

Corporate Financing Decisions When Investors Take the Path of Least Resistance

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We explore the consequences for corporate financial policy that arise when investors exhibit inertial behavior. One implication of investor inertia is that a firm pursuing a strategy of equity-financed growth will prefer a stock-for-stock merger over greenfield investment financed with an SEO. With a merger, acquirer stock is placed in the hands of investors, who, because of inertia, do not resell it all on the open market. If there is downward-sloping demand for acquirer shares, this leads to less price pressure than an SEO, and cheaper equity financing as a result. We develop a simple model to illustrate this idea, and present supporting empirical evidence. Both individual and institutional investors tend to hang on to shares granted them in mergers, with this tendency being much stronger for individuals. Consistent with the model and with this cross-sectional pattern in inertia, acquirer announcement effects are more negative when the target has higher institutional ownership.

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I. 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 may not be continuous and updating may not be fully rational, investors still can be thought of as processing new information and re-evaluating 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—which we add to below—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)), or the cognitive fixed costs associated with re-evaluating and re-optimizing an existing portfolio.¹

In this paper, we argue that investor inertia may exert a significant influence on financial-market outcomes. Our particular focus is the consequences of inertia for corporate financial policy, and the main idea can be illustrated with a simple example. Consider a firm A that needs to acquire a new physical asset—say a chemical plant—and that has no spare cash or debt capacity. The firm is faced with two options. First, it can do a seasoned equity offering (SEO) and use the proceeds to build the chemical plant from scratch. Alternatively, it can engage in a

¹ In a famous experiment, Kahneman, Knetsch and Thaler (1990) demonstrate that students who are randomly endowed with a coffee mug subsequently place a much higher reservation price on it than students who are not given a mug, and who are asked to bid on one. They argue that this behavior arises out of loss aversion (Kahneman and Tversky (1979)).

stock-for-stock merger with another firm T whose only asset is an exactly identical plant. Suppose that the purchase price is the same in either case, and that there are no other real-side distinctions, so that time-to-build and other such considerations can be ignored. The basic question we pose is this: is there any reason for firm A to prefer the stock-for-stock merger over the SEO-financed greenfield investment?

Note that in the standard corporate-finance framework, there is no meaningful difference between the two transactions, and hence no reason for firm A to prefer one over the other. In either case, the firm winds up with the same assets, and the same capital structure. Even if there is asymmetric information as in Myers and Majluf (1984), this argument still applies: equity-financed investment is equity-financed investment, so either deal should in principle carry the same information content.

We entertain two departures from the standard framework. First, we assume that there is a downward-sloping demand curve for firm A 's shares. This downward-sloping demand curve arises not from asymmetric information, but rather from irreducible differences of opinion among investors as to the value of A 's pre-existing assets. Second, and crucially, we assume that 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 an 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.²

Under these conditions, a stock-for-stock merger will be strictly more attractive to firm A than SEO-financed greenfield investment. The reason is that with a merger, some firm- A shares are simply absorbed by the inertial T investors, and thus are not ever floated on the open market.

² These two assumptions place the model in the broader literature of behavioral corporate finance that considers the impact of less-than-fully-rational investors on corporate investment and financing decisions. Early work in this area includes Fischer and Merton (1984), Morck, Shleifer, and Vishny (1990a), Blanchard, Rhee, and Summers (1993), and Stein (1996). See Baker, Ruback, and Wurgler (2004) for a survey.

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 as in an SEO. 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.³

This way of thinking about equity financing ties in closely with recent empirical work by Fama and French (2004). They document 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 actually quite substantial for most classes of firms. For example, over the period from 1999 through 2001, Fama and French find that S&P 100 firms raised an annual average of only 0.09 percent of assets via SEOs, but 1.05 percent via various forms of stock-based compensation, and 3.68 percent via mergers. In other words, the volume of equity finance raised in mergers was roughly 40 times that raised in SEOs.

As Fama and French (2004) point out, these stylized facts are problematic for 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 such a dominant substitute. Indeed, as noted above, a direct application of Myers-Majluf logic would seem to imply that stock-for-stock mergers face the same asymmetric-information problems as SEOs.⁴

³ Madrian and Shea (2001), and Choi, Laibson, Madrian and Metrick (2002, 2003) 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, very few workers choose to opt out, resulting in participation rates close to 100 percent. 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.

⁴ It is possible to augment the Myers-Majluf model so as to introduce a distinction between mergers and SEOs. Perhaps the terms of a merger have to be negotiated with target management, who are better informed about the value of acquirer assets than the typical outside shareholder, and who thus act as a certifier of acquirer-firm value.

In contrast, our theory not only explains why SEOs are rarely seen, it also provides an affirmative rationale for the use of stock-for-stock mergers in preference to SEOs.⁵ Of course, we do not mean to claim that there are not a variety of other factors that might also potentially drive a wedge between mergers and SEOs. For example, a merger may be more attractive to a firm than SEO-financed greenfield investment because it eliminates the delays associated with time-to-build. Nevertheless, the Fama-French (2004) facts are sufficiently striking that, at a minimum, the sort of thought experiment that we consider would seem to be well-motivated.

After fleshing out our idea with the aid of a simple model in Section II, we examine some of its empirical implications in Section III. 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.⁶ Even in such cases, target investors have a remarkably high likelihood of owning acquirer shares after the merger transaction closes. We estimate that roughly 80 percent of individuals behave as "sleepers", and simply accept any shares they are given in a merger without actively rebalancing in any way. For institutions, the estimated fraction of sleepers is significantly smaller, at around 30 percent, but still noteworthy.

The problem with this story is that it may well be possible for the acquirer to co-opt target management by offering a side payment (e.g., a seat on the board of the combined company) which would compromise their role as a certifier.

⁵ Our basic line of reasoning suggests that stock-based employee compensation may 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 will prefer to place stock with them than to sell it on the open market. This observation may help to resolve the puzzle of why firms give stock to low-level employees, where incentive effects are likely to be minimal. See, e.g., Bergman and Jenter (2003) and Oyer (2004).

⁶ As discussed below, 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.

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 will be 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 fairly robust evidence for this hypothesis. We also provide another clue that these return effects appear to be due to price pressure, as our model asserts: the acquirer has more abnormal trading volume around the announcement date when the target has a higher proportion of institutional shareholders.

II. The Model

A. 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 will be 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 cashflows from assets already in place. These assets in place will yield a liquidating dividend of D at time 2.

Our first crucial 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.

Taken together, these assumptions have the effect of creating a downward-sloping demand curve for firm- A assets.⁷ Given this 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

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

From (1), it is easy to see 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 cashflows. The intuition is that as the firm gets larger, shares must be absorbed by investors who are relatively less optimistic. Moreover, $\frac{d^2P_0}{dFdH} < 0$, so that an increase in heterogeneity amplifies the downward slope of the demand curve.

⁷ We use this particular formulation to ease the exposition. In fact, any set of assumptions that produces downward-sloping demand is sufficient. And, on this point, the empirical literature is fairly clear. Bagwell (1992) shows that investors have downward-sloping demand in Dutch auction share repurchases, and Shleifer (1986), Harris and Gurel (1986) and more recently Kaul, Mehrotra, and Morck (2000), Wurgler and Zhuravskaya (2002), and Greenwood (2004) 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.

