



ELSEVIER

Journal of Financial Economics 60 (2001) 3–43

JOURNAL OF
Financial
ECONOMICS

www.elsevier.com/locate/econbase

Disappearing dividends: changing firm characteristics or lower propensity to pay?[☆]

Eugene F. Fama^a, Kenneth R. French^{b,*}

^aGraduate School of Business, University of Chicago, Chicago, IL 60637, USA

^bSloan School of Management, Massachusetts Institute of Technology, Cambridge, MA 02142, USA

Received 7 January 2000; accepted 17 August 2000

Abstract

The proportion of firms paying cash dividends falls from 66.5% in 1978 to 20.8% in 1999, due in part to the changing characteristics of publicly traded firms. Fed by new listings, the population of publicly traded firms tilts increasingly toward small firms with low profitability and strong growth opportunities – characteristics typical of firms that have never paid dividends. More interesting, we also show that regardless of their characteristics, firms have become less likely to pay dividends. This lower propensity to pay is at least as important as changing characteristics in the declining incidence of dividend-paying firms. © 2001 Published by Elsevier Science S.A.

JEL classification: G35; G32

Keywords: Dividends; Payout policy; Stock repurchases; New listings

[☆]We acknowledge the comments of John Graham, Douglas Hannah, Anil Kashyap, Tobias Moskowitz, G. William Schwert (the editor), Andrei Shleifer, Janice Willett, Paul Zarowin, and seminar participants at Harvard University, the University of Chicago, the National Bureau of Economic Research, the University of Rochester, and Virginia Polytechnical Institute. The referees, Harry DeAngelo and René Stulz, were particularly helpful.

* Corresponding author.

E-mail address: kfrench@mit.edu (K.R. French).

1. Introduction

Dividends have long been an enigma. Since they are taxed at a higher rate than capital gains, the common presumption is that dividends are less valuable than capital gains. In this view, firms that pay dividends are at a competitive disadvantage since they have a higher cost of equity than firms that do not pay. The fact that many firms pay dividends is then difficult to explain.

Using CRSP and Compustat, we study the incidence of dividend payers during the 1926–99 period, with special interest in the period after 1972, when the data cover NYSE, AMEX, and NASDAQ firms. The percent of firms paying dividends declines sharply after 1978. In 1973, 52.8% of publicly traded non-financial non-utility firms pay dividends. The proportion of payers rises to a peak of 66.5% in 1978. It then falls rather relentlessly. In 1999, only 20.8% of firms pay dividends.

The decline after 1978 in the percent of firms paying dividends raises three questions. (i) What are the characteristics of dividend payers? (ii) Is the decline in the percent of payers due to a decline in the prevalence of these characteristics among publicly traded firms, or (iii) have firms with the characteristics typical of dividend payers become less likely to pay? We address these questions.

We use logit regressions and summary statistics to examine the characteristics of dividend payers. Both approaches suggest that three characteristics affect the decision to pay dividends: profitability, investment opportunities, and size. Larger firms and more profitable firms are more likely to pay dividends. Dividends are less likely for firms with more investments.

The summary statistics provide details on the nature of dividend payers, former payers, and firms that have never paid. Former payers tend to be distressed. They have low earnings and few investments. Firms that have never paid dividends are more profitable than former payers and they have strong growth opportunities. Dividend payers are, in turn, more profitable than firms that have never paid. But firms that have never paid invest at a higher rate, do more R&D, and have a higher ratio of the market value of assets to their book value (V_t/A_t , a proxy for Tobin's Q) than dividend payers. The investments of dividend payers are on the order of pre-interest earnings, but the investments of firms that have never paid exceed earnings. Finally, payers are about 10 times as large as non-payers.

The decline after 1978 in the percent of firms paying dividends is due in part to an increasing tilt of publicly traded firms toward the characteristics of firms that have never paid – low earnings, strong investments, and small size. This tilt in the population of firms is driven by an explosion of newly listed firms, and by the changing nature of the new firms. The number of publicly traded non-financial non-utility firms grows from 3,638 in 1978 to 5,670 in 1997, before declining to 5,113 in 1999. Newly listed firms always tend to be small, with extraordinary investment opportunities (high asset growth rates and high V_t/A_t). What

changes after 1978 is their profitability. Before 1978, new lists are more profitable than seasoned firms. In 1973–77, the earnings of new lists average a hefty 17.79% of book equity, versus 13.68% for all firms. The profitability of new lists falls throughout the next 20 years. The earnings of new lists in 1993–98 average 2.07% of book equity, versus 11.26% for all firms.

The decline in the profitability of new lists is accompanied by a decline in the percent of new lists that pay dividends. During 1973–77, one-third of newly listed firms pay dividends. In 1999, only 3.7% of new lists pay dividends. The surge in numbers and the changing nature of new lists produce a swelling group of small firms with low profitability but large investments that have never paid dividends. This group of firms is a big factor in the decline in the percent of firms paying dividends.

It is perhaps obvious that investors have become more willing to hold the shares of small, relatively unprofitable growth companies. But the resulting tilt of the publicly traded population toward such firms is only half of the story for the declining incidence of dividend payers. Our more striking finding is that firms have become less likely to pay dividends, whatever their characteristics. We characterize the decline in the likelihood that a firm pays dividends, given its characteristics, as a lower propensity to pay. What we mean is that the perceived benefits of dividends (whatever they are) have declined through time.

We use two approaches to quantify how characteristics and propensity to pay combine to produce the decline in the percent of dividend payers. One approach works with logit regressions. The other uses relative frequencies of payers in portfolios formed on profitability, investment opportunities, and size. Both approaches say that lower propensity to pay is at least as important as changing characteristics in explaining the decline in the percent of dividend payers.

Lower propensity to pay is quite general. For example, the percent of dividend payers among firms with positive earnings declines after 1978. But the percent of payers among firms with negative earnings also declines. Small firms become much less likely to pay dividends after 1978, but there is also a lower incidence of dividend payers among large firms. Firms with many investment opportunities become much less likely to pay dividends after 1978, but dividends also become less likely among firms with fewer investments.

The effects of changing characteristics and propensity to pay vary across dividend groups. The characteristics of dividend payers (large, profitable firms) do not change much after 1978, and controlling for characteristics, payers become only a bit more likely to stop paying. Changing characteristics and lower propensity to pay show up more clearly in the dividend decisions of former payers and firms that have never paid. For example, after 1978, lower profitability and abundant growth opportunities produce much lower expected rates of dividend initiation by firms that have never paid. But controlling for characteristics, firms that have never paid also initiate dividends at much lower rates after 1978, and former payers become much less likely to resume dividends.

Share repurchases jump in the 1980s, and it is interesting to examine the role of repurchases in the declining incidence of dividend payers. We show that because repurchases are largely the province of dividend payers, they leave the decline in the percent of payers largely unexplained. Instead, the primary effect of repurchases is to increase the already high earnings payouts of cash dividend payers.

Our story proceeds as follows. Section 2 presents the facts about dividends to be explained. Section 3 documents the characteristics of dividend payers and the progressive tilt of the population of publicly traded firms toward the characteristics of firms that have never paid. Section 4 presents qualitative evidence on the reduced propensity to pay dividends. Section 5 quantifies the effects of characteristics and propensity to pay. Section 6 examines share repurchases. Section 7 concludes.

2. Time trends in cash dividends

Our goal is to explain the decline after 1978 in the incidence of dividend payers among NYSE, AMEX, and NASDAQ firms. We begin by examining the behavior of dividends for the longer 1926–99 period covered by CRSP. Fig. 1 shows the total number of non-financial non-utility firms on CRSP each year, and the number of firms that (i) pay cash dividends, (ii) do not pay, (iii) formerly paid, and (iv) have never paid. Fig. 2 shows percents of the total number of firms in the four dividend groups. We exclude utilities from the tests to avoid the criticism that their dividend decisions are a byproduct of regulation. We also exclude financial firms. The data to come on the characteristics of dividend payers are from Compustat, and Compustat's historical coverage of financial firms is spotty. Until mid-1962, CRSP covers only NYSE firms. The jumps in the total number of firms in 1963 and 1973 in Fig. 1 are due to the addition of AMEX and then NASDAQ firms.

The proportion of NYSE non-financial non-utility firms paying dividends falls by half during the early years of the Great Depression, from 66.9% in 1930 to 33.6% in 1933 (Fig. 2). Thereafter, the percent paying rises. In every year from 1943 to 1962, more than 82% of NYSE firms pay dividends. More than 90% pay dividends in 1951 and 1952. With the addition of AMEX firms in 1963, the proportion of payers drops to 69.3%. The addition of NASDAQ firms in 1973 lowers the proportion of payers to 52.8%, from 59.8% in 1972. It then rises to 66.5% in 1978, the peak for the post-1972 period of NYSE-AMEX-NASDAQ coverage. The proportion paying declines sharply after 1978, to 30.3% for 1987. It continues to decline thereafter, though less rapidly. In 1999, only 20.8% of firms pay dividends.

Both the numerator (the number of dividend payers) and the denominator (the number of sample firms) contribute to the decline after 1978 in the percent

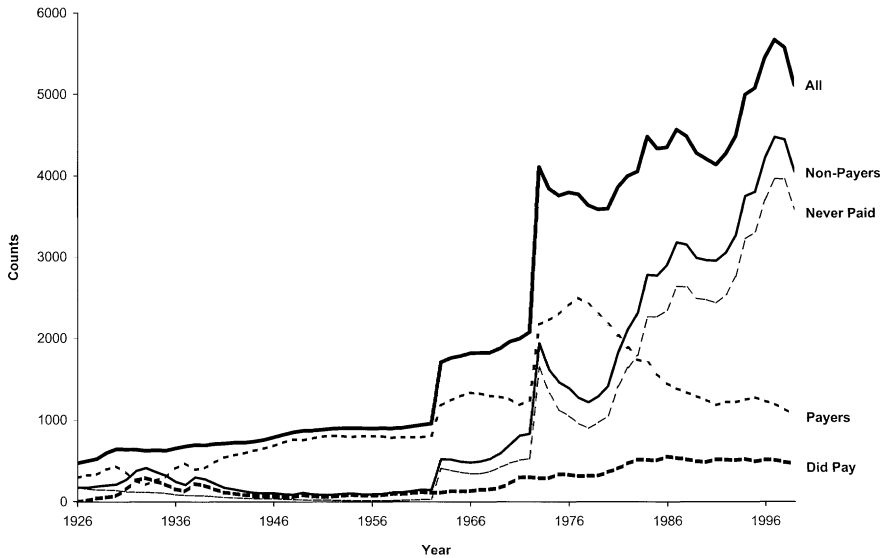


Fig. 1. The number of CRSP firms in different dividend groups. The CRSP sample includes NYSE, AMEX, and NASDAQ securities with share codes of 10 or 11. A firm must have market equity data (price and shares outstanding) for December of year t to be in the sample for that year. We exclude utilities (SIC codes 4900–4949) and financial firms (SIC codes 6000–6999). Payers pay dividends in year t ; non-payers do not. The two subgroups of non-payers are firms that have never paid and former payers (firms that do not pay in year t but did pay in a previous year).

of firms paying dividends. Swelling numbers of new listings cause the CRSP sample to expand by about 40%, from 3,638 firms in 1978 to 5,113 in 1999 (Fig. 1). New lists average 5.2% of listed firms (114 per year) during 1963–77, versus 9.6% (436 per year) for 1978–99 (Table 1).

More interesting, the population of dividend payers shrinks by more than 50% after 1978. There are 2,419 dividend payers in 1978 but only 1,182 in 1991 and 1,063 in 1999 (Fig. 1). The decline in the number of payers means that payers added to the sample fail to replace those lost. Dividend payers are lost when firms stop paying dividends or disappear from CRSP due to merger or delisting. Payers are added to the sample when former payers resume dividends, firms that have never paid initiate dividends, or new firms pay dividends in the year of listing.

Table 2 provides details on the change in the number of payers. The rate at which dividend payers are lost from the sample (due to dividend terminations, mergers, and delistings) rises from 6.8% per year for 1963–77 to 9.8% for 1978–99. Much of the increase is due to mergers. There is no clear trend in the rate at which dividend payers terminate dividends. During 1978–99, on average 5.0% of payers stop paying each year. This is higher than the termination rate

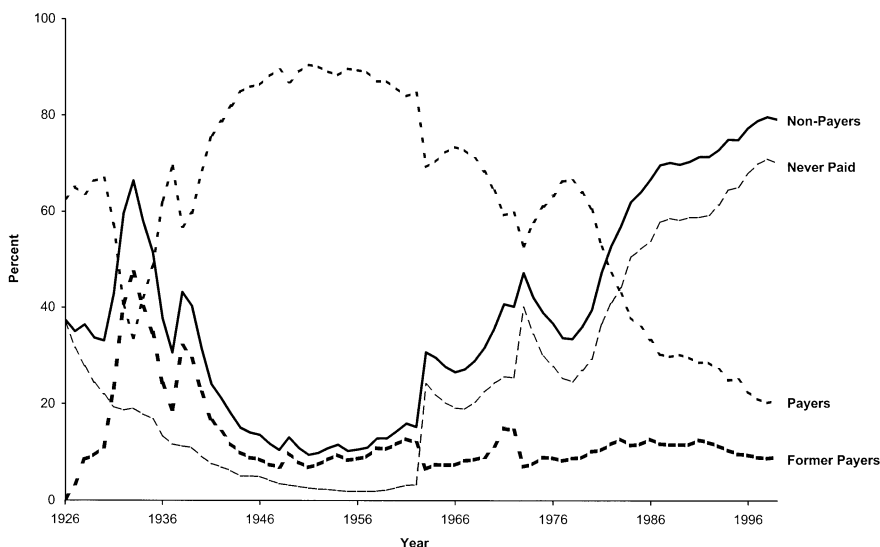


Fig. 2. The percent of CRSP firms in different dividend groups. The CRSP sample includes NYSE, AMEX, and NASDAQ securities with share codes of 10 or 11. A firm must have market equity data (price and shares outstanding) for December of year t to be in the sample for that year. We exclude utilities (SIC codes 4900–4949) and financial firms (SIC codes 6000–6999). Payers pay dividends in year t ; non-payers do not. The two subgroups of non-payers are firms that have never paid and former payers (firms that do not pay in year t but did pay in a previous year).

for 1963–77, 3.5% per year, but it is lower than the rate for 1927–62, 5.4% per year. A relatively steady termination rate is consistent with the evidence in DeAngelo and DeAngelo (1990) and DeAngelo et al. (1992) that only distressed firms (with strongly negative earnings) terminate dividends. In contrast, during 1978–99, dividend payers merge into other firms at the rate of 3.9% per year. This is higher than the merger rates for 1927–62 (0.6% per year) and 1963–77 (2.7% per year). Dividend payers delist at the rate of 0.9% per year during 1978–99, versus 0.3% for 1927–62 and 0.8% for 1963–77.

