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Cash holdings, corporate governance, and acquirer returns

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Abstract

Background: The wealth effect of limiting shareholder rights via anti-takeover provisions(ATPs) is a contentious issue. By taking the differential effect hypothesis perspective, our study aims to provide additional evidence about the relation between ATPs and acquisition performance.

Methods: We examine the interaction of antitakeover provisions (ATPs) with firm characteristics and governance environment in explaining the cross-section of bidder announcement returns. Using a sample of 3,340 completed acquisitions by 1,217 firms during 1996–2006, we test the association between ATPs, firm characteristics, and governance environments with bidder returns.

Results: We find that ATPs hurt acquisition performance only when acquirers hold a high level of excess cash. Similarly, ATPs are associated with lower bidder returns only when industry competition is weak and public pension fund ownership is low as well. By contrast, when industry competition is intense and/or public pension fund ownership is high, ATPs do not hurt bidder returns.

Conclusions: The complementarity among ATPs, excess cash, industry competition, and public pension fund ownership suggests that ATPs per se do not necessarily result in value-destroying acquisitions for all firms. We address the endogeneity issue of unknown variables by using a proxy for firm prestige and draw the same conclusions.

Keywords: Cash holdings, Corporate governance, Anti-takeover provisions, Mergers and acquisitions

JEL classification: G30, G32, G34

Background

Anti-takeover provisions (ATPs) restrict shareholders' rights by shielding managers from takeovers and shareholder activism. The wealth effect of limiting shareholder rights via ATPs is a contentious issue. Grounded in agency theory, the extant literature suggests that ATPs exacerbate agency problems by insulating managers from the discipline of the market for corporate control. Conversely, ATPs may dissuade opportunistic biddings and lead to higher target premiums. With the deterrence effect, managers may also be able to pursue risky, long-term projects that increase long-term value (Chemmanur and Jiao 2011). While these conflicting arguments predict either the abolition or addition of ATPs to maximize firm value, they appear inconsistent with the fact that large publicly traded companies adopt a fairly stable number and type of ATPs.[1]

This leads us to an eclectic view that explicitly recognizes various contingencies that shape both the costs and benefits of shifting power from shareholders to managers via ATPs. We refer to this as the *differential effect hypothesis*. This hypothesis contends that the wealth effect of ATPs differs across firms according to firm-specific characteristics and a firm's governance environment. Several researchers have examined the heterogeneous effects of ATPs on firm policies and stock returns. For example, Dittmar and Mahrt-Smith (2007) and Harford et al. (2008) show that the value of cash holdings and investment policies depend on a firm's governance quality measured by the number of ATPs. Using the passage of the Business Combination (BC) law as an exogenous shock to governance, Giroud and Mueller (2010) finds that the law adversely affected operating performance and stock market responses only for firms in non-competitive industries. Similarly, Kadyrzhanova and Rhodes-Kropf (2011) note that the types of ATPs interact with industry characteristics in determining the target premium, the deterrence effect, and firm value. Cremers and Nair (2005) show that a governance index-based trading strategy produces abnormal returns only when public pension funds or large blockholders have a higher ownership stake.

While these findings are consistent with the differential effect hypothesis, there are no studies examining the heterogeneous effect of ATPs in the context of acquisition performance. We aim to fill this gap with this study focusing on acquisition performance. Mergers and acquisitions are the most notable events intensifying conflicts among interested parties and thus provide an appropriate setting to identify the heterogeneous wealth effect of ATPs. Researchers have extensively examined the relation between ATPs and acquisition performance as a potential channel through which ATPs may affect firm value.[2] Examining acquisitions during 1990–2003, Masulis et al. (2007) find a negative association between governance provisions and bidder announcement returns and infer that managers protected by ATPs are more likely to engage in value-destroying acquisitions, supporting the managerial entrenchment hypothesis.

Other researchers challenge this causal interpretation and argue that ATPs do not necessarily deter takeovers or cause poor acquisition decisions. For the deterrence effect, Comment and Schwert (1995) argue that ATPs increase target managers' bargaining power, but do not deter takeover transactions. Bates et al. (2008) report a mixed impact from ATPs in deterring takeover activities and note that the probability of becoming a target decreases for firms with classified boards, but some provisions, such as golden parachutes, even facilitate takeovers. Bauguess and Stegemoller (2008) examine the relation between ATPs and bidder announcement returns for S&P500 firms during 1994–2005 and find that ATPs are unrelated to bidder returns and conclude that ATPs do not encourage managers to undertake value-destroying acquisitions.

Thus, the current empirical evidence on the issue is inconclusive and needs further investigation. The contradicting evidence suggests that it is more important to understand when and under which circumstances ATPs affect acquisition performance. By taking the differential effect hypothesis perspective, our study aims to provide additional evidence about the relation between ATPs and acquisition performance.

Using a sample of 3,340 completed acquisitions by 1,217 firms during 1996–2006, we test the association between ATPs, firm characteristics, and governance environments with bidder returns. Our primary measure of ATPs uses the entrenchment index (the E-index)

developed by Bebchuk et al. (2009). The E-index consists of six anti-takeover provisions that include blank check preferred stock, classified boards, limits to charter amendments, limits to bylaw amendments, supermajority rule, and poison pills. We also use Gompers et al.'s G-index and classified boards in isolation as a robustness check.

We measure firm characteristics and governance environments with a firm's excess cash holdings, industry competition, and public pension fund ownership. Prior studies suggest that these factors may interact with ATPs to explain firm performance. First, we examine whether a firm's excess cash holding influences the relationship between ATPs and bidder returns. Faleye (2004) argues that firms may use excess cash to repurchase stocks to fend off takeover attempts, and firms are significantly less likely to become takeover targets if they have excess cash (Harford 1999). These arguments suggest that ATPs' deterrent effect can be strengthened when firms also hold excess cash. Thus, we expect that managers in firms with a high E-index and high excess cash are more likely to engage in value-destroying acquisitions. Consistent with this prediction, we find that E-index is associated with lower bidder returns only when excess cash is also high. The results suggest that excess cash complements ATPs in acquisition performance.

We next examine the interactive nature of ATPs with product market competition and public pension fund ownership. Shleifer and Vishny (1997) and Bertrand and Mullainathan (2003) suggest that managers of firms in competitive industries are under constant pressure to remove managerial slack. Furthermore, for firms in non-competitive industries, exogenous changes in the governance environment create a higher agency problem (Giroud and Mueller 2010), and ATPs are associated with lower firm value only for those firms (Giroud and Mueller 2011). We thus predict that ATPs' deterrence effect is more pronounced for bidders in non-competitive industries. Similarly, the presence of large shareholders facilitates takeovers (Shleifer and Vishny 1986), and their presence generates abnormal returns in governance-based trading strategies. These studies suggest that the effectiveness of ATPs depends on the strength large shareholders' monitoring. We thus predict that the adverse impact of ATPs on acquisition performance is particularly severe in the absence of large shareholders.

Using industry net profit margins and public pension fund ownership as proxies for industry competition and large shareholder ownership, respectively, we find evidence consistent with these predictions. Specifically, we find that ATPs are negatively associated with bidder returns only when product market competition is weak and large shareholder ownership is low. The complementary effect of ATPs and excess cash also holds only for bidders in non-competitive industries and with lower large shareholder ownership. Thus, industry competition and public pension funds' monitoring work as substitutes in determining the effect of ATPs on bidder returns. This finding is new to the literature.

We conduct a set of robustness tests, including additional controls for CEO incentives, board structure, and leadership structure. We use alternative measures of ATPs using the G-index or classified boards dummy variable. The results confirm the influence of excess cash and other governance mechanisms on the association between governance indices and acquisition returns. We address the endogeneity issue of the unknown omitted variables by using a proxy variable for firm prestige. We consider the possibility that ordinary low-status firms adopt ATPs and then their managers make poor acquisition decisions. Consistent with this view, we find a detrimental effect of excess cash and that ATPs are associated with lower acquisition performance only in low-status, ordinary firms. Conversely,

the adverse impact of ATPs and excess cash is positively attenuated in prestigious firms, suggesting that managers of prestigious firms do not misuse ATPs and excess cash to pursue the private benefits of control. Nonetheless, we continue to find the differential effect of firm prestige only for the sub-group of acquirers operating in non-competitive industries and having lower public pension fund ownership. This alleviates the concern of omitted variable bias.

This study makes several contributions to the literature. First, our study expands our understanding of the interactive nature of ATPs with firm characteristics and governance environments. While prior studies examine the interactive effect of ATPs with each governance force in isolation, we consider the interactions among ATPs, excess cash, industry competition, and large shareholder ownership altogether.[3] Thus, to the best of our knowledge, our study makes the first attempt to provide a comprehensive analysis of such interactive effects in acquisition events. Our study also contributes to the literature by testing the relationship between ATPs and acquisition performance. The interactive effect indicates that a test design examining the average effect of ATPs forfeits considerable statistical power. By explicitly modeling the interactive nature of the relationship, we improve the statistical power of tests and clarify the inconsistency in the previous literature.

The remainder of the paper is organized as follows. In Section 2, we discuss the related literature and propose our hypotheses. Section 3 describes our sample selection procedure and provides descriptive statistics. Section 4 explores the influence of external governance and excess cash on the relationship between bidder returns and governance indices. Section 5 conducts robustness tests and discusses the endogeneity issues. Section 6 concludes the paper.

Literature review

In this section, we review the related literature and advance our hypotheses examining the interactive effects of ATPs with excess cash, industry competition, and public pension fund ownership.

Excess cash holdings and ATPs

Excess cash has both positive and negative implications on shareholder value. Firms may hold excess cash for precautionary purposes (Faulkender and Wang 2006; Pinkowitz and Williamson 2007), and may be valuable for firms that are financially constrained (Denis and Sibilkov 2010), and that experience a credit-crunch period (Duchin et al. 2010). However, agency theory predicts a lower firm value for firms hoarding excess cash since agency conflicts are particularly severe when firms possess substantial free cash flow (Jensen 1986). In addition, previous studies suggest that excess cash may serve as an effective shield against takeover threats (Harford 1999), as does share repurchases (Denis 1990). Faleye (2004) argues that cash-rich firms can readily implement share repurchases to ward off takeover attempts because they do not need to rely on external financing.

Thus, excess cash has an ambiguous net effect on firm performance. To examine the trade-offs of excess cash, several studies explicitly acknowledge the interaction of excess cash with a firm's governance environment. For example, Dittmar and Mahrt-Smith (2007) demonstrate that the net effect of excess cash depends on a firm's governance quality, specifically that excess cash has less value in firms with a large number of

ATPs. Similarly, Harford et al. (2008) find that managers in poorly governed firms tend to disburse excess cash quickly in value-destroying investments. These findings suggest that excess cash interacts with ATPs to determine the effectiveness of a firm's takeover defenses.

It is possible that excess cash strengthens the deterrence effect of ATPs. Accordingly, managers are more likely to engage in value-destroying acquisitions when the firm has a larger number of ATPs combined with a higher level of excess cash. Consistent with this view, Chi and Lee (2010) show that ATPs are more negatively related to Tobin's q only when free cash flow is also high. Harford et al. (2012a) find that entrenched managers tend to avoid private targets, but are more likely to use cash when they do so. They conjecture that paying cash has the effect of avoiding scrutiny and the potential creation of a blockholder. Harford et al. (2008) also find that the adverse impact of ATPs on firm value (measured with Market-to-Book ratio) is more pronounced for firms with a higher level of excess cash.

