. Premium results for stock deals

In Table 3 we report regressions that explain premiums in stock deals on the basis of institutional ownership by growth-oriented institutions and capital gains tax liabilities. In these specifications our primary focus is on *All_GrProReturn* and *(All_GrPro)(Tax*Δ*)*. As described in Section 3.1, the premium regressions are adjusted to correct for the endogeneity of the payment method choice and hence we include Heckman's Lambda, the significance of which indicates that selection is a factor in explaining premiums. The first column of results reports the first stage probit regression, which uses the acquirer's pre-announcement cash flow divided by the target's book value of assets to identify the model (this variable is not included in any of the premium regressions).[16] We estimate models (1)-(4) for all of the 830 stock-financed bids, and models (5)-(8) for the 712 completed stock-financed deals only. *p*-values, which are corrected for heteroskedasticity, are in parentheses below regression coefficients. All regressions also include industry and year indicator variables, which for brevity we do not report in the table.[17]

In model (1) we find that the premiums are significantly and negatively related to *All_GrPro*, the percent of institutionally-owned shares by growth-oriented institutions. The coefficient of -0.5816, along with the 21.2% standard deviation of *All_GrPro* in Panel B of Table 2, implies that a one standard deviation increase in *All_GrPro* is associated with a 12.3% lower premium in absolute terms. Hence, ownership by growth-oriented institutional investors is statistically and economically related to bid premiums, even without explicitly considering capital gains tax liabilities. This is consistent with the basic intuition of the model, as long as there are sufficient deals in the sample in which target shareholders face tax liabilities (or other frictions creating a wedge between payment in cash vs. stock).

Before discussing the next model, we comment on the control variables we include throughout all specifications in the table. First, we include the level of total institutional ownership in the target, *All_Agg*, the coefficient on which is positive and significant. Next we include *Transient_Agg*, the portion of target shares owned by institutions that tend to have short-term investment horizons as defined in Bushee (2001) and Bushee and Noe (2000). Gaspar et al. (2005) find that short-term institutional investors are associated with lower bid premiums, so the negative significance of the coefficient for *Transient_Agg* in all of the specifications in Table 3 is consistent with their findings. Because these are stock deals, the target's premium (which is measured with target returns) could be affected by the market's perception of the value effects for the acquirer. Therefore we also include *Acq CAR(−1,+1)*, the acquirer's three-day cumulative abnormal return centered around the announcement date. This variable is positive and significant.

The log of *AcquirerP/B* is the acquirer's log-transformed ratio of the market value of equity to the book value of equity. This variable is negative and strongly significant across all models, suggesting that acquirers with high valuation ratios offer lower premiums in stock deals. We also include the log transformation of two size variables, *Acquirer Scaled Size* (the market value of the acquirer's equity 20 days prior to deal announcement divided by the market value of U.S. equities on CRSP) and *Acquirer Relative Size* (the market value of the acquirer divided by that of the target, measured 20 days prior to deal announcement). The coefficient on the log of *Acquirer Scaled Size* is negative and weakly significant in models (1) and (3), and strongly significant in models (5)-(8) which focus on completed deals. Hence, in terms of deals that are completed, larger acquirers are able to pay somewhat lower premiums. However, the log of *Acquirer Relative Size* is positive and highly significant in all models (all *p*-values are less than 0.001).

The next control variable is *Acquirer Leverage* (the acquirer's debt-to-assets ratio), the coefficient on which is insignificant across all specifications. Finally, we include two indicator variables. *Non-Diversifying*, set to one when the target and acquirer share the same three-digit SIC code, is negative and significant across all specifications, indicating that premiums are lower in non-diversifying stock deals. *Toehold_Dum*, set to one if the acquirer owns a toehold as of the announcement date, is positive and significant in all eight models.

In model (2) we add *All_GrProReturn*, one of our two tax variables of interest, and find it is negative and strongly significant ($p = 0.009$) which is consistent with Prediction 2. Its coefficient, along with its standard deviation in stock deals of 72.2%, indicates that a one standard deviation increase results in an 8.1% lower bid premium. *All_GrPro* remains negative and significant on its own. We additionally include *Target Return* in this regression, and its insignificance is consistent with the prior literature finding that target-share capital gains liabilities as measured through prior target returns on their own, do not help to explain stock premiums. Thus, model (2) demonstrates the importance of factoring in the extent to which target shareholders are likely to find the acquirer's stock acceptable from an investment perspective, as manifested in the statistical and economic significance

[16] Acq Cashflow/Tgt_Size proxies for the acquirer's ability to pay cash for the target (i.e., the extent to which the acquirer is cash constrained). See Martin (1996) for another study using this variable to predict payment in cash vs. stock.

[17] To verify that our results are not overly affected by clustering at the firm level, we repeat all of the analysis for a sample in which acquirers and targets appear only once, and obtain very similar results.

Table 3
Regressions explaining premiums in stock-financed deals using *All_GrProReturn* and *(All_GrPro)(TaxΔ)*.
This table reports sample-selection corrected OLS regressions explaining the premium in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. A Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The specification of the probit is the same as model (4) in this Table with the additional variable *Acq Cashflow/Tgt_Size* defined as the acquirer's cash flow (EBIDT minus interest expense minus taxes minus preferred and common dividends) divided by the market value of the target's common equity. The output from the first stage of the two-stage regression is reported in the first column of results. The dependent variable in the second-stage OLS regressions below is *Premium*, the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *All_GrPro* is the aggregate ownership by all growth-oriented institutions of the target divided by the aggregate ownership of all institutional owners of the target. *All_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions. *TaxΔ* is the change in the capital gains tax rate from the baseline of 20%. *Target Return* is the target firm's return over the year prior to the merger announcement. *All_Agg* is the total institutional ownership in the target. *Transient_Agg* is ownership by transient investors (those with relatively short holding periods) as classified in Bushee (2001) and Bushee and Noe (2000). *Acq CAR(−1,+1)* is the acquirer's three-day announcement cumulative abnormal return. For the remaining variables, market values are measured 20 days prior to the merger announcement and accounting items are measured at the latest fiscal year-end prior to the merger announcement. *Log(Acquirer P/B)* is the log of the acquirer's price-to-book ratio of equity. *Log(Acquirer Scaled Size)* is the market value of the acquirer's common equity divided by the size of the equity market used in the CRSP value-weighted market index. *Log(Relative Acquirer Size)* is the log of the market value of the acquirer's equity divided by that of the target. *Acquirer Leverage* is the ratio of total debt to total assets. *Non-diversifying* is an indicator set to one if the acquirer and target share the same three-digit SIC code. *Toehold_Dum* is a dummy variable that takes the value one if the bidder holds the target's stock as of the announcement date. The statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Year and industry dummies are included (but not reported) and heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

Deals:	1st Stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	All	All	All	All	Completed	Completed	Completed	Completed
All_GrPro	0.9442***	−0.5816***	−0.5215***	−0.5024***	−0.4443***	−0.6081***	−0.5376***	−0.5202***	−0.4557***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[0.002]	[<0.001]	[<0.001]	[<0.001]	[0.002]
All_GrProReturn	0.0815		−0.1118***		−0.1117**		−0.1259***		−0.1246***
	[0.387]		[0.009]		[0.010]		[0.005]		[0.005]
(All_GrPro)(TaxΔ)	0.2027			−3.8300	−3.7742			−4.2115	−3.9680
	[0.969]			[0.188]	[0.199]			[0.174]	[0.203]
TaxΔ	9.9190**			1.3930	1.1446			1.6050	1.2325
	[0.022]			[0.611]	[0.678]			[0.587]	[0.678]
Target Return	−0.0868		0.0376		0.0384		0.0427		0.0424
	[0.162]		[0.179]		[0.175]		[0.135]		[0.138]
All_Agg	−0.8276***	0.3688**	0.3925***	0.3909***	0.4152***	0.4564***	0.4899***	0.4695***	0.5022***
	[0.001]	[0.012]	[0.009]	[0.008]	[0.006]	[0.002]	[0.001]	[0.002]	[0.001]
Transient_Agg	1.2101**	−1.0133***	−0.9747***	−1.0338***	−0.9966***	−0.9504***	−0.8949***	−0.9572***	−0.9023***
	[0.016]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[0.001]	[<0.001]	[0.001]
Acq Car(−1,+1)	−4.3383***	1.0413***	1.1735***	1.0892***	1.2216***	1.1360***	1.2422***	1.1582***	1.2624***
	[<0.001]	[0.005]	[0.002]	[0.003]	[0.001]	[0.003]	[0.001]	[0.002]	[0.001]
Log(Acq P/B)	0.2953***	−0.1069***	−0.1032***	−0.1104***	−0.1070***	−0.1051***	−0.1002***	−0.1075***	−0.1026***
	[<0.001]	[0.001]	[0.002]	[<0.001]	[0.001]	[0.003]	[0.007]	[0.002]	[0.006]
Log(Acq Scaled Size)	0.1063***	−0.0369*	−0.0296	−0.0385*	−0.0313	−0.0652***	−0.0576***	−0.0659***	−0.0584***
	[0.003]	[0.059]	[0.145]	[0.051]	[0.126]	[0.002]	[0.010]	[0.002]	[0.009]
Log(Acq Rel. Size)	−0.2963***	0.1430***	0.1399***	0.1463***	0.1433***	0.1677***	0.1642***	0.1688***	0.1654***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Acq Leverage	−0.9254***	−0.0208	−0.0161	−0.0047	0.0003	0.1339	0.1354	0.1458	0.1467
	[<0.001]	[0.877]	[0.906]	[0.973]	[0.998]	[0.366]	[0.368]	[0.326]	[0.330]
Non-Diversifying	0.0670	−0.1097**	−0.1162***	−0.1128***	−0.1195***	−0.1055**	−0.1136**	−0.1093**	−0.1172**
	[0.407]	[0.010]	[0.008]	[0.009]	[0.007]	[0.020]	[0.014]	[0.016]	[0.011]
Toehold_Dum	−0.9381***	0.2854**	0.3071**	0.3015**	0.3236**	0.3692**	0.3845**	0.3771**	0.3919**
	[<0.001]	[0.041]	[0.029]	[0.031]	[0.022]	[0.021]	[0.016]	[0.018]	[0.014]
Acq Cashflow/Tgt_Size	−0.0144*								
	[0.054]								
Constant	0.7541	0.4217	0.5076	0.3850	0.4707	0.0427	0.1239	−0.0001	0.0825
	[0.209]	[0.179]	[0.111]	[0.224]	[0.143]	[0.895]	[0.707]	[1.000]	[0.803]
Heckman's Lambda		−0.4039***	−0.4470***	−0.4259***	−0.4698***	−0.4530***	−0.4939***	−0.4593***	−0.4997***
		[0.007]	[0.004]	[0.005]	[0.003]	[0.004]	[0.002]	[0.003]	[0.002]
Observations	1881	830	830	830	830	712	712	712	712

