

THE MARKET FOR CORPORATE CONTROL AND CORPORATE CASH HOLDINGS

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Abstract

Conventional wisdom asserts that firms with large cash holdings are likely takeover targets. Using hostile takeover activity from 1985-1994, I find the probability a firm will be acquired decreases with cash. This holds for firms with excess cash and those with poor investment opportunities. Cash decreases acquisition probability by deterring potential bids, but does not increase premiums offered when bids occur. Finally, cash decreases after passage of antitakeover legislation. Thus, managers may hold cash to entrench themselves at shareholders' expense. Consequently, the market for corporate control does not monitor corporate cash holdings. Rather, cash may decrease such monitoring.

Keywords: Cash holdings, Hostile takeovers, Market for corporate control, Managerial entrenchment

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1. Introduction

“I look at a cash-rich company in America and wonder what’s wrong with its management. What’s wrong with its business? Who is going to take it over? What do the people at this cash cow think they are doing?”¹ This quote by Peter Canelo, U.S. investment strategist at Morgan Stanley Dean Witter conveys the conventional wisdom in finance, that the market for corporate control monitors corporate cash holdings by targeting firms with large amounts of cash.

Much evidence indicates management would rather keep resources within the firm than pay them out to shareholders, and management can keep resources in the form of liquid assets. If large cash holdings make firms susceptible to takeover, then the threat from the market for corporate control should reduce management's willingness to accumulate large cash holdings.

Jensen (1986) argues that firms with free cash flow that refuse to pay it out to shareholders are likely takeover targets. Hence, Jensen argues that the market for corporate control can monitor the cash holdings of firms. Yet, Opler, Pinkowitz, Stulz, and Williamson (1999) [OPSW] find that many firms seem to hold too much cash and do so for extended periods of time. Additionally, Harford (1999) finds that firms with excessive amounts of cash are less likely to be takeover targets. These results are puzzling in light of the active market for corporate control in the U.S. Perhaps large cash holdings provide firms with the flexibility and resources to defend themselves from unwanted takeover attempts. It may also be, perhaps paradoxically, that a firm with large cash holdings may be more difficult to value since the target can easily and quickly pay out its cash.

¹ International Herald Tribune, September 26-27, 1998, page 20.

In this paper, I investigate whether the market for corporate control monitors cash holdings. Using hostile takeover attempts from 1985-1994, I examine the impact of cash on acquisition probability. In logistic regressions, I find that cash does not make a firm more likely to be acquired. In fact, cash rich firms are significantly less likely to lose their independence via hostile takeover. The results are similar for firms holding “too much” cash using measures of excess cash (see OPSW (1999)). Even in firms with poor investment opportunities, where the costs of holding cash are likely large, cash does not increase acquisition probability. The results are inconsistent with the market for corporate control monitoring cash holdings. Instead, cash may decrease such monitoring.

Having documented that the takeover market does not monitor cash, I investigate this relation. Specifically, I examine whether cash reduces the probability of being targeted, whether cash allows targeted firms to defeat a bid, or both. Consistent with Harford (1999), I find that cash significantly reduces the probability of being targeted; however, it does not appear that having large amounts of cash helps a firm remain independent once it is targeted. On the other hand, firms with too little cash are more likely to be acquired once a control contest is initiated.

Since higher levels of cash actually reduce the probability that the firm will be acquired, I examine whether this is in shareholders’ interests. Cash may benefit shareholders by reducing the probability of acquisition, but increasing the bid premium (see Stulz (1988) for this argument in relation to ownership). Shareholders may then receive higher returns, albeit less frequently. I find that bid premiums are not higher for firms with more cash, indicating that managers, not shareholders benefit from large cash holdings.

The evidence in Harford (1999) makes these results even more disconcerting. Harford shows that cash rich firms are more likely to make value decreasing acquisitions. Thus, shareholders of cash rich firms

are not only less likely to receive takeover premiums, but face an increased likelihood that management wastes the cash through bad acquisitions.

Overall, the results indicate that the market for corporate control does not effectively monitor the cash holdings of corporations. Perhaps paradoxically, an active takeover market may encourage managers to hold excess cash to increase the probability that their firm remains independent.

I test this by examining cash holdings when antitakeover laws are enacted. If managers use cash as a takeover deterrent, we might expect to see cash decrease when the laws are enacted. Conversely, if cash holdings are the result of an agency problem which the market for corporate control is able to correct, we should see an increase in cash after the laws' passage, since takeovers are more difficult. I show that firms hold significantly less cash after antitakeover laws are enacted. These results are robust to many specifications and lend strong support to the idea that not only does the takeover market not monitor the cash holdings of firms, but an active market for corporate control may promote higher cash holdings than we might otherwise observe.

Finally, I examine cash holdings of non-target firms in industries where hostile takeovers occur. Industry (excess) cash increases by 15% (60-86%) in the quarter of the hostile takeover. Mitchell and Mulherin (1996) argue that takeovers may be driven by industry shocks; thus, my results suggest that firms boost cash when takeover probability increases.

This paper provides empirical evidence that the market for corporate control does not monitor cash holdings by showing that cash rich firms are not more likely to be acquired. My results indicate that cash can promote the independence of management not only from the capital markets, but from the market for corporate control as well. The next section examines the implications of cash holdings for the market for

corporate control. The data are described in Section 3 while analyses and results are presented in Section 4. Section 5 examines how cash holdings change when takeover probability changes. Section 6 concludes.

2. Cash and the Market for Corporate Control

Does the takeover market need to monitor cash holdings, or might other mechanisms serve this purpose? Jensen (1986) argues that debt serves this function by bonding managers to make future interest payments. However, diffuse shareholders may be unable to force management to increase leverage. Zweibel (1996) argues that managers may be willing to incur debt to avoid being takeover targets. However, if larger cash holdings do not increase the probability of a takeover, it seems unclear why managers have the incentive to issue debt in his model.

Another possibility is that creditors, for instance banks, monitor cash holdings. Pinkowitz and Williamson (2000) show that in the bank centered system of Japan, cash holdings are significantly higher than they are in the United States. Their empirical work seems to confirm the assertions by Macey and Miller (1997) that banks may encourage conservatism in firms, resulting in too little risk taking. Since cash is a risk-free asset (at least nominally), banks may have no incentive to limit a firm's cash holdings. This is simply an extension of the agency conflict between bondholders and stockholders discussed in Jensen and Meckling (1976). Because managers and creditors have no incentive to monitor cash holdings, it becomes important to determine whether the market for corporate control does. The following sections present competing hypotheses regarding whether takeovers can prevent managers from holding large, perhaps excessive, levels of cash.

2.1 Theoretical Predictions

Jensen (1986) argues that firms that refuse to pay free cash flow out to shareholders are likely takeover targets. Firms may hold excess cash if they do not have adequate positive NPV projects and managers do not want to return cash to shareholders. If the investment opportunities of a firm are related to the quality of management, excess cash can imply inferior managers. If the market for corporate control is competition among managerial teams for productive assets (Jensen and Ruback (1983)), we might expect to see higher quality managers bidding for cash rich firms.

Cash also allows managers to make investments without being subjected to the monitoring of the capital markets. If managers desire to build empires or consume perquisites, cash enables them to do so. With benefits to control, managers may have an incentive to decrease the riskiness of the firm's investment program to lessen the probability of bankruptcy. Holding cash allows managers to do this. Hence, large cash holdings may symbolize that management is not working in the best interests of shareholders. In such a case, control activity should be more likely.

The statement in the introduction is not unusual. Many believe that cash makes firms likely targets. One reason for this belief is that potential bidders may be able to use the target's cash to help finance the takeover. In many takeovers, assets are liquidated to repay bridge financing. Shleifer and Vishny (1993) argue that assets may not be easily sold at their full value. As such, more than \$1 of assets will need to be liquidated to raise \$1 of cash. However, if bidders can use cash dollar for dollar, a large stockpile of cash may invite a takeover attempt. This belief seems fairly common among practitioners. Ivan Obolensky, vice president of a brokerage and investment banking concern stated, "[Paramount is] definitely a target for takeover. Paramount is cash rich and collecting more money; that's always good. Its 1990 earnings

include interest income alone of \$78.8 million. That's what people love. Paramount will have to invest this cash quickly.'² Standard and Poors advised, "[Block Drug's] balance sheet showed cash, marketable securities, and long term investments totaling \$300.5 million . . . We believe this makes the company an attractive takeover target."³ Some analysts also embrace the conventional wisdom, ". . . Pacific Scientific's strong balance sheet and ample working capital, including cash and marketable assets, make it a logical target for a leveraged buyout. One analyst last year called the company a 'sitting duck'."⁴

How can a belief seem so pervasive if it's not at least partially correct? A possibility is that if those who defy the common wisdom profit from more accurately predicting targets, they have no incentive to reveal that the popular beliefs are incorrect. Also, the press may pay more attention to events which support the conventional wisdom. For instance, the highly publicized activity surrounding Chrysler and Kirk Kerkorian supports the idea that cash holdings increase the chances that a firm will be targeted. It is unclear whether the Chrysler situation is the norm or an exception.

Other work implies that the liquidity of cash may be so unique that the market for control cannot monitor a firm's cash holdings.⁵ In fact, there are several reasons why stockpiles of cash might make firms less likely to be targeted. One reason is that firms could use their liquid resources as a defense. For instance, firms with large cash holdings can more readily repurchase shares, leading to a lower probability of takeover success.

² Publishers Weekly, January 25, 1991

³ Standard & Poor's Emerging and Special Situation, April 18, 1994.

⁴ Los Angeles Times, April 21, 1987

⁵ Myers and Rajan (1998) describe how liquidity may prevent firms from obtaining external finance.

Bagwell (1991) shows that takeovers are more costly for bidders if the target repurchases. She argues that in a repurchase, investors with the lowest valuations will tender first, thus any attempt by the bidder to acquire stock will have to be done at a higher average price. Additionally, her model assumes no costs to the bidder in an unsuccessful takeover attempt. In reality, the costs of bidding can be substantial which could further induce bidders to pass up potential targets.⁶ Stulz (1988) and Harris and Raviv (1988) both argue that takeovers can be defended through repurchases due to the change in proportional ownership they bring about. A repurchase from outside shareholders increases the proportionate holdings of managers, making a successful acquisition more difficult. Although Harris and Raviv use debt to finance the repurchase, the argument may be strengthened if the repurchase is financed from internal cash since this is less costly for managers.

However, stock repurchases are not the sole mechanism through which a cash rich firm can defend itself. A firm with substantial resources can engage in outside acquisitions making itself a less appealing target. For instance, targets could acquire assets unrelated to the line of business, or conversely, assets directly related to the bidder so that a takeover raises antitrust issues. Also, there may be reluctance to bid for cash rich firms due to the possibility of the Pac Man defense, whereby the target attempts to acquire the bidder. Finally, target management can pay the cash to shareholders at any time which may eliminate the very reason for a takeover attempt. This point is formalized in Hendershott (1996) whose model shows that large cash flow agency problems of targets are not associated with successful acquisitions. The intuition is that takeovers will not occur to rectify problems that targets can resolve more easily and cheaply

⁶ Bagnoli, Gordon and Lipman (1989), Persons (1994), and Sinha (1991) also argue that stock repurchases can serve as a takeover defense.

than bidders.

The immediate liquidity of cash further complicates the analysis for a prospective hostile bidder. Although it seems that cash should be easily valued, it is not certain that a bidder will acquire the cash since the target can quickly and (relatively) costlessly commit to squandering it. Consider the case where a firm can commit to wasting its cash (on managerial perquisites, for example) if it appears that a hostile bidder will be successful, while committing not to waste it for another bidder, such as a white knight. If any synergies that the hostile bidder predicated her bid upon are not firm specific, they would be available to the white knight as well. In such a case, the firm should be able to prevent the hostile bidder from acquiring control.

If we consider the bidder's decision, the above analysis implies we may rarely see hostile bids for cash rich firms. With costly bids, firms will undertake a hostile bid only when there is a reasonable chance to win. If the target can use its cash to decrease the probability of success, hostile bidders may not target cash rich firms. Since we do not observe takeover attempts where the bid is conditioned on the target maintaining its level of cash, this must be considered by potential bidders and could prevent takeover attempts from occurring. This problem is unlikely to occur with noncash assets since they are more difficult and perhaps costly to liquidate (Shleifer and Vishny (1993)).

Thus, there is an unresolved question in finance. Do hostile takeovers monitor a firm's cash holdings? If the market for corporate control can not prevent managers from holding cash, there may be no device (short of ex ante contracting) which serves as a check on corporate cash holdings.

2.2 Prior Empirical Work

If the market for corporate control monitors cash holdings, cash rich firms should be targeted more frequently, controlling for other factors. Palepu (1986) and Song and Walkling (1993) find no impact of liquidity on the probability of being a target while Ambrose and Megginson (1992) and Comment and Schwert (1995) find that liquidity does not affect acquisition probability. Finally, Walkling (1985) shows that liquidity is unrelated to successful tender offers. However, these studies use working capital as a measure of liquidity, rather than cash and equivalents. Cash holdings may be substantially different from other current assets because there is no liquidation cost, either explicitly (Sheifer and Vishny (1993)) or in terms of time.