However, Harford et al. (2008) note that this complementary effect disappears for accounting profitability rather than firm value. Similarly, cash-driven acquisitions are generally associated with lower operating performance, but this performance is not particularly lower for firms with a large number of ATPs (Dittmar and Mahrt-Smith 2007). Thus, we examine the interaction effect of excess cash and ATPs on acquisition performance to clarify its existence.[4] We hypothesize that ATPs are associated with lower bidder returns if they are combined with a high level of excess cash.

In examining the interaction effect, there is a potential endogeneity concern with excess cash. Managers of firms with a large number of ATPs may accumulate excess cash for managerial perquisites. Thus, if firms with a large number of ATPs tend to hoard large cash reserves, it is difficult to identify the interaction effect. While evidence from outside the US suggests that weak shareholder rights are associated with higher cash reserves (Lins and Kalcheva 2007) , other studies show that US firms with a large number of ATPs hold lower excess cash (Harford et al. 2008). In a setting with strong shareholder rights protection and enforcement, entrenched managers in the US rather prefer to dissipate excess cash quickly in value-destroying investments because large cash reserves are too visible target of shareholder activism. This managerial preference drives the negative association between ATPs and excess cash.

Arguably, the negative correlation between ATPs and excess cash may indicate firms' optimal choice to mitigate the potential agency problems associated with free cash flow. This suggests that well-governed firms can stockpile excess cash without incurring agency conflicts of free cash flow (Harford et al. 2012b); however, this view predicts no significant interaction between ATPs and excess cash. The optimal choice view is also inconsistent with evidence that firms with higher excess cash holdings tend to make sub-optimal investment decisions (Dittmar and Mahrt-Smith 2007; Harford et al. 2008).

Interactive effect of industry competition and public pension fund ownership

Recent evidence shows that the wealth effect of ATPs depends on a firm's governance environment.[5] We examine the influence of product market competition and monitoring by large shareholders on the association between ATPs and bidder returns.

We first examine the interaction of ATPs with product market competition. Shleifer and Vishny(1997) and Bertrand and Mullainathan (2003) suggest that product market competition serves as an effective governance mechanism to eliminate managerial slack. Further, Giroud and Mueller (2010) argue that product market competition interacts with a firm's takeover vulnerability. Kadyrzhanova and Rhodes-Kropf (2011) find that delay provisions are associated with higher target premiums for firms in non-competitive industries, but not for those in competitive industries. Giroud and Mueller (2011) also show that ATPs are associated with lower stock returns, worse operating performance, lower bidder returns, and lower firm value for firms in non-competitive rather than competitive industries. These findings suggest that the wealth effect of ATPs depends on industry competition. While Masulis et al. (2007) find lower bidder returns for firms operating in non-competitive industries, they do not specifically examine the interaction effect of ATPs and industry competition. Given that industry competition interacts with ATPs, previous studies may be discarding important information by focusing on the effect of ATPs or industry competition in isolation. As industry competition disciplines managerial behavior, ATPs in non-competitive industries could have a higher negative impact on shareholder value whereas this effect has a lower impact in competitive industries.[6] Alternatively, it is possible that industry competition and ATPs are substitutes with an independent effect on acquisition performance. However, ATPs may also be systematically correlated with lower industry competition since self-interested managers in non-competitive industries may prefer to adopt additional ATPs to entrench themselves.

Next, we consider the influence of public pension fund ownership in the association of ATPs and bidder returns. Public pension funds monitor firms more actively for shareholders' interests than do other institutional investors because they are generally free from conflicts of interest and corporate pressure (Gillan and Starks 2000). Shleifer and Vishny (1986) also predict that the presence of large shareholders facilitates takeovers. Conversely, some argue that public pension fund managers are subject to political concerns and are thus less effective monitors (Woidtke 2002). These arguments suggest that the wealth effect of public pension fund ownership is unclear.

To clarify the issue, some studies explicitly consider the interactive nature of public pension fund ownership with other governance mechanisms. Dittmar and Mahrt-Smith (2007) report that cash holdings are associated with higher firm value only in firms with higher public pension fund ownership. Kim and Lu (2011) show that managerial ownership is strongly associated with firm value only when large shareholders are absent. Cremers and Nair (2005) find that a governance-based trading strategy generates positive abnormal returns only when public pension fund ownership is also high.

These findings suggest that strong public pension fund monitoring interacts with ATPs to explain the cross-section of bidder returns. We predict that the adverse impact of ATPs on acquisition performance is particularly severe when public pension fund monitoring is weak. Alternatively, large shareholder monitoring may substitute market discipline for corporate control.

Methods

Sample

The initial sample consists of firms included in the Investor Responsibility Research Center (IRRC; currently, RiskMetrics) database of antitakeover provisions for the period

from 1996 to 2006. We also acquire director-related information from the IRRC director database for which data collection began in 1996. In 2007, the IRRC began using different data collection procedures, so we end the study period in 2006 to maintain consistency in the governance index measures. The IRRC governance database issued six volumes of data, in 1995, 1998, 2000, 2002, 2004, and 2006. Following previous studies, we assume that during the years between two consecutive publications, firms had the same governance provisions as in the previous publication year. From the initial sample, we exclude those firms with sales revenues of less than $20 million and those lacking the required financial data from COMPUSTAT annual files and stock return data from CRSP. Following previous studies, we also exclude dual-class firms and real estate investment trusts (REITs). We match the IRRC governance data with the acquisition sample from the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database that meets the following criteria: (i) acquirers are US firms and the deals are completed within 1,000 days from the announcement date, (ii) acquirers control less than 50 % of the target's shares prior to the announcement and owns 100 % of the target shares after the transaction, and (iii) the deal value disclosed in the SDC is greater than $1 million and at least 1 % of the acquirer's market value of equity, as measured on the 11th trading day prior to the announcement date.

Our sample acquirers include financial firms (SIC 6000–6999) and utility firms (4900–4999), and excluding these firms yields qualitatively the same results. We also include firms that make multiple acquisitions, however, excluding these firms does not have a material impact on the results. After the selection procedure, our final sample consists of 3,340 acquisitions completed by 1,217 firms. We supplement the data set with the COMPUSTAT Executive Compensation database to compute CEO ownership variables, SEC 13f filings for large institutional ownership data, CRSP header files for firm age data, and the IRRC Directors database for board information.

Descriptive statistics and announcement period abnormal returns

Panel A of Table 1 presents the annual distribution of the number of acquisitions. The number of acquisitions increases from 1998, a year in which the IRRC expanded its coverage by about 25 %. In the next two columns, we report the E-index and the G-index. We note that governance indices are relatively stable over time. Given the institutional pressure and shareholder activism to strengthen shareholder rights, it is surprising that firms maintain as many provisions in the later period. This pattern is not unique to our sample, as it occurs for the entire universe of IRRC firms.

Panel B reports the five-day announcement period cumulative abnormal returns (CARs) around the acquisition announcement date. Following the standard event study method, we measure expected returns using the market model and market-adjusted returns. We use the CRSP value-weighted index as the benchmark market index. Market model parameters are estimated over a (–210, –11) day window relative to the announcement date of the acquisitions. The mean and median CARs for the entire sample period are significantly positive with large variations in the estimated CARs. Using the market model residuals, the mean CAR_{MM} is 0.49 % and the median is 0.31 %. Using market adjusted returns, CAR_{MAR} is also positive and significant, but in a higher magnitude.

Table 1 Annual distribution of acquisitions, announcement abnormal returns, and correlation among corporate governance measures

Year	Number of Acquisitions		E-index		G-index	
Panel A. Annual distribution of the acquisition sample and governance indices						
1996	243		2.2 [2.0]		9.7 [10.0]	
1997	240		2.3 [2.0]		10.1 [10.0]	
1998	425		2.0 [2.0]		8.7 [8.0]	
1999	326		2.0 [2.0]		9.1 [9.0]	
2000	295		2.2 [2.0]		9.3 [9.0]	
2001	238		2.2 [2.0]		9.3 [9.0]	
2002	327		2.2 [2.0]		9.1 [9.0]	
2003	304		2.4 [2.0]		9.1 [9.0]	
2004	345		2.5 [2.0]		9.3 [9.0]	
2005	322		2.6 [3.0]		9.6 [9.5]	
2006	275		2.4 [2.0]		9.3 [9.0]	
Mean [Median]			2.3 [2.0]		9.3 [9.0]	
N	3,340		3,340		3,340	
	Mean	Median	Min	Max	25th	75th
Panel B. Announcement abnormal returns						
$CAR_{MM}(-2, +2)$	0.493^{***}	0.311^{***}	−20.66	23.72	−3.03	3.98
$CAR_{MAR}(-2, +2)$	0.769^{***}	0.530^{***}	−20.88	24.04	−2.78	4.29
	$CAR_{MM}(-2, +2)$	E-index	Excess Cash	Industry NPM	Pension Ownership	
Panel C. Pearson correlations among CARs, the E-index, and conditioning factors						
$CAR_{MM}(-2, +2)$	1.00					
E-index	−0.01	1.00				
Excess Cash	-0.07^{***}	-0.17^{***}	1.00			
Industry NPM	-0.03^{**}	0.08^{***}	-0.18^{***}	1.00		
Pension Ownership	−0.03	0.05^{**}	−0.01	0.03^{*}	1.00	

Panel A shows the annual distribution of 3,340 acquisitions from 1996 to 2006. Mean and median in blanket values of governance indices are reported in the next two columns. *E-Index* is the entrenchment index of six governance provisions and *G-index* is the governance index of twenty-four provisions in [12]. Panel B reports cumulative abnormal returns (CARs) using the standard event study methodology with the market model (CAR_{MM}) and market-adjusted returns (CAR_{MAR}). Panel C reports the Pearson correlation among bidder returns (CAR_{MM}), the E-index, and conditioning factors. *Excess Cash* is cash holdings net of the normal cash level estimated with the fixed-effect model (1) in Table 3. *Pension Ownership* is the percentage ownership by the 19 largest public pension funds. *Industry NPM* is the intensity of industry competition measured by industry median net profit margin for the Fama-French 48 industries. All variables are winsorized at the 1st and 99th percentiles. *, **, and ***denote significance at the10%, 5 %, and 1 % level, respectively

Panel C shows the correlation analysis results among our key variables. Hereafter, we mostly report results based on market model abnormal returns to compare these with results in Masulis et al. (2007). We report the results for the market-adjusted abnormal return as a robustness check. We first note that the correlation between the E-index and CARs is –0.01, but is statistically insignificant. This contrasts with Masulis et al. (2007)'s findings of a significant and negative association between bidder returns and the E-index. From the results of multivariate tests in the next section, we show that the different sample periods cause this inconsistency.

Excess cash holdings and industry median net profit margin (industry NPM) are negatively correlated with CAR_{MM}. The correlation between pension ownership and CAR_{MM} is negative, but statistically insignificant. The correlations of the E-index with excess cash, industry NPM, and public pension fund ownership are statistically significant, suggesting

that these variables are somewhat jointly determined. However, the economic magnitudes of the correlations appear small.

Table 2 describes deal and firm characteristics. These variables are associated with bidder announcement returns in prior studies (*see* Masulis et al. 2007 for the summary of the previous literature). Panel A reports summary statistics for the deal characteristics variables. These include pre-merger price run-up; whether the bidder and target are in the same industry (industry M&A); relative deal size; whether the bidder and target are in high-tech industries; the public, private, and subsidiary status of the target; deal attitude; method of payment; and tender-offer acquisitions. We use the data reported in the SDC to construct these variables. Means and medians for each variable are similar to those reported in Masulis et al. (2007).

