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Institutional Holdings and Payout Policy

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ABSTRACT

We examine the relation between institutional holdings and payout policy in U.S. public firms. We find that payout policy affects institutional holdings. Institutions avoid firms that do not pay dividends. However, among dividend-paying firms they prefer firms that pay fewer dividends. Our evidence indicates that institutions prefer firms that repurchase shares, and regular repurchasers over nonregular repurchasers. Higher institutional holdings or a concentration of holdings do not cause firms to increase their dividends, their repurchases, or their total payout. Our results do not support models that predict that high dividends attract institutional clientele, or models that predict that institutions cause firms to increase payout.

INSTITUTIONAL INVESTORS ARE ONE OF THE MAJOR INVESTOR GROUPS in the United States. In 1996, institutions held more than 50% of the equity of U.S. industrial firms, compared to around 35% a decade earlier. There is a trend toward more institutional holdings in both small and large firms.

How institutional investors affect corporate financial policies and, consequently, corporate value, is an important question that receives more attention these days from both academics and practitioners. In this paper, we investigate one aspect of this question, the relation between institutional ownership and payout policy. We derive implications of theories that relate a firm's payout policy to investors' characteristics and test these hypotheses on a large data set of institutional holdings and corporate payouts between 1980 and 1996.

Corporate theories suggest several reasons why ownership structure and payout policies might be related. First, agency theories suggest that with lower monitoring costs, managers are likely to share more of the profits with the investors. Jensen (1986) argues that with enhanced monitoring, firms are more likely to pay out their free cash flow. Assuming that institutions are better monitors, these theories imply that larger institutional holdings will lead to higher payouts (holding all else constant).

Second, Allen, Bernardo, and Welch (2000) argue that to increase value, firms want institutions to monitor or to facilitate takeovers. Institutions prefer

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dividends because of common institutional charter and prudent-man rule restrictions, and because of the comparative tax advantages that some institutions have for dividends. Thus, the second implication is that higher dividends will lead to larger institutional holdings.

Third, adverse selection problems might lead uninformed investors to prefer dividends over repurchases (Barclay and Smith (1988), Brennan and Thakor (1990)). Large, informed shareholders do not face this problem. They prefer stock repurchases, the least costly payout for them. Since institutions are likely to be more informed, the theory implies that they prefer firms that pay out in the form of repurchases rather than in the form of dividends.

Using annual data on dividends, repurchases, and institutional holdings during the period 1980 to 1996, we provide a number of new results on the relation between institutional holdings and payout policy, and, by implication, on the validity of some of the payout theories mentioned above.

First, we find that when comparing dividend-paying firms to non-dividend-paying firms, there is clear evidence that institutions prefer dividend-paying firms, even after holding constant size, risk, market-to-book ratio, and a host of other variables.

Our second finding is that institutions do not show any preference for firms that pay high dividends. Regardless of size or the market-to-book ratio category, institutions do not have a preference for firms that pay high dividend. In fact, we find some evidence that institutions prefer low-dividend stocks to high-dividend stocks. We further examine the relation between dividends and institutional holdings using a vector autoregression specification to control for autocorrelations and time trends, and we find a similar result: Firms that increase their dividends do not attract more institutional holdings. This result also holds for the different groups of institutions. Despite a potentially larger tax advantage and/or prudent-man rule restrictions, pension funds and bank trusts do not show preference for high dividends. Thus, there is no evidence to support the notion that higher dividends lead to higher ownership by institutions, as some of the theories suggest. Interestingly, these results are consistent with managements' perception regarding the impact of payout policy on investors' clientele. Brav et al. (2005) report that managers believe that individuals are more attracted to dividend increases than institutional investors are.

Third, we find that institutions prefer firms that repurchase shares. Our evidence indicates that institutional ownership is higher for repurchasing firms relative to non-repurchasing firms. However, unlike the evidence on dividends, we find that firms that repurchase more (relative to either their market value, their book value of assets, or their earnings), as well as firms that repurchase regularly, have higher institutional ownership. The evidence indicates that when firms change their repurchase policy, the institutional holding changes in the same direction.

We also find a time trend in institutions' preference for dividend-paying firms and repurchasing firms. Before the enactment of SEC rule 10b-18 in the mid-1980s, which enabled firms to more freely repurchase their shares, institutions

as a whole preferred firms that paid more dividends.[1] However, since the mid-1980s, institutions' preference for dividends has changed, and shows an aversion to high dividends. At the same time, they show a preference for firms that repurchase their shares. Thus, with no real choice to make over the form of payout, institutions chose to hold high dividend stock. Once the "safe harbor" rule was adopted and firms were able to choose between repurchases and dividends, institutions chose firms that repurchased more and paid fewer dividends. This result supports the notion that the relation between institutions and dividends is not mostly due to the strong time trend of decrease in dividend payouts (e.g., Fama and French (2001) and Grullon and Michaely (2002)) in conjunction with the strong time trend of increase in institutional holdings.

Fourth, when investigating whether institutions affect payout policy, we find that institutional ownership and a concentration of ownership do not cause firms to increase payout. We use the VAR methodology offered by Holtz-Eakin, Newey, and Rosen (1988) to disentangle the causality effect between institutional holdings and payout. We do not find evidence that an increase in institutional ownership or in ownership concentration leads to either future increases in dividends, repurchases, or total payout.

Finally, despite their potential monitoring role (Carleton, Nelson, and Weisbach (1998), Gillan and Starks (2000)), pension funds do not behave differently from other institutions with respect to payout policy: Larger holdings by pension funds do not cause firms to increase payout.

Does this evidence support any of the theories? On one hand, the positive relation between repurchases and institutional holdings is consistent with the agency theories (e.g., Jensen (1986)) and with the adverse selection theory of Brennan and Thakor (1990) and Barclay and Smith (1988). On the other hand, the data do not support other aspects of these theories. For example, we do not find that institutional holdings affect repurchase policy (one prediction of the adverse selection theory), but that repurchase policy affects institutions. There is also no evidence that firms that are likely to suffer from asymmetric information (i.e., smaller size firms and high market-to-book firms) show a stronger relation between repurchases and institutional holdings than do firms that are less likely to suffer from asymmetric information, although one could argue that institutions might have more incentives to invest resources to become informed in larger firms. Neither do we find a significant association between these variables in firms with more free cash flow problems (agency).

Prior empirical works examine aspects of the relation between institutions and dividend policy. Michaely, Thaler, and Womack (1995) investigate the share of institutional ownership around 182 dividend omissions. They do not find a significant change in ownership after the omission. However, Brav and Heaton (1998) find a drop in institutional ownership around dividend omissions after the ERISA regulations took effect in 1974. Binay (2001) examines both initiations and omissions. He reports a significant drop in institutional ownership

[1] See Grullon and Michaely (2002) for an analysis of the impact of Rule 10b-18 on the substitution between dividends and repurchases.

after omissions and an increase in institutional ownership after initiations. Amihud and Li (2002) look at the relation between price reaction to dividend announcements and institutional holdings. Their findings support the argument that institutions are more informed than other investors.

Del Guercio (1996) examines the role of dividends in the portfolio selection of institutions. After controlling for several other factors, such as market capitalization, liquidity, risk, and S&P ranking, she finds that dividend yield has no power in explaining banks' portfolio choice and is actually a negative indicator in mutual funds' portfolio choice. Overall, her evidence indicates that the prudent-man rule has an important role, but that dividends do not play a major role in it. Hotchkiss and Lawrence (2003) report that dividends are a part of institutions' investment style. They find that as dividend yield increases, a higher portion of the stocks is held by institutions whose portfolio consists of high yield firms.[2]

Several recent papers focus on tax-based institutional clientele effects. Perez-Gonzalez (2000) looks at changes in firms' dividend policy as a result of tax reforms. He finds that dividend policy is affected to a much greater degree by the tax reform when the largest shareholder is an individual than it is when the largest shareholder is an institution or when there is no large shareholder. Jain (1999) examines the existence of a tax-based clientele and reports that institutions prefer to invest in low-dividend-yield stocks. He concludes that his findings are not consistent with the tax-based dividend clientele hypothesis. On the other hand, Strickland (1996) examines clientele within institutional holdings, and reports that taxable institutional owners prefer low-dividend-yield stocks, but tax-exempt investors do not show a preference for either high- or low-yield stocks. He interprets his findings as consistent with the existence of tax induced dividend clienteles.

Unlike these papers, which focus mainly on the tax clientele aspect, our paper takes a broader approach both theoretically and empirically. Theoretically, we consider other aspects, such as the potential effect of institutional monitoring on payout. Empirically, we consider both the effect of institutional holdings on the different forms of payout and the effect of different forms of payout on institutional holdings.

The paper is organized as follows. In the next section, we derive our hypotheses. In Section II, we describe the data and our variables. In Section III, we test the relation between dividend policy and institutional holdings, and in Section IV we test the relation between repurchase policy and institutional holdings. Section V tests the relation between total payout and institutional holdings. Section VI concludes.

[2] The results of Hotchkiss and Lawrence (2003), Amihud and Li (2002), and Hotchkiss and Strickland (2003) are all consistent with the idea that shareholder composition influences prices and volume behavior around corporate information events, such as earnings and dividends. Graham and Kumar (2004) look at dividend preferences of a group of retail investors, which are in a way the complement of institutional investors in the market. They find that retail investors in general do not prefer dividends, but that those who hold dividends prefer larger dividends.

I. Payout and Institutions—Hypotheses

There are several important ways in which institutions differ from individual investors. In general, institutions manage large pools of funds and, therefore, invest larger amounts in each stock. Because they have larger amounts at stake, they should have incentives to devote resources to monitoring (see, e.g., Grossman and Hart (1980) and Shleifer and Vishny (1986) for the effect of investment size on monitoring incentives). They also have several coordination mechanisms to increase their effectiveness in monitoring, even if they do not hold very large block of shares in the corporation.[3]

Institutions are also likely to be better informed than are individual investors. Not only do institutions devote resources to gathering information, but they are also sometimes privy to corporate information that individual investors do not have (see, e.g., Michaely and Shaw (1994)). In fact, one of the justifications for introducing the recent "Fair Disclosure" regulation (FD) is that it will "end the special access to companies, long enjoyed by industry analysts and institutional investors" (*Financial Times*, Nov 11, 2000). Based on these unique features of institutions, many finance and economics studies have assumed that institutions are better at monitoring and in gathering information.

Institutions have two other notable features that distinguish them from individual investors: taxes, and regulations. Some institutional investors are taxed differently. For example, pension funds, university endowment funds, and not-for-profit institutions do not pay taxes on their capital gains or dividends. This feature might create a tax-based institutional clientele.

Second, unlike most individual investors, institutions are fiduciaries. They invest on behalf of others and are, therefore, subject to agency conflicts. As a result, they are constrained by several rules aimed at preventing them from speculating with other peoples' money. For example, those institutions governed by "prudent-man" rules invest a larger proportion of their holdings in "prudent" stocks. Age, lengthy and stable dividends and earnings records, and high external validation have been used as indicators of prudence (see, e.g., Del Guercio (1996)).

The combination of institutions' better monitoring and information gathering abilities and the advantages some forms of payouts offer institutions (taxes, prudent man) have led some researchers to suggest an interaction between corporate payout policy and institutional holdings.

General agency models, such as the costly state verification model (e.g., Townsend (1979)), suggest that lower monitoring costs imply higher payout. Although the optimal contract in many of these models resembles debt (see Diamond (1984) and Gale and Hellwig (1985)), the positive relation between payout and monitoring costs generally holds.

