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Corporate financing decisions when investors take the path of least resistance

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Abstract

We argue that inertial behavior on the part of investors can have significant consequences for corporate financial policy. One implication of investor inertia is that it improves the terms for the acquiring firm in a stock-for-stock merger, because acquirer shares are placed in the hands of investors, who, independent of their beliefs, do not resell these shares on the open market. In the presence of a downward-sloping demand curve, this leads to a reduction in price pressure and, hence, to cheaper equity financing. We develop a simple model to illustrate this idea and present supporting empirical evidence.

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1. Introduction

Much of finance theory rests on the assumption that investors continuously monitor their portfolios and condition their investment decisions on the most recently available information. Even in models with transaction costs (e.g., Constantinides, 1986) or behavioral biases (e.g., Barberis, Shleifer and Vishny, 1998, Daniel, Hirshleifer, and Subrahmanyam, 1998, and Hong and Stein, 1999), where trade need not be continuous and updating need not be fully rational, investors still can be thought of as processing new information and reevaluating the decision of whether or not to trade on a constant basis.

While this assumption is convenient for modeling purposes, it is also unrealistic. A large body of existing evidence suggests that people often behave in a way that might be characterized as inertial, or as taking the path of least resistance. Inertial behavior can arise from a variety of sources, including endowment effects (Thaler, 1980, Kahneman, Knetsch, and Thaler, 1990, 1991), a tendency to procrastinate in decision making (Akerlof, 1991, O'Donoghue and Rabin, 1999), and the cognitive fixed costs associated with reevaluating and re-optimizing an existing portfolio.

In this paper, we argue that investor inertia can exert a significant influence on financial market outcomes. Our particular focus is on the consequences of inertia for mergers, and the main idea can be illustrated with a simple example. Consider a firm *A* that intends to acquire another firm *T* via a stock-for-stock merger, and suppose that the following two conditions hold. First, there is a downward-sloping demand curve for firm *A*'s shares. This downward-sloping demand curve arises not from asymmetric information, but from irreducible differences of opinion among investors as to the value of *A*'s preexisting assets. Second, and crucially, some

investors in the target firm *T* are inertial in the following sense: They will not make the active decision to buy shares in *A* in, say, a seasoned equity offering (SEO). But, if they are granted these shares in a stock-for-stock merger, they will also not make the active decision to sell them.

Under these conditions, an increase in the fraction of inertial investors makes the stock-for-stock merger more attractive to firm *A*. Greater target-firm inertia means that more firm *A* shares are simply absorbed by the current *T* investors and thus are not ever floated on the open market. With a downward-sloping demand curve for firm *A* shares, this implies a smaller negative price impact, which means that firm *A* does not have to give up as many new shares in the merger. Said differently, a stock-for-stock merger changes the default setting for inertial *T* investors relative to an SEO. It makes the default one in which they are holders of *A* shares, which can be thought of as pushing out the overall demand curve for firm *A* stock.[1]

After fleshing out our idea with the aid of a simple model in Section 2, we examine some of its empirical implications in Section 3. We begin by verifying that our premise of investor inertia is relevant in the context of mergers. Using data on both individuals and institutions, we look at investors' propensity to hold on to shares that they are granted in stock-for-stock mergers. We focus on situations in which a given investor in the target owns none of the acquirer before the deal, so that it can be inferred that he does not have a high valuation for the acquirer. (The conceptually cleanest case is one in which the acquirer is very large relative to the target, so the post-merger combined company is composed almost entirely of acquirer-firm assets.) Even so, target investors have a remarkably high likelihood of owning acquirer shares after the merger

[1] Madrian and Shea (2001) and Choi, Laibson, Madrian, and Metrick (2002, 2004) demonstrate just how powerful the effect of defaults can be in the context of retirement savings decisions. To take just one example, when firms set the default in their 401(k) plans to automatic enrollment, few workers choose to opt out, resulting in participation rates close to 100%. In contrast, if the default is no enrollment, so that a worker has to make an active decision to participate in the plan, participation rates are generally much lower. In a related corporate finance paper, Zhang (2004) argues that the endowment effect can explain initial public offering underpricing.

transaction closes. We estimate that roughly 80% of individuals behave as sleepers, and simply accept shares they are given in a merger. For institutions, the estimated fraction of sleepers is significantly smaller, at around 30%, but still noteworthy.

Next, we test one of the theory's central predictions. Given that institutional investors are less prone to inertia than individuals, our model implies that the announcement return to the acquirer in a stock-for-stock deal is more negative, all else equal, if the target firm has a higher proportion of institutional shareholders. This is because institutions are expected to dump more of the acquirer-firm shares they receive back onto the market. Individuals, by contrast, tend to hang on to these shares, thereby mitigating price impact. Using a variety of specifications, we find robust evidence for this hypothesis. We also provide another clue that these return effects are the result of price pressure, as our model suggests: The acquirer has more trading volume around the announcement date when the target has a higher proportion of institutional shareholders.

To rule out alternative explanations, we verify some finer predictions of the model. Both acquirer return and volume effects are largest when the overlap between target and acquirer institutional ownership is small. Intuitively, non-overlapping owners of the target are the ones most likely to unload their shares on announcement of a merger, as they have demonstrated a lack of interest in holding acquirer assets. The results are also stronger when various proxies suggest that the acquirer's demand curve is steep. Finally, we show that, consistent with our model, each of the above results is present only in stock-swap mergers, and not in cash deals.

On a more speculative note, in Section 4 we make two empirical connections between our theory and corporate financing decisions. The first has to do with the means of payment in a merger. In a more general version of the model, acquiring firms prefer to use stock as opposed to

cash as consideration when the inertia of target shareholders is high. Consistent with this prediction, we find a negative relationship between target institutional ownership and the probability that a merger is conducted with stock. Like our other results, this effect is most pronounced when the overlap between target and acquirer institutional ownership is small.

A second connection is with recent empirical work by Fama and French (2005). They show that, although SEOs are relatively rare, total external equity financing (which, in addition to SEOs, can come in the form of stock-for-stock mergers or stock-based employee compensation) is substantial for most classes of firms. For example, over the period from 1999 through 2001, Fama and French find that Standard & Poor's (S&P) 100 firms raised an annual average of only 0.09% of assets via SEOs, but 1.05% via various forms of stock-based compensation and 3.68% via mergers. In other words, the volume of equity finance raised in mergers by these large firms was roughly 40 times that raised in SEOs.

As Fama and French (2005) point out, these stylized facts are not easily reconciled with standard corporate finance theories, such as the asymmetric information-based approach of Myers and Majluf (1984). Myers and Majluf have a good story for the relative scarcity of SEOs taken in isolation, but they have little to say about why mergers would be a dominant substitute. A direct application of Myers and Majluf logic would seem to imply that stock-for-stock mergers face the same asymmetric-information problems as SEOs.

In contrast, our theory suggests an affirmative rationale for the primacy of stock-for-stock mergers as compared with SEOs.[2] To be specific, imagine a firm with an exogenously specified

[2] Our basic line of reasoning suggests that stock-based employee compensation could also be preferred to SEOs. If workers are subject to an endowment effect (so that, once granted stock, they are reluctant to sell it, even if they would not have gone out and bought it on their own in the first place), a firm facing a downward-sloping demand curve prefers to place stock with them than to sell it on the open market. This observation could help to resolve the puzzle of why firms give stock to low-level employees, when incentive effects are likely to be minimal. See, e.g., Bergman and Jenter (2006) and Oyer (2004).

growth strategy that, over the next year, involves one acquisition, and one major new greenfield investment (e.g., construction of a new plant). Suppose further that, because of optimal capital-structure considerations, one of these two transactions needs to be financed with an equity issue; i.e., either the merger has to be stock-for-stock or the greenfield investment has to be accompanied by an SEO. Which outcome is more likely? Because the SEO effectively amounts to a limiting case of our model with no investor inertia, it is associated with a more negative price impact, all else equal, and hence tends to be less attractive. Thus we would expect the firm to finance the merger with a stock swap, but to finance the greenfield investment with cash. This is an outcome very much in the spirit of Fama and French (2005).

2. The model

2.1. Investor beliefs

The model has three dates, labeled 0, 1, and 2. The focus is on the behavior of a potential acquirer firm *A*, which is faced with an investment decision at time 1. As of time 0, however, the prospect of investment is unanticipated by the market, so *A*'s stock is priced solely on the basis of cash flows from assets already in place. These assets in place yield a liquidating dividend of *D* at time 2.

Our first assumption is that there are differences of opinion among investors in firm *A* as to the expected value of *D*. In particular, there is a continuum of *A*-specialists who have values of $E(D)$ uniformly distributed on the interval $[F, F + H]$, where the parameter H can be interpreted as a measure of the divergence of opinion. And while they are risk-neutral, the *A*-specialists are

constrained to not invest more than their total wealth of W. To ensure the existence of interior solutions in what follows, we stipulate that $W > F$. Finally, maintaining a short position over the interval from time 0 to time 2 is assumed to be impossible.[3] Taken together, these assumptions have the effect of creating a downward-sloping demand curve for firm A assets. However, we should emphasize that any set of assumptions that produces downward-sloping demand is sufficient for our purposes.[4] For example, we could alternatively allow short-selling but make all investors risk-averse.

Given the demand curve, the market value of the firm at time 0, P_0, is determined by setting P_0 equal to the total wealth of those A-specialists with valuations in excess of P_0. In other words, the value of the firm is equal to the wealth of those investors who are buyers in equilibrium. This condition is equivalent to

$$P_0 = \frac{W}{H}\left(F + H - P_0\right), \text{ or } P_0 = (F + H)\frac{W}{W+H}. \quad (1)$$

From Eq. (1), along with our assumption that $W > F$, it follows that P_0 always lies between F and $(F + H)$. The fraction of investors who are long the stock in equilibrium is given by $\frac{F+H}{W+H}$. Also, we have the intuitive properties that $\frac{dP_0}{dW} > 0$ and $\frac{dP_0}{dH} > 0$. The latter is just a version of the Miller (1977) insight that, in the presence of a short-sales constraint, prices are increasing in the heterogeneity of investor opinion. To see the import of the downward-sloping demand curve, observe that $\frac{dP_0}{dF} = \frac{W}{W+H} < 1$. This means that, if W is held constant, the firm's market value does not go up one-for-one with an increase in expected cash flows. The intuition is

[3] Miller (1977) was the first to model the combined effects of differences of opinion and short-sales constraints. Recent treatments include Chen, Hong, and Stein (2002), Scheinkman and Xiong (2003), and Hong, Scheinkman, and Xiong (2006).

[4] The empirical literature provides clear support for the premise of downward-sloping demand. Bagwell (1992) and Hodrick (1999) look at demand curves in the context of Dutch auction share repurchases. Shleifer (1986), Harris and Gurel (1986), and more recently Kaul, Mehrotra, and Morck (2000), Wurgler and Zhuravskaya (2002), and Greenwood (2005) illustrate the price impact of uninformed demand, by examining index inclusion and rebalancing decisions. Mitchell, Pulvino, and Stafford (2004) focus on price pressure in the context of mergers and acquisitions.

that, as the firm gets larger, shares must be absorbed by investors who are less optimistic. Moreover, $\frac{d^2P_0}{dFdH} < 0$, so that an increase in heterogeneity amplifies the downward slope of the demand curve.

Example: *Suppose F = 100, H = 100, and W = 300. Then firm A has a market value of* $P_0 = 150$ *at time 0. The more optimistic half of the A-specialists (those with valuations between 150 and 200) own all the shares, while the remaining half of the A-specialists (those with valuations between 100 and 150) sit out of the market.*

2.2. Stock-for-stock merger when all target shareholders are awake

At time 1, the manager of firm *A* announces that he has decided to acquire a target firm *T* and to finance the acquisition with an equity issue. The purchase price of the target is *K*, and the merger increases firm *A*'s terminal dividend by $R > K$, which implies that the merger is positive-NPV (net present value) for firm *A*.[5] For simplicity, we assume there is no disagreement among the *A*-specialists as to the value added by the acquisition, so that once it is on the books, their expectations of terminal cash flow are uniformly distributed on the interval $[F + R, F + R + H]$.