of *All_GrProReturn*. We also note that the insignificance of *Target Return* is inconsistent with the view that targets with higher prior returns have stronger bargaining power.

In model (3) we replace *All_GrProReturn* with *(All_GrPro)(TaxΔ)*, our second tax variable of interest, along with *TaxΔ* in place of *Target Return*, and find that both are insignificant. Model (4) includes all four variables, and we continue to find that *All_GrProReturn* is both statistically and economically significant. The coefficient changes little from that in model (2), implying that a one standard deviation in *All_GrProReturn* remains associated with an 8.1% lower bid premium.

In models (5)-(8) we repeat models (1)-(4) using only the sample of completed deals. The motivation for this exercise is to investigate whether the ownership and tax variables help explain premiums that are accepted by target shareholders. If this is not the case, then it would be inconsistent with the notion that bidders respond to (or take advantage of) target-shareholder preferences in deals that are actually completed. Models (6) and (8) confirm the earlier results that the coefficient on *All_GrProReturn* is negative and significant (*p*-values are smaller and the coefficients are slightly larger in magnitude).

In Table 4 we repeat the analysis of Table 3, except that we replace the two variables *All_GrProReturn* and *(All_GrPro)(Tax*Δ*)*, respectively, with *Tonly_GrProReturn* and *(Tonly_GrPro)(Tax*Δ*)*. Thus, the focus in this table is on measuring the capital gains tax liabilities for growth-oriented target shareholders that do not have a pre-merger position in the acquirer. The motivation, as noted earlier, is that growth-oriented target shareholders that own target but not acquirer stock may more strongly influence the deal terms. This is because their wealth is presumably more affected by the transaction terms than that of target shareholders who are invested in both stocks (and hence have a stake in both sides of the transaction).

In the baseline regression of model (1), the coefficient on *Tonly_GrPro* is negative and significant ($p<0.001$). In model (2) we include *Tonly_GrProReturn*, and we find that the coefficient on this variable is also statistically significant ($p<0.001$). In terms of economic magnitude, the standard deviation of *Tonly_GrProReturn* as reported for stock deals (45.2%), along with the regression coefficient of -0.2261, imply that a one standard deviation increase is associated with a 10.2% lower bid premium in absolute terms, all else equal.

Model (3) repeats model (2) but uses *(Tonly_GrPro)(Tax*Δ*)*, and unlike the analagous intereaction tax variable in Table 3, we find that the coefficient here is negative and significant ($p=0.003$). The effect of a higher tax rate is also economically significant, in that if we hold *Tonly_GrPro* constant at its median of 25.2% for stock deals, the coefficients on *(Tonly_GrPro)(Tax*Δ*)* and *Tax*Δ collectively imply that an increase in the tax rate from 20% to 28% is associated with a 14.6% lower bid premium in absolute terms. Model (4) includes all of the tax variables, and they have similar economic and statistical significance to the levels found in models (2) and (3).

These results are even stronger in models (5)-(8), which focus on the subsample of completed deals. Again we find that target shareholders' willingness to own acquirer stock and tax effects jointly explain a significant portion of the variation in stock-financed bid premiums. We note, in addition, that the variable *Tax*Δ is, on its own, insignificant. This reinforces the importance of factoring in investment preferences when investigating tax effects.

6.2. Additional premium results

6.2.1. Premium results based on ownership by growth-oriented mutual funds and investment advisors

Thus far we have used the style preferences of institutional investors in the target firm as a way to identify the investment preferences of target shareholders as a whole. However, it is worth confirming that the results also hold if we define growth-oriented institutional ownership only on the basis of holdings by mutual funds and investment advisors (types 3 and 4 in the 13F institutional holdings data). After all, these institutions should care about capital gains to the extent that gains must eventually be offset by losses or passed along to their retail clients. Evidence in Gibson et al. (2000) suggests that actively managed funds, in particular, pay attention to the gains they must pass through to their retail clients.

In Table 5, we report the results of regressions that redefine growth-oriented institutional ownership based only on mutual funds and investment advisers. In Panel A we repeat the specifications in Table 3, which focus on the *All_GrPro* versions of institutional ownership, (all of the other control variables are included as well, but not shown for brevity). As we observe, *All_GrProReturn* continues to be negatively associated with premiums, with coefficients that are economically and statistically significant. In Panel B we repeat the specifications in Table 4, which focus on the *Tonly_GrPro* versions of institutional ownership. Here as well, we continue to observe that premiums are jointly decreasing in growth-oriented institutional ownership and variables that measure capital gains tax liabilities. Both *Tonly_GrProReturn* and *(Tonly_GrPro)(Tax* Δ*)* remain significant with coefficients that are of the same order of magnitude as in Table 4.

6.2.2. Premium results for above-median and below-median growth acquirers

The results to this point rely on an assumption, consistent with prior literature and the average price-to-book ratios reported in Table 1, that acquirers in stock deals tend to be growth firms. Some stock-deal acquirers are better described as growth firms than others, however, and not all of the acquirers in our sample of stock deals would necessarily be classified as good fits for growth-oriented portfolios. Therefore, we expect stronger empirical results for deals in which the acquirers have stronger growth attributes. We investigate this prediction in two alternative ways. First, we split the stock-deal acquirers in our sample into two groups based on whether they are above or below the sample median in terms of *AcquirerP/B*. We then repeat regression models (2), (3), (6) and (7) from Table 3 for each subsample. If the earlier results are explained by acquirers that are growth firms, then we expect to observe that the capital gains tax variables have greater explanatory power for the regressions using the above-median sample.

Panel A of Table 6 reports the first set of results. The model numbers refer to the specifications in Table 3, and we include all of the control variables from the earlier table except for *AcquirerP/B* (we do not report the coefficients here for brevity). The sample sizes in the above- and below-median regressions are not quite equal because some acquirers appear in more than one deal (see the sample construction description). As shown in Panel A, the coefficients on *All_GrProReturn* in the above-median regressions are economically and statistically significant (the largest *p*-value is 0.023), but insignificant in the below-median regressions. And unlike in Table 3, we find weak significance for *(All_GrPro)(Tax* Δ*)* in the above-median regressions.

Table 4
Regressions explaining premiums in stock-financed deals using *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)*.
This table reports sample-selection corrected OLS regressions explaining the premium in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. A Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The specification of the probit is the same as model (4) in this Table with the additional variable *Acq Cashflow/Tgt_Size* defined as the acquirer's cash flow (EBIDT minus interest expense minus taxes minus preferred and common dividends) divided by the market value of the target's common equity. The output from the first stage of the two-stage regression is reported in the first column of results. The dependent variable in the second-stage OLS regressions below is *Premium*, the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *Tonly_GrPro* is the aggregate ownership by all growth-oriented institutions of the target that do not own acquirer shares divided by the aggregate ownership of all institutional owners of the target in the quarter preceding the merger announcement. *Tonly_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target but not the acquirer in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions that do not own acquirer shares. *TaxΔ* is the change in the capital gains tax rate from the baseline of 20%. *Target Return* is the target firm's return over the year prior to the merger announcement. *Tonly_Agg* is the total institutional ownership in the target by institutions that do not own acquirer shares as of the last quarter-end prior to the merger announcement divided by the total number of target shares outstanding. *Transient_Agg* is ownership by transient investors (those with relatively short holding periods) as classified in Bushee (2001) and Bushee and Noe (2000). *Acq CAR(−1,+1)* is the acquirer's three-day announcement cumulative abnormal return. For the remaining variables, market values are measured 20 days prior to the merger announcement and accounting items are measured at the latest fiscal year-end prior to the merger announcement. *Log(Acquirer P/B)* is the log of the acquirer's price-to-book ratio of equity. *Log(Acquirer Scaled Size)* is the market value of the acquirer's common equity divided by the size of the equity market used in the CRSP value-weighted market index. *Log(Relative Acquirer Size)* is the log of the market value of the acquirer's equity divided by that of the target. *Acquirer Leverage* is the ratio of total debt to total assets. *Non-diversifying* is an indicator set to one if the acquirer and target share the same three-digit SIC code. *Toehold_Dum* is a dummy variable that takes the value one if the bidder holds the target's stock as of the announcement date. The statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Year and industry dummies are included (but not reported) and heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