[3] Recent papers such as Gillan and Starks (2000), Hartzell and Starks (2003), and Carleton et al. (1998) provide supporting evidence to the monitoring role of institutions, although the extent and effectiveness of institutional monitoring is still debatable (Roe (1997)). Allen et al. (2000) note several companies (Institutional Shareholders Services, Investor Responsibility Research Center, Proxy Monitor), which coordinate institutional voting.

Jensen's (1986) free cash flow hypothesis implies a similar relation between the cost of disciplining the manager and managerial propensity to pay cash to investors. Jensen also suggests that such agency conflicts are likely to occur in firms with low growth opportunities and large amounts of cash.

Assuming that institutions are better monitors and that their monitoring capabilities and incentives increase with the total stake they hold, there should be a positive relation between firms' payout and total institutional holdings. If coordination mechanisms across institutions are less than perfect, then concentration of ownership might be a better measure of their ability and incentives to monitor. Therefore, we include both measures in our empirical tests.

In addition, empirical evidence (e.g., Gillan and Starks (2000)) suggests that pension funds are more likely to monitor than are other types of institutions. Thus, we consider the possibility that pension funds have a stronger impact on dividend level. We summarize the predictions of the general agency models in H1.

H1: *All else equal, firms with greater institutional holdings or greater concentration of institutional holdings will pay out more cash (either through dividends or through repurchases). We expect this relation to be stronger when pension funds are the institutional holders.*

Our second hypothesis relates dividends to institutional holdings. Adapting Shleifer and Vishny's (1986) argument that firms that want to attract a particular clientele can do so by altering their payout policy, Allen et al. (2000) theorize that firms pay dividends to attract institutions. According to Allen et al., firms want to attract institutions to increase value, which can stem from the institutions' ability to monitor or to facilitate takeovers.

In Allen et al. (2000), institutions prefer dividends for two reasons. First, institutions are less likely to be sued by investors if their portfolios consist of firms that pay more dividends, since the court considers these firms more prudent investments. Second, institutions are taxed less heavily on dividends. Dividends attract more institutions because of the institutions' relative tax advantage.

We note that just like the theory, some of our empirical tests assume that institutions, regardless of their type, have a better ability to monitor and to gather information. Moreover, since the majority of institutions are subject to either some prudent-man rules and/or have a relative tax advantage for dividends, the association between payout policies and institutional holdings suggested by the theory should hold for all institutional types, at least to some extent. Nevertheless, given the tax code and the extent to which prudent-man rules hold for the various institutions' type, theories based on prudent-man rules and tax advantages are more likely to hold for pension funds and bank trusts (Del Guercio (1996)). These institutions are more likely to be attracted to dividends because of their relative tax advantage (pension funds) and stricter prudent-man rules (pension funds and bank trusts). Therefore, we test separately the

relation between holdings by the different institutional groups and payout policy.

Hypothesis 2 summarizes the predictions of Allen et al. (2000):

H2: *All else equal, firms that pay larger dividends will attract more institutional investors. We expect the relation to be stronger in pension funds and bank trusts.*

Allen et al. (2000) offer a second explanation for the relation between institutional holdings and payout policy. In this explanation, based on asymmetric information, undervalued firms that want to signal their worth wish to attract institutions because institutions are better at assessing the firm's true worth. These firms will pay dividends because dividends attract institutions for the same tax and prudent-man reasons we noted before. Allen et al. predict that higher dividends should attract more institutional investors, which is similar to hypothesis H2. However, since the explanation relies on a signaling argument, it is more likely to hold for firms that operate in an environment where asymmetric information is likely to be a significant problem.

Brennan and Thakor (1990) and Barclay and Smith (1988) offer a different explanation for the choice of payout policy. They point to the disadvantage that stock repurchases have for uninformed investors. Such investors are likely to lose if they tender their shares when informed investors are in the market, since informed investors are more likely to sell when the stock is overvalued. Therefore, if the adverse selection costs associated with repurchases are severe enough to outweigh the tax advantage of repurchases, then uninformed investors will prefer dividends to repurchases.

Despite their tax disadvantage, dividends do not entail an information disadvantage because they are paid pro rata. Informed investors do not suffer from the adverse selection problem. They will prefer stock repurchases, the tax-efficient payout. Since institutions are likely to be better informed, the theory implies that firms with larger institutional ownership are likely to use repurchases as the method of payment to shareholders. We summarize this prediction in H3.

H3: *All else equal, firms with greater institutional holdings will subsequently repurchase more shares. We expect this relation to be stronger for firms that are prone to asymmetric-information problem.*

In our hypotheses, we derive predictions not only about the correlation between payout policy and institutional holdings, but also about the causal relation between the two. Allen et al. (2000) assume that firms first commit to a payout policy and that institutional investors who observe this commitment decide on their investment policy. On the other hand, both agency and adverse-selection theories assume that institutional ownership is exogenously given and that increased institutional ownership influences future payout policy. The

general agency theories, such as Jensen (1986), imply that firms with larger institutional ownership will subsequently pay more cash, either in the form of repurchases or in the form of dividends, especially if these firms are more likely to suffer from agency problems. The adverse-selection theory (Brennan and Thakor (1990)) implies that firms with larger institutional holdings will shift their payout policy toward repurchases.

The causal relation between the endogenous variables seems to be an integral part of these models. In fact, equilibrium in these models might not hold if the decisions (payout policy and institutional investment) are determined simultaneously because either the firm or the investors will prefer to deviate from the equilibrium. For example, in the Allen et al. (2000) model, it is crucial that firms commit to dividend payout and that investors observe the payout level before they trade. A static equilibrium in which firms decide to pay dividends and institutions simultaneously decide to buy the firms' shares will not hold because firms will prefer to deviate, by not paying costly dividends.

With this intuition in mind, we look both at the relation between current payout and future holdings, and between current holdings and future payout.

II. Data Description and Definition of Variables

A. Data

Our institutional holdings data consist of end-of-year total institutional stock holdings for every publicly traded U.S. firm between 1980 and 1996. We obtain the data from Thomson Financial (previously known as CDA Spectrum), which gathers the information from institutional 13F SEC filings. Institutions that file 13F are bank trusts, insurance companies, investment companies (mutual funds), investment advisors (most of the large brokerage firms), and "others" (pension funds and endowments). Only institutions with holdings of $100 million or more under management must file. The filings are submitted quarterly and include institutional holdings in every U.S. firm, as long as the holdings are more than $200,000 or 10,000 shares.[4]

We match the institutional-holding data with the CRSP and Compustat databases. We exclude financial companies and utilities from the sample. Our final sample consists of 79,010 firm years.

Table I presents summary statistics of institutional holdings for every size quintile and over the years. In each year, we sort firms according to their market capitalization and group them into size quintiles. We then group all firm-years within each quintile over the entire sample period and over three time periods: 1980–1985, 1986–1990, and 1991–1996. We calculate median and mean (both equal weighted and value weighted) institutional holdings for each group.

Two patterns appear in the data. The first pattern is that institutional ownership increases over the years from value-weighted mean holdings of 38.79%

[4] There might be some large shareholders that are not institutions, which might interact with payout policy. However, our data are limited to 13F filing institutions.

Table I
Institutional Ownership—Summary Statistics

This table reports information on aggregate institutional holdings across different firm size groups. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. The data consist of end-of-year total institutional stock holdings for every publicly held U.S. firm between 1980 and 1996. We calculate size quintiles annually, based on end-of-year market capitalization, as provided by CRSP. We do not include financial companies and utility companies in the sample.

				Full Sample			1980–1985			1986–1990			1991–1996		
Market Cap Quintile	Average Market Cap ($M)	Median Market Cap ($M)	No. of observations	Median Institutional Holdings	Mean Institutional Holdings	Mean Institutional Holdings (Value Weighted)	Median Institutional Holdings	Mean Institutional Holdings	Mean Institutional Holdings (Value Weighted)	Median Institutional Holdings	Mean Institutional Holdings	Mean Institutional Holdings (Value Weighted)	Median Institutional Holdings	Mean Institutional Holdings	Mean Institutional Holdings (Value Weighted)
Lowest	6	4	15,802	0.50	6.11	7.09	0.00	2.99	3.17	0.65	4.71	5.18	2.04	9.76	9.23
2	20	16	15,802	4.77	10.23	13.54	0.84	4.48	5.11	4.31	8.55	9.14	10.72	16.25	17.96
3	55	46	15,802	14.06	19.04	23.29	5.94	10.64	12.18	13.56	17.17	18.07	24.60	27.40	28.96
4	169	145	15,802	27.30	30.58	35.78	16.74	19.86	22.47	27.27	29.20	30.88	39.60	40.53	42.43
Highest	2421	859	15,802	47.66	45.62	50.21	37.95	36.58	40.91	47.05	44.18	47.97	57.78	54.24	54.63
All	534	46	79,010	13.76	22.32	48.51	6.28	14.91	38.79	13.02	20.77	46.44	22.77	29.64	53.00

in the earlier period (1980–1985) to 53% in the later period (1991–1996). The second pattern is that institutional holdings are concentrated in large firms. In fact, in the lowest quintile, mean institutional holdings are only 7.09% compared with 50.21% holdings in the highest quintile. These findings are similar to the findings of Gompers and Metrick (2001).

B. Definition of Variables

Following Benartzi, Michaely, and Thaler (1997), we define the annual dividend ($Div(t)$), as four times the last quarterly dividend paid in year t. We normalize the dividend by book assets instead of price, to ensure that our results are not driven by price variation.[5]

We use repurchases to book assets to measure firms' repurchase activity. We define repurchase as the dollar amount of stock and preferred stock that the firm bought during its fiscal year, as reported in the statement of cash flow (Compustat item 115), divided by the book value of assets at the end of the year. The dollar repurchase has a drawback. It includes repurchases not only of common stocks, but also of other types of stocks, such as preferred stocks. However, repurchases of securities other than common stocks represent only a very small portion of firms' repurchase activity (see Stephens and Weisbach (1998) and Grullon and Michaely (2002)).

To measure changes in repurchases, we use the dollar amount of repurchases in year t minus the dollar amount of repurchases in year $t - 1$, divided by the book value of assets at the end of year t. (As with the dividend measure, we repeat our experiments with denominators other than book value of assets, such as dollar repurchased to market cap, dollar repurchased to earnings before interests, taxes, depreciation and amortization, and dollar repurchased to net earnings.) We define total payout as the sum of repurchases and dividends.

We use two measures of institutional holdings. The first measure is total ownership of all institutions as a percentage of firms' total shares outstanding, and the second is the sum of the five largest institutional holdings as a percentage of the firms' total shares outstanding. The second measure better captures concentration of holdings. It is possible that institutions' ability to monitor and to affect boards' decisions is more closely related to concentration than it is to total holding, for example, because of coordination problems.[6]

The time it takes institutions to respond to changes in payout policy might be different from the time it takes institutions to affect and change firm's payout policy. For example, studies on information dissemination by institutions show that institutions react fast to news and that information in the beginning of a

[5] We replicate our results (both the non-parametric and the regression analysis) using other denominators, such as price, EBITDA, and Net Earnings. We find that these alternative specifications do not alter any of our conclusions.

[6] For robustness purposes, we repeated our tests with another ownership-concentration index, defined as the sum of the squares of the percentage holdings by individual institutions. The results are similar to those obtained with the five largest holdings. Therefore, we do not report them in the paper.

quarter can affect institutional holdings at the end of that quarter (e.g., Sias, Starks, and Titman (2001)). (On the other hand, it might take an institution some time to sell a large portion of its shares if the market is not liquid enough.)