We assume that none of the target shareholders is among the group of *A*-specialists. That is, as of time 0, their expectations of firm *A*'s terminal dividend are relatively low. Without loss of generality one can think of all of them as simply having $E(D) = F$. Empirically, this implies

[5] Although we assume that the *A*-manager is interested in the merger simply because it represents a positive-NPV investment, our results would be similar if instead we assumed that the *A*-manager was motivated by either a desire to increase the size of his empire or a belief that his stock was overvalued, as in Stein (1996) or Shleifer and Vishny (2003), for example.

that, prior to the merger announcement at time 1, there is no overlap between the investors in firms *A* and *T*. Nothing substantive changes if we allow for partial overlap.

In a stock-for-stock merger, shares in the newly created merged firm *M* are placed directly into the hands of firm *T*'s investors. Based on their pessimism about the prospects for firm *A*'s preexisting assets, these *T*-investors also have low valuations of *M* [they consider it to be worth only $(F + R)$] as compared with the pool of *A*-specialists, whose valuations of *M* all exceed $(F + R)$. Thus one might expect that the *T*-investors would immediately take any shares in *M* that they receive in a stock-for-stock exchange and sell them off in the open market, where these shares would have to be absorbed by *A*-specialists.

This logic is correct, if all *T*-investors are aware of the merger and actively respond to it in a fashion consistent with their low valuations. In this case, the stock-for-stock merger is identical to the following decoupled transaction: Shares in the merged firm *M* are sold off in an SEO (and bought by *A*-specialists) and the proceeds of this SEO are used to pay the *T*-investors in cash for their shares. In either case, the absence of inertia implies that any shares in *M* must ultimately wind up in the hands of those with the highest valuations for *M*, and the *T*-investors are not among this group.

To finance the merger, new shares must be issued to raise an amount *K*. For the case in which all *T*-investors are responsive, denote the post-merger market value of the firm at time 1 by P_1^R. Any *A*-specialists who were long at time 0 cannot participate in the new issue, because they already have all of their wealth invested in firm *A* shares. Thus the new shares must be absorbed by those *A*-specialists who were previously on the sidelines. This group has total

wealth of $(W - P_0)$, and has valuations distributed uniformly on the interval $[F + R, P_0 + R]$.[6] Because the market value of the shares they absorb must equal K, equilibrium requires that

$$K = \frac{W - P_0}{P_0 - F}\left(P_0 + R - P_1^R\right), \tag{2}$$

which can be rewritten as

$$P_1^R = P_0 + R - \frac{H}{W}K\,. \tag{3}$$

P_1^R is necessarily less than $P_0 + R$: The market value does not go up by the full amount of the added cash flows R from the firm-T assets. In other words, the equity issue has a price-pressure effect, the magnitude of which is increasing in the heterogeneity parameter H. This reflects the fact that the issue must be absorbed by the relatively less optimistic A-specialists, who were sitting out of the market prior to the issue.

Example (continued): *Keep $F = 100$, $H = 100$, and $W = 300$. Suppose further that $K = 100$, and $R = 110$. This yields $P_1^R = 226.67$, so that a 44.12% share in the firm is issued in the merger (because $0.4412 \cdot 226.67 = 100$). The market value of the stake held by preexisting firm A shareholders drops from 150 to 126.67. Thus the merger is accompanied by a negative price impact of 15.56%. After the merger, 83.33% of the A-specialists have long positions.*

2.3. Stock-for-stock merger when some target shareholders are asleep

To explore the consequences of investor inertia, we now posit that only a fraction $\alpha < 1$ of the T-investors are awake. As before, these awake T-investors sell off any shares in the merged firm M that they receive in the merger. The remaining $(1 - \alpha)$ of the T-investors are

[6] For the equity issue to raise K from the pool of A-specialists, it must be that the total wealth of the previously sidelined A-specialists, $(W - P_0)$, weakly exceeds K. This condition can be expressed as $W(W - F)/(W + H) \geq K$, and we assume it holds in what follows.

asleep and simply hold on to the shares in *M* that they are given. Thus for the sleeping *T*-investors, the default condition matters: They would not actively seek to buy shares offered in an SEO, but they also do not actively seek to sell shares that are granted to them as part of a stock-for-stock merger. Or said differently, the sleeping *T*-investors always take the path of least resistance, which is simply to do nothing.

While the inertial behavior of the sleeping *T*-investors clearly differs from that of investors in standard finance models, for our purposes one need not interpret this inertia as a manifestation of fundamentally irrational behavior. Perhaps some investors, most likely individuals, view it as costly to keep track of the stocks in their portfolio on a constant basis. Or even if they are aware of the merger, the benefits of rebalancing could be outweighed by the search and transactions costs associated with finding a new stock to buy, especially for those investors who have relatively small positions in the target. We find some evidence that those individual investors with the smallest dollar positions in the target behave in an especially inertial fashion, consistent with this meta-rational hypothesis.

In the presence of sleepers, we assume that the awake *T*-investors are the only ones who actively evaluate the bid from firm *A*. In doing so, they continue to place a reservation value of *K* on their firm's assets and recognize that they will immediately resell all shares that they receive in the stock swap. If we denote by P_1^S the post-announcement market value of the merged firm when there are sleepers, then the requirement that the bid be satisfactory to the awake *T*-investors amounts to saying that the total value of shares issued in the merger, evaluated at P_1^S, be equal to *K*. This condition is exactly the same as the analogous one in the fully awake case.

Where things differ is in the determination of P_1^S. As a result of the sleeping *T*-investors who hang on to their shares, only a fraction α of the shares issued in the merger ever comes on

the market, and hence only this fraction must be absorbed by the pool of previously sidelined *A*-specialists. Thus Eqs. (2) and (3) are modified as follows:

$$\alpha K = \tfrac{W-P_0}{P_0-F}\left(P_0 + R\ - P_1^S\right) \text{ and} \tag{4}$$

$$P_1^S = P_0 + R\ - \tfrac{H}{W}\alpha K\,. \tag{5}$$

Example (continued): *As before, keep F = 100, H = 100, W = 300, K = 100, and R = 110. Assume that the fraction of sleepers among T-investors is given by α = 0.50. These parameters yield P_1^S = 243.31, which implies that a 41.10% share of the firm is issued in the merger, less than the 44.12% share issued in the case with fully awake investors. (The value of the merger bid, evaluated at market prices, is 0.411 · 243.31 = 100.) The market value of the stake held by preexisting firm A shareholders drops from 150 to 143.31: The merger is accompanied by a negative price impact of 4.46%. After the merger, 66.67% of the A-specialists have long positions with an aggregate market value of 193.31, and sleeping T-investors have a long position with a market value of 50.*

2.4. Empirical implications

The model's most direct empirical implications can be summarized as follows.

Proposition 1: Merger announcement effects

(i) All else equal, an increase in the fraction α of awake target-firm investors strengthens the adverse impact of a stock-for-stock merger announcement on the price of the bidding firm. (ii) An increase in the slope of the acquirer's demand curve, as measured by the degree of

investor heterogeneity H, has a similar effect. (iii) There is an interaction between these two variables: A steeper acquirer demand curve amplifies the negative stock-price consequences of awake target-firm investors. Thus, denoting the announcement price impact by ΔP, (i) $\frac{d\Delta P}{d\alpha} < 0$*; (ii)* $\frac{d\Delta P}{dH} < 0$*; and (iii)* $\frac{d^2\Delta P}{d\alpha dH} < 0$.

Proposition 1 follows immediately from inspection of Eq. (5). Part (i) of the proposition forms the basis for one of our main empirical tests below. Part (ii), which does not involve the wakefulness parameter α, and which holds even in a world with no inertia, is the subject of a recent paper by Moeller, Schlingemann, and Stulz (2004). They use the dispersion of analyst forecasts as a proxy for *H* and find evidence consistent with the hypothesis that $\frac{d\Delta P}{dH} < 0$. Taking a similar approach to measuring *H*, we also attempt to test part (iii) of the proposition. Thus, consistent with our theoretical emphasis, our empirical work centers on those effects that are most directly related to the wakefulness parameter α.

2.5. Merger arbitrage

In the model, the announcement and completion of a merger occur simultaneously, at time 1. More realistically, there can be a substantial time lag between announcement and completion, and completion may not be a sure thing when the deal is first announced. It is easy to extend the model to incorporate these features. Proposition 1 above is unchanged, though the model now also admits a role for merger arbitrageurs.

To see how such arbitrage might work, imagine that the announcement of a merger occurs at time 1, but the transaction is not completed until time 1½. Moreover, because

completion is not ensured as of time 1, the stocks of firm *T* and firm *A* are not interchangeable immediately post-announcement: They are no longer certain to both turn into claims on the merged firm *M*. In this setting, it is possible that awake *T*-investors want to sell their shares in *T* immediately, as of time 1. But the previously sidelined *A*-specialists could prefer to buy *A* shares when their price falls at this time, instead of buying *T* shares. This is because their primitive preference is for *A* assets, and there is a risk that the *T* shares do not turn into a claim on any *A* assets, if the deal falls through. The arbitrageurs can bridge this gap by buying *T* shares from the *T*-investors and for each share bought, short-selling $K/(P_1^S - K)$ *A* shares to the *A*-specialists.[7] If the deal does go through, each side of the arbitrage trade converts into the same number of shares in the merged firm *M*. If not, arbitrageurs are left with an unhedged position in *T* and *A* shares.

As long as completion risk is small, the results for prices at time 1 remain approximately the same as described. That is, the adverse impact to *A*'s stock price occurs primarily on announcement of the deal, not on completion, and continues to be a function of the number of sleepers among the *T*-investors. Intuitively, the more sleepers there are, the fewer shares of *T* are unloaded onto the arbitrageurs at time 1, and hence the fewer shares of *A* are short-sold by these arbitrageurs into the downward-sloping demand curve of the *A*-specialists.

The one thing we gain by explicitly considering the process of merger arbitrage is a more precise set of predictions about trading volume as of the announcement date.

[7] This calculation assumes that both firms have the same number of shares outstanding. We are now allowing arbitrageurs to hold short positions between time 1 and time 1½, even though we previously ruled out short-selling by investors over the longer interval from time 1 to time 2. A loose rationalization might be that those players who have the ability to short-sell are unwilling to take long-horizon unhedged short positions because of fundamental risk. Alternatively, it is possible to reformulate the model so that downward-sloping demand curves arise from other sources (e.g., risk aversion) and nobody faces any short-sales constraints.

Proposition 2*:* Abnormal trading volume around merger announcements

(*i) All else equal, an increase in the fraction* α *of awake target-firm investors leads both to more trading volume in the target around the announcement date and (ii) to more trading volume in the acquirer.*

Part (i) of the proposition is self-evident: If all target-firm shareholders are asleep, none of them sells on announcement of the deal, and there is no trading volume in the target. Part (ii) is a bit more subtle and relies on the merger-arbitrage mechanism: The more shares are dumped by awake target-firm shareholders, the more the arbitrageurs have to step in and buy, and hence the more short-selling of the acquirer they end up doing to hedge their positions.[8] These predictions for volume are a useful complement to our predictions for acquirer stock returns in Proposition 1. If both Propositions 1 and 2 are borne out in the data, it becomes more likely that the results for stock returns are driven by the sort of price-pressure effects envisioned in our model, as opposed to some other confounding factor.

Our account of the price-pressure consequences of merger arbitrage is complementary to that of Mitchell, Pulvino, and Stafford (2004). Loosely speaking, these authors take the volume of risk arbitrage selling in the acquirer as exogenous and show that this selling has a negative impact on the acquirer's announcement returns. Our model endogenizes the level of risk arbitrage activity, tracing it back to the fraction of awake *T*-investors.