Panel B reports mean and median values for firm characteristics. These include firm size (book value of assets), Market-to-Book ratio (MtoB), free cash flow, and leverage. We construct these variables following Masulis et al. (2007), and the mean and median for each variable are comparable to those reported in Masulis et al. (2007).

Panel C of Table 2 reports our interaction variables. Excess cash is cash holdings net of predicted cash holdings. Following previous studies including Dittmar and Mahrt-Smith (2007) and Harford et al. (2008), we estimate the normal levels of cash holdings

Table 2 Descriptive statistics

Panel A. Deal characteristics			
Private Target	0.39	Tender Offer	0.07
Public Target	0.26	HighTech	0.38
Hostile Deal	0.03	Industry M&A	0.36
Cash Only	0.43	Deal Value($MM)	666.1 [130.0]
Stock Only	0.13	Relative Deal Size	0.20 [0.07]
		Price Runup	0.11 [0.03]
Panel B. Acquirer characteristics			
Assets ($Mil)	5,080 [1,612]	Free Cash Flow	0.02 [0.04]
MtoB	2.02 [1.61]	Leverage	0.20 [0.17]
Panel C. Excess cash, industry NPM, and public pension fund ownership			
Excess Cash	0.058 [0.220]	Industry NPM	0.135 [0.117]
Excess $Cash_{ALT}$	0.059 [0.225]	Pension Ownership	0.022 [0.020]

This table provides summary statistics for the sample of 3,340 acquiring firm-year observations from 1996 to 2006. Deal characteristics are obtained from the SDC M&A database. *Private (Public) Target* is a dummy variable indicating private (public) status of target companies. The remaining targets are from subsidiaries. *Hostile Deal* is a dummy variable indicating hostile takeover attempt. *Cash (Stock) Only* is a dummy variable indicating one hundred percent cash (stock) offer. *Tender Offer* is a dummy variable indicating whether tender-offer is launched for the target. *HighTech* is a dummy variable indicating whether acquirers and targets are in high-tech industries defined in SDC. *Industry M&A* is a dummy variable indicating that acquirers and targets are in the same three-digit SIC industries. *Deal value* is the dollar value of consideration paid by the acquirer excluding fees and expenses, as reported in SDC. *Relative Deal Size* is deal value divided by acquirer market capitalization measured three months before the acquisition announcement date. *Price Runup* is buy-and-hold returns of acquirers during the (−252, −11) days before the announcement date. Acquirer characteristics are computed using data from COMPUSTAT, and pension ownership data is from 13f filings. *Assets* is the book value of assets (item 6). *MtoB* is [the book value of assets *minus* (book value of equity and deferred tax) *plus* (the number of shares outstanding *times* fiscal year ending price)] divided by the book value of total assets ((item 6 - item 60 - item74 + item 25*item 199) / item 6)). *Free Cash Flow* is (net income before extraordinary items *plus* depreciation *minus* capital expenditure) divided by the book value of assets ((item 18 + item 14 − item 128)/ item 6). *Leverage* is (long-term debt *plus* short-term debt) divided by (book value of assets *minus* current liabilities *plus* short-term debt ((item 9 + item 34)/(item 6 − item 5 + item 34)). *Cash Holdings* are cash and short-term investment (item 1) divided by net assets (item 6 *minus* item 1). *Excess Cash* is cash holdings net of the normal cash level estimated with the fixed-effect model (1) in Table 3. *Excess* $Cash_{ALT}$ is excess cash estimated with the fixed-effect model (2) in Table 3. *Pension Ownership* is share ownership held by the 19 largest public pension funds. *Industry NPM* is the industry median net profit margin for the Fama-French 48 industries. Means and medians in the blanket are reported. All variables are winsorized at the 1st and 99th percentiles

with firm and industry characteristics. For the 1,217 acquirers in our sample, we construct a panel data set by matching firms with Compustat annual files from 1996–2006. This generates 10,729 firm-year observations during the sample period. Using this data set, we estimate the normal cash level of each acquirer in a given year. In Table 3, the dependent variable is cash holdings defined as cash and short-term investments (item 1)

Table 3 Estimation of normal cash holdings

	(1)	(2)	(3)
	Fixed	Fixed	OLS
ln(Net Assets)	−0.587***	−0.587***	−0.155***
	(−16.93)	(−16.95)	(−8.35)
Net Profitability	0.921***	0.905***	0.477***
	(6.67)	(6.48)	(2.74)
Net WC	−0.915***	−0.919***	−0.771***
	(−7.14)	(−7.22)	(−5.77)
Industry Cash Flow Volatility	0.417	0.417	3.499***
	(1.29)	(1.27)	(7.75)
MtoB	0.086***	0.085***	0.171***
	(11.81)	(11.73)	(18.98)
R&D	0.102	0.097	3.098***
	(0.42)	(0.39)	(11.22)
R&D Dummy	−0.053	−0.056	−0.145*
	(−0.59)	(−0.63)	(−1.85)
E-index		−0.003	−0.074***
		(−0.15)	(−4.04)
Pension Ownership		−2.267**	−1.137
		(−2.12)	(−0.87)
Industry NPM		0.173	−0.974
		(0.37)	(−1.44)
CAPEX		−0.035	−0.226
		(−0.13)	(−0.55)
Leverage		−0.065	−0.672***
		(−0.69)	(−6.29)
Dividend Dummy		−0.021	−0.124**
		(−0.46)	(−2.38)
Diversification Dummy		0.056	0.042
		(1.53)	(0.87)
Intercept	1.534***	1.565***	−0.902***
	(5.51)	(5.38)	(−4.14)
Adj. R^2	0.790	0.790	0.540
N	10,729	10,729	10,729

The dependent variable is cash holdings, which is a natural log of (cash and short-term investment divided by net assets). *Net assets* is total assets minus cash and short-term investment. *Net Profitability* is (operating income before depreciation net of interest and tax) divided by net assets. *Net WC* is (current assets minus current liabilities and cash and short investment) divided by net assets. *Industry CashFlow Volatility* is the industry median standard deviation of cash flows over the past 10 years, and industry is defined by the Fama-French 48 industries. *The mob* is measured as the ratio of the market value of assets to book value of assets, where market value is defined as the book value of assets minus the book value of equity and deferred taxes, plus the market value of equity. *R&D* is R&D expenses scaled by net assets. When R&D value is missing, we assign a value of zero and add *R&D dummy* variable having a value of one if R&D expenses are missing and zero otherwise. *E-index* is the entrenchment index. *Pension Ownership* is the percentage share ownership held by the 19 largest public pension funds. *Industry NPM* is the industry median net profit margin. *CAPEX* is the net capital expenditures divided by net assets. Leverage is long-term debt divided by net assets. *Dividend dummy* has a value of one if the firm pays dividends and zero otherwise. *Diversification dummy* has a value of one if the firm has multiple segments and zero otherwise. Models (1) and (2) are estimated with the fixed-effect models with firm-fixed effects and calendar year dummy variables. Model (3) is an ordinary least-squared estimation with calendar year dummy variables and industry fixed effects. Industry is defined at the Fama-French 48 industries. The numbers in parentheses are heteroscedasticity-robust t-stats. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

divided by net assets (item 6 *minus* item 1). All models include year and industry dummy variables. Following Dittmar and Mahrt-Smith (2007), we estimate the normal level of cash holdings with the fixed-effect models. Model (1) in Table 3 shows our baseline estimate. Consistent with the findings in Dittmar and Mahrt-Smith (2007) and Harford et al. (2008), cash holdings are positively associated with profitability and Market-to-Book ratio and negatively associated with firm size and net working capital. We then define excess cash as cash holdings net of predicted cash holdings from model (1). This is our primary measure of excess cash. As a robustness check, we alternatively define excess cash (Excess Cash_{ALT}) with the predicted values from the fixed effect model (2) in Table 3 that includes additional firm characteristic variables. This does not have a material impact on our inference. The signs and magnitudes of the coefficients estimated with the OLS model in model (3) are largely consistent with the findings in Faulkender and Wang (2006) and Pinkowitz and Williamson (2007). We estimate excess cash using the results from fixed effect models because, as Dittmar and Mahrt-Smith (2007) argues, unknown firm fixed-effect could affect a firm's cash policy.

Industry competition is measured by the industry median net profit margin (industry NPM) for the 48 Fama-French industries. The mean (median) industry NPM is 13.5 % (11.7 %), ranging from 1.7 % to 41.5 %. Higher industry NPM suggests lower industry competition. Public pension fund ownership is share ownership held by the 19 largest pension funds as listed in Dittmar and Mahrt-Smith (2007). The mean (median) public pension fund ownership is 2 %, ranging from zero to 9.1 %. For about 25 % of acquirers, public pension fund ownership is zero.

Results and discussion

In this section, we conduct multivariate tests examining the interactions of ATPs with excess cash, industry competition, and public pension fund ownership with bidder returns.

Interactive effect of corporate governance and excess cash

In Table 4, we regress the E-index on the five-day announcement period abnormal returns ($\text{CAR}_{\text{MM}}(-2, +2)$) of bidders. The models include controls for deal characteristics, bidder characteristics, year dummy variables, and industry fixed effects. The industry is defined by the 48 Fama-French industries (use of the three-digit SIC industry codes does not alter the inferences). In model (1) of Table 4, the coefficient on the E-index is −0.156, but it is statistically insignificant. This appears inconsistent with the strong negative association documented in Masulis et al. (2007). However, Core et al. (2006) find that the governance-based trading strategy does not produce abnormal returns during the 2000–2003 period. Bebchuk et al. (2013) also suggest that the association between the E-index and bidder returns weakens in the later period since rational investors learn about the poor performance of firms with many ATPs. Since our sample includes more recent acquisitions than those used in Masulis et al. (2007), our results are likely to reflect the diminishing association between ATPs and firm performance. Alternatively, Sokolyk (2011) demonstrates that individual ATPs could have differential effects on the takeover premium so as to cancel each other out. Thus, the overall effect of the E-index becomes insignificant. We further discuss the impact of market expectations from investor learning in section 5. 3.