Dividend payers disappear at a higher rate during 1978–98, but the more important factor in the decline in the number of payers is the failure of new payers to replace those that are lost. Former payers (always a relatively small group) resume dividends at an average rate of 11.8% per year during 1963–77; this rate falls to 6.2% per year for 1978–99 and 2.5% for 1999. New lists surge after 1978, but the proportion paying dividends in the year of listing declines from 50.8% for 1963–77 to 9.0% for 1978–99 and only 3.7% in 1999 (Table 1). New lists feed a swelling group of firms that never get around to paying dividends. The initiation rate for firms that have never paid dividends drops from 7.1% per year for 1963–77 to 1.8% for 1978–99 and a tiny 0.7% for 1999.

Table 1
Counts and percents of CRSP and Compustat firms in different dividend groups

Payers pay dividends in year t ; non-payers do not. The two subgroups of non-payers are firms that have never paid and former payers (firms that do not pay in year t but did pay in a previous year). A new list is a firm that first appears on CRSP or Compustat in year t . (See the appendix for more complete definitions of payers, non-payers, and new lists.) New Lists that Pay is the percent of newly listed firms that pay in year t . The numbers are averages of annual values for the indicated time periods.

Counts of CRSP firms	1926–62	1963–99	1963–77	1978–99	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	1999
All firms	762	3,679	2,528	4,464	1,779	1,948	3,856	3,735	4,357	4,276	5,208	5,113
New lists	25	305	114	436	99	140	103	286	515	352	584	322
Counts of Compustat firms		1963–98	1963–77	1978–98	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	
All firms		2,919	1,823	3,702	1,024	1,600	2,847	2,883	3,301	3,566	4,831	
New lists		205	69	302	61	100	45	112	283	261	511	
Percents of CRSP firms	1926–62	1963–99	1963–77	1978–99	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	1999
Payers	74.7	47.6	65.5	35.5	71.6	64.6	60.3	58.2	36.1	29.4	23.5	20.8
Non-payers	25.3	52.4	34.5	64.5	28.4	35.4	39.7	41.8	63.9	70.6	76.5	79.2
Never paid	10.0	42.2	25.4	53.7	20.9	23.7	31.6	31.8	51.7	58.7	66.6	70.1
Former payers	15.3	10.1	9.1	10.8	7.4	11.7	8.2	10.0	12.1	11.9	9.8	9.1
New lists	3.5	7.8	5.2	9.6	5.6	7.2	2.7	7.5	11.7	8.2	11.2	6.3
New lists that pay	83.0	25.9	50.8	9.0	72.1	47.3	33.1	15.7	8.8	7.9	5.2	3.7
Percents of Compustat firms		1963–98	1963–77	1978–98	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	
Payers		51.2	68.5	38.8	74.5	66.6	64.3	62.7	40.0	31.9	23.6	
Non-payers		48.8	31.5	61.2	25.5	33.4	35.7	37.3	60.0	68.1	76.4	
Never paid		39.7	23.1	51.7	19.4	23.0	26.8	28.6	49.7	58.1	67.1	
Former payers		9.1	8.5	9.6	6.1	10.5	8.9	8.7	10.2	10.0	9.3	

Table 2
What happens in year t to CRSP firms that do and do not pay dividends in year $t - 1$
 Firms that Continue to Pay pay dividends in years $t - 1$ and t . Firms that Stop Paying pay dividends in $t - 1$ and not in t . Firms that Merge are delisted in year t with a CRSP delist code between 200 and 299. Delist includes all other firms delisted in year t . The numbers are averages of annual values for the indicated time periods.

	What happens in year t to firms that pay dividends in year $t - 1$ (percent)											
	1927–62	1963–99	1963–77	1978–99	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	1999
Continue to pay	93.7	91.3	93.1	90.1	94.1	91.3	94.0	90.8	88.1	89.4	91.9	89.6
Stop paying	5.4	4.4	3.5	5.0	2.6	4.5	3.3	4.1	5.7	6.0	4.5	4.2
Merge	0.6	3.4	2.7	3.9	2.6	3.5	1.9	3.9	4.4	3.8	3.2	5.5
Delist	0.3	0.8	0.6	0.9	0.8	0.5	0.5	1.1	1.7	0.8	0.4	0.5
	What happens in year t to firms that do not pay dividends in year $t - 1$ (percent)											
	1927–62	1963–99	1963–77	1978–99	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	1999
Start paying	15.0	5.2	8.8	2.7	9.9	4.1	12.3	5.0	2.5	2.4	1.5	0.9
Do not pay	81.2	86.0	84.9	86.8	84.3	90.3	80.0	86.4	86.3	85.5	89.3	82.3
Merge	0.8	3.2	2.3	3.8	2.1	2.5	2.3	3.7	2.8	3.5	4.2	7.3
Delist	2.9	5.1	3.5	6.3	3.6	2.5	4.3	4.1	7.7	8.1	4.9	9.3
	Percent of non-payers in year $t - 1$ that start paying in year t											
	1927–62	1963–99	1963–77	1978–99	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98	1999
All non-payers in $t - 1$	15.0	5.2	8.8	2.7	9.9	4.1	12.3	5.0	2.5	2.4	1.5	0.9
Never paid in $t - 1$	8.5	4.0	7.1	1.8	6.9	3.2	11.3	3.6	1.4	1.7	1.0	0.7
Former payers in $t - 1$	16.9	8.5	11.8	6.2	14.1	6.2	15.1	9.4	6.5	5.8	4.3	2.5

Although mergers contribute to the decline in the number of dividend payers, they are not important in the decline in the percent of payers. During the critical 1978–99 period, non-payers merge into other firms at about the same rate (3.8% per year) as payers (3.9% per year), so mergers have little effect on the percent of firms paying dividends. Non-payers delist at a higher rate (6.3% per year for 1978–99) than payers (0.9% per year). Thus, delistings reduce the number of firms paying dividends, but they actually increase the percent of firms paying.

Fig. 2 gives a simple view of the factors that contribute to the decline in the percent of firms paying dividends. Terminations by dividend payers and resumptions by former payers have little net effect. Terminations and resumptions determine the population of former payers, which grows from 319 firms in 1978 to 466 in 1999 (Fig. 1). Because the number of listed firms also grows, the proportion of all firms accounted for by former payers only rises from 8.8% in 1978 to 9.1% in 1999 (Fig. 2). As a result, the decline in the proportion of firms paying dividends (from 66.5% in 1978 to 20.8% in 1999) almost matches the growth in the proportion that have never paid (from 24.7% in 1978 to 70.1% in 1999). This group (new lists that never become dividend payers) is a big factor in both the decline in the numerator of the percent of dividend payers (the number of payers) and the increase in the denominator (the number of sample firms).

The rest of the paper addresses two questions raised by the declining incidence of dividend payers: (i) Has the population of firms drifted toward a lower frequency of firms with the characteristics typical of payers, or (ii) have firms with the characteristics typical of payers become less likely to pay dividends? We start by establishing the characteristics of dividend payers, and the declining incidence of these characteristics among publicly traded firms.

3. Characteristics of dividend payers

Our evidence on the characteristics of dividend payers and non-payers is from Compustat. The time period, 1963–98, is shorter than the 1926–99 CRSP period examined above, but the Compustat data cover the post-1972 NYSE-AMEX-NASDAQ period and the post-1978 period of most interest to us.

On average, the CRSP sample has about 750 more firms than the Compustat sample in their shared 1963–98 period (Table 1). The difference between the samples is due to CRSP's more complete coverage and the data requirements we impose on the Compustat sample (see the appendix). But the Compustat sample does show the sharp decline in the percent of dividend payers observed in the CRSP sample. Dividend payers average 64.3% of Compustat firms in 1973–77 and 23.6% in 1993–98 (Table 1). The averages for CRSP are 60.3% in 1973–77 and 23.5% in 1993–98.

Our initial discussion of the characteristics of dividend payers focuses on the evidence from summary statistics that payers and non-payers differ in terms of

profitability, investment opportunities, and size. The evidence from the summary statistics is then confirmed with logit regressions.

3.1. Profitability

Table 3 details the characteristics of firms in various dividend groups. Dividend payers have higher measured profitability than non-payers. For the full 1963–98 period, E_t/A_t (the ratio of aggregate earnings before interest to aggregate assets) averages 7.82% per year for payers versus 5.37% for non-payers. Among non-payers, E_t/A_t averages 4.54% per year for former dividend payers. This is lower than the profitability of firms that have never paid dividends, 6.11% per year, which in turn is below the profitability of dividend payers, 7.82% per year.

Earnings before interest, E_t , are the payoff on a firm's assets, but earnings available for common, Y_t , may be more relevant for the decision to pay dividends. Table 3 shows that the gap between the profitability of payers and non-payers is wider when profitability is measured as Y_t/BE_t (aggregate common stock earnings over aggregate book equity). For 1963–98, Y_t/BE_t averages 12.75% for dividend payers, versus 6.15% for non-payers. Among non-payers, Y_t/BE_t averages 7.94% for firms that have never paid dividends and only 3.18% for former payers.

Low profitability becomes more common in the second half of the 1963–98 period. The plots of the decile breakpoints for E_t/A_t in Fig. 3 provide perspective. Initially the breakpoints drift upward, peaking around 1979 or 1980. After the peak years, profitability declines. The decline is marginal in the higher profitability deciles, but it is large in the lower profitability deciles. The lowest breakpoint (the tenth percentile) switches from consistently positive to consistently negative in 1982. At least 20% of firms have negative earnings before interest after 1984. In the last three years, 1996–98, negative earnings before interest afflict more than 30% of the firms.

Many of the firms that are unprofitable later in the sample period are new listings. Until 1978, more than 90% of new lists are profitable (Fig. 4). Thereafter, the fraction with positive earnings falls. In 1998, only 51.5% of new lists have positive common stock earnings. Table 3 shows that before 1982, new lists – even new lists that do not pay dividends – tend to be more profitable than all publicly traded firms. After 1982 the profitability of new lists falls. The deterioration occurs as the number of new lists explodes, and it is dramatic for the increasingly large group of new lists that do not pay dividends. By 1993–98 (when there are 511 Compustat new lists per year and only 5.2% pay dividends), the common stock earnings of newly listed non-payers average only 0.27% of book equity, versus 11.26% for all firms. The low profitability of new lists later in the sample period is in line with similar evidence on the low post-issue profitability of IPO firms (Jain and Kini, 1994; Mikkelson et al., 1997).

Table 3

Average firm size, and ratios of aggregate earnings, investment, firm value, and liabilities to aggregate assets and book equity, for different dividend groups and for new lists

A_t , BE_t , ME_t , $L_t = A_t - BE_t$, and $V_t = L_t + ME_t$ are assets, book common equity, market value of common equity, book liabilities, and total market value, at the end of fiscal year t . E_t , Y_t , D_t , and RD_t are earnings before interest but after taxes, after-tax earnings to common stock, dividends, and R&D expenditures for fiscal year t . Investment, dA_t , is $A_t - A_{t-1}$. The ratios shown are ratios of the year t aggregate values of the variables for the firms in a group, averaged over the years in a period. Results are shown for all firms and for firms grouped according to dividend status. Results are also shown for all new lists and for newly listed dividend payers and non-payers.