Deals:	1st Stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	All	All	All	All	Completed	Completed	Completed	Completed
Tonly_GrPro	0.4970*	−0.5467***	−0.4194***	−0.3631**	−0.2685*	−0.4984***	−0.3537***	−0.2695*	−0.1679
	[0.065]	[<0.001]	[0.001]	[0.012]	[0.069]	[<0.001]	[0.006]	[0.065]	[0.262]
Tonly_GrProReturn	0.0647		−0.2261***		−0.2109***		−0.2634***		−0.2439***
	[0.661]		[<0.001]		[0.001]		[<0.001]		[<0.001]
(Tonly_GrPro)(TaxΔ)	7.9644			−8.1362***	−7.1719**			−9.4557***	−8.1859***
	[0.117]			[0.003]	[0.010]			[0.001]	[0.005]
TaxΔ	9.6589***			0.2307	−0.0744			0.3575	−0.2885
	[0.004]			[0.920]	[0.974]			[0.883]	[0.906]
Target Return	−0.0572		0.0236		0.0258		0.0268		0.0282
	[0.299]		[0.300]		[0.287]		[0.246]		[0.252]
Tonly_Agg	−1.4314***	0.8901***	0.9423***	0.9782***	1.0236***	0.9185***	1.0102***	0.9734***	1.0570***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Transient_Agg	1.3862***	−1.2039***	−1.1841***	−1.3033***	−1.2796***	−1.0309***	−0.9958***	−1.1084***	−1.0706***
	[0.002]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Acq Car(−1,+1)	−4.4360***	1.0499***	1.1940***	1.3483***	1.4508***	1.1225***	1.3047***	1.4200***	1.5529***
	[<0.001]	[0.006]	[0.002]	[0.001]	[<0.001]	[0.004]	[0.001]	[0.001]	[<0.001]
Log(Acq P/B)	0.2982***	−0.0966***	−0.0916***	−0.1131***	−0.1079***	−0.0956***	−0.0924**	−0.1152***	−0.1112***
	[<0.001]	[0.002]	[0.005]	[0.001]	[0.002]	[0.007]	[0.012]	[0.002]	[0.005]
Log(Acq Scaled Size)	0.0632*	−0.0258	−0.0217	−0.0279	−0.0244	−0.0387**	−0.0357*	−0.0420**	−0.0393*
	[0.072]	[0.156]	[0.238]	[0.142]	[0.206]	[0.046]	[0.072]	[0.040]	[0.059]
Log(Acq Rel. Size)	−0.2636***	0.1294***	0.1331***	0.1474***	0.1495***	0.1351***	0.1439***	0.1566***	0.1629***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Acq Leverage	−0.8890***	−0.0721	−0.0545	−0.0262	−0.0134	0.0825	0.1073	0.1367	0.1544
	[<0.001]	[0.588]	[0.684]	[0.852]	[0.924]	[0.572]	[0.468]	[0.374]	[0.321]
Non-Diversifying	0.0673	−0.1002**	−0.1064**	−0.1048**	−0.1109**	−0.1064**	−0.1157**	−0.1130**	−0.1218**
	[0.409]	[0.018]	[0.013]	[0.018]	[0.013]	[0.017]	[0.010]	[0.015]	[0.010]
Toehold_Dum	−0.9325***	0.2410*	0.2485*	0.3336**	0.3321**	0.2828*	0.3104**	0.3737**	0.3890**
	[<0.001]	[0.085]	[0.076]	[0.022]	[0.022]	[0.074]	[0.049]	[0.021]	[0.016]
Acq Cashflow/Tgt_Size	−0.0144*								
	[0.066]								
Constant	0.4186	0.4343	0.4656*	0.5183*	0.5370*	0.2091	0.2489	0.2933	0.3181
	[0.422]	[0.123]	[0.099]	[0.079]	[0.069]	[0.469]	[0.392]	[0.332]	[0.296]
Heckman's Lambda		−0.3525**	−0.3884**	−0.5003***	−0.5210***	−0.3645**	−0.4248***	−0.5136***	−0.5544***
		[0.022]	[0.013]	[0.002]	[0.002]	[0.022]	[0.009]	[0.002]	[0.001]
Observations	1881	830	830	830	830	712	712	712	712

In Panel B we repeat the exercise but use the *Tonly_GrPro* form of institutional growth ownership in the target, analogous to Table 4. Once again we find that the coefficients of interest, those on *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)*, have greater economic and statistical significance in the above-median regressions. Based on these panels, we conclude that the earlier results in Tables 3 and 4 are more strongly driven by the deals in the sample that have acquirers with stronger growth attributes.

Price-to-book ratios offer just one way to measure growth. Indeed, the growth style preference measure we employ to classify institutions is based on a number of additional growth metrics including sales growth, earnings growth, dividend yield, firm

Table 5
Supplemental regressions explaining premiums in stock-financed deals for institutions classified as mutual funds or investment advisors.
This table reports sample-selection corrected OLS regressions explaining the premium in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. Panels A and B report regression results for institutions classified as mutual funds or investment advisors (Types 3 and 4 in the CDA/Spectrum 13F database). *Panel A* repeats the regression models from Table 3 and *Panel B* repeats the regression models from Table 4. A Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The specification of the probit is the same as model (4) in this Table with the additional variable *Acq Cashflow/Tgt_Size* defined as the acquirer's cash flow (EBIDT minus interest expense minus taxes minus preferred and common dividends) divided by the market value of the target's common equity. The dependent variable in the OLS regressions below is *Premium*, the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *All_GrPro* is the aggregate ownership by all growth-oriented institutions (classified by type) of the target divided by the aggregate ownership of all institutional owners of the target. *All_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions. *Tax*Δ is the change in the capital gains tax rate from the baseline of 20%. *Tonly_GrPro* is the aggregate ownership by all growth-oriented institutions (classified by type) of the target that do not own acquirer shares divided by the aggregate ownership of all institutional owners of the target. *Tonly_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target but not the acquirer in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions that do not own acquirer shares. The regressions also include control variables *Transient_Agg, Target Return, Log(Acquirer P/B), Acq CAR(−1,+1), Log(Acquirer Scaled Size), Log(Relative Acquirer Size) Acquirer Leverage, Non-Diversifying, Toehold_Dum*, year and industry dummies which we do not report below for brevity along with *All_Agg (Panel A) and Tonly_Agg (Panel B)*. See Tables 3 and 4 for the respective variable definitions. The statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Institutional investors based on mutual funds and investment advisors for All_GrPro								
All_GrPro	−0.5590***	−0.4917***	−0.5061***	−0.4423***	−0.5487***	−0.4608***	−0.4607***	−0.3788***
	[<0.001]	[<0.001]	[<0.001]	[0.001]	[<0.001]	[<0.001]	[0.001]	[0.007]
All_GrProReturn		−0.0979*		−0.0975*		−0.1249**		−0.1237**
		[0.055]		[0.059]		[0.018]		[0.022]
*(All_GrPro)(Tax*Δ*)*			−2.3681	−2.2631			−4.0741	−3.8970
			[0.389]	[0.414]			[0.166]	[0.190]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.4375***	−0.4625***	−0.4627***	−0.4880***	−0.4894***	−0.5258***	−0.5290***	−0.5661***
	[0.005]	[0.004]	[0.004]	[0.003]	[0.003]	[0.002]	[0.001]	[0.001]
Observations	830	830	830	830	712	712	712	712
Panel B: Institutional investors based on mutual funds and investment advisors for Tonly_GrPro								
Tonly_GrPro	−0.6353***	−0.4920***	−0.4948***	−0.3851**	−0.5718***	−0.4071***	−0.3656**	−0.2445
	[<0.001]	[<0.001]	[0.001]	[0.011]	[<0.001]	[0.002]	[0.015]	[0.110]
Tonly_GrProReturn		−0.2524***		−0.2388***		−0.3059***		−0.2879***
		[<0.001]		[0.001]		[<0.001]		[<0.001]
*(Tonly_GrPro)(Tax*Δ*)*			−6.6024**	−5.4914*			−8.7269***	−7.3842**
			[0.026]	[0.062]			[0.005]	[0.017]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.3856**	−0.3784**	−0.5148***	−0.4906***	−0.3978**	−0.4195***	−0.5473***	−0.5512***
	[0.011]	[0.013]	[0.002]	[0.003]	[0.012]	[0.008]	[0.001]	[0.001]
Observations	830	830	830	830	712	712	712	712

maturity, idiosyncratic risk, etc. Hence, for our second test of the prediction, we exploit investor types and holdings and use a revealed preference approach to define the above-median sample of deals (in terms of the acquirer being a growth firm). Specifically, we split the sample based on the percentage of institutional ownership in the *acquirer* by growth-oriented institutional investors (irrespective of whether the institutional investors own target stock). We estimate the regressions as before for acquirers with above- and below-median growth-oriented ownership and report the results in Panels C and D. Similar to the results in Panels A and B, we find stronger significance for the tax variables in the above-median regressions than in the below-median regressions. These results confirm that capital gains tax liabilities and investment style preferences jointly have a significant impact on stock-deal premiums when the acquirer's stock more closely matches the investment preferences of target shareholders.

