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Shareholder investment horizons and the market for corporate control ☆

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Abstract

This paper investigates how the investment horizon of a firm's institutional shareholders impacts the market for corporate control. We find that target firms with short-term shareholders are more likely to receive an acquisition bid but get lower premiums. This effect is robust and economically significant: Targets whose shareholders hold their stocks for less four months, one standard deviation away from the average holding period of 15 months, exhibit a lower premium by 3%. In addition, we find that bidder firms with short-term shareholders experience significantly worse abnormal returns around the merger announcement, as well as higher long-run underperformance. These findings suggest that firms held by short-term investors have a weaker bargaining position in acquisitions. Weaker monitoring from short-term shareholders

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could allow managers to proceed with value-reducing acquisitions or to bargain for personal benefits (e.g., job security, empire building) at the expense of shareholder returns.

JEL classification: G34; G23; G32

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1. Introduction

This paper is an empirical analysis of the impact of shareholder investment horizons on the market for corporate control. Our purpose is to investigate the claim that the U.S. corporate governance system myopically puts too much emphasis on the short term, leading to distorted investment decisions.[1] Mergers and acquisitions (M&As) are a good setting to study the influence of shareholder investment horizons on corporate decision making. An acquisition is an important investment decision likely to impact the shareholder value of the bidding firm. Receiving an acquisition offer is often a direct source of sizable gains for target firm shareholders. In addition, unsolicited acquisitions provide indirect gains by disciplining managerial actions ex ante (Jensen, 1993).

Investment horizons, as many other shareholder characteristics, are naturally hard to observe. The availability of data on institutional holdings provides a unique opportunity to infer investment horizon from actual portfolio behavior. Institutions constitute the biggest investor group in the U.S. equity markets and are usually portrayed as a pivotal investor group in takeovers (Useem, 1996). They are also investors whose portfolio policies are important, well defined, and professionally set up. Previous research has investigated the role played in acquisitions by different classes of shareholders (e.g., managers, institutions, blockholders) but has not addressed investment horizon per se.

Institutional investors have different portfolio horizons for many reasons. Different demographics or liquidity needs of final owners can imply strategies with different horizons. For example, employee-defined contribution plans usually have a long-term orientation, while retail open-ended mutual funds tend to be more short-term oriented because of frequent money inflows and outflows (Edelen, 1999). Agency problems inherent in delegated asset management also affect investment horizons. Shorter horizons could result from the inability to continuously gather capital to implement long-term strategies (Shleifer and Vishny, 1997) or from the incentives to trade on short-term signals if there is imperfect information about the portfolio manager's ability (Scharfstein and Stein, 1990; Dow and Gorton, 1997).

M&A events are strongly affected by agency problems existing between managers and shareholders. The effectiveness of the monitoring activities that can alleviate

[1]See Stein (1989), Porter (1992), and Noe and Rebello (1997).

these problems depends on the existence of shareholders with enough cash-flow rights and incentives to monitor firm managers effectively.[2] Moreover, M&As are characterized by high bargaining costs, mostly because the bidder has to surrender a significant portion of the gains to acquire control. Based on this theoretical background, we suggest two interrelated channels through which shareholder investment horizons influence the outcome of M&A events.

First, we expect investment horizons to affect the degree to which firm managers are monitored. Investors with a shorter horizon have fewer incentives to spend resources in monitoring, as they are less likely to remain shareholders of the firm long enough to reap the corresponding benefits. In addition, they have less time to learn about the firm. Therefore, the length of the investment horizon of shareholders affects managerial behavior both in initiating corporate control transactions and in merger negotiations. Weakly monitored managers will trade off shareholder interests for personal benefits, ranging from job security (target) to empire building (bidder), at the expense of shareholder returns.

Second, shareholder investment horizons affect the bargaining power of each party involved in an acquisition. A deal can create economic surplus that has to be split between the target and the bidder. In a tender offer, shareholders with a short-term orientation have a lower ability to hold out in the negotiation, in the sense identified by Grossman and Hart (1980), when compared with long-term investors who can afford to stay in the firm until all the benefits of the acquisition are realized. In a friendly merger, managers of firms held by short-term shareholders can be expected to have a weaker bargaining position, as a result of higher chances that their shareholders take the "Wall Street walk" and sell their holdings.

The two effects, monitoring and bargaining power, are intertwined. Weak monitoring by short-term investors can lead to managers trying to cut a deal for themselves at the expense of shareholder interests at the bargaining table. Our hypothesis predicts that we should observe lower premiums for target firms held by short-term investors, as well as a higher probability of a bid being received. Similarly, we should observe a more negative abnormal return around the merger announcement for bidder firms held by short-term investors, as well as a higher probability of a bid being made.

To test these predictions, we build a measure of investor horizon based on the average turnover of investors' entire portfolios. Short-term investors are defined as those exhibiting high portfolio turnover. We then characterize the ownership structure of a firm prior to an acquisition announcement in terms of its shareholders' portfolio turnover. Our characterization of the behavior of investors uses a one-year history of filings and is measured six to nine months before the announcement date.

We show that the more short-term oriented the target shareholders are (that is, the more frequently they rotate their portfolio), the lower is the target premium. At the same time, the more short-term oriented the bidder shareholders are, the more

[2]The amount of monitoring performed depends on the shareholder's size of stake (Shleifer and Vishny, 1986), his liquidity concerns (Bolton and Von Thadden, 1998), and the possibility of profitably trading on information acquired during the monitoring process (Kahn and Winton, 1998).

negative is the bidder abnormal market return around the merger announcement. For example, in the case of target firms, an increase of one standard deviation on the average institutional shareholder level of portfolio turnover (a mere difference of four months from the average 15-month period the firm's investors hold a stock) implies more than a 3% reduction in premium.

Our paper also analyzes the impact of investor horizons on the likelihood of a bid and finds that short-term investors facilitate the deal by increasing its probability. Given that investor horizons affect both the likelihood and the premium of a transaction, we investigate whether a problem of sample-selection bias exists. We find that, even after properly accounting for this phenomenon, our variables still exhibit significant statistical power to explain premium levels.

Finally, we address the question of whether investor horizons are related to the long-term performance of the merging firms. Acquirers with short-term shareholders prior to the merger are found to underperform significantly (by as much as –0.7% monthly, or –8% per year, over a holding period of three years), compared with acquirers with long-term shareholders.

Our findings clearly demonstrate the trade-off implicit in the prevalence of short-horizon ownership structures, thus contributing to the debate on the U.S. corporate governance system. In particular, shareholders' investment horizons affect the relative affordability of takeovers. The more short term the shareholders of the target are, the higher the likelihood of a takeover and the lower its cost. At the same time, short-term shareholders in the bidder provide more leeway for managers to overbid and carry out value-reducing acquisitions. This trade-off follows the arguments put forward by Jensen (1993).

In addition, our findings shed light on the true costs and benefits of pursuing a policy of relationship investing (Kensinger and Martin, 1996; Chidambaran and John, 1999) or shareholder targeting (Useem, 1996). Industry practitioners seem to devote considerable attention to investor horizon considerations, and many firms implement investor relation activities aimed at attracting long-term investors to their shareholder base. Our paper adds to this debate by empirically validating the idea that it does make a difference who the shareholders are. In particular, managers face a trade-off between targeting acquiescent short-term shareholders who are not committed to the company and targeting demanding long-term shareholders who can give them a strong hand at a merger negotiation table.

Our paper adds to the stream of literature that investigates the effects of shareholder heterogeneity on stock prices (e.g., Shleifer, 1986; Bagwell, 1991). Hotchkiss and Strickland (2000) find that ownership composition affects stock price behavior around the release of corporate information. Bushee (2001) shows that transient (high turnover and highly diversified) investors are associated with an overweighting of near-term expected earnings. In the context of M&As, Stulz et al. (1990) conclude that higher institutional ownership is associated with lower acquisition premiums. Ambrose and Megginson (1992) do not find a significant impact for the level of ownership on the likelihood of a bid.

The remainder of the paper is articulated as follows. Section 2 lays out our main testable hypothesis. Section 3 describes the sample and the variables. Section 4

analyzes the impact of investor horizon on the acquisition premium and on the bidder's short-term stock price performance. Section 5 does the same for the likelihood of the takeover and addresses the issue of sample selection bias. Section 6 investigates the impact of investor horizon on the long-term performance of acquiring companies. A brief conclusion follows.

2. Main hypothesis and testable propositions

The null hypothesis posits that shareholder investment horizons play no role in the market for corporate control. If managers always act in the shareholders' best interest and we stay within the realm of perfect capital markets, whatever a company does can be undone by its shareholders through portfolio rebalancing (as it would be the case if the stock ceases to exist because of a merger). In this scenario, little reason exists to expect that differences in ownership structure affect corporate decisions.

We now describe our working hypothesis and its predictions for the target, the bidder, and the cross-effects between firms.[3]

2.1. Target firm

Differences in investment horizon qualify the nature of the Grossman and Hart (1980) free-rider problem. Long-term investors will hold out and not tender their shares in a tender offer (or approve a proposed merger) unless they are offered a premium that incorporates the improvement resulting from the acquisition. In contrast, short-term investors are more likely to divest before all the benefits of the acquisition are realized. This creates a wedge between the bargaining power of short-term held potential targets and long-term held ones.

At the same time, the weaker monitoring incentives of short-term investors increase the discretionary power of managers in negotiating the deal terms. Managers of the target firm might bargain not only over the price to be paid to their shareholders, but also over such items as future position in the merged company, board composition, or executive compensation. Hartzell, Ofek, and Yermack (2004) suggest that target managers do so at the cost of a lower premium.