We expect that institutional holdings will have a slower effect on payout policy, since it takes time for institutions to affect a board's decision making. Therefore, our definition of payout at year t is the last payout at year t (based on the last quarterly dividend at year t, or last annual report of repurchase activity that is publicly available at the end of year t) and our definition of institutional holdings at year $t + 1$ is the holdings as of December 31 of year t. Thus, when we test whether payout at year t affects institutional holdings at year $t + 1$, we have a shorter time lag than a year, but we still have payout information preceding institutional holding decisions. Conversely, the effect of institutional holdings at year t on payout at year $t + 1$ would be more than a year, consistent with our expectation of a slower effect of institutional holdings on payout policy. To ensure the robustness of our results to different time intervals, we also use longer time lags and we test whether these lags add to the explanatory power of our results.

We control for differences across firms by using the following exogenous variables: the beta of the stock, market-to-book ratio, industry dummy variables for the one digit SIC codes, log sales (to control for size), and past abnormal returns.[7] Market-to-book ratio is the market value of equity, plus the book value of preferred stocks, plus the book value of total liabilities, minus the book value of deferred taxes, divided by book value of assets. We obtain our data from Compustat, and calculate the ratio at the end of fiscal year t. Log($Sales(t)$) is the natural logarithm of the total sales of the firm at the end of fiscal year t. Past abnormal return is calculated as the company's stock return between January 1 of year t and December 31 of year t, adjusted by the return as given by the CAPM using the company beta (as reported in CRSP); the 10-year treasury bond yield; and the realized return on the S&P 500 index in year t.

III. The Interaction between Dividend Policy and Institutional Holdings

To study whether dividend policy affects institutional holdings, we start with a nonparametric test. We take all firm-years with valid information on their dividend payments and book values (so that we can calculate the dividend to book value ratio), a total of 69,047 firm-years. For every year, we separate the sample into market-cap quintiles.

In our first test, we separate dividend-paying firm-years from non-dividend-paying firm-years in every size quintile, and we calculate mean and median institutional holdings in each of the groups. We present the results in Table II, Panel A.

[7] We also looked at a more refined industry classification (Fama and French (1997)). None of the results in the paper is affected by the classification choice.

Table II

Institutional Ownership and Dividend Payment

The data consist of publicly held U.S. firms between 1980 and 1996 with institutional holdings information and Compustat book value information, except utility and financial companies. We obtain the Institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. In Panel A, firms in each group are divided annually into those that pay dividends and those that do not pay dividends. The statistics in Panel A are for differences in means, medians, and value-weighted means of institutional holdings between the size group that pays dividends and the size group that does not pay dividends. In Panel B, firms that pay dividends are divided annually into three equal groups based on their dividend-to-book ratio. Groups are then aggregated across years and size quintiles. The number of firms in each group is not exactly the same because of rounding error. Statistics in Panel B are for differences in means, medians, and value-weighted means of institutional holdings between the high-dividend and the low-dividend groups. The symbols *,** denote significance at the 5% and 1% levels, respectively.

Panel A: Institutional Holdings (%) in Dividend Paying and Non-dividend Paying Firms

	Non-Paying			Paying			Tests for Differences in Holdings: Paying vs. Non-Paying		
Size Quintile	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	*t*-Test	*t*-Test (Value Weighted)	Wilcoxon Rank Test
				1980–1996					
Lowest	0.68	(6.46)	13,356	4.60	(8.32)	449	0.43	2.83	9.98**
2	5.51	(10.74)	12,218	9.79	(13.48)	1,589	6.57**	7.14**	10.91**
3	14.85	(19.76)	10,883	18.56	(21.83)	2,927	3.88**	5.38**	9.91**
4	26.82	(31.01)	8,585	30.70	(32.60)	5,225	3.94**	3.43	7.97**
Highest	44.48	(43.32)	4,608	49.56	(48.08)	9,208	11.99**	15.31**	10.44**
Total	8.99	(18.09)	49,650	36.29	(36.20)	19,398	46.05**	64.87**	102.86**

(*continued*)

Panel B: Institutional Ownership (%) across Dividend-Paying Firms
(Dividend Yield Is Defined as Dividend Payment over Book Value of Assets)

Size Quintile	Paying-Low Div/Book			Paying-Med. Div/Book			Paying-High Div/Book			Tests for Differences in Holdings between High and Low Groups		
	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	*t*-Test	*t*-Test (Value Weighted)	Wilcoxon Rank Test
					1980–1996							
Lowest	7.05	(12.11)	139	3.92	(6.79)	148	2.57	(6.47)	162	−3.77	−4.15	−2.97
2	9.31	(13.51)	518	10.69	(14.48)	530	9.34	(12.48)	541	−1.23	−2.00	−1.03
3	19.03	(23.09)	965	20.22	(22.97)	975	16.48	(19.46)	987	−4.72	−7.11	−3.12
4	31.64	(33.79)	1,729	32.11	(33.65)	1,743	28.77	(30.38)	1,753	−5.13	−7.18	−4.41
Highest	50.51	(49.13)	3,059	50.76	(49.50)	3,070	47.74	(45.63)	3,079	−7.08	−4.59	−6.45
Total	36.86	(37.39)	6,410	37.79	(37.38)	6,466	34.20	(33.85)	6,522	−8.99	−5.73	−7.95

The data in Panel A indicate that institutions have higher holdings in dividend-paying stocks than in non-dividend-paying stocks. This result is highly significant and holds for every size quintile. To ensure that our results are not driven by a particular time trend, we perform similar tests for three subperiods: 1980–1985, 1986–1990, and 1991–1996. The results of the subperiods are similar to those reported in Panel A.

For every year, and every size quintile, we further divide the dividend payers into three categories: low-, medium-, and high-dividend-to-book firms. We then calculate mean and median end-of-year institutional holdings in each size quintile. We present the results in Table II, Panel B. On average, a firm that belongs to the low-dividend-to-book group does not have lower institutional holdings than does a firm belonging to the high-dividend-to-book group. In fact, our tests of differences in holdings between the two groups suggest that the low-dividend-to-book group has significantly higher mean and median holdings in almost all size quintiles than does the high-dividend-to-book group.

Again, we perform similar tests for three subperiods: 1980–1985, 1986–1990, and 1991–1996. We find that, on average, a firm that belongs to the low-dividend-to-book group does not have lower institutional holdings than a firm belonging to the high-dividend-to-book group in any of the subperiods. After 1986, a significant negative relation seems to appear.[8]

Our main conclusions from Table II are that on average, institutions have higher holdings in dividend-paying firms than in non-dividend-paying firms, even after controlling for size. Furthermore, we conclude that institutions do not have higher holdings in high dividend-paying firms. In fact, we find an opposite trend.

We also look at median and mean holdings for each of the institution types, grouping by market-to-book quintiles, and do not find a positive relation between institutional holdings and dividend-to-book ratios.

By and large, these results do not support the hypothesis that institutions are attracted to high dividend-paying stocks. However, a possible drawback of our analysis is that it does not account for other firm characteristics that affect institutional holdings, characteristics that might be correlated with dividends. For example, the high-dividend group might be composed of relatively stable firms and the low-dividend group might be composed of growth firms. The pattern might be due to these differences.

To account for this potential shortcoming, we perform a regression analysis in which we can hold constant many more of the firm's characteristics.[9] The

[8] Using data from 1990 onward, Hotchkiss and Lawrence (2003) find that institutional ownership is higher in dividend paying firms, consistent with our results. Jain (1999) and Hotchkiss and Lawrence (2003) also fail to find positive relation between dividend yield and institutional holdings.

[9] Although the regression analysis allows us to control for several exogenous variables, it forces us to impose a linear model structure. Also, since the dependent variable is bounded, the regression suffers from a misspecification. We address the misspecification problem by using an inverse logit transformation of the dependent variable. All results stay the same. We include in the paper the regressions with the bounded dependent variable because the coefficients of the explanatory variables in these regressions have a straightforward interpretation.

dependent variable in the regression is institutional holdings (scaled by total number of shares outstanding) at $t + 1$. To allow for the possibility that dividend policy influences pension funds and banks differently (because of relative taxes and prudent-man rules), we also report results for regressions in which the dependent variable is only the holdings of banks and pension funds (scaled by total number of shares). The independent variables are the firm's annual dividend-to-book ratio at the end of year t, the firm's log sales, beta, abnormal past returns, market-to-book value ratio, and its industry affiliation. We use the beta of the stock and log sales to account for risk, market-to-book ratio to account for growth opportunities and potential asymmetric information, and dummy variables for different industry sectors to account for industry preferences. We also account for trends in dividend payouts over time by interacting the dividends with period dummies.

Table III, Panel A presents the results of the regression analysis. In this analysis, to avoid a problem with outliers for these regressions (and for all regressions in this paper), we truncate extreme observations (1% of observations with extreme payout). Column 1 shows that institutions as a whole prefer dividend-paying firms to non-dividend-paying firms. A dividend-paying firm has between 1.75% and 9.5% more institutional holdings (depending on the time period), and the result is significant at the 1% level. The results are similar for the subgroup of bank trusts and pension funds in all periods (column 2) and for the subgroup of mutual funds, investment advisors and insurance companies in 1986–1990 and in 1991–1996 (column 3).

At the same time, we find a time trend in the relation between dividends and institutional holdings. In the years 1980–1985, a higher dividend-to-book ratio is associated with higher institutional holdings. The result is robust for all subgroups. In the subperiods 1986–1990 and 1991–1996, we see a negative association between institutional holdings and dividends. The result is significant at the 1% level for institutions as a whole and for the subgroup of mutual funds, investment advisors, and insurance companies. The negative association between dividends and institutional holdings follows changes in SEC repurchase rules (10b-18) that made it easier for firms to pay a higher portion of their payout through repurchases.

Other characteristics that consistently affect institutional holdings are size, market-to-book ratio, beta, and industry sectors. An increase in log sales by 100% (equivalent to approximately a 2.7-fold increase in sales) is associated with 5.54% increase in institutional holdings. Holding size constant, firms with higher betas also have larger institutional holdings. This result suggests an institutional preference toward corporations with more market risk. An increase of market-to-book ratio by 100% results in an increase in institutional holdings by about 1%, suggesting that institutions prefer firms with growth opportunities.

To further investigate the time pattern of the relation between dividends and institutional holdings and to account for potential biases from autocorrelation of dividends across the years, we repeat the regressions separately for each of

Table III

Effect of Dividends on Institutional Holdings

This table reports estimates of regressions of institutional holdings on dividend payments. Panel A shows estimates of the regression:

$$\begin{aligned} &\textit{Institutional Holdings}\ (t+1) \\ &= a + \sum b_j \textit{Dummy Pay/no Pay dividend}\ (t) \times \textit{Period\_Dummy}_j \\ &\quad + \sum c_j \textit{Dividend-to-Book}\ (t) \times \textit{Period\_Dummy}_j + [\textit{Control Variables}\ (t)], \end{aligned}$$

where *Holdings* $(t+1)$ are institutional stock holdings as of December 31 of year t, as a percentage of shares outstanding. *Dividend-to-Book* is the last quarterly dividend in year t multiplied by 4 and divided by the book value of assets at the end of year t. The control variables are as follows: Log(*Sales*(t)) is the natural log of sales at the end of year t. *Annual adjusted return*(t) is the annual return on the stock in year t minus the beta return of the stock. *Market-to-Book*(t) is the market value of equity plus the book value of preferred dividend plus the book value of total liabilities minus the book value of deferred taxes, divided by book value of assets, all calculated at the end of year t. *Beta* is taken from CRSP. All regressions include dummy variables for the firms' one-digit SIC code, (omitted from the table). Panel B shows estimates of the separate annual regressions. The data consist of all firms with CRSP, Compustat, and institutional holdings information between 1980 and 1996. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. We obtain other firm-specific financial information from the CRSP and the Compustat tapes. We do not include financial or utility companies in the sample. The symbols *,** denote significance at the 5% and 1% levels, respectively.