[8] An important caveat is that this short-selling occurs only if the terms of the merger involve an exchange ratio that is fixed as of the announcement date. If, instead, the dollar value of the bid is fixed, and the exchange ratio is left to float until completion, the arbitrageurs do not want to short the acquirer. See Mitchell, Pulvino, and Stafford (2004) for an analysis of this issue.

2.6. Capital gains taxes

We have not yet addressed the following question: To what extent can what we call investor inertia, or sleepiness, be thought of as simply a rational reluctance on the part of target-firm shareholders to incur capital gains taxes by selling their shares? This question can be addressed both theoretically and empirically. On the empirical side, our analysis in Section 3.2.3 below demonstrates conclusively that inertia is not primarily driven by tax considerations. In particular, we find that sleepiness is not any greater among individuals with taxable accounts than among those with non-taxable accounts.

Even holding this empirical finding aside, it is not at all obvious that, as a matter of theory, one can generate the sorts of patterns in acquirer announcement returns predicted by Proposition 1 using capital gains tax effects alone. To see why, consider the simple limiting case of a target firm in which all investors are heavily taxed individuals. It could be true that these individuals are reluctant to sell any shares in the acquirer that they get as part of a merger. But if they are fully rational, and understand this ex ante, they demand a greater number of shares in the first place, to compensate them for the fact that they are going to be forced to hold stock that they do not value highly. So on net, the acquirer is made worse off as a result of the tax-related friction. In this simple example, as long as everybody is rational, the acquirer must bear the cost of inefficiently placing shares in the wrong hands.

Example (continued): *As before, keep F = 100, H = 100, W = 300, K = 100, and R = 110. Consider two cases. In the first, all target shareholders are awake, and there are no taxes. This implies that 44.12% of the firm's shares must be issued to raise 100. In the second case, all*

target shareholders are again awake, but there are prohibitive capital gains taxes, so that target shareholders are forced to hang on to any acquirer shares they receive in a merger. Target shareholders value the combined post-merger firm at 210 and have a reservation price of 100. So to get them to sell, they must be given 47.62% of the combined firm (100/210 = 0.4762), which is more than in the case with no taxes.

Thus, in this example, investor inertia delivers something that capital gains taxes alone cannot. When it is granted to them as consideration in a merger, not only are inertial target investors more likely to hang on to a stock that they would otherwise never have bought, but also, crucially, they do not have to be compensated for doing so. This latter feature is why acquirers can benefit from target-investor inertia, as in Proposition 1.

However, the above example is not the only relevant case. Consider an alternative with some heterogeneity across investors in terms of their tax situations. Suppose 60% of target investors are tax-exempt institutions, and 40% are taxable individuals. In this case, it could be that only the tax-exempt institutions are pivotal in setting the terms of the deal. If so, the acquiring firm does not have to compensate the individual shareholders of the target for giving them a stock they do not want. In other words, once one introduces heterogeneity, capital gains taxes can generate an effect that is isomorphic to the concept of inertia in our model, though this depends on parameter values, e.g., on the proportion of taxable versus non-taxable investors.

Again, however, the most clear-cut answer to the tax question is the empirical one. The evidence strongly suggests that the inertia that we find among individual investors is unrelated to tax considerations.

3. Empirical analysis

Our empirical work is divided into two parts. First, we simply show that the key premise of our model holds in the data; that is, target investors behave in an inertial fashion around merger transactions. While we find that both individual and institutional investors exhibit inertia, it is substantially more pronounced among individuals. Second, using this distinction between individuals and institutions to create a proxy for the extent of investor inertia, we test the cross-sectional implications of the model summarized in Propositions 1 and 2. We show that acquirer announcement returns are more negative in transactions in which the target firm has a greater proportion of institutional (i.e., awake) shareholders and that acquirer abnormal trading volume is also greater around such transactions.

3.1. Data

Our sample of mergers has 2,995 successfully completed transactions announced between the second quarter of 1980 and the fourth quarter of 2000. Of these, most of our analysis focuses on the subset of 1,851 stock-swap deals; the remaining cash deals are used only as a control sample.[9] We require that each deal involves a public acquirer, with a matched announcement return available from the Center for Research in Security Prices (CRSP). Information on individual investor holdings comes from the records of a discount brokerage firm (this is the Barber and Odean, 2000, data) and is available only from 1991 to 1996. We also

[9] Of our 1,851 stock deals, we identify 53, or just under 3%, where the acquirer has a pre-bid position in the target. The number of these toeholds is too small for them to affect our overall analysis one way or another. However, toeholds appear to behave as sleepy investors. In deals with toeholds, the return to the acquirer is less negative, and trading volume is reduced, though given the small number of toehold observations these effects are not reliably estimated.

make use of a variety of CRSP and Compustat variables, as well as analyst forecast data from Institutional Brokers' Estimate System (IBES).

Quarterly observations on institutional ownership come from the CDA/Spectrum Institutional Holdings database, over the period from the first quarter of 1980 through the fourth quarter of 2002. These data, which come from Securities and Exchange Commission (SEC) 13-F filings, cover institutions with more than $100 million in assets, which means that we effectively measure institutional ownership with some error; e.g., if a firm is owned only by institutions with less than $100 million in assets, we code it as having zero institutional ownership. Furthermore, this data set aggregates up mutual fund holdings to the level of the fund family, not the individual fund, which prevents us from saying anything about the inertial tendencies of individual fund managers. We have, however, also looked at a different data set on mutual fund holdings to gain some insight into the determinants of inertia at the individual-fund level.

Table 1 presents summary statistics for the mergers in our sample. All variables are Winsorized at the first and 99th percentiles, both in Table 1 and in the analysis that follows. However, our regressions yield essentially identical point estimates and modestly larger standard errors if we do not Winsorize any of the dependent variables. In Panel A, we look at target institutional ownership, which is calculated for the quarter prior to the announcement of a merger and expressed as a percentage of shares outstanding. We also look at non-overlapping target institutional ownership, defined as the fraction of the target owned by those institutions who own no shares in the acquiring firm. (Matvos and Ostrovsky, 2006, highlight the importance of overlapping institutional ownership in mergers.) As we discuss below, non-overlapping institutional ownership is probably the best available proxy for the wakefulness parameter α.

Insert Table 1 near here.

Panel B gives several deal characteristics. Acquirer and target size are equal to price times shares outstanding two days prior to announcement. Relative size is equal to target size expressed as a percentage of total target and acquirer size. Acquirer and target leverage are equal to interest-bearing debt (items 9+34 from Compustat) expressed as a percentage of book assets (item 6) at the fiscal year-end prior to announcement. Acquirer and target market-to-book are equal to book assets minus book equity (items 216-130+35) plus price times shares outstanding (from CRSP), all divided by book assets. Same industry is an indicator variable equal to one if the target and the acquirer are in the same Fama and French (1997) industry.

Panel C presents stock market data, all taken from CRSP. Acquirer and target announcement returns are cumulative returns in excess of the value-weighted market over a five-day window surrounding the announcement of a merger. Acquirer announcement volume is the average daily volume over a five-day window surrounding the announcement of a merger, expressed as a percentage of shares outstanding. Normal volume is the average daily volume over a 60-day window starting 90 trading days before the announcement of a merger.

Finally, Panel D shows two acquirer demand-curve proxies, constructed from data in CRSP and IBES. Our first proxy follows Scherbina (2004) and Moeller, Schlingemann, and Stulz (2004), who use dispersion in analyst forecasts as a measure of disagreement about fundamental value. Our particular measure is the same adopted by Moeller, Schlingemann, and Stulz in a similar context and is equal to the standard deviation of all outstanding earnings forecasts of long-term growth. Our second proxy, idiosyncratic risk, is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama and French factors (R_M, *SMB*, *HML*) and the matched 48-industry portfolio return. (All factor and portfolio returns were obtained from Ken French's website.)

3.2. Measuring investor inertia

If all mergers were announced and completed instantaneously, as in our simple model, it would be a straightforward matter to measure target investor inertia. Consider a merger in which we have a set of target investors who have no initial position in the acquirer. By revealed preference, these target-only investors do not place an especially high value on the acquirer. If these investors were all awake, we would expect them to sell their shares immediately upon announcement and simultaneous completion. In contrast, if the target-only investors were asleep, we would expect them to do nothing. Thus a natural measure of inertia would be the fraction of target-only investors doing nothing. This would correspond exactly to the key variable $(1 - \alpha)$ in our model.

In practice, there is a lag between the announcement and completion of a deal. Our aim is to get a picture of the total selling activity by target-only investors over this interval. Moreover, the passage of time raises subtle benchmarking issues. For example, suppose that a particular deal takes a year to close and 10% of the target-only investors sell their shares during the course of this year. Should we draw the conclusion that 10% are effectively awake and responding to the merger? Not necessarily. Even in a year without a merger, there is a baseline level of turnover. In other words, we expect to see some selling, for example, because of liquidity demand, even if all target investors are completely oblivious to the fact that a merger has occurred. So, to measure inertia correctly, we need to calculate turnover above and beyond what would be expected absent a merger.

Fig. 1 illustrates our method for calculating investor inertia in a hypothetical merger transaction. Time from announcement to completion is measured along the X-axis. The merger is announced at the Y-axis and is completed by the end of the dashed line. At any point in between, the dashed line represents the fraction of those pre-announcement target investors with no initial position in the acquirer who continue to hold a long position, either in the target (in the period prior to completion) or in the acquirer (in the period after completion). For example, the figure shows that, at completion, 32% of the original target-only investors are still holding their positions, which have now converted into shares of the acquirer.

Insert Fig. 1 near here.

The upper solid line in Fig. 1, which starts out at 100% and declines gradually, is the fraction of target-only investors we would expect to be continuing holders based on normal turnover during a non-merger period. In this hypothetical example, the figure shows that only 53% of investors are expected to still hold their target shares seven quarters later, even if they pay no attention to the merger. The lower solid line, which starts out at 0%, captures the idea that an investor who is awake and sells the target immediately upon announcement might, over time, experience a change in view and re-buy the target or the acquirer at some later date. The figure shows that 14% of the original target-only investors in this example would be expected to own the acquirer seven quarters later if they were to sell out at the time of the merger announcement, simply because they revise their opinion of the acquirer.

To compute an adjusted measure of inertia that incorporates both of these benchmarks, we define inertia at completion as the difference between the fraction of post-completion holders and the lower benchmark (labeled *a* in Fig. 1), divided by the difference between the upper benchmark and the lower benchmark (labeled *b* in Fig. 1). In other words, inertia measures, in relative terms, how close post-completion holdings are to the upper benchmark, as opposed to

the lower benchmark. In the specific example shown in Fig. 1, inertia at completion is 44.9% (44.9 = 32–14 divided by 53–14).

In the institutional data, we calculate the upper and lower benchmarks by examining the behavior of investors in the same set of target stocks in the period beginning 12 quarters before merger announcement. For the purpose of computing the benchmarks, we again focus on those target investors who have no initial position in the acquirer. The upper benchmark is these investors' propensity to close out their position in the target over various horizons, and the lower benchmark is their propensity to establish a new position in the acquirer over various horizons. We take a similar approach with individual investors, calculating the benchmarks in 1991 for all deals that are announced in 1993 or later.

3.*2.1. Individual investor inertia*

Table 2 presents our analysis of inertia among individual investors. This analysis is restricted to the 305 stock-swap mergers that have at least one target-only investor during the interval for which we have the brokerage-firm data. For each deal, we begin with all investors, who, at the month-end prior to the transaction, hold the target but not the acquirer. We then track the holdings of this set of individuals over the period from announcement to completion. Each of the first nine columns in the table isolates deals with a fixed length of time to completion (one month, two months, etc.) and the final column presents aggregated results for all 305 deals.

Insert Table 2 near here.

