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Why are corporate payouts so high in the 2000s?[☆]

Kathleen Kahle[a,†], René M. Stulz[b,‡,*]

[a] Eller College of Management, University of Arizona, AZ, United States
[b] Fisher College of Business, Ohio State University, OH, United States

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ABSTRACT

The average annual inflation-adjusted amount paid out through dividends and repurchases by public industrial firms is more than three times larger from 2000 to 2019 than from 1971 to 1999. We find that an increase in aggregate corporate income accounts for 37% of the increase in aggregate annual payouts, and an increase in the payout rate accounts for 63%. Firms have higher payout rates in the 2000s not only because they are older, larger, and have more free cash flow, but also because they pay out more of their free cash flow. Though firms spend less on capital expenditures in the 2000s than before, capital expenditures decrease similarly for firms with payouts and for firms without.

At the turn of the century, financial economists worried about “disappearing dividends” (Fama and French, 2001). Times have changed. In recent years, the media and politicians have been increasingly concerned about the magnitude of corporate payouts. These concerns primarily focus on the size of stock buybacks rather than dividend payments. For example, Senator Marco Rubio complains that “At present, Wall Street rewards companies for engaging in stock buybacks, temporarily increasing their stock prices at the expense of productive investment” and suggests taxing repurchases.[1] Senators Chuck Schumer and Bernie Sanders want to restrict repurchases because they are a form of “corporate self-indulgence.” Like Rubio, they suggest that managers are so focused on shareholder value that “rather than investing in ways to make their businesses more resilient or their workers more productive, [they] have been dedicating ever larger shares of their profits to dividends and corporate share repurchases.”[2] Academics also express concern that the growth of repurchases has contributed to a decrease in capital expenditures among firms (Almeida et al., 2016; Gutiérrez and Philippon, 2017).

In this paper, we investigate why payouts are so high in the 2000s, before the COVID-19 crisis. We gather data on payouts and firm characteristics from 1971 to 2019 for industrial firms listed on U.S. exchanges. We measure a firm’s payouts as the sum of its dividends and its repurchases in excess of equity issuance (net repurchases). To adjust for

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* Corresponding author.
E-mail address: Stulz.1@osu.edu (R.M. Stulz).

† Kahle is the Thomas Moses Professor in Finance at the Eller College of Management, University of Arizona and is affiliated with ECGI.

‡ Stulz is Everett D. Reese Chair of Banking and Monetary Economics, Fisher College of Business, Ohio State University, and is affiliated with NBER, ECGI, and the Wharton Financial Institutions Center.

[1] “America needs to restore dignity of work,” by Marco Rubio, The Atlantic, December 13, 2018.

[2] “Limit corporate buybacks,” by Chuck Schumer and Bernie Sanders, New York Times, February 3, 2019.

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inflation, we examine real dollar amounts using the price level in 2017. Not surprisingly, we find in Section 1 that payouts from 2000 to 2019 are large. The companies in our sample pay out \$11.76 trillion from 2000 to 2019 (\$12.80 trillion if we do not net out equity issuance from repurchases). In the 2000s, annual aggregate real payouts average more than three times their pre-2000 level. Aggregate payouts as a percentage of aggregate corporate assets also increase substantially, averaging 2.88% from 1971 to 1999 versus 4.40% from 2000 to 2019. When we examine the ratio of aggregate payouts to aggregate operating income, we see a large increase as well; the ratio averages 19.19% from 1971 to 1999 but 33.68% from 2000 to 2019. The year 2018 is the first year that corporations can take advantage of the 2017 Tax Cuts and Jobs Act (TCJA) and is the only year when real payouts exceed \$1 trillion. In that year, aggregate payouts are 48.72% of aggregate operating income.

Much of the recent debate about payouts focuses on repurchases. In our data, the growth in the average payout rate comes entirely from repurchases. This finding is consistent with the evidence in Skinner (2008) on the growing importance of repurchases. Dividends average 14.39% of operating income from 1971 to 1999 and 14.42% from 2000 to 2019. In contrast, net repurchases average 4.80% of operating income before 2000 and 19.27% from 2000 to 2019. Some readers might argue that our evidence shows payouts are high because of repurchases. In other words, if firms only paid dividends, payouts would be much lower. However, if firms could not pay out via repurchases, they likely would have increased their dividends (Grullon and Michaely, 2002), so there is no grounds for such a conclusion. A more careful analysis is therefore required to understand why payouts are so much higher in the 2000s.