If potential bidders anticipate these issues, they will offer lower premiums for targets held by short-term investors and will make bids more often. We therefore expect that *the more short term the investors of the target firm are, the lower is the premium received by target shareholders and the higher is the probability of a takeover bid*.[4]

[3]We thank an anonymous referee for valuable help in refining our hypothesis.

[4]One alternative prediction is that low monitoring by short-term shareholders increases the wedge between the current firm value and the next-best alternative use of the firm's assets. This implies a higher potential for the deal to unlock economic value. Consequently, we still expect firms held by short-term investors to be more likely to become a target of a bid, but to exhibit higher, not lower, premiums. It is an empirical question which of the mentioned effects predominates.

2.2. Bidder firm

While for target firms takeovers can act as a disciplining device, for bidders these same acquisitions can be a manifestation of agency problems. Empirical evidence shows that returns to bidder shareholders in mergers are insignificant at best, with many studies finding negative returns.[5] The Jensen (1986) free cash-flow theory emphasizes the incentives for bidder managers to undertake acquisitions that bring them private benefits of control, while Roll (1986) interprets overbidding as a consequence of managerial hubris. Monitoring and intervention (at the extreme, blocking mergers through the use of a proxy contest) require in many instances a high engagement from bidder shareholders. This is less likely for short-term investors who could prefer to sell their stake. Being accountable to long-term shareholders reduces the leeway that managers of the bidder have to engage in questionable acquisitions and to bid too aggressively in merger negotiations.

We therefore expect that *for firms held by short term investors, we should observe a higher probability of undertaking a takeover bid as well as more negative bidder abnormal returns.*

2.3. Cross-effects between firms

The payoff accruing to one party in the bargaining process should be directly related to the investment horizon of the shareholders of the other party. If the bidder's shareholders have short horizons, the bidder likely overpays, generating a gain for target shareholders. Analogously, if the target's shareholders have short horizons, managers of the target likely trade-off personal benefits for a lower final price. This implies that more value accrues to the bidder firm. In summary, *the higher the fraction of short-term investors in the target (bidder) firm, the bigger should be the fraction of value accruing to the bidder (target) firm.*

3. Data and empirical testing issues

3.1. Sample construction

We use data on all acquisition announcements involving U.S. targets and taking place between January 1980 and December 1999, extracted from the Securities Data Corporation (SDC) database. We require that the target firm is listed in NYSE, Amex or Nasdaq; that the target's CUSIP can be matched with Center for Research in Securities Prices (CRSP) data; and that the outcome of the merger is known (either completed or withdrawn). We exclude extreme outliers and transactions

[5]This body of evidence has been accumulated since Morck et al. (1990). Fuller et al. (2002) report that bidder returns are negative only for the cases of purchasing public target firms.

Table 1
Summary statistics for the sample used in this study

Our base sample consists of 3,814 events recorded in the SDC mergers and acquisitions database from 1980 to 1999 that have non-missing data for the variables used in the regressions in the following tables. We keep acquisition announcements that are the first bid for a target in each contest. For each company involved in the event, we obtain the corresponding accounting variables (from COMPUSTAT), stock price behavior (from CRSP), and institutional investor variables (from CDA/Spectrum and our previous calculations). N denotes the number of cases (observations) for which the variable in question is present in the sample, and the numbers provided are sample averages (unless otherwise noted). An acquisition is considered successful if the "status" field in SDC has "completed" as keyword. An acquisition is considered hostile if the "attitude" field in SDC was marked "unsolicited" or "hostile". The "consideration offered" field in SDC refers to the list of all components of consideration (i.e., means of payment) offered by the acquirer/bidder. An acquisition is considered all-cash if the field "consideration offered" in SDC had only "cash" as keyword. An acquisition is considered all-equity if the field "consideration offered" in SDC did not include "cash" as keyword. To define intra-industry acquisitions, we use the Fama and French (1997) 49-industry classification. The SIC code used to classify firms was obtained from CRSP. Abnormal return premium is the premium, defined as the cumulative abnormal return, measured relative to a CRSP value-weighted market model using a year of prior daily data, to the target firm stock for trading days [−63, +126] relative to the announcement date (see Schwert, 2000). Actual offer premium is the premium defined as [bidder's offer/target's pre-bid market value of equity) − 1], where the value of the bidder's offer is computed using, in order of availability, the sum of the value of the considerations offered, the initial offer price, or the final offer price as reported in SDC (see Officer, 2003, for details). Days to completion is the difference in calendar days between the announcement date and the date the deal is considered effective.

	N	Full sample	1980–1989	1990–1999
Number of events	—	3,814	1,232	2,582
Percent successful	3,814	84.6%	77.5%	88.0%
Percent hostile	3,814	6.1%	10.8%	3.9%
All cash	3,814	63.2%	64.2%	62.7%
All stock	3,814	15.0%	7.9%	18.4%
Intra-industry	3,814	31.4%	21.7%	36.0%
Target listed on Nasdaq	3,814	51.7%	33.0%	60.7%
Abnormal return premium	3,814	21.5%	16.3%	23.9%
Actual offer premium	2,501	52.7%	48.4%	54.4%
Acquirer leverage > target	1,453	74.3%	77.4%	73.3%
Acquirer M/B > target M/B	1,410	65.7%	59.1%	67.9%
Relative size (median)	1,532	19.5%	25.3%	17.7%
Days to completion (median)	3,227	59	49	64

whose value represents less than 1% of the target's market value.[6] Whenever there are several bids for the same target (occurring within one year of the first bid), we keep only the first bid. We do so because revised or competing bids are likely to be associated with low abnormal stock returns, as the target's price already incorporates the news that the company is in play. If firms with short-term

[6]We exclude events in which the target's P/E, debt-equity, market-to-book, or ROE is greater than one-hundred (Schwert, 2000) and the target or the acquirer has more than 200% institutional ownership (institutions sometimes report common and preferred shares, while CRSP reports common shares).

shareholders tend to receive multiple bids, a spurious negative correlation between shorter investment horizon and abnormal return premiums could be generated.[7] The final number of events in our base sample is 3,814.

Table 1 presents summary statistics for the sample. Overall, the characteristics of our sample are in line with those reported in recent studies (Andrade et al., 2001; Holmström and Kaplan, 2001; Schwert, 2000). The number of acquisitions increased markedly in the 1990s, relative to the previous decade, while the rate of hostility declined substantially. The 1990s were also characterized mainly by related acquisitions and a greater use of stock-financed acquisitions.

A central variable of interest is the acquisition premium. Most of our analysis is conducted using the Schwert (2000) abnormal return premium, defined as the sum of abnormal returns of the event firm's stock for trading days [–63, +126] relative to the announcement date. We use as benchmark to calculate abnormal returns the market model whose parameters are estimated using daily returns for the trading year ending on day –64. We employ an equivalent procedure to calculate the bidder firm's abnormal return around the announcement date. This abnormal return-based measure of premium, although common in the M&A literature, mixes the market's estimate of the nominal premium with the likelihood of the acquisition going through (Betton and Eckbo, 2000; Officer, 2003). To address this issue, we complement our analysis of target firms with the actual offer premium, measured as [(bidder's offer/target's pre-bid market value of equity)−1]. The value of the bidder's offer is computed using SDC data, following the procedure described in more detail in Officer (2003).[8]

3.2. Investor turnover

Investor-level portfolio information comes from CDA/Spectrum, a database of quarterly 13-F filings of money managers to the U.S. Securities and Exchange Commission. The database contains the positions (of more than 10,000 shares or US$200,000 in value) of all the institutions with more than US$100 million dollars under discretionary management. Gompers and Metrick (2001) provide a detailed analysis of this data set. 13-F filings do not contain short-selling positions, used frequently by merger arbitrageurs in merger deals.

A short-term investor should buy and sell his investments frequently, while a long-term investor should hold his positions unchanged for a considerable length of time. To implement this idea empirically, we calculate for each institutional investor a measure of how frequently he rotates his positions on all the stocks of his portfolio (churn rate). If we denote the set of companies held by investor i by Q, the churn rate

[7]We thank an anonymous referee for pointing out this issue to us. All our results are similar if we include all bids and are available upon request.

[8]The value of the bidder's offer is equal to (in order of availability in SDC) the total consideration offered, the value resulting from the initial offer premium, and the value resulting from the final offer premium.

of investor i at quarter t is

$$\mathrm{CR}_{i,t} = \frac{\sum_{j \in Q} \left| N_{j,i,t} P_{j,t} - N_{j,i,t-1} P_{j,t-1} - N_{j,i,t-1} \Delta P_{j,t} \right|}{\sum_{j \in Q} \frac{N_{j,i,t} P_{j,t} + N_{j,i,t-1} P_{j,t-1}}{2}}, \tag{1}$$

where $P_{j,t}$ and $N_{j,i,t}$ represent the price and the number of shares, respectively, of company j held by institutional investor i at quarter t. This definition follows those commonly used to assess overall portfolio rotation (Carhart, 1997; Barber and Odean, 2000; CRSP, 2003).[9]

We use investor churn rates to construct a measure of *investor turnover* for the firm that measures the investment horizon of institutional shareholders in the firm prior to an acquisition announcement. Denote by S the set of shareholders in company k and by $w_{k,i,t}$ the weight of investor i in the total percentage held by institutional investors at quarter t. The investor turnover of firm k is the weighted average of the total portfolio churn rates of its investors over four quarters:

$$\text{Investor turnover of firm } k = \sum_{i \in S} w_{k,i,t} \left(\frac{1}{4} \sum_{r=1}^{4} \mathrm{CR}_{i,t-r+1} \right). \tag{2}$$

In our paper the instant of measurement t is such that at least two full quarters pass between the measurement of all shareholder variables and the announcement date.