For example, the first column of Table 2 shows that 21 mergers are completed in the next calendar month after announcement. In these transactions, 11.4% of pre-merger individual investors close out their positions in the target before completion. Thus, pre-completion holdings

are 88.6% (88.6 = 100 – 11.4). Of the remaining 88.6%, another 26.3% close out their positions within three months after completion, leaving net post-completion holdings at 65.3% [65.3 = 88.6 · (1 – 0.263)] four months after we start tracking the holdings of the target-only investors in these 21 mergers.

This post-completion figure of 65.3 can then be compared with the upper four-month benchmark of 87.3%, which means that, in a typical non-merger-affected, four-month period for the full set of target stocks, 12.7% of individual investors close out their positions. It can also be compared with the lower four-month benchmark of 0.3%, which means that in a typical non-merger-affected, four-month period for the full set of target stocks, only 0.3% of individual investors in the target who do not initially have a position in the acquirer open a new position in the acquirer. Putting it all together, we calculate inertia of 74.7% for the subset of mergers that take one month from announcement to completion (74.7 = 65.3–0.3 divided by 87.3–0.3).

The results are similar in each of the subsequent columns, representing deals that take two or more months to move from announcement to completion. The final column aggregates across these different samples, weighting each one by the number of target-only investors. On average, for individuals, post-completion holdings are 64.1%, and inertia is 78.8%. Thus, loosely speaking, we estimate that about 80% of individuals effectively sleep through mergers in which they are shareholders in the target firm.

This is a rough number, and one can certainly argue with the details of our benchmarking methodology. However, our basic conclusion is likely to be robust: The vast majority of individual target-firm investors do not react to a merger by unloading their shares. Fig. 2 highlights the conclusions in Table 2 graphically. Across all merger horizons, the ownership percentage falls at a similar rate to that of the upper benchmark. Essentially all horizons are

within 10% of this upper benchmark. Given that the lower benchmark never gets above 1%, it is clear that the inertia among individual target investors is substantial.

Insert Fig. 2 near here.

3.2.2. Institutional investor inertia

Table 3 undertakes an analogous exercise for institutional investors. Given the broader coverage of the CDA/Spectrum data, we are able to include 1,797 stock-swap mergers in this analysis. This is the subset of mergers that have at least one target-only investor between the second quarter of 1980 and the fourth quarter of 2002. Because of the SEC 13-F reporting requirements, we are forced to look at things on a quarterly, as opposed to monthly, basis.

Insert Table 3 near here.

Aggregating across all transactions, we find that 30.0% of pre-merger institutional investors hold on to their positions through completion, substantially less than the corresponding figure of 64.1% for individuals. The baseline rate of turnover is also higher. However, the first effect dominates and inertia is significantly lower, at 32.3% for institutions, as compared with 78.8% for individuals. In contrast to the individual investor turnover in Fig. 2, institutional holdings in Fig. 3 decline at a significantly faster rate than the upper benchmark across all merger completion horizons. By the conclusion of most of the mergers, the institutional holdings lines are all closer to the lower benchmark than to the upper one.

Insert Fig. 3 near here.

3.2.3. The determinants of inertia

Before proceeding to test Propositions 1 and 2, we examine some of the cross-sectional determinants of inertia within the broad categories of individual and institutional investors. For

example, one might expect that capital gains taxes would encourage any given investor to hold on to the stock of a target that has appreciated substantially. Or, if the target is large relative to the acquirer, a target investor with no revealed preference for the acquirer could nevertheless want to hold on to the shares of the merged company, because its value is determined to a large extent by the prospects of the original target assets.

In Table 4, we present the pre- and post-completion turnover of target-only investors calculated for various subsamples of stock-swap mergers. In Panels A and D, we address the tax hypothesis by splitting the individual and institutional-investor samples according to the pre-announcement return of the target, calculated as the cumulative return over the two-year period ending one month prior to announcement. Pre-announcement returns appear to be weakly related to the inertia of individual investors: Target investors are somewhat less willing to dump shares that have appreciated in value by more than 20%. However, the differential across groups is modest.[10] Even mergers in which the target has recently declined in value also involve considerable inertia. The inertia statistic of 76.5% for this group is close to the full-sample value of 78.8%. With institutions, there is no evidence at all to suggest that capital gains taxes matter for our measure of inertia. Both raw post-completion holdings and our inertia statistic are at their highest among those firms with negative pre-announcement returns, the group for which tax considerations would suggest that there should be the least inertia.

Insert Table 4 near here.

Using past two-year returns is a crude way to proxy for the tax status of any given investor. It fails to take into account the investor's basis in the stock, his holding period, and the potential gains and losses on any other stocks in his portfolio. One way to do a little better is to

[10] Two effects combine to make the inertia statistic greater among targets with large positive returns. First, post-completion holdings are greater, consistent with a capital gains tax story. And second, the upper benchmark is lower, consistent with the disposition effect (Shefrin and Statman, 1985). Thus, if anything, the modest differences in inertia that we show likely overstate the pure impact of capital gains tax considerations.

re-calculate the inertia statistic for only those individual positions that appear to involve capital losses, i.e., those in which the post-announcement stock price is below the investor's initial basis in the stock. If tax considerations were important, we would expect less inertia in this subsample. However, the inertia statistic (not tabulated) is if anything a bit higher in the capital-loss subsample than its full-sample value, at 84.0%.

A somewhat sharper test of the tax hypothesis is contained in Panel C. Here we split the individual-investor sample according to whether or not the account in question is taxable or tax-exempt. As can be seen, the differences in inertia across the two subsamples are negligible, with inertia statistics of 77.2% and 79.6% for taxable and non-taxable accounts, respectively. This runs strongly counter to the idea that inertia is a rational response to capital gains tax considerations. One caveat, however, is that the types of individuals who hold stocks in their retirement accounts could be different from those who do not. If so, our comparison of inertia across taxable and non-taxable accounts could be misleading, because it could be muddied by compositional differences in the investors under consideration. Fortunately, there is an easy fix for this problem. We can simply redo the taxable versus non-taxable account comparison, restricting the analysis to only those investors who have both types of accounts. The results (not tabulated) are essentially identical to those we report in Panel C of Table 4.

Panels B and E split the samples based on the relative size of the target, calculated as the target's market capitalization divided by the total market capitalization of the target and acquirer. Individuals exhibit uniformly high inertia in deals of widely varying relative size. Institutions appear slightly less passive when the target is large. Again, this result goes in the opposite direction relative to a simple rational story: Mergers with large targets represent situations in which the combined firm's assets ought to appear most attractive to those investors who initially

found the target worth owning, so such deals should be expected to generate more, not less inertia.

We have also tried a couple of other cross-sectional tests that are not shown in Table 4. In one of these, we show that inertia among individuals is somewhat lower, at 72.3% (as compared with the full-sample value of 78.8%) for those investors whose positions in the target are above the median size of $2,700. This is consistent with individual-investor inertia being in part a product of either the transactions costs or the fixed search costs associated with portfolio rebalancing.[11] At the same time, inertia remains substantial even for those individual investors whose stakes in the target are large, suggesting that not everything can be explained simply by small fixed costs. For example, for target positions over the 90th percentile value of $14,625, the inertia statistic is still 67.0%. One can rationalize this observation by appealing to sufficiently large search costs, but we would argue that in the limit this amounts to not much more than a relabeling of what we have been calling inertial behavior.

Finally, using the CDA/Spectrum Mutual Fund database (as opposed to the Institutional Holdings database), we uncover some systematic patterns in inertia across different types of mutual funds. For example, the inertia statistic is greater for balanced funds, at 52.8%, than it is for aggressive growth funds, at 38.2%. This is likely because the latter type of funds have a narrower investment mandate and, e.g., are forced to sell a high-growth target when it is acquired by a low-growth bidder. In addition, mutual funds in general tend to display substantially more inertia when the target and bidder are closer to the same size. Again, a plausible story is that size-

[11] For example, given that our sample period is the first half of the 1990s, round trip commission costs could potentially eat up 10% of the median position of $2,700. If one adds to this a modest search cost in the range of $100-$200, this might be sufficient to deter a rational investor with a median-size stake from trying to replace his shares in the acquirer with shares in another firm, even if his subjective alpha for the former was, say, -5% per year over the next three years.

based style mandates force a fund to unload a target when it is in a very different market-capitalization bracket than the acquirer.

3.3. Acquirer returns and volume around merger announcements

Having established the main premise of the model (that investors exhibit inertia), we now consider its empirical implications. The first part of Proposition 1 is that target-investor inertia leads to less negative acquirer announcement returns. A corollary laid out in Proposition 2 is that this effect works through volume, so that target-investor inertia leads to lower acquirer announcement volume at the same time. The third part of Proposition 1 is that the impact of target-investor inertia interacts with the slope of the demand curve for acquirer stock. The steeper is this demand curve, the greater should be the impact of inertia on acquirer announcement returns.

3.3.1. Institutional ownership and acquirer announcement returns

In Panel A of Table 5, we focus on stock-for-stock mergers and regress acquirer announcement returns on both target institutional ownership and non-overlapping target institutional ownership. The first regression uses the raw measure of institutional ownership as our proxy for investor wakefulness α and has no other controls, other than year fixed effects. This specification generates a coefficient of –3.87 on institutional ownership, which is strongly statistically significant (*t*-statistic = 4.72), consistent with Proposition 1. In economic terms, this coefficient implies that a 2.0 standard deviation increase in target institutional ownership reduces

the acquirer's announcement return by 1.76 percentage points, taking it from its unconditional mean value of –2.23% down to –3.99%.

Insert Table 5 near here.

The next regression again uses the raw measure of institutional ownership but adds a variety of controls described in Table 1: acquirer and target market capitalization (both in logs); acquirer and target leverage; acquirer and target market-to-book; the target announcement return; and an indicator variable equal to one if the two firms are in the same industry. Many of these (the size, leverage, market-to-book, and relatedness variables) are commonly used in regressions to explain acquirer announcement returns.[12] We add the target announcement return to the list because one potential competing explanation for the effect of institutional ownership has to do with bargaining power. Perhaps institutional blockholders in the target are able to extract a better price from the acquiring firm, leading to lower acquirer announcement returns. If so, the target announcement return should control for this effect. However, as it turns out, this variable has a significant, but positive, relationship with acquirer returns.

In any case, adding the full battery of controls has only a modest impact on the coefficient on institutional ownership. It goes from –3.87 to –2.59 and remains statistically significant, with a *t*-statistic of 2.17. In this specification, a 2.0 standard deviation increase in target institutional ownership reduces the acquirer return by 1.18 percentage points.

The next two columns of Panel A are analogous to the previous two, except that we replace target institutional ownership with non-overlapping target institutional ownership. This latter variable is arguably a more precise measure of the wakefulness parameter α in our model, because we expect an alert target shareholder to be most likely to sell shares in the acquirer if he

[12] See, e.g., Lang, Stulz, and Walkling (1989) and Morck, Shleifer, and Vishny (1990). Other typical merger-related controls are not included because of the nature of our sample. The acquirer attitude (see Schwert, 2000, for a discussion of hostility) is always friendly in our sample of stock swaps, and by definition the form of payment (see Andrade, Mitchell, and Stafford, 2001) is stock and the accounting treatment is pooling (see Martinez-Jerez, 2004).

did not own any such shares prior to the merger announcement and hence has not demonstrated a high valuation for acquirer assets. This redefinition of target institutional ownership leads to coefficient estimates that are markedly higher in absolute value. They are now –8.17 and –5.49 in the no-controls and full-controls specifications, respectively. We view this pattern as particularly supportive of our model, because it is hard to think of alternative hypotheses that would suggest a similar outcome.

Not surprisingly, target institutional ownership and non-overlapping target institutional ownership are highly correlated, with a univariate correlation coefficient of 0.76 for our sample of stock deals. In an untabulated analysis, we run an alternative version of our specifications in which we include both the level of institutional ownership and the level of non-overlapping ownership simultaneously. In these regressions, the coefficient on the latter variable can be interpreted as an interaction term. It is the impact on the institutional ownership coefficient of increasing the fraction of non-overlapping institution ownership. This coefficient is still statistically and economically significant in the more elaborate specification. We have also tried adding a control for acquirer institutional ownership to our regressions, to address the possibility that non-overlapping target ownership is somehow just a proxy for this. However, the coefficients on non-overlapping target institutional ownership are not affected by this modification.