Table 4 Regression of bidder returns on antitakeover provisions and excess cash

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				High Cash	Low Cash		
E-index	−0.156	−0.371***	−0.152	−0.522***	0.260	−0.133	−0.133
	(−1.53)	(−2.75)	(−1.38)	(−3.01)	(1.46)	(−1.21)	(−1.22)
E-index × After		0.526***					
		(2.71)					
Excess Cash			−0.067			−0.038	
			(−0.62)			(−0.35)	
E-index × Excess Cash						−0.162**	
						(−2.34)	
Excess $Cash_{ALT}$							−0.041
							(−0.38)
E-index × Excess $Cash_{ALT}$							−0.158**
							(−2.27)
ln(Assets)	−0.346***	−0.398***	−0.285**	−0.324	−0.083	−0.313**	−0.311**
	(−3.19)	(−3.78)	(−2.27)	(−1.55)	(−0.36)	(−2.45)	(−2.43)
MtoB	0.436***	0.318***	0.405**	0.230	0.426	0.392**	0.393**
	(3.03)	(2.35)	(2.54)	(0.95)	(1.43)	(2.45)	(2.45)
Free Cash Flow	1.526	2.068	−0.138	0.382	3.791	0.059	0.051
	(0.80)	(1.12)	(−0.07)	(0.14)	(0.89)	(0.03)	(0.02)
Leverage	1.461*	1.244	1.037	1.946	−0.602	1.142	1.135
	(1.81)	(1.64)	(1.19)	(1.39)	(−0.42)	(1.30)	(1.30)
Price Runup	−0.012***	−0.008**	−0.011**	−0.006	−0.026***	−0.011***	−0.011***
	(−3.01)	(−2.20)	(−2.58)	(−0.79)	(−3.99)	(−2.62)	(−2.62)
Industry M&A	−0.245	−0.168	−0.294	−0.099	−0.351	−0.309	−0.308
	(−0.93)	(−0.64)	(−1.07)	(−0.21)	(−0.76)	(−1.13)	(−1.12)
Relative Deal Size	1.120**	1.015*	1.167**	−0.284	0.870	1.161**	1.162**
	(2.01)	(1.76)	(2.10)	(−0.31)	(1.02)	(2.10)	(2.10)
HighTech	0.323	0.390	0.464	1.306*	−1.046	0.428	0.430
	(0.75)	(0.97)	(1.11)	(1.95)	(−1.49)	(1.03)	(1.03)
HighTech × Relative Deal Size	−3.228*	−3.593**	−4.033**	−3.964	−0.982	−3.918**	−3.921**
	(−1.72)	(−2.08)	(−2.12)	(−1.24)	(−0.31)	(−2.06)	(−2.06)
Private Target	−0.887***	−0.970***	−1.006***	−0.986*	−0.901**	−0.993***	−0.993***
	(−2.94)	(−3.24)	(−3.32)	(−1.92)	(−2.03)	(−3.26)	(−3.26)
Public Target	−2.910***	−2.891***	−3.154***	−2.860***	−4.012***	−3.135***	−3.135***
	(−6.88)	(−6.80)	(−7.05)	(−4.90)	(−5.23)	(−7.04)	(−7.04)
Hostile Deal	0.071	0.009	0.003	0.031	0.694	0.006	0.007
	(0.09)	(0.01)	(0.00)	(0.03)	(0.65)	(0.01)	(0.01)
Cash Only	0.535*	0.581**	0.690**	0.924*	0.600	0.694**	0.694**
	(1.95)	(2.18)	(2.41)	(1.80)	(1.42)	(2.42)	(2.42)
Stock Only	−0.508	−0.540	−0.330	−0.762	0.601	−0.356	−0.357
	(−0.96)	(−1.04)	(−0.60)	(−1.06)	(0.60)	(−0.65)	(−0.65)
Tender Offer	1.053*	1.043*	1.328**	0.546	2.411**	1.330**	1.330**
	(1.87)	(1.86)	(2.28)	(0.76)	(2.34)	(2.29)	(2.29)
Intercept	3.566***	3.090*	3.546**	2.311	3.897	3.713**	3.693**
	(2.60)	(1.86)	(2.36)	(0.77)	(1.07)	(2.44)	(2.43)
Adj. R^2	0.050	0.050	0.056	0.068	0.067	0.057	0.057
N	3,340	3,340	3,057	1,222	1,184	3,057	3,057

The dependent variable is the market model cumulative abnormal return (CAR_{MM} (−2,+2)) of the bidders. *E-index* is the entrenchment index of Bebchuk et al. (2009). *After* equals to 1 if the deal is announced after year 2001 and 0, otherwise. *Excess Cash* and *Excess* $Cash_{ALT}$ are cash holdings net of the normal cash level estimated with the fixed-effect model (1) and (3) in Table 2, respectively. In model (3) and (4), we divided the sample into *High (Low) Cash* sub-groups based on the sample median value of excess cash. All models are estimated with calendar year dummy variables and industry fixed effects. The numbers in parentheses are heteroscedasticity-robust t-stats. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

To check this possibility, we include an indicator variable, AFTER, which has a value of one if acquisitions are announced after 2001, and zero otherwise. We select 2001 following Bebchuk et al. (2013), who identify 2001 as the first year that market participants become fully aware of the impact of ATPs and were thus fully reflected in the stock prices. They argue that, as a result, we cannot observe any significant effect of ATPs after 2001. In model (2), the coefficient on the E-index is −0.37 and the coefficient on the interaction term of the E-index and AFTER is 0.53. Thus, the E-index is negatively associated with bidder returns in the pre-2002 period, but the combined effect of E-index on bidder returns becomes positive 0.155 (−0.371 + 0.526) in the later period (the sum of interaction terms is insignificant from the F-test). Thus, our result is not necessarily inconsistent Masulis et al. (2007)'s findings.

More importantly, we focus on the interactive effect of ATPs with excess cash. In model (3), we first examine the effect of excess cash and the E-index in isolation. The coefficient on excess cash is negative and statistically insignificant, and that on the E-index remains insignificant. We then consider the interaction of excess cash and the E-index by dividing the sample into high and low excess cash sub-groups based on the median value of excess cash. Models (4) and (5) in Table 4 show that the E-index is associated with lower bidder returns only when acquirers hoard a higher level of excess cash. Thus, consistent with the view that excess cash and ATPs are complements; ATPs hurt acquisition performance only for firms that also have a higher level of excess cash. If the negative relationship suggests poor acquisition performance, the results are consistent with Chi and Lee (2010)'s findings that the negative relationship between Tobin's q and governance indices exists only for firms with higher agency problems associated with free cash flow and those in Harford et al. (2008) reporting that managers of poorly governed firms disburse cash quickly on suboptimal investments. The other control variables have their expected signs.

In model (6), we introduce the interaction term of excess cash and E-index by pooling sample data. While pooled regression enhances estimation efficiency, it assumes the equal variance of residuals by restricting the control variables to have the same coefficients across the two different excess cash sub-groups. If the equality assumption is violated, the coefficients estimated in the pooled regression are biased. Here, similar to the sub-group regression results, the coefficient on the interaction term is significant (−0.16). In model (7), we deploy alternatively defined excess cash (Excess Cash_{ALT}) and obtain a similar result. We also examine the interactive effective of E-index and excess cash in the periods before and after year 2001. In untabulated results, we confirm that the interactive effect is persistently negative and significant in both periods.

In summary, the results in Table 4 show that the impact of ATPs depends on the level of excess cash holdings. This interactive effect suggests that ATPs per se do not spontaneously lead to poor acquisition performance and that contemporaneous changes in other driving factors, such as excess cash, could alter the relationship between governance indices and bidder returns.

Interactive effect of industry competition and public pension fund ownership

Table 5 presents the interactive effects of ATPs with industry competition and public pension fund ownership. We first consider the influence of industry competition. Fierce industry competition eliminates managerial slack whereas weak industry competition worsens agency problems by allowing firms to waste resources in value-destroying

Table 5 The effect of industry competition and pension ownership

	(1)	(2)	(3)	(4)
	Low Competition	High Competition	Low Pension	High Pension
E-index	−0.294**	−0.017	−0.321**	0.011
	(−2.03)	(−0.11)	(−2.01)	(0.09)
ln(Assets)	−0.161	−0.554***	−0.221	−0.469***
	(−1.10)	(−3.32)	(−1.30)	(−3.34)
MtoB	0.310	0.597***	0.283	0.494**
	(1.38)	(3.15)	(1.42)	(2.47)
Free Cash Flow	0.207	2.979	1.661	3.159
	(0.07)	(1.15)	(0.65)	(1.09)
Leverage	2.252**	1.333	1.274	1.834*
	(1.98)	(1.08)	(1.11)	(1.66)
Price Runup	−0.015***	−0.012**	−0.010*	−0.017***
	(−2.73)	(−2.17)	(−1.88)	(−3.76)
Industry M&A	−0.181	−0.279	0.194	−0.642*
	(−0.47)	(−0.71)	(0.49)	(−1.78)
Relative deal size	0.933	1.172	1.484**	0.202
	(1.27)	(1.31)	(2.14)	(0.20)
HighTech	−0.405	0.901	0.781	0.170
	(−0.70)	(1.51)	(1.14)	(0.31)
HighTech × Relative Deal Size	−4.287**	−2.265	−4.516	−2.358
	(−2.11)	(−0.81)	(−1.64)	(−1.02)
Private Target	−0.743*	−1.160***	−0.715	−1.025***
	(−1.84)	(−2.63)	(−1.51)	(−2.70)
Public Target	−2.719***	−3.240***	−3.393***	−2.215***
	(−4.93)	(−4.97)	(−5.14)	(−4.24)
Hostile Deal	0.896	−1.061	−0.163	0.339
	(0.83)	(−0.87)	(−0.13)	(0.35)
Cash Only	0.685*	0.461	0.366	0.700*
	(1.79)	(1.14)	(0.85)	(1.94)
Stock Only	0.030	−0.868	−0.384	−0.617
	(0.04)	(−1.11)	(−0.52)	(−0.82)
Tender Offer	0.695	1.528*	0.989	1.022
	(1.00)	(1.68)	(1.11)	(1.45)
Intercept	1.858	6.850***	3.381*	3.489*
	(1.03)	(3.98)	(1.77)	(1.80)
Adj. R^2	0.052	0.042	0.041	0.055
N	1,659	1,681	1,670	1,670

The dependent variable is the market model adjusted cumulative abnormal return (CAR_{MM} (−2,+2)) of bidders. In models (1)-(4), we conduct sub-group analysis by dividing the sample into *Low (High) Competition* sub-groups and *Low (High) Pension* sub-groups based on the sample median values of industry NPM and public pension fund ownership, respectively. All models are estimated with calendar year dummy variables and industry fixed effects (defined at the Fama-French 48 industries). The numbers in parentheses are heteroscedasticity-robust t-statistics. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

acquisitions (Giroud and Mueller 2010). Our primary interest is the effect of interactions between industry competition and ATPs on acquisition performance. We divide observations into high (low) industry competition sub-groups based on the median value of industry NPM and test the interactive effect of ATPs on bidder returns. By allowing a substantial within-group variation of ATPs, this sub-sample approach alleviates the concern that industry competition might be a proxy for ATPs.

In models (1)-(2) of Table 5, the E-index is negatively associated with acquisition performance only for the sub-group of acquirers with weak industry competition. The coefficient on the E-index is significant (−0.29) for firms in the low industry

competition sub-group, but insignificant (−0.017) for firms in the high industry competition sub-group. This confirms that ATPs in non-competitive industries is more detrimental to shareholder value, whereas the discipline provided by industry competition counteracts this effect.

A common measure of industry competition is the Herfindahl-Hirschman Index (HHI). However, HHI ignores competition from foreign companies and could thus bias the inference [7]. We therefore use a margin-based measure of competition, namely the industry median net profit margin (industry NPM) computed as operating income before depreciation and amortization divided by sales revenues [4]. A higher industry NPM implies weaker industry competition. We define the industry median NPM at the 48 Fama-French industry level. Following [7], we also consider an alternative measure of competition, the industry median ratio of selling expenses to sales. The result holds using this measure.

Public pension fund monitoring is an important governance mechanism. We expect that the adverse impact of ATPs on acquisition performance is particularly severe when public pension funds are not present. Consistent with our prediction, models (3)-(4) of Table 5 show that the E-index is associated with lower bidder returns in the low pension sub-group, but the association disappears in the high pension sub-group. This indicates that managers protected by a large number of ATPs make unwise acquisition decisions by taking advantage of weak monitoring environment. The result also suggests that public pension fund ownership and ATPs are complements shaping the relationship with bidder returns.

Thus far, we find that the effect of ATPs depends on industry competition and public pension fund ownership. We further examine whether these two governance mechanisms work independently or jointly to affect the relationship between ATPs and bidder returns. In Table 6, we divide our sample firms into four sub-groups based on the median values of public pension fund ownership and industry NPM. When acquirers operate in competitive industries (low industry NPM) and have high public pension fund ownership, we categorize these acquirers into the strongest governance environment sub-group. At the opposite end, acquirers in non-competitive industries that are relatively ignored by public pension funds are categorized into the weakest governance sub-group. The remaining acquirers are placed between these two sub-groups.