Fig. 1 illustrates our approach and emphasizes several important features of our measure. First, investor turnover is measured six to nine months before the announcement date. This is a greater time distance than the length of the run-up period, usually considered sufficient to avoid the possibility of rumors being made public about the deal (Schwert, 2000). Second, investor turnover uses a one-year history of information on the behavior of investors. Because churn rates are basically changes in holdings, this means we use portfolio information that dates 18–21 months before the event. This minimizes the influence of a single quarter in the calculations and makes our measure appropriate to test a long-run effect such as monitoring. Third, using churn rates calculated across investors' overall portfolios minimizes the possibility that an increase in traded volume (of the particular company involved in the upcoming event) would bias our results.[10] These features help us to treat investor turnover as a predetermined variable with respect to the event.

Further confirmation of this is given by unreported tests for the existence of anticipatory positioning of institutional investors prior to the announcement. Based

[9]By construction, the range of the churn rate is the interval [0, 2]. When performing its calculation, we exclude in each quarter the investors entering the CDA/Spectrum universe for the first time (because they would automatically have a maximum churn rate of 2). We also exclude in each quarter companies that have just entered the sample (for the same reason).

[10]We also control for the activity of arbitrageur institutions, which have short horizons, are attracted to firms around the takeover event, and would cause a feedback from returns to investor turnover (see Section 3.3).

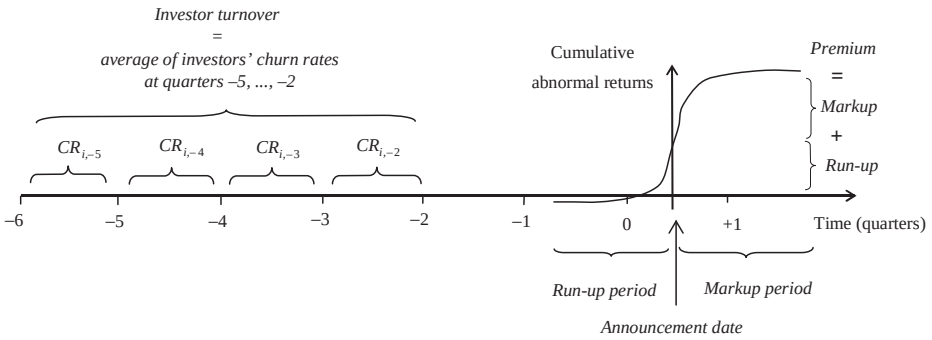

Fig. 1. Investor turnover, our main independent variable, is the average of investors' churn rates for a one-year period that finishes at least two full quarters before the announcement date. The run-up period is defined as the interval of trading days [−63, −1] relative to the announcement date (Schwert, 2000). Markup is analogously defined, for trading days [0, 126]. Our main dependent variable, abnormal return premium, is the sum of abnormal returns during the run-up and the markup period.

on Pinkowitz (1999), we look at time-series changes in investors' turnover, level of ownership and concentration of holdings, in target and bidder firms, for the quarters prior to announcement. We find that these changes are neither economically meaningful nor statistically different from corresponding control samples and conclude, like Pinkowitz (1999), for the absence of pre-positioning by institutional investors.[11]

Table 2 shows that median values of investor turnover do not differ much across target and bidder firms (P-value = 0.3). If we consider levels, we see that institutional investors with stakes in event firms before the event churn their portfolios intensively. A median portfolio turnover rate of 39% means that almost 20% of the portfolio is churned in a quarter, or around 80% of the position is turned over in a given year.[12] In other words, the median investor is holding an average stock in his portfolio for a period of around $12/0.8 = 15$ months.

3.3. Other shareholder portfolio variables

Table 2 presents summary statistics of additional shareholder portfolio variables. It is important to control for them in our analysis, because investor turnover might be correlated with investor characteristics other than investment horizon.

[11]After the announcement, institutions sell, in percentage terms, about 5.5% of the holdings they had prior to the merger, the degree of concentration of holdings increases, and the investor turnover measure jumps about 5% in percent points relative to the quarter before the announcement (probably a result of the entrance of arbitrageur institutions).

[12]This figure is consistent with Cai et al. (2000). Given that CDA/Spectrum has quarterly frequency, the estimates of turnover are lower than those obtained if data were available at a higher frequency.

Table 2
Summary statistics of the shareholder variables for target and bidder firms

Denote by S the set of shareholders in company k and by $w_{k,i,t}$ the weight of investor i in the total percentage held by institutional investors in quarter t. The instant of measurement t is such that there is at least two full quarters between the measurement of all shareholder variables and the announcement date. The investor turnover of firm k is the weighted average of the average total portfolio churn rates of its investors over four quarters (see text for details on the construction of the churn rates): $\text{Investor turnover of firm } k = \sum_{i \in S} w_{k,i,t} \left(\frac{1}{4} \sum_{r=1}^{4} \text{CR}_{i,t-r+1} \right)$. Fraction denotes the ratio of a firm's shares held by institutional investors relative to total shares outstanding in CRSP. Concentration is the Herfindahl index calculated over the distribution of weights $w_{k,i,t}$. For each institutional investor, we calculate the Herfindahl index and the average beta of its portfolio. Manager concentration is the weighted average (using the weights $w_{k,i,t}$) of the Herfindahl index for all investors $i \in S$. Similarly, beta is the weighted average (using the weights $w_{k,i,t}$) of the betas of all investors $i \in S$. The activism variable is the fraction of the firm's shares held by activist institutional investors relative to total shares outstanding. Activist investors are the ones belonging to the list of members of the Council of Institutional Investors. We also include in this table a measure of the change in arbitrage capital (following Baker and Savasoglu, 2002), measured in percentage terms. Arbitrage capital is the sum of total portfolio holdings of institutions considered as arbitrageurs. An institution is considered an arbitrageur if its holdings go from zero to positive in a target firm in the quarter immediately following a takeover announcement, for more than two hundred events during the sample period. This variable takes only one value per quarter; the averages presented are therefore time-series averages during the sample period.

	Full sample				1980–1989			1990–1999		
	N	Mean	Median	Standard error	Mean	Median	Standard error	Mean	Median	Standard error
Target										
Investor turnover	3,736	0.37	0.37	0.15	0.42	0.44	0.14	0.35	0.32	0.15
Fraction	3,746	0.33	0.30	0.23	0.28	0.24	0.20	0.35	0.32	0.23
Concentration	3,746	0.21	0.14	0.20	0.23	0.15	0.23	0.20	0.13	0.19
Manager concentration	3,746	0.02	0.01	0.03	0.02	0.02	0.03	0.02	0.01	0.03
Industry exposure	3,746	0.05	0.04	0.05	0.04	0.03	0.04	0.05	0.04	0.05
Beta	3,746	1.13	1.10	0.15	1.08	1.07	0.10	1.15	1.13	0.16
Activism	2,864	0.05	0.03	0.07	0.05	0.03	0.05	0.05	0.03	0.08
Bidder										
Investor turnover	2,162	0.38	0.39	0.14	0.43	0.45	0.14	0.36	0.32	0.13
Fraction	2,168	0.47	0.49	0.24	0.37	0.39	0.21	0.52	0.55	0.24
Concentration	2,168	0.11	0.05	0.16	0.13	0.06	0.19	0.10	0.05	0.14
Manager concentration	2,168	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.03
Industry exposure	2,168	0.06	0.05	0.05	0.05	0.04	0.05	0.06	0.05	0.05
Beta	2,168	1.12	1.10	0.13	1.07	1.07	0.09	1.15	1.11	0.14
Activism	1,967	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Change in arbitrage capital	3,184	0.05	0.06	0.09	0.04	0.06	0.10	0.06	0.06	0.08

- The level and concentration of institutional ownership play an important role in the theories of monitoring (Shleifer and Vishny, 1986; Stulz et al., 1990). Fraction, the level of ownership, is the ratio of the firm's shares held by institutional investors. Concentration, the degree of ownership concentration, is the Herfindahl Index of the investor weights $w_{k,i,t}$.
- Less risk-averse investors could reshuffle their portfolios more often. We therefore calculate two proxies for investors' risk-taking behavior. Beta is the weighted average of each shareholders' portfolio betas. It measures the shareholders' loading on systematic risk. Manager concentration is the weighted average of shareholders' portfolio concentration (Herfindahl Index of their holdings). It proxies for investors' sensitivity to idiosyncratic risk.
- Our measure of portfolio churning might be distorted by information-based trading. To capture information-gathering abilities, we calculate Industry exposure as the average percentage of shareholders' portfolios that are invested in the industry the event firm belongs to. The underlying assumption is that an investor who is heavily invested in an industry is likely to have better information-gathering abilities or monitoring skills for that industry.
- Investor turnover might be capturing the particularly long investment horizon of corporate governance activist institutions or short investment horizon of merger arbitrageurs. We therefore add a measure of shareholder activism and one of arbitrage capital. Activism is the fraction of the firm's shares held by the public pension funds members of the Council of Institutional Investors whose holdings are available in CDA/Spectrum.[13] Arbitrage capital is the sum of total portfolio holdings of arbitrageur institutions. We follow Baker and Savasoglu (2002) and classify an investor to be an arbitrageur if his holdings go from zero to positive in a target firm (in the quarter immediately following an acquisition announcement) for more than two-hundred events during the sample period.

Table 2 shows that, not surprisingly, institutional ownership is larger in bidders (because the latter are, on average, also larger firms). The median institutional ownership is 49% for bidders and around 30% for targets (the P-value of a Wilcoxon difference of medians test is $<.001$).[14] Concentration of ownership is lower for bidder firms (5% versus 14% for targets, P-value $<.001$). Activist investors have bigger stakes in bidder firms (6% versus 3%, P-value $<.001$).