A more direct test is performed in Harford (1999) which shows that cash rich firms are more likely to be bidders. He also finds that firms with large holdings of cash are less likely to be targeted. His results are the first direct evidence that cash may dissuade potential bidders. However, Harford does not examine whether cash makes a firm less likely to be acquired. Even if bids are less likely to occur, once a bid is made, a cash rich firm may be more likely to lose its independence. It is, therefore, possible that cash rich firms are less likely to be targeted, but more likely to be acquired. Hence, his results cannot say whether the takeover market monitors cash. However, Harford shows that cash rich firms are more likely to make value decreasing acquisitions. Thus, his results indicate that it is problematic if the market for corporate control fails to monitor cash holdings.

In the previous section, hypotheses were presented which argue that cash may make takeovers less likely because firms can use their cash to defend themselves. A remaining question is whether these defenses can be successfully implemented. Dann and DeAngelo (1988) examine defensive adjustments

by targets of hostile bidders. Although they have only eight firms where stock repurchases were used, they find that in all cases, the bidder did not acquire control.⁷ They state, “[t]hese facts offer some hint that stock repurchase served as a relatively strong deterrent . . . in our sample contests.” They continue, “[t]his fact suggests that the ex ante choice of a capital structure that preserves financial flexibility . . . can itself represent a takeover defense.” Clearly, no capital structure is more flexible than one with large holdings of cash.

If cash holdings deter hostile takeovers, we might expect managers to hold cash to entrench themselves. In fact, management may find that cash has advantages over more common antitakeover devices. A benefit of cash is its flexibility. Mitchell and Mulherin (1996) show that takeovers tend to be induced by industry shocks and the probability of takeover varies through time. Because a firm can vary its cash, it can increase (decrease) holdings when takeover probability is large (small). In addition, Comment and Schwert (1995) indicate that poison pills are not effective takeover deterrents, while this paper implies that cash holdings are effective. Also, cash holdings do not require consent from either the board of directors or shareholders.

Finally, the Chrysler saga offers another insight into cash holdings and takeover activity. Although a bid for the company did occur, management did not appear to be harshly disciplined. In exchange for a standstill agreement from Kerkorian, Chrysler agreed to pay out some of its cash. Nonetheless, management retained their jobs as well as control over a substantial amount of cash. Thus, even if cash rich firms are targeted, the outcome may not be detrimental to managers.

⁷ Denis (1990) also examines defensive changes in response to takeover activity. He finds that only eight of the 33 firms (24%) are successfully acquired after announcing a stock repurchase.

2.3 Summary

The prior research on cash holdings and the market for corporate control leaves us with an important empirical question. Does the takeover market monitor the cash holdings of firms as conventional wisdom believes, or might cash deter takeovers? If takeovers cannot prevent firms from holding excess cash, there may be no monitoring mechanism that can do so. Additionally, if cash serves as a takeover deterrent, an active market for corporate control may increase cash holdings rather than limit them. The remainder of this paper examines this question.

3. Data

For the accounting variables in this study, both the quarterly and annual Compustat tapes are used. For the quarterly tapes, some data items are not listed every quarter, but rather biannually or annually. For these cases, I divide the numbers equally across the spanned quarters. The data are from 1985-1994 covering 40 quarters. I use calendar quarters rather than fiscal quarters and exclude financial firms and utilities from the analysis. The annual data span 1971-1994.

In this paper, I measure cash as cash and marketable securities deflated by total assets.⁸ However, I also include several measures of excess cash defined as the residuals from regressions that predict cash to assets (see the Appendix). The excess cash measures allow me to examine whether firms which hold “too much” cash are more likely to be takeover targets.

Because I am trying to show that cash may be different from other liquid assets, I examine net

⁸ OPSW (1999) deflate cash by net assets which they define as (assets-cash). They use net assets to examine the amount of cash that non-cash assets have generated. However, since bidders are interested in the whole firm, I deflate by total assets. All results are similar using net assets.

working capital without cash (current assets - current liabilities - cash plus marketable securities). This allows me to isolate the impact of cash rather than other liquid assets. Finally, I examine cash flow using earnings after interest, taxes, and dividends, but before depreciation and amortization divided by total assets ((EBITDA - taxes - interest - dividends) / total assets). The cash flow variable is nearly identical to the one employed in Lehn and Poulsen (1989) and serves two purposes. First, it provides a measure of the amount of liquid assets that a firm's productive assets can generate. Second, Lehn and Poulsen use their measure as a proxy for free cash flow, hence this variable allows me to examine whether free cash flow differs from free cash stock.

To accurately examine the impact of cash holdings on takeover probability, I control for other firm characteristics which affect the probability of being targeted. In prior studies (see for instance, Palepu (1986), Ambrose and Megginson (1992), Song and Walkling (1993), Comment and Schwert (1995), and Harford (1999)), many of the same control variables appear. These include size, leverage, prior performance, and growth opportunities.

To control for size, I use stockholders' equity in 1994 dollars. Leverage is defined to be (long term debt + short term debt) / equity. I control for both prior stock returns and accounting performance using return on equity, sales growth, and past returns. Return on equity (ROE) is net income divided by stockholder equity. Sales growth is defined from year to year, thus for quarterly data it is calculated as $(\text{sales}_t - \text{sales}_{t-4}) / (\text{sales}_{t-4})$. Past stock performance is measured as the compounded 12 month raw stock return calculated using CRSP monthly stock returns. To control for the quality of a firm's investment opportunities, I use the market to book ratio (see, for instance, Smith and Watts (1992)). I define the ratio to be $(\text{book value of assets} - \text{book value of equity} + \text{market value of equity}) / \text{book value of assets}$.

However, since the empirical distribution of this ratio is heavily skewed and fat tailed, I invert the ratio and use book to market in my statistical analysis.⁹ To mitigate the effects of any outliers, all data items are winsorized at the one percent levels.

Takeover data are obtained from Comment and Schwert (1998) which examines acquisition attempts of exchange-listed firms from 1975-1994. Because the quarterly data start in 1985, I use the sample of 1,068 acquisition attempts from 1985-1994. Since hostile takeovers are associated with the monitoring role of the market for corporate control, I limit my analysis to the 200 hostile takeover attempts where majority control was sought. A takeover attempt is defined as hostile if Securities Data Corporation (SDC) defines it as such. Limiting the analysis to hostile takeover attempts has the added benefit of eliminating firms which put themselves up for sale. Those firms are likely to be financially constrained and cash poor, hence we may find a negative relationship between cash and takeover probability. Removing those firms should allow for a more powerful test of whether the market for corporate control monitors cash holdings.¹⁰

Although the Comment and Schwert (1998) data are matched with the annual COMPUSTAT tapes, when I remove financial firms and utilities and merge the data with the quarterly tapes, I find that 139 of the 200 hostile takeover attempts have data regarding cash holdings. Due to additional data availability,

⁹ The market to book (book to market) ratio has a skewness of 3.5 (0.34) and a kurtosis of 17.6 (approximately 3). My main results do not depend on whether I use book to market or market to book.

¹⁰ Schwert (2000) argues there are few economic differences between hostile and friendly takeovers. Harford (1999) shows that excess cash is negatively related to the probability of being targeted in any transaction, while I find negative, but insignificant coefficients using friendly takeovers. I also examine other characterizations of hostility, finding similar results for Schwert's Host(WSJ) and Host(Pre) measures. When I define hostility as Host(Uns), the coefficients on (excess) cash are insignificant.

the number of takeover attempts used in logistic regressions varies from 103 to 130. Of the 139 hostile takeover attempts, 93 are successful when success is defined as the target being acquired by any bidder. When I define success relative to the hostile bidder, only 50 are successful. Additional data requirements reduce the number of successful takeovers used in logistic regressions to a range of 73 to 91 (39 to 48 when success is defined relative to the hostile bidder).

From Comment and Schwert (1998), I also have measures of deal characteristics such as whether the bid was for cash or stock, whether the target had a poison pill in place, and whether there was more than one bidder. In addition, I examine the SDC Mergers and Acquisitions database to find more deal specific information on the sample of takeover attempts.

For the control sample, I use the full universe of COMPUSTAT firms. Because the takeover sample is limited to exchange-listed firms, I limit the control sample to firms which were listed on the NYSE or AMEX during 1985-1994.¹¹ Thus in each quarter, all exchange-listed firms which were not targets of a takeover attempt serve as the control firms. Since the full time series is used, firms which were targeted serve as part of the control sample in the quarters prior to being targeted.

4. Cash Holdings and Hostile Takeovers

4.1 Univariate Results

If management prefers to keep large levels of cash to invest in poor projects instead of paying higher dividends, then monitoring should alleviate this problem. As discussed in Section 2, Jensen (1986), among others, argues that the market for corporate control performs this role by targeting firms which have

¹¹ The results are unchanged if all COMPUSTAT firms are included in the control sample. I also add hostile attempts for Nasdaq firms and use the full universe of firms as the control, again the results are similar.

free cash and are unwilling to return it to shareholders.

In Table 1, I examine differences between firms that were targeted during 1985-1994 and those that were not. The table presents summary statistics for all variables discussed in Section 3. The last two columns present t-statistics (z-statistics) and p-values for tests of differences in the means (medians) between the takeover and control samples.

As Panel A reports, the firms differ with respect to their cash holdings. Firms which are never targeted during the sample period hold 40% more cash to assets, both at the mean and the median.¹² This difference is highly significant using both a t-test and a Wilcoxon test. The same holds true for the measures of excess cash. With net working capital, the differences between the targeted firms and the control firms are insignificant, while firms which were hostile targets have higher cash flow than non-targets at the mean, but not the median. Although the comparisons are univariate, it appears there may be a difference between cash and other measures of liquidity.

With the control variables, I find, consistent with Schwert (2000), that hostile targets are larger than non-targets, at least with respect to medians. Targeted firms have higher ROE and prior stock returns, thus they appear to have better performance. However, the ROE results go the other way when examining medians indicating that the distribution is skewed to the left. Targeted firms do not have strong growth opportunities as shown by lower sales growth and higher book to market ratios. Finally, firms which were targets have higher leverage at the median than non-targets.

It appears that targets differ from non-targets along several dimensions. Although the results in

¹² Since I truncate the hostile target sample at the quarter of being targeted, the cash results may be driven by an increasing trend in cash holdings. However, (excess) cash holdings tend to decrease over time, thus a secular trend is not driving the results.

Table 1 are only univariate, they provide a glimpse into whether the market for corporate control monitors cash holdings. I find that targets of hostile takeover attempts have lower levels of (excess) cash than firms which were never targets. This result runs counter to conventional wisdom.

4.2 Determinants of Acquisitions

4.2.1 Logistic Regressions

In this section, I examine whether the market for corporate control monitors cash holdings using logistic regressions to analyze whether cash rich firms are more likely to be acquired. Because many of the controls measure similar firm characteristics, there is a concern that any results may be affected by correlations among the variables. Thus, I present a correlation matrix in Table 2.¹³ As Table 2 reports, the correlations among most of the variables are not very high. For instance, cash holdings are negatively correlated with both cash flow and working capital, although the coefficients are only around -0.18. Since the correlations are not large, I include all variables simultaneously. I also estimate regressions with subsets of the variables.

Probability of Acquisition = f(ROE, Sales growth, NWC, Leverage, Book to market, Size, Cash flow, Prior stock returns, Cash)

I control for macroeconomic effects and seasonality using calendar year as well as quarter dummy variables. Panel A of Table 3 reports the results. The dependent variable equals one if there is a successful hostile attempt in a given quarter, and zero otherwise. In Panels A and B, a hostile attempt is successful

¹³ The regressions which predict cash are run quarterly, thus the coefficients are allowed to change each quarter. Hence, while the correlation among excess cash and the independent variables is zero in each quarter (by construction), the correlations are not necessarily zero for the full panel of data shown in Table 2.

if the firm is eventually acquired by any bidder. This is the definition Comment and Schwert (1998) use. In Panels C and D, I also examine acquisitions where success means the hostile bidder ultimately gains control. All independent variables are measured at the end of the quarter prior to the bid so I do not use any future information, and the characteristics of the target are potentially known to the bidder. I eliminate firm quarters with negative book values of equity since that creates negative leverage, which is difficult to interpret.¹⁴

The first column shows that larger firms with lower book to market ratios are significantly less likely to be acquired. This is consistent with Hasbrouck (1985) as well as Jensen and Ruback (1983) who argue that the market for corporate control is simply competition for control rights. If firms have high book to market ratios due to bad management, they are more likely to be acquired. It also confirms the belief that larger firms are less likely to be acquired because they require substantial resources to be husbanded by the bidder.

I find that firms with more cash are significantly less likely to be acquired. The coefficient on cash to assets has a z-statistic of -2.22 and implies that an increase in cash from the first to the third quartile decreases the probability of acquisition by almost 18%. If the market for corporate control monitors cash holdings, we should see a significantly positive coefficient. Thus, this is strong evidence that the takeover market does not monitor cash holdings.