	1963–98	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98
E_t/A_t (percent)								
All firms	7.59	8.45	7.38	7.69	9.02	8.04	6.45	6.35
Payers	7.82	8.58	7.54	7.81	9.13	8.37	6.64	6.88
Non-payers	5.37	5.34	5.37	5.94	7.01	4.90	4.94	4.30
Never paid	6.11	5.94	6.07	7.02	9.58	5.54	5.10	3.95
Former payers	4.54	4.57	4.51	4.62	4.32	3.89	4.64	5.13
All new lists	7.56	9.05	7.94	10.10	10.49	5.71	6.70	3.69
Payers	9.04	9.27	8.17	11.13	11.18	10.69	6.75	6.59
Non-payers	6.97	8.06	7.74	9.03	10.60	4.97	6.19	3.00
Y_t/BE_t (percent)								
All firms	12.04	12.55	11.58	13.68	14.36	11.37	9.62	11.26
Payers	12.75	12.69	11.87	14.04	14.60	12.07	10.46	13.41
Non-payers	6.15	7.95	7.37	7.67	8.96	3.96	3.44	4.12
Never paid	7.94	9.61	9.20	9.82	13.73	5.70	4.64	3.70
Former payers	3.18	5.91	4.77	4.55	0.67	-0.40	0.46	5.78
All new lists	10.71	14.73	12.63	17.79	16.08	7.09	6.29	2.07
Payers	13.52	14.51	12.54	18.73	17.50	14.78	6.78	10.41
Non-payers	9.88	15.65	13.20	16.21	15.76	5.25	4.75	0.27
dA_t/A_t (percent)								
All firms	9.25	9.35	9.70	9.93	10.44	7.11	9.28	9.00
Payers	8.78	9.32	9.52	10.16	10.44	6.57	9.20	6.65
Non-payers	11.62	10.10	13.53	6.47	10.32	12.43	9.62	17.67
Never paid	16.50	13.98	17.98	10.12	17.35	18.20	13.80	22.82
Former payers	4.67	5.46	7.80	1.64	2.85	3.33	3.42	7.61
All new lists	23.29	15.57	21.22	17.87	30.15	28.79	16.04	31.71
Payers	13.42	12.75	16.55	13.38	17.54	14.93	6.50	12.50
Non-payers	30.28	24.62	29.27	25.94	38.43	33.15	22.93	36.38
V_t/A_t								
All firms	1.40	1.71	1.52	1.12	1.06	1.24	1.35	1.72
Payers	1.39	1.72	1.53	1.14	1.05	1.22	1.34	1.69
Non-payers	1.42	1.42	1.47	0.99	1.25	1.42	1.42	1.86
Never paid	1.64	1.62	1.70	1.09	1.52	1.65	1.65	2.13
Former payers	1.10	1.17	1.16	0.86	0.94	1.07	1.12	1.34
All new lists	1.76	1.86	1.86	1.32	1.81	1.61	1.68	2.09
Payers	1.51	1.80	1.76	1.27	1.32	1.46	1.39	1.55
Non-payers	1.90	1.93	2.05	1.33	2.16	1.71	1.85	2.20

Table 3 (continued)

	1963–98	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98
<i>RD_t/A_t</i>								
All firms	1.67	0.65	1.08	1.35	1.66	2.36	2.17	2.27
Payers	1.61	0.64	1.11	1.35	1.62	2.30	2.05	2.09
Non-payers	2.07	0.76	0.74	1.33	2.38	2.89	3.19	3.03
Never paid	2.76	0.72	0.83	1.67	3.15	3.93	4.67	4.07
Former payers	1.03	0.80	0.62	0.90	1.52	1.24	1.04	1.08
All new lists	1.44	0.51	0.53	1.19	1.96	1.57	1.79	2.36
Payers	1.05	0.45	0.53	0.94	1.10	0.94	0.81	2.31
Non-payers	1.70	0.68	0.53	1.46	2.62	1.86	2.42	2.23
<i>A_t</i>								
All firms	577.06	270.85	336.75	367.40	544.63	584.55	877.91	977.27
Payers	1,389.18	348.33	471.41	533.72	838.59	1,345.67	2,452.04	3,343.61
Non-payers	110.43	43.75	71.71	65.89	70.88	92.44	143.87	255.46
Never paid	81.68	31.14	57.71	49.09	47.53	68.40	99.20	195.88
Former payers	262.42	84.34	101.04	116.79	148.30	211.73	399.68	689.62
All new lists	70.24	45.61	56.67	25.89	23.96	65.96	96.32	159.43
Payers	323.21	50.34	78.09	58.73	64.34	208.77	608.28	1,048.80
Non-payers	52.98	36.22	37.78	15.57	15.69	55.76	63.66	130.62
<i>L_t/A_t</i>								
All firms	0.55	0.41	0.51	0.57	0.54	0.52	0.64	0.62
Payers	0.54	0.40	0.50	0.57	0.53	0.52	0.64	0.64
Non-payers	0.60	0.57	0.62	0.63	0.63	0.57	0.62	0.56
Never paid	0.55	0.57	0.60	0.60	0.54	0.51	0.54	0.51
Former payers	0.67	0.57	0.63	0.66	0.72	0.68	0.73	0.66
All new lists	0.53	0.47	0.51	0.55	0.55	0.56	0.53	0.54
Payers	0.52	0.43	0.47	0.51	0.57	0.45	0.60	0.58
Non-payers	0.55	0.61	0.57	0.58	0.51	0.58	0.51	0.53

After 1977, more than 85% of new lists trade on NASDAQ. One might suspect that the declining incidence of dividend payers is a NASDAQ phenomenon, driven by looser listing standards. In fact, all three exchanges contribute to the growth of unprofitable new lists. Among firms that begin trading between 1978 and 1998, 10.7% of NYSE new lists, 29.0% of AMEX new lists, and 23.6% of NASDAQ new lists have negative common stock earnings. Fig. 5 shows that all three exchanges experience large declines in the percent of payers after 1978. The fraction of NYSE firms paying dividends drops from 88.6% in 1979 to 52.0% in 1999, a level not seen since the Great Depression. AMEX and NASDAQ payers drop from peaks of 63.4 and 54.1% in 1978 and 1977 to 16.9 and 8.6% in 1999. Thus, although it coincides with the explosion of unprofitable NASDAQ new lists, the decline in the percent of firms paying dividends is not limited to NASDAQ.

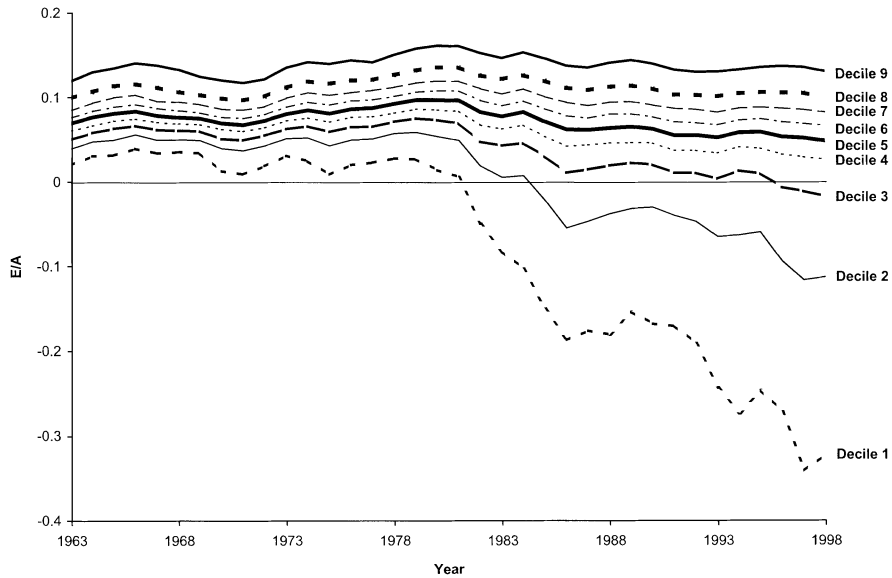


Fig. 3. Decile breakpoints for E_t/A_t . The sample of Compustat firms for calendar year t , 1963–98, includes non-financial non-utility firms with fiscal year-ends in t that satisfy the data requirements described in the appendix. E_t is earnings before interest but after taxes in year t . A_t is the book value of assets in year t .

3.2. Investment opportunities

Like profitability, investment opportunities differ across dividend groups. Firms that have never paid dividends have the best growth opportunities. Table 3 shows that they have much higher asset growth rates for 1963–98 (16.50% per year) than dividend payers (8.78%) or former payers (4.67%). V_t/A_t (the ratio of the aggregate market value to the aggregate book value of assets) is also higher for firms that have never paid (1.64) than for payers (1.39) or former payers (1.10). The R&D expenditures of firms that have never paid are on average 2.76% of their assets, versus 1.61% for dividend payers and 1.03% for former payers. Thus, though firms that have never paid seem to be less profitable than dividend payers, they have better growth opportunities. In contrast, former payers are victims of a double whammy – low profitability and poor investment opportunities.

Newly listed firms are again of interest. Dividend-paying new lists invest at a higher rate during 1963–98 (13.42% per year, Table 3) than all dividend payers (8.78%). There is an even larger spread between the asset growth rates of non-paying new lists and all non-paying firms. The 1963–98 average growth rate



Fig. 4. Percent of newly listed firms with positive earnings on common stock, $Y_t > 0$. A firm in the Compustat sample is defined as a new list in calendar year t if it is added to the CRSP database between January and December of year t . NYSE firms added to the CRSP database in December 1925, AMEX firms added in July 1962, and NASDAQ firms added between December 1972 and February 1973 are not defined as new lists. Earnings on common stock, Y_t , is earnings after interest, taxes, and preferred dividends.

for non-paying new lists – an extraordinary 30.28% per year – is almost twice the high 16.50% average growth rate for all firms that have never paid dividends. Similarly, V_t/A_t is higher for newly listed non-payers than for all firms that have never paid dividends. Thus, although newly listed non-payers suffer from low profitability later in the period, they have abundant investments.

Some readers express a preference for capital expenditures (roughly the change in long-term assets), rather than the change in total assets, to measure investment. Our view is that short-term assets are investments. Just as they invest in machines, firms invest in cash, accounts receivable, and inventory to facilitate their business activities. And when cash is retained for future long-term investments, the resources for these investments are committed when the cash is acquired.

Finally, a caveat is in order. The investment evidence suggests that, measured by E_t/A_t , the profitability advantage of dividend payers over firms that have never paid is probably exaggerated, for three reasons. (i) If investments take time to reach full profitability, E_t/A_t understates profitability for growing firms. And firms that have never paid grow faster than dividend payers. (ii) When R&D is

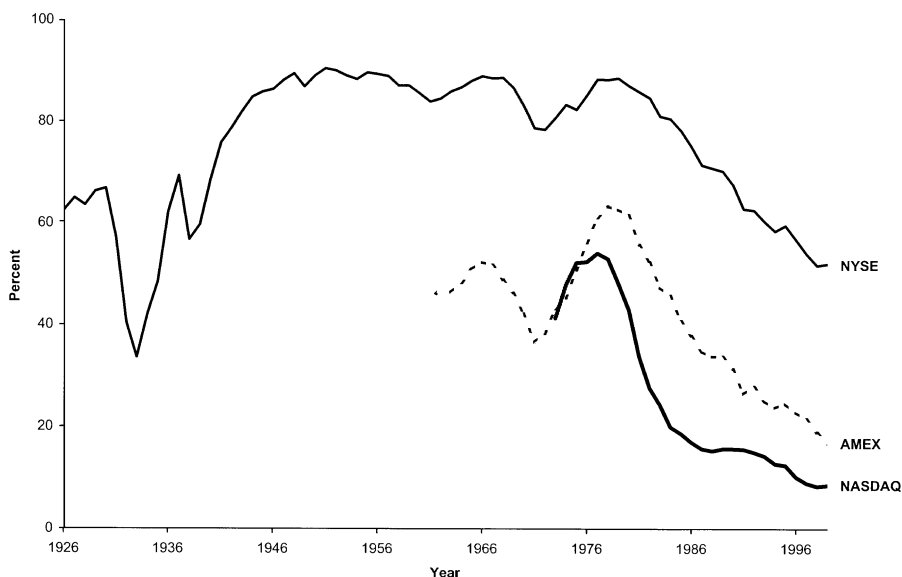


Fig. 5. Percent of CRSP firms paying dividends. The CRSP sample includes NYSE, AMEX, and NASDAQ securities with share codes of 10 or 11. A firm must have market equity data (price and shares outstanding) for December of year t to be in the sample for that year. We exclude utilities (SIC codes 4900–4949) and financial firms (SIC codes 6000–6999).

a multiperiod asset, mandatory expensing of R&D causes us to understate earnings and assets. If R&D is growing, E_t/A_t understates profitability. RD_t/A_t is higher for firms that have never paid dividends than for dividend payers. And the RD_t/A_t spread grows through time, from 0.32% in 1973–77 to 1.98% in 1993–98 (Table 3). (iii) Since firms that have never paid dividends grow faster, their assets are on average younger than those of dividend payers. Inflation is then likely to cause us to overstate the profitability advantage of dividend payers relative to firms that have never paid.

3.3. Size

Dividend payers are much larger than non-payers. During 1963–67, the assets of payers average about eight times those of non-payers (Table 3). In the non-payer group, former payers are about three times the size of firms that have never paid. In later years, as the Compustat sample grows and the number of payers declines, payers become even larger relative to non-payers. During 1993–98, the assets of payers average more than 13 times those of non-payers.

Table 4 gives a different perspective on the relative size of dividend payers and non-payers. The table shows that payers account for 93.5–95.8% of the aggregate book and market values of assets and common stock during 1973–77, when

Table 4
Percent of aggregate values accounted for by firms paying dividends

A_t , BE_t , ME_t , $L_t = A_t - BE_t$, and $V_t = L_t + ME_t$ are assets, book common equity, market value of common equity, book liabilities, and total market value, at the end of fiscal year t . $dA_t = A_t - A_{t-1}$ is the change in assets in fiscal year t . E_t , Y_t , SP_t , and SI_t are earnings before interest but after taxes, after-tax earnings to common stock, stock purchases, and stock issues for fiscal year t . dT_t is the change in treasury stock. The table shows average values for the indicated periods of the year t percents of the aggregate values of the variables (sums over all Compustat firms in the sample) accounted for by firms that pay dividends.