Panel A: Panel Regression

	Dependent Variable		
Explanatory Variable	1 Holdings $(t+1)$ by by All Types of Institutions	2 Holdings $(t+1)$ by Bank Trusts and Pension Funds	3 Holdings $(t+1)$ by Mutual Funds, Investment Advisors and Insurance Companies
Intercept	−13.67**	−4.01**	−9.67**
	−(55.17)	−(34.58)	−(49.32)
Log (*Sales* (t))	5.54**	1.86**	3.68**
	(132.30)	(94.89)	(111.21)
Annual adjusted return (t)	−0.02	−0.34**	0.31**
	−(0.24)	−(7.43)	(4.09)
Market to book (t)	0.99**	0.36**	0.63**
	(26.32)	(20.22)	(21.32)
Beta	4.79**	0.84**	3.95**
	(42.41)	(15.90)	(44.23)
Dummy Pay/no Pay dividend (t)	**1.75****	**2.51****	**−0.76****
× Dummy 1980–1985	**(4.77)**	**(14.64)**	**−(2.62)**
Dummy Pay/no Pay dividend (t)	**9.41****	**5.27****	**4.14****
× Dummy 1986–1990	**(25.68)**	**(30.76)**	**(14.29)**
Dummy Pay/no Pay dividend (t)	**9.50****	**4.58****	**4.92****
× Dummy 1991–1996	**(29.44)**	**(30.34)**	**(19.30)**
Dividend to book (t) × Dummy	**106.74****	**83.43****	**23.31****
1980–1985	**(10.65)**	**(17.81)**	**(2.94)**
Dividend to Book(t) × Dummy	**−41.95****	**−1.53**	**−40.42****
1986–1990	**−(5.76)**	**−(0.45)**	**−(7.02)**
Dividend to Book(t) × Dummy	**−53.80****	**−2.31**	**−51.49****
1991–1996	**−(9.19)**	**−(0.84)**	**−(11.12)**
Dummy 1986–1990	6.01**	1.18**	4.83**
	(26.11)	(10.95)	(26.54)
Dummy 1991–1996	12.43**	0.36**	12.07**
	(56.40)	(3.53)	(69.23)
Observations	54,508	54,508	54,508
R^2	47.81%	35.08%	41.50%

(*continued*)

Table III—*Continued*

Panel B: Year by Year Regressions
The Regression in Panel A Is Repeated for Each of the Years 1980–1996.
Only the Dividend Coefficients Are Reported

	Explanatory Variable	
Year	Dividend to Book (t)	Dummy Pay/No Pay Dividend (t)
1980	102.39**	2.34**
	(6.35)	(3.23)
1981	153.11**	2.58**
	(7.92)	(3.40)
1982	173.57**	3.75**
	(8.47)	(4.86)
1983	90.23**	6.63**
	(4.51)	(8.39)
1984	60.97**	8.38**
	(3.03)	(10.67)
1985	40.47	8.43**
	(1.89)	(10.32)
1986	3.76	8.58**
	(0.26)	(11.07)
1987	−59.11**	12.10**
	−(3.82)	(15.09)
1988	−67.78**	12.00**
	−(4.44)	(15.11)
1989	−51.88**	10.09**
	−(4.14)	(12.50)
1990	−26.47	9.69**
	−(1.76)	(11.22)
1991	−24.04**	9.75**
	−(1.01)	(7.50)
1992	−55.81**	9.05**
	−(3.04)	(9.09)
1993	−60.79**	7.12**
	−(3.48)	(7.14)
1994	−72.93**	7.13**
	−(3.85)	(7.35)
1995	−34.53**	5.41**
	−(3.16)	(5.93)
1996	−83.19**	7.52**
	−(3.84)	(7.07)

the years. We report this result in Panel B of Table III. (To conserve space, we only report the dividend coefficient for each year.)

Between 1980 and 1984, we find a significant, positive relation between dividend levels and institutional holdings, but this relation gradually becomes negative, and from 1987 onward, it is significantly negative. One interpretation of this finding is that it relates to the introduction of rule 10b-18 in 1982. Before rule 10b-18 was adopted, firms faced major obstacles when they attempted to repurchase shares and, therefore, they resorted to dividends (Grullon and Michaely (2002)). With no real choice to make over the form of payout, institutions as a whole chose to hold high-dividend stock. Once the "safe harbor"

rule was adopted and firms were able to choose between repurchases and dividends, institutions' preference for dividends has changed and they do not prefer stocks that pay high dividends. As we show in the next section, they shift their holdings toward firms that repurchased more.

The positive, significant association between institutional holdings and dividend-paying firms relative to non-dividend-paying firms on the one hand, and the negative and significant association between institutional holdings and the level of dividend payments on the other hand, does not support the hypothesis that institutions prefer high-dividend-paying stocks. Perhaps institutions prefer dividend-paying stocks because of the prudent-man regulations. However, our evidence indicates that both institutions with mild prudent-man regulations (mutual funds, investment advisors, and insurance companies) and institutions with strict prudent-man regulations (bank trusts and pension funds) show a high propensity toward dividend-paying firms.[10]

To ensure that our results are not driven by the scaling factor of dividends (book value of assets), we also repeat the regressions, now using dividend yield, dividend to earnings before interest, taxes, depreciation and amortization, and dividend to net earnings. The results of all the robustness checks confirm those in our original regression. We also apply this regression separately for each size and book to market quintile. We find a significantly larger negative effect between holdings and dividends within the largest firms. This evidence might suggest that institutional investors try to reduce their holdings in firms that increase their dividends at times when they face shrinking investment opportunities and when they become mature (Grullon, Michaely, and Swaminathan (2002)).

No other pattern emerges within the size or the book-to-market quintiles. In particular, there is no evidence that firms that face more asymmetric information (small firms and low book-to-market firms) are able to use dividends to attract institutions that will help them to reveal their true worth, as the signaling model of Allen et al. (2000) might suggest.

So far, we have looked at the effect of dividend policy on institutional ownership. However, we must also look at the effect of institutional ownership on dividend policy, since agency theory indicates that institutional holdings have an effect on payout. Therefore, we repeat the nonparametric test (as in Table II), but this time, in each of the groups (size and dividend yield), we look at median and average institutional holdings in the *previous* year. We find the high level of institutions in year t is associated with lower levels of dividends in year $t + 1$.

We also repeat the level regressions on dividend-paying firms, but this time the dependent variable is dividends (scaled by book assets) at the end of year $t + 1$ and the independent variables are institutional ownership at the end of year t and control variables. We find that the level of institutional ownership in year

[10] Tax considerations might cause pension funds to show less aversion to dividends than do bank trusts. We check for this possibility and find that pension funds' aversion to high dividend stocks is similar to the aversion shown by bank trusts.

t is negatively associated with the dividends in year $t + 1$. Since the agency explanation (hypothesis 1) suggests that institutions will further exert their monitoring abilities in firms with a larger potential for free cash flow problems, we also apply the regression analysis separately for each size and market-to-book quintile. We expect institutions to increase payout in larger firms and in firms that have lower market-to-book ratios. We do not find any evidence that in large firms or high book-to-market firms the association between institutional holding in year t and the dividends in year $t + 1$ is positive, or even less negative than in other type of firms.[11]

One interpretation of the results is that institutions do not like dividends and influence firms in which they have large holdings to pay fewer dividends. But, it is also possible that these results are driven by the high correlation in both institutional holdings and in dividends over time. The negative relation might exist because institutional holdings in year $t - 1$ are a rough proxy for institutional holdings in year $t + 1$, or because dividend payout in year $t - 1$ is a rough proxy for dividend payout in year $t + 1$. Thus, the correlation masks the causal relation between institutional holdings and dividend payout, and a simple regression analysis could lead to incorrect inferences.

To account for the potential bias due to the correlation in holdings and payout over time, we specify two types of correlation. The first is the correlation that is due to omitted fixed effects, and the second is the correlation that is due to autoregressive relation in payout and institutional holdings through time. We must also account for potential time trends due to the time-varying relation between dividends and institutional holdings through time, since over the last 20 years both institutional holdings and dividend policy seem to follow a time trend. Therefore, we consider the following vector autoregressive specification:

$$InstHoldg_{i,t+1} = a_{0,t+1} + \sum_{k=1}^{m} a_{k,t+1} InstHoldg_{i,t-k+1} + \sum_{k=1}^{m} b_{k,t+1} Dividend_{i,t-k+1} + \Psi_{t+1} f_i + u_{i,t+1} \quad (1)$$

$$Dividend_{i,t+1} = c_{0,t+1} + \sum_{k=1}^{m} c_{k,t+1} InstHoldg_{i,t-k+1} + \sum_{k=1}^{m} d_{k,t+1} Dividend_{i,t-k+1} + \Phi_{t+1} g_i + v_{i,t+1}, \quad (2)$$

where $i = 1, \ldots, N$ indexes firms and $t = 1, \ldots, T$ indexes years in our panel. The variables $a_{k,t+1}$, $b_{k,t+1}$, $c_{k,t+1}$, $d_{k,t+1}$ $k = 0, \ldots, m$ and Ψ_{t+1}, Φ_{t+1} are unobservable parameters that depend on time, m is the order of the equation (number of time

[11] We also looked at the effect of changes in institutional holdings on changes in dividends across the different size and market-to-book quintiles, and obtained the same results.

lags), and the variables f_i and g_i are fixed-effect parameters that differ across firms.

In essence, equations (1) and (2) represent each a set of T equations (a regression for each of the years in the panel). The error terms, u_{it+1} and v_{it+1}, have the following properties:

$$E(u_{it} * Inst.Hldg_{is}) = E(u_{it} * Payout_{is}) = 0, \quad (s < t) \tag{3}$$

$$E(v_{it} * Inst.Hldg_{is}) = E(v_{it} * Payout_{is}) = 0, \quad (s < t). \tag{4}$$

This specification is similar to the one offered by Holtz-Eakin et al. (1988), who study the dynamic relation between hours worked and wage rates of employees. Although the specification is parsimonious, it is relatively general because it allows for different coefficients over time, and, through the interaction of f_i and g_i with Φ_{t+1} and Ψ_{t+1}, for time-varying firm-specific effects. The coefficients a_{0t+1} in equation (1) and c_{0t+1} in equation (2) represent macro shocks and time trends in institutional holdings and in dividend payout policy shared by all firms. The factors $\Psi_{t+1}f_i$ and $\Phi_{t+1}g_i$ capture constant firm-specific attributes that have a time-varying effect on both institutional holdings and dividend payout. For example, g_i might indicate whether the firm is in a growth industry, and Φ_{t+1} might represent a negative or a positive shock to the investment opportunities of all firms at year t.

We restrict ourselves to a panel of firms that pay dividends between the years 1985 and 1996 ($T = 12$). Our final panel consists of 654 firms, or 7,848 firm-year observations. (We cannot use the full range of years (1980–1996) due to data unavailability. The number of eligible firms goes down to about 300 when we use the full range of years.) We define the variable $InstHoldg_t$ as the institutional holdings relative to total number of shares outstanding as of December 31 of year $t - 1$. Equation (1) tests the theory of Allen et al. (2000). Positive coefficients $\{b_{k,t+1}\}$ $t = 1, \ldots, T$ in equation (1) will indicate that firms with larger dividends attract more institutional holdings. As before, we use three different measures of institutional holdings: total institutional holdings; holdings by pension funds and bank trusts; and holdings by mutual funds, insurance companies, and investment advisors.[12]

Equation (2) tests the agency theory (hypothesis 1). Positive coefficients $\{c_{k,t+1}\}$ $t = 1, \ldots, T$ in equation (2) will indicate that firms with more institutional holdings will pay higher dividends. We use several different measures for $InstHoldg_t$ in equation (2) to capture the monitoring ability of institutions. The first is total institutional holdings, the second is the five largest holdings, and the third one is holdings by pension funds, since a priori we expect pension

[12] For completeness, we also use largest five institutional holdings (relative to total shares outstanding) instead of total institutional holdings. The results for this specification are not materially different from the total holdings.

funds to be more active monitors (e.g., Gillan and Starks (2000) and Carleton et al. (1998)).