In models (1)-(4) of Table 6, we re-estimate the relationship between ATPs and bidder returns for each sub-group. The results show that ATPs are negatively associated with bidder returns only for bidders in the weakest governance environment. The coefficient on the E-index is −0.54 in weakest governance sub-group (model 4). In the other sub-groups (models 1–3), the coefficients on the E-index are insignificant and similar in magnitude. This suggests that either a competitive industry or public pension fund investors can mitigate the harmful effect of ATPs. Thus, industry competition and the public pension fund monitoring are substitutes. This new finding implies that improving other governance channels can attenuate the adverse impact of ATPs, allowing firms to maintain ATPs without impairing firm value. This may explain the stability of ATPs over time.

We further add the interaction effect of excess cash in models (5)-(8). In models (5)-(7), we do not find any detrimental effect of the E-index and its interaction term with excess cash. In model (8), the E-index coefficient is significant (−0.59), as is the coefficient on the

Table 6 The interactive effect of excess cash, industry competition, and public pension fund ownership

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	High Pension	Low Pension	High Pension	Low Pension	High Pension	Low Pension	High Pension	Low Pension
	High Competition	High Competition	Low Competition	Low Competition	High Competition	High Competitive	Low Competition	Low Competition
E-index	−0.047	−0.061	−0.056	−0.544**	−0.052	−0.000	0.006	−0.588**
	(−0.23)	(−0.25)	(−0.31)	(−2.34)	(−0.25)	(−0.00)	(0.04)	(−2.40)
E-index × Excess Cash					−0.134	−0.185	−0.026	−0.343**
					(−0.79)	(−1.23)	(−0.22)	(−2.12)
Excess Cash					−0.132	−0.186	−0.187	0.229
					(−0.46)	(−0.72)	(−0.99)	(1.05)
ln(Assets)	−0.635***	−0.442	−0.344*	0.022	−0.530*	−0.200	−0.226	−0.235
	(−2.75)	(−1.59)	(−1.82)	(0.10)	(−1.87)	(−0.58)	(−1.12)	(−0.90)
MtoB	0.463	0.433*	0.630**	0.008	0.499	0.493	0.621**	−0.007
	(1.35)	(1.71)	(2.19)	(0.02)	(1.48)	(1.64)	(2.30)	(−0.02)
Free Cash Flow	6.086	3.029	1.578	2.490	4.068	−0.216	0.794	3.805
	(1.30)	(0.92)	(0.47)	(0.57)	(0.84)	(−0.06)	(0.24)	(0.83)
Leverage	2.098	1.224	2.872*	2.738*	1.410	0.396	1.586	2.610
	(1.19)	(0.74)	(1.93)	(1.65)	(0.75)	(0.21)	(1.06)	(1.50)
Price Runup	−0.023***	−0.007	−0.014**	−0.019**	−0.026***	−0.007	−0.014**	−0.018**
	(−3.06)	(−1.05)	(−2.23)	(−2.41)	(−3.53)	(−1.02)	(−2.16)	(−2.24)
Industry M&A	−0.292	−0.143	−0.829*	0.639	−0.515	−0.015	−0.711	0.381
	(−0.49)	(−0.25)	(−1.71)	(1.06)	(−0.84)	(−0.02)	(−1.44)	(0.62)
Relative Deal Size	1.815	0.738	−0.455	1.946**	2.108	0.829	−0.399	1.908**
	(1.12)	(0.69)	(−0.38)	(2.08)	(1.31)	(0.74)	(−0.32)	(2.03)
HighTech	1.548*	0.472	−1.145	1.321	1.436*	0.854	−1.181*	1.348
	(1.97)	(0.53)	(−1.64)	(1.30)	(1.84)	(0.85)	(−1.67)	(1.45)
HighTech × Relative Deal Size	−6.584*	0.008	0.973	−9.614***	−7.042*	−0.000	0.340	−10.249***
	(−1.83)	(0.00)	(0.38)	(−2.89)	(−1.84)	(−0.00)	(0.13)	(−3.01)
Private Target	−1.539***	−0.722	−0.692	−0.982	−1.478**	−0.938	−0.853	−1.092*
	(−2.77)	(−1.08)	(−1.38)	(−1.52)	(−2.55)	(−1.36)	(−1.64)	(−1.67)
Public Target								

Table 6 The interactive effect of excess cash, industry competition, and public pension fund ownership *(Continued)*

	−2.752***	−3.126***	−1.884***	−4.037***	−2.812***	−3.915***	−1.839***	−4.111***
	(−3.32)	(−3.21)	(−2.75)	(−4.54)	(−3.23)	(−3.53)	(−2.63)	(−4.36)
Hostile Deal	−0.088	−2.255	0.422	1.005	−0.071	−2.144	0.553	0.496
	(−0.05)	(−1.29)	(0.37)	(0.54)	(−0.04)	(−1.09)	(0.51)	(0.25)
Cash Only	0.746	0.022	0.699	0.657	0.894	0.302	0.635	1.047*
	(1.33)	(0.04)	(1.41)	(1.09)	(1.60)	(0.44)	(1.30)	(1.68)
Stock Only	−1.588	−0.736	0.494	0.150	−1.736	−0.358	0.467	0.441
	(−1.50)	(−0.68)	(0.49)	(0.15)	(−1.56)	(−0.31)	(0.46)	(0.41)
Tender Offer	0.887	1.633	1.280	0.280	0.988	2.345	1.369	0.376
	(0.78)	(1.19)	(1.42)	(0.24)	(0.82)	(1.57)	(1.48)	(0.32)
Intercept	1.916	4.093	1.085	3.118	1.015	4.126	0.623	5.670**
	(0.82)	(1.48)	(0.41)	(1.16)	(0.39)	(1.31)	(0.23)	(2.24)
Adj. R^2	0.080	0.015	0.031	0.088	0.087	0.013	0.038	0.096
N	796	885	874	785	747	755	841	714

The dependent variable is the market model adjusted cumulative abnormal return (CAR_{MM} (−2,+2)) of bidders. Two-way sorts are based on the median values of public pension fund ownership and industry NPM. All models are estimated with calendar year dummy variables and industry fixed effects. Industry is defined at the Fama-French 48 industries. The numbers in parentheses are heteroscedasticity-robust t-statistics. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

interaction between the E-index and excess cash (–0.34). Again, the adverse impact of ATPs and the interaction effect of ATPs with excess cash exist only for bidders in the weakest governance sub-group.

In untabulated results, we also conduct pooled regression and find that the interactive effect of pension fund ownership is positive and remains significant, but the effect of industry competition remains positive and insignificant.

As with our tests on the interactive effect of industry competition and ATPs, we divide bidders into two sub-groups based on the sample median value of public pension fund ownership. We then examine whether bidders with lower public pension fund ownership make poorer acquisition decisions if they have a large number of ATPs and whether this negative association decreases for bidders with higher public pension fund ownership.

Following Gillan and Starks (2000) and Shleifer and Vishny (1986), we use the percentage of shares held by the 19 largest public pension funds as our primary measure for public pension fund ownership. We construct this measure using data from SEC 13f filings at the end of each fiscal year. When there are multiple reports within a one-month period, we use the average ownership of these reports. We also examine block ownership, defined as 5 % or higher ownership by institutional investors and obtain similar results.

Our results show that ATPs are associated with lower bidder returns only in the sub-group with lower-than-median public pension fund ownership. This confirms the complementary nature of public pension fund ownership and ATPs and the association with bidder returns.

Anecdotal evidence suggests that some public pension funds, like Calpers, may avoid firms with a large number of ATPs, implying that a large number of ATPs are systematically correlated with lower public pension fund ownership. Thus, our findings may reflect this negative correlation instead of the interaction effect. In Panel C of Table 1, we note, however, that the correlation between public pension fund ownership and ATPs is actually positive and small in magnitude. In addition, our sub-sample analysis alleviates the concern that public pension ownership may be a proxy for ATPs.

Robustness check and omitted factors

Robustness check

To check the robustness of our empirical results, we consider (1) the influence of internal governance channels provided by CEO incentives, the board of directors, and the leadership structure; (2) acquisition performance measured by market-adjusted returns; (3) alternative definitions of industry competition and large shareholders; and (4) alternative definitions of governance indices. Table 7 reports the robustness test results only for the sub-group with the weakest governance environment. The results for other sub-groups are summarized in the Appendix: Table 10.

CEO incentives

CEO incentives are measured by CEO share ownership measured by the top 5 executives' share ownership and its squared term. Examining the percentage of equity-based compensation in a CEO's total compensation, Sokolyk (2011) find a significant positive

Table 7 Robustness tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CEO incentives	Board and leadership	$CAR_{MAR}(-2, +2)$	Block ownership	Sales expenses	G-index	Classified boards
E-index	−0.639** (−2.15)	−0.521* (−1.77)	−0.535* (−1.77)	−0.266 (−0.97)	−0.020 (−0.09)		
E-index × Excess Cash	−0.481** (−2.48)	−0.471** (−2.54)	−0.406** (−2.22)	−0.339** (−2.21)	−0.298** (−2.11)		
ln(G-index)						−1.344 (−1.16)	
ln(G-index) × Excess Cash						−1.384** (−2.00)	
Classified Board							−0.103 (−0.13)
Classified Board × Excess Cash							−1.164** (−2.34)
Excess Cash	0.154 (0.58)	0.107 (0.41)	0.048 (0.18)	−0.075 (−0.33)	−0.269 (−1.24)	3.124** (2.02)	0.892** (2.08)
ln(Assets)	−0.208 (−0.62)	0.180 (0.52)	0.277 (0.80)	0.185 (0.56)	0.160 (0.48)	0.244 (0.70)	0.244 (0.70)
MtoB	−0.159 (−0.37)	−0.098 (−0.23)	0.008 (0.02)	−0.447 (−1.15)	0.863* (1.94)	−0.120 (−0.27)	−0.102 (−0.22)
Free Cash Flow	2.010 (0.40)	1.989 (0.40)	2.038 (0.40)	0.096 (0.02)	1.760 (0.40)	2.690 (0.53)	1.307 (0.26)
Leverage	3.628 (1.62)	2.688 (1.18)	2.388 (1.06)	2.201 (1.27)	−0.286 (−0.14)	2.068 (0.91)	2.135 (0.95)
Price Runup	−0.014 (−1.25)	−0.017 (−1.56)	−0.004 (−0.36)	0.002 (0.16)	−0.020* (−1.82)	−0.019 (−1.61)	−0.018 (−1.61)
Industry M&A	0.792 (1.12)	0.772 (1.06)	0.724 (0.98)	1.018 (1.59)	0.823 (1.38)	0.775 (1.07)	0.792 (1.08)
Relative Deal Size	1.120 (1.26)	0.815 (0.89)	0.599 (0.63)	−0.971 (−0.91)	−0.520 (−0.50)	0.845 (0.90)	1.023 (1.12)
HighTech	1.260 (1.04)	1.390 (1.17)	1.142 (0.97)	−1.266 (−1.25)	−0.695 (−0.58)	1.450 (1.20)	1.299 (1.06)
HighTech × Relative Deal Size	−8.191** (−1.98)	−7.725* (−1.85)	−8.109* (−1.94)	−1.152 (−0.35)	2.260 (0.34)	−8.072* (−1.93)	−8.269* (−1.96)
Private Target	−0.929 (−1.19)	−1.184 (−1.53)	−1.456* (−1.86)	−0.895 (−1.30)	−1.452** (−2.31)	−1.221 (−1.58)	−1.235 (−1.60)
Public Target	−3.956*** (−3.94)	−3.908*** (−4.19)	−3.702*** (−3.93)	−2.078*** (−2.60)	−2.211*** (−3.01)	−3.920*** (−4.24)	−4.114*** (−4.44)
Hostile Deal	0.913 (0.38)	0.896 (0.37)	1.042 (0.41)	0.608 (0.35)	−1.572 (−1.00)	0.957 (0.39)	0.929 (0.38)
Cash Only	0.984 (1.37)	1.150 (1.64)	1.101 (1.60)	0.512 (0.80)	0.124 (0.21)	1.142 (1.61)	1.251* (1.76)
Stock Only	0.764 (0.64)	1.067 (0.89)	0.881 (0.72)	0.403 (0.37)	−0.312 (−0.29)	0.944 (0.77)	1.135 (0.93)
Tender Offer	−0.307 (−0.24)	−0.467 (−0.37)	−0.957 (−0.76)	−0.229 (−0.20)	−0.644 (−0.61)	−0.245 (−0.19)	−0.192 (−0.15)
CEO Ownership	−0.165 (−1.21)	−0.087 (−0.58)	−0.045 (−0.30)	0.047 (0.37)	0.207 (1.49)	−0.081 (−0.53)	−0.081 (−0.56)
CEO Ownership Squared	0.005 (1.34)	0.003 (0.83)	0.003 (0.62)	−0.002 (−0.52)	−0.007* (−1.70)	0.004 (0.85)	0.004 (0.91)
ln(Board Size)		−4.112*** (−2.70)	−4.419*** (−2.83)	−0.809 (−0.54)	−1.575 (−1.14)	−4.058** (−2.56)	−4.449*** (−2.73)
Pct. of Ind. Directors		−0.550 (−0.69)	−0.650 (−0.79)	−0.855 (−1.17)	−0.462 (−0.67)	−0.737 (−0.90)	−0.774 (−0.97)