7. The effect of growth-oriented institutional owners and taxes on the share of merger gains

In this section we examine the manner in which merger gains are shared between acquirers and targets. By examining the share of merger gains received (rather than the bid premium), we address a potential selection bias concern with the premium results—namely, the possibility that the overall value of merger gains are lower (and hence premiums are lower) in deals with larger target-share capital gains tax liabilities and higher portions of growth-oriented target shareholders. Although it is unclear, ex ante, why such a selection bias would be expected, it is worth addressing the possibility. As discussed in the hypothesis section (Prediction 2 in particular), we expect the acquirer to fare better when there are greater target-share capital gains tax liabilities and target shareholders are more likely to retain the acquirer's shares.

Table 6
Supplemental regressions explaining premiums in stock-financed deals.
This table reports sample-selection corrected OLS regressions explaining the premium in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. *Panels A, B, C and D* repeat regression models (2), (3), (6) and (7) from Tables 3 and 4 but stratify the sample based upon whether the acquirer's growth characteristic is above or below the sample median for stock deals. *Panels A and B* stratify the sample using the acquirer's price-to-book ratio, and *Panels C and D* stratify the sample using the proportion of growth-oriented institutional owners that own the acquirer's stock. Panels A and C use the *All_GrPro* form of institutional ownership (as in Table 3) whereas Panels B and D use the *Tonly_GrPro* form of institutional ownership (as in Table 4). For each regression in each panel, a Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The dependent variable in the OLS regressions below is Premium, the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *All_GrPro* is the aggregate ownership by all growth-oriented institutions of the target divided by the aggregate ownership of all institutional owners of the target. *All_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions. *Tax*Δ is the change in the capital gains tax rate from the baseline of 20%. *Tonly_GrPro* is the aggregate ownership by all growth-oriented institutions of the target that do not own acquirer shares divided by the aggregate ownership of all institutional owners of the target. *Tonly_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target but not the acquirer in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions that do not own acquirer shares. The regressions also include control variables *Tax*Δ, *Transient_Agg*, *Target Return*, *Log(Acquirer P/B)*, *Acq CAR(−1,+1)*, *Log(Acquirer Scaled Size)*, *Log(Relative Acquirer Size) Acquirer Leverage*, *Non-Diversifying*, *Toehold_Dum*, year and industry dummies which we do not report below for brevity along with *All_Agg (Panels A and C) and Tonly_Agg (Panels B and D)*. See Tables 3 and 4 for the control variable definitions and the regression specifications. The statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

Panel A: Premium regressions for stock deals using *All_GrPro*, sample stratified by *Acquirer P/B*

Model from Table 3	(2)	(2)	(3)	(3)	(6)	(6)	(7)	(7)
Acq P/B status: Median	Above	Below	Above	Below	Above	Below	Above	Below
Sample deals	All	All	All	All	Completed	Completed	Completed	Completed
All_GrPro	−0.6917***	−0.1562	−0.6372***	−0.3998**	−0.6498***	−0.2531	−0.6018***	−0.5024**
	[<0.001]	[0.369]	[0.001]	[0.033]	[<0.001]	[0.242]	[0.001]	[0.024]
All_GrProReturn	−0.1161**	−0.0436			−0.1321***	−0.0300		
	[0.023]	[0.527]			[0.008]	[0.685]		
*(All_GrPro)(Tax*Δ*)*			−6.8174*	5.0948			−7.7549*	3.4259
			[0.092]	[0.241]			[0.054]	[0.497]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.3999**	0.0995	−0.3537**	−0.3073	−0.3358**	0.0959	−0.2835*	−0.3662
	[0.023]	[0.693]	[0.042]	[0.103]	[0.036]	[0.768]	[0.074]	[0.107]
Observations	412	418	412	418	355	357	355	357

Panel B: Premium regressions for stock deals using *Tonly_GrPro*, sample stratified by *Acquirer P/B*

Model from Table 4	(2)	(2)	(3)	(3)	(6)	(6)	(7)	(7)
Acq P/B status: Median	Above	Below	Above	Below	Above	Below	Above	Below
Sample deals	All	All	All	All	Completed	Completed	Completed	Completed
Tonly_GrPro	−0.3364*	−0.2692	−0.3294*	−0.3441*	−0.3130*	−0.3268*	−0.3244*	−0.2093
	[0.070]	[0.105]	[0.095]	[0.074]	[0.077]	[0.059]	[0.087]	[0.340]
Tonly_GrProReturn	−0.3010***	−0.1786*			−0.3463***	−0.1860		
	[<0.001]	[0.096]			[<0.001]	[0.120]		
*(Tonly_GrPro)(Tax*Δ*)*			−10.5511***	−2.7843			−10.7854***	−9.0868*
			[0.004]	[0.490]			[0.004]	[0.053]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.4731**	0.1416	−0.4831**	−0.3577*	−0.4700***	0.1728	−0.4694***	−0.5255**
	[0.014]	[0.533]	[0.013]	[0.064]	[0.006]	[0.585]	[0.008]	[0.030]
Observations	412	418	412	418	355	357	355	357

Panel C: Premium regressions for stock deals using *All_GrPro*, sample stratified by growth-oriented institutional ownership in acquirer

Model from Table 3	(2)	(2)	(3)	(3)	(6)	(6)	(7)	(7)
Acq growth-oriented ownership: Median	Above	Below	Above	Below	Above	Below	Above	Below
Sample deals	All	All	All	All	Completed	Completed	Completed	Completed
All_GrPro	−0.5322***	−0.3809	−0.3890**	−0.5465*	−0.5523***	−0.1736	−0.4605**	−0.3812
	[0.001]	[0.117]	[0.033]	[0.082]	[<0.001]	[0.421]	[0.013]	[0.136]
All_GrProReturn	−0.1674*	−0.0812*			−0.2114**	−0.0999**		
	[0.053]	[0.098]			[0.010]	[0.046]		
*(All_GrPro)(Tax*Δ*)*			−6.7182*	−1.0488			−5.2834	−4.3856
			[0.068]	[0.882]			[0.164]	[0.475]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.3362**	−0.6425**	−0.3070**	−0.8684***	−0.4378***	−0.2575	−0.3924**	−0.6441***
	[0.031]	[0.047]	[0.046]	[0.008]	[0.006]	[0.344]	[0.014]	[0.008]

(continued on next page)

Table 6 (*continued*)

Panel C: Premium regressions for stock deals using *All_GrPro*, sample stratified by growth-oriented institutional ownership in acquirer

Model from Table 3	(2)	(2)	(3)	(3)	(6)	(6)	(7)	(7)
Acq P/B status: Median	Above	Below	Above	Below	Above	Below	Above	Below
Sample deals	All	All	All	All	Completed	Completed	Completed	Completed
Observations	410	420	410	420	354	358	354	358

Panel D: Premium regressions for stock deals using *Tonly_GrPro*, sample stratified by growth-oriented institutional ownership in acquirer

Model from Table 4	(2)	(2)	(3)	(3)	(6)	(6)	(7)	(7)
Acq growth-oriented ownership: Median	Above	Below	Above	Below	Above	Below	Above	Below
Sample deals	All	All	All	All	Completed	Completed	Completed	Completed
Tonly_GrPro	−0.5783*** [<0.001]	−0.0537 [0.803]	−0.4722*** [0.008]	−0.0691 [0.792]	−0.4741*** [0.003]	0.0406 [0.833]	−0.3821** [0.032]	0.0607 [0.795]
Tonly_GrProReturn	−0.3475** [0.016]	−0.1937*** [0.003]			−0.4040*** [0.005]	−0.2323*** [0.001]		
(Tonly_GrPro)(TaxΔ)			−8.0359*** [0.009]	−6.8214 [0.203]			−8.1911*** [0.010]	−9.0875* [0.072]
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.2257 [0.129]	−0.4996 [0.106]	−0.2446 [0.104]	−0.7045*** [0.005]	−0.3337** [0.031]	−0.1339 [0.626]	−0.2994* [0.054]	−0.5191** [0.010]
Observations	410	420	410	420	354	358	354	358

Our measure of how the merger gains are shared is *Relative Rank*. This variable is the percentile rank (across all sample observations) of the target firm's *Premium* (the CAR over days −63 to +126) divided by the sum of the percentile rank of the target's *Premium* and the percentile rank of the acquirer's CAR over trading days −63 to +126 relative to the announcement date. Hence, *Relative Rank* is a measure of how target shareholders fare relative to acquirer shareholders, such that in regressions that predict *Relative Rank*, the predicted signs on our variables of interest are the same as in Tables 3 and 4. One advantage of this measure over, say, dividing target returns by acquirer returns, is the ability to appropriately handle deals with negative acquirer returns. Observations with negative acquirer CARs simply have lower percentile acquirer CAR ranks and hence lower denominators (all else equal).

In Table 7 we report regressions that replicate those in Table 4 except that we use *Relative Rank* as the dependent variable, and we also replace the 3-day acquirer CAR with *Combined Value*, which controls for the overall value of the merger (see Appendix B for more detail). For brevity, from this point onward we focus our analysis using *Tonly_GrPro* and *Tonly_GrProReturn*. Results using *All_GrPro* and *All_GrProReturn* are mixed as before, with signs in the expected direction but with coefficients that are economically and statistically significant in some cases and insignificant in others (we provide these results in Online Appendix Table 1). As before, the first column of numbers reports the first stage probit regression. In model (1), the coefficient on *Tonly_GrPro* is negative and significant as in the earlier results.