$Dividend_t$ is four times the last quarterly dividend per share in year t, adjusted for stock splits. We choose not to normalize the dividend by the book value of assets or by price because in this specification we rely heavily on the time-series properties of dividends, and firms typically use past dividend per share (rather than dividend yield or dividend to book), as a benchmark for dividend per share in the following periods. We describe the estimation technique in the Appendix and report only the results of our estimations and tests below.

We first test for the right lag m in equations (1) and (2). We use this test to check how far back we should go to determine whether past institutional holdings and payout policies affect future payout policy and whether past payout policies and institutional holdings affect future institutional holdings.

For both equations and for all institutional holdings specifications, we cannot reject the hypothesis that the lag is $m = 1$. This result means that it takes no more than 1 year for past institutional holdings and past payout to affect future payout, and that it takes no more than 1 year for past payout and past institutional holdings to affect future institutional holdings.[13]

Therefore, we assume that $m = 1$. Substituting $m = 1$ in equations (1) and (2) leads to the following specifications:

$$\begin{aligned} InstHoldg_{i,t+1} = a_{0,t+1} + a_{1,t+1} InstHoldg_{i,t} + b_{1,t+1} Dividend_{i,t} \\ + \Psi_{t+1} f_i + u_{i,t+1} \end{aligned} \tag{5}$$

$$\begin{aligned} Dividend_{i,t+1} = c_{0,t+1} + c_{1,t+1} InstHoldg_{i,t} + d_{1,t+1} Dividend_{i,t} \\ + \Phi_{t+1} g_i + v_{i,t+1}. \end{aligned} \tag{6}$$

To estimate the coefficients in equations (5) and (6), we use the past values of institutional holdings and dividend payout as instruments, implying that only the coefficients $\{b_{k,t+1}, c_{k,t+1}\}$ $t = 1989, \ldots, 1996$ are identifiable (see Appendix for more details). We present estimates of these coefficients in Table IV.

Table IV, Panel A presents the estimates of $b_{1,t+1}$, the effect of dividends on institutional holdings. Column 1 shows a strong negative effect of dividend payout. In all but 1 year, institutional holdings are negatively affected by dividend payout. The effect is significantly negative (5% level) in the years 1992, 1993, and 1996, and marginally significant (10% level) in the year 1995. This result confirms our nonparametric and regression results, and suggests that institutions as a whole do not prefer high dividends. In fact, we find that high dividends have a negative effect on institutional holdings. We find that even after controlling for autocorrelations in dividends, for time trends in dividend

[13] In fact, due to the timing specification, there is a slight difference between the two effects. The effect of dividends on institutions is several months (the difference between the time of the last dividend payment in year t, and the time of institutional holding report (December 31) of year t), and the effect of institutions on dividends is more than a year but less than 2 years (the difference between December 31 of year $t - 2$ and the time of the last dividend payment in year t).

Table IV

VAR—Dividends and Holdings

This table reports the results of the vector-autoregressive regressions:

$$InstHoldg_{i,t+1} = a_{0t+1} + a_{1t+1}InstHoldg_{i,t} + b_{1,t+1}Dividend_{i,t} + \psi_{t+1}f_i + u_{it+1} \text{ and}$$
$$Dividend_{i,t+1} = c_{0t+1} + c_{1t+1}InstHoldg_{i,t} + d_{1,t+1}Dividend_{i,t} + \Theta_{t+1}g_i + v_{it+1}$$

using the Holtz-Eakin et al. (1988) methodology. In the regressions, $Dividend_{i,t}$ is four times the last quarterly dividend per share at the end of year t, adjusted for stock splits from 1985. The variable $Inst_{i,t+1}$ is the percentage holdings of institutional investors as of December 31 of year t. The factors f_i and g_i are latent firm-fixed effects, and ψ_t and Θ_t are latent time coefficients. The sample consists of 654 CRSP firms that paid dividends from 1985 until 1996. The estimates in Panels A and B are of the coefficients $b_{1,t+1}$ and $c_{1,t+1}$, respectively.

Panel A: Effect of Dividend Payout on Institutional Holdings

VAR regression: $InstHoldg_{i,t+1} = a_{0t+1} + a_{1t+1}InstHoldg_{i,t} + b_{1,t+1}Dividend_{i,t} + \psi_{t+1}f_i + u_{it+}$
Estimation results of the coefficient b_{1t+1}

	1 Total Institutional Holdings		2 Holdings by Banks and Pension Funds		3 Holdings by Mut. Funds, Insurance & Investment Comp.	
Year	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
1989	−10.080	0.587	−1.208	0.916	−14.312	0.357
1990	−0.809	0.850	3.559	0.179	−1.779	0.643
1991	2.139	0.764	8.638	0.164	−4.010	0.637
1992	−7.554	0.044	1.766	0.530	−5.727	0.164
1993	−7.643	0.001	4.504	0.002	−10.355	0.000
1994	−1.061	0.564	−2.356	0.033	0.664	0.704
1995	−6.710	0.096	−10.252	0.000	−3.592	0.250
1996	−5.932	0.002	2.569	0.001	−4.981	0.024

Panel B: Effect of Institutional Holdings on Dividend Payout

VAR regression: $Dividend_{i,t+1} = c_{0t+1} + c_{1t+1}InstHoldg_{i,t} + d_{1,t+1}Dividend_{i,t} + \Theta_{t+1}g_i + v_{it+1}$
Estimate results of the coefficient $c_{1,t+1}$

	1 InstHoldg = Total Institutional Holdings		2 InstHoldg = Largest 5 Institutional Holdings		3 InstHoldg = Total Holdings by Pension Funds	
Year	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
1989	0.0084	0.3713	0.0311	0.1302	0.0780	0.3361
1990	−0.0032	0.8157	0.6785	0.1749	−0.0937	0.3099
1991	0.0028	0.6512	−0.0186	0.6255	−0.0204	0.8304
1992	0.0222	0.1966	0.0422	0.2497	0.0005	0.9898
1993	0.0201	0.3278	0.0421	0.7715	0.0086	0.9174
1994	−0.0126	0.2995	−0.0048	0.8089	0.1172	0.1757
1995	0.0193	0.1460	−0.0081	0.7561	−0.0061	0.8789
1996	0.0131	0.4943	0.0108	0.6341	0.0536	0.2793

payouts, and for time-varying fixed effects, institutions tend to decrease their holdings when dividends are higher. The result is particularly robust, since we do not scale the dividend variable by any time-varying size factor.

Columns 2 and 3 present the results for the two groups of institutions. Consistent with the regression results, high dividends have a negative impact on holdings by mutual funds, investment advisors, and insurance companies. The negative effect exists in all but one of the years (column 3). The effect is particularly significant in 1993 and 1996.

The effect of dividends on holdings by pension funds and bank trusts (column 2) is less persistent, although there seems to be no general positive relation between dividends and holdings in this group. The effect is significant and negative in 1994 and 1995 and significant and positive in the years 1993 and 1996.

It could be that we do not capture the right relation in our analysis because for most years, dividends do not change much. However, we note that in our sample, there is a considerable fraction of firms that has an abnormal change in dividends. For every year in the sample, about 32% of the firm have a change of more than 10% in their dividends relative to the previous year, similar to the results found in prior studies (e.g., Benartzi et al. (1997)). We believe that this fraction should be significant enough to capture the right relation between dividends and institutional holdings.

For robustness, we also run a regression of changes in institutional holdings on changes in dividends, using only firms with abnormal change in dividends (more than 10% change relative to the previous year). We do not find a positive relation in these regressions for any of the measures of institutional holdings.

By and large, our results confirm the nonparametric and regression results. There is no positive effect of dividends on institutional holdings, and some of our results suggest a strong negative effect. This result does not support the argument of Allen et al. (2000) that higher dividends attract institutions.

Table IV, Panel B presents the effect of institutional holdings on dividend. Column 1, Panel B presents the effect of total institutional holdings on dividend. Unlike the previous panel, here there is no significant effect of total institutional holdings on dividends in any of the years. The p-values reject a significant relation (at the 5% significance level) in all of the years. We also find that the largest five holdings have no significant effect on dividend payout (column 2). The coefficients are not significant (at the 5% level) in all of the years. This result suggests that concentration of ownership does not play a significant role in affecting dividend payout, which does not support the agency theory. Column 3 shows that holdings by pension funds also have no significant effect on dividend payout.

The results of Panel B suggest that neither total institutional holdings nor concentration of holdings increase dividend payout. Since the concentration of holdings appears to better capture the incentives of the institutions to monitor, we would expect a significant effect of concentration of holdings and dividends, yet the effect is insignificant. These results suggest that, by and large, institutions do not increase dividend payout. The results do not support the agency

theory, which predicts that larger institutional holdings (either in percentage or concentration) results in an increased corporate payout.

IV. The Interaction between Repurchases and Institutional Holdings

The implication of the Brennan and Thakor (1990) study is that institutions will encourage management to increase repurchases, and therefore, institutional holdings will affect future repurchase policy. However, Brennan and Thakor mention the possibility that in a dynamic setting, firms that repurchase more because they have a large base of informed investors will attract future informed investors because these investors do not face an adverse selection problem.

To test the relation between repurchases and institutional holdings, we start with a nonparametric test. Since firms in the early 1980s are subject to strict repurchasing rules, there is very little repurchase activity in those years (Grullon and Michaely (2002)). Therefore, we omit firm-years in the early period (1980–1985) from the analysis. We divide the sample in any given year into firms that report share repurchases in their annual statement filed during the year, and firms that do not. For every year and for every size quintile, we further divide the group that repurchases shares into three equal-size categories: low, medium, and high repurchase-to-book firms. We then group all firms across the years and compute the median and mean institutional holdings at the end of the year. We present the results in Table V.

In Table V, Panel A, we compare holdings in repurchasing and non-repurchasing firms. Over the entire period, average and median institutional holdings in repurchasing firms are higher than in non-repurchasing firms. Median institutional holdings in repurchasing firms are 24.4% compared with 12.94% in non-repurchasing firms, and mean institutional holdings in repurchasing firms are 32.93% compared to 25.12% in non-repurchasing firms. The larger institutional holdings cannot be attributed to differences in the market capitalization of the repurchasing firms. For almost every size quintile, institutions hold more in firms that repurchase shares. The results are also robust across the different time periods (not shown in the table).

Table V, Panel B shows holdings for the low-, medium-, and high-repurchase groups. On average, a firm that belongs to the low-repurchase group has lower institutional holdings than does a firm belonging to the high-repurchase group. However, this result is pronounced only in the highest size quintile, and suggests that institutions do not have an aversion toward high repurchasing firms. In fact, overall, there is a marginally significant tendency toward high repurchasing firms, and especially in the largest firms.