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.

At time 1, the manager of firm A unexpectedly announces that he has decided to buy a specific asset—for concreteness, think of it as a chemical plant—and to finance it with an equity issue.⁸ The one remaining choice is how to implement the purchase, which can be carried out in one of two ways. The first option is a combination of greenfield investment and a seasoned equity offering (SEO). That is, firm A raises cash in an SEO, and uses this cash to build the plant from scratch. The second option is a stock-for-stock merger with a publicly-traded target firm T whose only asset happens to be the desired type of plant. The former case is more straightforward, and makes a natural benchmark, so we consider it first.

B. Greenfield Investment Financed by an SEO

It costs an amount K to build the plant as a greenfield investment. Once built, the plant increases firm A 's terminal dividend by $R^G > K$. For simplicity, we assume that there is no disagreement among the A -specialists as to the value added by the plant, so that once it is on the books, their expectations of terminal cashflow are uniformly distributed on the interval $[F + R^G, F + R^G + H]$.

⁸ In what follows, we assume that the A -manager is interested in equity-financed growth simply because it represents a positive-NPV investment. However, our results would be similar if instead we assumed that the A -manager was motivated by either: i) a desire to increase the size of his empire; or ii) a belief that his stock was overvalued, as in Stein (1996) or Shleifer and Vishny (2003), for example.

To finance construction of the plant, the SEO must be for enough shares to raise K . Let s^G denote the share of the company that is sold off in the SEO. In order to determine how big s^G needs to be, we have to solve for the equilibrium post-SEO market value of the firm at time 1, which we denote by P_1^G . Note that any A -specialists who were long at time 0 cannot participate in the SEO, since 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 $[F + R^G, P_0 + R^G]$.⁹ Since the market value of the shares they absorb is $s^G P_1^G$, equilibrium requires that

$$s^G P_1^G = \frac{W - P_0}{P_0 - F} (P_0 + R^G - P_1^G), \quad (2)$$

which can be re-written as

$$P_1^G = \frac{W - P_0}{W - P_0 + s^G (P_0 - F)} (P_0 + R^G). \quad (3)$$

Note that for any non-zero s^G , the SEO has price-pressure effects. That is, the time-1 market value of the firm P_1^G is necessarily less than $P_0 + R^G$ —the market value does not go up by the full amount of the added cashflows R^G from the new investment. Again, this is a direct consequence of the downward-sloping demand curve for firm- A assets—the SEO must be absorbed by the relatively less optimistic A -specialists, who were sitting out of the market prior to the issue.

The requirement that the SEO raise an amount K simply means that we must have $s^G P_1^G = K$. Using equation (3), this can be shown to be equivalent to

$$s^G = \frac{W - P_0}{((P_0 + R^G)(W - P_0) - K(P_0 - F))} K. \quad (4)$$

⁹ In order for the SEO to be able to raise K , 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.

Example (continued): As before, keep $F = 100$, $H = 100$, and $W = 300$. Suppose further that $K = 100$, and $R^G = 110$. This yields $s^G = 0.4412$, and $P_1^G = 226.67$. That is, 44.12 percent of the firm's shares are issued in the SEO, yielding proceeds of 100. (Note that $0.4412 \cdot 226.67 = 100$.) The market value of the stake held by pre-existing firm- A shareholders drops from 150 to 126.67—the SEO is accompanied by a negative price impact of 15.56 percent. After the SEO, 83.33 percent of the A -specialists have long positions.

C. Stock-for-Stock Merger

As an alternative to greenfield investment, firm A can seek to acquire firm T in a stock-for-stock merger. Firm T 's only asset is a plant similar to that which be built from scratch by firm A . In particular, if A acquires T , its terminal dividend increases by a certain amount R^M . The obvious benchmark case is when $R^M = R^G$, so that merger and greenfield investment yield identical cashflows. But we will also briefly consider the case in which $R^M < R^G$, so that there are some relative diseconomies associated with the merger—for example, the plant is not a perfect fit for the acquirer, or the target has some other assets which are costly for the acquirer to dispose of.

1. All target shareholders are awake

We make the following assumptions about target shareholders. First, none of them are 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 that, prior to the merger announcement at time 1, there is no overlap between the investors in firms A and T .¹⁰

Second, target shareholders are willing to sell out for an aggregate consideration of K , which is equal to the cost of greenfield investment for firm A . This is a natural normalization for our purposes. One way to rationalize it is to imagine that the plant is no longer of any use to the management of firm T , and that besides firm A and firm T , there are many other financially unconstrained firms in the economy to whom such a plant is worth exactly K . Competition among these other firms—who would pay in cash instead of shares—not only pins down the cost of greenfield investment (if the resources to build new plants are in limited supply) but also sets the reservation value for T 's shareholders when they auction off their firm.¹¹

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. Recall that these T -investors have relatively low valuations of M —they consider it to be worth only $(F + R^M)$ —as compared to the pool of A -specialists, whose valuations of M all exceed $(F + R^M)$. Thus one might expect that the T -investors would immediately take any shares in M that they received in a stock-for-stock exchange, and sell them off in the open market, where these shares would be absorbed by A -specialists, thereby replicating the outcome in the SEO case.

This logic is correct, if all T -investors are aware of the merger and behave rationally with respect to it. More precisely, it is easy to establish that, under full rationality, when $R^M = R^G$, the two transactions are identical: the fraction of the merged firm given to T -investors, s^M , is the

¹⁰ Nothing substantive changes if we allow for partial overlap.

¹¹ We do not explicitly model the details of this auction. Perhaps the easiest way to think of it is that the acquisition is negotiated between acquirer and target management, and that the former, knowing the latter's reservation value of K , makes a take-it-or-leave-it offer for this amount.

same as the fraction issued in the SEO case, s^G ; and the post-announcement market values, P_1^M and P_1^G , are also the same.

2. Some target shareholders are asleep

However, our primary interest is in exploring the consequences of investor inertia, so we posit that only a fraction $\alpha < 1$ of the T -investors are “awake”. These awake T -investors rationally sell off any shares in M that they receive in the merger. The remaining $(1 - \alpha)$ of the T -investors are “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 do not actively seek to buy shares that are 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.

In the presence of sleepers, we assume that the awake T -investors are the only ones who actively evaluate the bid from firm A .¹² 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 again denote the post-announcement market value of the merged firm by P_1^M , and the fractional stake given to *all* of the T -investors by s^M , the requirement that the bid be satisfactory to the awake T -investors amounts to $s^M P_1^M = K$. Note that this condition looks exactly the same as the analogous one in the greenfield case.