Tonly_GrPro is negative and significant in all but the last model. In model (1), for example, its coefficient is statistically significant ($p<0.001$), with a magnitude implying that a one standard deviation increase is associated with a 4.1% lower value of *Relative Rank* in absolute terms. To clarify, note that *Relative Rank* ranges from 0% to 100% by construction, and hence an absolute reduction of 4.1% from its median value (50%) would result in a value of 45.9%. In model (2) we introduce the first tax variable of interest, *Tonly_GrProReturn*, which is negative and significant at the 10% level ($p=0.063$). The coefficient's magnitude implies that a one standard deviation increase results in 1.8% lower value of *Relative Rank* in absolute terms.

Model (3) focuses on the *TaxΔ* variables. We find that *(Tonly_GrPro)(TaxΔ)* is negative and significant ($p=0.015$), and the two variables *(Tonly_GrPro)(TaxΔ)* and *TaxΔ* collectively imply that holding *Tonly_GrPro* constant at its sample median (for all stock deals) of 25.2%, a tax rate of 28% (*TaxΔ* = 0.08) as opposed to 20% is associated with a 6.1% lower value of *Relative Rank*. In model (4) we include all of the tax variables and continue to find economically and statistically significant effects. Models (5)-(8) repeat the specifications for completed deals only, and all of the tax variables in models (6)-(8) are somewhat more significant than in models (2)-(4). For example, in model (8) a one standard deviation increase in *Tonly_GrProReturn* is associated with a 2.4% lower value of *Relative Rank*, compared to a 1.6% lower value in model (4). Also, holding *Tonly_GrPro* at its sample median (for either completed deals or all deals depending on the case), in model (8) a higher tax rate is associated with a 9.1% lower value of *Relative Rank*, as compared to a 6.3% lower value in model (4). Hence, as in Table 4 when explaining bid premiums, we find stronger effects in deals that are actually completed.

8. Growth-oriented institutional owners and the method of payment

In Table 8 we report probit regressions in which the dependent variable is set to one if the offer consideration is at least 50% stock (and zero otherwise).[18] The main variable of interest is *Predicted Premium* (*Cash–Stock*). To construct this variable, we first

[18] Results are qualitatively similar if we limit the sample to deals with either 100% cash or at least 50% stock (i.e., if we exclude deals with stock consideration greater than 0% and less than 50%).

Table 7
Regressions explaining relative rank for stock-financed deals using *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)*.
This table reports sample-selection corrected OLS regressions explaining the bargaining split between target and acquirer acquirer shareholders in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. The target institutional ownership is decomposed into those institutions that own the target but not the acquirer. A Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The specification of the probit is the same as model (4) in this Table with the additional variable *Acq Cashflow/Tgt_Size* defined as the acquirer's cash flow (EBIDT minus interest expense minus taxes minus preferred and common dividends) divided by the market value of the target's common equity. The output from the first stage of the two-stage regression is reported in the first column of results. The dependent variable in the second stage regression is *Relative Rank*, the ratio of the percentile rank of the target firm *CAR* to the percentile rank of the target firm *CAR* plus the percentile rank of the acquirer firm *CAR*. *CAR* is the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *Tonly_GrPro* is the aggregate ownership by all growth-oriented institutions of the target that do not own acquirer shares divided by the aggregate ownership of all institutional owners of the target. *Tonly_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target but not the acquirer in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions that do not own acquirer shares. *TaxΔ* is the change in the capital gains tax rate from the baseline of 20%. *Target Return* is the target firm's return over the year prior to the merger announcement. *Tonly_Agg* is the total institutional ownership in the target by institutions that do not own acquirer shares as of the last quarter-end prior to the merger announcement divided by the total number of target shares outstanding. *Transient_Agg* is ownership by transient investors (those with relatively short holding periods) as classified in Bushee (2001) and Bushee and Noe (2000). *Log(Acquirer P/B)* is the log of the acquirer's price-to-book ratio of equity. *Log(Acquirer Scaled Size)* is the market value of the acquirer's common equity divided by the size of the equity market used in the CRSP value-weighted market index. *Log(Relative Acquirer Size)* is the log of the market value of the acquirer's equity divided by that of the target. *Acquirer Leverage* is the ratio of total debt to total assets. *Non-Diversifying* is an indicator set to one if the acquirer and target share the same three-digit SIC code. *Toehold_Dum* is a dummy variable that takes the value one if the bidder holds the target's stock as of the announcement date. *Combined Value* is the weighted average (using the prior fiscal year's total assets as weights) of the target and acquirer CARs over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Year and industry dummies are included (but not reported) and heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients, which are marginal effects.

	1st Stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tonly_GrPro	0.5558**	−0.1869***	−0.1648***	−0.1345**	−0.1222**	−0.1754***	−0.1490***	−0.1071**	−0.0912
	[0.035]	[<0.001]	[0.001]	[0.012]	[0.028]	[<0.001]	[0.002]	[0.049]	[0.121]
Tonly_GrProReturn	0.0007		−0.0405*		−0.0343*		−0.0564**		−0.0494*
	[0.996]		[0.063]		[0.095]		[0.019]		[0.064]
(Tonly_GrPro)(TaxΔ)	7.4889			−2.3827**	−2.2585**			−2.7834***	−2.5704**
	[0.138]			[0.015]	[0.024]			[0.008]	[0.022]
TaxΔ	9.1012***			−0.1591	−0.2207			−0.3192	−0.5128
	[0.006]			[0.850]	[0.797]			[0.727]	[0.603]
Target Return	−0.0852		0.0066		0.0084		0.0099		0.0110
	[0.104]		[0.426]		[0.352]		[0.269]		[0.266]
Tonly_Agg	−1.3306***	0.2675***	0.2781***	0.2940***	0.3102***	0.2779***	0.3079***	0.2925***	0.3240***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Transient_Agg	1.2820***	−0.3745***	−0.3724***	−0.4068***	−0.4114***	−0.3657***	−0.3657***	−0.3881***	−0.3916***
	[0.004]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Log(Acq P/B)	0.3230***	0.0118	0.0122	0.0057	0.0044	−0.0037	−0.0057	−0.0098	−0.0129
	[<0.001]	[0.368]	[0.384]	[0.683]	[0.770]	[0.805]	[0.725]	[0.539]	[0.472]
Log(Acq Scaled Size)	0.0782**	−0.0120*	−0.0114*	−0.0129*	−0.0129*	−0.0143*	−0.0145*	−0.0153**	−0.0160*
	[0.024]	[0.068]	[0.090]	[0.062]	[0.071]	[0.052]	[0.059]	[0.047]	[0.057]
Log(Acq Rel. Size)	−0.2931***	0.0388***	0.0391***	0.0455***	0.0470***	0.0476***	0.0510***	0.0543***	0.0585***
	[<0.001]	[0.002]	[0.003]	[0.001]	[0.001]	[0.001]	[0.001]	[<0.001]	[0.001]
Acq Leverage	−1.0082***	−0.0754	−0.0733	−0.0564	−0.0516	−0.0209	−0.0115	−0.0024	0.0083
	[<0.001]	[0.145]	[0.164]	[0.301]	[0.360]	[0.720]	[0.849]	[0.969]	[0.901]
Non-Diversifying	0.0469	−0.0317**	−0.0331**	−0.0325**	−0.0345**	−0.0336**	−0.0367**	−0.0352**	−0.0386**
	[0.559]	[0.035]	[0.029]	[0.038]	[0.031]	[0.038]	[0.027]	[0.038]	[0.034]
Toehold_Dum	−0.9033***	0.0897*	0.0882	0.1189**	0.1216**	0.0943	0.1019*	0.1200**	0.1286**
	[<0.001]	[0.091]	[0.107]	[0.031]	[0.035]	[0.111]	[0.092]	[0.048]	[0.049]
Combined value	−0.1380	−0.0610***	−0.0636***	−0.0597***	−0.0612***	−0.0768***	−0.0807***	−0.0765***	−0.0793***
	[0.149]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Acq Cashflow/Tgt_Size	−0.0142*								
	[0.060]								
Constant	0.6762	0.5466***	0.5451***	0.5695***	0.5705***	0.5506***	0.5523***	0.5683***	0.5704***
	[0.189]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Heckman's Lambda		−0.1324**	−0.1340*	−0.1791***	−0.1877**	−0.1700**	−0.1874***	−0.2110***	−0.2316***
		[0.041]	[0.053]	[0.010]	[0.012]	[0.011]	[0.009]	[0.003]	[0.003]
Observations	1881	830	830	830	830	712	712	712	712

use stock deals (50% or more of the consideration in stock) to estimate a prediction model for stock deal premiums. Specifically, to obtain a fitted value for each deal's predicted premium assuming stock financing, we use Table 4 specifications (2), (3), (6) or (7), depending on the tax variable of interest and sample used (all deals or completed deals) in the probit specification. Similarly, we obtain fitted values for predicted premiums assuming cash financing from analogous models in Table 4 (these regressions are available from the authors). For each deal in the probit regression, *Predicted Premium* (*Cash–Stock*) is then constructed as the