One control that is not included in the specifications in Table 5 is ownership of the target by insiders, which could potentially influence acquirer returns through some sort of screening mechanism. For example, a target with high inside ownership might accept only very synergistic bids, because insiders are likely to have to hold on to the stock of the combined firm after completion. The practical problem is that we do not have data on target inside ownership for

many of the transactions in our data set. However, we do have such data for a selected subsample, compiled by Thomson Financial from SEC Form 3, Form 4, Form 5, and Form 144. Within this subsample, which is approximately 70% of the size of our full sample, the effect of adding target insider ownership to our regressions appears to be relatively small. It causes the coefficients on target institutional ownership and non-overlapping target institutional ownership to drop by 18% and 7%, respectively.

Panel B of Table 5 is an exact replica of Panel A, except that the sample includes cash mergers instead of stock mergers. This is effectively a placebo check. According to our theory, target institutional ownership should be irrelevant in cash deals. In contrast, some competing explanations for the results in Panel A suggest a similar pattern across stock and cash mergers. For example, if high institutional ownership of the target leads to low bidder returns through some sort of enhanced-bargaining effect, this should work similarly for both stock and cash deals. However, as can be seen in Panel B, there is no discernible impact of target institutional ownership in the cash-merger sample. The coefficient of interest is never close to statistically significant and is positive in three out of four cases. Thus cash mergers seem to be fundamentally different from stock mergers on this dimension, consistent with our model.

We have been focusing our analysis of returns on the short (five-day) window around the merger announcement date, both because this gives us the most statistical power and because our theory makes the most clear-cut predictions with respect to it. Our static model offers less guidance regarding longer-run price impacts. In practice, there are likely to be two competing effects. On the one hand, because less-inertial institutional investors continue to sell more after the merger announcement and through completion, one might expect the adverse price impact associated with institutional ownership to continue to grow over the medium run. On the other

hand, at some longer horizon, it is possible that sleepy individual investors eventually wake up and sell their shares, too, which would work in the opposite direction. Even if we do not have much to say about the longer run, a temporary price-pressure effect nevertheless matters for existing shareholders of the acquirer, because it directly influences the number of acquirer shares that have to be granted to the target.

In spite of the theoretical ambiguities, we have undertaken some further empirical work that effectively redoes Table 5 for longer return horizons of up to a year after the initial announcement window. The point estimates from these regressions suggest that the short-run effect of target institutional ownership is partially reversed in subsequent months. However, these point estimates are sufficiently imprecise that we can never come close to rejecting the hypothesis that there are no further abnormal returns associated with target institutional ownership after the initial five-day event window.

3.3.2. Institutional ownership and acquirer announcement volume

The model makes the ancillary prediction that, in stock deals, the impact of shareholder inertia on acquirer announcement returns works through trading volume, as in Proposition 2. In particular, target shareholders who are awake sell out on announcement. Merger arbitrageurs buy these shares and short the acquirer, closing their positions when the merger is successfully completed. Examining volume also serves as yet another check on alternative hypotheses linking target institutional ownership and acquirer returns. Again, if target institutional ownership affects acquirer returns through a mechanism such as bargaining power, we would not expect it to also influence volume simultaneously.

Table 6 repeats the analysis in Table 5, replacing acquirer returns as the dependent variable with the average daily turnover in the acquirer over the five-day window surrounding the merger announcement. We keep all the same right-hand-side variables as before and also add normal trading volume (defined as the average daily turnover in the acquirer over the 60-day period starting 90 days before the announcement) as another control.

Insert Table 6 near here.

Across all four specifications in the stock merger sample in Panel A, the results are uniformly supportive of Proposition 2. The coefficients on raw target institutional ownership are 0.59 and 1.07 in the specifications with and without controls, respectively, and are strongly statistically significant in both cases. When we use non-overlapping target institutional ownership instead, the coefficients again rise in absolute value, to 0.86 and 1.70, respectively. And as before, the implied economic effects are substantial. A 2.0 standard deviation increase in target institutional ownership increases the average acquirer's daily turnover during the announcement period from a mean of 1.00% to between 1.26% and 1.48%, or by between 25% and 50%. In Panel B, we see that, for cash mergers, target institutional ownership has little effect on turnover, just as it has no effect on returns. The coefficients are in all cases much smaller than in Panel A and, with one exception, not statistically significant. Again, this is just what one would expect based on our model.

3.3.3. Demand-curve and relative-size interactions

The two key ingredients of our model are inertia among target shareholders and a downward-sloping demand curve for acquirer shares. Thus, as formulated in the third part of Proposition 1, we expect our results for target institutional ownership to be strongest among

acquirer firms with steeply sloped demand curves. To operationalize this hypothesis, we employ two different proxies for the slope of the demand curve. The first aims to measure the difference of opinion among investors with respect to acquirer value, in the spirit of the parameter *H* in the model. Specifically, we follow Moeller, Schlingemann, and Stulz (2004) and calculate the standard deviation of all outstanding analysts' forecasts for long-run growth.

The second proxy is the nonindustry idiosyncratic risk of the acquirer. We compute this as the standard deviation of the residuals from a regression of acquirer excess returns on the Fama and French factors (R_M, *SMB*, *HML*) and the matched 48-industry portfolio return. The premise here is as follows. In the presence of both differences of opinion and risk aversion, an increase in idiosyncratic risk makes the demand curve steeper, because it reduces the size of the position that any one investor with a given valuation is willing to take on. Although this effect is absent from our model (which, for simplicity, uses wealth constraints instead of risk aversion to generate the shape of the demand curve), it is formalized in, e.g., Chen, Hong, and Stein (2002). Moreover, Wurgler and Zhuravskaya (2002) provide empirical validation for the idea of using idiosyncratic risk as a proxy for demand-curve slope, showing that the impact of S&P 500 index inclusion on stock prices is increasing in the idiosyncratic risk of the included firm.

Idiosyncratic risk could be a proxy for other factors as well. For example, Dierkens (1991) uses idiosyncratic risk as a measure of asymmetric information in a study of equity issues. So our results with this variable are no doubt open to alternative interpretations. Nevertheless, while an asymmetric-information story might easily explain why acquirers with more idiosyncratic risk have more negative announcement returns on average, it is less clear that such a story has anything to say about the higher-level interactions that we focus on.

Table 7 presents regressions of acquirer announcement returns (in stock deals only) on target institutional ownership, our measures of the slope of the demand curve facing the acquirer, and the product of the two variables. In Panel A, we use the raw measure of institutional ownership; in Panel B we use non-overlapping institutional ownership. In either case, our theory suggests that the interaction term should attract a negative coefficient. The first two regressions in each panel employ dispersion in analyst forecasts as the proxy for the steepness of the acquirer's demand curve, while the second two use idiosyncratic risk.

Insert Table 7 near here.

The results in Table 7 provide further corroboration of the model. The interaction of the acquirer demand-curve proxies and target institutional ownership is negative in all eight specifications shown in the table and significant (at the 10% level or better) in the four specifications in Panel A that use raw institutional ownership. In Panel B, with non-overlapping institutional ownership, the interaction coefficients are generally at least as big, but the standard errors are larger, perhaps because non-overlapping ownership has less cross-sectional variation.

Moreover, each of the eight specifications implies economically meaningful interaction effects. The demand-curve proxies are standardized to have zero mean and unit variance. So the fact that the coefficients on target institutional ownership and on the interaction term are of the same magnitude means that a 1.0 standard deviation increase in the steepness of the demand curve roughly doubles the effect of institutional ownership on acquirer returns.

Table 7 also considers the interaction of target institutional ownership and relative size, defined as the log of the ratio of target to acquirer market capitalization. The logic for this test again comes directly from Eq. (5), with relative size serving as a proxy for the variable K in our model: All else equal, a larger target implies a potentially larger demand shock to be absorbed by the pool of A-specialists, thereby increasing the marginal impact of investor inertia. As can be

seen, the coefficient on this interaction term is negative, as predicted, in all specifications and significantly so in those in Panel A that use raw institutional ownership.

To sum up, higher target institutional ownership leads to more negative announcement effects for the acquirer. Our additional tests help pin down the mechanism. Institutional holders of the target exhibit less inertia and so are more likely to sell their shares on announcement. This leads to more price pressure and a negative announcement effect that is strongest when the target is large relative to the acquirer and for those acquiring firms with steeply sloped demand curves.

4. Further implications

In addition to its implications for merger announcement effects, our model makes two more speculative predictions for corporate finance. All else equal, inertia makes equity more attractive than cash as consideration in a merger or acquisition, and it makes equity issued in the context of a merger more attractive than equity issued in an SEO.[13]

4.1. Financing choice

The first hypothesis is that stock-financed mergers are more attractive to an acquiring firm when a greater fraction of target shareholders are asleep. This arises naturally in a more general version of the model, in which the acquiring firm can use either cash or shares as

[13] In formulating these hypotheses, we are taking the identity of the target firm as exogenous; i.e., as determined by factors outside of our model, such as the quality of the match between the acquirer and the target. It is tempting to add the prediction that a firm with a greater fraction of sleeping shareholders is more likely to become a target in the first place. However, this factor could be of second-order importance relative to considerations of match quality. Also, the same inertia that improves the terms for the acquiring firm could also lead to target management entrenchment, thereby discouraging merger bids.

payment. To make the financing choice interesting, we need to introduce a cost of using cash, such as the expected costs of financial distress. With this extra ingredient, it is straightforward to show that an increase in target shareholder inertia makes stock financing relatively more attractive.

Using the entire sample of cash and stock mergers, we run a probit regression in which the dependent variable is a dummy that equals one if the consideration in the deal is stock (and zero if it is cash), and in which the independent variables include either target institutional ownership or non-overlapping target institutional ownership, as well as the controls used in previous tables. As can be seen in Table 8, either measure of institutional ownership has a strong negative influence on the probability of a merger being done with stock. We report the coefficients as percentage effects evaluated at the mean of each independent variable. In the specifications with the full set of controls, these coefficients imply that a 2.0 standard deviation increase in target institutional ownership reduces the probability of a stock offering by 9.4% from a mean of 61.8%, and a 2.0 standard deviation increase in non-overlapping target institutional ownership reduces the probability by 16.9%. Both estimates are statistically significant, as is the difference between the two. Given that institutional investors are less likely to be sleepers than individuals are, this pattern fits with our hypothesis.

Insert Table 8 near here.

There are other interpretations for these results. Maybe some institutions simply have a preference, as compared with individual investors, for receiving cash as opposed to stock in a merger transaction, and acquirers cater to this preference to lower the required merger premium. We cannot directly refute this alternative story, though it would seem to have a hard time rationalizing the fact that our results are considerably stronger for the non-overlapping measure of institutional ownership that is most closely tied to our theoretical model. Moreover, because

acquirer shares can always be sold, an institutional preference for cash requires that institutions expect significant transaction costs when selling acquirer stock. The focus of our model is precisely on the price pressure component of these transaction costs.