Where things differ is in the determination of P_1^M , the equilibrium post-announcement value of the merged firm. As a result of the sleeping T -investors who hang on to their shares,

¹² One might imagine that only awake T -investors are ever involved in negotiating the terms of the merger with the acquirer. In reality, a friendly merger typically requires approval of a majority of *those shareholders who actually vote*, which suggests that this assumption is well-motivated. In other words, if sleepers do not vote, having a large fraction of sleepers does not interfere with getting a deal done.

only a fraction αs^M of the merged firm comes on the market, and hence only this fraction αs^M must be absorbed by the pool of previously-sidelined A -specialists. Thus equation (3) is modified as follows:

$$P_1^M = \frac{W - P_0}{W - P_0 + \alpha s^M (P_0 - F)} (P_0 + R^M). \quad (5)$$

Similarly, the analog to equation (4) is now

$$s^M = \frac{W - P_0}{((P_0 + R^M)(W - P_0) - \alpha K (P_0 - F))} K. \quad (6)$$

Example (continued): As before, keep $F = 100$, $H = 100$, $W = 300$, $K = 100$, and $R^M = 110$. Assume the fraction of sleepers among T -investors is given by $\alpha = 0.50$. These parameters yield $s^M = 0.4110$, and $P_1^M = 243.31$. That is, 41.10 percent of the firm's shares are issued in the SEO. (Note that the value of the merger bid, evaluated at market prices, is $0.411 \cdot 243.31 = 100$.) The market value of the stake held by pre-existing firm- A shareholders drops from 150 to 143.31—the merger is accompanied by a negative price impact of 4.46 percent. After the merger, 66.67 percent 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.

As can be seen, if $R^M = R^G$, the initial shareholders in firm A are strictly better off with the stock-for-stock merger than with greenfield investment financed by an SEO: they give up a smaller stake in the merged firm, and suffer a smaller adverse price hit upon announcement of the deal.¹³ Their gains come at the expense of the sleeping T -investors. In the greenfield case,

¹³ More generally, what happens when $R^M < R^G$? Now the choice depends on just how optimistic the manager of firm A is. Assuming he owns some stock—or acts on behalf of his initial shareholders—the manager of A prefers

the sleepers are not harmed by their inertial behavior, because given their low valuations of firm- A assets, there is never any reason for them to participate in the SEO. In contrast, with a stock-for-stock merger, the sleepers wind up with shares that—if they were to think about it—they would consider to be worth less than what they had before the deal. The failure of the sleepers to unload their stake in the merged firm makes bidding-firm shareholders better off, as it reduces the quantity that must be absorbed by the A -specialists, and hence the price impact of the merger.

This discussion makes it clear that our results are driven by the interplay of two key assumptions. First, we require a downward-sloping demand curve for the assets of the acquirer firm; this downward-sloping demand curve is in turn the product of differences of opinion and a short-sales constraint. And second, we also require that some non-zero fraction of target-firm shareholders behave as sleepers, and automatically hang on to any shares that they are granted in a stock-for-stock merger. If either of these assumptions fails to hold, then for $R^M = R^G$, SEO-financed greenfield investment and the stock-for-stock merger become equivalent transactions.

D. Empirical Implications

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

Proposition 1: Mergers vs. Greenfield Investment

(i) If a firm can acquire approximately the same assets via a merger as through greenfield capital expenditures, it will prefer the merger. (ii) Moreover, this preference for mergers over

merger to greenfield investment if: $(1 - s^M)(E(D) + R^M) > (1 - s^G)(E(D) + R^G)$, where $E(D)$ is the manager's expectation of the cashflow coming from firm A 's original (pre-transaction) assets. With $(1 - s^M) > (1 - s^G)$, the manager will have a stronger preference for a merger the greater is $E(D)$, all else equal. In other words, he will be willing to tolerate a larger shortfall of R^M relative to R^G . The intuition is that the merger allows the original shareholders to part with a smaller stake, and this is worth more the more optimistic one is about the prospects for firm A 's assets.

capital expenditures will be more pronounced when: the difference of opinion among acquiring-firm investors is greater; or (iii) when the firm is financially constrained.

We have already discussed the intuition for parts (i) and (ii) of the proposition. As to part (iii), which concerns the role of financial constraints, note that since the model presumes the need for equity financing, and since downward-sloping demand curves are to some degree problematic for equity financing of any type, our general predictions should be largely confined to those firms that do not have sufficient spare cash or debt capacity to avoid an equity issue altogether.¹⁴

Proposition 2: Merger Announcement Effects

(i) All else equal, an increase in the fraction of awake target-firm investors strengthens the adverse impact of a stock-for-stock merger announcement on the price of the bidding firm.

(ii) There is an interaction effect between the slope of the demand curve and the fraction of awake investors: a steeper demand curve amplifies the negative stock-price consequences of awake investors. Thus, denoting the announcement price impact by ΔP , we have that: (i) $\frac{d\Delta P}{d\alpha} < 0$; and (ii) $\frac{d^2\Delta P}{d\alpha dH} < 0$.

Proposition 2 follows immediately from the comparative-statics properties of the model with respect to the parameters α and H . Part (i) of the proposition forms the basis for one of our

¹⁴ A firm that considers its stock to be overvalued, and that wants to exploit this overvaluation, can be thought of as “financially constrained” in our sense—issuing equity is essential to any transaction it undertakes. Our model then explains why stock-for-stock mergers are more attractive for such a firm than equity-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 equity-financed capital expenditures.

main empirical tests below. Part (ii) is harder to test directly, because it requires us to measure the slope of the demand curve facing a given firm. Nevertheless, we take some tentative steps in this direction, using a couple of different proxies for demand-curve slope.

E. Further Issues

1. Merger arbitrage

In the model developed above, 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. Neither of the two propositions above is changed, though the model may now also admit 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 $1\frac{1}{2}$. Moreover, since 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 will want to sell their shares in T immediately, as of time 1. But the previously-sidelined A -specialists may prefer to buy A shares when their price falls at this time, rather than buying T shares. This is because their primitive preference is for A assets, and there is a risk that the T shares will 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 $\frac{s^M}{1-s^M}$ A shares to the A -specialists.¹⁵ If the deal does indeed go through, each side of the arbitrage trade will convert into the same number of shares in the merged firm M . If not, arbitrageurs will be left with an unhedged position in T and A shares.

As long as the completion risk is small, the results for prices at time 1 should remain approximately the same as described above. That is, the adverse impact to A 's stock price will occur primarily on announcement of the deal, rather than on completion, and will continue 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.

Proposition 3: 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 will sell on announcement of the deal, and there will be no trading volume in the target.

¹⁵ Note that 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 the fundamental risk involved.

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.¹⁶ These predictions for volume are a useful complement to our predictions for acquirer stock returns in Proposition 2 above. If both Propositions 2 and 3 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.

2. Capital gains taxes

We have not yet addressed the following important 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? In other words, might we be able to generate all of our results by appealing to nothing more than such taxes?

The basic answer is no. Let us begin with the simplest case, in which all target shareholders are symmetric with respect to tax considerations—all have the same basis, and all face the same marginal tax rate on capital gains. It is certainly true that, conditional on doing a merger, these shareholders will have a preference for receiving the consideration in shares, rather than in cash, because the former allows them to avoid the capital-gains tax. So the tax-driven prediction is that a relatively large fraction of mergers should be done on a stock-for-stock, rather than cash basis.