To understand the increase in payouts, we must distinguish between two potential sources. First, for a given propensity to pay, a firm's payouts increase as its income increases. We show aggregate earnings growth explains 37% of the increase in real constant dollar aggregate payouts from 1971–1999 to the 2000s. Second, for a given level of income, a firm's payouts increase if its propensity to pay increases. The payout rate measures propensity to pay. We demonstrate that increases in payout rates account for 63% of the increase in payouts. In regressions predicting aggregate payouts, we find the best predictor of aggregate payouts is aggregate earnings. Macroeconomic conditions do not help explain the increase in payouts. Consequently, to explain the increase in aggregate payouts, we have to understand why firms have higher payout rates in the 2000s.

In Section 2, we investigate whether firms have changed in ways that can explain an increase in payout rates. Because the dollar payouts of the 200 firms with the highest payouts account for more than 80% of the payouts every year in our sample, we consider separately how the top 200 payers (the top payers) change from 1971–1999 to 2000–2019 compared with the other payers; we similarly compare payers and nonpayers. We find that the top payers are highly successful, older firms that are much larger in the 2000s than before. The lifecycle model of payouts (DeAngelo et al., 2006) predicts younger firms should invest heavily and have no payouts, whereas older, larger, successful firms have free cash flow (FCF) that they can pay out. Though there has been much concern about the decrease in capital expenditures of U.S. firms and whether it is due to increased payouts, capital expenditures fall similarly for payers and nonpayers. Nonpayers use the cash released by lower capital expenditures to increase R&D. In contrast, payers (and especially the top payers) increase R&D spending, but by less than the decrease in capital expenditures; thus, they have an increase in FCF that enables them to make larger payouts. This change in how firms invest reflects the growing importance of intangible assets and the fact that younger firms invest at a higher rate (see Kahle and Stulz, 2017, for references).

In Section 3, we investigate whether changes in firm characteristics can explain the change in payout rates. Because no established empirical model in finance provides a quantitative estimate of the optimal payout rate as a function of firm characteristics, we use two empirical approaches to determine whether changes in firm characteristics can explain the high payout rates of the 2000s. In the first approach, we use data from 1971 through 1999 to estimate payout-rate models. To avoid data-snooping concerns, we include firm characteristics common in the payout literature. We then use these models to predict payout rates from 2000 through 2019. If models estimated from 1971 to 1999 predict payouts well in the 2000s, changes in firm characteristics explain changes in payout rates. In the second approach, we estimate models over the whole sample period (1971–2019) but allow for intercept and/or slope changes in the 2000s to assess whether firms pay out differently in the 2000s. With this approach, changes in intercepts and/or slopes indicate changes in firm characteristics are not sufficient to explain changes in payout rates.

When examining firm-level payout rates, a model estimated on data from 1971 to 1999 predicts an increase in the average payout rate. For the whole sample of firms with required data, the average payout rate is 8.17 percentage points higher in the 2000s than in 1971–1999. When we restrict this sample to firms with payouts, the difference increases to 14.20 percentage points. When we estimate the model over 1971–1999, this model predicts an increase of 4.65 percentage points in the average payout rate if estimated for all firms and 5.07 percentage points if estimated only for the firms with payouts. Another way to look at the performance of the model is that it explains 56.92% of the increase in the average payout rate when estimated on the whole sample and 35.74% when estimated on the sample of payers only. However, the average predictions from 2000 to 2019 understate the importance of changes in firm characteristics in explaining the increase in the payout rate. First, the model performs better if our prediction period stops in 2017, because the Tax Cuts and Jobs Acts (TCJA) causes firms to increase payouts for reasons that our model does not capture. Over this period, we explain 84.56% of the increase in the payout rate for the whole sample and 59.32% of the increase for payers. Second, focusing on payers, although the model underpredicts mean payout rates in the 2000s, it overpredicts median payout rates. Consequently, the underprediction is driven by firms at the right tail of payout rates.

We also investigate whether payout rates are higher in the 2000s by estimating our models over the whole sample period but allowing for an increase in the payout rate in the 2000s, in the 2010s, and in 2018 regardless of firm characteristics. We find no evidence that a firm pays out more in the 2000s than it did before, given its characteristics. In other words, existing firms do not suddenly pay out more. However, among firms that pay, the firms that initiate payouts in the 2000s have higher payouts than predicted by their characteristics. Specifically, using the sample of payers, the average percentage prediction error for the mean payout rate in the 2000s is 20.82% for firms that initiate payouts before 2000 and is 30.29% for firms that initiate them afterwards. Further, we find that the firms with higher payouts are firms that initiate payouts with repurchases. Repurchases are a more flexible tool for payouts than dividends in that firms can vary the amount of equity they repurchase each year without fearing the adverse consequences associated with dividend cuts (Jagannathan et al., 2000).