4. Investment horizon and short-term takeover premium

The first issue we address is whether investment horizons affect the acquisition premium and the bidder's stock price performance around the announcement. Fig. 2

[13]The council is one of the broadest organizations defending active corporate governance. Our list of 14 institutions contains its most preeminent members. Several papers use the universe of council members to study the impact of activist policies. See Karpoff (1998) for a survey.

[14]We discuss median values because the distributions of many of the variables are considerably skewed.

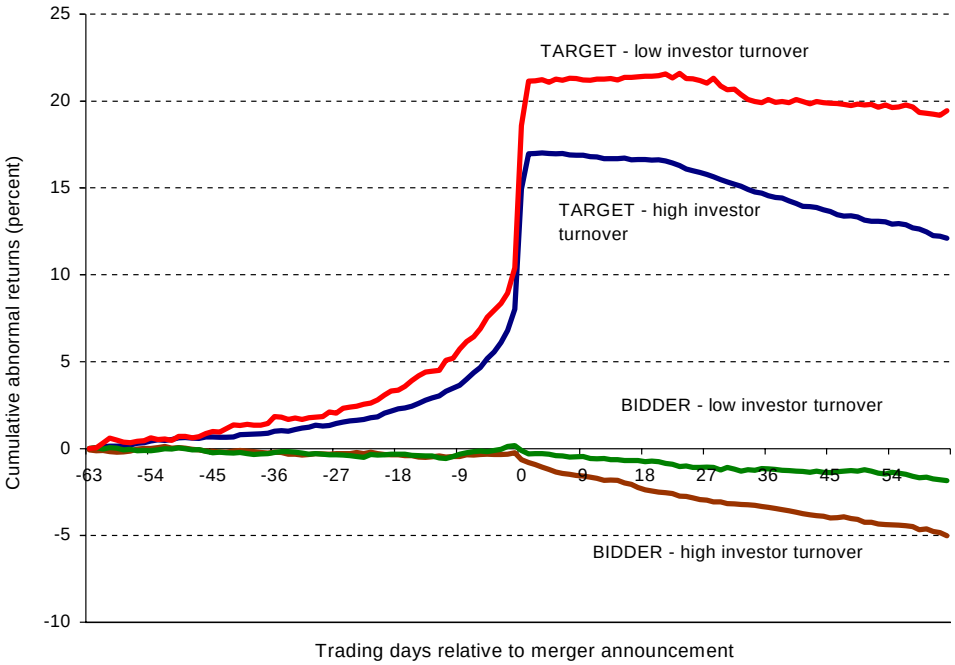

Fig. 2. Cumulative abnormal returns around acquisition announcement: firms with high investor turnover versus firms with low investor turnover. Cumulative abnormal returns for target and bidder firms are measured relative to a CRSP value-weighted market model using a year of prior daily data (Schwert, 2000). Investor turnover is the average of investors' churn rates for a one-year period that finishes at least two full quarters before the announcement date. Each month we sort all stocks in the CRSP-COMPUSTAT-CDA/Spectrum universe according to their investor turnover. A target is considered a high investor turnover firm if its investor turnover variable is in the top third of the distribution for the entire universe on the month prior to the acquisition. Inversely, a target is considered a low investor turnover firm if its investor turnover variable is in the bottom third of the distribution for the entire universe in the month prior to the acquisition. The same procedure is used for the case of bidder firms.

reports the average cumulative abnormal returns around the acquisition announcement for firms with high investor turnover and for firms with low investor turnover. We classify a firm as high (low) if its investor turnover is above (below) the 67th (33rd) percentile of the distribution of investor turnover for the full CRSP-Compustat-CDA/Spectrum universe of firms.

Fig. 2 suggests that target firms with high investor turnover exhibit lower premiums relative to targets with low investor turnover. At the same time, bidders with high investor turnover underperform more significantly than bidders with low investor turnover. This is preliminary but strong evidence of our hypothesis that target (bidder) firms with short-term shareholders are associated with lower premiums (more negative bidder abnormal returns).

4.1. Target firm results

We estimate the following White-adjusted ordinary least-squares (OLS) cross-sectional regression for the target premium:

$$\text{Premium}_k = \mathbf{X}_{\text{InvestorTurnover},\,k}\,\beta + \mathbf{X}_{\text{OtherShareholderVars},\,k}\,\delta + \mathbf{X}_{\text{Controls},\,k}\,\gamma + \upsilon_k, \quad (3)$$

where $\mathbf{X}_{\text{InvestorTurnover}}$ is the vector of investor turnover, $\mathbf{X}_{\text{OtherShareholderVars}}$ is a matrix containing the shareholder portfolio variables discussed in Section 3.3, and $\mathbf{X}_{\text{Controls}}$ is a matrix composed of the standard set of control variables commonly employed in the M&A literature to predict target premiums. Column 0 of Table 3 includes, for purposes of comparison with the literature, only the matrix of controls. Like Schwert (2000) and Officer (2003), we find that the target's premium is negatively related to the target's size, market-to-book ratio, and initial bidder toehold. The target's premium is higher if the deal is considered hostile, if it consists of a tender offer, or if it is an intra-industry acquisition.

Our base specification in Column 1 shows that the level of investor turnover of the target's shareholders negatively impacts the target's premium (coefficient of –0.20, *T*-statistic of –2.2). This result is economically significant: An increase of one standard deviation in the turnover rate (or of 0.15 per quarter, which represents a increase of about 30% of the average yearly churning of the investors' portfolios) reduces the target firm's premium by 3%. This increase in churning is equivalent to a decrease in the investors' holding period from 15 to 11 months.

This result survives an important series of robustness checks reported in Table 3. Column 2 includes the normalized trading volume of the target firm and the percentage of the firm's shares held by mutual funds and investment advisers. Investor turnover could be picking up the higher natural turnover activity characteristic of very liquid stocks or the stakes of more aggressive investors such as mutual funds or investment banks. Results show that this is not the case. Column 3 adds the holdings of executive officers in the target firm for the year before the acquisition announcement.[15] The *T*-statistic of manager holdings is insignificant.[16] More important, it is still the case that the presence of short-term shareholders decreases the acquisition premium. Finally, Column 5 uses the actual offer premium as the dependent variable in our regression. The results again indicate that target firms held by short-term investors receive lower-ball offers. These findings support the hypothesis that incumbent shareholders with short investment horizons lower the ability of targets to hold out in the deal negotiation and make it more likely that weakly monitored target managers do not maximize returns for their shareholders.

[15]The source for managerial holdings is the Standard & Poor's Execucomp database, which has information on the compensation of the top five officers of S&P-500, S&P Midcap-400, and S&P SmallCap-600 firms, from 1992 onward. The number of observations available in this regression is therefore much smaller.

[16]This result echoes the Stulz (1988) argument that managers of the target firm will demand a high premium if they wish to be compensated for surrendering control, but they could also use their holdings to facilitate a deal (and reduce the premium) if they wish to sell out.

The impact of the investment horizon of the *bidder's* shareholders on the returns of the target firm (the cross-effect) provides further confirmation of our hypothesis. Column 4 and Column 6 of Table 3 introduce the investor turnover of the bidder firm in the abnormal return premium and actual offer premium regressions, respectively. The positive and significant coefficients show that short-term held bidders are not only associated with higher returns accruing to target shareholders, but also that these bidders offer a higher price for the target firm.

The level of institutional ownership (fraction) seems to affect positively the acquisition premium, contrary to the findings of Stulz et al., (1990).[17] Most of the other variables (concentration of ownership, beta, manager concentration, and industry exposure) do not exhibit a consistent sign across specifications. The positive sign of activism can be the result of activist investors' higher ability to extract a bigger surplus from the bidder when they bargain to tender their shares or set the terms of the merger agreement. Finally, the negative sign of change in arbitrage capital is consistent with the Cornelli and Li (2002) prediction that arbitrage capital availability should facilitate takeovers.

4.2. Bidder firm results

Table 4 reports a similar analysis for the case of the bidder firm. Eq. (3) is estimated with the same set of variables as before, with the exceptions that they now refer to the bidder instead of the target and to the first bid made by each acquirer within a given contest. As in previous literature, firm and deal characteristics have low power to explain the bidder abnormal returns around M&A events. The introduction of the investor variables increases the explanatory power substantially, although to a still low absolute level.

The most important finding is the negative and significant coefficient of investor turnover that holds across all specifications. This suggests that the more short term the shareholders are, the more negative the bidder return (i.e., the higher the bidder discount) is. This finding is consistent with the hypothesis that short-term investors appropriate less value in a takeover and provide managers more scope to undertake value-reducing acquisitions. Concerning the existence of cross-effects, Column 4 reports that the coefficient of the target firm's investor turnover is positive but not statistically significant. Differences in size between bidder and target firm might explain why this effect seems to be hampered in this instance.

Columns 5 and 6 of Table 4 replicate our main specifications using the abnormal bidder return calculated in a [–1, +1] trading days event window around the announcement date. The coefficient point estimate of Column 5 is around –0.03, much lower than the –0.3 to –0.5 point estimates obtained using the Schwert (2000) extended bidder abnormal return. This conclusion seems to indicate that for bidder firms the market impact of shareholder horizons is spread over time instead of felt immediately at the time of announcement. In the context of our hypothesis, this

[17]Possible sources of this difference are the different sample and time period of their study. In addition, the authors use the square root, not the level, of ownership as an explanatory variable.