4.2. Equity financing in mergers and SEOs

Our theory also has something to say about why equity financing might be more common in the context of mergers than it is with greenfield investment (Fama and French, 2004). As outlined in the Section 1, this point is easiest to see by thinking of a firm with an exogenously specified growth strategy that, over the next year, entails one acquisition and one major new greenfield investment, with the two transactions being of roughly similar size. Assume that, to keep its capital structure in balance, the firm needs to finance one of these two investments with an equity issue. That is, either the merger has to be stock-for-stock or the greenfield investment has to be accompanied by an SEO. [14]

We have seen that an SEO effectively amounts to a limiting case of our model with no inertia, because all shares must be sold off in the market, and none can simply be placed in the hands of inertial investors. Thus the SEO is associated with a more negative price impact than the stock-for-stock merger, all else equal, and hence tends to be less attractive. So we would expect the firm to finance the merger with a stock swap, but to finance the greenfield investment

[14] A firm that considers its stock to be overvalued, and that wants to exploit this overvaluation, can be thought of as needing to finance some of its investments with equity issues in this sense. Our model then explains why stock-for-stock mergers are a more attractive option for such an overvalued firm than SEO-financed capital expenditures, even when the assets ultimately acquired would be similar in either case. This contrasts with Shleifer and Vishny (2003) who argue that stock-for-stock mergers are motivated by overvaluation but do not explain why they are any better an outlet for overvalued acquirers than SEO-financed capital expenditures.

with cash. This is a prediction that fits closely with the empirical results of Fama and French (2005).

Pushing the logic further, our model also suggests that the relative preference for doing the merger as a stock swap as opposed to financing the greenfield investment with an SEO is stronger when the difference of opinion *H* among acquiring-firm investors is greater, more target shareholders are asleep, and the scale of the two investments is larger.

Although we do not test any of these hypotheses formally, we can offer a bit of suggestive evidence. We have done some further comparisons of merger and SEO activity that speak to scale effects. Based on a sample of 6,526 SEOs and 2,040 stock-for-stock mergers of public companies over the period 1990-2003, we find that mergers raise substantially more total equity financing than SEOs, $2,559 billion versus $968 billion. Also, the largest transactions, both in absolute terms and relative to issuer size, are more likely to be mergers than SEOs. For example, about 53% of stock-for-stock mergers are for more than $100 million, while only 33% of SEOs are. Alternatively, 23% of mergers are for more than 50% of the issuer's market value, while only 10% of SEOs are. (These numbers are based on an analysis of transactions in the Thomson Financial mergers and acquisitions and seasoned equity offerings databases.)

Again, we stress that these stylized facts do not represent a decisive test. They are also consistent with other interpretations, such as mergers having an advantage over greenfield investment when it comes to big projects in which time-to-build considerations are likely to be important. Nevertheless, they do fit nicely with the model's implication that the relative appeal of a stock-for-stock merger is greatest when the firm's growth plan is such that it needs to raise a very large amount of equity financing.

5. Conclusions

Most people are reluctant to make active decisions. Instead, they tend to follow the path of least resistance, accepting defaults. This has important implications for corporate finance. Raising equity in an SEO requires investors to actively buy the shares of the issuing firm. The default option is to buy no shares. By contrast, raising equity in a stock-swap merger works well to the extent that target investors do not actively opt out of holding the shares of the acquiring firm. The default option is to accept the shares of the acquiring firm as consideration for shares in target. We find that this sort of inertia is a pervasive aspect of investor behavior. Individuals accept the default roughly 80% of the time, and institutions accept it a third of the time.

In a classical stock market with horizontal demand curves, inertial behavior of this kind would be irrelevant for prices. However, combining inertia with a downward-sloping demand curve makes the price impact of a stock-swap merger relatively small, and the terms for existing shareholders better as a result. We test this idea within the sample of stock-swap mergers, using institutional ownership to proxy for low investor inertia. Consistent with the theory, acquirer announcement returns are more negative when inertia is low. The broader conclusion for corporate finance is that, when firms face downward-sloping demand curves, as numerous studies suggest, stock-swap mergers could play a particularly important role in supporting a strategy of rapid, equity-financed growth.

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Fig. 1. Calculating inertia. To calculate the fraction of investors that are passive with respect to a merger transaction, we compare their holdings with benchmark holdings levels (in bold). The upper benchmark reflects the fraction of investors that, during a non-merger period, held a given stock in month zero and continued to hold it in subsequent months. The lower benchmark reflects the fraction of investors that, during a non-merger period, did not hold a given stock in month zero but did hold it during subsequent months. These benchmarks can be compared with the fraction of investors that, at the time of a merger announcement, held the target but not the acquirer and who continue to hold the target prior to completion or who hold the acquirer after the merger is completed.

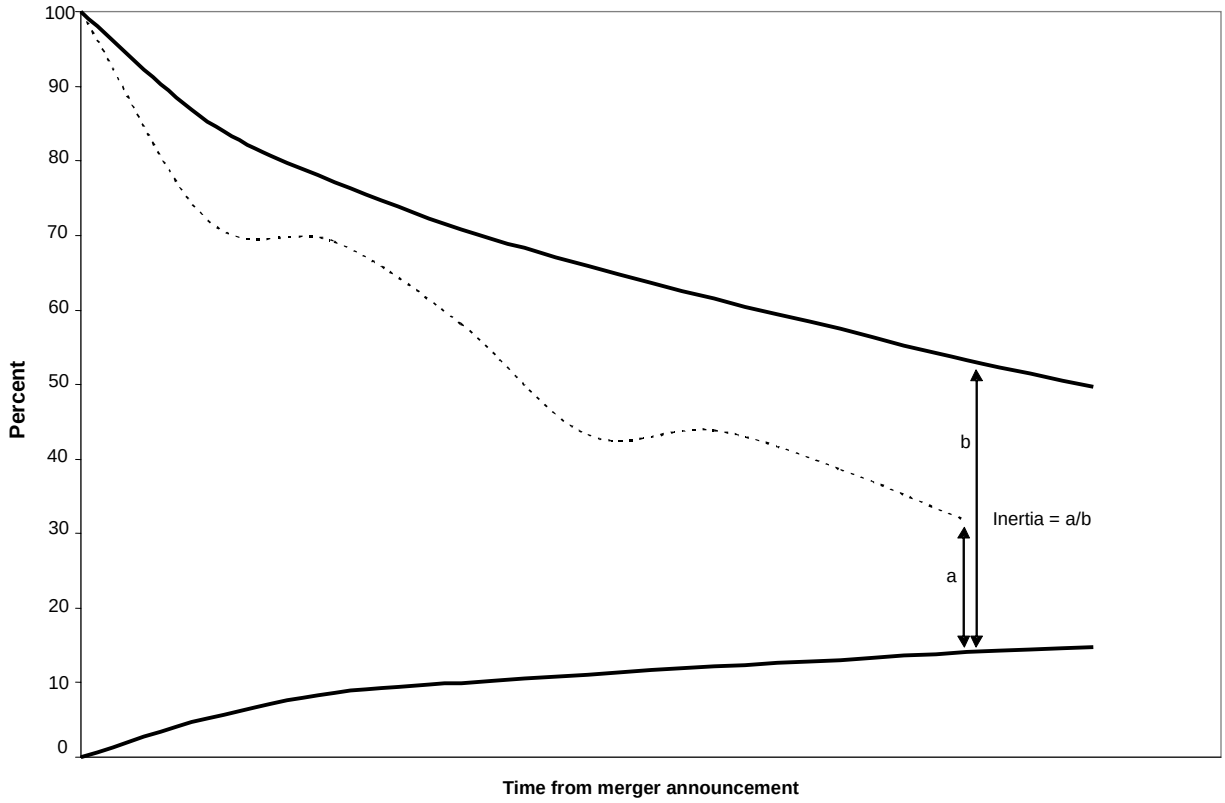

Fig. 2. Turnover around merger announcements: individual holdings. We identify situations in a database of individual investor holdings at a large discount broker from 1991 to 1996 when the investor has a position in a target but not its acquirer in the month ending prior to the announcement of a stock-swap merger in the *Wall Street Journal*. The figure includes 305 successful stock-swap mergers that are completed within nine months involving a public acquirer and with at least one matched individual investor with a position in the target but not the acquirer. Each dashed line tracks the percentage of the original individual investors that still has a position in the target at each month end prior to completion and that has a position in the acquirer two full months following the completion of the stock swap. We split the sample, plotting one line for each number of months elapsed between the announcement and completion of a merger. The solid lines benchmark the individual investor holdings. The upper benchmark holdings reflects the corresponding turnover for situations in the individual investor database when an individual owns shares in a target but not its acquirer in 1991 for all deals that are announced in 1993 or later. The lower benchmark starts with the same situations and tracks the purchase of the acquirer shares.

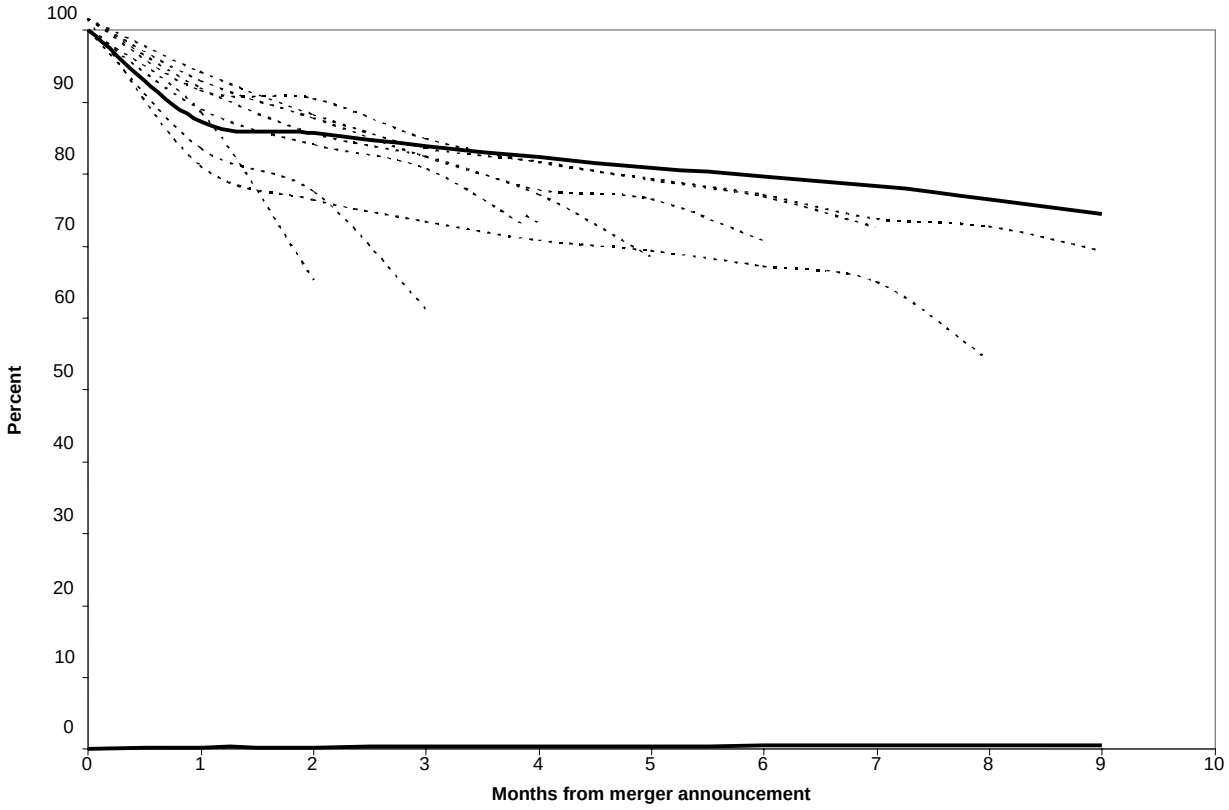

Fig. 3. Turnover around merger announcements: institutional holdings. We identify situations in the CDA/Spectrum Institutional Holdings database in which an institution has a position in a target but not its acquirer in the quarter ending prior to the announcement of a stock-swap merger in the *Wall Street Journal*. The figure includes 1,789 successful stock-swap mergers that are completed within six quarters, involving a public acquirer and with at least one matched institution with a position in the target but not the acquirer. Each dashed line tracks the percentage of the original institutions that still has a position in the target at each quarter end prior to completion and that has a position in the acquirer at the quarter end following the completion of the stock swap. We split the sample, plotting one line for each number of quarters elapsed between the announcement and completion of a merger. The solid lines benchmark the institutional holdings. The upper benchmark holdings reflects the corresponding turnover for situations in the CDA/Spectrum Institutional Holdings database when an institution owns shares in a target but not its acquirer in the quarter ending 12 quarters prior to announcement. The lower benchmark starts with the same situations 12 quarters prior to announcement and tracks the purchase of the acquirer shares.