Because models estimated from 1971 to 1999 explain a sizeable fraction of the increase in payout rates during the 2000s, changes in firm characteristics must be of first-order importance to understand why payout rates increase. We find the most important firm characteristics in explaining the change in payout rates for the whole sample are, in order, firm size, age, cash holdings, and leverage. When we turn to payers only, the most important firm characteristics are, again in order of importance, cash holdings, leverage, age, and capital expenditures. Although capital expenditures decrease in the 2000s (Gutiérrez and Philippon, 2017; Alexander and Eberly, 2018) and are negatively related to payouts, the decrease in capital expenditures is not among the top three changes in firm characteristics explaining the increase in payout rates for either all firms or for the payers only.

We expect that increased monitoring by institutional investors pushes firms to more aggressively maximize shareholder wealth in the 2000s than during the pre-2000 period. With this hypothesis, payout rates should be more strongly related to firm characteristics in the 2000s than before. In Section 4, we find support for this hypothesis. We show our model explains at least 65% of the increase in the payout rate for the sample of payers. We also show firms pay out more of their FCF in the 2000s than before. In Section 5, we report a number of robustness investigations and extensions. In particular, we account for market timing, cross-market arbitrage, and differences between multinational firms and domestic firms.

1. The increase in aggregate payouts

In this section, we first introduce the sample used throughout the paper. We then show payouts are much higher in 2000–2019 than in 1971–1999 and that the increase is driven by an increase in repurchases. The increase in the dollar payouts is due to both an increase in operating income and an increase in payout rates, but the increase in payout rates accounts for almost twice as much of the increase in average yearly aggregate payouts than the increase in operating income—63.15% versus 36.85%. Finally, we show that macroeconomic factors do not explain the increase in aggregate payouts beyond their impact on earnings.

1.1. The sample

Our initial data source is all firms in Compustat from 1971 to 2019. We start in 1971 because Compustat data on share repurchases and equity issuance are unavailable before then. We exclude firms not incorporated in the U.S., as well as financial firms and utilities (Standard Industrial Classification (SIC) codes 6000–6999 and 4900–4949, respectively) because of their statutory capital requirements and other regulatory restrictions. We also exclude firms with missing data for total assets (AT), dividends (DV), and market capitalization (CSHO and PRCC_F). We merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11.

Following Banyi et al. (2008), we compute share repurchases as the purchase of common and preferred stock (PRSTKC) minus any reduction in the value of preferred stock; depending on availability, we use redemption (PSTKRV), liquidating (PSTKL), or par value (PSTK) for the value of preferred stock. However, firms often simultaneously issue and repurchase equity, so when a firm has a positive gross payout, whether it is raising or distributing funds is unclear (Grullon et al., 2011). In particular, firms concerned about the dilutive effect of stock-based compensation may offset the dilution by repurchasing (Kahle, 2002; Bonaimé et al., 2020). Consequently, we compute net repurchases, defined as repurchases minus issuance of stock (SSTK). If either calculation yields a negative value, (net) repurchases are set to zero. Dividends are measured as cash dividends (DV). Gross (net) payout is the sum of dividends and (net) repurchases. In the remainder of the paper, we focus on net payouts, but our conclusions are robust to using gross payouts. All dollar values are reported in real 2017 dollars using the CPI. The Appendix contains a complete list of variable names and definitions.

1.2. Aggregate constant dollar payouts

We begin by examining aggregate payouts from 1971 to 2019. Aggregate payouts are obtained by summing the dollar payouts of all firms in our sample. Because we exclude financial firms and utilities, however, our aggregate values do not represent the aggregate payouts of all public firms. As shown in Fig. 1, aggregate real net payouts increase over time. They equal $103 billion in 1971. They first exceed $200 billion in 1987, fall to $154 billion in 1991, and then increase steadily to more than $300 billion in 1998. Aggregate net payouts exceed $500 ($600) billion for the first time in 2005 (2006), and in 2007 they reach $740 billion. Net payouts fall during the global financial crisis (GFC), and in 2009, only $353 billion are paid out. They recover quickly, however, and in 2014 exceed their 2007 peak. Not surprisingly, the all-time peak is in 2018, the year that the Tax Cuts and Jobs Acts (TCJA) becomes effective, when net real payouts exceed $1 trillion. Our conclusions are robust to excluding 2018 from our sample.