Table 3
Ordinary least squares estimates of the relation between investor turnover and the target's premium

The left-hand side variables are the target firm's abnormal return premium and actual offer premium, as defined in text and the caption of Table 1. The right-hand side variables are all measured for the target firm, and all accounting variables are calculated over the fiscal year prior to the acquisition, except where noted. ROE is the ratio of earnings to average equity [COMPUSTAT items 20/(60 + 60 (t – 1)]. Sales growth is the proportional change in sales (log [COMPUSTAT items 12/12 (t – 1)]). Liquidity is the ratio of net liquid assets to total assets [COMPUSTAT items (4–5)/6]. D/E is the ratio of debt to equity (COMPUSTAT items 9/60). M/B is the ratio of year-end market value of common stock to book value of equity (COMPUSTAT items 24∗25/60). P/E is the ratio of year-end stock price to earnings per share (COMPUSTAT items 24/58). Size is the log of equity capitalization at the start of the runup period (price times shares outstanding from CRSP). An aquisition is considered hostile if the "attitude" field in SDC was marked "unsolicited" or "hostile". Competing bids is a dummy variable indicating whether SDC records another bid by a different bidder for the same target firm in the following six months (as in officer, 2003). Intra-industry is a dummy variable indicating whether the acquisition involved two firms belonging to the same Fama and French (1997) 49-industry classification. Tender offer is a dummy variable equal to one if the bid involved a tender offer (as recorded in SDC). Toehold is a dummy variable equal to one if the fraction of the target's common stock owned by the bidder is greater than 5% at the bid announcement date or zero otherwise (following Officer, 2003). Denote by S the set of shareholders in company k and by $w_{k,i,t}$ the weight of investor i in the total percentage held by institutional investors in quarter t. The instant of measurement t is such that there is at least two full quarters between the measurement of all shareholder variables and the announcement date. The investor turnover of firm k is the weighted average of the average total portfolio churn rates of its investors over four quarters (see text for details on the construction of the churn rates): $\text{Investor turnover of firm } k = \sum_{i \in S} w_{k,i,t} \left(\frac{1}{4} \sum_{r=1}^{4} \text{CR}_{i,t-r+1} \right)$. Fraction denotes the ratio of a firm's shares held by institutional investors relative to total shares outstanding in CRSP. Concentration is the Herfindahl Index calculated over the distribution of weights $w_{k,i,t}$. For each institutional investor, we calculate the Herfindahl Index and the average beta of its portfolio. Manager concentration is the weighted average (using the weights $w_{k,i,t}$) of the Herfindahl Index for all investors $i \in S$. Similarly, beta is the weighted average (using the weights $w_{k,i,t}$) of the betas of all investors $i \in S$. The activism variable is the fraction of the firm's shares held by activist institutional investors relative to total shares outstanding. Activist investors are the ones belonging to the list of members of the Council of Institutional Investors. We also included in this table a measure of the change in arbitrage capital (following Baker and Savasoglu, 2002), measured in percentage terms. Arbitrage capital is the sum of total portfolio holdings of institutions considered as arbitrageurs. An institution is considered an arbitrageur if its holdings go from zero to positive in a target firm in the quarter immediately following a takeover announcement, for more than two hundred events during the sample period. All specifications include time dummies (for the year where announcement takes place) and industry dummies (for the target firm's industry, the latter obtained from the Fama and French, 1997, classification). Volume is the trading volume for the target firm, measured as the average daily (raw) number of shares of traded during the year prior to the run-up period (trading days [−316, −64] relative to the announcement date), divided by shares outstanding at the beginning of the run-up period. The fraction held by category 3 (mutual funds) and by category 4 (investment advisers) is the ratio of a firm's shares held by institutional investors of these categories relative to total shares outstanding. Managerial Holdings is the ratio of a firm's shares held by management officers of the firm (obtained from EXECUCOMP) relative to total shares outstanding. The turnover of BIDDER firm (cross-effect) is the investor turnover measure calculated as above, but for shareholders of the bidder firm. T-statistics are calculated using White's heteroskedastic consistent errors.

Dependent variable	Abnormal return premium										Actual offer premium			
	(0)		(1)		(2)		(3)		(4)		(5)		(6)	
	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic
Intercept	0.905	11.92***	1.387	6.15***	1.228	5.16***	1.848	2.88***	1.161	3.55***	0.780	5.30***	0.790	2.13**
ROE	0.002	0.43	0.001	0.15	−0.001	−0.13	0.027	0.56	0.001	0.15	0.002	0.44	−0.007	−1.49
Sales growth	−0.024	−1.10	−0.073	−2.68***	−0.042	−1.15	−0.125	−1.29	−0.029	−0.64	−0.017	−0.71	−0.042	−1.29
Liquidity	−0.006	−0.16	−0.008	−0.15	−0.035	−0.61	−0.055	−0.35	−0.077	−1.09	−0.020	−0.42	−0.182	−2.65***
D/*E*	0.022	0.44	0.132	2.20**	0.077	1.34	−0.217	−1.50	0.068	0.94	0.090	1.64	0.062	0.88
M/*B*	−0.006	−2.57**	−0.006	−1.88*	−0.007	−2.01**	0.001	0.23	−0.007	−1.45	0.002	0.79	0.004	0.93
P/*E*	0.000	−1.11	0.000	−1.14	0.000	−0.56	−0.001	−0.78	0.000	−1.04	0.000	−1.02	0.000	−0.89
Size	−0.062	−10.62***	−0.088	−9.58***	−0.079	−8.59***	−0.086	−2.60***	−0.078	−6.68***	−0.047	−5.57***	−0.023	−2.18**
Hostility	0.046	1.69*	0.081	2.96***	0.091	3.18***	0.105	1.35	0.034	0.90	0.055	1.77*	0.041	0.97
Competing bids	0.072	1.71*	0.091	2.04**	0.081	1.99**	0.264	1.40	0.058	1.40	0.006	0.14	−0.006	−0.13
Intra–industry	0.098	5.35***	0.075	3.67***	0.061	3.00***	0.020	0.33	−0.008	−0.30	0.082	4.10***	0.052	1.93*
Tender offer	0.240	12.58***	0.207	10.00***	0.203	9.30***	0.170	1.33	0.160	5.77***	0.137	6.20***	0.043	1.44
Toehold	−0.148	−8.04***	−0.122	−6.01***	−0.116	−5.50***	−0.147	−2.58	−0.091	−3.20***	−0.129	−5.42***	−0.163	−5.14***
Investor turnover			−0.200	−2.20**	−0.348	−3.50***	−1.088	−3.32***	−0.560	−4.51***	−0.176	−2.00**	−0.239	−1.76*
Fraction			0.083	1.66*	0.243	2.21**	0.049	0.16	0.273	1.95*	0.076	1.49	0.252	1.99**
Concentration			−0.141	−1.53	−0.052	−0.34	−0.369	−0.57	0.004	0.02	0.224	2.09**	0.522	3.07***
Manager Concentration			0.340	1.45	0.059	0.17	3.813	3.57***	0.069	0.17	−0.071	−0.15	−0.756	−1.59
Industry exposure			0.114	0.50	0.186	0.66	−2.991	−3.11***	0.116	0.35	0.462	1.92*	0.038	0.12
Beta			−0.181	−2.18**	−0.118	−1.29	0.003	0.01	−0.141	−1.31	0.340	4.20***	0.300	2.60***
Activism			0.558	3.48***	0.630	3.07***	0.937	1.88*	0.544	2.75***	−0.168	−1.21	−0.314	−1.69*
Change in arbitrage capital			−0.242	−1.96**	−0.342	−2.78***	−0.453	−1.05	−0.206	−1.40	0.005	0.04	0.023	0.16
Volume					−1.095	−0.39	−6.561	−0.81	−0.868	−0.24			8.909	3.37***
Fraction category 3 (mutual funds)					0.057	0.29	0.387	0.64	0.160	0.66			−0.290	−1.41
Fraction category 4 (investment advisers)					−0.414	−2.76***	−0.041	−0.10	−0.331	−1.76*			−0.085	−0.47
Managerial holdings							−0.325	−1.22						
Turnover of BIDDER (cross–effect)									0.405	5.33***			0.424	5.84***
Year and industry dummies	—		Yes		Yes		Yes		Yes		Yes		Yes	
Mean squared error	0.24		0.22		0.18		0.16		0.17		0.15		0.13	
Adjusted R^2	0.093		0.140		0.159		0.106		0.162		0.113		0.126	
N	3,814		2,863		2,340		258		1,471		1,880		984	

The symbols ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively, for the two-tailed hypothesis test that the coefficient equals zero.

Table 4
Ordinary least squares estimates of the relation between investor turnover and the bidder's short-term stock price performance

We keep the first bid made by each different acquirer within a given contest. The left-hand side variable in Columns 1 through 4 is the bidder's abnormal return, defined as the cumulative abnormal return, measured relative to a CRSP value-weighted market model regression using a year of prior daily data, to the bidder firm's stock for trading days [−63, +126] relative to the announcement date (Schwert, 2000). Columns 5 and 6 replicate Columns 1 and 4 but use as a dependent variable the sum of the bidder abnormal returns in the [–1, +1] event window around the announcement date. The right-hand side variables are all measured for the bidder firm following the procedures detailed in the caption to Table 3. *T*-statistics are calculated using White's heteroskedastic consistent errors.