Table 8
Probit regressions explaining method of payment choice using *Tonly_GrProReturn and (Tonly_GrPro)(TaxΔ)*.
This table reports probit regressions explaining the choice between stock and cash mergers accounting for the difference in anticipated premiums. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, and are not regulated utilities. The probit regression binary dependent variable takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. *Predicted Premium (Cash–Stock)* is the difference in predicted premiums. The predicted premium for stock deals is the fitted value from model 2, 3, 6 or 7 in Table 4 depending on the sample, all vs. completed, and tax variable, *Tonly_GrProReturn* vs. (*Tonly_GrPro*) × (*Tax*Δ) as noted above each specification below. The predicted premium for cash deals is estimated from similar models but on the basis of cash deals. *Tonly_Agg* is the total institutional ownership in the target by institutions that do not own acquirer shares as of the last quarter-end prior to the merger announcement divided by the total number of target shares outstanding. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database. For the remaining variables, market values are measured 20 days prior to the merger announcement and accounting items are measured at the latest fiscal year-end prior to the merger announcement. *Log(Acquirer P/B)* is the log of the acquirer's price-to-book ratio of equity. *Log(Acquirer Scaled Size)* is the market value of the acquirer's common equity divided by the size of the equity market used in the CRSP value-weighted market index. *Log(Relative Acquirer Size)* is the log of the market value of the acquirer's equity divided by that of the target. *Acquirer Leverage* is the ratio of total debt to total assets. *Non-diversifying* is an indicator set to one if the acquirer and target share the same three-digit SIC code. *Toehold_Dum* is a dummy variable that takes the value one if the bidder holds the target's stock as of the announcement date. Year and industry dummies are included (but not reported) and heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	All	All	All	All	Completed	Completed	Completed	Completed
Tax variable used in predicted premium regression	*Tonly_GrProRet*	*Tonly_GrProRet*	*(Tonly_GrPro) × (TaxΔ)*	*(Tonly_GrPro) × (TaxΔ)*	*Tonly_GrProRet*	*Tonly_GrProRet*	*(Tonly_GrPro) × (TaxΔ)*	*(Tonly_GrPro) × (TaxΔ)*
Predicted Premium (Cash-Stock)	0.4506***	0.3269***	0.5654***	0.5040***	0.4511***	0.2780***	0.5826***	0.4548***
	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
Tonly_Agg		−0.0727		0.0064		−0.1107		−0.0182
		[0.504]		[0.952]		[0.350]		[0.876]
Log(Acq P/B)		0.1083***		0.0577***		0.1253***		0.0749***
		[<0.001]		[0.004]		[<0.001]		[0.001]
Log(Acq Scaled Size)		0.0181		0.0087		0.0279**		0.0180
		[0.114]		[0.440]		[0.027]		[0.146]
Log(Acq Rel. Size)		−0.0615***		−0.0197		−0.0950***		−0.0516***
		[0.001]		[0.235]		[<0.001]		[0.005]
Acq Leverage		−0.3517***		−0.2706***		−0.3643***		−0.2818***
		[<0.001]		[0.001]		[<0.001]		[0.003]
Non-Diversifying		−0.0069		−0.0473*		0.0053		−0.0381
		[0.813]		[0.095]		[0.867]		[0.222]
Toehold_Dum		−0.2587***		−0.1706***		−0.2145***		−0.1238
		[<0.001]		[0.007]		[0.007]		[0.122]
Observations	1881	1881	1881	1881	1545	1545	1545	1545
Pseudo R-squared	0.216	0.246	0.246	0.257	0.217	0.254	0.252	0.263

difference between the fitted values for cash and stock premiums. This allows us to test the model's implication, as discussed in Section 2, that the method of payment selected will take into account the premium the acquirer is expected to pay using one form of payment vs. another.

As shown in the table, *Predicted Premium* (*Cash–Stock*) is positive and highly significant in all eight models, showing that stock financing is increasingly more likely the larger the amount by which the expected cash premium exceeds the expected stock premium. The standard deviation of *Predicted Premium* (*Cash–Stock*) used in models (1) and (2) is 0.58. Hence, the coefficient of 0.4506 in model (1), which is the marginal effect, implies that a one standard deviation increase in *Predicted Premium* (*Cash–Stock*) is associated with a 26.1% higher likelihood of stock financing in absolute terms. The effect on the likelihood of stock in the other models ranges from 17.0% in model (6) to 37.8% in model (7).

To gauge the importance of tax effects, we use the premium specifications to quantify the effect of a one standard deviation increase in the variable of interest, which is either *Tonly_GrProReturn* or *(Tonly_GrPro)(TaxΔ)*, on *Predicted Premium* (*Cash–Stock*). We then quantify how the resulting change in *Predicted Premium* (*Cash–Stock*) affects the likelihood of stock financing. In model (1) of Table 8, this calculation implies that a one standard deviation increase in *Tonly_GrProReturn* is associated with a 4.8% higher likelihood of stock financing in absolute terms. In model (2) we add the various control variables in our study and the result is qualitatively similar, with a one standard deviation increase in *Tonly_GrProReturn* associated with a 3.5% higher likelihood of stock financing. Model (3) uses *(Tonly_GrPro)(TaxΔ)* and *TaxΔ*, and holding *Tonly_GrPro* constant at its sample median, the effect is much stronger–a higher tax rate is associated with a 31.1% higher likelihood of stock. In model (4), the increase in the likelihood of stock is 27.7%. Models (5)–(8) repeat the analysis using completed deals, and as in our earlier results, the effects in models (5) – (8) are 6.9%, 4.3%, 33.7%, and 26.3%, respectively.

9. Exploring a monitoring channel

Thus far our results show that target-shareholder investment preferences and tax liabilities impact the method of payment choice, as well as premiums in stock deals. Gaspar et al. (2005) also study how the shareholder base impacts the merger process, and find that premiums are lower when a larger portion of target shareholders tend to have short-term investment strategies. They argue such investors are likely to exert less monitoring effort. This result parallels Chen et al. (2007), who study acquirers and find that long-term institutional investors positively affect post-merger acquirer performance, and increase the chances that bad bids are withdrawn. These papers raise the possibility that some of our results may be explained, at least to some extent, by the variation in the degree of target-shareholder monitoring for the deals in our sample. We investigate this issue next.

Given the papers noted above, we begin by characterizing the target shareholder base according to its long- or short-term investment style. In Panel A of Table 9 we present step-wise regressions that use the *Tonly* versions of the tax variables, *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)*. For results using *All_GrProReturn* and *(All_GrPro)(TaxΔ)* see the Online Appendix. The variables we introduce, one at a time, are *Transient_Agg* (which we note is always included in the earlier tables) and *Dedicated_Agg*, which is the portion of investors classified as having long-term investment styles according to Bushee (2001) and Bushee and Noe (2000). Our goal is to see whether these variables are significant, and also observe how the tax-variable results are affected by their inclusion. We use the same empirical methodology as in Table 4, with the first stage estimated separately for each model in order to also include the appropriate *Transient_Agg* and *Dedicated_Agg* variables (we do not report the first stages for brevity).

Model (1) of Panel A presents a baseline regression without either of the investor-horizon variables.[19] In model (2) we add *Transient_Agg* and find it is negative and significant (this specification is the same regression reported in model (4) of Table 4). As noted earlier in the paper, this shows that premiums are smaller when investors have shorter-term investment horizons. Of note, the economic and statistical significance of *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)* is not materially affected. In model (3) we replace *Transient_Agg* with *Dedicated_Agg* and find it is positive and significant as one would expect. Again, the tax-related variables are little affected, as is also the case in model (4) which includes both *Transient_Agg* with *Dedicated_Agg*. When both are included we note that only the former is significant. Models (5)–(8) repeat the analysis for completed deals, and results are similar except that we do not find that *Dedicated_Agg* is significant in any model. Overall, we conclude that consistent with prior literature, shareholder monitoring (to the extent measured by investor horizon) affects deal outcomes. However, the tax results in our analysis do not appear to be explained by active monitoring and hence are more likely due to managers responding to incentives they already have to take capital gains tax liabilities and investment preferences into account in deal negotiations.

Another potential monitoring variable is the acquirer's return over the year preceding the deal. If the acquirer stock price has risen dramatically, target shareholders may perceive the stock as overvalued and demand a higher premium in return (this presumes that such overvaluation has not yet dissipated by the time we measure bid premiums). So, in Panel B we report a similar piecewise analysis using *Acquirer Return*, and also try including and excluding the log of the acquirer's price-to-book ratio, *Log(Acq P/B)*, a related variable sometimes interpreted as useful in measuring overvaluation. Only the acquirer's price-to-book ratio is significant, but its sign is negative which is inconsistent with stronger shareholder monitoring when the acquirer's stock has a high valuation. Instead, it appears that the ability of *acquirers* to negotiate a better deal is positively related to its price-to-book ratio. Comparing the coefficient magnitudes and statistical significances of the tax variables across the eight models, our main results are not materially affected by the inclusion or exclusion of the variables related to the acquirer's recent stock return or valuation.

We conclude that our main results on how shareholder investment preferences and capital gains liabilities affect the merger process are not due to these factors influencing how aggressively they monitor target management.

[19] We include all of the control variables as in Table 4, but do not report them here for brevity.