¹⁶ An important caveat is that this short-selling will only occur 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 will not want to short the acquirer. See Mitchell, Pulvino and Stafford (2004) for an analysis of this issue.

However, our Proposition 1 is about something logically distinct: a preference on the part of the acquirer for a stock-for-stock merger over the combination of greenfield investment and an SEO. And here the tax story does not help, because the greenfield-investment option does not impose a tax burden on anybody. Thus even in the limit where a merger could be executed in a completely tax-free fashion, there would still be no tax-related reason to strictly prefer the merger.

In contrast to Proposition 1, Propositions 2 and 3 are about cross-sectional differences in the degree of sleepiness across target firms. In principle, it is possible that these differences could be related to tax considerations.¹⁷ For example, if institutional investors are always tax exempt, and individuals are not, this might explain why individuals are more prone to hang on to their shares after a merger than institutions. But taxes alone cannot generate the sorts of patterns in acquirer announcement returns predicted by Proposition 2.

To see why, consider a target firm in which all investors are heavily-taxed individuals. It may be true that these individuals will be 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 will 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. As long as everybody is rational, the acquirer must bear the cost of inefficiently placing shares in the wrong hands. In contrast, if target shareholders are non-taxable institutions, the shares will ultimately make their way into the right hands, those of the previously-sidelined *A*-investors who value them more highly.

¹⁷ This does not seem to be the case empirically, however. We show below that the degree of sleepiness does not seem to vary much with proxies for capital-gains-tax exposure. For example, sleepiness is not noticeably more pronounced in target firms that have had large price run-ups over the past few years.

Example (continued): As before, keep $F = 100$, $H = 100$, $W = 300$, $K = 100$, and $R^M = 110$. Consider two cases. In the first case, all target shareholders are fully awake, and there are no taxes. As we have seen, this yields the same outcome as in the SEO, where 44.12 percent 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 they have a reservation price of 100. So to get them to sell, they must be given 47.62 percent of the combined firm ($100/210 = 0.4762$), which is more than in the case with no taxes.

The bottom line is that 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 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 2.

III. Empirical Analysis

Our empirical work is divided into two parts. First, we simply document 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 2 and 3.

We show that acquirer announcement returns are more negative in transactions where 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.

A. Data

Our sample of mergers includes 1,891 successfully completed stock-swap transactions announced between the second quarter of 1980 and the fourth quarter of 2000. We require that each deal involves a public acquirer, with a matched announcement return available from CRSP. 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. We track institutional holdings starting in the quarter prior to announcement. Information on individual investor holdings comes from the records of a discount brokerage firm (this is the Odean (1998) data) and is available only from 1991 to 1996. We also make use of a variety of CRSP and Compustat variables, as well as analyst forecast data from IBES.

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. 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. 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 (6) at the fiscal year end prior to announcement. Acquirer and target market-to-book are equal to book assets minus book

equity (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 included in the same Fama and French (1997) 48-industry grouping.

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 acquirer demand-curve proxies, constructed from data in CRSP and IBES. Idiosyncratic risk is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama-French factors (R_M , SMB , HML), and the matched 48-industry portfolio return.¹⁸ Following Scherbina (2002), we use dispersion in analyst forecasts as a measure of disagreement about fundamental value. Analyst dispersion is the standard deviation of all outstanding earnings per share forecasts for the fiscal year preceding the announcement of the merger, scaled by the book value of equity per share.¹⁹

B. Investor Inertia

1. Methodology

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

¹⁸ All factor and portfolio returns were obtained from Ken French's website.

¹⁹ For details on this calculation, see Sadka and Scherbina (2004).

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 that we see ten percent of the target-only investors selling their shares during the course of this year. Should we draw the conclusion that ten percent 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.

Figure 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 percent of the original target-only investors are still holding their positions, which have now converted into shares of the acquirer.

The upper solid line in Figure 1, which starts out at 100 percent and declines gradually, is the “fully passive” benchmark. This 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 percent of investors are expected to continue to hold their target shares seven quarters later, even if they pay no attention to the merger. The lower solid line, which starts out at zero percent and increases gradually, is the “fully active” benchmark. The idea here is that an investor who is awake and sells out of 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 percent of the original target-only investors in this example would be expected to have a position in 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.²⁰

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 fully active benchmark (labeled a in Figure 1), divided by the difference between the fully passive benchmark and the fully active benchmark (labeled b in Figure 1). In other words, inertia measures, in relative terms, how close post-completion holdings are to the fully passive

²⁰ In the institutional data, we calculate the fully passive and fully active benchmarks by examining the behavior of investors in the same set of target stocks in the period beginning twelve quarters before merger announcement. For the purpose of computing the benchmark, we again focus on those target investors who have no initial position in the acquirer. The fully passive benchmark is these investors’ propensity to close out their position in the *target* over various horizons, and the fully active 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 on all deals that are announced in 1993 or later.

benchmark, as opposed to the fully active benchmark. In the specific example shown in Figure 1, inertia at completion is 44.9 percent ($44.9 = 32 - 14$ divided by $53 - 14$).

2. Individual investor inertia

Table 2 presents our analysis of inertia among individual investors. This analysis is restricted to the 305 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.

For example, the first column of Table 2 shows that we have 21 mergers with a time to completion of one month.²¹ In these transactions, 11.4 percent of pre-merger individual investors close out their positions in the target *before* completion; thus pre-completion holdings are 88.6 percent ($88.6 = 100 - 11.4$). Of the remaining 88.6 percent, another 26.3 percent close out their positions within three months *after* completion, leaving net post-completion holdings at 65.3 percent ($65.3 = 88.6 \cdot (1 - 0.263)$) 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 to the fully passive four-month benchmark of 87.3 percent, which means that, in a typical non-merger-affected, four-month period for the full set of target stocks, 12.7 percent of individual investors close out their positions. It can also be compared to the fully active four-month benchmark of 0.3 percent,

²¹ Specifically, a merger is considered to have a time to completion of one month if it is announced at any time during one calendar month and completed at any time during the next.

which means that in a typical non-merger-affected, four-month period for the full set of target stocks, only 0.3 percent of individual investors in the target who do not initially have a position in the acquirer open a new position in the acquirer.²² Putting it all together, we calculate inertia of 74.7 percent 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 very 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 percent, and inertia is 78.3 percent. Thus, loosely speaking, we estimate that about 80 percent 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, it is important to note that 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. Figure 2 highlights the conclusions in Table 2 graphically. Across all merger horizons, the ownership percentage falls at a similar rate to that of the passive benchmark. Essentially all horizons are within ten percent of this upper benchmark. Given that the active benchmark never gets above one percent, it is clear that the inertia among individual target investors is substantial.

3. Institutional investor inertia

Table 3 undertakes an analogous exercise for institutional investors. Because of the broader coverage of the CDA Spectrum data, we are able to include 1,797 mergers in this

²² The finding that the lower benchmark is so low for individual investors is a consequence of the low diversification of individual investors. The median investor in our dataset holds two stocks at any given time.

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.