Table 7 Robustness tests *(Continued)*

CEO-Chair		2.664	3.292	1.908	−0.175	2.819	2.781
		(1.23)	(1.51)	(1.05)	(−0.10)	(1.33)	(1.26)
Intercept	5.825*	9.448**	9.205**	2.500	6.358	10.072**	8.379*
	(1.76)	(2.28)	(2.14)	(0.62)	(1.58)	(2.06)	(1.94)
Adj. R^2	0.076	0.089	0.070	0.034	0.066	0.079	0.082
N	548	545	545	577	606	545	545

The dependent variable is the cumulative abnormal return of bidders using the market-adjusted returns ($CAR_{MAR}(-2, +2)$) in model (3) and the market model residuals (CAR_{MM} (−2,+2)) in other models. The results for the weakest governance sub-group are reported (the results for other sub-groups are summarized in Appendix: Table 10). The weakest governance sub-group is defined as acquirers having below the median value of public pension fund ownership and above the median value of industry NPM. *CEO Incentives* are measured with share ownership by top 5 executives and its squared term. *Board structure* is measured by the board size and the percentage of independent directors. *Leadership structure* is measured by CEO-Chair duality. *Block Ownership* is the percentage ownership by institutional block holders. *Sales Expense* is the industry median ratio of operating income divided by sales revenues, which is a measure of industry competition. *G-index* is the sum of 24 antitakeover provisions in Gompers et al. (2003). *Classified Boards* is an indicator variable for board classification. All models are estimated with calendar year dummy variables and industry fixed effects. Industry is defined at the Fama-French 48 industries. The numbers in parentheses are heteroscedasticity-robust t-statistics. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

relationship between managers' equity-based compensation and bidder returns, whereas Masulis et al. (2007) does not find this association. In model (1) of Table 7, including the CEO ownership variables does not have a material impact on our findings. Similar to Masulis et al. (2007), the coefficients on CEO ownership and its squared term are insignificant. The coefficient on the E-index is −0.64 and that on the interaction term of the E-index with excess cash is −0.48, both statistically significant at the 5 % significance level. In other sub-groups, we do not find an adverse impact of the E-index and the interaction effect with excess cash (see panel (1) in the Appendix: Table 10). We also examine delta and vega as alternative measures of CEO incentives.[7] In an untabulated result, the coefficients on delta and vega are all insignificant and our inference holds.

Board characteristics and leadership structure

Major corporate decisions, such as mergers and acquisitions, must be approved by the board of directors, who act as an important internal governance mechanism (Core et al. 1999, Weisbach 1988, Yermack 1996). For board characteristics, we consider board size and the percentage of independent directors (Weisbach 1988). The leadership structure is measured by CEO-Chairman duality, which is also used as a measure of CEO entrenchment (Core et al. 1999). In model (2) of Table 7, we find the interactive effects of the E-index. We note that board size is associated with lower bidder returns, which is consistent with the view that small boards are effective monitors (Yermack 1996). In the untabulated test, we add the interaction of E-index and board size and the percentage of independent directors, but the coefficients on these interaction terms are insignificant.

Alternative specifications

Here, we show that our findings for the interactive effect are robust to alternative definitions of the variables. In model (3), bidder returns are measured by the market-adjusted abnormal returns using CRSP value-weighted returns. In model (4), large shareholder ownership is measured by the block holdings of institutions with more than 5 % ownership. In model (5), industry competition is defined by the industry

median sales expenses-to-revenues ratio. We predict that sales expenses will increase as firms in competitive industries tend to increase their marketing efforts.[8] In models (6) and (7), we measure ATPs with the G-index and the classified board dummy variable, respectively. From models (3)-(7) of Table 7, the coefficients on ATPs are all negative and insignificant. The adverse impact of ATPs is more evident when ATPs interact with excess cash only when industry competition is weak and large shareholder ownership is low. In panels (3)-(7) of the Appendix: Table 10, we confirm that ATPs and the interaction with excess cash do not negatively affect acquisition performance in other sub-groups.

Endogeneity of governance indices

So far, we demonstrate that the association between ATPs and bidder returns depends on the level of excess cash reserves, industry competition, and public pension fund ownership. The results support the notion that ATPs' wealth effect has a heterogeneous effect across firms according to their characteristics and governance environments. In this section, we address the endogeneity issue to further confirm the existence of the interactive effects.

Several studies suggest that the negative relationship between ATPs and firm performance explains the endogenous decision to adopt ATPs. Hermalin and Weisbach (2003) argue that relating ATPs to the cross-section of Tobin's q may have endogeneity problems. Examining analysts' earnings forecast errors and earnings announcement returns, Core et al. (2006) find that the market does not appear to be surprised by the poorer (better) operating performance of firms with a large (small) number of ATPs. This suggests that ATPs may not be responsible for the unexpected abnormal returns. Cremers et al. (2009) argue that a takeover factor is correlated with both ATPs and stock returns. When the takeover factor is correctly specified in the expected return model, they find that the association between ATPs and abnormal stock returns disappears. Furthermore, Lehn et al. (2007) argue that lower-valued firms tend to adopt more ATPs and, when they internally decide to adopt ATPs, governance quality is no longer associated with firm value.

We consider two types of the endogeneity issues. First, it is possible that poorly performing firms adopt more ATPs or managers adopt ATPs in order to make value-destroying acquisitions later. However, most protective provisions were adopted by 1990, with new adoptions since then relatively rare (Masulis et al. 2007). Because we collect acquisition data starting from 1996, the reverse causality or look-ahead bias is not plausible for our sample.

Nonetheless, our findings may still be influenced by unknown omitted variables. The concern is that our findings of the interactive effect may be spurious if our interaction variables and ATPs co-vary with some unknown factors that happen to be correlated with bidder returns. The common econometric methodologies have some limitations in completely resolving the issue because they require strictly exogenous instruments that are often hard to obtain. In addition, inadequate instruments may cause further biased results (Roberts and Whited 2013).

We address this issue by adding potentially missing variables and by reducing the unexplained portion of CARs' variation. We first consider firm prestige or reputation.

Jensen (1983) argues that managers of prestigious companies have wide exposure to public attention, media coverage, and regulatory scrutiny and posits that the market for outside directors provides incentives to promote and defend their reputation as experts in the decision process controls. Consequently, there is potential for a substantial devaluation of human capital when they disclose bad acquisitions and use ATPs to extract private benefits from control. Since public pension funds have a long-term investment horizon, they may prefer to hold larger ownership blocks in these prestigious firms, which in turn may increase their monitoring incentives. Maug et al. (2012) examine the impact of firm reputation and prestige on CEO compensation using the Fortune ranking as a proxy for firm prestige. Following their study, we measure the prestige effect with an indicator variable (*Prestige*) having a value of one if bidders are listed on the Standard & Poor's (S&P) 500 index or in the Fortune 500, and zero otherwise.

Table 8 reports the results for the sub-group with the weakest governance environment. In untabulated results, we do not find any significant effect of firm prestige in the other sub-groups. Interestingly, we find that prestigious firms are more likely to adopt ATPs. This may be because prestigious firms can adopt more ATPs without hurting firm value. In model (1) of Table 8, we add the *Prestige* dummy variable for the specification used in model (8) of Table 6. Similar to the previous result, the coefficient on the E-index is −0.48 and that on the interaction term with excess cash is −0.43. The coefficient on *Prestige* is negative and insignificant. This suggests that managers of prestigious firms do not necessarily make better acquisition decisions than those of other firms.

Next, we examine the effect of firm prestige by introducing the interaction term between the Prestige dummy variable and the E-index. In model (2), the result shows the moderating effect of firm prestige. The coefficient of the interaction term is 1.89 and significant, suggesting that the effect of E-index on bidder returns is positive for prestigious companies. By contrast, the coefficient on the E-index is significant (−1.21), suggesting that managers of other firms are likely to misuse ATPs to entrench themselves. We continue to find a significant and negative interactive effect of excess cash and the E-index. The results may reconcile the inconsistency in earlier studies. By examining prestigious acquirers (S&P500 firms), [10] finds that ATPs do not hurt firm performance, whereas the adverse impact of ATPs, as documented in Masulis et al. (2007), is most evident for other firms.

In model (3) of Table 8, we introduce a triple interaction of the E-index, the *Prestige* dummy variable, and excess cash. The coefficient on this interaction is significant (0.833), suggesting that the interaction effect of excess cash and ATPs is also positive in prestigious firms. The coefficients on the E-index and its interaction with excess cash are all negative and significant at the 1 % level, suggesting that the adverse impact of ATPs and the incremental effect of excess cash are relevant only for non-prestigious firms.

Taken together, the results suggest that managers of prestigious firms do not adopt ATPs to entrench themselves, while those in other firms do so when they hoard excess cash and exist in a weak governance environment. We also note that the R-squared in models (1)-(3) gradually increases from 8.9 % to 11 %, and then to 11.8 %, alleviating the concern of omitted variable bias.