	1963–98	1971–98	1983–98	1963–67	1968–72	1973–77	1978–82	1983–87	1988–92	1993–98
Y_t	96.4	96.0	95.2	98.1	96.7	96.8	97.8	97.3	97.2	91.7
E_t	93.5	92.6	90.6	97.4	94.9	94.9	96.3	94.3	91.7	86.7
dA_t	85.5	83.2	74.2	95.7	91.8	95.9	95.1	80.0	85.5	60.0
A_t	90.7	89.4	86.2	95.9	92.8	93.5	95.1	90.5	88.9	80.3
V_t	90.3	88.8	84.9	96.6	93.3	94.3	94.3	89.1	88.2	78.7
BE_t	90.8	89.2	85.1	97.0	94.3	94.3	96.0	91.5	88.3	77.1
ME_t	90.3	88.5	83.8	97.3	94.4	95.8	94.2	88.8	87.4	76.7
L_t	90.3	89.3	86.7	94.2	91.3	92.9	94.3	89.6	89.2	82.2
SP_t		88.0	88.9			84.4	91.4	90.9	89.1	87.1
SI_t		68.4	53.6			90.4	88.0	67.3	61.3	35.8
dT_t			92.2					100.3	84.7	91.7

64.3% of firms in the Compustat sample pay dividends. Even during 1993–98, when fewer than one-quarter of Compustat firms pay dividends, payers account for more than three-quarters of aggregate book and market values.

Dividend payers are more profitable and non-payers derive more of their market value from expected growth, so the share of dividend payers in aggregate earnings is even higher than their share of assets and market values. During each of the four five-year periods from 1973 to 1992, payers account for about 97% of common stock earnings (Table 4). For 1993–98, the 23.6% of firms that pay dividends account for all but 8.3% of aggregate earnings.

The fact that, even at the end of the sample period, dividend payers account for a large fraction of aggregate earnings, is, however, a bit misleading. Firms with negative earnings (mostly non-payers) become more common later in the sample period. As a result, we shall see that dividend payers can continue to account for a large fraction of aggregate earnings even though an increasing fraction of profitable firms, that in earlier times would be dividend payers, are now non-payers.

Finally, firms that do not pay dividends are big issuers of equity. During 1971–98 (when data on stock purchases and issues are available on Compustat), the aggregate net stock issues of non-payers average 2.80% of the aggregate market value of their common stock, versus a trivial -0.05% for dividend payers. Dividend payers' share of gross stock issues drops from 90.4% for

1973–77 to 35.8% for 1993–98 (Table 4). Thus, though much less important on other dimensions, firms that do not pay dividends currently account for almost two-thirds of the aggregate value of stock issues. This is not surprising, given that the non-payer group tilts increasingly toward growth firms with investment outlays much in excess of their earnings.

3.4. Synopsis

The evidence suggests that three fundamentals – profitability, investment opportunities, and size – are factors in the decision to pay dividends. Dividend payers tend to be large, profitable firms with earnings on the order of investment outlays (Table 3). Firms that have never paid are smaller and they seem to be less profitable than dividend payers, but they have more investment opportunities (higher asset growth rates, higher V_t/A_t , and higher RD_t/A_t), and their investment outlays are much larger than their earnings. The salient characteristics of former dividend payers are low earnings and few investments.

The steady decline after 1978 in the percent of firms paying dividends is in part due to an increasing tilt of the population of publicly traded firms toward the characteristics typical of firms that have never paid. The source of the tilt is new lists. There is a surge in newly listed firms after 1977, and they differ from earlier new lists. During the early years of the 1963–98 period, new lists tend to be small, profitable firms with abundant investments. After 1977, new lists continue to be small and to grow rapidly. But their profitability deteriorates, and new lists that pay dividends become increasingly rare. The new breed of new lists feeds a swelling group of small firms with low earnings and strong growth opportunities – the timeworn characteristics of firms that have never paid dividends.

3.5. Confirmation from logit regressions

Table 5 summarizes annual logit regressions that document more formally the marginal effects of size, profitability, and investment opportunities on the likelihood that a firm pays dividends. The size of an NYSE, AMEX, or NASDAQ firm for a given year is its NYSE percentile, NYP_t , that is, the percent of NYSE firms that have the same or smaller market capitalization. This size measure is meant to neutralize any effects of the growth in typical firm size through time. Profitability is measured as the ratio of a firm's earnings before interest to its total assets, E_t/A_t . The proxies for investment opportunities are a firm's rate of growth of assets, dA_t/A_t , and its market-to-book ratio, V_t/A_t . Rather than one overall regression, we estimate the logit regressions year-by-year. In the spirit of Fama and MacBeth (1973), we use the time-series standard deviations of the annual coefficients, which allow for correlation of the regression residuals across firms, to make inferences about average coefficients.

Table 5
Logit regressions to explain which firms pay dividends

We estimate logit regressions for each year t of the 1963–98 period. The dependent variable is 1.0 in year t if a firm pays dividends, 0.0 otherwise. The explanatory variables are profitability (E_t/A_t), the growth rate of assets (dA_t/A_t), the market-to-book ratio (V_t/A_t), and the percent of NYSE firms with the same or lower market capitalization (NYP_t). The year t regressions are estimated for all Compustat firms with the required data items. The table shows means (across years) of the regression intercepts (Int) and slopes, and t -statistics for the means, defined as the mean divided by its standard error (the times-series standard deviation of the regression coefficient divided by the square root of the number of years in the period).

	Average coefficient					t -statistic				
	Int	NYP _{<i>t</i>}	V_t/A_t	dA_t/A_t	E_t/A_t	Int	NYP _{<i>t</i>}	V_t/A_t	dA_t/A_t	E_t/A_t
1963–98	– 0.48	5.03	– 0.83	– 0.97	10.47	– 4.17	37.84	– 16.93	– 6.50	12.20
1963–77	– 0.11	4.56	– 0.85	– 0.88	15.09	– 1.18	22.14	– 8.82	– 2.99	11.67
1978–98	– 0.75	5.36	– 0.81	– 1.04	7.17	– 4.53	39.65	– 16.21	– 6.84	27.66
1963–67	– 0.20	4.35	– 0.66	– 0.70	16.71	– 2.24	24.67	– 10.39	– 1.56	12.07
1968–72	– 0.27	3.84	– 0.62	– 1.90	18.63	– 1.31	21.27	– 11.02	– 5.68	9.31
1973–77	0.14	5.48	– 1.27	– 0.03	9.93	1.03	31.17	– 8.14	– 0.08	9.13
1978–82	0.40	5.69	– 1.15	– 0.55	8.08	5.60	44.62	– 20.88	– 2.43	17.41
1983–87	– 0.62	5.58	– 0.77	– 1.23	7.51	– 3.00	40.19	– 9.59	– 5.43	16.55
1988–92	– 1.32	5.83	– 0.72	– 0.48	6.00	– 82.55	52.15	– 20.94	– 2.51	11.93
1993–98	– 1.33	4.51	– 0.65	– 1.75	7.09	– 17.59	34.25	– 14.31	– 9.95	21.78
1963–98	– 1.20	4.26	– 1.20	– 1.55	7.21	– 10.07	35.69	– 10.07	– 8.92	14.61
1963–77	– 0.63	3.83	– 1.31	– 1.31	9.71	– 11.53	26.28	– 11.53	– 4.18	12.46
1978–98	– 1.61	4.58	– 1.61	– 1.73	5.43	– 11.07	32.03	– 11.07	– 8.82	25.47
1963–67	– 0.62	3.81	– 0.62	– 1.00	11.22	– 6.14	23.38	– 6.14	– 2.31	9.59
1968–72	– 0.63	3.29	– 0.63	– 2.33	11.39	– 4.66	34.03	– 4.66	– 5.60	14.14
1973–77	– 0.63	4.37	– 0.63	– 0.59	6.51	– 12.51	21.78	– 12.51	– 1.17	9.09
1978–82	– 0.58	4.74	– 1.54	– 1.54	5.59	– 5.09	30.47	– 5.09	– 3.63	21.07
1983–87	– 1.52	4.93	– 1.52	– 2.00	6.27	– 11.19	24.97	– 11.19	– 6.18	15.02
1988–92	– 2.12	5.06	– 2.12	– 0.85	4.38	– 166.29	26.73	– 166.29	– 2.41	9.92
1993–98	– 2.11	3.75	– 2.11	– 2.38	5.45	– 49.00	25.53	– 49.00	– 13.24	28.15

The full-period (1963–98) average slopes from the regressions confirm our inferences about the roles of size, profitability, and investment opportunities in the decision to pay dividends. Larger firms are more likely to pay dividends; the average slope on NYP_t is 37.84 standard errors from zero. More profitable firms are more likely to pay dividends; the average slope on E_t/A_t is 12.20 standard errors from zero. And firms with more investments are less likely to pay dividends; the average slopes on V_t/A_t and dA_t/A_t are -16.93 and -6.50 standard errors from zero. Strong negative average slopes for V_t/A_t (more than eight standard errors from zero) and strong positive slopes for NYP_t and E_t/A_t (more than nine standard errors from zero) are also observed in every five-year subperiod. The average slope for dA_t/A_t is negative in every subperiod, but the small five-year sample size makes the weaker negative marginal effect of investment outlays less consistently reliable in the subperiods.

Our results on the characteristics of dividend payers and non-payers complement the evidence in Fama and French (1999) that among dividend payers, larger and more profitable firms have higher payout ratios, and firms with more investments have lower payouts. And all these results are consistent with a pecking-order model in which firms are reluctant to issue risky securities because of asymmetric information problems (Myers and Majluf, 1984; Myers, 1984) or simply because of high transactions costs. Bigger asymmetric information problems and higher costs when issuing securities can also explain why smaller firms are less likely to pay dividends. That more profitable firms pay more dividends while firms with more investments pay less is also consistent with the propositions of Easterbrook (1984) and Jensen (1986) about the role of dividends in controlling the agency costs of free cash flow.

4. The propensity to pay dividends: qualitative evidence

The surge in new listings in the 1980s and 1990s, and the changing nature of new lists, cause the population of publicly traded firms to tilt increasingly toward the characteristics – small size, low profitability, and strong growth opportunities – of firms that have never paid dividends. But this is not the whole story for the decline in the percent of dividend payers. Our more interesting result is that, given their characteristics, firms have become less likely to pay dividends. This section presents some preliminary qualitative evidence. Section 5 then quantifies how the changing characteristics of firms combine with lower propensity to pay to explain the decline in the incidence of dividend payers.

If the decline in the percent of dividend payers is due entirely to the changing characteristics of firms, firms with particular characteristics should be as likely to pay dividends now as in the past. Fig. 6 suggests that this is not the case. The figure shows time series plots of the percent of dividend payers among (i) firms with positive common stock earnings, $Y_t > 0$, (ii) firms with negative Y_t , (iii)



Fig. 6. Percent of payers among firms with (i) positive and negative earnings on common stock, $Y_t > 0$ and $Y_t < 0$; and (ii) earnings before interest but after taxes greater than and less than investment, $E_t > dA_t$ and $E_t < dA_t$. The sample of Compustat firms for calendar year t , 1963–98, includes non-financial non-utility firms with fiscal year-ends in t that satisfy the data requirements described in the appendix. Y_t , earnings on common stock, is earnings after interest, taxes, and preferred dividends in year t ; E_t is earnings before interest but after taxes in year t ; and dA_t , investment, is the change in the book value of assets from $t - 1$ to t .

firms with earnings before interest that exceed investment outlays, $E_t > dA_t$, and (iv) firms with $E_t < dA_t$. In all four groups, firms become less likely to pay dividends later in the sample period.

In 1978, 72.4% of firms with positive common stock earnings pay dividends. In 1998, 30.0% of profitable firms pay dividends, less than half the fraction for 1978. The proportion of payers among firms with $E_t > dA_t$ falls from 68.4% in 1978 to 32.4% in 1998. These results suggest that dividends become less likely among firms with the characteristics (positive earnings and earnings in excess of investment) of dividend payers. But unprofitable firms and firms with investment outlays that exceed earnings also become less likely to pay. For firms with $E_t < dA_t$, the proportion paying dividends falls from 68.6% in 1978 to 15.6% in 1998. Dividends are never common among unprofitable firms. But these firms also become less likely to pay dividends in the 1980s and 1990s. Before 1983, about 20% of firms with negative common stock earnings pay dividends. In 1998, only 7.2% of unprofitable firms pay dividends. In short, the evidence suggests that firms become less likely to pay dividends, whatever their characteristics.

It is worth dwelling a bit on these results. The surge in unprofitable non-paying new lists causes the aggregate profitability of firms that do not pay dividends to fall in the 1980s and 1990s (Table 3). But Fig. 6 says that this decline in aggregate profitability hides the fact that an increasing fraction of firms with positive earnings – firms that in the past would typically pay dividends – now choose not to pay. Similarly, for non-payers the spread of aggregate investment over aggregate earnings widens later in the sample period, again largely as a result of new lists. But Fig. 6 says that an increasing fraction of firms with earnings that exceed investment – firms that in the past would typically pay dividends – are now non-payers. In short, the surge in unprofitable new lists with investment outlays far in excess of earnings causes the aggregate characteristics of non-payers, documented in Table 3, to mask widespread evidence of a lower propensity to pay dividends.

5. Changing characteristics and propensity to pay: quantitative effects

This section quantifies the effects of changing characteristics and propensity to pay on the percent of dividend payers. The approach is simple. We first estimate the probabilities that firms with given characteristics (size, profitability, and investment opportunities) pay dividends during 1963–77, the 15-year period of Compustat coverage preceding the 1978 peak in the percent of dividend payers. We then apply the probabilities from the 1963–77 base period to the samples of firm characteristics observed in subsequent years to estimate the expected percent of dividend payers for each year after 1977. Since the probabilities associated with characteristics are fixed at their base period values, variation in the expected percent of payers after 1977 is due to the changing characteristics of sample firms. We then use the difference between the expected percent of payers for a year (calculated using the base period probabilities) and the actual percent to measure the change in the propensity to pay dividends. A decline in the propensity to pay implies a positive difference between expected and actual percents of payers.