I examine measures of excess cash in regressions (2)-(4). Because Jensen's (1986) free cash flow theory applies only to firms with "too much" cash, I separate excess cash into positive and negative

¹⁴ Eliminating these firm quarters also removes negative ROEs driven by the denominator, rather than negative earnings. My main results are similar if I do not eliminate these firm quarters which represent about 1% of the total. My results are also robust to defining leverage as (long term + short term debt) / total assets.

components. The positive (negative) excess cash variable equals excess cash if positive (negative) and zero otherwise. Thus, positive excess cash is a quantitative measure of “free cash”. If there is monitoring by the takeover market, the coefficient on positive excess cash should be significantly positive. The theory has little to say regarding negative excess cash. In all three cases, the coefficients on positive excess cash are not positive, rather they are significantly negative. Thus, the idea that the takeover market monitors firms with “free cash” appears to be soundly rejected.

Although my results show that cash holdings significantly decrease the probability of being acquired, some may feel that examining cash without other measures of liquidity is insufficient. Thus, I reexamine all four specifications including net working capital (without cash) and cash flow. Regressions (5)-(8) isolate the impact of cash on acquisition probability and serve as a conservative test of whether the market for corporate control monitors cash holdings. Both total cash and positive excess cash remain negative and significant. Thus, firms with “free cash” are not more likely to be acquired, in fact, they are less likely to be acquired. This result opposes conventional wisdom and indicates that the takeover market does not effectively monitor a firm’s cash holdings. The implication seems to be that managers could hold large levels of cash with relative immunity. In fact, rational managers may hold more cash than they would in the absence of an active market for corporate control because a stockpile of cash seems to decrease the probability of hostile acquisition.

Cash holdings provide managers with flexibility. However, such flexibility is a double-edged sword. Cash allows managers to take positive NPV projects they may be unable to finance externally due to informational asymmetries or other market imperfections. At the same time, large cash holdings allow managers to undertake projects which may be detrimental to shareholders. In firms with poor investment

opportunities, one would expect this negative aspect to be more important since agency costs of managerial discretion are high. Therefore, at the very least, the takeover market should discipline excessive cash holdings in firms with poor investment opportunities. Panel B of Table 3 examines this by including an interaction variable between (positive excess) cash and investment opportunities. Each quarter, I segment firms by book to market ratio. High BM is a dummy variable which equals one if a firm is in the highest quartile of book to market for that quarter. Firms are reclassified each quarter as investment prospects change. If high book to market firms have poor investment prospects and the market for corporate control effectively monitors cash holdings, high book to market firms which hold excess cash should be acquired more frequently. Hence, the interaction term between high book to market and (positive excess) cash should be significantly positive. Instead, the interaction terms are always negative and at times significantly so. Even for firms where (positive excess) cash is likely to cause high costs from managerial discretion, the market for corporate control does not serve a monitoring function.¹⁵

Since managers are more likely to lose their jobs after a hostile bidder gains control (Walkling and Long (1984)), I reexamine my results defining successful acquisitions as those where the hostile bidder gains control of the firm. The results are shown in Panels C and D of Table 3. Using only firms which lost their independence to hostile bidders provides a strong test of the monitoring capability of the market for corporate control since these are the cases most likely to be disciplinary. Even with this robust test,

¹⁵ Since book to market ratios vary by industry, it is possible I am only measuring industries with poor investment opportunities. Thus, I repeat the analysis using an industry adjusted book to market ratio calculated by subtracting the median book to market ratio for the industry. Industries are defined by 2 digit SIC codes. The results are unchanged and indicate that industry effects do not drive the results. I also reexamine the results defining high BM using a four quarter average of book to market. This captures longer-term measures of investment opportunities rather than quarterly variation. The interaction variables are never significantly positive and are often negative.

(positive excess) cash holdings make firms significantly less likely to be acquired. In fact, a firm increasing its cash from the first to the third quartile is 45% less likely to be acquired. Panel D shows results including the interactive dummy for poor investment opportunities. The results are no different from the earlier evidence. Even when the costs from cash holdings are the highest, the firm is still not more likely to be acquired.

The results of Table 3 offer some interesting insights. Consider the positive coefficient on cash flow and the negative coefficient on (positive excess) cash. If firms are cash cows, i.e. they generate large cash flows yet have few growth opportunities, it seems they are prime targets for takeover. This is consistent with the evidence in Lehn and Poulsen (1989) and, at first glance, seems as though the takeover market solves the free cash flow problem. In fact, this reasoning may be the impetus for the conventional wisdom. However, if managers retain their cash, the firm is less likely to be acquired as indicated by the significant negative coefficients on cash holdings. Perhaps surprisingly, the results imply that a takeover threat may prevent firms from returning cash to shareholders in any form, including dividends. This is in direct contrast to Jensen's (1986) free cash flow theory. Jensen argues that firms waste free cash because keeping it would make them more likely to be disciplined via takeover. However, the results in Table 3 indicate that firms may retain free cash for the very reason that it makes them less likely to be acquired. Thus, an active market for corporate control may, perversely, cause firms to hold more cash than they otherwise would.

4.2.2 Robustness of Results

An alternative explanation to my results is that firms choose to hold large amounts of cash when they believe they are unlikely to be acquired; hence, endogeneity may be driving the results. Although the

excess cash measures mitigate endogeneity by controlling for the determinants of cash balances, I also address this problem in another way. In Section 5, I study this issue by examining cash when takeover probability changes and conclude that endogeneity is not driving the results.

I examine the robustness of the results in various ways. First, I examine other specifications, including using lagged terms for ROE and sales growth to better control for firm performance. In another check, I include research and development expenses to control for firm specific assets which bidders may not value as highly as targets. In addition, it is more costly to liquidate firm specific assets, thus those firms may be less likely to be targeted. Finally, I examine specifications used by Palepu (1986) and one similar to Harford (1999). The results are all qualitatively similar.

Cash holdings may be driven by industry, and Mitchell and Mulherin (1996) find that takeovers seem to be caused by industry shocks, thus it may be important to control for industry effects. Although the excess cash specifications address these problems, I proceed along three additional fronts. First, I rerun all tests using standard errors calculated by assuming independence across industries, but correlation within industries (defined by two digit SIC code). Relaxing the assumption of independence within industries allows for industry shocks. Second, I rerun the regressions including dummy variables for each two digit SIC code. Finally, I use another measure of excess cash holdings which is defined as the deviation of cash to assets from the industry average. In all three cases, cash and excess cash remain significantly negative.

Prior research (Comment and Schwert (1995), Palepu (1986), and Harford (1999)) uses a four year average for the independent variables. I use an average of the previous four quarters which reduces some of the noise present in quarterly data. I also examine the results using annual data computed from

the trailing four quarters. Both sets of results are similar.

Some may be concerned that the excess cash measures are residuals from a regression which includes variables such as cash flow and market to book. Thus, combining those variables with excess cash in the logistic regressions may lead to simultaneity problems. Although this is tempered by the fact that the residuals are orthogonal to those variables, I run a different specification where I use lagged excess cash as an instrumental variable for excess cash. The results are similar.

Overall, cash does not appear to attract bidders, rather it may act as a deterrent. This is not limited to “normal” levels of cash; firms with excess cash are also less likely to be targeted. Even in firms with poor investment prospects, large cash holdings do not make the firm more likely to be targeted. This is in direct contrast to the conventional wisdom and inconsistent with the idea that the market for corporate control effectively monitors corporate cash holdings. Combined with the findings that cash flow is positively related to takeover, my results seem to imply that the market for corporate control may, paradoxically, encourage firms to hold higher levels of cash.

4.3 Why are Cash Rich Firms Less Likely to be Acquired?

4.3.1 Cash holdings and the probability of being targeted

The empirical evidence indicates that large cash holdings make firms less likely to be acquired. However, the mere threat of being targeted may be enough to monitor a firm’s cash. Hence, I reexamine the results of the previous section using all hostile takeover attempts. In addition to examining whether the threat of takeover is enough to monitor firms, assessing the impact of cash on the probability of being targeted allows for further analysis of the prior results. The earlier results are consistent with two roles for

cash: it either lowers the probability that a firm is initially targeted, or cash rich firms are just as likely to be targeted, but can use their resources to defend themselves, or both. This section attempts to determine which effect drives the results.

If the threat of takeover is enough to monitor a firm's cash, we should find that cash rich firms are more likely to be targeted. Thus, I examine regressions similar to those in Table 3, but using all hostile attempts, not just successful ones. Panel A of Table 4 shows the results.

Specification (1) shows that the probability of being a hostile takeover target is lower for cash rich firms. The coefficient is -0.0301 with a t-statistic of -3.03. In addition, the marginal effects are of similar magnitude to those in Table 3. More importantly, the coefficients on positive excess cash are all significantly negative indicating that firms with free cash are less likely to be targeted.

To ensure I control for other aspects of liquidity, I include cash flow and net working capital. In regressions (5)-(8), there is no change in the inferences regarding (positive excess) cash. The results indicate that the takeover market does not monitor free cash, and managers can lessen their chances of being targeted if they increase their cash holdings. Cash flow is again positive indicating that firms with the potential to generate cash are likely targets. This result is consistent with Lehn and Poulsen (1989) and provides further support that free cash flow differs from free cash stock.

For completeness, I examine whether the market for corporate control is more likely to target cash rich firms with poor investment opportunities using an interaction variable between high book to market and (excess) cash. Panel B of Table 4 shows that even for firms with poor investment opportunities, (positive excess) cash holdings do not increase the probability of being targeted. In fact, all the interaction terms have negative coefficients.

The prior results appear quite robust; however, there are two potential concerns. First, since the time series of data is used, serial correlation may affect the standard errors. At the same time, there is a large discrepancy between the number of hostile takeovers (the ones in the logistic regressions) and the number of non-takeover quarters (the zeros). It may be that the coefficients are affected because with such a disparity, it might be difficult to measure the mean effect.

One way to correct these biases is to use a matched sample approach. The matched sample mitigates the above problems because the number of control firms equals the number of target firms. Also, a matched sample can be analyzed without the time series and eliminates serial correlation.

However, matched sample tests rely on arbitrary specifications of matching characteristics in order to pick the control firms.¹⁶ In addition, the matched control sample is the result of one particular draw from the control firms. If one elected to match firms on other characteristics, it is possible to get very different results. Ideally, we would like a test which encompasses the benefits of the matched sample, (i.e. similar sample size and no serial correlation) while at the same time controlling for the fact that one particular draw may not be entirely reliable.

To this end, I replicate the logistic regressions of Tables 3 and 4 using a series of randomly matched samples and examine the empirical distribution of coefficients. For each specification, I randomly select, with replacement, a control sample using approximately the same number of firms as there are hostile targets (acquisitions). I then estimate logistic regressions using this control sample. I repeat the experiment 1000 times and retain the coefficients on (positive excess) cash.

¹⁶ In unreported results, I use control samples matched on industry, time, and firm size and/or book to market. The results are qualitatively similar.

Table 5 shows the results from the bootstrap simulations. Panel A shows results from logistic regressions using all hostile targets. The first column reproduces the results from Table 4, showing a coefficient on cash of -0.0301 with a z-statistic of -3.03. The corresponding p-value is 0.002. The results from the 1000 simulations are shown in the second column. The first number, -0.0263, represents the mean, while the number in braces, -0.0267, is the median of the distribution of coefficients. The original coefficient seems reasonable differing from the mean and median of the empirical distribution by only 10%. In fact, the last column shows that 366 of the 1000 coefficients are less than -0.0301 indicating that the result is not an extreme draw. It seems that the dramatically different sample sizes have little impact on the magnitude of the coefficient.

The second column also shows the empirical p-value which is calculated by examining how many of the 1000 coefficients are positive. For the cash to assets specification, only 13 of the 1000 coefficients are greater than zero; hence, the empirical p-value is 0.013. Thus serial correlation appears to influence the original standard errors since the empirical p-value is 6 times as large as the regression p-value. Nonetheless, the inferences do not change since the empirical p-values are usually significant as well. In addition, although I do not report it, I examine the distribution of the t-statistics from the 1000 replications. For the cash to assets specification, 429 of the 987 negative coefficients are significantly negative at the five percent level. In other words, 42.9% of the t-statistics are less than -1.96. If the results were strictly random (i.e. the original results were wholly due to serial correlation), we should expect to find only 5% of the t-statistics less than -1.96. This is further support that cash is significantly negatively related to takeover probability.

The third column of Table 5 describes the empirical distribution of coefficients. The top number

in each row is the coefficient representing the 95th percentile of the distribution, while the bottom number represents the 5th percentile. Finally, to examine the size of the control samples used, I include the mean and median of the distribution of sample sizes in the fourth column. The first number represents the number of target firms, while the second (third) number is the mean (median) of the distribution of the number of control firms. Thus, in the cash to assets specification, there are 130 target firms, and an average of 133.5 control firms in each replication.

The remainder of Panel A compares the original tests to the simulation evidence for the excess cash measures. Panel B examines the evidence when the logistic regressions are run using only firms which were successfully acquired (see Panel A of Table 3). Panel C examines the results of regressions conditioning on acquisitions where the hostile bidder was successful (see Panel C of Table 3). In each of the panels, the results are similar. The bootstrap results indicate that although the original p-values may be overstated, the inferences remain unchanged.