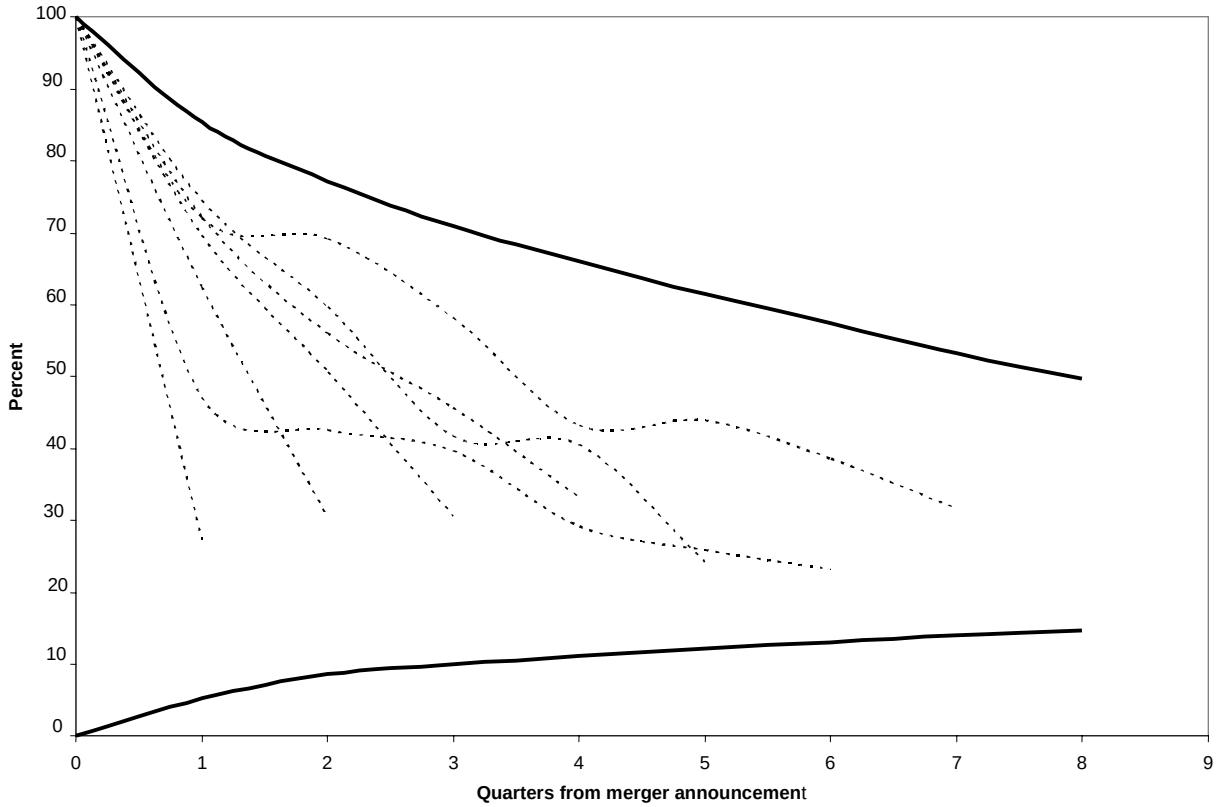

Table 1. Merger summary statistics. The sample includes successful stock-swap and cash mergers with Center for Research in Security Pricing (CRSP) targets announced between the second quarter of 1980 and the forth quarter of 2000, involving a CRSP acquirer with a matched announcement return. Institutional ownership (IO) is summarized in Panel A. Target IO is totaled from the CDA/Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. Non-overlapping target IO includes only those institutions that own no shares of the acquiring firm. This is expressed as a percentage of both shares outstanding and total target IO. The deal characteristics in Panel B are from CRSP and Compustat. Cash deal is equal to one when the consideration is cash and zero when the consideration is stock. Acquirer and target size are equal to price times shares outstanding from CRSP. Relative size is equal to target size expressed as a percentage of total target and acquirer size. Acquirer and target leverage are equal to interestbearing debt (9+34) from Compustat expressed as a percentage of book assets. Acquirer and target market to book (M/B) are equal to book assets (6) minus book equity (216-130+35) from Compustat plus price times shares outstanding from CRSP all divided by book assets. Same industry is an indicator variable equal to one if the target and the acquirer are included in the same Fama and French 48-industry grouping. The stock market data in Panel C are from CRSP. The acquirer and target announcement returns are the return in excess of the value-weighted market over a five-day window surrounding the announcement of the merger. The acquirer announcement volume is the average daily volume over a five-day window surrounding the announcement of the merger expressed as a percentage of shares outstanding. Normal volume is the average daily volume over a 60-day window starting 90 trading days before the announcement of the merger and expressed as a percentage of shares outstanding. The acquirer demand curve proxies in Panel D are from CRSP and Institutional Bankers' Estimate System. The dispersion in analyst forecasts is the standard deviation of all outstanding long-term growth forecasts. Idiosyncratic risk is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama and French Benchmark Factors (Rm, SMB, HML) and the matched 48 industry portfolio return. All factor and portfolio returns were obtained from Ken French's website. All variables are Winsorized at the first and 99th percentiles.

	Summary statistics, second quarter of 1980 to fourth quarter of 2000					
	N	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**
Panel A. Institutional ownership						
Target IO (percent of total)	2,995	26.32	20.42	22.75	0.00	85.19
Non-overlapping target IO (pct of total)	2,995	13.09	8.91	13.63	0.00	61.30
Non-overlapping target IO (percent of IO)	2,816	51.07	50.66	30.87	0.00	100.00
Panel B. Deal characteristics						
Cash deal	2,995	0.38	0.00	0.49	0.00	1.00
Acquirer size (millions of dollars)	2,995	7,192	1,094	20,900	5	146,000
Target size (millions of dollars)	2,995	490	105	1,196	0	7,680
Relative size (percent)	2,992	17.69	11.28	18.27	0.00	85.77
Acquirer leverage (percent)	2,816	21.91	19.29	16.65	0.00	78.56
Target leverage (percent)	2,508	21.75	17.29	20.36	0.00	84.93
Acquirer M/B	2,834	2.42	1.30	3.25	0.63	22.04
Target M/B	2,537	2.02	1.30	2.05	0.45	14.01
Same industry	2,995	0.57	1.00	0.49	0.00	1.00
Panel C. Stock market data						
Acquirer announcement return (percent)	2,995	-1.17	-0.94	7.29	-24.08	20.82
Target announcement return (percent)	2,995	18.67	14.72	21.79	-24.50	97.37
Acquirer announcement volume (pct)	2,963	0.81	0.38	1.14	0.01	6.65
Normal volume (percent)	2,929	0.49	0.29	0.60	0.01	3.53
Panel D. Acquirer demand curve						
Dispersion in analyst forecasts (percent)	1,599	3.28	2.50	3.07	0.00	60.90
Idiosyncratic risk (percent)	2,853	8.06	6.71	4.66	2.54	27.59

Table 2. Turnover around merger announcements: individual holdings. We identify situations in a database of individual investor holdings at a large discount broker from 1991 to 1996 when the investor has a position in a target but not its acquirer in the month ending prior to the announcement of a stock-swap merger in the *Wall Street Journal*. The first row shows the number of successful stock-swap mergers, involving a public acquirer and with at least one matched individual investor with a position in the target but not the acquirer. We split the sample according to the number of months elapsed between the announcement and completion of a merger. The following ten rows show percentage turnover in this set of target positions over the nine months following the merger announcement and in the three-month period that the merger is successfully completed. Turnover in the quarter that the merger is completed occurs when one of the original investors still has a position in the target in the month prior to completion but does not have a position in the acquirer three months later. The next two rows compound the pre-completion and completion turnover to compute the percentage of the original investors that still has a position in the target at the month end prior to completion and that has a position in the acquirer three months later. The last two rows benchmark the post-completion holdings. The upper benchmark holdings reflects the corresponding turnover for situations in the individual investor database where an individual owns shares in a target but not its acquirer in 1991 for all deals that are announced in 1993 or later. The lower benchmark starts with the same situations and tracks the purchase of the acquirer shares. The final row reports the difference between post-completion holdings and the lower benchmark expressed as a percentage of the difference between the upper and lower benchmarks.

	Total months to completion									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9+**	**All**
Number of successful stock swaps	21	76	56	44	39	32	12	8	17	305
Announcement+1 turnover (percent)	11.4	16.4	11.0	8.6	9.6	7.4	20.4	10.0	6.5	12.1
Announcement+2 turnover (percent)		7.2	5.5	5.7	7.0	6.4	6.0	1.2	5.0	6.1
Announcement+3 turnover (percent)			4.0	6.3	3.8	5.4	4.1	6.3	1.4	4.4
Announcement+4 turnover (percent)				6.4	5.8	2.3	3.6	4.0	5.2	5.0
Announcement+5 turnover (percent)					1.7	3.2	2.1	2.8	4.4	2.9
Announcement+6 turnover (percent)						3.0	3.2	2.9	7.7	4.8
Announcement+7 turnover (percent)							3.3	4.4	10.1	6.5
Announcement+8 turnover (percent)								1.5	3.7	3.4
Announcement+9 turnover (percent)									3.1	3.1
Completion turnover (percent)	26.3	21.1	11.3	11.5	7.7	5.6	17.1	4.7	6.9	14.0
Pre-completion holdings (percent)	88.6	77.6	80.8	75.6	74.9	75.2	63.4	71.1	56.4	74.7
Post-completion holdings (percent)	65.3	61.2	71.6	66.9	69.1	70.9	52.6	67.8	57.2	64.1
Upper benchmark holdings (percent)	87.3	85.7	83.9	82.3	80.9	79.7	78.4	76.4	70.7	81.7
Lower benchmark holdings (percent)	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.4
Inertia (percent)	74.7	71.3	85.3	81.2	85.3	88.9	66.9	88.7	80.7	78.8

Table 3. Turnover around merger announcements: institutional holdings. We identify situations in the CDA/Spectrum Institutional Holdings database in which an institution has a position in a target but not its acquirer in the quarter ending prior to the announcement of a stock-swap merger in the *Wall Street Journal*. The first row shows the number of successful stock-swap mergers, involving a public acquirer and with at least one matched institution with a position in the target but not the acquirer. We split the sample according to the number of quarters elapsed between the announcement and completion of a merger. The following five rows show percentage turnover in this set of target positions over the four quarters following the merger announcement and in the quarter that the merger is successfully completed. Turnover in the quarter that the merger is completed occurs when one of the original institutions still has a position in the target in the quarter prior to completion but does not have a position in the acquirer in the quarter after completion. The next two rows compound the pre-completion and completion turnover to compute the percentage of the original institutions that still has a position in the target at the quarter end prior to completion and that has a position in the acquirer at the quarter end following the completion of the stock swap. The last two rows benchmark the post-completion holdings. The upper benchmark holdings reflects the corresponding turnover for situations in the CDA/Spectrum Institutional Holdings database when an institution owns shares in a target but not its acquirer in the quarter ending 12 quarters prior to announcement. The lower benchmark starts with the same situations 12 quarters prior to announcement and tracks the purchase of the acquirer shares. The final row reports the difference between post-completion holdings and the lower benchmark expressed as a percentage of the difference between the upper and lower benchmarks.