We use two approaches to estimate the probability function for the base period, logit regressions and relative frequencies of dividend payers in portfolios formed on profitability, investment opportunities, and size. We show results that use 1963–77 as the base period, but using 1973–77 (the first five-year period of NYSE-AMEX-NASDAQ coverage) as the base period produces similar results.

5.1. Regression estimates

Table 6 shows the expected percents of dividend payers obtained by applying the average coefficients from year-by-year logit regressions for 1963–77 to the samples of firm characteristics of subsequent years. Two sets of results are

shown. In one, the regressions use size (NYSE percentile, NYP_t), profitability (E_t/A_t), and two measures of investment opportunities (V_t/A_t and dA_t/A_t) to explain the probability that a firm pays dividends. In the other, V_t/A_t is dropped, leaving dA_t/A_t as the sole measure of investment opportunities. (The base period regressions are summarized in Table 5.)

Why two sets of results? Our approach to measuring the effects of changing characteristics on the incidence of dividend payers presumes that the proxies for profitability, investment opportunities, and size have constant meaning through time. This presumption is especially suspect for V_t/A_t . V_t/A_t drifts up in the 1980s and 1990s (Table 3). With rational pricing, the drift in V_t/A_t is due to some mix of (i) increasing profitability of assets in place, (ii) more profitable or more abundant expected investments, or (iii) lower discount rates for expected cash flows. Profitability (E_t/A_t) and investment outlays (dA_t/A_t) show no clear tendency to increase during the 1980s and 1990s (Table 3). It is reasonable to conclude that declining discount rates have a role in the drift in V_t/A_t . For our purposes, upward drift in V_t/A_t that is not due to improved investment opportunities causes us to overestimate the decline in the percent of payers due to changing characteristics and to understate the decline due to propensity to pay.

Consider first the regressions that use NYP_t , E_t/A_t , and both V_t/A_t , and dA_t/A_t to explain the probability that a firm pays dividends. Since we use the same 1963–77 average regression function to estimate the expected percent of payers in each of the following years, changes in the expected percent after 1977 are due to the changing characteristics of sample firms. When the average regression function for 1963–77 is applied to the sample of firm characteristics for 1978, the expected proportion of payers is 70.0%. The proportion of dividend payers for 1963–77 is 68.5%. Thus, roughly speaking, the characteristics of firms in 1978 are similar to those of the base period. The expected proportion of payers falls after 1978, reaching 44.6% in 1998. The 25.4 percentage point decline in the expected proportion of payers, from 70.0% in 1978 to 44.6% in 1998, is an estimate of the effect of changing characteristics on the percent of firms paying dividends.

The actual percent of dividend payers for a given year of the 1978–98 period is also the expected percent that would be produced by a logit regression estimated on that year's sample of firms. Thus, by comparing the actual percent of payers for a year and the expected percent produced with the regression function for the 1963–77 base period, we can infer the effect of changes in the regression function, or equivalently, changes in the propensity to pay dividends. In 1978, the actual percent of payers is only 1.5 percentage points below the expected. The spread between the expected and actual percent widens thereafter. By 1998, when the regression function for 1963–77 predicts that 44.6% of firms pay dividends, only 21.3% actually pay. The difference, 23.3 percentage points, between the expected and actual percents for 1998 estimates the end-of-sample shortfall in the percent of dividend payers due to reduced propensity to pay.

Table 6

Estimates from logit regressions of the effect of changing characteristics and declining propensity to pay on the percent of firms paying dividends

We use all firms for each year of the 1963–77 base period to estimate logit regressions that explain whether a firm pays dividends. The explanatory variables are profitability (E_t/A_t), the growth rate of assets (dA_t/A_t), the market-to-book ratio (V_t/A_t), and the percent of NYSE firms with the same or lower market capitalization (NYP_t). Firms is the number of firms in the sample for a year, or the average for a period. Payers is the number (or average number) of dividend payers. Actual Percent is the percent of payers (the ratio of payers to firms, times 100). The Expected Percent of payers for a year t is estimated by applying the average logit regression coefficients for 1963–77 to the values of the explanatory variables for each firm for year t , summing over firms, dividing by the number of firms, and then multiplying by 100. The evolution of Expected Percent measures the effects of changing characteristics on the percent of dividend payers. Expected – Actual measures the effect of propensity to pay. There are two sets of results. One uses V_t/A_t and dA_t/A_t to control for investment opportunities; the second uses only dA_t/A_t .

	Firms	Payers	Actual Percent	V_t/A_t and dA_t/A_t		dA_t/A_t	
				Expected Percent	Expected – Actual	Expected Percent	Expected – Actual
1963–77	1,823	1,218	68.5				
1978	2,901	1,988	68.5	70.0	1.5	66.9	– 1.6
1979	2,819	1,918	68.0	69.7	1.7	67.3	– 0.7
1980	2,806	1,825	65.0	67.9	2.9	67.9	2.9
1981	2,917	1,698	58.2	65.3	7.1	65.9	7.7
1982	2,974	1,596	53.7	61.5	7.8	62.5	8.8
1983	3,127	1,470	47.0	54.1	7.1	60.1	13.1
1984	3,239	1,393	43.0	56.9	13.9	58.9	15.9
1985	3,196	1,319	41.3	53.4	12.1	57.6	16.3
1986	3,357	1,220	36.3	48.7	12.4	54.1	17.8
1987	3,587	1,162	32.4	49.0	16.6	53.8	21.4
1988	3,526	1,151	32.6	52.0	19.4	55.4	22.8
1989	3,429	1,144	33.4	52.5	19.1	57.0	23.6
1990	3,451	1,131	32.8	55.2	22.4	57.9	25.1
1991	3,582	1,115	31.1	50.7	19.6	57.2	26.1
1992	3,845	1,137	29.6	48.7	19.1	55.7	26.1
1993	4,265	1,143	26.8	45.5	18.7	53.4	26.6
1994	4,558	1,168	25.6	47.3	21.7	53.3	27.7
1995	4,768	1,177	24.7	45.9	21.2	53.9	29.2
1996	5,211	1,157	22.2	43.3	21.1	52.1	29.9
1997	5,278	1,113	21.1	42.6	21.5	51.2	30.1
1998	4,906	1,045	21.3	44.6	23.3	52.1	30.8

As predicted, when we drop V_t/A_t from the 1963–77 base period regressions, changing characteristics make a smaller contribution to the decline in the percent of dividend payers. The expected proportion of payers now declines from 66.9% in 1978 to 52.1% in 1998. This 14.8 percentage point decline (due to

changing NYP_t , E_t/A_t , and dA_t/A_t characteristics) compares to the estimated 25.4 percentage point decline obtained when V_t/A_t is used along with dA_t/A_t to measure investment opportunities. Conversely, when we drop V_t/A_t from the base period regressions, lower propensity to pay gets more weight in explaining the declining percent of dividend payers. In 1978 and 1979, the actual percent of payers is slightly higher than the expected percent. Thereafter, the expected percent exceeds the actual, and by increasing amounts. The final (1998) shortfall in the proportion of dividend payers due to lower propensity to pay, 30.8%, is 7.5 percentage points higher than the 23.3% estimate obtained when V_t/A_t is also included in the base period regressions.

One can quarrel about whether excluding V_t/A_t as a control variable provides cleaner estimates of the decline in the percent of dividend payers due to changing characteristics. But there is no need. The important point is that, with or without V_t/A_t , the regression approach uncovers the tracks of a potentially elusive phenomenon – the lower propensity of firms to pay dividends, given their characteristics.

5.2. Regressions for different dividend groups

There is a missing variable in the regressions underlying Table 6 – lagged dividend status. Table 7 summarizes annual logit regressions estimated separately for firms classified as payers, former payers, and firms that have never paid as of the previous year. The full-period (1963–98) average coefficients show that the decision to pay dividends in year t depends on dividend status in $t - 1$. Dividend payers produce a large positive average intercept (1.26, $t = 8.94$), but the intercepts for former payers and firms that have never paid are strongly negative (-3.38 , $t = -21.84$; and -2.16 , $t = -8.37$). The regression slopes confirm that there is inertia in dividend decisions. Skipping the details, for given positive values of the explanatory variables [size (NYP_t), profitability (E_t/A_t), and investment opportunities (V_t/A_t and dA_t/A_t)], the probability that a dividend payer continues to pay is higher than the probability that a non-payer with the same characteristics starts paying.

The regressions for the three dividend groups allow us to examine how the effects of changing characteristics and propensity to pay differ across the groups. Table 8 uses the average 1963–77 logit coefficients for each dividend group to estimate expected percents of payers for each group in subsequent years. The proportion of year $t - 1$ dividend payers expected to continue paying in year t only falls from 97.9% in 1978 to 97.0% in 1998. Thus, roughly speaking, the characteristics of dividend payers do not change much through time. In all but one year of the 1978–98 period, the actual percent of continuing payers falls short of the expected. But the annual differences (the effect of lower propensity to pay) average only 1.2% for 1978–98. This small decline in the propensity to pay nevertheless has a nontrivial cumulative effect on the payer population. The

Table 7
Logit regressions to explain which firms pay dividends

The logit regressions are estimated separately for each year t of the 1963–98 period for (i) firms that paid dividends in year $t - 1$ (Dividend Payers), (ii) firms that have Never Paid as of year $t - 1$, and (iii) firms that did not pay in $t - 1$ but did pay in an earlier year (Former Payers). The dependent variable is 1.0 in year t if a firm pays dividends, 0.0 otherwise. The explanatory variables are NYSE percentile (NYP_t), the market-to-book ratio (V_t/A_t), the rate of growth of assets (dA_t/A_t), and profitability (E_t/A_t). The table shows means (across years) of the regression intercepts (Int) and slopes, and t -statistics for the means, defined as the mean divided by its standard error (the times-series standard deviation of the regression coefficient divided by the square root of the number of years in the period).

	Average coefficient					t -statistic				
	Int	NYP_t	V_t/A_t	dA_t/A_t	E_t/A_t	Int	NYP_t	V_t/A_t	dA_t/A_t	E_t/A_t
Dividend Payers										
1963–98	1.26	5.54	0.32	1.57	13.51	8.94	5.64	2.11	3.69	8.26
1963–77	1.04	6.85	0.54	2.03	21.19	4.22	2.96	1.72	2.06	7.75
1978–98	1.41	4.60	0.17	1.24	8.02	8.75	13.27	1.25	5.89	9.74
1963–67	0.63	10.71	1.10	1.07	26.47	0.95	1.53	1.44	0.37	4.25
1968–72	1.13	4.61	-0.16	1.42	24.32	5.06	4.48	-0.86	2.68	7.75
1973–77	1.36	5.23	0.68	3.59	12.80	5.05	6.70	1.50	4.60	7.49
1978–82	1.83	6.19	-0.36	1.34	12.72	8.01	11.76	-2.14	2.70	9.68
1983–87	1.28	4.14	0.40	1.68	7.66	2.86	7.09	1.00	3.21	5.57
1988–92	1.17	5.03	0.17	1.19	6.82	6.09	7.44	1.47	2.62	4.54
1993–98	1.38	3.32	0.41	0.82	5.40	3.84	8.39	1.83	3.27	10.26
Former Payers										
1963–98	-3.38	2.19	-0.60	0.14	10.41	-21.84	10.91	-7.47	0.85	10.41
1963–77	-2.81	1.59	-0.83	0.79	14.95	-10.32	5.89	-5.42	2.59	9.32
1978–98	-3.78	2.62	-0.43	-0.33	7.16	-30.96	10.49	-6.66	-3.75	10.69
1963–67	-2.00	1.77	-1.19	1.25	15.77	-5.29	6.93	-3.46	1.76	7.57
1968–72	-3.89	0.94	-0.37	0.17	15.96	-11.87	1.43	-2.04	0.38	3.70
1973–77	-2.53	2.07	-0.94	0.95	13.11	-10.76	6.41	-9.38	2.83	7.86
1978–82	-2.98	1.29	-0.51	-0.21	7.18	-14.13	7.27	-3.55	-0.91	5.47
1983–87	-4.20	2.62	-0.21	-0.20	7.87	-43.61	5.06	-3.29	-1.37	6.67
1988–92	-3.97	3.61	-0.35	-0.36	6.72	-37.82	13.91	-7.13	-3.20	6.84
1993–98	-3.94	2.92	-0.63	-0.50	6.92	-28.84	7.41	-4.20	-2.61	3.73
Never Paid										
1963–98	-2.16	0.72	-1.28	0.63	14.84	-8.37	2.11	-3.64	2.04	5.82
1963–77	-1.60	0.18	-1.98	0.82	22.23	-3.27	0.26	-2.66	1.23	4.04
1978–98	-2.57	1.10	-0.78	0.48	9.56	-10.32	3.69	-3.09	2.07	9.51
1963–67	-0.66	-0.14	-3.58	1.03	30.34	-0.54	-0.08	-1.74	0.52	1.95
1968–72	-2.81	-0.26	-0.86	0.76	22.34	-4.77	-0.26	-1.29	0.99	4.05
1973–77	-1.33	0.95	-1.51	0.69	14.00	-5.64	1.50	-3.80	1.71	4.17
1978–82	-1.56	2.07	-1.94	1.22	14.03	-2.04	7.47	-2.49	2.00	4.90
1983–87	-2.63	1.51	-0.59	0.20	8.32	-5.33	1.76	-1.68	0.63	11.89
1988–92	-3.09	1.00	-0.16	-0.01	8.32	-14.21	6.38	-1.02	-0.04	4.80
1993–98	-2.92	0.04	-0.49	0.51	7.88	-14.28	0.08	-1.76	1.10	5.64

annual spreads between expected and actual percents of payers for 1978–98 cumulate to about 320 payers lost due to lower propensity to pay.