4.3.2 Cash Holdings and the Probability of the Success of a Takeover Bid

We have seen that cash decreases the probability of being targeted, but cash may also help targeted firms defend themselves. To examine this, I use the sample of hostile takeover attempts and study which factors contribute to a successful bid. In the sample, 67% (93 of 139) of the hostile attempts are successful when success is defined without regard to the identity of the winning bidder. This is less than the 78% completion rate Comment and Schwert (1998) find in their full sample, but it may be expected that hostile takeovers are less likely to be completed than friendly ones. If success is defined relative to the hostile bidder, only 36% (50 of 139) of the bids are successful.

To examine the impact of cash holdings on the probability of bid success, I look only at firms in the quarter they were targeted. The results are shown in Table 6. Panel A defines success without regard to the winner, while bids in Panel B are successful only if the hostile bidder acquires control.

Walking (1985) documents that target management opposition, shares owned by the bidder (toehold) and bid premiums are important determinants of tender offer success. Although my sample is not limited to tender offers, I include variables which control for these factors as well as other characteristics. Management opposition is inherently controlled for since I use only hostile attempts. However, I also include a measure of a firm's antitakeover defenses. Pill equals one if the target had a poison pill in place since this may reduce the probability of success. Toehold is the percentage of target shares the bidder owned on the announcement day. Bid premiums are measured comparing the highest hostile bid to the target stock price 20 trading days (approximately one month) prior to the first announcement of the takeover attempt.¹⁷ Lastly, I include dummy variables of bid characteristics. Cash Offer equals one if the offer is for cash, while Tender Offer equals one if the bid is launched via a tender offer. Finally, if there are multiple bidders, Auction equals one.

The results in Panel A show that tender offers are more likely to succeed. In addition, although bid premium is positive, it is insignificant. However, bid premiums are measured relative to the hostile bidder while success is measured without regard to the identity of the winning bidder. The analysis in Panel B clarifies this problem.

The results in Panel A do not show that target cash holdings make the deal less likely to succeed.

¹⁷ Since, I use the highest revision offered by the hostile bidder and measure it relative to the date of the first announcement, my measurement of bid premium may be upwardly biased.

Although the coefficients on (positive excess) cash are negative, they are insignificant. Interestingly, the coefficients on negative excess cash are always significantly positive. Thus, firms with excess cash may be unable to defeat a takeover attempt, but firms which do not have adequate cash are significantly more likely to be acquired.

Since Panel A measures success without regard to the eventual acquirer, there may be a bias introduced into the cash coefficients. For example, if managers successfully find a white knight, I count that to be a successful acquisition. As posited in Section 2, if a targeted firm can use its cash to seek out a white knight, the coefficients on (excess) cash would be biased away from finding deterrence. Hence, in Panel B, I examine the impact of (excess) cash on success of hostile bidders.

In Panel B, the negative coefficient on auction indicates that hostile bidders are far less likely to acquire control if multiple bidders exist. These are likely to be cases where the target finds a white knight. Consistent with Walkling (1985), the probability of the hostile bidder acquiring control is significantly increasing in the premium offered. This confirms that the coefficients in Panel A are due to the definition of success. However, the coefficient on toehold is negative and significant indicating that firms with greater ownership in the target are less likely to successfully acquire the firm. It may be that hostile bidders with toeholds do not intend to complete the transaction, but hope to gain on their existing stake from another bidder winning the firm. The fact that the coefficients are not significant in Panel A lends support to this argument.

Finally, the coefficients on (positive excess) cash are similar to those in Panel A, although the coefficient on excess cash 1 is positive. Similar to Panel A, firms with too little cash (i.e. negative excess cash) are more likely to be acquired by a hostile bidder. Hence, the results of Table 6 document that

having excess cash is insufficient to defeat a hostile bidder, but having too little cash makes a firm significantly more likely to be successfully acquired by a hostile bidder.

The results in Table 6 also reject the idea that bidders can use a target's cash to finance the acquisition. If that were true, we should observe targets with large amounts of (positive excess) cash being successfully acquired more often, hence we should see significantly positive coefficients. The negative coefficients on cash strongly reject this possibility. Similarly, we should see negative coefficients on negative excess cash, but instead we find significantly positive estimates. Thus, contrary to some popular press beliefs, there are not deals which "finance themselves".¹⁸

4.4 Cash Holdings and Bid Premiums

It seems that (positive excess) cash holdings decrease acquisition probability. Hence, cash may be a takeover deterrent. If so, it may benefit management or, if cash encourages higher bid premiums, could be in the interests of shareholders. This is the argument made by Stulz (1988) applied to cash holdings rather than ownership. If cash benefits shareholders, we should observe higher bid premiums for cash rich targets. This would imply that shareholders earn higher returns, albeit with lower probability.

Walkling and Edmister (1985) examine determinants of bid premiums in tender offers and I use a modified specification of their model. Table 7 shows regression results where the dependent variable is bid premium measured relative to the target stock price 20 trading days before the first announcement of takeover activity. Examining only the bid premium offered by the hostile bidder may not be representative of the gains target shareholders can attain because it does not account for other bidders. To control for

¹⁸ "Self-financed" deals only makes sense for cash offers and Table 6 includes non-cash bids. However, when I use only cash offers, the results are similar.

this, I examine two different measures of bid premium in Table 7. First, I calculate the premium measured relative to the highest hostile bid and then I calculate it relative to the highest bid that the firm received in the corporate control contest. Bid prices are collected from the SDC Merger and Acquisition database. I include, but do not report, quarterly and yearly dummies to control for macroeconomic events and seasonality.

Consistent with Walkling and Edmister (1985), bid premiums are significantly decreasing with the hostile bidder's toehold. Not surprisingly, when the dependent variable is the highest premium offered in the contest, the variable auction is positive and significant. The regressions also show that bid premiums are not significantly increasing in cash. In fact, the coefficients are negative. I find similar results with the excess cash measures and when premium is measured using the highest bid. It does not appear that target cash increases bid premiums. If anything, premiums are lower for cash rich firms. Thus, shareholders do not seem to benefit from the cash holdings. Rather, it appears that the benefits accrue only to managers in the form of greater entrenchment.¹⁹

5. Cash Holdings and Changes in Takeover Probability

5.1 Decreases in Probability from Anti-Takeover Laws

Although the market for corporate control is thought to monitor cash holdings, this does not appear true. Rather, cash holdings seem to entrench managers to the detriment of shareholders. If managers hold cash to increase their likelihood of independence, it is possible that we might see lower cash holdings when

¹⁹ I also look at the premiums paid for the firm's non-cash assets by assuming the bidder pays one dollar for each dollar of the target's cash (see Billett and Ryngaert (1997)). The premiums are positive and at times significant, but this is partially by construction. When I examine a measure of bid premium based on CARs (see Stulz, Walkling, and Song (1990)), I find that firms with higher cash do not receive higher premiums.

takeover probability is reduced. This is in direct contrast to what free cash flow theory would predict. With that theory, we would expect managers to be willing to hold more cash when they become more entrenched.

One way to examine this is to look at cash holdings surrounding implementation of an antitakeover device. However, since most are implemented when takeover is likely, there is an endogeneity problem. An exception is the passage of antitakeover legislation, which is primarily exogenous. Using the sample of business control laws from Bertrand and Mullainathan (1998) allows for an examination of how the addition of a takeover defense impacts cash holdings.²⁰

If the laws reduced the threat from the market for corporate control, the test is clear. Free cash flow theory would argue that cash holdings should increase after the laws are enacted. On the other hand, cash may decrease if the takeover market does not effectively monitor cash holdings. Comment and Schwert (1995) raise the question of whether business combination laws decreased takeover probability and document that there appears to be little evidence of deterrence. However, Bertrand and Mullainathan (1998) review work which shows that business control laws not only lessened takeover activity, but were also detrimental to shareholder wealth. Even if the laws ended up being ineffective, what matters is the perceived probability of takeover. As long as managers believed that the laws would deter takeovers, the test should remain valid.²¹

²⁰ See Bertrand and Mullainathan (1998) for a description of the antitakeover laws.

²¹ In unreported tests, I find that firms which decreased their cash holdings after the laws were enacted are no more likely to be targeted than firms which did not reduce their cash. This may indicate that the laws were effective. When I re-examine the results in Tables 3 and 4 with a dummy variable for anti-takeover laws, the coefficients on the law variables are insignificant and positive, while the other results are unchanged. Thus, it is unclear whether the laws were truly effective. This question is left for future research.

I use the differences-in-differences methodology that Bertrand and Mullainathan (1998) discuss (see their paper for a good description of the method). Essentially, the methodology requires running a fixed effects regression determining cash holdings. The specification includes firm specific dummies, annual dummies, firm characteristics, and a dummy variable which represents the passage of the business control law. The results are documented in Table 8. The variable *Law* equals one if the firm is incorporated in a state with a takeover law and the time is during or after the year the law goes into effect. Hence, it measures whether a firm is covered by a business combination law. Since the regression includes firm specific fixed effects as well as annual dummies, the coefficient of *Law* represents the impact of the law on cash holdings for firms in the state where the law was implemented. Thus a positive coefficient on *Law* would indicate that, controlling for other factors, firms held more cash when they fell under the protection of the takeover law. This is what we should see if cash holdings are the result of an agency problem. On the other hand, if firms are holding cash as a takeover deterrent, we might expect a negative coefficient. The remaining variables in the specification are identical to those used to calculate excess cash (see Table A1 or Table 8 for a description) except that the data is annual, not quarterly.²²

The coefficient on *Law* in the first regression is significantly negative indicating that firms held less cash after they fell under the protection of antitakeover laws. Since leverage and cash holdings may be simultaneously determined, I also include a specification without leverage, capital expenditures, and dividends. This can be interpreted as a reduced form equation. The coefficient on *Law* is still significantly negative. The results seem to reject free cash flow theory. Instead, they indicate that not only does an

²² The data come from OPSW (1999) and thus industry sigma is measured as the volatility of cash flow to net assets where net assets are (assets - cash). All other variables are deflated by total assets.

active market for corporate control fail to monitor corporate cash holdings, but it causes firms to hold more cash than they otherwise might.²³

For robustness, I also rerun both specifications using time and industry dummy variables as well as a regression using only time dummies. However, without firm dummies, these specifications can not fully examine the impact of the laws on cash holdings. Nonetheless, the results continue to support the idea that firms held less cash after the laws went into effect.

Since the year by year firm data are likely not independent, the t-statistics from a pooled regression may be inflated. Thus, a Fama-Macbeth (1973) regression may be useful. Unfortunately, this methodology provides no help since we require the time-series in order to examine the impact of the law. I attempt to perform an analogous study by running the specifications by state of incorporation and then using the series of coefficients to draw inferences. The results are included in the state-average category. Again, the coefficients on Law are significantly negative. This is strengthened by the fact that where no law was passed, the coefficient on Law is zero. In fact 24 of the 52 coefficients are zero while only 3 (7) are positive in the first (second) specification.²⁴

As a further check, I examine the average coefficient on Law if I set it equal to the intercept when no law was passed. This strengthens my findings. Additionally, I rerun all results using only firms

²³ Forcing managers to hold cash may be in shareholders' interests if the alternative is wasting the cash on negative NPV projects. In this respect, the market for corporate control may monitor cash by discouraging managers from wasting it. However, Harford (1999) indicates that management will eventually spend the cash on poor acquisitions, so it is unclear whether the threat of takeover is enough to prevent managers from wasting the cash. I thank the referee for this insight.

²⁴ There are more than 50 data points since Washington, D.C., US territories, and foreign countries are included in the Compustat incorporation code. The results are no different if I eliminate the territories and foreign country codes from the sample.

incorporated in Delaware and then all firms except those in Delaware. In each case, cash significantly decreases after the laws are enacted. Garvey and Hanka (1998) argue that laws passed before 1987 were unenforceable and exclude them. When I do this, my results remain unchanged.

Since the regression includes yearly dummy variables, the results can not be driven by macroeconomic changes, but there is another potential interpretation of the negative coefficient on Law. Although the takeover law is mainly exogenous, it is possible that the laws are passed when the local economy is performing poorly. As such, I may find cash decreasing after laws are enacted due to poorer operating performance of firms covered by the laws. However, the regressions in Table 8 control for spending (capital expenditures and R&D) and operating performance (cash flow); thus, if laws are enacted when state economies are slowing, the coefficient on Law should be unaffected. In addition, the results are unchanged using only firms incorporated in Delaware; but, many of those firms are not geographically located in that state and thus should not be affected by a local economic slowdown. It does not seem that my results are explained by business cycles.

Another possible reason for the negative coefficients on Law is that firms in states which were not covered by laws increased their cash holdings around the time the laws went into effect. Thus, the result may not be driven by covered firms decreasing their cash. To test this I examine several specifications looking only at firms in states where laws were eventually passed. The results (available upon request) show that this concern is unwarranted. Firms in states where laws were passed decreased their cash significantly after the passage of the anti-takeover laws.

The evidence shows that when a firm became covered by a business combination law it reduced its cash. This is inconsistent with the hypothesis that entrenched management increases cash holdings for

discretionary purposes. However, this is not to say that entrenchment did not occur. Rather, it supports the idea that the laws entrenched management. The fact that managers held less cash indicates they believed the probability of takeover was lower. The reduction in cash implies that an active market for corporate control may actually lead to larger cash holdings.