Dependent variable	Bidder abnormal return										Bidder abnormal return in days [−1, 1]			
	(0)		(1)		(2)		(3)		(4)		(5)		(6)	
	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic
Intercept	0.047	0.53	0.426	1.86*	0.744	3.65***	1.099	3.39***	0.784	3.77***	−0.029	−1.07	−0.014	−0.48
ROE	−0.007	−0.16	0.041	0.61	−0.056	−1.67*	−0.096	−1.93*	−0.063	−1.85*	0.000	−3.04***	0.000	−0.94
Sales growth	−0.033	−0.46	0.001	0.05	−0.016	−0.78	0.040	1.09	−0.007	−0.33	0.000	0.01	−0.003	−1.02
Liquidity	−0.021	0.36	−0.159	−2.36**	−0.144	−2.10**	−0.071	−0.67	−0.159	−2.31**	−0.001	−0.07	−0.003	−0.29
D/*E*	−0.001	−0.20	−0.001	−0.10	−0.009	−1.38	0.009	1.33	−0.011	−1.46	0.000	−0.02	0.000	0.51
M/*B*	−0.001	−0.51	0.001	0.49	0.000	−0.17	−0.010	−2.34**	0.000	−0.02	0.000	−1.38	0.000	−0.58
P/*E*	−0.000	0.64	0.000	0.87	0.000	0.39	0.000	−0.52	0.000	1.32	0.000	−1.89*	0.000	−1.43
Size	−0.008	−1.39	−0.030	−3.17***	−0.030	−3.18***	−0.027	−1.93*	−0.030	−3.13***	0.002	1.51	0.002	1.55
Histility	−0.055	−1.72	−0.031	−0.97	−0.042	−1.40	−0.048	−1.23	−0.039	−1.29	−0.011	−2.81***	−0.011	−2.61***
Competing bidders	−0.016	−0.53	0.003	0.09	0.014	0.45	0.047	0.79	0.009	0.27	−0.004	−0.96	−0.004	−0.92
Intra-industry	−0.003	0.16	0.033	1.73*	0.039	2.05**	0.010	0.38	0.038	2.00**	0.000	−0.15	−0.001	−0.27
Tender offer	−0.042	1.99	0.006	0.26	−0.003	−0.13	0.008	0.26	−0.007	−0.33	0.004	1.07	0.004	1.23
Toehold	−0.002	0.09	0.027	0.86	0.045	1.51	0.045	0.99	0.038	1.26	0.005	0.91	0.004	0.80

Investor turnover		−0.519	−2.50**	−0.354	−3.02***	−0.478	−2.51**	−0.452	−2.90***	−0.028	−1.97**	−0.039	−2.15
Fraction		−0.019	−0.35	0.143	1.25	0.122	0.60	0.089	0.74	0.005	0.66	−0.024	−1.51
Concentration		−0.234	−1.25	−0.066	−0.28	−0.517	−1.16	−0.025	−0.10	0.029	1.38	0.041	1.22
Manager concentration		0.468	0.93	0.490	1.00	1.866	2.78***	0.659	1.43	−0.037	−0.58	0.005	0.07
Industry exposure		−0.461	−1.18	−0.640	−1.60	−1.967	−3.01***	−0.759	−1.93*	−0.008	−0.17	−0.027	−0.52
Beta		−0.067	−0.48	−0.203	−1.62	−0.266	−1.52	−0.242	−1.90*	−0.019	−1.11	−0.030	−1.61
Activism		−0.569	3.32***	−0.439	2.30**	−0.274	−0.65	0.421	2.16**	−0.028	−1.25	−0.017	−0.61
Change in arbitrage capital		−0.119	−1.0	−0.143	−1.28	−0.165	−0.82	−0.152	−1.37	−0.003	−0.21	−0.004	−0.24
Volume				1.830	0.48	14.850	2.85***	3.149	0.81			0.975	2.25**
Fraction category 3 (mutual funds)				−0.074	−0.36	−0.313	−1.05	0.000	0.00			0.048	1.73*
Fraction category 4 (Investment advisers)				−0.424	−2.38**	−0.662	−2.36**	−0.366	−2.01**			0.028	1.14
Managerial holdings						0.069	0.24						
Turnover of TARGET (cross-effect)								0.084	0.72			0.005	0.40
Year and industry dummies	—	Yes		Yes		Yes		Yes		Yes		Yes	
Mean squared error	0.20	0.17		0.15		0.13		0.15		0.00		0.00	
Adjusted R^2	0.001	0.034		0.048		0.062		0.052		0.011		0.008	
N	2,202	1,964		1,842		784		1,808		1,964		1,808	

The symbols ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively, for the two-tailed hypothesis test that the coefficient equals zero.

might be because the market takes time to uncover the terms of the deal and its true value. We address this topic further in Section 6.

4.3. Additional robustness checks

We perform (unreported) additional tests that are also worth mentioning. First, our results are unchanged if we explicitly exclude merger arbitrageurs from the set of shareholders used to construct investor turnover, out of the concern that their presence in this measure might still be a source of bias.[18] Second, we find that our results are robust to dropping the other shareholder portfolio variables (fraction, concentration, manager concentration, industry exposure and beta) from the regression. Third, we find that the results do not differ if we split the sample according to the mode of acquisition (mergers versus tender offers).

We also investigate if differences in investment horizon matter more when management interests are less aligned with shareholders. Datta et al., (2001) show that high levels of equity-based compensation (EBC), defined as the Black–Scholes value of recently awarded options, provide the stronger incentives for managers to engage in value-creating acquisitions. We therefore interact investor turnover with a dummy of whether a firm is above-median on EBC. The interaction is positive and statistically significant, suggesting that the negative effect of investor turnover on bidder abnormal returns is partially mitigated if bidder management is aligned with shareholder interests. This supports our hypothesis that weak monitoring is one of the channels through which investor horizons affect acquisitions.[19]

5. Investment horizon, probability of acquisition, and sample-selection correction

5.1. Probability of acquisition

A relevant issue in its own right is whether shorter investment horizons increase the likelihood of a firm entering an M&A transaction, either as a bidder or target firm. To address this issue, we estimate a probit model of the acquisition likelihood. Denote h_k^* the latent unobservable variable that represents the value of the acquisition to the decision maker and h_k a dummy that takes the value of one if the company is involved in a deal: $h_k = 1$ if $h_k^* > 0$ or $h_k = 0$ if $h_k^* < 0$. The probit regression to be estimated for the probability of Prob($h_k = 1$) is

$$h_k^* = \mathbf{X}_{\text{InvestorTurnover},k}\,\theta + \mathbf{X}_{\text{OtherShareholderVars},k}\,\eta + \mathbf{X}_{\text{Control},k}\,\varsigma + \upsilon_k. \tag{4}$$

To perform this analysis, we build an expanded data set that is made up of the universe of firms for which we are able to match CRSP, COMPUSTAT, and

[18]The average sample value of the resulting measure, "investor turnover no-arbs", is 0.27 compared with 0.38 for investor turnover calculated using all investors (*P*-value of difference <0.01), so the churn rate of arbitrageurs is higher than that of other investors. For example, the average churn rate of the top ten arbitrageurs is 0.54.

[19]All the robustness results in this section are available upon request.

CDA/Spectrum. The data set includes a total of 17,640 different securities tracked over each of the sample years 1980 through 1999. We construct the accounting and institutional control variables in the same way as before, with the exception that they are now calculated as averages over the two years prior to the forecast year and an additional variable is employed (the stock's abnormal return, as defined in Comment and Schwert, 1995). The results are reported in Table 5. Panel A reports, on the left column, the results of the likelihood of a firm being a target in a given year and, on the right column, the results of the likelihood of being a bidder.

Regarding the target firms, we find that firms with higher investor turnover have a significantly higher chance of receiving an offer. This suggests that potential bidders are more willing to bid for firms held by short-term investors, because these constitute easier targets with lower bargaining power in the event of the bid. In terms of the control variables, the results are consistent with those existing in the literature (Palepu, 1986; Comment and Schwert, 1995). Fraction has a positive coefficient, while ownership concentration decreases the likelihood of receiving an offer (Pinkowitz, 1999). Changes in arbitrage capital are positively related to the likelihood of receiving an offer. Regarding the bidder firms, the positive coefficient of investor turnover again supports our conjectured hypothesis.

5.2. Sample-selection correction

If investment horizons affect the probability of an acquisition being observed, this could potentially bias our previous OLS estimates. For example, if the presence of short-term shareholders for the target firm facilitates bids, the potential economic value of the deal does not need to be so high to compensate the costs of launching it. We would therefore observe a lower premium on average. This could induce a negative relation between average premiums and the amount of short-term investors. Therefore, to identify the marginal effect of investor turnover on premium, we need to control for sample selection.

Heckman (1979) suggests a two-stage procedure to solve the sample-selection problem, based on first estimating Eq. (4) using a probit choice model and then running OLS on

$$\text{Premium}_k = \mathbf{X}_{\text{InvestorTurnover},k}\,\beta_2 + \mathbf{X}_{\text{OtherShareholderVars},k}\,\delta_2 + \mathbf{X}_{\text{Controls},k}\,\gamma_2 + \sigma\lambda_k + \upsilon_k \quad (5)$$

where λ_k is a term known as Heckman's Lambda, constructed using the results from the first stage. The standard errors in the second stage regression are corrected for heteroskedasticity and for the fact that Lambda is an estimated regressor (Greene, 1997). The significance of the estimate of σ obtained from Eq. (5) provides a test of the null of no sample selection bias. The results are reported in Table 5, Panel B. The left-hand side contains the results of the second-stage estimates for target firms, with two alternative premium measures: the abnormal return premium and the actual offer premium (these should be compared with Column 4 and Column 6, respectively, of Table 3). The right-hand side contains the results for the bidder firms.

Table 5
Full analysis of the relation between investor turnover and the acquisition premium taking into account possible sample-selection issues

Panel A presents a probit regression of the likelihood of a firm being a target (bidder) of a takeover bid. The base sample universe is the merged set of COMPUSTAT, CDA/Spectrum, and CRSP firms and includes a total of 17,640 different securities tracked over each of the sample years 1980 through 1999. The number of observations available refers therefore to firm-years instead of events as in previous tables. The left-hand side variable of the probit regression is a dummy taking the value of one if the company is the target (bidder) of an acquisition bid that year and zero otherwise. Right-hand side variables include all accounting and institutional variables calculated as before (see Table 3), with the exception that they are now calculated as averages over the prior two years. We also add the cumulative abnormal return, measured relative to a CRSP value-weighted market model and estimated using the third year prior to the forecast year, of the firm's stock for the two previous years (see Palepu, 1986; Comment and Schwert, 1995). Panel B presents the estimates for the relation between investor turnover and the acquisition premium using Heckman's sample-selection correction technique (Heckman, 1979). This equation is estimated using the selected sample (i.e., the sample of firms for which there were events). The left-hand side variable is, as before, the target's (bidder's) premium, while target (bidder) accounting and institutional variables are used on the right-hand side. The results for targets are presented in the left–hand side of the table, while results for bidders are presented in the right-hand side. The statistical significance of Heckman's Lambda can also be seen as a test for the null hypothesis that sample selection is irrelevant in the sample. *T*-statistics for the second stage are calculated using the procedure described in Greene (1997).