Table 9
Institutional monitoring, acquirer valuation, and capital gains using *Tonly_GrProReturn* and *(Tonly_GrPro)(TaxΔ)*.
This table reports sample-selection corrected OLS regressions explaining the premium in stock-financed deals. The sample consists of 1881 mergers announced during 1981–2006 for which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ, are not in the financial services industry, are not regulated utilities, and for which stock comprises at least 50% of the consideration. *Panel A* investigates the role of institutional monitoring of the target by examining the extent to which institutions are relatively short-term or long-term investors. *Transient_Agg* is ownership by transient investors (those with relatively short holding periods) as classified in Bushee (2001) and Bushee and Noe (2000). *Dedicated_Agg* is ownership by dedicated investors (those with relatively long holding periods) as classified in Bushee (2001) and Bushee and Noe (2000). *Panel B* investigates the role acquirer valuation. *Log(Acquirer P/B)* is the log of the acquirer's price-to-book ratio of equity. *Acquirer Return* is the acquirer firm's return over the year prior to the merger announcement. In both panels a Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an OLS regression corrected for sample-selection (i.e. payment method choice). The dependent variable in the first-stage probit specification takes the value one if the deal consideration (proposed or completed) comprises more than 50% stock. The specification of the probit is the same as the corresponding model in this Table with the additional variable *Acq Cashflow/Tgt_Size* defined as the acquirer's cash flow (EBIDT minus interest expense minus taxes minus preferred and common dividends) divided by the market value of the target's common equity. The dependent variable in the second-stage OLS regressions below is *Premium*, the cumulative abnormal return over days −63 to +126 around the merger announcement using a market model estimated with the CRSP value-weighted market return over days −318 to −64. Institutional ownership is measured at the latest quarter-end prior to the merger announcement using the CDA/Spectrum 13F database, and institutional style preference (growth vs. value) is according to Abarbanell et al. (2003). *Tonly_GrPro* is the aggregate ownership by all growth-oriented institutions of the target that do not own acquirer shares divided by the aggregate ownership of all institutional owners of the target in the quarter preceding the merger announcement. *Tonly_GrProReturn* is the average holding period return of all growth-oriented institutions invested in the target but not the acquirer in the quarter before the merger announcement interacted with the proportion of the target held by growth-oriented institutions that do not own acquirer shares. *TaxΔ* is the change in the capital gains tax rate from the baseline of 20%. The regressions in *Panel A* also include control variables *Target Return*, *Tonly_Agg*, *Acq CAR(−1,+1)*, *Log(Acquirer P/B)*, *Log(Acquirer Scaled Size)*, *Log(Relative Acquirer Size)*, *Acquirer Leverage*, *Non-Diversifying*, *Toehold_Dum*, year and industry dummies which we do not report below for brevity. The regressions in *Panel B* also include control variables *Target Return*, *Tonly_Agg*, *Transient_Agg*, *Acq CAR(−1,+1)*, *Log(Acquirer Scaled Size)*, *Log(Relative Acquirer Size)*, *Acquirer Leverage*, *Non-Diversifying*, *Toehold_Dum*, year and industry dummies which we do not report below for brevity. See Table 4 for all control variable definitions. The statistical significance of *Heckman's Lambda* implies that sample selection is relevant. Heteroskedasticity-adjusted *p*-values are in parentheses beneath coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Deals:	All	All	All	All	Completed	Completed	Completed	Completed
Panel A: Transient & dedicated investors								
Tonly_GrPro	−0.1875	−0.2685*	−0.1728	−0.2580*	−0.1039	−0.1679	−0.0953	−0.1646
	[0.199]	[0.069]	[0.236]	[0.081]	[0.493]	[0.262]	[0.529]	[0.272]
Tonly_GrProReturn	−0.2207***	−0.2109***	−0.2165***	−0.2094***	−0.2569***	−0.2439***	−0.2545***	−0.2435***
	[0.001]	[0.001]	[0.001]	[0.001]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
(Tonly_GrPro)(TaxΔ)	−6.4038**	−7.1719**	−6.4880**	−7.1998***	−7.7554***	−8.1859***	−7.8746***	−8.2135***
	[0.020]	[0.010]	[0.018]	[0.010]	[0.009]	[0.005]	[0.008]	[0.005]
Transient_Agg		−1.2796***		−1.2256***		−1.0706***		−1.0537***
		[<0.001]		[<0.001]		[<0.001]		[<0.001]
Dedicated_Agg			0.6028**	0.2948			0.3589	0.0927
			[0.026]	[0.285]			[0.201]	[0.742]
TaxΔ	−0.7986	−0.0744	−1.8285	−0.6328	−1.1501	−0.2885	−1.7688	−0.4674
	[0.731]	[0.974]	[0.447]	[0.789]	[0.647]	[0.906]	[0.493]	[0.852]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.4675***	−0.5210***	−0.4650***	−0.5217***	−0.5674***	−0.5544***	−0.5632***	−0.5544***
	[0.007]	[0.002]	[0.007]	[0.002]	[0.001]	[0.001]	[0.002]	[0.001]
Observations	830	830	830	830	712	712	712	712
Panel B: Acquirer valuation								
Tonly_GrPro	−0.3078**	−0.2685*	−0.2943**	−0.2870*	−0.2027	−0.1679	−0.2026	−0.1924
	[0.043]	[0.069]	[0.044]	[0.052]	[0.178]	[0.262]	[0.160]	[0.199]
Tonly_GrProReturn	−0.2299***	−0.2109***	−0.2123***	−0.1980***	−0.2593***	−0.2439***	−0.2480***	−0.2387***
	[0.001]	[0.001]	[0.001]	[0.002]	[<0.001]	[<0.001]	[<0.001]	[<0.001]
(Tonly_GrPro)(TaxΔ)	−7.4138***	−7.1719**	−6.9145**	−6.9783**	−8.1719***	−8.1859***	−7.5137***	−7.9051***
	[0.010]	[0.010]	[0.011]	[0.011]	[0.006]	[0.005]	[0.007]	[0.006]
Log(Acq P/B)		−0.1079***		−0.1091***		−0.1112***		−0.1125***
		[0.002]		[0.001]		[0.005]		[0.002]
Acquirer Return			−0.0287	−0.0039			−0.0369	−0.0245
			[0.295]	[0.882]			[0.201]	[0.393]
TaxΔ	−0.3368	−0.0744	0.3747	0.0524	−0.2764	−0.2885	0.8339	−0.0788
	[0.887]	[0.974]	[0.865]	[0.981]	[0.913]	[0.906]	[0.714]	[0.973]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Heckman's Lambda	−0.5599***	−0.5210***	−0.4663***	−0.5122***	−0.5422***	−0.5544***	−0.4185***	−0.5482***
	[0.003]	[0.002]	[0.004]	[0.001]	[0.005]	[0.001]	[0.008]	[0.001]
Observations	830	830	830	830	712	712	712	712

10. Conclusion

We investigate the role of target shareholder preferences and tax liabilities on the merger process. The simple model we present predicts that payment in stock is more likely when target-share capital gains tax liabilities are larger and the acquirer's stock more closely matches the investment preferences of target shareholders. Moreover, premiums in stock deals will be jointly decreasing in capital gains tax liabilities and the extent to which the acquirer's stock matches target-shareholder investment preferences.

In our empirical analysis, we focus on the style preferences (growth vs. value) of institutional shareholders of the target firm to proxy for the investment style preferences of the broader shareholder base. Prior literature, as well as our own evidence, supports the notion that acquirers making stock-financed bids are more likely regarded as growth firms compared to those making cash-financed bids. Hence, for stock deals we expect that premiums will be negatively related to the magnitude of the capital gains tax liabilities and target-share ownership by growth-oriented institutions. We also expect stock financing to be more likely than cash financing when a greater portion of the target is owned by such institutions and there are more significant capital gains tax liabilities.

To test these predictions, we examine 1881 completed and failed deals over the 1981–2006 period. We find that for stock-financed deals, a one-standard deviation increase in our measure of capital gains for growth-oriented shareholders is associated with an 8% lower bid premium in absolute terms, and hence acquirers capturing a larger portion of the merger gains on the table. This result is robust to including a wide variety of control variables and controlling for the endogeneity of the method of payment choice. Moreover, these results are stronger if we redefine institutional ownership on the basis of which institutions are more likely to care about capital gains tax liabilities (mutual funds and investment advisors), or when the acquirer firm's valuation makes it particularly likely to be considered a growth firm. We also find that when a stock bid is expected to be lower due to capital gains tax liabilities and institutional shareholder preferences for growth stock, payment in stock is significantly more likely.

Our findings have important implications for the efficiency of the overall merger process. The results indicate, for instance, that acquirers can benefit by making stock offers when target shareholders face substantial capital gains tax liabilities. These lower acquisition costs could enhance social welfare by facilitating value creating mergers. However, tax effects may also affect which targets are chosen, which implies that some mergers may take place that are less desirable than others from a social welfare perspective.

The results in our study also have implications for capital gains tax policy in the context of the market for corporate control. In particular, consider a sustained period of strong stock market performance. The prior literature finds that stock-financed acquisitions are more prevalent in such an environment, possibly due to firms with overvalued equity using their stock for acquisitions. Although firms could issue new stock to raise cash for acquisitions and other purposes, they may instead find it advantageous to make stock-financed acquisitions due to the tax deferral benefit that stock-for-stock mergers bring. This effect is stronger when potential target firms have had stronger stock price performance because this increases the capital gains tax liabilities that target shareholders face. Thus, higher capital gains tax rates, which further increase capital gains tax liabilities, may exacerbate the incidence of firms with overvalued equity making value-destroying acquisitions, particularly during bull markets.