5.2 Increases in Probability from Industry Shocks

The previous section demonstrates that cash holdings decrease when takeover probability diminishes. Although this suggests that firms use cash as a takeover deterrent, the inference would be strengthened if firms increase their cash when takeovers are more likely. Again, the difficulty is finding a way to measure an exogenous increase in takeover probability. Mitchell and Mulherin (1996) demonstrate that takeovers cluster in time and industry and argue that takeovers may be driven by industry shocks. Thus, another way to examine whether firms use cash as a deterrent is to analyze the cash holdings of firms in an industry where a such a shock occurred.

I use two digit SIC codes for industries and assume the shock occurs in the quarter of the first hostile takeover attempt of a firm in the industry. Each quarter, I calculate the (excess) cash to assets of the median firm in each industry and refer to this as the industry cash holdings. All firms which were hostile targets are excluded so that the industry medians are comprised only of non-targets. I then examine the change in the industry cash holdings around the quarter of the shock.

During my sample, 36 industries experience a takeover shock. Figure 1 depicts the mean change in cash holdings of the 36 industries. The initial hostile announcement occurs at sometime during period 1. Prior to the shock, industry cash holdings vary by fewer than 20 basis points; however, in period 1, the

mean increase in industry cash is nearly 80 basis points. This magnitude is considerable because the average level is only 5.2% of total assets. The excess cash results are similar. In the quarter of the shock, excess cash increases by 43 to 86 basis points. These changes represent an increase in industry excess cash of 60 to 86% from the prior quarter.

The increase in cash holdings by non-target firms indicates that when takeover probability increases, firms hoard cash as a defense. The figure is consistent with firms stocking a “war chest” to defend themselves from a potential bid. The results in Figure 1 also eliminate the concern that prior results are driven by endogeneity. Rather, it appears that cash can be a takeover deterrent.

6. Conclusions

This paper provides evidence that, contrary to conventional wisdom, the market for corporate control does not effectively monitor a firm’s cash holdings. Using logistic regressions, I document that the levels of both cash and excess cash significantly decrease the probability that a firm will be acquired by reducing the chances of being targeted in the first place. The results imply that managers might hold cash to entrench themselves.

I find that bid premiums are not increasing in cash holdings, instead, they appear to be lower for cash rich firms. Thus, shareholders appear to derive no benefit from cash holdings since the firm receives takeover bids less frequently and does not obtain higher returns when a bid materializes.

I also examine the impact of antitakeover legislation on corporate cash holdings, and find that after business combination laws go into effect, firms hold significantly less cash than they did before the law was enacted. Finally, firms boost their cash when takeover probability increases. The results support the

argument that the takeover market does not monitor cash holdings.

These findings make the results in Harford (1999) quite concerning. Harford shows that cash rich firms tend to make value decreasing acquisitions. Thus, governance mechanisms should attempt to eliminate the cash from their control. However, the results of this paper indicate that the market for corporate control is ineffective in this regard.

Future research should examine other measures of managerial entrenchment. If cash is an entrenchment device, we may see more entrenched management holding less cash. For instance, how do cash holdings change with managerial ownership? Do firms with outsider dominated boards hold more cash? Can institutional ownership monitor the cash holdings of a firm? In addition, it would be interesting to examine the time series of cash as a manager remains in his position. Perhaps older, tenured managers hold less cash than younger, newer ones.

Finally, a theoretical model of bidding is needed which addresses the problems of valuing assets which can be easily disposed. The fact that bid premiums appear to be lower for cash rich firms suggests that this may be a consideration for bidders. Once a suitable model is created, it will allow for richer tests and insight into the unique nature of cash holdings.

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Table 1
Summary Statistics of Quarterly Data

Cash is defined as cash plus marketable securities. Excess cash to assets (Excash) is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). NWC is defined as (current assets - current liabilities - cash), thus net working capital is measured net of cash. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to market is defined as book assets / (book assets - book equity + market equity). Leverage is (long term debt + short term debt) / equity. ROE is return on equity and measured as (net income / stockholders equity). Sales growth is measured on a year to year basis as $(sales_t - sales_{t-4}) / (sales_{t-4})$. Prior Returns is the compounded raw returns for the previous 12 months. Hostile targets are all firm quarters of exchange-listed firms before they were targets of a hostile takeover. Control sample is all firm quarters of exchange-listed firms which were not hostile targets during the sample period. The number of observations appears in brackets under the means. Differences of means are tested using a t-test while differences in medians are tested with a Wilcoxon z-test.

Variable	Hostile Targets			Control Sample			t-stat.	z-stat
	Mean	Median	Std. Dev	Mean	Median	Std. Dev	(p-value)	(p-value)
Panel A: Cash variables								
Cash / Assets	0.0739 [2,550]	0.0367	0.0960	0.0997 [62,912]	0.0472	0.1333	9.67 (0.0000)	6.14 (0.0000)
Excash / Assets 5	0.0359 [2,550]	0.0026	0.0948	0.0573 [62,912]	0.0075	0.1308	8.17 (0.0000)	2.94 (0.0033)
Excash / Assets 2	0.0222 [2,310]	-0.0004	0.0680	0.0364 [50,356]	0.0033	0.0975	6.93 (0.0000)	4.22 (0.0000)
Excash / Assets 1	0.0251 [1,869]	0.0017	0.0671	0.0360 [39,503]	0.0036	0.0957	4.84 (0.0000)	2.01 (0.0441)
Cash Flow / Assets	0.0187 [2,051]	0.0199	0.0195	0.0167 [48,257]	0.0200	0.0343	-2.61 (0.0092)	0.83 (0.4048)
NWC / Assets	0.1462 [2,503]	0.1311	0.1635	0.1523 [59,813]	0.1423	0.1838	1.64 (0.1014)	0.98 (0.3280)
Panel B: Control Variables								
Size	771.1 [2,550]	301.7	1167.7	827.1 [62,888]	119.0	2743.6	1.03 (0.3045)	-21.62 (0.0000)
Book / Market	0.8396 [2,543]	0.8352	0.2255	0.7878 [61,743]	0.8005	0.2880	-8.95 (0.0000)	-8.88 (0.0000)
ROE	0.0117 [2,547]	0.0218	0.1656	-0.0021 [62,835]	0.0251	0.2025	-3.40 (0.0007)	2.43 (0.0153)
Sales Growth	0.0848 [2,546]	0.0500	0.4966	0.1674 [62,313]	0.0703	0.7149	5.78 (0.0000)	8.02 (0.0000)
Prior Returns	0.1747 [2,550]	0.1382	0.4345	0.1457 [62,912]	0.0801	0.4890	-2.95 (0.0032)	-6.21 (0.0000)
Leverage	1.1682 [2,378]	0.6799	1.9927	1.2266 [54,874]	0.6262	2.3857	1.18 (0.2395)	-4.26 (0.0000)

Table 2
Correlation Table

The table presents the simple pair wise correlations among the variables. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). NWC is net working capital defined without cash. Thus, NWC is (current assets - current liabilities - cash and marketable securities). Prior Returns is the compounded raw return from the previous 12 months. Cash is defined as cash plus marketable securities. Excash is a measure of excess cash to assets using the residual from first pass regressions predicting cash to assets (see Appendix for first pass regressions). The number in parentheses is the p-value for a test that the correlation equals zero.

	ROE	Sales Growth	NWC / Assets	Debt / Equity	Book / Market	Size	Cash flow / Assets	Prior Returns	Cash / Assets	Excash5 / Assets	Excash2 / Assets
ROE											
Sales Growth	0.0383 (0.0000)										
NWC / assets	0.1281 (0.0000)	-0.0330 (0.0000)									
Debt / Equity	-0.3082 (0.0000)	0.0092 (0.0280)	-0.2036 (0.0000)								
Book / Market	-0.0604 (0.0000)	-0.1338 (0.0000)	0.0672 (0.0000)	0.0638 (0.0000)							
Size	0.0437 (0.0000)	-0.0353 (0.0000)	-0.1635 (0.0000)	-0.0527 (0.0000)	-0.0247 (0.0000)						
Cash flow / Assets	0.4507 (0.0000)	0.0085 (0.0571)	0.0951 (0.0000)	-0.1452 (0.0000)	-0.1518 (0.0000)	0.0735 (0.0000)					
Prior Returns	0.1491 (0.0000)	0.1578 (0.0000)	0.0262 (0.0000)	-0.0628 (0.0000)	-0.3548 (0.0000)	0.0130 (0.0009)	0.1662 (0.0001)				
Cash / Assets	0.0069 (0.0789)	0.0741 (0.0000)	-0.1606 (0.0000)	-0.1076 (0.0000)	-0.2088 (0.0000)	-0.0646 (0.0000)	-0.1808 (0.0000)	0.0696 (0.0000)			
Excash5 / Assets	0.0206 (0.0000)	0.0658 (0.0000)	-0.1816 (0.0000)	-0.1083 (0.0004)	-0.2120 (0.0000)	-0.0300 (0.0000)	-0.1594 (0.0005)	0.0705 (0.0000)	0.9953 (0.0000)		
Excash2 / Assets	0.0483 (0.0000)	0.0313 (0.0000)	-0.0729 (0.0000)	-0.0181 (0.0004)	-0.0851 (0.0000)	-0.0561 (0.0000)	-0.0171 (0.0005)	0.0373 (0.0000)	0.8860 (0.0000)	0.8883 (0.0000)	
Excash1 / Assets	0.0392 (0.0000)	0.0294 (0.0000)	-0.0793 (0.0000)	-0.0174 (0.0004)	-0.0803 (0.0000)	-0.0582 (0.0000)	-0.0239 (0.0001)	0.0371 (0.0000)	0.8823 (0.0000)	0.8836 (0.0000)	0.9957 (0.0000)

Table 3

Logistic regressions determining likelihood of hostile acquisition

The dependent variable is set equal to 1 if a successful hostile takeover is announced for a firm in a given quarter and set to 0 otherwise. A takeover is determined to be successful if the firm is eventually acquired even if by other than the hostile bidder. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998) where a takeover attempt is hostile if SDC reports is as such. The control sample includes all exchange listed firm quarters from 1985-1994. All specifications include annual dummies as well as dummies for three of the four quarters to account for seasonality. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). NWC is net working capital defined without cash. Thus, NWC is (current assets - current liabilities - cash and marketable securities). Prior returns is the compounded raw return from the previous 12 months. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Takeovers in the last row gives the number of successful hostile takeovers in the regression. In Panel B, High BM is a dummy variable which equals one if the firm is in the highest quartile of book to market of all firms for that quarter. Panels C and D replicate the earlier panels except that the takeover is defined to be successful only if the hostile bidder acquires control.

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0008 (0.16)	-0.0001 (-0.01)	-0.0006 (-0.10)	-0.0027 (-0.43)	-0.0065 (-1.07)	-0.0067 (-1.13)	-0.0074 (-1.20)	-0.0073 (-1.18)
Sales growth	-0.0025 (-1.29)	-0.0025 (-1.32)	-0.0020 (-1.07)	-0.0012 (-0.74)	-0.0015 (-0.83)	-0.0015 (-0.86)	-0.0014 (-0.80)	-0.0014 (-0.80)
Debt / Equity	-0.0012 (-1.22)	-0.0011 (-1.21)	-0.0017 (-1.56)	-0.0022 (-1.50)	-0.0020 (-1.44)	-0.0018 (-1.41)	-0.0022 (-1.48)	-0.0022 (-1.48)
Book to Market	0.6237 (1.96)	0.6885 (2.20)	0.7670 (2.32)	0.4440 (1.18)	0.6851 (1.80)	0.7213 (1.88)	0.6895 (1.78)	0.6802 (1.75)
Size	-0.0001 (-1.87)	-0.0001 (-2.30)	-0.0001 (-1.81)	-0.0001 (-2.39)	-0.0001 (-2.54)	-0.0001 (-2.65)	-0.0001 (-2.59)	-0.0001 (-2.60)
Prior Returns	0.0022 (0.99)	0.0022 (0.96)	0.0024 (1.04)	-0.0008 (-0.33)	-0.0010 (-0.44)	-0.0011 (-0.45)	-0.0011 (-0.47)	-0.0011 (-0.46)
Cash flow / Assets					0.0961 (2.00)	0.0920 (1.88)	0.0945 (1.95)	0.0938 (1.94)
NWC / Assets					-0.0046 (-0.73)	-0.0021 (-0.34)	-0.0060 (-0.95)	-0.0059 (-0.94)
Cash / Assets	-0.0230 (-2.22)				-0.0200 (-1.63)			
Positive Excess Cash 5 / Assets		-0.0408 (-2.77)				-0.0326 (-2.03)		
Negative Excess Cash 5 / Assets		0.1834 (2.47)				0.1458 (1.81)		
Positive Excess Cash 2 / Assets			-0.0345 (-2.25)				-0.0297 (-1.74)	
Negative Excess Cash 2 / Assets			0.1106 (1.52)				0.0980 (1.31)	
Positive Excess Cash 1 / Assets				-0.0291 (-1.88)				-0.0300 (-1.79)
Negative Excess Cash 1 / Assets				0.0991 (1.17)				0.1092 (1.31)
N	50,623	50,623	47,501	37,099	37,445	37,445	37,099	37,099
Pseudo R ²	5.64%	6.05%	5.70%	6.68%	6.86%	7.11%	6.96%	6.96%
Takeovers	91	91	89	73	73	73	73	73