Aggregating across all transactions, we find that 30.0 percent of pre-merger institutional investors hold on to their positions through completion, substantially less than the corresponding figure of 64.1 percent for individuals. The baseline rate of turnover is also higher. However, the first effect dominates and inertia is significantly lower, at 32.3 percent for institutions, as compared to 78.3 percent for individuals. In contrast to the individual investor turnover in Figure 2, institutional holdings in Figure 3 decline at significantly faster rate than the passive benchmark across all merger completion horizons. By the conclusion of most of the mergers, the institutional holdings lines are all closer to the active benchmark than to the passive one. Nonetheless, even the institutional holdings are considerably higher than the active benchmark, suggesting, under the assumptions of the model, that a stock swap is a more attractive way to raise equity than an SEO regardless of the target's ownership structure.

Undoubtedly though, institutions are much less passive than individuals. We take advantage of this fact in what follows, using the fraction of institutional investors in the target firm as a proxy for the parameter α in our model. This allows us to undertake direct tests of Propositions 2 and 3.

4. Investor inertia, capital gains taxes, and relative size

Before proceeding to Propositions 2 and 3, we consider whether there is an identifiable rational component to investor inertia. In particular, capital gains taxes might push investors to hold on to appreciated stock in a merger and sell stock that has fallen in value. Or, if the target is

large relative to the acquirer, a target investor with no revealed preference for the acquirer may rationally 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 subsamples of mergers, based on pre-announcement return and relative size. Panels A and C calculate individual and institutional turnover 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 percent. However, the differential across groups is quite modest.²³ Even mergers where the target has recently declined in value also involve considerable inertia; indeed, the inertia statistic of 76.5 percent for this group is close to the full-sample value of 78.3 percent.

With institutions, there is no evidence 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 where tax considerations would suggest that there should be the *least* inertia.

Panels B and D 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 mergers of widely varying relative size. Institutions, on the other hand, appear slightly less passive when the target is large, accounting

²³ Two effects combine to make the inertia statistic greater among targets that have experienced large positive returns. First, post-completion holdings are greater, consistent with a capital-gains tax story. And second, the upper (fully active) benchmark is lower, consistent with the disposition effect (Shefrin and Statman (1985)). Thus, if anything, the modest differences in the inertia statistic that we document probably overstate the pure impact of capital-gains-tax considerations.

for at least 25 percent of combined firm value. Again, this result goes in the opposite direction relative to a simple rational story: mergers with large targets represent situations where 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.

C. 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. In particular, Tables 5 through 7 present our tests of Propositions 2 and 3. The first part of Proposition 2 is that target-investor inertia leads to less negative acquirer announcement returns. A corollary laid out in Proposition 3 is that this effect works through volume, so that target-investor inertia leads to lower acquirer announcement volume at the same time. The second part of Proposition 2 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.

1. Institutional ownership and acquirer announcement returns

In Table 5, we use target institutional ownership as a proxy for the fraction of target shareholders that are awake, and regress acquirer announcement return on target institutional ownership. The first regression has no other controls. This univariate specification generates a coefficient of -3.91 on institutional ownership, which is strongly statistically significant (t -statistic = 4.80), consistent with Proposition 2.

However, because institutions tend to own larger firms, it is possible that this result is a size effect—stock-financed takeovers generally result in negative announcement returns, and

takeovers of larger firms have larger effects. To address this concern, we include size controls in the remaining regressions. Indeed, when we add the log of relative size as an explanatory variable, it comes in significantly negative, and the coefficient on institutional ownership falls to -2.98 . Nevertheless, this coefficient remains statistically significant, with a t -statistic of 3.56 .

In the final two regressions, we include a variety of additional controls. Some 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)). We do include several other variables described in Table 1: 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.²⁴

One competing explanation for the effect of institutional ownership has to do with bargaining power. Perhaps institutional blockholders are able to extract a better price from the acquiring firm, leading to lower acquirer announcement returns. It is for this reason that we include the target announcement return as an additional control. As it turns out, this has a significant, but *positive*, relationship with acquirer returns.²⁵ In any case, neither this, nor any of the other added controls has a material impact on the basic relationship of interest: the coefficients on institutional ownership in the last two columns are -3.49 and -2.90 respectively.

²⁴ Lang, Stulz, and Walkling (1989) and Morck, Shleifer, and Vishny (1990b) consider the impact of the motivations of acquirer management on announcement returns. These considerations are unlikely to interfere with the relationship between the target ownership structure and acquirer announcement returns, but just to be sure, we include controls that capture target and acquirer resources, growth prospects, and the relatedness of the two firms. Of these, only the acquirer market-to-book has a statistically significant effect.

²⁵ This is unlikely to be a causal relationship. More plausibly, some mergers are just better than others in which case both acquirer and target returns are high.

In terms of economic magnitudes, our four specifications imply that a two-standard deviation increase in target institutional ownership moves the announcement return from its unconditional mean value of -2.26 percent to somewhere between -3.62 and -4.10 percent, i.e., an increase in absolute value of between 60 to 80 percent relative to the mean. Overall then, the results of Table 5 provide fairly clear-cut support for the first part of Proposition 2.

2. Institutional ownership and acquirer announcement volume

The model makes the ancillary prediction that the impact on acquirer announcement returns works through trading volume, as in Proposition 3. 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. Empirically, this is similar in spirit to Mitchell, Pulvino, and Stafford (2004), who look at situations where merger arbitrageurs are likely to initiate short positions in the acquiring firm. Here, institutional ownership is the proxy for the selling pressure that pushes down the price of the acquirer. Examining volume also serves as a second check on alternative hypotheses linking institutional ownership and acquirer returns. For example, if institutional ownership affects acquirer returns through a mechanism like 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 an additional control. Across all four specifications, the results are uniformly supportive of Proposition 3. The coefficient on target

institutional ownership ranges from 0.64 to 1.14, depending on the specification, and in each case is strongly statistically significant. The implied economic effects are again substantial: a two-standard deviation increase in target institutional ownership increases the average acquirer's daily turnover during the announcement period from a mean of 1.01 percent to between 1.35 and 1.61 percent, or by between 33 and 59 percent.

3. Demand curve interactions

There are two ingredients to our model: inertia among target shareholders, and a downward-sloping demand curve for acquirer shares. Thus, as formulated in the second part of Proposition 2, we expect that our results will 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 calculate the standard deviation of all outstanding analysts' forecasts for earnings per share for the fiscal year preceding the announcement of the merger, scaled by the book value of equity per share.

The second proxy is the non-industry 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-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).²⁶ 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.

Table 7 presents regressions of acquirer announcement returns on target institutional ownership, our measures of the slope of the demand curve facing the acquirer, and the product of the two variables. Our theory suggests that target institutional ownership should result in more negative acquirer announcement returns when the acquirer demand curve is especially steep. That is, the interaction term should contribute negatively in explaining announcement returns. The first three sets of regressions employ idiosyncratic risk as a measure of the steepness of the acquirers demand curve. The second three employ dispersion in analyst forecasts. In the second and third regressions in each set we add the various controls employed earlier.