	Likelihood of being a TARGET firm			Likelihood of being a BIDDER firm		
	Coefficient	*T*-statistic	Marginal effect	Coefficient	*T*-statistic	Marginal effect
Panel A. First stage: probit estimates						
Intercept	−2.63	−23.10	−0.18***	−1.87	−17.82	−0.18***
ROE	0.00	−0.46	0.00	0.01	1.92	0.00*
Sales growth	0.02	0.85	0.00	0.15	7.87	0.02***
Liquidity	−0.10	−1.79	−0.01*	−0.28	−5.54	−0.03***
D/*E*	0.01	2.01	0.00**	0.01	1.46	0.00
M/*B*	−0.01	−1.83	0.00*	0.00	1.11	0.00
P/*E*	0.00	−1.19	0.00	0.00	1.08	0.00
Size	0.00	−5.56	0.00***	0.00	18.32	0.00***
Abnormal return	−61.92	−6.76	−4.18***	28.64	3.66	2.78***
Investor turnover	1.29	6.83	0.09***	0.94	5.23	0.09***
Fraction	0.40	6.19	0.03***	0.61	11.58	0.06***
Concentration	−0.99	−7.42	−0.07***	−1.67	−13.35	−0.16***
Manager concentration	0.50	0.86	0.03	0.72	1.40	0.07
Industry exposure	0.50	1.63	0.03	0.56	2.07	0.05**
Beta	0.32	3.03	0.02***	−0.16	−1.65	−0.02*
Activism	−0.10	−0.54	−0.01	0.62	3.72	0.06***
Change in arbitrage capital	1.58	4.75	0.11***	−0.23	−0.84	−0.02
Likelihood ratio index		0.39			0.10	
N		43,793			44,005	

Dependent variable	TARGET abnormal return premium		TARGET actual offer premium		BIDDER abnormal return premium	
	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic
Panel B. Sample-selection corrected estimates for premium regressions						
Intercept	2.40	8.90***	0.67	2.47**	0.72	2.84***
ROE	0.00	0.34	−0.01	−0.74	−0.07	−2.03**
Sales growth	−0.04	−1.28	−0.04	−1.13	−0.02	−1.16
Liquidity	0.01	0.23	−0.12	−2.03**	−0.04	−0.74
D/E	−0.02	−0.34	0.03	0.46	−0.02	−3.06***
M/B	−0.01	−1.94*	0.01	1.36	0.00	0.30
P/E	0.00	−0.56	0.00	−0.64	0.00	0.53
Size	−0.06	−5.49***	−0.04	−3.64***	−0.03	−2.38**
Hostility	0.03	0.68	0.02	0.52	−0.04	−1.27
Competing bidders	0.04	0.83	−0.01	−0.13	0.00	−0.01
Intra-industry	−0.02	−0.93	0.03	1.22	0.03	1.62
Tender offer	0.19	5.85***	0.05	1.77*	0.01	0.24
Toehold	−0.10	−3.18***	−0.11	−3.31***	0.72	2.84***
Target investor turnover	−0.55	−5.13***	−0.25	−2.24**	0.20	1.90*
Bidder investor turnover	0.49	6.76***	0.47	6.22***	−0.32	−2.63***
Fraction	0.07	0.48	0.24	1.62	0.11	0.92
Concentration	0.54	2.80***	0.37	1.98**	0.15	0.81
Manager concentration	−0.49	−0.97	−0.58	−0.91	0.53	1.07
Industry exposure	0.04	0.13	0.20	0.66	−0.79	−3.08***
Beta	−0.30	−3.23***	0.15	1.65*	−0.22	−2.36**
Activism	0.57	2.83***	−0.29	−1.46	0.40	2.18**
Change in arbitrage capital	0.03	0.20	0.10	0.78	0.02	0.22
Volume	−1.06	−0.55	10.63	4.16***	4.07	1.56
Fraction category 3 (m. funds)	0.29	1.36	−0.13	−0.61	−0.07	−0.42
Fraction category 4 (inv. Adv.)	−0.26	−1.41	−0.02	−0.12	−0.49	−2.96***
Heckman's lambda	−0.49	−5.35***	−0.01	−0.10	−0.04	−0.72
Mean squared error		0.17		0.13		0.15
Adjusted R^2		0.170		0.137		0.048
N		1,354		969		1,702

The symbols ***, **, and * denote significance levels of 1%, 5%, and 10%, respectively, for the two-tailed hypothesis test that the coefficient equal zero.

Our basic conclusions are left unchanged. The coefficient of the target's investor turnover is significant and negative, while the cross-effect (the investor turnover of the bidder firm) is positive. The point estimates and significance levels are similar to those reported in Table 3. The results for the bidder also replicate our earlier single-stage results from Table 4. We conclude that our results do not stem from a potential sample selection problem.[20] The coefficient of Heckman's Lambda is significant and negative for the abnormal return premium regression, which means that sample selection was empirically relevant (at least for the target regressions using the abnormal return premium measure).

We also perform a probit analysis of the success probability of the merger (not reported). Our results confirm Schwert (2000) and other researchers' findings that hostility is the only powerful predictor of merger success. Investor turnover is not significant. Shareholding structure hence affects jointly the likelihood of a bid and its pricing but has little predictive power over the outcome of the contest once initiated. If the characteristics of the bid are an equilibrium response to the shareholder structure, then there is no reason to expect a relation between investor turnover and success rates. For example, short-term investors make firms easier targets but also command lower premiums, therefore mitigating any effect of investment horizon on the probability that a deal goes through.

6. Investment horizon and long-term performance

Research on the long-run performance of mergers has shown that returns to bidder firms are on average nonpositive, with some authors finding positive but insignificant returns (e.g., Franks et al., 1991) and others reporting negative and significant returns (e.g., Agrawal et al., 1992). Subsequent papers (Loughran and Vijh, 1997; Rau and Vermaelen, 1998) reveal that this long-run underperformance is primarily found in acquisitions paid in stock and in the case of glamour acquirers. The crucial issue in both cases is that the announcement date stock price reaction does not fully incorporate into prices all the relevant information about the merger.

The results of Sections 4 and 5 show that, in the short-run, the division of gains tends to harm bidder firms with more short-term investors. This is consistent with short-term investors allowing the bidder's management to bid too aggressively. If it takes time for the market to learn about the true quality of the deal, we expect to find a pattern of under-reaction where firms with short-term shareholders exhibit greater long-run underperformance. We test this prediction by looking at long-run returns of acquirer firms, conditional on the type of shareholding structure they had before the merger.

We employ two long-run study methodologies: the calendar-time portfolio regression (CTPR) approach (e.g., Ikenberry et al., 2000) and the calendar-time abnormal return (CTAR) approach (Jaffe, 1974; Mandelker, 1974). The CTPR

[20]One difference to Table 4 is that the cross-effect term (the target's investor turnover) in the bidder regression is now significantly positive.

approach has the advantage of taking into account cross-sectional dependence and being less sensitive to model misspecification (Mitchell and Stafford, 2000). The CTAR approach offers a solution to the heteroskedasticity problem induced by the clustering of events over time, a characteristic feature of M&A activity (Fama, 1998). Full details concerning the two methodologies can be found in Table 6.

For each month of the sample period (1980–1999), we form portfolios of bidder firms that have just completed an acquisition during that month and keep them in a portfolio for a prespecified holding period. Portfolios are rebalanced monthly to drop all the firms that have just reached the end of their holding period and to add all firms that have just completed a transaction. We exclude multiple observations of the same firm that occur within the same holding period (Mitchell and Stafford, 2000). We use holding periods of one to 12 months (one year), one to 24 months (two years), and one to 36 months (three years) after the event month.

To capture the cross-sectional variation in shareholding behavior, we form portfolios as follows. Each month, we sort all the stocks in the CRSP-COMPUSTAT-CDA/Spectrum universe according to their institutional shareholders' turnover.[21] An acquirer firm is considered an acquirer with high investor turnover if its investor turnover variable is in the top third of the distribution for the entire universe in the month prior to the acquisition. Inversely, an acquirer is considered an acquirer with low investor turnover if its investor turnover variable is in the bottom third of the distribution. We then form a portfolio that buys acquirers with high investor turnover and sells acquirers with low investor turnover, to investigate whether there are significant performance differences between the two types of firms.

Table 6 reports the results for both equal-weighted and value-weighted portfolios and for the CTPR and CTAR approaches. Panel A shows the results for the portfolio of all acquirers in the sample. The results are comparable to the findings of previous literature. Over a holding period of three years, the value-weighted portfolio of acquirers exhibits a negative abnormal return of –0.2% per month, or –2.4% per year (Column 6 of the table). Panel B shows that the alpha of a portfolio strategy that buys acquirers with short-term shareholders and sells acquirers with long-term shareholders is negative and highly significant.