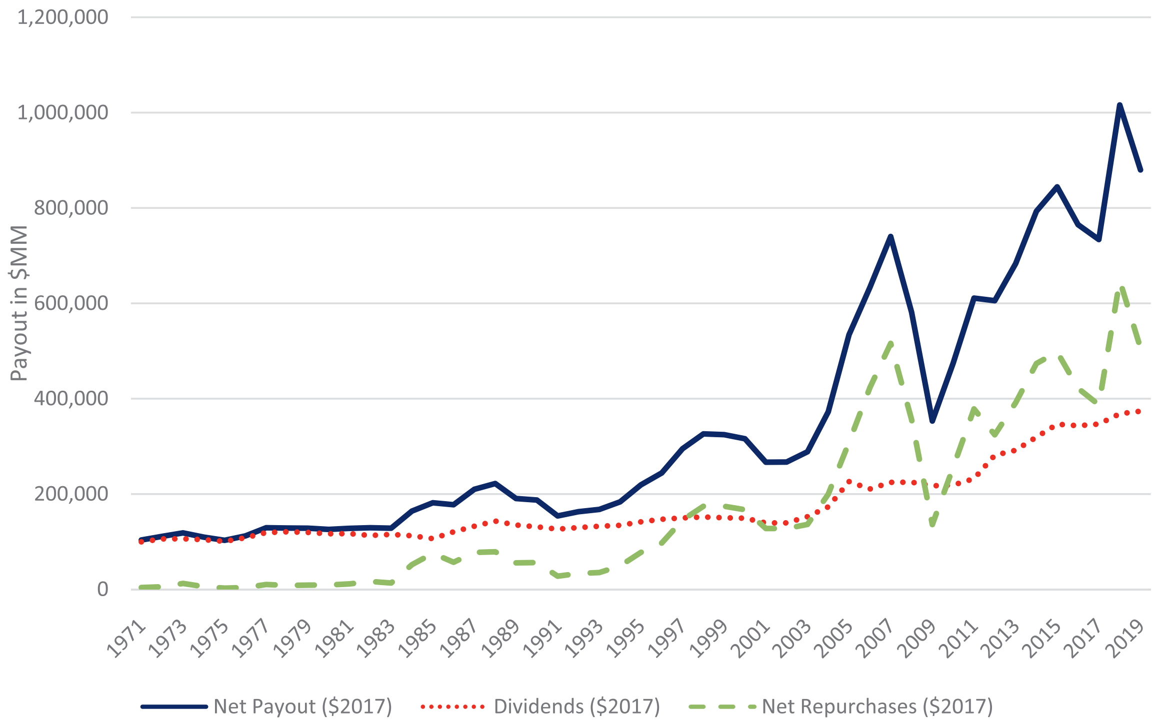

Fig. 1. Aggregate real net payouts by year. This figure shows aggregate real payouts (in 2017 $MM) from 1971 to 2019 for the sample of listed CRSP/Compustat firms described in Table 1. Repurchases are calculated as the purchase of common and preferred stock (PRSTKC) minus any reduction in the value of preferred stock; depending on availability, we use redemption (item PSTKRV), liquidating (item PSTKL), or par value (item PSTK) for the value of preferred stock. Net repurchases are equal to repurchases minus issuance of stock (item SSTK). If either calculation yields a negative value, repurchases are set to zero. Dividends are measured as cash dividends (DV). Net payout is defined as the sum of dividends and net share repurchases.

Table 1 provides summary statistics for relevant sample periods. We refer to the period from 1971 to 1999 as the pre-2000 period. The post-2000 period (or 2000s) starts in 2000 and ends in 2019. We divide this period into the pre-GFC period (2000–2007) and the 2010s (2010–2019). Panel A shows the aggregate real dollar amounts and the yearly averages in each period. Panel B tabulates yearly averages of ratios of interest.

Column (1) of Panel A shows aggregate real net payouts. In the pre-2000 period, total real net payouts equal $4965 billion. In the post-2000 period, the total is more than twice the amount in the pre-2000 period. In the 2010s, 62.98% of net real payouts in the 2000s are paid out. We also show the yearly averages. Not surprisingly, the yearly average increases sharply from before to after 2000. Specifically, the yearly average total net payouts are 3.43 times larger in the post-2000 period than in the pre-2000 period. The average is 73.28% higher in the 2010s than from 2000 to 2007. The only year in which aggregate net real payouts exceed $1 trillion is 2018, when they amount to $1016 billion.

The high payouts of the 2000s are often attributed to the growth of repurchases, so Fig. 1 also shows dividends and net repurchases separately. Real net repurchases are extremely low before the 1982 SEC Rule 10b-18 safe harbor that facilitated repurchases. Repurchases increase after 1982, but do not exceed $100 billion until 1997. After 1997, they exceed dividend payments in every year except for 2001–2003 and 2009. Net repurchases are extremely large in 2007; the only year with higher net repurchases is 2018. In contrast to repurchases, the path of dividends is smoother. Dividends equal $100 billion in 1971. They increase fairly steadily but do not exceed $200 billion until 2005, and $300 billion until 2014.