To further explore these findings, we regress institutional holdings in year $t+1$ on the repurchase-to-book ratio at t, controlling for the log of the firm's sales, past performance, the market-to-book ratio, its beta, and industry and year dummies. We also control for firms that are known to be regular repurchasing firms. Regular repurchasing firms in year t are firms that repurchased shares

Table V

Institutional Ownership of Repurchasing and Non-repurchasing Firms

This table shows institutional ownership in repurchasing and non-repurchasing firms, and across repurchasing firms. In Panel A, we divide firms into two groups, based on whether they report share repurchases in year *t*. In Panel B, firms that repurchase are divided every year into three equal groups based on their repurchase-to-book ratio. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. The data consist of every publicly held U.S. firm between 1980 and 1996, excepting utility and financial firms. For each firm-year in the data we calculate total institutional holdings as of December 31 of year *t*. We then divide total institutional holdings according to their annual size quintile and group them across the years. The statistics in Panel A are for differences in means, medians, and value-weighted means of total institutional holdings for each pay-size category. We then aggregate groups across years. Statistics in Panel B are for differences in means, medians, and value-weighted means of total institutional holdings between the high-repurchase and the low-repurchase groups. The symbols *,** denote significance at the 5% and 1% levels, respectively.

Panel A: Institutional Holdings (%) in Repurchasing and Non-repurchasing Firms

	Non-repurchasing			Repurchasing			Tests for Differences in Holdings: Paying vs. Non-Paying		
Size Quintile	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	*t*-test	*t*-test (Value Weighted)	Wilcoxon Rank Test
				1986–1996					
Smallest	1.45	(7.31)	7,088	2.83	(6.82)	1,575	1.13	0.02	7.24**
2	8.83	(14.54)	6,947	12.62	(15.66)	2,022	2.60**	1.98*	9.00**
3	21.78	(25.22)	6,318	25.30	(27.92)	2,298	6.04**	4.84**	8.17**
4	36.87	(38.57)	5,699	39.30	(39.89)	2,547	2.58**	2.67**	3.87**
Largest	53.90	(50.43)	4,841	54.11	(52.07)	3,650	3.62**	1.50	1.69
Total	12.94	(25.12)	30,893	24.40	(32.93)	12,092	29.00**	13.89**	35.80**

(*continued*)

Table V—*Continued*

Panel B: Institutional Holdings (%) across Repurchasing Firms (Repurchase Is Defined as Dollar Value of Repurchases over Book Value of Assets)

	Paying-Low Repurchase			Paying-Medium Repurchase			Paying-High-Repurchase			Tests for Differences in Holdings between High and Low Groups		
Size Quintile	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	Median Institutional Holdings	Mean Institutional Holdings	No.	*t*-Test	*t*-Test (Value Weighted)	Wilcoxon Rank Test
						1986–1996						
Lowest	4.39	(7.92)	525	2.16	(5.92)	525	2.20	(6.63)	525	−1.50	−1.18	−4.45
2	12.96	(16.41)	674	12.60	(15.29)	674	11.92	(15.30)	674	−1.41	−1.66	−1.57
3	25.15	(28.10)	766	25.05	(27.73)	766	25.67	(27.94)	766	−0.17	−1.38	−0.16
4	38.84	(39.61)	849	38.35	(39.28)	849	40.59	(40.77)	849	1.19	1.66	1.88
Highest	51.83	(49.87)	1,217	54.18	(52.42)	1,216	55.70	(53.88)	1,217	5.18**	6.71**	4.23**
Total	30.04	(32.53)	4,031	30.47	(32.76)	4,030	32.54	(33.51)	4,031	1.83	11.65**	1.62

at least once during the years $t - 1$ and $t - 2$. About 35% of the repurchasing firms in the sample are regular repurchasers. These firms tend to have higher market value ($1.73 billion mean relative to $401 million in the nonregular repurchasers), a slightly lower market-to-book ratio (1.59 relative to 1.73 in the nonregular repurchasers), and about the same market risk (average beta of 0.78 relative to 0.74 in the non-repurchasing firms).

As before, we perform separate regressions for institutions as a whole and for the two institutional subgroups. We present the results in Table VI. Institutions as a whole (column 1) prefer firms that repurchase more. The positive relation is significant for both bank trusts and pension funds (column 2) and for mutual funds, insurance companies, and investment advisors (column 3).

Since there are many firms in our sample that do not repurchase at all, there is a possibility that they actually drive the results. Therefore, we repeat the regression, using only those firms that repurchased either in year t or in year $t - 1$. The results of this regression are actually stronger. Moreover, the regressions show that institutions as a whole prefer firms that repurchase regularly to firms that do not repurchase regularly. A firm that repurchases regularly has 4.28% higher institutional holdings than does a nonregular repurchasing firm. The positive relation between institutional holdings and regular repurchasers is robust for both the group of bank trusts and pension funds and the group of mutual funds, insurance companies, and investment advisors. However, it is significant and positive only in the group of bank trusts and pension funds.

The positive relation between institutional holdings and repurchasing firms is consistent with Brennan and Thakor (1990). However, other aspects of the results seem at odds with their theory: The propensity toward repurchasing firms does not depend on the severity of the asymmetric information. When we repeat the regressions for each size and market-to-book quintile (not reported in the table), we find that the results are particularly strong for firms that are less likely to face asymmetric information problems (low market-to-book and large-size firms) than for firms that are less likely to face asymmetric information problems (high market-to-book and small-size firms).[14]

The level regression controls for differences in firms other than repurchase policy. However, there might be some nonmeasurable characteristics, such as institutional beliefs, and institutional preferences, that could create institutional shareholdings benchmark levels that are different for each firm. We can better control for firm-specific, omitted variables by looking at the effect of changes in dividends on changes in institutional holdings. Such an analysis will net out many firm- and investor-specific omitted considerations.[15]

Table VII presents the effect of changes in repurchases on changes in institutional holdings. The results show that institutional holdings increase after

[14] We note that there is still the possibility that the reason for our findings is that institutions have more incentives to become informed in larger firms.

[15] We do not apply the Holtz-Eakin et al. (1988) specification to repurchases, since repurchases are not persistent over time. Thus, correlation through time is not as severe here as is the case with dividends.

Table VI
Effect of Repurchasing on Institutional Holdings

This table reports estimates of regression:

$$Inst.Holdings\ (t+1) = a + b\ Dummy\ Regular\ Repurchase\ (t) + c\ Repurchase\text{-}to\text{-}Book\ (t) + [Control\ Variables\ (t)].$$

Holdings $(t+1)$ are institutional holdings as a percentage of total shares outstanding as of December 31 of year $t+1$. Repurchase-to-Book is the total dollar value of repurchases in year t (Compustat item 115) divided by the book value of assets at the end of year t. A firm is a regular repurchaser in year t if it repurchased at least once in the years $t-1$, $t-2$. The control variables are as follows: Log(*Sales*(t)) is the natural log of sales at the end of year t. *Annual adjusted return*(t) is the annual return on the stock as reported in year t minus the beta-return of the stock. *Market-to-book*(t) is the market value of equity plus the book value of preferred dividend plus the book value of total liabilities minus the book value of deferred taxes, divided by book value of assets, all calculated at the end of year t. *Beta* is taken from CRSP. The data consist of end-of-year total institutional stock holdings for every publicly held U.S. firm between 1986 and 1996. We do not include financial or utility companies in the sample. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. We obtain other firm-specific financial information from the CRSP and Compustat tapes. All regressions include dummy variables for the firms' one-digit SIC code (omitted from the table). The symbols *,** denote significance at the 5% and 1% levels, respectively.

	Dependent Variable		
	1 Holdings $(t+1)$ by All Types of Institutions	2 Holdings $(t+1)$ by Bank Trusts and Pension Funds	3 Holdings $(t+1)$ by Mutual Funds, Investment Advisors, and Insurance Companies
Intercept	-8.66^{**}	-3.20^{**}	-5.46^{**}
	$-(27.54)$	$-(23.34)$	$-(21.42)$
Log *(Sales*(t))	6.36^{**}	2.11^{**}	4.25^{**}
	(114.37)	(86.91)	(94.36)
Annual adjusted return (t)	0.65^{**}	-0.10	0.76^{**}
	(4.90)	$-(1.79)$	(7.01)
Market to Book (t)	0.86^{**}	0.39^{**}	0.47^{**}
	(16.32)	(17.03)	(10.97)
Beta	5.17^{**}	0.93^{**}	4.24^{**}
	(32.21)	(13.27)	(32.61)
Rep to Book (t)	**18.63^{**}**	**6.64^{**}**	**11.99^{**}**
	(6.82)	**(5.57)**	**(5.42)**
Dummy Regular Rep (t)	**4.28^{**}**	**3.86^{**}**	**0.42**
	(13.63)	**(28.17)**	**(1.66)**
Dummy 1991–1996	5.56^{**}	-1.21^{**}	6.77^{**}
	(26.05)	$-(13.05)$	(39.19)
Observations	31,999	31,999	31,999
R^2	43.14%	32.42%	35.44%

Table VII

Effect of Changes in Repurchases on Changes in Institutional Holdings

This table reports estimates of the regression

$$(Holdings\,(t+1) - Holdings\,(t)) = a + b\,(Repurchase\,(t) - Repurchase\,(t-1))/Book\,(t) + [Control\ Variables].$$

Holdings $(t+1)$ are institutional holdings as a percentage of total shares outstanding as of December 31 of year $t+1$. *Repurchase*(t) is the amount of repurchases (Compustat item 115) in year t. Log(*Sales*(t)) is the natural log of sales at the end of year t. *Annual adjusted return*(t) is the annual return on the stock as reported in year t minus the beta-return of the stock. *Market-to-book*(t) is the market value of equity plus book value of preferred dividend plus book value of total liabilities minus book value of deferred taxes, divided by book value of assets, all calculated at the end of year t. *Beta* is taken from CRSP. The data consist of end-of-year total institutional stock holdings for every publicly held U.S. firm between 1986 and 1996. We do not include financial or utility companies in the sample. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. We obtain other firm-specific financial information from the CRSP and Compustat tapes. All regressions include dummy variables for the firms' one-digit SIC code (omitted from the table). The symbols *,** denote significance at the 5% and 1% levels, respectively.

	Dependent Variable		
	1 Change in Inst. Holdings $(t+1) - (t)$	2 Change in Holdings of Banks and Pension Funds $(t+1) - (t)$	3 Change in Holdings of Mutual Funds, Investment Advisors and Insurance Companies
Intercept	0.91**	0.16	0.77**
	(3.19)	(1.22)	(3.14)
Log (*Sales* (t)) – Log(*Sales* $(t-1)$)	0.22	0.19**	0.01
	(1.63)	(3.09)	(0.09)
Annual Adj. Return (t) – *Annual Adj. Return* $(t-1)$	−0.09	−0.16*	0.06
	−(0.65)	−(2.48)	(0.47)
Market to Book (t) – *Market to Book* $(t-1)$	−0.23*	−0.06	−0.17*
	−(2.40)	−(1.29)	−(1.99)
Beta (t) – *Beta* $(t-1)$	−0.05	0.04	−0.12
	−(0.30)	(0.56)	−(0.84)
(*Repurchase* (t) – *Repurchase* $(t-1)$)/*Book* (t)	**3.32***	**1.67***	**1.66**
	(2.37)	**(2.57)**	**(1.33)**
Log(*Sales* (t))	0.03	−0.05*	0.08*
	(0.75)	−(2.30)	(2.05)
Annual Adjusted Return (t)	0.97**	0.54**	0.47**
	(4.70)	(5.62)	(2.59)
Market to Book (t)	−0.05	0.06	−0.11
	−(0.56)	(1.40)	−(1.47)
Beta	−0.16	−0.07	−0.03
	−(0.87)	−(0.85)	−(0.17)
Dummy 1991–1996	−0.02	−0.37**	0.33*
	−(0.11)	−(4.79)	(2.18)
Observations	10,662	10,662	10,662
R^2	0.44%	0.77%	0.23%
F	3.73	5.89	2.48

firms increase their repurchases. There is a positive and significant relation for institutional holdings as a whole, as well as for banks and pension funds. For mutual funds, investment companies, and insurance companies the relation is positive, but not significant.