The data support our conjecture that underperformance is worse for acquirers held by short-term shareholders. Over a holding period of three years, the value-weighted portfolio strategy exhibits negative abnormal returns of −0.7% per month, or –8% per year. Using equal-weighted returns delivers similar results. If equal weighting is used, the effect is already visible the year immediately following the acquisition. In addition, most of this abnormal negative performance comes from the underperformance of acquirers with short-term investors. The bottom panels show the alpha coefficient for a portfolio that buys exclusively acquirers with high investor turnover (Panel C) and a portfolio that buys exclusively acquirers with low

[21]To have a more conservative test, calculations in this section exclude arbitrageur institutions. Because arbitrageurs present in the bidder sell on announcement, their short-term nature allows more overbidding and implies a higher likelihood of finding underperformance. Results are not sensitive to this modification.

Table 6
Estimates of the abnormal return of a portfolio composed of acquirer firms during the sample period, using the calendar-time portfolio regressions (CTPR) approach of Ikenberry, Lakonishok, and Vermaelen (2000) and the calendar-time abnormal return (CTAR) approach of Jaffe (1974) and Mandelker (1974). For each month of the sample period, we form portfolios of firms that have just completed an acquisition and keep them in the portfolio for a prespecified holding period counted relative to the event month. We exclude multiple observations of the same firm that occur within the same holding period (Mitchell and Stafford, 2000). Portfolios are rebalanced monthly to drop all companies that have just reached the end of their holding period and add all firms that have just completed a transaction. Holding periods used are one to 12 months (one year), one to 24 months (two years), and one to 36 months (three years). In the CTPR approach, the excess return of the portfolio of acquirers is regressed on the three Fama and French (1993) factors $R_{p,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 \mathrm{SMB}_t + \beta_3 \mathrm{HML}_t + \varepsilon_t$. Abnormal performance is measured by the intercept of this time-series regression. In the CTAR approach, the residual $\hat{e}_{i,t} = R_{i,t} - R_{f,t} - \beta_{1,i}(R_{m,t} - R_{f,t}) - \beta_{2,i}\,\mathrm{SMB}_t - \beta_{3,i}\,\mathrm{HML}_t$ is calculated for each acquirer using factor betas estimated from returns in the three years prior to the acquisition announcement date. These residuals are aggregated to form a portfolio of residuals for each month, $\hat{e}_t = \frac{1}{S_t}\sum_i \omega_{i,t}\hat{e}_{i,t}$ where S_t is the number of firms in the portfolio in month t and ω is the weight of the firm in the portfolio (we use both equal-weighting and value-weighting). An estimate of the portfolio's standard deviation is used to standardized the residuals, such that $s\hat{e}_t = \hat{e}_t/\mathrm{SD}_t$, where $\mathrm{SD}_t = \sqrt{\frac{1}{49}\sum_{j=1}^{50}\left(\hat{e}_{t,t-j+1} - \frac{1}{50}\sum_t \hat{e}_{t,t-j+1}\right)^2}$ Abnormal performance is measured by the SR statistic, the time-series average of standardized portfolio residuals $\mathrm{SR} = \frac{1}{N}\sum_t s\hat{e}_t$.where N denotes the number of months that the strategy lasts. Panel A shows the results for the case in which the portfolio is composed of all acquirers in the sample. Panel B shows the results for a portfolio formed as follows: Each month, we sort all stocks in the CRSP-COMPUSTAT-CDA/Spectrum universe according to their Investor Turnover. An acquirer firm is considered an acquirer with high investor turnover if its investor turnover variable is in the top third of the distribution for the entire universe on the month prior to the acquisition. Inversely, an acquirer is considered an acquirer with low investor turnover if its investor turnover variable is in the bottom third of the distribution for the entire universe on the month prior to the acquisition. Panel B presents results for a portfolio that buys acquirers with high investor turnover and sells acquirers with low investor turnover. The estimated alpha and the different betas are shown, for the different holding periods. For purposes of comparison, Panel C presents results for a portfolio that buys acquirers with high investor turnover exclusively and Panel D presents results for a portfolio that buys acquirers with low investor turnover exclusively. *T*-statistics for the CTPR approach are calculated using White's heteroskedastic consistent errors.

Equally weighted portfolios							Value weighted portfolios					
	(1) After one year		(2) After two years		(3) After three years		(4) After one year		(5) After two years		(6) After three years	
	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic	Coefficient	*T*-statistic
Panel A. Portfolio of all acquirers												
α	−0.001	−1.48	−0.004	−4.19***	−0.004	−4.44***	0.001	1.11	−0.002	−2.55**	−0.002	−2.40**
β_{Rm-Rf}	1.078	46.80***	1.082	46.19***	1.096	42.43***	1.042	34.10***	1.047	43.72***	1.045	39.16***
β_{SmB}	0.630	13.87***	0.688	17.64***	0.710	17.13***	−0.171	−3.96***	−0.075	−1.99**	−0.057	−1.41
$\beta_{HmL.}$	0.115	2.28**	0.164	3.82***	0.207	5.02***	−0.083	−1.45	−0.002	−0.04	0.063	1.27
Adjusted R^2	0.93		0.95		0.95		0.88		0.92		0.90	
N	190		190		190		190		190		190	
SR	−0.073	−1.05	−0.204	−2.92***	−0.176	−2.15**	0.022	0.32	−0.183	−2.62**	−0.150	−2.15**
Panel B. Portfolio of acquirers with high investor turnover minus acquirers with low investor turnover												
$\alpha_{HT\ minus\ LT}$	−0.005	−2.40**	−0.005	−2.63***	−0.006	−3.09***	−0.002	−0.80	−0.007	−2.74***	−0.007	−2.64***
β_{Rm-Rf}	0.185	3.05***	0.172	3.03***	0.187	3.49***	0.194	2.65***	0.221	2.89***	0.275	4.08***
β_{SmB}	0.328	3.96***	0.341	4.19***	0.380	5.53***	0.544	4.33***	0.631	6.54***	0.528	5.54***
$\beta_{HmL.}$	−0.255	−2.23**	−0.322	−3.20***	−0.306	−3.36***	−0.222	−1.42	−0.157	−1.16	−0.164	−1.67*
Adjusted R^2	0.20		0.29		0.36		0.18		0.27		0.31	
N	190		190		190		190		190		190	
$SR_{HT\ minus\ LT}$	−0.118	−1.68*	−0.215	−3.04***	−0.254	−3.59***	−0.045	−0.063	−0.141	−1.99**	−0.139	−1.97**
Panel C. Portfolio of only acquirers with high investor turnover												
α_{HT}	−0.005	−3.64***	−0.007	−4.99***	−0.007	−5.14***	−0.002	−0.90	−0.218	−3.11***	−0.007	−4.16***
SR_{HT}	−0.146	−2.07**	−0.284	−4.04***	−0.308	−4.38***	−0.085	−1.21	−0.168	−2.40**	−0.229	−3.26***
Panel D. Portfolio of only acquirers with low investor turnover												
α_{LT}	0.000	0.25	−0.002	−1.30	−0.002	−1.32	0.001	0.25	0.000	0.20	0.000	−0.15
SR_{LT}	−0.001	−0.02	−0.064	−0.90	−0.050	−0.71	−0.059	−0.83	−0.044	−0.62	−0.073	−1.03

The symbols***,**, and * denote significance levels of 1%, 5%, and 10%, respectively, for the two-tailed hypothesis test that the coefficient equals zero.

investor turnover (Panel D). The alpha coefficient and the SR statistic of the acquirers with high investor turnover is of the same order of magnitude as that of the difference portfolio, while the acquirers with low investor turnover portfolio does not exhibit abnormal returns.[22]

Why is this underreaction pattern observed only for firms held by short-term investors? We believe that such a mispricing phenomenon is more likely for companies in which investors have shorter horizons, because these investors do not have strong incentives to arbitrage the price back to fundamental value (DeLong et al., 1990). This reasoning relies on the assumption that long-term capital is scarce. Goldman and Slezak (2003) develop a model in which short tenure by delegated portfolio managers lowers their incentive to trade on long-term information. As a result, the shorter is the investment horizon of fund managers, the more likely it is that prolonged rational mispricing can occur.

7. Conclusion

The attention given to shareholder characteristics in the M&A literature has mostly been restricted to the role played by institutional differences between classes of shareholders (e.g., firm managers, affiliated blockholders, or institutional investors). We focus on differences in investment horizon, and we put forward explanations as to why they are likely to be a major source of variation in the value of a takeover deal. A longer investment horizon of the shareholders implies a higher ability to hold out in the merger negotiation. At the same time, shareholders with longer investment horizon have bigger incentives to monitor. This means that firm managers are less likely to trade off shareholder returns for their own personal benefit.

We show that investment horizon affects the affordability of takeovers. Short-term shareholders in the target enhance the likelihood of a takeover and lower its cost. At the same time, short-term shareholders in the bidder give managers more leeway to carry out value-reducing acquisitions. Long-term investors defend management from takeovers (by making bids more expensive) but also prevent overbidding and value-reducing acquisitions.

In future work it is worth investigating the impact of shareholder horizons on other aspects of corporate control. Given our findings, we expect that shareholders' horizon will affect the outcome of other events in which shareholder monitoring and bargaining constitute major features (such as proxy fights, going private transactions, or self-tender offers). At a more general level, it would be interesting to study the determinants of a firm's shareholder base. We believe that long-term capital is scarce, because of the problems discussed in the literature (e.g., the importance of

[22]As a robustness check, we repeat the analysis considering the case of industry-adjusted returns (e.g., Gompers et al., 2003). Using the Fama and French (1997) industry classification, we calculate a value-weighted excess return for all industries and subtract from each acquirer return the corresponding industry return before constructing the portfolios. Results are similar and are available upon request.

liquidity needs or the distortions of incentives caused by delegated portfolio management). Hence long-term capital cannot have a major presence in all firms. What are the key attributes that attract long-term capital to a company or that persuade existing shareholders to hold their investments for longer periods? This is an open question left for future research.

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