Changing characteristics and lower propensity to pay have bigger effects on the dividend decisions of former payers. When the average coefficients of the 1963–77 regressions for former payers are applied to the former payer samples of later years, the expected proportion of those resuming dividends falls (due to changes in characteristics) from 17.4% in 1978 to 9.9% in 1998. Given their characteristics, the propensity of former payers to resume dividends is also lower after 1978; the difference between expected and actual percents resuming is positive after 1979, and the average difference for 1978–98 is 3.1 percentage points. In 1998, 9.9% of former payers are expected to resume, but only 4.0% (less than half the expected number) actually do.

Changing characteristics and lower propensity to pay also have strong separate effects on the dividend decisions of firms that have never paid. Changes in characteristics cause the expected proportion of initiators among firms that have never paid to fall from 11.3% in 1978 to 5.2% in 1998, a decline of more than half. The consistently positive differences between the expected and actual percents of initiators after 1978 then say that controlling for characteristics, firms that have never paid dividends become less likely to start. For 1978–98, the difference averages 3.8 percentage points (6.8% expected versus 3.0% actual). In 1998, 5.2% of the never paid are expected to start paying dividends, but only 0.8% (less than one-sixth the expected number) actually do – rather strong evidence of a declining propensity to initiate dividends.

The regressions estimated separately for payers, former payers, and firms that have never paid are useful for documenting that, to different degrees, changing characteristics and lower propensity to pay affect the dividend decisions of all three groups. But the regressions are inappropriate for estimating how the decline in the overall percent of dividend payers splits between characteristics and propensity to pay. Suppose we estimate the overall expected percent of payers for a year as the sum of the expected number of payers in each dividend group divided by the total number of firms (Table 8). With separate regressions, the probability that a payer continues to pay is higher than the probability that an otherwise similar non-payer initiates dividends. The expected number of payers for a year thus depends on the distribution of firms across dividend groups in the preceding year. Toward the end of the sample period, many firms are non-payers because of the lower propensity to pay. As a result, the decline from 1978 to 1998 in the overall expected percent of payers combines the effects of changing characteristics and lower propensity to pay, and the 1998 difference between the overall actual and expected percents of payers understates the cumulative effect of propensity to pay.

We are interested in long-term dividend patterns. Under reasonable assumptions, the regression approach that ignores lagged dividend status (Table 6) does a better job capturing the long-term effects of changing characteristics and

Table 8
Estimates from logit regressions of the effect of changing characteristics and propensity to pay on the percent of firms paying dividends

The logit regressions are estimated separately for each year t of the 1963–77 period for (i) firms that paid dividends in year $t - 1$ (Payers), (ii) firms that have Never Paid as of year $t - 1$, and (iii) firms that did not pay in $t - 1$ but did pay in an earlier year (Former Payers). The explanatory variables are NYSE percentile (NY P), profitability (E_t/A_t), the growth rate of assets (dA_t/A_t), and the market-to-book ratio (V_t/A_t). Act is the actual percent of payers (the ratio of payers to firms, times 100). Exp is the expected percent of payers for a year, estimated by applying the average logit regression coefficients for 1963–77 to the values of the explanatory variables for each firm for year t , summing over firms, dividing by the number of firms, and then multiplying by 100. The evolution of Exp measures the effect of changing characteristics on the percent of dividend payers. Exp - Act (expected minus actual) measures the effects of propensity to pay. Exp for Payers + Never Paid + Former is the sum of the weighted Exp's of dividend payers, firms that have never paid, and former payers, where the weights are the year t proportions of all firms in the three dividend groups.

	Payers			Never Paid			Former Payers			Payers + Never Paid + Former		
	Act	Exp	Exp - Act	Act	Exp	Exp - Act	Act	Exp	Exp - Act	Act	Exp	Exp - Act
1963–77	97.3			9.1			13.0			68.5		
1978–98	95.7	96.9	1.2	3.0	6.8	3.8	8.3	11.4	3.1	38.8	41.5	2.7
1978	97.2	97.9	0.7	11.3	11.3	0.0	18.1	17.4	-0.7	68.5	68.9	0.4
1979	97.7	98.0	0.3	5.1	11.3	6.2	18.4	18.2	-0.2	68.0	69.8	1.8
1980	96.4	97.6	1.2	4.2	9.7	5.5	13.8	15.3	1.5	65.0	67.4	2.4
1981	95.4	97.9	2.5	3.8	9.8	6.0	8.9	16.6	7.7	58.2	62.3	4.1
1982	95.7	96.6	0.9	3.2	8.7	5.5	6.7	14.5	7.6	53.7	56.9	3.2
1983	94.1	96.4	2.3	2.4	5.9	3.5	6.7	10.5	3.8	47.0	49.9	2.9
1984	96.3	97.1	0.8	3.1	7.9	4.8	10.5	13.9	3.4	43.0	46.0	3.0
1985	96.8	96.8	0.0	2.2	6.5	4.3	8.2	10.4	2.2	41.3	43.6	2.3
1986	94.8	95.5	0.7	2.2	5.6	3.4	6.1	8.4	2.3	36.3	38.7	2.4
1987	95.2	96.1	1.3	2.5	5.8	3.3	6.9	10.0	3.1	32.4	35.0	2.6
1988	95.5	97.5	1.6	3.8	6.7	2.9	8.4	9.7	1.3	32.6	35.0	2.4
1989	95.6	97.5	1.9	3.2	6.6	3.4	10.6	12.2	1.6	33.4	36.1	2.7
1990	95.3	97.2	1.9	2.6	7.1	4.5	6.2	10.5	4.3	32.8	36.4	3.6
1991	94.8	95.6	0.8	2.0	5.5	2.5	4.7	8.5	3.8	31.1	33.8	2.7
1992	94.8	95.8	1.0	2.5	5.1	2.6	7.8	9.0	1.2	29.6	31.6	2.0
1993	95.0	96.2	1.2	2.3	4.6	2.3	5.6	7.4	1.8	26.8	28.8	2.0
1994	95.3	97.2	1.9	2.1	5.5	3.4	6.6	8.8	2.2	25.6	28.5	2.9
1995	97.3	97.1	-0.2	1.6	5.1	3.5	5.9	9.9	4.0	24.7	27.4	2.7
1996	96.4	97.4	1.0	1.2	4.8	3.6	6.4	10.0	3.6	22.2	25.3	3.1
1997	95.0	96.6	1.6	1.2	4.7	3.5	3.0	8.6	5.6	21.1	24.3	3.2
1998	96.2	97.0	0.8	0.8	5.2	4.4	4.0	9.9	5.9	21.3	25.1	3.8

propensity to pay. If propensity to pay, given a firm's characteristics, is constant prior to 1978, the average allocations of firms across dividend groups during the 1963–77 base period should largely be driven by characteristics rather than by lagged dividend status. In this situation, the base period average regression function that ignores lagged dividend status captures the pre-1978 long-term propensity to pay, given characteristics. And applying the base period regression function to the samples of firm characteristics of subsequent years produces estimates of the long-term effects of changing characteristics and propensity to pay.

5.3. Estimates of base period probabilities from portfolios

The logit regressions use a functional form for the base period relation between characteristics and the likelihood that a firm pays dividends that may be misspecified. Our second approach addresses this problem by allowing the base period probabilities to vary with characteristics in an unrestricted way.

Each year from 1963 to 1977, we form 27 portfolios as the intersections of independent sorts of firms on profitability (E_t/A_t), investment opportunities (V_t/A_t or dA_t/A_t), and size. We sort firms into three equal groups on E_t/A_t , V_t/A_t , and dA_t/A_t , but we do not form equal groups on size. Instead, we use the 20th and 50th percentiles of market capitalization for NYSE firms to allocate NYSE, AMEX, and NASDAQ firms to portfolios. We use NYSE percentiles to prevent the growing population of small NASDAQ firms from changing the meaning of small, medium, and large over the sample period. The 20th and 50th NYSE percentiles lead to similar average numbers of firms in the medium and large groups (and many more in the small group). To have a manageable number of portfolios, each with many firms, we use V_t/A_t or dA_t/A_t (but not both) to control for investment opportunities.

We estimate the base period probabilities that firms in each of the 27 portfolios pay dividends as the sum of the number of payers in a portfolio during the 15 years of 1963–77 divided by the sum of the number of firms in the portfolio. These base period probabilities are free of assumptions about the form of the relation between characteristics and the probability that a firm pays dividends (except, of course, that all firms in a portfolio are assigned the same probability). The number of observations in the base period probability estimates is always at least 45, and it is 165 or greater for all but one portfolio.

The base period probabilities vary across portfolios in a familiar way (Table 9). Larger firms are more likely to pay dividends; controlling for profitability (E_t/A_t) and investment opportunities (V_t/A_t or dA_t/A_t), the 1963–77 probability that a firm pays dividends increases across size portfolios. More profitable firms are more likely to pay dividends; controlling for size and V_t/A_t ,

or dA_t/A_t , high E_t/A_t portfolios have higher percents of payers in 1963–77 than low E_t/A_t portfolios. Finally, firms with more investments are less likely to pay dividends; the high V_t/A_t (or dA_t/A_t) portfolio in a size- E_t/A_t group typically has a lower base period percent of dividend payers than the low V_t/A_t (or dA_t/A_t) portfolio.

We form portfolios each year after 1977 using breakpoints designed to have the same economic meaning as those of the 1963–77 base period. For profitability and investment opportunities, we assume that values of E_t/A_t , V_t/A_t , and dA_t/A_t have constant meaning. (Again, this assumption is shaky for V_t/A_t .) Thus, in forming portfolios after 1977, the E_t/A_t , V_t/A_t , and dA_t/A_t breakpoints are averages (across years) of the breakpoints for 1963–77. Holding breakpoints constant means that outside the base period, the split of firms across E_t/A_t , V_t/A_t , and dA_t/A_t groups varies with changes in the distribution of these characteristics across firms. Finally, we assume that the 20th and 50th percentile breakpoints for NYSE market capitalization, allowed to vary through time, are measures of size with relatively constant economic meaning. The proportions of firms in the three size groups vary through time with the size and number of AMEX and NASDAQ firms relative to NYSE firms.

The expected percent of dividend payers for a given year t after 1977 is

$$Ep_t = \frac{\sum_{i=1}^{27} n_{it} p_i}{N_t} \times 100,$$

where n_{it} is the number of firms in portfolio i in year t , N_t is the total number of firms, and p_i is the expected proportion of dividend payers in portfolio i , estimated as the actual proportion for 1963–77. Since the expected proportion of payers in a portfolio is fixed at the 1963–77 base value, the aggregate expected percent of payers varies through time because changes in the characteristics of firms alter the allocation of firms across the 27 portfolios. The evolution of the expected percent of payers after 1977 can thus be attributed to changing characteristics. The difference between the expected percent of payers for a year and the actual percent then measures the effect of changes in the propensity to pay dividends.

When V_t/A_t is used to measure investment opportunities, the expected proportion of payers for 1978 produced by the portfolio approach is 70.0% (Table 10). The expected proportion falls over the next 20 years, to 53.3% in 1998. Thus, when V_t/A_t measures investment opportunities, the portfolio approach says that changes in the characteristics of firms cause the proportion of payers to drop by 16.7 percentage points from 1978 to 1998. The actual proportion of firms paying dividends in 1978, 68.5%, is close to the expected 70.0%. Thereafter, the spread between expected and actual widens. In the final year, 1998, 53.3% of firms are expected to pay dividends but only 21.3% actually

Table 9
 Percents of dividend payers in 27 portfolios formed on size, profitability, and either market-to-book ratio or investment outlays

Each year we form two sets of 27 portfolios of NYSE, AMEX, and NASDAQ firms, using sorts on profitability (E_i/A_i), market-to-book ratio (V_i/A_i), investment (dA_i/A_i), and size (market capitalization, ME). In each of the 15 base years, 1963–77, firms are sorted into three equal groups on E_i/A_i , V_i/A_i , and dA_i/A_i . In the years after 1977, we use the average breakpoints for 1963–77 to assign firms to the three E_i/A_i , V_i/A_i , and dA_i/A_i groups. The breakpoints for the three size groups for year t are the 20th and 50th NYSE percentiles of ME, for that year. Big firms have ME, above the median ME, of NYSE firms; medium-sized firms are between the 20th and 50th percentiles; small firms are below the 20th NYSE percentile. The 27 portfolios are the intersections of the size, E_i/A_i , and V_i/A_i , or dA_i/A_i groups. The table shows annual values and averages of annual values of the percents of the firms in the portfolios that pay dividends.