The results in Table 7 provide additional corroboration of the model. The interaction of idiosyncratic risk and institutional ownership is negative and statistically significant in each specification. Idiosyncratic risk is standardized in these regressions to have zero mean and unit variance. So the fact that target institutional ownership and the interaction term are of about the same magnitude means that a one-standard-deviation increase in idiosyncratic risk roughly doubles the effect of institutional ownership on acquirer announcement returns. Dispersion in analyst forecasts has similar economic significance, but in this case all three specifications fail to produce statistically significant coefficients on the interaction term.

²⁶ In particular, see equation 4 of Chen, Hong, and Stein (2002). This equation demonstrates that the sensitivity of price to supply shocks is larger in absolute value when the risk tolerance of the heterogeneous buyers is small. An increase in idiosyncratic risk has an analogous effect. See also Novy-Marx (2004) for more on the general argument that risk aversion makes demand curves slope downward, and hence creates the appearance of illiquidity.

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

IV. Conclusion

Most people are reluctant to make an active decision. Instead, they tend to follow the path of least resistance, accepting the default choice. 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 friendly 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 percent 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—inertia makes an SEO less attractive than a stock-swap merger as a way to support a strategy of rapid, equity-financed growth.

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Figure 1. Calculating inertia. To calculate the fraction of investors that are passive with respect to a merger transaction, we compare their holdings to 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 to 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.

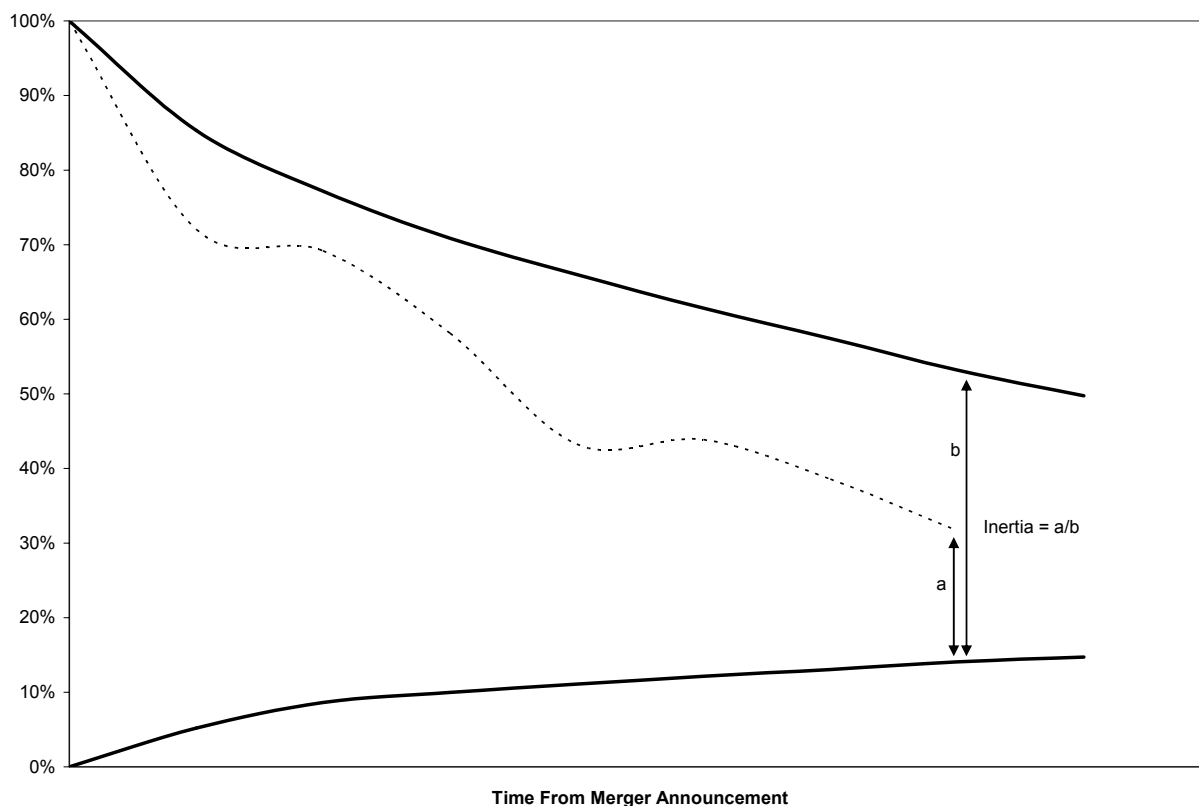


Figure 2. Turnover around merger announcements: Individual holdings. We identify situations in a database of individual investor holdings at a large discount broker from 1991 to 1996 where the investor has a position in a target but not its acquirer in the month ending prior to the announcement of a 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 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.