Panel B:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0009 (0.17)	-0.0001 (-0.01)	-0.0007 (-0.12)	-0.0028 (-0.45)	-0.0069 (-1.11)	-0.0072 (-1.18)	-0.0078 (-1.23)	-0.0077 (-1.22)
Sales growth	-0.0026 (-1.28)	-0.0026 (-1.30)	-0.0021 (-1.06)	-0.0012 (-0.72)	-0.0015 (-0.81)	-0.0015 (-0.84)	-0.0015 (-0.80)	-0.0015 (-0.79)
Debt / Equity	-0.0012 (-1.24)	-0.0012 (-1.28)	-0.0018 (-1.60)	-0.0023 (-1.53)	-0.0021 (-1.48)	-0.0019 (-1.47)	-0.0023 (-1.51)	-0.0023 (-1.51)
Book to Market	1.2065 (3.20)	1.5628 (4.11)	1.3461 (3.05)	0.9037 (1.80)	1.2826 (2.86)	1.5161 (3.22)	1.1619 (2.32)	1.1676 (2.34)
Size	-0.0001 (-1.90)	-0.0001 (-2.35)	-0.0001 (-1.89)	-0.0001 (-2.41)	-0.0001 (-2.55)	-0.0001 (-2.65)	-0.0001 (-2.63)	-0.0001 (-2.63)
Prior Returns	0.0024 (1.07)	0.0022 (0.95)	0.0026 (1.08)	-0.0006 (-0.28)	-0.0009 (-0.38)	-0.0011 (-0.45)	-0.0010 (-0.42)	-0.0010 (-0.42)
Cash flow / Assets					0.1002 (2.08)	0.0960 (1.94)	0.0976 (2.00)	0.0970 (1.99)
NWC / Assets					-0.0051 (-0.81)	-0.0021 (-0.32)	-0.0065 (-1.03)	-0.0064 (-1.02)
Cash / Assets	-0.0117 (-1.15)				-0.0086 (-0.72)			
High BM * Cash / Assets	-0.0760 (-1.74)				-0.0793 (-1.57)			
Positive Excess Cash 5 / Assets		-0.0251 (-1.77)				-0.0180 (-1.14)		
High BM * Positive Excess Cash 5		-0.1054 (-1.86)				-0.0973 (-1.53)		
Negative Excess Cash 5 / Assets		0.0998 (1.22)				0.0790 (0.88)		
High BM * Negative Excess Cash 5		0.3465 (2.14)				0.2753 (1.66)		
Positive Excess Cash 2 / Assets			-0.0218 (-1.45)				-0.0178 (-1.07)	
High BM * Positive Excess Cash 2			-0.0796 (-1.42)				-0.0800 (-1.25)	
Negative Excess Cash 2 / Assets			0.0703 (1.11)				0.0776 (1.14)	
High BM * Negative Excess Cash 2			0.1835 (0.83)				0.1011 (0.50)	
Positive Excess Cash 1 / Assets				-0.0179 (-1.20)				-0.0180 (-1.11)
High BM * Positive Excess Cash 1				-0.0754 (-1.22)				-0.0815 (-1.26)
Negative Excess Cash 1 / Assets				0.0755 (1.00)				0.0866 (1.14)
High BM * Negative Excess Cash 1				0.1137 (0.79)				0.1155 (0.50)
N	50,623	50,623	47,501	37,099	37,445	37,445	37,099	37,099
Pseudo R ²	5.97%	6.69%	5.96%	6.87%	7.21%	7.60%	7.17%	7.19%
Takeovers	91	91	89	73	73	73	73	73

Panel C:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0020 (0.23)	0.0005 (0.06)	0.0019 (0.22)	-0.0029 (-0.37)	-0.0086 (-1.43)	-0.0087 (-1.46)	-0.0091 (-1.49)	-0.0090 (-1.48)
Sales growth	-0.0051 (-2.23)	-0.0051 (-2.26)	-0.0051 (-2.17)	-0.0037 (-1.93)	-0.0051 (-2.24)	-0.0051 (-2.23)	-0.0052 (-2.23)	-0.0052 (-2.22)
Debt / Equity	-0.0022 (-1.12)	-0.0020 (-1.11)	-0.0019 (-0.99)	-0.0025 (-0.90)	-0.0023 (-0.86)	-0.0020 (-0.83)	-0.0025 (-0.87)	-0.0025 (-0.87)
Book to Market	0.0129 (0.03)	0.1101 (0.25)	0.1039 (0.22)	-0.0534 (-0.10)	0.5024 (0.91)	0.5534 (0.99)	0.5040 (0.89)	0.4955 (0.88)
Size	-0.0000 (-1.11)	-0.0001 (-1.63)	-0.0000 (-1.12)	-0.0001 (-1.52)	-0.0001 (-1.74)	-0.0002 (-1.87)	-0.0001 (-1.79)	-0.0001 (-1.79)
Prior Returns	-0.0008 (-0.33)	-0.0009 (-0.34)	-0.0008 (-0.29)	-0.0029 (-0.98)	-0.0034 (-1.10)	-0.0035 (-1.12)	-0.0035 (-1.13)	-0.0034 (-1.12)
Cash flow / Assets					0.2022 (3.39)	0.1976 (3.21)	0.2002 (3.27)	0.1999 (3.27)
NWC / Assets					-0.0114 (-1.38)	-0.0080 (-0.92)	-0.0128 (-1.54)	-0.0128 (-1.55)
Cash / Assets	-0.0358 (-2.56)				-0.0266 (-1.68)			
Positive Excess Cash 5 / Assets		-0.0749 (-3.08)				-0.0596 (-2.37)		
Negative Excess Cash 5 / Assets		0.3201 (3.08)				0.2948 (2.49)		
Positive Excess Cash 2 / Assets			-0.0562 (-2.47)				-0.0419 (-1.85)	
Negative Excess Cash 2 / Assets			0.0998 (0.96)				0.0808 (0.80)	
Positive Excess Cash 1 / Assets				-0.0392 (-1.97)				-0.0422 (-1.89)
Negative Excess Cash 1 / Assets				0.0664 (0.57)				0.0916 (0.81)
N	45,207	45,207	42,449	32,954	33,263	33,263	32,954	32,954
Pseudo R ²	4.38%	5.52%	4.34%	5.52%	6.64%	7.59%	6.73%	6.75%
Takeovers	48	48	48	39	39	39	39	39

Panel D:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0022 (0.24)	0.0005 (0.06)	0.0021 (0.23)	-0.0027 (-0.34)	-0.0089 (-1.47)	-0.0092 (-1.51)	-0.0095 (-1.53)	-0.0093 (-1.51)
Sales growth	-0.0052 (-2.22)	-0.0052 (-2.24)	-0.0051 (-2.14)	-0.0036 (-1.92)	-0.0052 (-2.22)	-0.0051 (-2.18)	-0.0052 (-2.20)	-0.0051 (-2.19)
Debt / Equity	-0.0024 (-1.14)	-0.0021 (-1.14)	-0.0019 (-1.00)	-0.0024 (-0.90)	-0.0024 (-0.88)	-0.0020 (-0.85)	-0.0025 (-0.89)	-0.0025 (-0.89)
Book to Market	0.6903 (1.14)	0.7602 (1.38)	0.1547 (0.27)	-0.1916 (-0.32)	1.0907 (1.73)	0.9894 (1.61)	0.4101 (0.72)	0.4338 (0.75)
Size	-0.0000 (-1.14)	-0.0001 (-1.63)	-0.0000 (-1.06)	-0.0001 (-1.43)	-0.0001 (-1.75)	-0.0002 (-1.85)	-0.0001 (-1.71)	-0.0001 (-1.71)
Prior Returns	-0.0007 (-0.25)	-0.0008 (-0.30)	-0.0007 (-0.25)	-0.0029 (-0.96)	-0.0033 (-1.06)	-0.0034 (-1.08)	-0.0034 (-1.12)	-0.0034 (-1.11)
Cash flow / Assets					0.2060 (3.52)	0.2007 (3.31)	0.2012 (3.36)	0.2011 (3.35)
NWC / Assets					-0.0119 (-1.44)	-0.0083 (-0.95)	-0.0129 (-1.56)	-0.0129 (-1.57)
Cash / Assets	-0.0233 (-1.75)				-0.0149 (-0.98)			
High BM * Cash / Assets	-0.1117 (-1.28)				-0.0873 (-1.18)			
Positive Excess Cash 5 / Assets		-0.0582 (-2.58)				-0.0464 (-1.92)		
High BM * Positive Excess Cash 5		-0.1573 (-1.09)				-0.1235 (-0.95)		
Negative Excess Cash 5 / Assets		0.2959 (2.38)				0.3147 (2.09)		
High BM * Negative Excess Cash 5		0.1507 (0.74)				0.0106 (0.05)		
Positive Excess Cash 2 / Assets			-0.0474 (-2.16)				-0.0359 (-1.61)	
High BM * Positive Excess Cash 2			-0.0878 (-0.84)				-0.0682 (-0.73)	
Negative Excess Cash 2 / Assets			0.1426 (1.44)				0.1458 (1.38)	
High BM * Negative Excess Cash 2			-0.1063 (-0.53)				-0.1496 (-0.94)	
Positive Excess Cash 1 / Assets				-0.0345 (-1.75)				-0.0356 (-1.63)
High BM * Positive Excess Cash 1				-0.0566 (-0.65)				-0.0706 (-0.74)
Negative Excess Cash 1 / Assets				0.1393 (1.17)				0.1626 (1.39)
High BM * Negative Excess Cash 1				-0.1849 (-0.96)				-0.1677 (-0.90)
N	45,207	45,207	42,449	32,954	33,263	33,263	32,954	32,954
Pseudo R ²	4.79%	5.90%	4.56%	5.81%	6.98%	7.88%	7.03%	7.05%
Takeovers	48	48	48	39	39	39	39	39

Table 4

Logistic regressions determining likelihood of being targeted

The dependent variable is set equal to 1 if a hostile takeover attempt is announced for a firm in a given quarter and set to 0 otherwise. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998). A takeover attempt is defined as hostile if SDC reports it as such. The control sample includes all exchange listed firm quarters from 1985-1994. All specifications include annual dummies as well as dummies for three of the four quarters to account for seasonality. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). NWC is net working capital defined without cash. Thus, NWC is (current assets - current liabilities - cash and marketable securities). Prior returns is the compounded raw return from the previous 12 months. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Takeovers in the last row gives the number of takeover attempts in the regression. In Panel B, High BM is a dummy variable which equals one if the firm is in the highest quartile of book to market of all firms for that quarter.

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0057 (0.73)	0.0049 (0.64)	0.0056 (0.71)	0.0048 (0.45)	0.0008 (0.07)	0.0005 (0.04)	0.0003 (0.02)	0.0004 (0.03)
Sales growth	-0.0055 (-1.92)	-0.0054 (-1.94)	-0.0051 (-1.77)	-0.0030 (-1.28)	-0.0034 (-1.36)	-0.0034 (-1.38)	-0.0034 (-1.34)	-0.0034 (-1.34)
Debt / Equity	-0.0014 (-1.62)	-0.0013 (-1.60)	-0.0015 (-1.79)	-0.0016 (-1.60)	-0.0017 (-1.62)	-0.0015 (-1.57)	-0.0016 (-1.58)	-0.0017 (-1.59)
Book to Market	0.8394 (2.85)	0.8903 (3.08)	1.0255 (3.43)	0.8664 (2.39)	1.0347 (2.80)	1.0640 (2.88)	1.0694 (2.87)	1.0630 (2.85)
Size	-0.0000 (-1.36)	-0.0000 (-1.76)	-0.0000 (-1.32)	-0.0000 (-2.37)	-0.0001 (-2.67)	-0.0001 (-2.73)	-0.0001 (-2.71)	-0.0001 (-2.71)
Prior Returns	0.0048 (2.57)	0.0048 (2.55)	0.0051 (2.66)	0.0030 (1.41)	0.0028 (1.31)	0.0028 (1.29)	0.0028 (1.28)	0.0028 (1.28)
Cash flow / Assets					0.0828 (1.70)	0.0813 (1.66)	0.0825 (1.69)	0.0822 (1.69)
NWC / Assets					-0.0067 (-1.25)	-0.0050 (-0.91)	-0.0068 (-1.24)	-0.0068 (-1.25)
Cash / Assets	-0.0301 (-3.03)				-0.0257 (-2.29)			
Positive Excess Cash 5 / Assets		-0.0426 (-3.30)				-0.0322 (-2.45)		
Negative Excess Cash 5 / Assets		0.1228 (2.12)				0.0829 (1.28)		
Positive Excess Cash 2 / Assets			-0.0317 (-2.58)				-0.0287 (-2.09)	
Negative Excess Cash 2 / Assets			0.0216 (0.50)				0.0458 (0.84)	
Positive Excess Cash 1 / Assets				-0.0270 (-2.18)				-0.0289 (-2.15)
Negative Excess Cash 1 / Assets				0.0362 (0.61)				0.0494 (0.83)
N	55,950	55,950	52,455	41,219	41,613	41,613	41,219	41,219
Pseudo R ²	7.95%	8.09%	7.76%	8.04%	8.36%	8.38%	8.28%	8.29%
Takeovers	130	130	128	103	103	103	103	103