	Investment variable is V_i/A_i						Investment variable is dA_i/A_i														
	Low E_i/A_i		Medium E_i/A_i		High E_i/A_i		Low E_i/A_i		Medium E_i/A_i		High E_i/A_i										
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High									
1963–77	48.5	31.0	13.6	72.3	58.7	32.5	66.9	65.2	51.1	36.4	47.2	36.6	60.4	69.4	52.9	58.3	71.2	51.8			
1978	45.8	21.7	7.5	70.2	49.3	8.6	72.3	57.3	42.9	30.6	52.0	41.1	56.2	73.3	58.6	56.3	73.2	57.2			
1978–82	44.7	24.1	3.5	66.7	44.4	15.3	66.8	56.0	36.6	32.3	46.5	24.2	57.4	65.3	47.8	57.8	67.1	46.4			
1983–87	25.9	17.3	3.6	47.0	39.0	18.6	37.0	39.2	24.2	16.8	22.0	9.3	40.9	50.7	24.1	38.4	45.6	21.7			
1988–92	17.8	12.7	2.4	24.7	26.9	12.6	23.7	24.8	17.6	12.9	16.3	5.7	27.7	25.0	15.1	25.0	31.6	13.0			
1993–98	15.7	10.6	1.5	29.1	25.8	11.5	16.1	18.2	17.0	8.8	12.9	4.4	29.9	26.4	12.9	22.3	28.2	11.0			
1998	10.7	7.4	1.6	19.0	24.7	11.5	11.8	15.6	20.5	6.0	10.7	5.1	24.8	27.2	12.6	23.0	23.2	13.1			
				Small firms						Medium-sized firms						Big firms					
1963–77	80.4	67.9	43.4	92.8	85.7	63.1	91.5	85.0	75.2	68.5	77.9	61.5	86.4	89.0	72.4	86.5	89.1	69.5			
1978	84.3	66.7	12.5	97.6	71.4	66.7	95.2	86.2	79.2	59.3	81.2	82.4	91.7	89.7	84.3	80.0	95.2	83.3			
1978–82	88.8	68.2	19.7	94.9	79.3	52.9	95.1	87.5	67.6	73.7	86.7	60.9	90.8	91.4	75.1	84.1	91.8	72.0			
1983–87	66.3	61.5	17.6	90.3	77.9	44.4	81.3	77.8	56.3	57.4	80.0	28.7	86.9	76.5	52.4	78.6	81.5	50.4			
1988–92	58.3	52.4	13.2	65.4	63.1	36.8	67.3	55.0	42.4	49.1	46.4	23.3	67.0	66.8	34.8	65.1	57.4	31.2			
1993–98	52.1	43.1	11.5	63.9	55.3	30.3	22.8	44.5	32.5	38.3	38.7	12.6	62.8	55.0	24.7	57.8	51.5	21.1			
1998	39.1	32.1	8.8	39.1	53.0	28.8	25.0	47.1	29.5	28.3	32.3	11.1	52.7	58.8	24.0	61.7	44.4	19.5			
				Small firms						Medium-sized firms						Big firms					
1963–77	89.1	87.4	82.5	96.8	95.1	90.1	96.6	96.6	92.4	84.2	90.4	87.1	96.6	96.9	85.5	97.5	97.2	87.9			
1978	95.6	77.8	50.0	98.9	88.9	100.0	99.0	97.8	90.9	90.0	92.3	85.4	95.0	95.5	97.8	100.0	99.4	92.4			
1978–82	93.8	89.8	36.7	97.1	96.4	84.9	99.2	97.5	85.2	92.9	92.3	79.4	94.9	95.4	93.7	97.8	98.7	84.7			
1983–87	86.6	85.2	56.3	95.1	92.1	77.7	99.5	95.9	84.7	85.9	83.1	70.7	94.4	93.3	78.7	95.2	95.4	79.1			
1988–92	85.3	88.9	53.4	90.4	87.6	77.6	76.0	82.2	81.8	85.6	86.0	58.2	90.7	87.4	69.8	89.5	93.3	66.7			
1993–98	66.3	68.4	45.5	66.0	81.4	61.7	54.6	70.5	60.7	73.7	66.3	36.7	85.5	76.8	48.0	84.7	80.3	37.5			
1998	67.7	56.8	37.8	62.5	76.6	47.5	50.0	53.3	56.4	75.6	55.7	28.4	78.6	62.7	40.6	78.2	73.0	33.6			

Table 10

Effects of changing characteristics and propensity to pay on the percent of firms paying dividends, estimated from 27 portfolios formed on size, profitability (E_t/A_t), and either market-to-book ratio (V_t/A_t) or investment outlays (dA_t/A_t)

Firms is the number of firms in the sample for a year, or the average for a period. Actual Percent is the percent of payers (the ratio of payers to firms, times 100). The Expected Percent of payers for a year is the number of firms in each of the 27 size- $E_t/A_t - V_t/A_t$ portfolios (or the 27 size- $E_t/A_t - dA_t/A_t$ portfolios) for the year times the proportion of dividend payers in the portfolio during the 1963–77 base period, summed over the 27 portfolios, divided by the total of firms in the 27 portfolios for the year, and then multiplied by 100. The expected percents change through time due to changes in the characteristics (size, E_t/A_t , and V_t/A_t or dA_t/A_t) of sample firms. Expected – Actual, the difference between the expected and actual percents of payers, measures the effect of changing propensity to pay.

	Firms	Actual Percent	V_t/A_t		dA_t/A_t	
			Expected Percent	Expected – Actual	Expected Percent	Expected – Actual
1963–77	1,823	66.8				
1978	2,901	68.5	70.0	1.5	65.1	– 3.5
1979	2,819	68.0	69.5	1.5	65.0	– 3.0
1980	2,806	65.0	68.3	3.2	65.7	0.6
1981	2,917	58.2	65.9	7.7	64.4	6.1
1982	2,974	53.7	63.0	9.4	62.0	8.4
1983	3,127	47.0	57.6	10.6	61.2	14.2
1984	3,239	43.0	59.1	16.1	60.3	17.3
1985	3,196	41.3	56.4	15.1	59.3	18.0
1986	3,357	36.3	53.6	17.2	57.6	21.3
1987	3,587	32.4	53.6	21.2	57.3	24.9
1988	3,526	32.6	55.4	22.7	58.1	25.5
1989	3,429	33.4	55.2	21.8	58.7	25.3
1990	3,451	32.8	58.6	25.8	59.4	26.6
1991	3,582	31.1	56.5	25.3	59.4	28.3
1992	3,845	29.6	53.9	24.3	59.1	29.5
1993	4,265	26.8	50.3	23.5	57.4	30.6
1994	4,558	25.6	51.9	26.3	57.8	32.2
1995	4,768	24.7	52.2	27.5	58.4	33.7
1996	5,211	22.2	50.6	28.4	57.9	35.7
1997	5,278	21.1	49.3	28.2	57.3	36.2
1998	4,906	21.3	53.3	32.0	58.3	37.0

pay. The difference, 32.0 percentage points, is the end-of-sample estimate of the decline in the percent of payers due to reduced propensity to pay dividends.

Using dA_t/A_t rather than V_t/A_t to measure investment opportunities lowers our estimate of the effect of changing characteristics on the decline in the percent of dividend payers. The expected proportion of payers now falls by only 6.8

percentage points, from 65.1% in 1978 to 58.3% in 1998. Conversely, using dA_t/A_t rather than V_t/A_t to form portfolios increases the share of the decline in the percent of payers attributed to lower propensity to pay. In 1978, the actual proportion of payers is 3.5 percentage points above the expected. After 1979, however, the expected percent exceeds the actual, and by increasing amounts. In 1998, 58.3% of firms are expected to pay dividends, but only 21.3% in fact pay. Thus, the end-of-sample shortfall in the proportion of dividend payers due to lower propensity to pay is 37.0 percentage points.

In short, like the logit tests, the portfolio approach says that changing characteristics and lower propensity to pay both have roles in the decline in the percent of firms paying dividends. And lower propensity to pay is at least as important as changing characteristics.

5.4. Propensity to pay: entrails from the portfolio approach

What kinds of firms do not pay dividends in 1998 that would have paid in earlier years? The answer from Table 9 is – all kinds. Lower propensity to pay cuts across all size, profitability, and investment groups. Table 9 shows percents of dividend payers in the portfolios formed on size, E_t/A_t , and V_t/A_t or dA_t/A_t . A portfolio's expected percent of payers after 1977 is the actual percent for the 1963–77 base period. Thus, the time path of the percent of payers for a portfolio traces the effects of propensity to pay dividends for firms with given size, E_t/A_t , and V_t/A_t or dA_t/A_t characteristics.

The results for the 27 portfolios formed on size, E_t/A_t , and dA_t/A_t are easiest to judge since each of these portfolios has at least 47 firms in 1998. The percents of dividend payers in the 27 portfolios are often higher in 1978 than in 1963–77. After 1978, the propensity to pay declines. For every portfolio, the percent of payers is lower in 1998 than in 1978. The results for the 27 portfolios formed on size, E_t/A_t , and V_t/A_t are similar; the percent of dividend payers declines (due to lower propensity to pay) in all but one portfolio. The only exception, small firms with medium E_t/A_t and high V_t/A_t , occurs because the percent of payers in 1978 is abnormally low. The 1998 proportion, 11.5%, is well below the average for 1963–77, 32.5%.

At the 1978 peak, most big stocks pay dividends whatever their characteristics. When dA_t/A_t is used to control for growth opportunities, the 1978 proportion of payers exceeds 85.0% in all nine big-stock portfolios, and it is above 92.0% in seven of the nine (Table 9). But even among big stocks, the propensity to pay declines sharply after 1978. When dA_t/A_t is used to measure growth opportunities, the 1998 proportion of payers never reaches 80.0% in any big-stock portfolio, it is below 65.0% for five of the nine, and the 1998 proportion of payers is 40.6% or less in three big-stock portfolios.

The decline in the propensity to pay dividends is even larger among small stocks. When dA_t/A_t is used to measure growth opportunities, the 1978

proportion of payers is less than 40.0% in only one of nine small-stock portfolios and it is 52.0% or higher in seven (Table 9). In contrast, the 1998 proportion of dividend payers exceeds 20.0% only in the four small-stock portfolios with medium or high profitability and low or medium investment outlays. In the five small-stock portfolios with low profitability or high investment outlays, dividend payers are an endangered species; the 1998 proportion of payers is 13.1% or less.

Finally, controlling for size and investment opportunities, the percent of dividend payers declines after 1978 in each of the three profitability groups, but there is no particular pattern across E_t/A_t groups. In contrast, controlling for size and profitability, the propensity to pay declines more from 1978 to 1998 for firms with high investment outlays. In other words, investment outlays become more of a deterrent to dividends (a result that seems in line with the logit regressions in Table 5). The big-stock portfolios provide striking examples. In 1978, 85.7%, 97.8%, and 92.4% of the firms in the three big-stock portfolios with high dA_t/A_t pay dividends. In 1998, only 28.4%, 40.6%, and 33.6% pay. Clearly, rapidly growing large firms no longer feel compelled to pay dividends.

6. Share repurchases

Declining propensity to pay suggests that firms have become aware of the tax disadvantage of dividends. Consistent with this view, Table 11 confirms earlier evidence (Bagwell and Shoven, 1989; Dunsby, 1995) that share repurchases surge in the mid-1980s. For 1973–77 and 1978–82, aggregate share repurchases average 3.37% and 5.12% of aggregate earnings. For 1983–98, repurchases are 31.42% of earnings. Bagwell and Shoven (1989) argue that the increase in repurchases indicates that firms have learned to substitute repurchases for dividends in order to generate lower-taxed capital gains for stockholders. But subsequent tests of this hypothesis produce mixed results (DeAngelo et al., 2000; Jagannathan et al., 2000; Grullon and Michaely, 2000).

For our purposes, repurchases turn out to be rather unimportant. In particular, we show that because repurchases are primarily the province of dividend payers, they leave most of the decline in the percent of payers unexplained. Instead, the primary effect of repurchases is to increase the already high cash payouts of dividend payers.

We first address a problem. Previous papers treat all share repurchases as non-cash dividends, that is, a repackaging of shareholder wealth that substitutes capital value for cash dividends. There are two cases where repurchases do not have this effect: (i) repurchased stock is often reissued to employee stock ownership plans (ESOPs) and as executive stock options, and (ii) repurchased stock is often reissued to the acquired firm in a merger. [Allen and Michaely (1995) show that the surge in repurchases after 1983 lines up with a surge in

mergers.] An acquiring firm repurchases stock when it wishes to finance a merger with retained earnings or debt but the acquired firm (for tax reasons) prefers stock. Repurchases to complete mergers simply help finance this form of investment. Like other investments, mergers allow firms to transform earnings into capital value rather than dividends. But repurchases of stock to finance a merger are not a source of additional capital value, beyond what is produced by the merger.

A better measure of repurchases that qualify as non-cash dividends is the annual change in treasury stock. Treasury stock captures the cumulative effects of stock repurchases and reissues, and it is not affected by new issues of stock (seasoned equity offerings). Treasury stock data are not available on Compustat before 1982, so the first change is for 1983. But the treasury stock data do cover the period of strong repurchase activity. Some firms use the retirement method, rather than treasury stock, to account for repurchases. Our aggregate changes in treasury stock include the net repurchases of these firms, measured (for each firm) as the difference between purchases and sales of stock, when the difference is positive, and zero otherwise. (See the appendix for details.)

During 1983–98, the annual change in treasury stock, dT_t , is less than half of gross share repurchases, SP_t ; specifically, dT_t and SP_t average 14.95% and 31.42% of earnings (Table 11). Cash dividends are 45.24% of earnings, so if gross repurchases are treated as an additional payout of earnings, the total payout for 1983–98 averages 76.66% of earnings. Substituting the more appropriate annual change in treasury stock drops the payout to (a still high) 60.19% of earnings.

Aggregate changes in treasury stock are substantial relative to aggregate earnings, but they fall far short of explaining the decline in the percent of dividend payers due to lower propensity to pay. The problem is that the fraction of non-payers with positive dT_t is low. During 1983–98, on average only 14.5% of non-payers have positive dT_t (Table 12). And the percent of firms with positive dT_t overstates the extent to which firms substitute repurchases for dividends. Consider a firm that repurchases shares in one fiscal year and reissues them as part of an ESOP, executive compensation plan, or merger in the next. Because the repurchase and reissue are spread across two fiscal years, they cause a positive change in dT_t in the first year and a negative change in the second. Although the repurchase just accommodates a reissue, a simple count of firms with positive dT_t misclassifies the repurchase as a substitute for a cash dividend. On average, 6.9% of non-payers have negative dT_t during 1983–98. The results for 1993–98 are similar; 14.5% of non-payers have positive dT_t and 6.6% have negative dT_t .