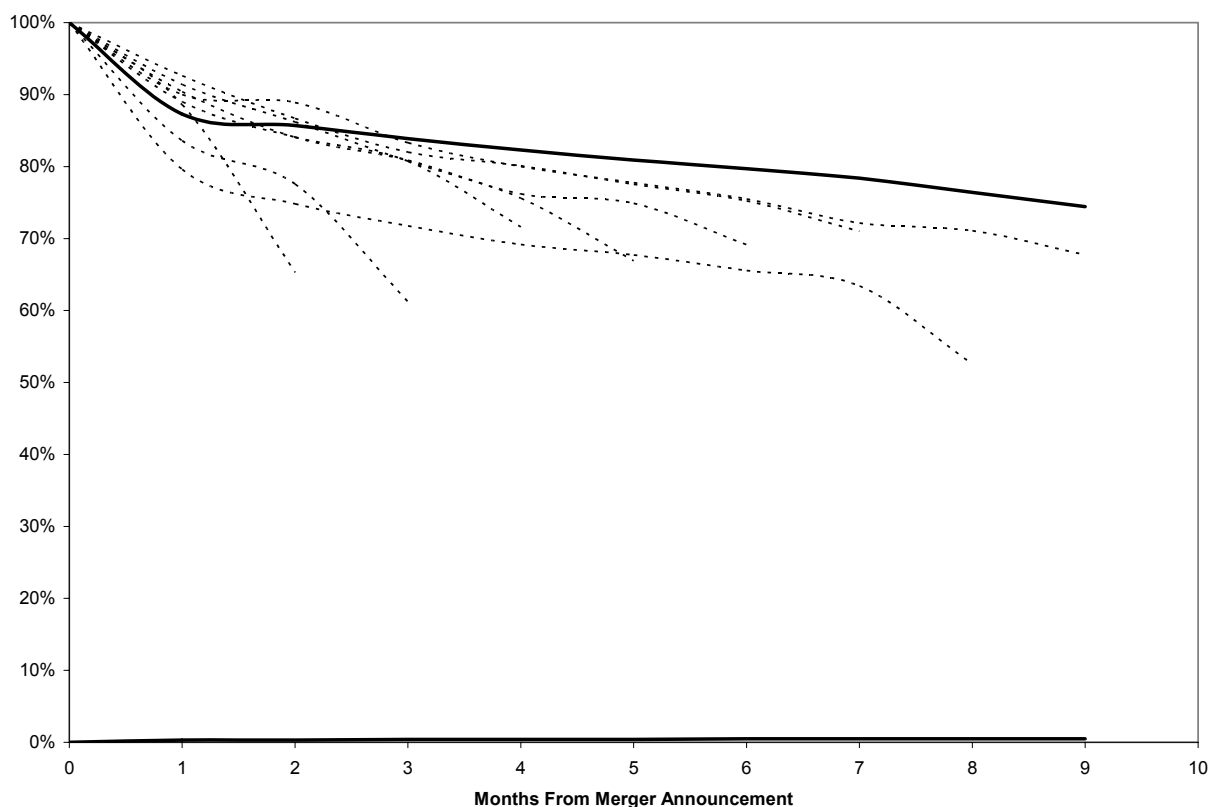


Figure 3. Turnover around merger announcements: Institutional holdings. We identify situations in the CDA Spectrum Institutional Holdings database where an institution has a position in a target but not its acquirer in the quarter ending prior to the announcement of a stock-swap merger in the *Wall Street 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 where an institution owns shares in a target but not its acquirer in the quarter ending *twelve quarters prior* to announcement. The lower benchmark starts with the same situations twelve quarters prior to announcement and tracks the purchase of the acquirer shares.

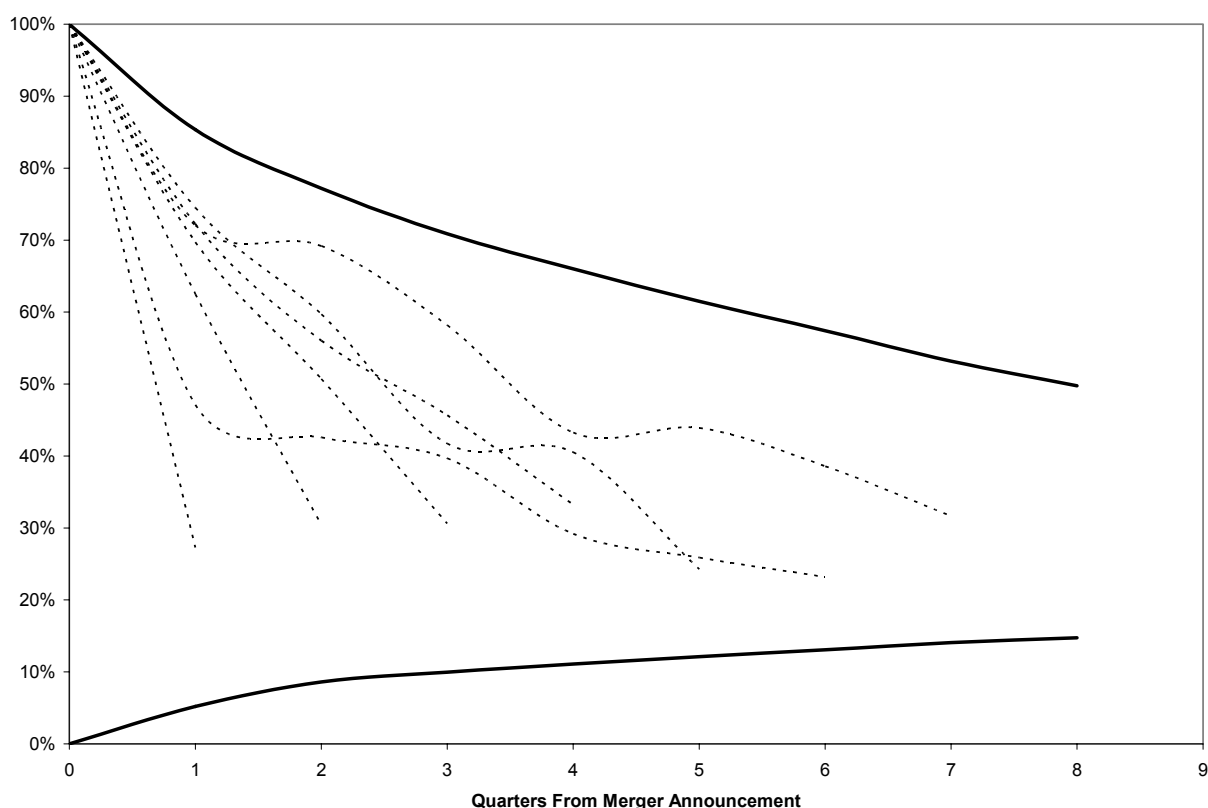


Table 1. Stock swap mergers: Summary statistics. The sample includes successful stock-swap mergers announced between 1980 Q2 and 2000 Q4, involving a public acquirer with a matched announcement return from CRSP. Target institutional ownership is totaled from the CDA Spectrum Institutional Holdings database for the quarter prior to the announcement of the merger and expressed as a percentage of shares outstanding. The deal characteristics in Panel B are from CRSP and Compustat. 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 interest bearing debt (9+34) from Compustat expressed as a percentage of book assets. Acquirer and target market to book 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 IBES. Idiosyncratic risk is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama-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. The dispersion in analyst forecasts is the standard deviation of all outstanding earnings per share forecasts for the current fiscal year, scaled by the book value of equity. For details, see Sadka and Scherbina (2004). All variables are Winsorized at the first and 99th percentiles.

	Summary Statistics, 1980Q2-2000Q4					
	N	Mean	Median	SD	Min	Max
Panel A. Institutional Ownership						
Target Institutional Ownership (%)	1,891	26.30	19.89	23.47	0.02	86.41
Panel B. Deal Characteristics						
Acquirer Size (\$M)	1,891	6,990	1,164	19,900	6	143,000
Target Size (\$M)	1,891	673	127	1,720	1	11,400
Relative Size (%)	1,889	18.44	13.58	16.64	0.01	72.51
Acquirer Leverage (%)	1,777	20.42	17.25	16.11	0.01	71.66
Target Leverage (%)	1,568	19.95	13.99	19.90	0.00	82.70
Acquirer M/B	1,788	2.92	1.37	4.30	0.75	28.24
Target M/B	1,584	2.30	1.31	2.63	0.57	17.52
Same Industry	1,824	0.50	1.00	0.50	0.00	1.00
Panel C. Stock Market Data						
Acquirer Announcement Return (%)	1,891	-2.26	-1.82	7.75	-27.07	18.40
Target Announcement Return (%)	1,891	14.63	12.01	19.10	-24.65	79.80
Acquirer Announcement Volume (%)	1,867	1.01	0.48	1.40	0.02	8.06
Normal Volume (%)	1,844	0.55	0.30	0.70	0.02	4.01
Panel D. Acquirer Demand Curve						
Idiosyncratic Risk (%)	1,800	8.47	6.90	5.19	2.20	28.65
Dispersion in Analyst Forecasts (%)	1,346	0.72	0.40	1.01	0.00	6.74