Panel B:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0059 (0.74)	0.0049 (0.64)	0.0056 (0.71)	0.0049 (0.45)	0.0007 (0.06)	0.0003 (0.03)	0.0003 (0.02)	0.0003 (0.03)
Sales growth	-0.0056 (-1.93)	-0.0056 (-1.97)	-0.0052 (-1.78)	-0.0030 (-1.28)	-0.0034 (-1.36)	-0.0035 (-1.39)	-0.0034 (-1.34)	-0.0034 (-1.34)
Debt / Equity	-0.0015 (-1.64)	-0.0014 (-1.65)	-0.0016 (-1.81)	-0.0016 (-1.61)	-0.0017 (-1.64)	-0.0016 (-1.61)	-0.0017 (-1.59)	-0.0017 (-1.60)
Book to Market	1.1689 (3.35)	1.5061 (4.47)	1.3071 (3.86)	0.9815 (2.44)	1.2838 (3.07)	1.5452 (3.68)	1.1704 (2.90)	1.1955 (2.94)
Size	-0.0000 (-1.38)	-0.0000 (-1.79)	-0.0000 (-1.36)	-0.0001 (-2.33)	-0.0001 (-2.67)	-0.0001 (-2.74)	-0.0001 (-2.67)	-0.0001 (-2.68)
Prior Returns	0.0049 (2.65)	0.0048 (2.51)	0.0051 (2.70)	0.0030 (1.44)	0.0029 (1.34)	0.0027 (1.26)	0.0028 (1.30)	0.0028 (1.30)
Cash flow / Assets					0.0840 (1.72)	0.0829 (1.68)	0.0832 (1.71)	0.0829 (1.70)
NWC / Assets					-0.0069 (-1.29)	-0.0048 (-0.88)	-0.0069 (-1.26)	-0.0069 (-1.27)
Cash / Assets	-0.0220 (-2.06)				-0.0192 (-1.57)			
High BM * Cash / Assets	-0.0395 (-1.36)				-0.0292 (-0.97)			
Positive Excess Cash 5 / Assets		-0.0304 (-2.25)				-0.0231 (-1.59)		
High BM * Positive Excess Cash 5		-0.0559 (-1.50)				-0.0358 (-1.02)		
Negative Excess Cash 5 / Assets		0.0484 (0.73)				0.0224 (0.30)		
High BM * Negative Excess Cash 5		0.2545 (2.32)				0.1982 (1.67)		
Positive Excess Cash 2 / Assets			-0.0240 (-1.79)				-0.0237 (-1.55)	
High BM * Positive Excess Cash 2			-0.0351 (-1.05)				-0.0217 (-0.65)	
Negative Excess Cash 2 / Assets			0.0035 (0.09)				0.0458 (0.88)	
High BM * Negative Excess Cash 2			0.0712 (0.60)				0.0030 (0.02)	
Positive Excess Cash 1 / Assets				-0.0224 (-1.62)				-0.0236 (-1.58)
High BM * Positive Excess Cash 1				-0.0202 (-0.62)				-0.0230 (-0.68)
Negative Excess Cash 1 / Assets				0.0329 (0.59)				0.0455 (0.80)
High BM * Negative Excess Cash 1				0.0131 (0.09)				0.0162 (0.12)
N	55,950	55,950	52,455	41,219	41,613	41,613	41,219	41,219
Pseudo R ²	8.06%	8.44%	7.83%	8.06%	8.43%	8.60%	8.30%	8.32%
Takeovers	130	130	128	103	103	103	103	103

Table 5
Bootstrap Results

A simulation is conducted where a random sample of control firms is selected (with replacement) and then a logistic regression is run using the specification $\text{Target} = f(\text{ROE, sales growth, leverage, book-to-market ratio, firm size, prior returns, measure of cash})$. The specifications are similar to those in columns (1)-(4) of Table 3. 1000 replications of the regression are run and the distribution of simulated coefficients is retained. The column Full Sample includes the coefficient from the large sample tests, the t-statistic, in parentheses, and the corresponding p-value, in brackets. The column Simulation contains the mean of the distribution of 1000 replications of the coefficient. The median of the distribution is displayed in braces, while the empirical p-value is enclosed in brackets. The empirical p-value contains the percentage of replications where the coefficient is positive. The column Confidence Interval gives the 90% confidence interval calculated empirically from the 1000 replications. The top number represents the 5th percentile of the distribution of coefficients while the bottom number is the 95th percentile. The fourth column contains the number of observations used in each trial. The top number represents the number of hostile takeover attempts, the middle number is the mean of the distribution of control firms from the 1000 replications. The final number in the column, shown in braces, is the median of the number of control firms used in the 1000 replications. The final column shows the percentage of replication coefficients which are less than the coefficient obtained in the large sample tests (shown in the first column). Panel A shows the results using the firms which were targets of hostile takeovers, without regard to the outcome of the attempt and corresponds to Table 4. Panel B shows results from takeovers which were successful, even if the hostile bidder did not acquire control and corresponds to Table 3 Panel A. Panel C shows results using only those firm which were successfully acquired by the hostile bidder and corresponds to Panel C of Table 3.

Panel A: All Targets	Full Sample	Simulation	Confidence Interval	Number of Observations	Coefficient p-value
Cash / Assets	-0.0301 (-3.03) [0.002]	-0.0263 {-0.0267} [0.013]	-0.0422 -0.0087	130 133.50 {134}	0.366
Positive Excess Cash 5 / Assets	-0.0426 (-3.30) [0.001]	-0.0368 {-0.0375} [0.005]	-0.0581 -0.0142	130 138.42 {139}	0.364
Positive Excess Cash 2 / Assets	-0.0317 (-2.58) [0.010]	-0.0274 {-0.0288} [0.056]	-0.0517 0.0015	128 128.41 {128}	0.419
Positive Excess Cash 1 / Assets	-0.0270 (-2.18) [0.029]	-0.0220 {-0.0244} [0.151]	-0.0551 0.0188	103 80.49 {81}	0.444

Panel B: Completed	Full Sample	Simulation	Confidence Interval	Number of Observations	Coefficient p-value
Cash / Assets	-0.0230 (-2.22) [0.026]	-0.0197 {-0.0205} [0.072]	-0.0392 0.0033	91 93.24 {93}	0.427
Positive Excess Cash 5 / Assets	-0.0408 (-2.77) [0.006]	-0.0372 {-0.0385} [0.025]	-0.0619 -0.0065	91 96.49 {97}	0.427
Positive Excess Cash 2 / Assets	-0.0345 (-2.25) [0.025]	-0.0307 {-0.0316} [0.055]	-0.0580 0.0010	89 89.02 {89}	0.426
Positive Excess Cash 1 / Assets	-0.0291 (-1.88) [0.060]	-0.0251 {-0.0277} [0.134]	-0.0635 0.0217	73 57.33 {57}	0.467

Panel C: Hostile Success	Full Sample	Simulation	Confidence Interval	Number of Observations	Coefficient p-value
Cash / Assets	-0.0358 (-2.56) [0.010]	-0.0358 {-0.0369} [0.069]	-0.0748 0.0055	48 48.73 {49}	0.522
Positive Excess Cash 5 / Assets	-0.0749 (-3.08) [0.002]	-0.0860 {-0.0852} [0.003]	-0.1334 -0.0390	48 51.11 {51}	0.662
Positive Excess Cash 2 / Assets	-0.0562 (-2.47) [0.014]	-0.0583 {-0.0594} [0.040]	-0.1059 -0.0047	48 48.09 {48}	0.549
Positive Excess Cash 1 / Assets	-0.0392 (-1.97) [0.049]	-0.0357 {-0.0431} [0.179]	-0.1012 0.0588	39 30.21 {30}	0.546

Table 6

Logistic regressions determining likelihood of takeover completion

In Panel A, the dependent variable is set equal to 1 if an announced hostile takeover is eventually completed without regard to the identity of the winner and set to 0 otherwise. In Panel B, the dependent variable is set to 1 if the hostile bidder acquires control and 0 otherwise. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998). A takeover attempt is defined as hostile if SDC reports it as such. Pill equals one if the target had a pill in place and zero otherwise. Cash offer equals one if the bid was for all cash, and zero otherwise. Tender offer equals one if the bid was made as a tender offer, and zero otherwise. Auction equals one if there were multiple bidders for the firm, and zero otherwise. Toehold equals the percentage of shares that the bidder owns in the target as of the date the bid is announced. Premium is the highest premium offered for the target by the hostile acquirer measured relative to the target's stock price 20 trading days before the announcement of the first bid. Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see Table 1 for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Completed in the last row gives the number of takeovers completed in the regression.

	Panel A: Completion without regard to winner				Panel B: Completion if the hostile bidder wins			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pill	-0.2914 (-0.55)	-0.5147 (-0.93)	-0.4498 (-0.78)	-0.1874 (-0.32)	0.3048 (0.46)	0.0904 (0.13)	0.2987 (0.42)	0.5123 (0.51)
Cash Offer	-0.2294 (-0.38)	-0.1469 (-0.26)	-0.3847 (-0.60)	-0.5226 (-0.72)	0.2580 (0.46)	0.4945 (0.79)	0.1141 (0.19)	-0.4016 (-0.53)
Tender Offer	2.8598 (4.77)	2.9016 (4.76)	2.7762 (4.54)	2.8791 (4.41)	4.9193 (5.14)	5.0471 (5.10)	4.7685 (5.14)	5.7037 (4.47)
Auction	-0.1243 (-0.25)	-0.1021 (-0.21)	-0.1548 (-0.30)	0.3400 (0.57)	-4.6740 (-4.94)	-4.9342 (-5.01)	-4.9189 (-5.21)	-5.5481 (-4.37)
Toehold	-0.0317 (-1.05)	-0.0254 (-0.87)	-0.0367 (-1.24)	-0.0418 (-1.27)	-0.1665 (-2.68)	-0.1644 (-2.47)	-0.1673 (-2.71)	-0.1510 (-2.21)
Premium	1.1802 (1.56)	1.3457 (1.83)	1.1593 (1.43)	1.2110 (1.40)	1.9488 (2.11)	2.3131 (1.99)	2.4276 (2.05)	4.4604 (2.22)
Cash / Assets	-0.0277 (-1.11)				-0.0044 (-0.17)			
Positive Excess Cash 5 / Assets		-0.0735 (-1.79)				-0.0888 (-1.83)		
Negative Excess Cash 5 / Assets		0.3089 (2.11)				0.7616 (2.54)		
Positive Excess Cash 2 / Assets			-0.0350 (-0.59)				-0.0206 (-0.42)	
Negative Excess Cash 2 / Assets			0.3163 (2.37)				0.3355 (2.04)	
Positive Excess Cash 1 / Assets				-0.0301 (-0.42)				0.0110 (0.24)
Negative Excess Cash 1 / Assets				0.2990 (2.04)				0.4233 (2.09)
N	135	135	124	99	135	135	124	99
Pseudo R ²	29.56%	31.69%	30.87%	31.15%	54.83%	59.23%	56.01%	62.30%
Completed	92	92	88	72	50	50	48	39