In model (4), we add the interactions between target public/private status and the method of payments. The R-squared further increases to 12.6 % and we continue to find

Table 8 The influence of firm prestige

	(1)	(2)	(3)	(4)	(5)
E-index	−0.483	−1.206***	−1.248***	−1.209***	−1.367***
	(−1.64)	(−3.18)	(−3.35)	(−3.25)	(−3.24)
E-index × Excess Cash	−0.431**	−0.518***	−0.825***	−0.829***	−0.827***
	(−2.34)	(−2.91)	(−3.37)	(−3.34)	(−3.31)
E-index × Prestige		1.894***	1.833***	1.849***	1.937***
		(3.92)	(3.97)	(4.04)	(3.51)
E-index × Excess Cash × Prestige			0.833***	0.836***	0.862**
			(2.73)	(2.71)	(2.39)
Prestige	−0.918	−1.147	−1.052	−1.200	−1.691
	(−0.85)	(−1.10)	(−1.04)	(−1.18)	(−1.49)
Excess Cash	0.016	−0.025	−0.030	0.013	−0.156
	(0.06)	(−0.10)	(−0.12)	(0.05)	(−0.57)
ln(Assets)	0.472	0.541	0.552	0.595	1.039**
	(1.04)	(1.23)	(1.26)	(1.35)	(2.08)
MtoB	−0.106	−0.155	−0.188	−0.162	−0.267
	(−0.24)	(−0.40)	(−0.51)	(−0.44)	(−0.68)
Free Cash Flow	3.732	5.276	5.314	5.526	3.660
	(0.77)	(1.08)	(1.10)	(1.16)	(0.78)
Leverage	2.318	2.310	2.639	2.647	1.190
	(1.00)	(1.02)	(1.16)	(1.17)	(0.50)
Price Runup	−0.020*	−0.021**	−0.022**	−0.022**	−0.020*
	(−1.85)	(−1.99)	(−2.18)	(−2.15)	(−1.91)
Industry M&A	0.816	0.826	0.738	0.785	0.745
	(1.14)	(1.17)	(1.05)	(1.11)	(1.01)
Relative Deal Size	0.874	0.859	0.829	1.100	1.303
	(0.95)	(0.93)	(0.91)	(1.18)	(1.38)
HighTech	1.335	1.255	1.334	1.378	1.783
	(1.11)	(1.07)	(1.15)	(1.16)	(1.44)
HighTech × Relative Deal Size	−7.919*	−7.827*	−7.594*	−7.873*	−7.314*
	(−1.84)	(−1.84)	(−1.79)	(−1.84)	(−1.69)
Private Target	−1.133	−1.062	−1.126	−2.165**	−2.276**
	(−1.47)	(−1.38)	(−1.48)	(−2.44)	(−2.49)
Public Target	−3.958***	−3.628***	−3.727***	−5.182***	−5.556***
	(−4.14)	(−3.92)	(−4.04)	(−4.57)	(−4.70)
Hostile Deal	1.024	1.409	1.312	1.286	1.241
	(0.42)	(0.59)	(0.56)	(0.54)	(0.51)
Cash Only	1.137	1.059	1.092	−1.124	−1.171
	(1.64)	(1.54)	(1.59)	(−1.09)	(−1.07)
Stock Only	0.948	0.696	0.700	−0.441	−0.908
	(0.80)	(0.61)	(0.62)	(−0.11)	(−0.19)
Tender Offer	−0.162	−0.012	0.095	−1.160	−0.960
	(−0.13)	(−0.01)	(0.08)	(−0.88)	(−0.71)
CEO Ownership	−0.058	−0.023	−0.034	−0.042	0.032
	(−0.39)	(−0.16)	(−0.23)	(−0.29)	(0.24)
CEO Ownership Squared	0.003	0.002	0.002	0.003	0.001
	(0.71)	(0.50)	(0.58)	(0.63)	(0.24)
ln(Board Size)	−3.589**	−3.819***	−3.599**	−3.405**	−2.616
	(−2.36)	(−2.60)	(−2.48)	(−2.34)	(−1.56)
Pct. of Ind. Directors	3.009	3.242	3.127	2.711	2.413
	(1.46)	(1.58)	(1.53)	(1.38)	(1.18)
CEO-Chair	−0.457	−0.405	−0.292	−0.283	−0.312
	(−0.58)	(−0.52)	(−0.37)	(−0.36)	(−0.40)
Private Target × Cash Only				2.826*	2.250
				(1.67)	(1.43)

Table 8 The influence of firm prestige *(Continued)*

Public Target × Cash Only				5.060***	5.651***
				(2.98)	(3.04)
Private Target × Stock Only				1.731	1.985
				(0.40)	(0.39)
Public Target × Stock Only				1.588	1.837
				(0.36)	(0.36)
Intercept	7.510	6.100	4.518	3.699	−1.766
	(1.53)	(1.24)	(0.86)	(0.73)	(−0.27)
Incorporation State Dummy	No	No	No	No	Yes
Adj. R^2	0.089	0.110	0.118	0.126	0.146
N	545	545	545	545	545

The dependent variable is the cumulative abnormal returns (CAR_{MM} (−2,+2)) of bidders. *Prestige* is a measure of firm prestige, having a value of one if a bidder is listed on the S&P500 index or Fortune 500 list and zero otherwise. Models (1)-(5) are estimated for the weakest governance sub-group, defined as acquirers having below the median value of public pension fund ownership and above the median value of industry NPM. All models are estimated with calendar year dummy and industry fixed effects. In models (5), incorporation state dummy variables are added. Industry is defined at the Fama-French 48 industries. The numbers in parentheses are heteroscedasticity-robust t-statistics. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

the interaction effect and the prestige effect. We also note that cash transactions for public targets are value-enhancing. In model (5), to control for the influence of state anti-takeover laws and state-specific institutional and political influence, we add state dummy variables to indicate states where acquirers are incorporated. State anti-takeover laws and other state-specific practices have an important influence on potential takeover attempts and thus a firm's governance environment. Introducing the state-fixed effect improves the R-squared to 14.6 %, though our findings related to other variables remains qualitatively the same. We also examine the measure of management quality used in Masulis et al. (2007). The quality of bidder management is measured by the industry-adjusted operating income growth rate over the three years prior to the acquisition announcement year. In untabulated results, the coefficient on the interaction with the E-index and management quality is significantly positive, suggesting some influence of management quality in mitigating the adverse impact of the E-index.

In summary, we address the endogeneity issue of unknown omitted variables by using a proxy variable for firm prestige and confirm that our findings related to the interactive nature of ATPs holds. This ameliorates the concern about omitted variable bias, although it might not completely resolve the issue.

Market expectation and the value of cash holdings

One of our main findings is that the market reacts negatively to acquisitions by cash-rich firms with more ATPs. According to Bebchuk et al. (2013)'s learning hypothesis, market participants gradually learn about the poor performance of cash-rich firms with more ATPs and they should then discount stock prices. In a perfect market without information asymmetry, the effect of excess cash and ATPs on acquisitions is already priced in stock values. If so, the market response to acquisition announcements should not be associated with excess cash and ATPs.[9] Bebchuk et al. (2013) further argue that the structural break in the learning effect occurred around 2001, when market

participants became fully aware of the value of governance structures, suggesting that governance structures and excess cash were fully reflected in stock prices after 2001.

To examine this proposition, we use Pinkowitz et al. (2006)'s value regression. Specifically, we regress firm value on the E-index, excess cash, and their interaction term while controlling for the determinants of future cash flows. The dependent variable is the ratio of the firm's market value to net assets. The control variables include earnings, R&D expenses, dividends, and interest expenses at their current levels as well as their past changes (from year t-1 to t) and future changes (from t to $t + 1$). The model specification also includes past and future changes in net assets (book value) and market value. We construct these variables as described in Pinkowitz et al. (2006). The initial data set consists of all firm-year observations of acquisitions during 1991–2006. To avoid the effect of acquisitions on firm value, we exclude firm-year observations in which an acquisition is announced. The final sample consists of 9,929 firm-year observations. Table 9 presents the results of the estimation. In model (1), the E-index is not significantly associated with firm value, while excess cash is positively associated with firm value. Model (2) includes the interaction term of excess cash and the E-index. The coefficient on the interaction term is −1.331, suggesting that the effect of the E-index on Tobin's q is 0.063-1.331 × (Excess Cash). The effect would thus change from positive (negative) to negative (positive) if excess cash is less (greater) than 0.047. This might indicate the presence of a structural change or the differential effects among individual ATPs used in the E-index.

In model (3), the interaction term of excess cash remains be negative after adding the interaction terms of the E-index with pension ownership and industry competition. The results in models (2)-(3) thus suggest that the market predicts the poor performance of cash-rich firms with more ATPs, and the current firm value reflects this expectation. However, this does not imply that the market fully anticipates the information contents of ATPs and excess cash.

We next examine whether the market expectation on the value of the E-index and excess cash differs before and after 2001 by including a triple interaction term among the E-index, excess cash, and *After* dummy variable. *After* is one for the period after 2001, and zero otherwise. In model (4), the coefficient on the triple interaction term is insignificant. In model (5), we use two years of lags in measuring past and future changes in control variables and obtain similar results. The results in models (4)-(5) indicate that the market expectation for the value of ATPs and excess cash did not change, though market participants learned about the value of good governance structure during the 2000's. This suggests that the market did not fully anticipate that cash-rich firms with many ATPs would engage in value-destroying acquisitions, even after they obtained this information.

The systematic association between bidder returns and the interaction of excess cash and ATPs therefore suggests that the market expectation on the value of excess cash and ATPs could differ from actual outcomes. This view is consistent with Pinkowitz et al. (2006)'s argument that market learning fails to fully incorporate the impact of ATPs into firms' stock prices when M&A occurs in waves driven by unpredictable technological and regulatory shocks. Our findings of the interaction effects thus support the notion that the valuation contents of excess cash and ATPs in acquisitions cannot be fully anticipated.

Table 9 The market expectation and the value of cash holdings

	(1)	(2)	(3)	(4)	(5)
E-index$_t$	0.005 (0.17)	0.063** (2.48)	0.135** (2.54)	0.135** (2.56)	0.147*** (2.98)
Excess Cash$_t$	2.548*** (40.25)	4.043*** (50.92)	4.063*** (8.71)	4.062*** (8.63)	3.130*** (5.88)
E-index$_t$ × Excess Cash$_t$		−1.331*** (−28.94)	−1.311*** (−6.65)	−1.300*** (−5.39)	−0.974*** (−4.78)
E-index$_t$ × Excess Cash$_t$ × After				−0.020 (−0.09)	0.217 (1.32)
E-index$_t$ × Pension Ownership$_t$			−0.207 (−0.39)	−0.205 (−0.38)	0.369 (0.72)
E-index$_t$ × Industry NPM$_t$			−0.383* (−1.67)	−0.386* (−1.73)	−0.484** (−2.38)
Pension Ownership$_t$			−2.638 (−1.59)	−2.648 (−1.59)	−3.788** (−2.37)
Industry NPM$_t$			−1.882** (−2.48)	−1.882** (−2.48)	−0.914 (−1.39)
Earnings$_t$	6.425*** (34.95)	6.771*** (38.58)	6.397*** (9.36)	6.392*** (9.39)	5.072*** (7.23)
ΔEarnings$_t$	−0.584*** (−8.43)	−0.842*** (−12.65)	−0.819*** (−3.48)	−0.820*** (−3.52)	−0.709*** (−2.74)
ΔEarnings$_{t+1}$	3.222*** (26.95)	3.133*** (27.50)	2.939*** (6.09)	2.935*** (6.10)	1.699*** (4.78)
R&D$_t$	7.288*** (11.42)	9.101*** (14.89)	8.620*** (3.80)	8.652*** (3.86)	11.710*** (5.67)
ΔR&D$_t$	−0.985* (−1.73)	−2.110*** (−3.88)	−1.895 (−1.15)	−1.911 (−1.16)	−3.358*** (−2.60)
ΔR&D$_{t+1}$	−0.706** (−2.29)	−0.685** (−2.34)	−0.890 (−0.61)	−0.887 (−0.61)	2.048*** (3.00)
Dividends$_t$	6.240*** (9.28)	4.007*** (6.21)	4.068*** (2.71)	4.081*** (2.59)	5.741*** (3.88)
ΔDividends$_t$	−1.102*** (−3.72)	−0.452 (−1.60)	−0.541* (−1.72)	−0.539* (−1.75)	−0.184 (−0.40)
ΔDividends$_{t+1}$	3.519*** (6.89)	2.833*** (5.81)	2.727** (2.45)	2.746** (2.28)	4.867*** (3.36)
Interests$_t$	10.284*** (6.32)	8.340*** (5.38)	6.987*** (2.86)	6.986*** (2.86)	9.899*** (4.51)
ΔInterests$_t$	0.344 (0.20)	0.378 (0.23)	−0.530 (−0.13)	−0.530 (−0.12)	−2.286 (−1.22)
ΔInterests$_{t+1}$	14.671*** (8.91)	14.635*** (9.33)	12.606*** (3.84)	12.62*** (3.82)	2.785* (1.84)
ΔNet Assets$_t$	−0.128 (−1.54)	−0.302*** (−3.78)	−0.255 (−1.32)	−0.255 (−1.32)	−0.041 (−0.45)
ΔNet Assets$_{t+1}$	−0.524*** (−12.21)	−0.488*** (−11.92)	−0.404*** (−4.02)	−0.404*** (−4.02)	−0.247*** (−4.11)
ΔMV$_{t+1}$	−0.345*** (−43.39)	−0.340*** (−44.96)	−0.339*** (−3.94)	−0.339*** (−3.97)	−0.486*** (−7.96)