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 where 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 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									All
	1	2	3	4	5	6	7	8	9+	
Number of Successful Stock Swaps	21	76	56	44	39	32	12	8	17	305
Announcement+1 Turnover (%)	11.4	16.4	11.0	8.6	9.6	7.4	20.4	10.0	6.5	12.1
Announcement+2 Turnover (%)		7.2	5.5	5.7	7.0	6.4	6.0	1.2	5.0	6.1
Announcement+3 Turnover (%)			4.0	6.3	3.8	5.4	4.1	6.3	1.4	4.4
Announcement+4 Turnover (%)				6.4	5.8	2.3	3.6	4.0	5.2	5.0
Announcement+5 Turnover (%)					1.7	3.2	2.1	2.8	4.4	2.9
Announcement+6 Turnover (%)						3.0	3.2	2.9	7.7	4.8
Announcement+7 Turnover (%)							3.3	4.4	10.1	6.5
Announcement+8 Turnover (%)								1.5	3.7	3.4
Announcement+9 Turnover (%)									3.1	3.1
Completion Turnover (%)	26.3	21.1	11.3	11.5	7.7	5.6	17.1	4.7	6.9	14.0
Pre-Completion Holdings (%)	88.6	77.6	80.8	75.6	74.9	75.2	63.4	71.1	56.4	74.7
Post-Completion Holdings (%)	65.3	61.2	71.6	66.9	69.1	70.9	52.6	67.8	57.2	64.1
Upper Benchmark Holdings (%)	87.3	85.7	83.9	82.3	80.9	79.7	78.4	76.4	70.7	81.7
Lower Benchmark Holdings (%)	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6
Inertia (%)	74.7	71.3	85.3	81.2	85.3	88.9	66.9	88.7	80.7	78.3

Table 3. Turnover around merger announcements: Institutional holdings. We identify situations in the CDA Spectrum Institutional Holdings database where 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 where an institution owns shares in a target but not its acquirer in the quarter ending *twelve quarters prior* to announcement. The lower benchmark starts with the same situations twelve 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					All
	0	1	2	3	4+	
Number of Successful Stock Swaps	85	862	609	166	75	1,797
Announcement+1 Turnover (%)		37.5	30.3	27.8	36.0	34.4
Announcement+2 Turnover (%)			27.3	22.5	8.3	23.8
Announcement+3 Turnover (%)				18.5	12.9	17.5
Announcement+4 Turnover (%)					11.0	16.7
Completion Turnover (%)	72.7	51.3	39.6	27.2	26.6	43.6
Pre-Completion Holdings (%)		62.5	50.7	45.6	33.8	55.0
Post-Completion Holdings (%)	27.3	30.4	30.6	33.2	23.4	30.0
Upper Benchmark Holdings (%)	85.3	77.2	70.9	66.0	56.9	73.1
Lower Benchmark Holdings (%)	5.2	8.6	10.0	11.1	13.3	9.5
Inertia (%)	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 the first and the third panels, 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 the second and fourth panels, 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 CRSP) expressed as a percentage of the total market capitalization of the target and the acquirer.

	Pre-Completion	Post-Completion			
	Holdings	Holdings	Upper	Lower	Inertia
Panel A. Individuals, Target 2-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, 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. Institutions, Target 2-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 D. Institutions, 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 merger announcement returns. Regressions of acquirer merger announcement returns on target institutional ownership 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. 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. 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.

	Announcement Return (%)							
	Coef	[t]	Coef	[t]	Coef	[t]	Coef	[t]
Target Institutional Ownership	-3.91	[-4.80]	-2.98	[-3.56]	-3.49	[-3.51]	-2.90	[-2.41]
log(Target Size/Acquirer Size)			-0.59	[-5.02]	-0.44	[-3.12]		
log(Acquirer Size)							0.42	[2.95]
log(Target Size)							-0.56	[-2.77]
Acquirer Leverage					0.71	[0.43]	0.77	[0.47]
Target Leverage					1.04	[0.92]	1.10	[0.97]
Acquirer M/B					-0.24	[-2.82]	-0.25	[-2.87]
Target M/B					0.22	[1.46]	0.24	[1.58]
Target Announcement Return					0.07	[5.40]	0.07	[5.37]
Same Industry					-0.71	[-1.76]	-0.69	[-1.71]
Year FE		Yes		Yes		Yes		Yes
N		1,891		1,875		1,487		1,487
R ²		0.03		0.04		0.09		0.09

Table 6. Acquirer merger announcement volume. Regressions of acquirer merger announcement volume on normal volume, target institutional ownership, and deal characteristics. 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. 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.

	Acquirer Volume (%)							
	Coef	[t]	Coef	[t]	Coef	[t]	Coef	[t]
Normal Volume	1.38	[21.40]	1.36	[21.59]	1.32	[16.38]	1.32	[16.45]
Target Institutional Ownership	1.14	[10.80]	0.90	[8.95]	0.70	[6.28]	0.64	[4.49]
log(Target Size/Acquirer Size)			0.16	[11.28]	0.20	[11.95]		
log(Acquirer Size)							-0.20	[-11.06]
log(Target Size)							0.21	[9.70]
Acquirer Leverage					-0.30	[-1.62]	-0.30	[-1.62]
Target Leverage					0.23	[1.69]	0.22	[1.62]
Acquirer M/B					0.00	[-0.01]	0.00	[0.06]
Target M/B					0.06	[3.26]	0.06	[3.12]
Target Announcement Return					0.57	[3.93]	0.56	[3.91]
Same Industry					0.09	[1.84]	0.08	[1.79]
Year FE		Yes		Yes		Yes		Yes
N		1,844		1,830		1,479		1,479
R ²		0.57		0.60		0.61		0.61

Table 7. Acquirer merger announcement returns: Interactions with proxies for demand-curve slope. Regressions of acquirer merger announcement returns on target institutional ownership, acquirer demand curve 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. 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. The first three regressions use idiosyncratic risk as a proxy for the slope of the acquirer demand curve; the second three regressions use dispersion in analyst forecasts. Idiosyncratic risk is the standard deviation of the residuals from a regression of acquirer excess returns on the Fama-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. The dispersion in analyst forecasts is the standard deviation of all outstanding earnings per share forecasts for the current fiscal year, scaled by the book value of equity. For details, see Sadka and Scherbina (2004). 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.

	Non-Industry Idiosyncratic Risk						Dispersion in Analyst Forecasts					
	Coef	[t]	Coef	[t]	Coef	[t]	Coef	[t]	Coef	[t]	Coef	[t]
Target Institutional Ownership (IO)	-3.78	[-4.77]	-2.71	[-3.35]	-2.48	[-2.08]	-3.10	[-3.42]	-1.10	[-1.18]	-2.44	[-1.81]
Demand Curve (DC)	0.20	[0.52]	0.59	[1.54]	0.72	[1.45]	0.83	[1.48]	1.09	[1.90]	0.84	[1.33]
IO * DC	-3.00	[-2.40]	-3.32	[-2.71]	-3.00	[-2.24]	-2.93	[-1.49]	-2.89	[-1.47]	-2.46	[-1.18]
log(Target Size/Acquirer Size)			-0.62	[-5.12]					-0.88	[-6.41]		
Other Controls		No		No		Yes		No		No		Yes
Year FE		Yes		Yes		Yes		Yes		Yes		Yes
N		1,800		1,784		1,443		1,346		1,341		1,125
R ²		0.04		0.05		0.09		0.03		0.06		0.09