On average, 76.4% of Compustat firms do not pay dividends during 1993–98. Thus, even if we use our upper bound of 14.5% to estimate the fraction of non-payers that use share repurchases as a substitute for dividends, this group is only 11.1% (0.764×0.145) of all firms. This is about one-third of the smaller

Table 12

Percent of firms with positive and negative changes in treasury stock

The change in treasury stock, dT_t , is measured from the end of fiscal year $t - 1$ to the end of fiscal year t . The reported percent of firms with a positive change in treasury stock, $dT_t > 0$, or a negative change in treasury stock, $dT_t < 0$, is the average of the annual percents. Positive changes in treasury stock include firms that use the retirement method to account for repurchases if their repurchases for fiscal year t exceed their stock issues. Negative changes in treasury stock do not include firms that use the retirement method and have negative net repurchases. The results are shown for all firms and for firms grouped according to dividend status.

	1983–98	1983–87	1988–92	1993–98
All				
Net $dT > 0$	20.1	19.0	22.0	19.5
Net $dT < 0$	10.1	10.1	11.5	9.0
Payers				
Net $dT > 0$	33.4	28.9	34.5	36.2
Net $dT < 0$	17.2	16.1	19.0	16.5
Non-payers				
Net $dT > 0$	14.5	12.8	16.1	14.5
Net $dT < 0$	6.9	6.0	8.0	6.6
Never paid				
Net $dT > 0$	13.5	12.0	15.3	13.3
Net $dT < 0$	5.6	4.8	6.5	5.5
Former payers				
Net $dT > 0$	20.5	16.9	21.1	23.0
Net $dT < 0$	14.5	12.1	17.0	14.5

estimate (32.0) of the shortfall in the percent of payers that the portfolio approach of the preceding section attributes to lower propensity to pay dividends. Thus, lower propensity to pay must be related to other aspects of the investment and financing decisions of non-payers.

Net repurchases are larger and more prevalent among dividend payers. On average, 33.4% of dividend payers have positive dT_t during 1983–98, versus 14.5% for non-payers (Table 12). The aggregate dT_t of dividend payers averages 0.89% of their aggregate market equity, versus 0.28% for non-payers (Table 11). Aggregate cash dividends average 2.78% of the aggregate market equity of dividend payers during 1983–98. Thus, dividend payers use share repurchases rather than dividends for about 25% of their cash payments to shareholders.

The cash dividend payout ratio of dividend payers shows no tendency to decline. The aggregate dividends of payers are 47.22% of their aggregate

earnings in 1983–98, versus 44.78% for 1963–98. And on average, 92.2% of the annual aggregate change in treasury stock during 1983–98 is by firms that also pay dividends (Table 4). We infer that the large share repurchases of 1983–98 are mostly due to an increase in the desired payout ratios of dividend payers, which they are reluctant to satisfy with cash dividends. Table 3 then shows that the higher payout ratios of dividend payers during 1983–98 are associated with lower rates of investment (dA_t/A_t) and higher book leverage (L_t/A_t).

Finally, even during the 1993–98 period, when dividend payers are only 23.6% of Compustat firms (Table 1), they nevertheless account for 91.7% of common stock earnings (Table 4). It is thus not surprising that the aggregate payout ratio D_t/Y_t (the ratio of aggregate dividends to aggregate common stock earnings) for all firms is basically the same as the ratio for dividend payers – and likewise shows no tendency to decline through time. Confirming Dunsby (1995), Table 11 shows that the aggregate payout ratio for all firms actually increases from 33.95% in 1973–77, when 64.3% of firms pay dividends, to 39.31% in 1993–98, when only 23.6% of firms pay dividends.

We emphasize, however, that the aggregate payout ratio says nothing about the propensity of firms to pay dividends. As noted earlier, the surge in unprofitable non-paying new lists in the 1980s and 1990s keeps the aggregate profits of non-payers low even though the non-payer group includes an increasing fraction of firms with positive earnings – firms that in the past would have paid dividends. As a result, the aggregate payout ratio for all firms masks the kind of widespread evidence of lower propensity to pay dividends, among individual firms of all types, that is obvious in Tables 6, 8, and (especially) 9.

7. Conclusions

From a post-1972 peak of 66.5% in 1978, the proportion of dividend payers among NYSE, AMEX, and NASDAQ non-financial non-utility firms falls to 20.8% in 1999. The decline in the incidence of dividend payers is in part due to an increasing tilt of publicly traded firms toward the characteristics of firms that have never paid dividends – small size, low earnings, and large investments relative to earnings. This change in the nature of publicly traded firms is driven by a surge in new listings after 1978 and by the changing nature of new lists. Before 1978, newly listed firms have strong investment opportunities (high asset growth rates and high market value of assets relative to book value) and they are more profitable than seasoned firms. After 1978, new lists continue to have high V_t/A_t and high asset growth rates, but their profitability falls. The surge in new lists and their changing characteristics produce a swelling group of small firms with low profitability but strong investment opportunities that never pay dividends.

The change in the characteristics of firms is important in the declining incidence of dividend payers. But it is only half the story. Our more interesting result is that given their characteristics, firms have become less likely to pay dividends. We use logit regressions and a portfolio approach to document that characteristics and propensity to pay make large separate contributions to the decline in the percent of payers. When V_t/A_t is used to measure investment opportunities, characteristics and propensity to pay are roughly equal partners in the decline in the percent of dividend payers. When only actual investment outlays, dA_t/A_t , are used to measure investment opportunities, propensity to pay has the larger role.

Lower propensity to pay is quite general. The percent of dividend payers among firms with positive earnings declines after 1978. But the percent of payers among firms with negative earnings also declines. Small firms become much less likely to pay dividends after 1978, but there is also a lower incidence of dividend payers among large firms. Firms with many investments become much less likely to pay dividends after 1978, but dividends also become less likely among firms with fewer investments.

The effects of changing characteristics and propensity to pay vary across dividend groups. The characteristics of dividend payers (large, profitable firms) do not change much after 1978, and controlling for characteristics, payers become only slightly more likely to stop paying. Changing characteristics and lower propensity to pay show up more clearly in the dividend decisions of former payers and firms that have never paid. Lower profitability and strong growth opportunities produce much lower expected rates of dividend initiation by firms that have never paid. But controlling for characteristics, firms that have never paid also initiate dividends at much lower rates after 1978, and former payers become much less likely to resume dividends.

The evidence that, controlling for characteristics, firms become less likely to pay dividends says that the perceived benefits of dividends have declined through time. Some (but surely not all) of the possibilities are: (i) lower transactions costs for selling stocks for consumption purposes, in part due to an increased tendency to hold stocks via open end mutual funds; (ii) larger holdings of stock options by managers who prefer capital gains to dividends; and (iii) better corporate governance technologies (e.g., more prevalent use of stock options) that lower the benefits of dividends in controlling agency problems between stockholders and managers.

Appendix. Data and variable definitions

The Compustat sample for calendar year t , 1963–98, includes those firms with fiscal year-ends in t that have the following data (Compustat data items in parentheses): total assets (6), stock price (199) and shares outstanding (25) at the

end of the fiscal year, income before extraordinary items (18), interest expense (15), dividends per share by ex date (26), preferred dividends (19), and (a) preferred stock liquidating value (10), (b) preferred stock redemption value (56), or (c) preferred stock carrying value (130). Firms must also have (a) stockholder's equity (216), (b) liabilities (181), or (c) common equity (60) and preferred stock par value (130). Total assets must be available in years t and $t - 1$. The other items must be available in t . We also use, but do not require, balance sheet deferred taxes and investment tax credit (35), income statement deferred taxes (50), purchases of common and preferred stock (115), sales of common and preferred stock (108), and common treasury stock (226). We exclude firms with book equity (BE_t) below \$250,000 or assets (A_t) below \$500,000. To ensure that firms are publicly traded, the Compustat sample includes only firms with CRSP share codes of 10 or 11, and we use only the fiscal years a firm is in the CRSP database at its fiscal year-end.

The CRSP sample, used in Tables 1 and 2 and Figs. 1, 2, and 5, includes NYSE, AMEX, and NASDAQ securities with CRSP share codes of 10 or 11. A firm must have market equity data (price and shares outstanding) for December of year t to be in the CRSP sample for that year. We exclude utilities (SIC codes 4900–4949) and financial firms (SIC codes 6000–6999) from both samples.

A.1. Derived variables

Preferred Stock = Preferred Stock Liquidating Value (10) [or Preferred Stock Redemption Value (56), or Preferred Stock Par Value (130)];

Book Equity (BE_t) = Stockholder's Equity (216) [or Common Equity (60) + Preferred Stock Par Value (130) or Assets (6) – Liabilities (181)] – Preferred Stock + Balance Sheet Deferred Taxes and Investment Tax Credit (35) if available – Post Retirement Asset (330) if available;

Market Equity (ME_t) = Stock Price (199) times Shares Outstanding (25);

Market Value of Firm (V_t) = Assets (6) – Book Equity + Market Equity;

Earnings Before Interest (E_t) = Earnings Before Extraordinary Items (18) + Interest Expense (15) + Income Statement Deferred Taxes (50) if available;

Earnings Available for Common (Y_t) = Earnings Before Extraordinary Items (18) – Preferred Dividends (19) + Income Statement Deferred Taxes (50) if available.

A.2. Dividend payers and non-payers

A firm in the Compustat sample is defined as a dividend payer in calendar year t if it has positive dividends per share by the ex date (26) in the (last) fiscal year that ends in t . A firm in the CRSP sample is defined as a dividend payer in

calendar year t if its with-dividend return exceeds its without-dividend return in any month of year t . A CRSP firm must have at least seven months of good returns in year t to be classified as a non-payer. A firm is included in only the All Firms category for a year if it has fewer than seven good returns and there is no month when its with-dividend and without-dividend returns differ.

A.3. Newly listed firms

A firm in the CRSP sample is defined as a new list in calendar year t if it is added to the CRSP database between June of year $t - 1$ and May of t . A firm in the Compustat sample is defined as a new list in calendar year t if it is added to the CRSP database between January and December of year t . Compustat firms must be in the CRSP database to be new lists. Moreover, NYSE firms added to the CRSP database in December 1925, AMEX firms added in July 1962, and NASDAQ firms added between December 1972 and February 1973 are not defined as new lists in either the CRSP or Compustat samples.

A.4. Change in treasury stock

The change in treasury stock for year t is defined as the change in the value of common treasury stock (Compustat data item 226) from year $t - 1$ to year t . When a firm uses the retirement method to account for repurchases, however, we replace the change in treasury stock by the maximum of zero and the difference between purchases (115) and sales (108) of common and preferred stock in year t .

Compustat indicates that a firm uses the retirement method in year t by setting annual footnote 45 equal to TR. But a check of the database reveals many TR firms with fiscal years in which (i) footnote 45 does not indicate the retirement method, (ii) treasury stock is zero, and (iii) purchases of common and preferred stock exceed sales. We infer that the firm uses the retirement method in these “non-TR” years. Thus, we assume that a firm uses the retirement method in any year in which footnote 45 is “TR”, and in all contiguous years in which common treasury stock is zero. For example, if footnote 45 is “TR” in year t and the treasury stock is zero from $t - 5$ to $t + 3$, we measure net repurchases for years $t - 5$ to $t + 4$ as the maximum of zero and the difference between purchases and sales. (We cannot use the change in treasury stock in year $t + 4$ because we need a start-up year to measure the annual difference.)

References

- Allen, F., Michaely, R., 1995. Dividend policy. In: Jarrow, R., Maksimovic, V., Ziemba, W. (Eds.), *Handbooks in Operations Research and Management Science: Finance*. North-Holland, Amsterdam, pp. 793–838.

- Bagwell, L., Shoven, J., 1989. Cash distributions to shareholders. *Journal of Economic Perspectives* 3, 129–149.
- DeAngelo, H., DeAngelo, L., 1990. Dividend policy and financial distress: an empirical examination of troubled NYSE firms. *Journal of Finance* 45, 1415–1431.
- DeAngelo, H., DeAngelo, L., Skinner, D., 1992. Dividends and losses. *Journal of Finance* 47, 1837–1863.
- DeAngelo, H., DeAngelo, L., Skinner, D., 2000. Special dividends and the evolution of dividend signaling. *Journal of Financial Economics* 57, 309–354.
- Dunsby, A., 1995. Share repurchases, dividends, and corporate distribution policy. Ph.D. Thesis, The Wharton School, University of Pennsylvania, Philadelphia.
- Easterbrook, F., 1984. Two agency-cost explanations of dividends. *American Economic Review* 74, 650–659.
- Fama, E., French, K., 1999. Testing tradeoff and pecking order predictions about dividends and debt. Unpublished working paper, Sloan School of Management, MIT, Cambridge, MA.
- Fama, E., MacBeth, J., 1973. Risk, return, and equilibrium: empirical tests. *Journal of Political Economy* 81, 607–636.
- Grullon, G., Michaely, R., 2000. Dividends, share repurchases, and the substitution hypothesis. Unpublished manuscript, Cornell University, Ithaca, NY.
- Jagannathan, M., Stephens, C., Weisbach, M., 2000. Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics* 57, 355–384.
- Jain, B., Kini, O., 1994. The post-issue operating performance of IPO firms. *Journal of Finance* 49, 1699–1726.
- Jensen, M., 1986. Agency costs of free-cash-flow, corporate finance, and takeovers. *American Economic Review* 76, 323–329.
- Mikkelsen, W., Partch, M., Shah, K., 1997. Ownership and operating performance of companies that go public. *Journal of Financial Economics* 44, 281–307.
- Myers, S., 1984. The capital structure puzzle. *Journal of Finance* 39, 575–592.
- Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information the investors do not have. *Journal of Financial Economics* 13, 187–221.