Appendix A. Illustrative example

This illustrative example incorporates variation in target-shareholder capital gains tax liabilities based on the two capital gains tax rates observed during our sample period, 20% and 28%. Panel A shows a baseline case in which the target and acquirer agree to a cash bid of $120 for each share of target stock. Panel B investigates when the target investor finds the acquirer stock undesirable from an investment standpoint ($\lambda = 0$) and hence immediately liquidates the acquirer shares received. Panel C investigates when the target investor finds the acquirer stock the most desirable from ($\lambda = 1$) and expects to retain the shares indefinitely.

Target investor's cost basis per share	$60
Pre-offer target share price	$100
Acquirer share price	$40

	Capital gains tax rate	
	20%	28%
Panel A: Cash offer of $120 per target share (baseline case)		
(i) Cash bid price per target share	$120.00	$120.00
(ii) Cost to acquiring firm per target share = pre-tax value to target shareholder: (i)	$120.00	$120.00
(iii) Target shareholder tax liability: [(i) – cost basis of $60] [t]	$12.00	$16.80
(iv) Target shareholder after-tax wealth: (ii) – (iii)	$108.00	$103.20
(v) Measured bid premium: (ii) – pre-offer target share price of $100	$20.00	$20.00
Panel B: Stock offer, assuming target shareholder immediately sells acquirer shares received (poor investment fit, $\lambda = 0$)		
(i) Exchange ratio (acquirer shares per target share)	3.00	3.00
(ii) Cost to acquiring firm per target share = pre-tax value to target shareholder: (i) × acquirer stock price	$120.00	$120.00
(iii) Target shareholder capital gains tax: [(ii) – cost basis of $60] [t]	$12.00	$16.80
(iv) Target shareholder after-tax wealth: (ii) – (iii)	$108.00	$103.20
(v) Measured bid premium: (ii) – pre-offer target share price of $100	$20.00	$20.00
Panel C: Stock offer, assuming target shareholder indefinitely retains acquirer shares received (good investment fit, $\lambda = 1$)		
(i) Exchange ratio (acquirer shares per target share)	2.70	2.58
(ii) Cost to acquiring firm per target share = pre-tax value to target shareholder: (i) × acquirer stock price	$108.00	$103.20
(iii) Target shareholder capital gains tax: $0 (indefinite retention of acquirer shares)	$0.00	$0.00
(iv) Target shareholder after-tax wealth: (ii) – (iii)	$108.00	$103.20
(v) Measured bid premium: (ii) – pre-offer target share price of $100	$8.00	$3.20

Appendix B. Data definitions

Institutional style variables

All_Agg: (All Aggregate) – the common stock ownership of all institutional owners of the target divided by the total number of target shares outstanding, measured at the last quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database.

All_GrPro: (All Growth Proportion) – the common stock ownership of all growth-oriented institutional owners of the target divided by the total number of target shares owned by all institutions, measured at the latest quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database, and the growth-oriented classification is based on Abarbanell et al. (2003).

Dedicated_Agg: (Dedicated Aggregate) – the common stock ownership of all institutional owners of the target classified as dedicated (those with relatively long holding periods) divided by the total number of target shares outstanding, measured at the last quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database, and the dedicated classification is based on Bushee (2001) and Bushee and Noe (2000).

Tonly_Agg: (Target Only Aggregate) – the common stock ownership of all institutional owners of the target that do not own acquirer shares divided by the total number of target shares outstanding, measured at the latest quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database.

Tonly_GrPro: (Target Only Growth Proportion) – the common stock ownership of all growth-oriented institutional owners of the target that do not own acquirer stock divided by the total number of target shares owned by all institutions, measured at the latest quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database, and the growth-oriented classification is based on Abarbanell et al. (2003).

Transient_Agg: (Transient Aggregate) – the common stock ownership of all institutional owners of the target classified as transient (those with relatively short holding periods) divided by the total number of target shares outstanding, measured at the last quarter-end prior to the merger announcement. Institutional ownership data is based on that reported in the CDA/Spectrum 13F database, and the transient classification is based on Bushee (2001) and Bushee and Noe (2000).

Capital gains tax liability variables

All_AggReturn: (All Aggregate Return) – the average holding period return of all institutions invested in the target as at the quarter before the merger announcement. For each institution invested in the target in the quarter before the merger announcement, we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the holdings data, we assume the institution's initial investment in the target is made in the middle of a quarter and calculate the institution's target-stock pre-announcement holding period return.

All_GrProReturn: (All Growth Proportion Return) – for each growth-oriented institution invested in the target in the quarter before the announcement date, we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the CDA/Spectrum 13F data, we assume the institution's initial investment is made in the middle of the quarter and then calculate the institution's target-stock pre-announcement holding period return. We then calculate the average holding period return and interact this average with the proportion of the target held by growth-oriented institutions (*All_GrPro*).

*Tax*Δ (Tax Delta) – the change in the capital gains tax rate from the baseline of 20%. This variable takes the value 8% during the years 1989–1996 and zero otherwise.

Tax Rate: The capital gains tax rate in effect.

Tonly_AggReturn: (Target Only Aggregate Return) – the average holding period return of all institutions invested in the target that do not own acquirer stock as at the quarter before the merger announcement. For each institution invested in the target but not the acquirer in the quarter before the merger announcement, we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the holdings data, we assume the institution's initial investment in the target is made in the middle of a quarter and calculate the institution's target-stock pre-announcement holding period return.

Tonly_GrProReturn: (Target Only Growth Proportion Return) – for each growth-oriented institution invested in the target but not the acquirer in the quarter before the announcement date, we compute the number of consecutive quarters the institution has owned the target. Given the quarterly nature of the CDA/Spectrum 13F data, we assume the institution's initial investment is made in the middle of the quarter and then calculate the institution's target-stock pre-announcement holding period return. We then calculate the average holding period return and interact this average with the proportion of the target held by target-invested-only growth-oriented institutions (*Tonly_GrPro*).

Merger variables

Acq CAR(−1,+1): The acquirer's announcement-period cumulative abnormal return (CAR), computed for the three-day period around the merger announcement date (day 0) using a market model (estimated over 250 to 20 trading days prior to merger announcement date using the CRSP value-weighted index for the market return).

Acq Cashflow/Tgt_Size: The acquirer's cash flow divided by the target's size. Cashflow (as defined in Martin (1996)) is computed as EBIDT − INTEREST − TAX − DIV where EBIDT equals earnings before interest, depreciation, and taxes, INTEREST equals interest

expense, TAX equals income tax expense plus (minus) the decrease (increase) in the deferred tax liability, and DIV equals common and preferred stock dividends. Target size is the market value of common equity of the target measured 20 trading days prior to the merger announcement.

Acq Leverage: The acquirer's total debt divided by total assets, computed at the latest fiscal year end prior to the merger announcement date.

Acquirer MA/BA: The market-to-book ratio of assets of the acquirer, which is the ratio of the market value of equity plus the book value of liabilities to the book value of assets. Book value of assets is defined as total assets and book value of liabilities is defined as total liabilities, measured at the latest fiscal year end prior to the merger announcement. Market value of equity is from CRSP and is measured 20 trading days prior to the merger announcement date. MA/BA is winsorized at the 1% and 99% levels.

Acquirer P/B: The acquirer's price-to-book ratio of equity, which is the ratio of the market value of equity to the book value of equity. Market value of equity is measured 20 trading days prior to the merger announcement date, and book equity is measured at the end of the latest fiscal year prior to the merger announcement date. When a firm has negative book value, following Dong et al. (2006), we assign the maximum value of P/B in the sample (after winsorizing P/B at 1% and 99%).

Acq Rel. Size: Market value of common equity of the acquirer divided by the market value of common equity of the target, both taken from CRSP, measured 20 trading days prior to the merger announcement date.

Acquirer Size: The market value of common equity of the acquirer measured 20 trading days prior to the merger announcement date.

Acquirer Return: the acquirer firm's return over the year prior to the merger announcement.

Acquirer Scaled Size: Market value of the acquirer's common equity according to CRSP, measured 20 trading days prior to the merger announcement date, divided by size of the equity market as measured by the market value (in millions) of all securities used in the value-weighted index on CRSP.

Combined Value: The weighted average cumulative abnormal return of the target and acquirer firms measured over trading days −63 to +126 relative to the merger announcement date using a market model (estimated over 318 to 64 trading days prior to the merger announcement date using the CRSP value-weighted index for the market return).

Non-Diversifying: An indicator variable set to one if the acquirer and target share the same three-digit SIC code.

Predicted Premium (Cash–Stock): The difference in predicted premiums. The predicted premium for stock deals is the fitted value from model 2, 3, 6 or 7 in Table 4 depending on the sample (all vs. completed) and tax variable (Tonly_GrProReturn vs. TaxΔ). The predicted premium for cash deals is estimated from similar models but on the basis of cash deals.

Premium: The target firm's cumulative abnormal return (CAR) over trading days −63 to −126 relative to the merger announcement date, using a market model (estimated over −318 to −64 trading days prior to the merger announcement using the CRSP value-weighted index for the market return).

Relative Rank: The ratio of the percentile rank of the target CAR to the sum of the percentile rank of the target CAR and the percentile rank of the acquirer CAR where both CARs are measured over trading days −63 to +126 relative the merger announcement date.

Target Return: The target firm's return over the year prior to the merger announcement.

Target Size: The market value of common equity of the target measured 20 trading days prior to the merger announcement date.

Appendix C. Supplementary data

Supplementary data to this article can be found online at doi:10.1016/j.jempfin.2012.03.005.

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