As a whole, our results tend to support those presented in the level regression: institutions seem to like repurchases. Even after controlling for other factors (growth, past performance, size, etc.), firms that repurchase more and firms that increase the amount they repurchase experience a higher level of institutional holdings.

Table VIII presents the effect of changes in institutional holdings on changes in repurchases (equation (8)). Similar to our analysis for dividends, here we consider the possibility that not only the relative holding of institutions might affect repurchase policy, but also those of the largest five holders. Higher concentration might give institutions a better incentive to monitor and better ability to do so. We also use holdings by pension funds, since pension funds are a priori likely to be active monitors (e.g., Gillan and Starks (2000) and Carlton et al. (1998)). The coefficient of changes in institutional holdings is not significant, both for changes in institutional concentration and changes in total percentage ownership, and for the group of pension funds.[16]

Overall, our results do not support the notion that institutions attempt to reduce agency conflicts by pressuring management to increase payout, either through repurchases or through dividends. The results also do not support the implication of the adverse-selection theories that an increase in institutional holdings will result in an increase in the level of repurchases. On the other hand, we find strong evidence that institutional investors increase their holdings in firms that repurchase more and in firms that increase their repurchase activity.

V. The Impact of Institutional Holdings on Total Payout Policy

The agency theory implies that higher institutional holdings will affect payout positively, which means that either future dividends or future repurchases or both will increase. So far, we have looked at the implications of the agency theory for dividends and repurchases. However, a natural implication of the theory is that an increase in institutional holdings will affect total payout. Therefore, we now look at the effect of institutional holdings on total payout, where total payout is the sum of dividends and repurchases.

We specify an autoregressive relation to total payout, similar to the one we used for dividends. Since we do not have any prediction on the effect of total

[16] We obtain similar results when we use the concentration index, rather than the percentage held by the top five institutions.

Table VIII

Effect of Changes in Institutional Holdings on Changes in Repurchases

This table reports estimates of the regression

$$(Repurchase\,(t+1) - Repurchase\,(t))/Book\,(t+1) = a + b\,(Holdings\,(t) - Holdings\,(t-1)) + [Control\ Variables].$$

Holdings $(t+1)$ are institutional holdings as a percentage of total shares outstanding as of December 31 of year $t+1$. *Repurchase* (t) is the amount of repurchases (Compustat item 115) in year *t*. Log(*Sales* (t)) is the natural log of sales at the end of year *t*. *Annual adjusted return* (t) is the annual return on the stock as reported in year t minus the beta-return of the stock. *Market-to-book* (t) is the market value of equity plus book value of preferred dividend plus book value of total liabilities minus book value of deferred taxes, divided by book value of assets, all calculated at the end of year *t*. *Beta* is taken from CRSP. The data consist of end-of-year total institutional stock holdings for every publicly held U.S. firm between 1986 and 1996. We do not include financial or utility companies in the sample. We obtain the institutional-holdings data from Thomson Financial, which gathers the information from institutional filings 13F. We obtain other firm-specific financial information from the CRSP and Compustat tapes. All regressions include dummy variables for the firms' one-digit SIC code (omitted from the table). The symbols *,** denote significance at the 5% and 1% levels, respectively.

	Explanatory Variable		
Dependent Variable: (*Rep* $(t+1)$ − *Rep* (t))/*Book* (t)	Change in Inst. Holdings $(t) - (t-1)$	Change in 5 Largest Inst. Holdings $(t) - (t-1)$	Change in Holdings by Pension Funds $(t) - (t-1)$
Intercept	−0.0100**	−0.0098**	−0.0099
	−(4.56)	−(4.69)	−(4.76)
Log (*Sales* (t)) − Log (*Sales* $(t-1)$)	0.0002	0.0002	0.0002
	(0.17)	(0.23)	(0.20)
Annual Adj. Return (t) − *Annual Adj. Return* $(t-1)$	−0.0021	−0.0021	−0.0021**
	−(1.94)	−(1.96)	−(2.00)
Market to Book (t) − *Market to Book* $(t-1)$	−0.0032**	−0.0031**	−0.0031**
	−(5.29)	−(5.24)	−(5.27)
Beta (t) − *Beta* $(t-1)$	−0.0022	−0.0022	−0.0022**
	−(1.82)	−(1.83)	−(1.87)
Institutional Holdings (t) − *Institutional Holdings* $(t-1)$	**0.0001**	**−0.0001**	**−0.0004**
	(1.10)	**−(1.44)**	**−(1.42)**
Log (*Sales* (t))	0.0012**	0.0012**	0.0012
	(3.53)	(3.60)	(3.61)
Annual Adjusted Return (t)	0.0071**	0.0071**	0.0070**
	(4.47)	(4.66)	(4.64)
Market to Book (t)	−0.0032**	−0.0031**	−0.0031
	−(5.69)	−(5.55)	−(5.56)
Beta	0.0008	0.0009	0.0010*
	(0.56)	(0.67)	(0.72)
Dummy 1991–1996	0.0057**	0.0055**	0.0054
	(4.26)	(4.20)	(4.14)
Observations	11,823	11,823	11,823
R^2	0.90%	0.90%	0.90%
F	7.28	7.34	7.34

payout on institutional holdings, we test only the effect of institutional holdings on total payout. The equation we estimate is as follows:

$$TotalPayout_{i,t+1} = c_{0,t+1} + \sum_{k=1}^{m} c_{k,t+1} InstHoldg_{i,t-k+1} + \sum_{k=1}^{m} d_{k,t+1} TotalPayout_{i,t-k+1} + \Phi_{t+1} g_i + v_{i,t+1}. \quad (7)$$

This specification is similar to the one we used in Section III, but instead of the variable *Dividend*, we use the variable *TotalPayout*. Our data consist of the same 654 firms we used in Section III. Our measure of $TotalPayout_t$ is the last quarterly dividend per share in year *t,* multiplied by four, plus total repurchase per share of fiscal year *t.* Since we use payout per share, we adjust for stock splits. We use three different measures of institutional holdings: total institutional holdings, largest five institutional holdings, and holdings by pension funds (all scaled by total shares outstanding).

As before, we first test for the right lag m. We use this test to check how far back we should go in determining whether past institutional holdings affect future total payout. For all institutional holdings specifications, we cannot reject the hypothesis that the lag is $m = 1$. This result means that the effect of holdings on payout is not more than 1 year. Therefore, we assume that $m = 1$, and equation (7) simplifies to:

$$TotalPayout_{i,t+1} = c_{0,t+1} + c_{1,t+1} InstHoldg_{i,t} + d_{1,t+1} TotalPayout_{i,t} + \Phi_{t+1} g_i + v_{i,t+1}. \quad (8)$$

We estimate the institutional holdings coefficient $c_{1,t+1}$ in equation (8) for each of the years 1989–1996 and present the results in Table IX. Table IX, column 1 presents the effect of total institutional holdings on total payout. The effect is insignificant in all of the years. Similarly, when using the five largest institutions' holdings (column 2), no pattern emerges. The coefficients of holdings by pension funds (column 3) are mostly negative and they are significant and negative in 3 years (1990, 1991, 1994).

The results in Table IX suggest that institutional holdings do not appear to positively affect total payout. Since the concentration of holdings seems to capture the incentives of the institutions to monitor, we would expect a significant positive relation there, yet the effect is either not significant or negative. We also do not find a significant, positive effect of holdings by mutual funds, investment advisors, and insurance companies on total payout. The effect of holdings by pension funds and bank trusts is either negative or insignificant.[17]

[17] As a robustness check, we repeat the autoregressive specification, setting total payout (t + 1) (or Dividend (t + 1) in the earlier specification) as the last total payout (dividend) in period *t,* (thereby reducing the time lag between institutional holdings and total payout/dividend to less than a year). The results are not materially different from the results under the original specification.

Table IX
VAR—Total Payout and Holdings

This table reports the results of the vector-autoregressive regression:

$$TotalPayout_{i,t+1} = c_{0t+1} + c_{1t+1}\, InstHoldg_{i,t} + d_{1,t+1}\, TotalPayout_{i,t} + \Theta_{t+1} g_i + v_{it+1}$$

using the Holtz-Eakin et al. (1988) methodology. $TotalPayout_{i,t}$ is the sum of four times the last quarterly dividend per share and repurchases per share at the end of year t, both adjusted for stock splits from 1985. $InstHoldg_{tt}$ is institutional holdings as of January 1, of year t. The variable g_i is a latent firm fixed effects, and Θ_t is a latent time coefficient. The sample consists of 654 firms that paid dividends from 1985 until 1996.

Effect of Institutional Holdings on Total Payout						
Estimates of the coefficient c_{1t+1}						
	Total Institutional Holdings		Largest 5 Institutional Holdings		Holdings by Pension Funds	
Year	Coefficient	p-Value	Coefficient	p-Value	Coefficient	p-Value
1989	−0.292	0.145	0.012	0.878	0.211	0.489
1990	10.702	0.160	0.851	0.061	−0.386	0.027
1991	−0.139	0.128	0.013	0.889	−0.822	0.001
1992	0.173	0.444	−0.125	0.303	−0.044	0.665
1993	0.008	0.956	−0.130	0.184	0.038	0.634
1994	0.097	0.324	−0.040	0.057	−0.201	0.011
1995	0.544	0.155	0.203	0.003	0.097	0.421
1996	−0.017	0.940	−0.167	0.006	−0.184	0.141

These results do not support the hypothesis that institutions increase payout. In most of the years, there is no significant relation. In those years when there is a significant relation, it seems to go in the opposite direction, suggesting that institutions actually decrease payout.

VI. Conclusion

Institutions are distinctive (relative to individual investors) in that they are likely to be better monitors and to enjoy an informational advantage. Institutions also have the benefit of a tax advantage on dividends relative to individuals, and they are subject to prudent-man rules.

Given the unique features of institutions, what should be the relation between institutional holdings and corporate payout policy? Corporate finance theory suggests several reasons why the extent of institutional holding and firms' payout policy might interact. First, larger institutional holdings may result in higher payouts (dividends and/or repurchases) and a reduction of the free cash flow problem (Jensen (1986)). Second, firms that want to attract institutions (either because of their monitoring abilities or for their informational advantages) might do so by paying more dividends (Allen et al. (2000)). Third, due to their information advantage, institutions might prefer repurchases over dividends (Brennan and Thakor (1990)).

In this paper we test these hypotheses, by investigating the interaction between institutional investors and firms' payout policy on a large data set of institutional holdings and corporate payouts between 1980 and 1996.

Taken as a whole, institutions are not attracted to firms that pay more dividends. This result does not support the predictions of Allen et al. (2000) that high dividends attract institutional holdings. Indeed, institutions prefer dividend-paying firms to non-dividend-paying firms, but within dividend-paying firms, institutions are not attracted to high dividends.

Interestingly, the result indicates that until the early 1980s, the effect of higher dividends on institutional holdings is positive, but from the mid-1980s onward it becomes negative. This result might be related to changes in repurchasing rules in the mid-1980s that allowed firms to repurchase shares more freely.

We find a positive relation between repurchases and institutional holdings. Firms that repurchase more shares attract institutions. Our results also suggest that institutions prefer firms that repurchase regularly to firms that repurchase sporadically. However, our results suggest that institutions are attracted to repurchasing firms, rather than trying to increase or more generally to affect firms' repurchase policies.

In fact, we find little evidence that institutions increase payout, whether it is dividend payout, repurchases, or total payout. That is, there is no evidence that an increase in institutional holdings in firms is followed by an increase in dividends or repurchases, not even for firms that are more likely to face agency problems.