Table 7
Determinants of Bid Premiums

The dependent variable is bid premium which is defined as the premium of the bid price over the stock price of the target firm 20 trading days before the date of the announcement of a hostile takeover. When hostile premium is indicated, it means that I use the bid premium offered by the hostile bidder, otherwise I use the highest bid premium received by the firm in the control contest. For the hostile bidder premium, the price that the bidder is willing to pay is the highest price they offered for the target during the control contest, and thus accounts for bid revisions. All specifications include dummies for each year as well as dummies for three of the four calendar quarters to account for seasonality. Pill is a dummy variable which equals one if the firm had a poison pill in place and zero otherwise. Auction is a dummy variable which equals one if there were multiple bidders and zero otherwise. Cash offer is a dummy which equals one if the bid is all cash and zero otherwise. Tender offer is a dummy variable which equals one if the deal is a tender offer and zero otherwise. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see Table 1 for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Cash / assets is $(\text{cash} + \text{marketable securities}) / \text{total assets}$. Leverage is defined as $(\text{long-term} + \text{short-term debt}) / \text{total assets}$. Book to Market is defined as $\text{book assets} / (\text{book assets} - \text{book equity} + \text{market equity})$. Toehold equals the percentage of shares that the bidder owns in the target as of the date the bid is announced. The t-statistics are calculated using White's (1980) correction.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pill	0.0304 (0.46)	-0.0376 (-0.46)	0.0430 (0.56)	-0.0089 (-0.11)	0.0355 (0.51)	-0.0311 (-0.37)	0.0488 (0.61)	0.0902 (1.31)
Auction	-0.0162 (-0.26)	0.1180 (1.95)	-0.0167 (-0.27)	0.1171 (1.95)	0.0034 (0.06)	0.1381 (2.35)	0.0683 (0.93)	0.1912 (2.85)
Cash Offer	-0.0209 (-0.31)	0.0562 (0.82)	-0.0248 (-0.37)	0.0479 (0.68)	-0.0170 (-0.25)	0.0608 (0.88)	-0.0500 (-0.71)	0.0264 (0.38)
Tender Offer	0.0892 (1.22)	0.1153 (1.65)	0.0878 (1.20)	0.1127 (1.62)	0.0918 (1.23)	0.1195 (1.68)	0.0501 (0.59)	0.0554 (0.68)
Leverage	0.0021 (1.02)	0.0024 (1.17)	0.0020 (0.97)	0.0022 (1.06)	0.0022 (0.81)	0.0024 (0.90)	0.0008 (0.22)	0.0012 (0.32)
Book to Market	0.1919 (1.23)	0.3544 (2.10)	0.1819 (1.20)	0.3337 (1.98)	0.1535 (1.01)	0.3148 (1.90)	0.1873 (1.20)	0.2166 (1.36)
Toehold	-0.0139 (-2.80)	-0.0159 (-2.95)	-0.0143 (-2.77)	-0.0166 (-3.08)	-0.0137 (-2.63)	-0.0157 (-2.80)	-0.0135 (-2.00)	-0.0154 (-2.18)
Cash / Assets	-0.0034 (-0.75)	-0.0013 (-0.27)						
Positive Excess Cash 5 / Assets			-0.0017 (-0.26)	0.0031 (0.48)				
Negative Excess Cash 5 / Assets			-0.0118 (-0.41)	-0.0252 (-0.95)				
Positive Excess Cash 2 / Assets					-0.0051 (-0.80)	-0.0023 (-0.33)		
Negative Excess Cash 2 / Assets					0.0033 (0.16)	0.0022 (0.12)		
Positive Excess Cash 1 / Assets							-0.0042 (-0.66)	-0.0042 (-0.60)
Negative Excess Cash 1 / Assets							-0.0050 (-0.20)	0.0004 (0.02)
N	126	126	126	126	124	124	99	99
Adjusted R ²	27.59%	33.98%	27.64%	34.61%	29.96%	36.42%	34.98%	40.43%
Hostile premium	yes	no	yes	no	yes	no	yes	no

Table 8

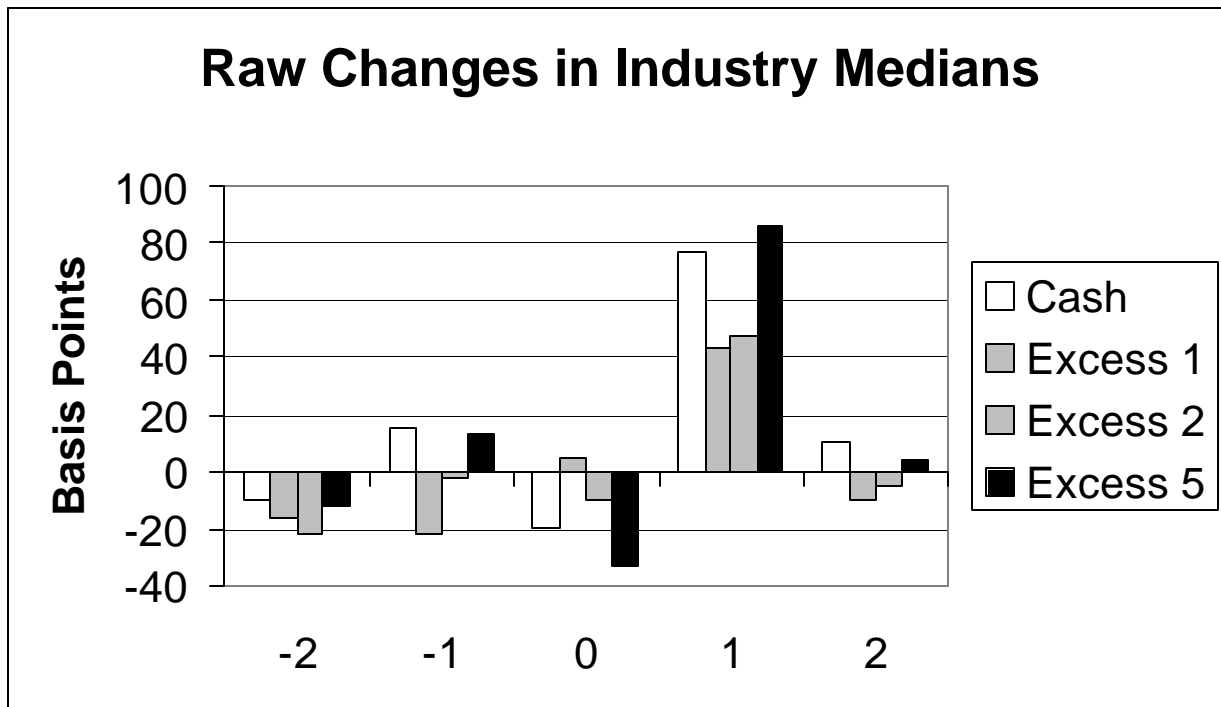
Effect of Anti-Takeover Laws on Cash Holdings

The dependent variable is the natural logarithm of cash / assets. Annual data is used from 1971-1994. The fixed effects regression is run with firm specific dummy variables. The industry-adjusted regression is run with dummies for each industry, defined by 2 digit SIC code. State average means that a pooled time-series cross-sectional regression is run for each location of incorporation and then the inferences are obtained using the average of the coefficients. Market to book is defined as $(\text{book assets} - \text{book equity} + \text{market equity}) / \text{book assets}$. Real size is the natural logarithm of real assets where real assets are deflated into 1994 dollars using the CPI. Cash flow is defined as $(\text{earnings before interest and taxes} + \text{depreciation and amortization} - \text{interest} - \text{taxes} - \text{common dividends})$. NWC is calculated without cash, thus it is $(\text{current assets} - \text{current liabilities} - \text{cash and marketable securities})$. Total leverage is long term plus short term debt divided by total assets. Industry Sigma is the mean of the standard deviations of cash flow / $(\text{assets} - \text{cash})$ over 20 years for firms in the same industry defined by 2 digit SIC codes. Dividend dummy is a variable set to 1 if a firm paid a dividend and 0 otherwise. Regulation dummy is a variable set to 1 if the firm is in a regulated industry in that year and 0 otherwise. Law is a dummy variable which equals one if the firm is incorporated in a state with a business combination law during or after the year that the law took effect. When time dummies is yes, it indicates that the regression is run with annual dummy variables to control for macroeconomic factors. White's correction for heteroscedasticity is used to calculate the t-statistics.

	Fixed Effects		Industry Adjusted		OLS		State Average	
Market to Book	0.0908 (17.15)	0.1116 (20.39)	0.1253 (28.08)	0.1898 (40.24)	0.1310 (29.63)	0.1971 (42.03)	0.0489 (1.08)	0.1320 (3.39)
Real Size	-0.0280 (-3.20)	-0.1290 (-14.97)	-0.0288 (-10.26)	-0.0618 (-23.00)	-0.0358 (-13.11)	-0.0686 (-26.64)	-0.1674 (-2.80)	-0.2195 (-3.81)
Cash flow / assets	0.4866 (9.54)	0.9459 (19.21)	0.5559 (13.32)	1.0994 (26.80)	0.6185 (14.97)	1.1505 (28.45)	0.6276 (2.23)	1.9641 (6.57)
NWC / assets	-1.3479 (-34.76)	-0.5824 (-15.53)	-1.4786 (-46.33)	-0.5528 (-16.98)	-1.4812 (-54.51)	-0.5447 (-20.93)	-1.5959 (-5.85)	-0.8502 (-2.69)
Capex / assets	-1.2763 (-17.99)		-1.7270 (-24.61)		-1.8837 (-27.76)		-2.1089 (-4.67)	
Leverage	-2.2735 (-61.55)		-2.7915 (-101.90)		-2.7588 (-102.98)		-2.9106 (-16.18)	
Industry Sigma	0.4676 (4.77)	0.4838 (4.77)	0.7734 (8.08)	1.0849 (10.46)	0.9747 (13.76)	1.4770 (19.43)	-0.4868 (-1.14)	-0.3294 (-0.55)
R&D / Sales	0.7845 (9.47)	1.0293 (12.61)	1.2867 (18.91)	1.8337 (25.88)	1.3715 (20.16)	1.9445 (27.14)	-2.7274 (-0.59)	-2.3531 (-0.52)
Dividend Dummy	0.0478 (3.65)		-0.0827 (-8.03)		-0.0939 (-9.35)		0.0793 (1.01)	
Regulation Dummy	-0.1125 (-2.28)	-0.2137 (-4.26)	-0.2861 (-5.15)	-0.3220 (-5.76)	-0.1449 (-3.39)	-0.3263 (-7.72)	-0.1488 (-1.60)	-0.2104 (-2.22)
Law	-0.0710 (-3.66)	-0.0913 (-4.53)	-0.0069 (-0.41)	-0.0598 (-3.27)	0.0118 (0.69)	-0.0410 (-2.22)	-0.1905 (-3.59)	-0.1672 (-3.02)
N	87,117	87,853	87,117	87,853	87,117	87,853	52	52
Adj. R ²	0.5667	0.5245	0.2431	0.1064	0.2278	0.0878	0.3739	0.2329
Time Dummies	yes	yes	yes	yes	yes	yes	no	no

Figure 1
 Changes in Industry Cash Holdings when Takeover Probability Increases

The figure shows the average changes in industry median cash holdings around a industry shock. The shock is defined as the first hostile takeover attempt in a 2 digit SIC code industry. The change in the cash holdings of the median non-target firm is calculated for each quarter around the shock. The graph shows the average change (in basis points) across 36 industries which experienced a shock during the 1985-1994 period. The initial takeover announcement (the shock) occurs at sometime during period 1.



Appendix

Determinants of cash holdings

OPSW develop a model for cash holdings so that they can determine levels of excess cash. I use three variations of their specification here, except that I use quarterly instead of annual data. In addition, because my data start in 1985, I omit the regulation dummy which would always be zero. Also, they deflate by (assets-cash) which they call net assets, while I deflate all variables by assets. Table A1 shows the results of these specifications with the natural log of cash divided by assets as the dependent variable. Although I conduct most of the analysis with six measures of excess cash, for the sake of brevity, I only report three.

Since the t-statistics are likely overstated in any pooled time-series cross section regression, I run all the models using the method of Fama and MacBeth (1973) where I run a cross sectional regression each quarter and examine the time series of coefficients. This also has the benefit of mitigating serial correlation in the excess cash measures which is important given that OPSW (1999) demonstrate that excess cash levels tend to be persistent.

The inferences of the full model (excess cash 1) are substantially similar to that obtained in OPSW using annual data (see their Table 5) and explains roughly 18% of the variation. One difference is that capital expenditures are negatively related to cash on a quarterly basis while it is insignificantly positive on an annual basis. Since the calculation of cash flow is missing for many firm quarters, I rerun the results omitting the cash flow variable (excess cash 2). Finally, I calculate a measure of excess cash using only firm size and cash flow volatility (excess cash 5) which allows me to calculate a measure of excess cash for each observation. I use the three models to determine excess cash on a quarterly basis which I define to

be the difference between actual cash / assets and that predicted by the models.

Table A1: Determinants of Cash /Assets

The dependent variable is the natural logarithm of cash / assets. Quarterly data is used from 1985-1994. A cross-sectional regression is run each quarter and the time series of coefficients are used to get the mean and t-statistic. Market to book is defined as (book assets - book equity + market equity)/ book assets. Real size is the natural logarithm of real assets where real assets are deflated into 1994 dollars using the CPI. Cash flow is defined as (earnings before interest and taxes + depreciation and amortization - interest - taxes - common dividends). NWC is defined as (current assets - current liabilities - cash), thus net working capital is measured net of cash. Total leverage is long term plus short term debt divided by total assets. Industry Sigma is the mean of the standard deviations of cash flow / assets over 20 quarters for firms in the same industry defined by 2 digit SIC codes. When R&D expense is listed as missing it is assigned the value of zero. Dividend dummy is a variable set to 1 if a firm paid a dividend and 0 otherwise.

Variable	Excess Cash 5	Excess Cash 2	Excess Cash 1
Real Size	-0.1318 (-48.01)	0.0067 (2.69)	-0.0054 (-1.51)
Industry Sigma	0.5240 (4.23)	0.4078 (3.53)	0.3799 (3.79)
Market to Book		0.1451 (34.36)	0.1571 (36.40)
NWC / Assets		-1.4769 (-42.54)	-1.4335 (-35.20)
Capex / Assets		-0.9231 (-8.66)	-0.8108 (-6.88)
Total leverage		-2.8929 (-114.72)	-2.5926 (-112.51)
R&D/Sales		0.4186 (8.04)	0.4766 (7.64)
Dividend Dummy		-0.3489 (-32.05)	-0.3053 (-32.69)
Cash Flow / Assets			0.5286 (3.39)
N	40	40	40
Adjusted R ²	3.91%	21.25%	18.36%