Table 9 The market expectation and the value of cash holdings *(Continued)*

Intercept	1.172	1.166	1.588***	1.590***	1.126***
	(0.86)	(0.90)	(6.73)	(6.58)	(6.12)
Adj. R^2	0.843	0.858	0.862	0.862	0.909
N	9,929	9,929	9,929	9,929	7,113

The dependent variable is the ratio of a firm's market value to net assets. *Net assets* is book value of total assets minus cash and short-term investment. *Excess cash* is cash and short-term investment minus normal cash holdings predicted from model (1) of table 3. *After* equals to 1 for years after year 2001 and 0, otherwise. *Earnings* are earnings before extraordinary items scaled by net assets. *R&D* is R&D expenses scaled by net assets. For missing R&D value, we assign a value of zero. *Dividends* is dividends/net assets. Interests is interest payments/net assets. *MV* is the market value of a firm divided by net assets. In models (1)-(4), changes are estimated over 1 lag and, in model (5), 2 lags. All models are estimated with year dummy variables and firm fixed effects. All final variables are winsorized at the 1st and 99th percentiles. ***, **, and *denote significance at the 1 %, 5 %, and 10 % levels, respectively

Frequent acquisitions as an alternative explanation

As an alternative explanation for our findings, the results may be driven by frequent acquisitions. It is possible that firms with a higher level of excess cash make acquisitions more frequently. Similarly, firms in non-competitive industries or those ignored by public pension funds may be more frequent acquirers. Several studies report frequent acquirers' poor performance.[10] If higher excess cash and weak governance increase the likelihood of acquisitions, and these frequent acquisitions are associated with lower bidder returns, our results may reflect the effect of frequent acquisitions rather than the interaction effects of ATPs with the governance environment.

We thus test whether the interactions of ATPs with excess cash, industry competition, and public pension fund ownership are associated with the likelihood of acquisitions. We estimate the likelihood of acquisitions for the universe of IRRC firms (8,951 firm-year observations). Among 1,687 unique firms, 1,018 firms (60 %) made acquisitions in any year during the sample period. We estimate a probit model that includes a set of controls. In an untabulated result, we find that the probability of acquisitions is positively associated with the E-index. Masulis et al. (2007) also note that dictatorship acquirers are more likely to make acquisitions than democratic acquirers do. However, we do not find evidence that the likelihood of acquisitions is associated with interaction effects among ATPs, excess cash, industry competition, and public pension fund ownership. This confirms that our findings are not driven by a higher acquisition frequency.

Conclusions

The effect of anti-takeover provisions on acquisition performance is an important issue in discovering the channels through which ATPs affect shareholder value. Previous studies report inconsistent evidence, so we aimed to clarify the inconsistency by exploring the interactions among ATPs and acquisition performance with firm characteristics and a firm's governance environment.

We show that ATPs' wealth effect depends on excess cash holdings, industry competition, and public pension fund ownership. Specifically, we find that the presence of either a competitive industry or strong monitoring by public pension funds can mitigate the harmful effect of ATPs. Conversely, ATPs are associated with lower bidder returns only when industry competition is weak and public pension fund ownership is low. We thus identify a strong complementarity among various governance mechanisms that interact with ATPs in determining acquisition performance. Accordingly, it

is important to acknowledge the interactive nature of ATPs with other governance mechanisms to fully understand the wealth effect of ATPs.

The interaction effects imply that ATPs do not necessarily hurt shareholder value for all firms. The results also suggest that ATPs' entrenchment effects may be not as widespread as predicted by agency theory. This may explain the pervasiveness of ATPs to date. Our inference is also broadly consistent with the view that the wealth effect of certain governance structures varies across firms according to their characteristics and governance environment.

Endnotes

[1]The Investor Responsibility Research Center (IRRC; currently, RiskMetrics) reports that, as of 2006, large public US firms have 9.3 ATPs on average. The corresponding number in 1996 was 9.7.

[2]Another stream examined the wealth effect of ATPs in various corporate decisions such as payout policy, cash policy, CEO compensation, and investment decisions.

[3]Giroud and Mueller (2010) examine the interaction of the G-index with industry competition and bidder returns. Kadyrzhanova and Rhodes-Kropf (2011) examines the interactive effect of delay provisions with industry competition in determining the target premium.

[4]Masulis et al. (2007) also examine how excess cash is associated with bidder returns. They show that ATPs are negatively associated with bidder returns, but excess cash itself has no significant effect on bidder returns. However, they do not examine the interaction of ATPs with excess cash.

[5]The extant literature emphasizes the complementarity of various governance mechanisms such as takeover threats, monitoring by large shareholders, industry competition, independent boards, and managerial share ownership (Cremers and Nair 2005, Bauguess and Stegemoller 2008, Bertrand and Mullainathan 2003, Chi and Lee 2010, Kim and Lu, 2011).

[6]Arguably, ATPs may lead to lower industry competition by deterring takeovers. However, as long as the deterrence effect is not overwhelming in the economic magnitude, this reverse causality is less plausible (Comment and Schwert 1995, Bates et al. 2008). Using UK industry competition data as an exogenous variable, Kadyrzhanova and Rhodes-Kropf (2011) also confirms that the causality runs from industry competition to ATPs, not vice versa.

[7]We construct the delta and vega numbers using CEO compensation and equity portfolio holdings data from the Execucomp database. Delta is defined as the dollar value changes (in thousands of 2006 dollars) in the value of a CEO's stocks and stock options for a 1 % change in the underlying stock price. Vega is the dollar changes (in thousands of 2006 dollars) in a CEO's stock option value for a 1 % change in the standard deviation of the underlying stock returns.

[8]We also examine the Herfindahl-Hirschman Index (HHI) as a measure of industry competition. Unlike Giroud and Mueller (2011), we did not find the interactive effect of industry competition and ATPs in any sub-groups. As HHI ignores competition from foreign companies, this insignificant result might be driven by the measurement error inherent in the HHI.

[9]We thank Sadok Ghoul for pointing out this implication.

[10]Doukas and Petmezas (2007) and Malmendier and Tate (2008) argue that overconfident managers are likely to acquire targets more frequently and the market reacts more negatively to these acquisitions.

Appendix

Table 10 The interactive effect of external governance and antitakeover provisions

	E-index	E-Index × excess cash	Excess cash	Adj.R^2	*N*
(1) CEO incentives					
High pension & high competition	−0.050 (−0.22)	−0.194 (−0.99)	0.057 (0.18)	0.186	647
High pension & low competition	−0.029 (−0.16)	0.006 (0.05)	−0.101 (−0.47)	0.135	680
Low pension & high competition	0.010 (0.03)	−0.206 (−1.10)	−0.548 (−1.60)	0.147	539
All three sub-groups	−0.031 (−0.22)	−0.078 (−0.88)	−0.162 (−1.06)	0.097	1,866
(2) Board and leadership					
High pension & high competition	−0.114 (−0.48)	−0.202 (−1.01)	0.096 (0.30)	0.108	647
High pension & low competition	−0.009 (−0.05)	0.017 (0.13)	−0.060 (−0.28)	0.038	680
Low pension & high competition	0.033 (0.10)	−0.259 (−1.34)	−0.445 (−1.23)	0.031	536
All three sub-groups	−0.031 (−0.23)	−0.095 (−1.04)	−0.114 (−0.73)	0.098	1,861
(3) $CAR_{MAR}(-2, +2)$					
High pension & high competition	−0.072 (−0.30)	−0.225 (−1.18)	0.124 (0.39)	0.164	647
High pension & low competition	−0.021 (−0.11)	0.024 (0.19)	−0.066 (−0.30)	0.128	680
Low pension & high competition	−0.056 (−0.17)	−0.311 (−1.56)	−0.366 (−1.00)	0.160	534
All three sub-groups	−0.064 (−0.43)	−0.125 (−1.36)	−0.080 (−0.51)	0.092	1,861
(4) block ownership					
High pension & high competition	−0.090 (−0.29)	−0.127 (−0.68)	−0.061 (−0.19)	0.078	617
High pension & low competition	−0.139 (−0.58)	−0.052 (−0.32)	0.300 (1.32)	0.172	648
Low pension & high competition	0.149 (0.53)	−0.144 (−0.76)	0.660* (−1.92)	0.174	564
All three sub-groups	−0.080 (−0.54)	−0.114 (−1.18)	−0.014 (−0.09)	0.110	1,829
(5) Sales expenses					
High pension & high competition	−0.305 (−0.97)	−0.214 (−0.92)	−0.076 (−0.23)	0.162	595
High pension & low competition	0.027 (0.11)	0.038 (0.28)	0.356 (1.69)	0.168	670
Low pension & high competition	−0.349 (−0.920	0.026 (0.12)	−0.406 (−1.16)	0.133	535

Table 10 The interactive effect of external governance and antitakeover provisions *(Continued)*

All three sub-groups	−0.205 (−1.30)	−0.128 (−1.25)	0.044 (0.28)	0.107	1,800
(6) G-index					
High pension & high competition	−0.786 (−0.84)	0.023 (0.03)	0.037 (0.02)	0.190	647
High pension & low competition	0.221 (0.26)	0.162 (0.28)	−0.406 (−0.32)	0.137	680
Low pension & high competition	−0.638 (−0.49)	−1.021 (−1.28)	1.743 (0.94)	0.149	534
All three sub-groups	−0.756 (−1.26)	−0.053 (−0.14)	−0.026 (−0.00)	0.10	1,861
(7) classified boards					
High pension & high competition	0.412 (0.66)	−0.665 (−1.16)	0.497 (1.07)	0.193	647
High pension & low competition	−0.335 (−0.73)	−0.399 (−1.25)	0.176 (0.66)	0.139	680
Low pension & high competition	0.488 (0.59)	−0.085 (−0.17)	−0.427 (−0.86)	0.146	534
All three sub-groups	0.109 (0.33)	−0.286 (−1.18)	0.047 (0.21)	0.098	1,861

Coefficients for the corresponding models in Table 6 are reported. The results are for the strong external governance sub-group (*High Pension & High Competition*) and the remaining two sub-groups, separately. We also report the aggregated result for all three sub-groups

Competing Interests
The authors declare that they have no competing interests.

Authors' contributions
SA and JC carried out the cash holdings, governance, and acquirer return studies, participated in the empirical analysis and drafted the manuscript. All authors read and approved the final manuscript.

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