What are the general implications to corporate payout theories? First, although it is possible that firms pay dividends to reduce agency conflicts, there is no evidence that either the portion of shares held by institutions or the concentration of their holdings is related to payout policy. Further, although it is possible that institutions are better able to monitor and control management actions than can individual investors, they do not do so through dividend policy. For that matter, neither do they increase repurchases nor total payout. There is no evidence that firms signal their true worth and try to attract institutions by increasing dividends. In fact, institutions as a group reduce their holdings in firms that increase their dividend payout. They increase their holdings in firms that pay fewer dividends and repurchase more.

It is also possible that there is too much heterogeneity among institutions to capture this effect when we are looking at institutions as a whole or even at subgroups of institutions (such as pension funds).[18] In other words, a small number of institutions might be strong monitors and they might affect dividend policy, but in a large group we observe little effect.

[18] Consistent with this argument, Hotchkiss and Strickland (2003) show that there is heterogeneity in institutional investors' behavior that is not captured by looking at aggregate institutional ownership or typical classifications of institutional types.

The prediction of the adverse selection model, that a higher portion of institutions will lead to an increase in corporate repurchase activity, is not supported by the data. We also find that repurchasing firms that are less prone to adverse selection problems attract institutions. However, consistent with the theory, we do find that an increase in repurchase activity is related to an increase in institutional holdings.

We suggest two avenues for future research. First, from the theoretical point, it is not clear why institutions prefer repurchases and individual investors prefer dividends. Although the asymmetric information argument might explain some of the results, other aspects of this argument are not supported by the data. Second, our evidence suggests that institutions do not monitor by forcing payouts. Nevertheless, there might be other ways in which institutions monitor. What exactly their monitoring role is, is a relatively open question that warrants further research.

Appendix

VAR Specification

This appendix briefly explains the estimation and testing procedures of the VAR specification in equations (1) and (2). For a more detailed explanation see Holtz-Eakin et al. (1988).

We focus on explaining the estimation and test procedures for equation (1) only. The procedure is the same for equation (2).

We use a semi-differencing approach to eliminate the firm-specific effects in equation (1). We define $r_{t+1} = \Psi_{t+1}/\Psi_t$, and then multiply year-t equation by r_{t+1} and subtract year-$(t+1)$ equation from the year-t equation. Thus, we develop the following set of equations:

$$InstHoldg_{i,t+1} = \alpha_{0,t+1} + \sum_{k=1}^{m+1} \alpha_{k,t+1} InstHoldg_{i,t-k+1} + \sum_{k=1}^{m+1} \beta_{k,t+1} Dividend_{i,t-k+1} + \varepsilon_{i,t+1}, \tag{A1}$$

where

$$\begin{aligned}
\alpha_{0t+1} &= a_{0t+1} - r_{t+1}\, a_{0t}, \\
\alpha_{1t+1} &= a_{1t+1} + r_{t+1}, \\
\alpha_{k,t+1} &= a_{k,t+1} - r_{t+1}\, a_{k-1,t+1}, \quad k = 2, \ldots, m, \\
\alpha_{m+1,t+1} &= -r_{t+1} a_{m,t+1}, \\
\beta_{1t+1} &= b_{1t+1}, \\
\beta_{k,t+1} &= b_{kt+1} - r_{t+1} b_{k-1,t}, \quad k = 2, \ldots, m, \\
\beta_{m+1,t+1} &= -r_{t+1} b_{m,t}, \\
\varepsilon_{it+1} &= v_{it+1} - r_{t+1} v_{it}.
\end{aligned}$$

When $m = 1$, the differencing leads to the following equation:

$$InstHoldg_{i,t+1} = \alpha_{0,t+1} + \alpha_{1,t+1} InstHoldg_{i,t} + \alpha_{2,t+1} InstHoldg_{i,t-1} + \beta_{1,t+1} Dividend_{i,t} + \beta_{2,t+1} Dividend_{i,t-1} + \varepsilon_{i,t+1}, \quad \text{(A2)}$$

where

$$\alpha_{0t+1} = a_{0t+1} - r_{t+1} a_{0t},$$
$$\alpha_{1t+1} = a_{1t+1} + r_{t+1},$$
$$\alpha_{2,t+1} = -r_{t+1} a_{2,t+1},$$
$$\beta_{1t+1} = b_{1t+1},$$
$$\beta_{2,t+1} = -r_{t+1} b_{2,t},$$
$$\varepsilon_{it+1} = v_{it+1} - r_{t+1} v_{it}.$$

The orthogonality conditions (3) in Section III imply that the error term of the transformed equation (A1) satisfies the following orthogonality conditions:

$$E(InstHoldg_{i,s} \varepsilon_{it+1}) = E(Dividend_{i,s} \varepsilon_{it+1}) = 0, \quad (s < t). \quad \text{(A3)}$$

Thus, the vector of instrumental variables that is available to identify the parameters of equation (A1) is

$$[1,\ InstHoldg_{i,t-1} \cdots InstHoldg_{i,1}, Dividend_{i,t-1} \cdots Dividend_{i,1}]. \quad \text{(A4)}$$

Using the orthogonality conditions (A3), a necessary condition for identification of (A1) is that there are at least as many instrumental variables as the right-hand-side variables. In general, the number of identifiable parameters will depend on the size of our panel. Thus, if $m = 1$, then to estimate the five parameters in equation (A2), we must have at least five instruments, which implies that we need both year-$(t - 1)$ and year-$(t - 2)$ data. More generally, we will need $T > m + 3$ to be able to identify the most recent $T - (m + 2)$ equations.

The identification of the original parameters in equations (1) and (2) is generally difficult, if not impossible because the parameters of the transformed equations contain the ratio r_{t+1}. However, because of the autoregressive specification, the parameter b_{1t+1} exactly equals β_{1t+1} and is, therefore, fully identifiable.

To estimate the transformed parameters, we first estimate the transformed parameters of each equation by using the relevant instruments in our panel. We then use the residuals from the equations to estimate the variance–covariance matrix. Finally, we stack all equations and use the estimated variance–covariance matrix to form a new GLS estimator of the parameters.

The procedure to test the appropriate lag m involves estimating the parameters and the variance–covariance matrix of the errors for $m = 0$, $m = 1$, $m = 2$, etc. Let Q_m be the corrected sum of squares of the residuals when we use m lags. Then to test if the lag is larger than m, we can form the test $L = Q_m - Q_{m+1}$, which has a chi-squared distribution with degrees of freedom equal to

the degrees of freedom of Q_m minus the degrees of freedom of Q_{m+1} (see Holtz-Eakin et al. (1988) for a complete derivation of the estimates and the tests).

REFERENCES

Allen, Franklin, Antonio E. Bernardo, and Ivo Welch, 2000, A theory of dividends based on tax clienteles, *Journal of Finance* 55, 2499–2536.

Amihud, Yakov, and Kefei Li, 2002, The declining information content of dividend announcements and the effect of institutional holdings, Working paper, New York University.

Barclay, Michael J., and Clifford W. Smith Jr., 1988, Corporate payout policy: Cash dividends versus open-market repurchases, *Journal of Financial Economics* 22, 61–82.

Benartzi, Shlomo, Roni Michaely, and Richard H. Thaler, 1997, Do changes in dividends signal the future or the past, *Journal of Finance* 52, 1007–1034.

Binay, Murat, 2001, Do dividend clienteles exist? Institutional investor reaction to dividend events, Working paper, University of Texas, Austin.

Brav, Alon, and J. B. Heaton, 1998, Did ERISA's prudent man rule change the pricing of dividend omitting firms?, Working paper, Duke University.

Brav, Alon, John R. Graham, Campbell R. Harvey, and Roni Michaely, 2005, Payout policy in the 21st century, *The Journal of Financial Economics* (forthcoming).

Brennan, Michael J., and Anjan V. Thakor, 1990, Shareholder preferences and dividend policy, *Journal of Finance* 45, 993–1018.

Carleton, Willard T., James M. Nelson, and Michael S. Weisbach, 1998, The influence of institutions on corporate governance through private negotiations: Evidence from TIAA-CREF, *Journal of Finance* 53, 1335–1362.

Del Guercio, Diane, 1996, The distorting effect of the prudent-man laws on institutional equity investments, *Journal of Financial Economics* 40, 31–62.

Diamond, Douglas W., 1984, Financial intermediation and delegated monitoring, *Review of Economic Studies* 51, 393–414.

Fama, Eugene F., and Kenneth R. French, 1997, Industry costs of equity, *Journal of Financial Economics* 43, 153–193.

Fama, Eugene F., and Kenneth R. French, 2001, Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics* 60, 3–43.

Gale, Douglas, and Martin Hellwig, 1985, Incentive-compatible debt contracts: The one-period problem, *Review of Economic Studies* 52, 647–663.

Gillan, Stuart L., and Laura T. Starks, 2000, Corporate governance proposals and shareholder activism: The role of institutional investors, *Journal of Financial Economics* 57, 275–305.

Gompers, Paul A., and Andrew Metrick, 2001, Institutional investors and equity prices, *The Quarterly Journal of Economics* 116, 229–259.

Graham, John R., and Alok Kumar, 2004, Do dividend clienteles exist? Evidence on dividend preferences of retail investors, Working paper, Duke University.

Grossman, Sanford J., and Oliver D. Hart, 1980, Takeover bids, the free-rider problem, and the theory of the corporation, *Bell Journal of Economics* 11, 42–54.

Grullon, Gustavo, and Roni Michaely, 2002, Dividends, repurchases, and the substitution hypothesis, *Journal of Finance* 57, 1649–1684.

Grullon, Gustavo, Roni Michaely, and Bhaskaran Swaminathan, 2002, Are dividend changes a sign of firm maturity? *Journal of Business* 75, 387–424.

Hartzell, Jay C., and Laura T. Starks, 2003, Institutional investors and executive compensation, *Journal of Finance* 58, 2351–2374.

Holtz-Eakin, Douglas, Whitney Newey, and Harvey S. Rosen, 1988, Estimating vector autoregressions with panel data, *Econometrica* 56, 1371–1395.

Hotchkiss, Edith S., and Stephen Lawrence, 2003, Empirical evidence on the existence of dividend clienteles, Working paper, Boston College.

Hotchkiss, Edith S., and Deon Strickland, 2003, Does shareholder composition matter? Evidence from the market reaction to corporate earnings announcements, *Journal of Finance* 58, 1469–1498.

Jain, Ravi, 1999, Institutional investors do not prefer dividends: Individual investors do, Working paper, Temple University.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.

Michaely, Roni, and Wayne H. Shaw, 1994, The pricing of initial public offerings: Tests of the adverse selection and signaling theories, *Review of Financial Studies* 7, 279–319.

Michaely, Roni, Richard H. Thaler, and Kent Womack, 1995, Price reactions to dividend initiations and omissions: Overreaction or drift? *Journal of Finance* 50, 573–608.

Perez-Gonzalez, Francisco, 2000, Large shareholders and dividends: Evidence from U.S. tax reforms, Working paper, Harvard University.

Roe, Mark J., 1997, The political roots of American corporate finance, *Journal of Applied Corporate Finance* 9, 8–22.

Shleifer, Andrei, and Robert W. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94, 461–488.

Sias, Richard W., Laura T. Starks, and Sheridan Titman, 2001, The price impact of institutional trading, Working Paper, University of Texas, Austin.

Stephens, Clifford P., and Michael S. Weisbach, 1998, Actual share reacquisitions in open market repurchases programs, *Journal of Finance* 53, 313–333.

Strickland, Deon, 1996, Determinants of institutional ownership: Implications for dividend clienteles, Working paper, Ohio State University.

Townsend, Robert M., 1979, Optimal contracts and competitive markets with costly state verification, *Journal of Economic Theory* 21, 265–293.