	Total quarters to completion					
	0	**1**	**2**	**3**	**4+**	**All**
Number of successful stock swaps	85	862	609	166	75	1,797
Announcement+1 turnover (percent)		37.5	30.3	27.8	36.0	34.4
Announcement+2 turnover (percent)			27.3	22.5	8.3	23.8
Announcement+3 turnover (percent)				18.5	12.9	17.5
Announcement+4 turnover (percent)					11.0	16.7
Completion turnover (percent)	72.7	51.3	39.6	27.2	26.6	43.6
Pre-completion holdings (percent)		62.5	50.7	45.6	33.8	55.0
Post-completion holdings (percent)	27.3	30.4	30.6	33.2	23.4	30.0
Upper benchmark holdings (percent)	85.3	77.2	70.9	66.0	56.9	73.1
Lower benchmark holdings (percent)	5.2	8.6	10.0	11.1	13.3	9.5
Inertia (percent)	27.6	31.8	33.9	40.3	23.2	32.3

Table 4. Turnover around merger announcements: subsamples based on deal characteristics. We repeat the analysis in Tables 2 and 3 for subsamples of stock swaps. See Tables 2 and 3 for details. In Panels A and D, we split the successful stock-swap mergers with at least one matched target position into three groups according the return in the two years ending one month prior to the announcement of the merger in the *Wall Street Journal*. In Panels B and E, we split the sample according to the relative size of the target and acquiring firms. Relative size is equal to the target market capitalization (price times shares outstanding from the Center for Research in Security Pricing) expressed as a percentage of the total market capitalization of the target and the acquirer. In Panel C, we split the sample of individuals according to whether or not any of their accounts are taxable.

	Pre-completion	Post-completion			
	Holdings	**Holdings**	**Upper**	**Lower**	**Inertia**
Panel A. Individuals, split on target two-year pre-announcement return					
<0%	75.2	61.2	79.9	0.2	76.5
0-20%	83.3	71.3	78.9	0.3	90.3
>20%	74.9	65.6	70.1	0.4	93.5
Panel B. Individuals, split on relative size					
<5%	77.1	62.7	74.8	0.3	83.8
5-25%	73.7	63.7	77.9	0.3	81.7
>25%	74.1	64.5	76.8	0.2	83.9
Panel C. Individuals, split on tax status					
Taxable	65.2	58.9	76.7	0.4	77.2
Tax-exempt	70.5	61.9	78.2	0.4	79.6
Panel D. Institutions, split on target two-year pre-announcement return					
<0%	53.5	33.1	73.4	9.4	37.0
0-20%	45.3	24.2	69.0	15.3	16.5
>20%	57.0	30.6	74.0	9.2	33.0
Panel E. Institutions, split on relative size					
<5%	54.6	31.6	74.5	9.2	34.4
5-25%	50.8	33.8	75.3	13.1	33.3
>25%	58.2	27.8	73.4	9.4	28.8

Table 5. Acquirer announcement returns. Regressions of acquirer merger announcement returns on target institutional ownership (IO) and deal characteristics. Panel A shows results for stocks-wap mergers, and Panel B shows results for cash mergers. The acquirer announcement return is the return in excess of the value-weighted market over a five-day window surrounding the announcement of the merger. Target institutional ownership is totaled from the CDA/Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. Non-overlapping target IO includes only those institutions that own no shares of the acquiring firm and is also expressed as a percentage of shares outstanding. M/B denotes the market-to-book ratio. The other deal characteristics are described in Table 1. All variables are Winsorized at the first and 99th percentiles. Announcement year fixed effects are included in all four specifications. Heteroskedasticity-robust *t*-statistics are reported in braces to the right of the corresponding point estimates.

	Announcement return (percent)							
	1		**2**		**3**		**4**	
Panel A. Stock deals								
Target IO	-3.87	[-4.72]	-2.59	[-2.17]				
Non-overlapping target IO					-8.17	[-5.44]	-5.49	[-3.07]
log(acquirer size)			0.42	[2.92]			0.34	[2.27]
log(target size)			-0.60	[-2.88]			-0.64	[-3.57]
Acquirer leverage			0.80	[0.50]			0.91	[0.56]
Target leverage			0.95	[0.85]			0.93	[0.84]
Acquirer M/B			-0.27	[-2.91]			-0.27	[-2.91]
Target M/B			0.24	[1.48]			0.24	[1.46]
Target announcement return			0.06	[5.16]			0.06	[5.16]
Same industry			-0.22	[-0.45]			-0.26	[-0.53]
Year fixed effects		Yes		Yes		Yes		Yes
N		1,851		1,475		1,851		1,475
R^2		0.03		0.08		0.03		0.08
Panel B. Cash deals								
Target IO	-0.43	[-0.49]	1.51	[1.27]				
Non-overlapping target IO					0.91	[0.68]	1.31	[0.75]
Additional controls		No		Yes		No		Yes
Year fixed effects		Yes		Yes		Yes		Yes
N		1,144		902		1,144		902
R^2		0.03		0.05		0.03		0.05

Table 6. Acquirer announcement volume. Regressions of acquirer merger announcement volume on normal volume, target institutional ownership (IO), and deal characteristics. Panel A shows results for stockswap mergers, and Panel B shows results for cash mergers. The acquirer announcement volume is the average daily volume over a five-day window surrounding the announcement of the merger expressed as a percentage of shares outstanding. Normal volume is the average daily volume over a 60-day window starting 90 trading days before the announcement of the merger and expressed as a percentage of shares outstanding. Target institutional ownership is totaled from the CDA/Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. Non-overlapping target IO includes only those institutions that own no shares of the acquiring firm and is also expressed as a percentage of shares outstanding. M/B denotes the market-to-book ratio. The other deal characteristics are described in Table 1. All variables are Winsorized at the first and 99th percentiles. Announcement year fixed effects are included in all four specifications. Heteroskedasticity-robust *t*-statistics are reported in braces to the right of the corresponding point estimates.

	Acquirer volume (percent)							
	1		**2**		**3**		**4**	
Panel A. Stock deals								
Target IO	1.07	[10.88]	0.59	[4.57]				
Non-overlapping target IO					1.70	[7.84]	0.86	[3.64]
Normal volume	1.35	[24.00]	1.27	[18.71]	1.34	[23.42]	1.26	[18.62]
log(acquirer size)			-0.19	[-11.61]			-0.18	[-10.90]
log(target size)			0.21	[10.16]			0.23	[12.44]
Acquirer leverage			-0.26	[-1.56]			-0.27	[-1.64]
Target leverage			0.26	[2.11]			0.26	[2.14]
Acquirer M/B			0.01	[0.55]			0.01	[0.71]
Target M/B			0.06	[3.24]			0.06	[3.27]
Target announcement return			0.57	[4.45]			0.59	[4.64]
Same industry			0.08	[1.61]			0.08	[1.52]
Year fixed effects		Yes		Yes		Yes		Yes
N		1,807		1,464		1,807		1,464
R^2		0.58		0.63		0.58		0.63
Panel B. Cash deals								
Target IO	0.21	[2.31]	0.12	[0.75]				
Non-overlapping target IO					0.27	[1.74]	0.11	[0.53]
Normal volume	0.99	[9.39]	0.88	[7.92]	0.99	[9.32]	0.88	[7.90]
Additional controls		No		Yes		No		Yes
Year fixed effects		Yes		Yes		Yes		Yes
N		1,122		898		1,122		898
R^2		0.44		0.42		0.44		0.42

Table 7. Acquirer announcement returns: interactions with proxies for demand-curve slope and relative size. Regressions of acquirer merger announcement returns (in stock deals only) on target institutional ownership (IO), acquirer demand-curve (DC) or relative-size proxies, interactions between the two, and deal characteristics. The acquirer announcement return is the return in excess of the value-weighted market over a five-day window surrounding the announcement of the merger. In Panel A, target institutional ownership is totaled from the CDA/Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. In Panel B, non-overlapping target IO includes only those institutions that own no shares of the acquiring firm and is also expressed as a percentage of shares outstanding. The first two regressions in each panel use dispersion in analyst long-term growth forecasts as a proxy for the slope of the acquirer demand curve; the next two regressions use idiosyncratic risk. The dispersion in analyst forecasts is the standard deviation of all outstanding long-term growth forecasts. Idiosyncratic risk is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama and French Benchmark Factors (*Rm, SMB, HML*) and the matched 48 industry portfolio return. The final two regressions in each panel focus on relative size, defined as the log of the ratio of target to acquirer market capitalization. All factor and portfolio returns were obtained from Ken French's website. The other deal characteristics are described in Table 1. All variables are Winsorized at the first and 99th percentiles. The demand curve variables are standardized to have zero mean and unit variance. Announcement year fixed effects are included in all four specifications. Heteroskedasticity-robust *t*-statistics are reported in braces to the right of the corresponding point estimates.

	Dispersion in analyst long-term growth forecasts				Non-industry idiosyncratic risk				Relative size			
	1		**2**		**3**		**4**		**5**		**6**	
Panel A. Target IO												
Target IO	-2.98	[-3.23]	-1.87	[-1.35]	-3.52	[-4.52]	-2.17	[-1.84]	-5.10	[-3.49]	-4.96	[-2.86]
Demand curve/ size (DC)	0.46	[0.86]	0.68	[1.23]	0.47	[1.38]	0.95	[2.22]	-0.27	[-1.70]		
Target IO * DC	-2.62	[-1.85]	-2.62	[-1.79]	-3.42	[-3.03]	-3.24	[-2.73]	-1.15	[-2.19]	-1.26	[-2.14]
Additional controls		No		Yes		No		Yes		No		Yes
Year fixed effects		Yes		Yes		Yes		Yes		Yes		Yes
N		1,186		999		1,771		1,454		1,835		1,475
R^2		0.03		0.09		0.04		0.08		0.04		0.08
Panel B. Non-overlapping target IO												
Non-overlapping target IO	-7.30	[-4.18]	-4.80	[-2.33]	-6.78	[-4.86]	-4.76	[-2.77]	-7.33	[-2.94]	-6.58	[-2.32]
Demand curve/size (DC)	0.24	[0.49]	0.46	[0.90]	0.19	[0.57]	0.60	[1.42]	-0.44	[-3.06]		
Non-overlapping target IO * DC	-4.79	[-1.61]	-4.99	[-1.61]	-3.00	[-1.47]	-2.84	[-1.35]	-0.61	[-0.59]	-0.71	[-0.58]
Additional controls		No		Yes		No		Yes		No		Yes
Year fixed effects		Yes		Yes		Yes		Yes		Yes		Yes
N		1,186		999		1,771		1,454		1,835		1,475
R^2		0.04		0.10		0.03		0.08		0.04		0.08

Table 8. Financing choice. Probit regressions of the form of payment (cash or stock) on target institutional ownership (IO) and deal characteristics. Target institutional ownership is totaled from the CDA/Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. Non-overlapping target IO includes only those institutions that own no shares of the acquiring firm and is also expressed as a percentage of shares outstanding. M/B denotes the market-to-book ratio. The other deal characteristics are described in Table 1. The coefficients show the impact of a unit change in the independent variable, evaluated at its mean, on the probability that the consideration is the acquiring firm's stock. All variables are Winsorized at the first and 99th percentiles. Announcement year fixed effects are included in all four specifications. Heteroskedasticity-robust *t*-statistics are reported in braces to the right of the corresponding point estimates.

	Consideration = stock							
	1		**2**		**3**		**4**	
Target IO	-6.83	[-1.65]	-20.76	[-3.30]				
Non-overlapping target IO					-45.02	[-6.67]	-61.95	[-7.21]
log(acquirer size)			-3.03	[-4.29]			-4.28	[-5.79]
log(target size)			6.34	[6.18]			7.04	[7.71]
Acquirer leverage			-12.39	[-1.78]			-11.03	[-1.59]
Target leverage			-5.47	[-0.98]			-6.19	[-1.10]
Acquirer M/B			4.82	[4.71]			4.92	[4.79]
Target M/B			0.92	[1.09]			0.86	[1.00]
Target announcement return			-0.43	[-8.18]			-0.41	[-7.88]
Same industry			13.87	[6.00]			12.58	[5.41]
Year fixed effects		Yes		Yes		Yes		Yes
N		2,995		2,377		2,995		2,377
R^2		0.04		0.15		0.05		0.16