Columns (2) and (3) of Panel A show the summary statistics for aggregate dividends and net repurchases, respectively. Total dividend payments are $3589 billion in the pre-2000 period and $4979 in the post-2000 period. Because the pre-2000 period is much longer than the post-2000 period, the finding that annual average dividends are higher in the 2000s is not surprising. Average annual dividend payments are 2.01 times higher in the 2000s than before and are 76.68% higher in the 2010s than in 2000–2007. The increase in net repurchases is much more dramatic than the increase in dividends. The sum of net repurchases is 4.93 times larger in the 2000s than before 2000. Perhaps more importantly, the annual average of net repurchases is 7.14 times higher in the 2000s than it was before 2000. Even more dramatically, average net repurchases from 2010 to 2019 are 9.02 times larger than average net repurchases before 2000.

1.3. Increase in income or increase in payout rate?

Payouts are the product of the payout rate and the available income, where the payout rate is the fraction of

Table 1
This table examines aggregate firm characteristics. Panel A shows aggregate total amounts and annual averages (in $MM) of firm characteristics, and Panel B shows ratios of key aggregate variables. All numbers are in 2017 dollars. The sample begins with all firms listed on Compustat from 1971 to 2019. We exclude firms not incorporated in the U.S. and financial firms and utilities (SIC codes 6000–6999 and 4900–4949, respectively) because of their statutory capital requirements and other regulatory restrictions. We also exclude firms with missing data for total assets (AT), dividends (DVC), and market capitalization (CSHO and PRCC_F). We then merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11. We divide the sample into several time periods, including pre-2000 (1971–1999) and post-2000 (2000–2019). The post-2000 period is further subdivided into pre-GFC and 2010s (2000–2007 and 2010–2019, respectively). We report the year 2018 separately due to the 2018 Tax Cuts and Jobs Act (TCJA). Details on all variables are provided in the Appendix.

Panel A (in $MM)	(1) Net Payout	(2) Dividends	(3) Net Repurchases	(4) Operating Income	(5) Assets	(6) Market Capitalization	(7) Gross Payout	(8) Gross Repurchases
Total pre 2000	4,965,120	3,588,803	1,376,317	25,443,745	176,973,892	149,036,478	5,327,581	1,738,777
Total post 2000	11,758,576	4,978,801	6,779,774	33,850,881	267,023,262	309,085,913	12,795,599	7,816,797
Total pre GFC (2000–2007)	3,418,923	1,413,908	2,005,015	11,765,456	94,236,352	110,094,523	3,871,152	2,457,244
Total 2010s (2010–2019)	7,405,215	3,122,672	4,282,543	18,935,824	148,472,763	178,050,435	7,910,578	4,787,906
Avg pre 2000	171,211	123,752	47,459	877,371	6,102,548	5,139,189	183,710	59,958
Avg post 2000	587,929	248,940	338,989	1,692,544	13,351,163	15,454,296	639,780	390,840
Avg pre GFC (2000–2007)	427,365	176,738	250,627	1,470,682	11,779,544	13,761,815	483,894	307,156
Avg 2010s (2010–2019)	740,522	312,267	428,254	1,893,582	14,847,276	17,805,044	791,058	478,791
2018	1,016,049	368,442	647,607	2,087,199	16,179,799	20,577,288	1,054,859	686,417

Panel B	(1) Net payout/ OI	(2) Dividends/ OI	(3) Net Repurchases/ OI	(4) Net Repurchases/ Net Payout	(5) Net Payout/ Assets	(6) Operating Income/ Assets	(7) Gross Repurchases/ Payout	(8) Gross Payout/ OI
Avg pre 2000	0.1919	0.1439	0.0480	0.2222	0.0288	0.1583	0.2611	0.2046
Avg post 2000	0.3368	0.1442	0.1927	0.5588	0.0440	0.1328	0.5981	0.3677
Avg pre GFC (2000–2007)	0.2815	0.1192	0.1623	0.5542	0.0366	0.1312	0.6068	0.3188
Avg 2010s (2010–2019)	0.3899	0.1647	0.2252	0.5744	0.0512	0.1351	0.6035	0.4168
2018	0.4872	0.1765	0.3107	0.6374	0.0637	0.1335	0.6507	0.5058

available income that the firm pays out. One could define available income as net income. Net income is problematic, however, both because it includes many transitory items and because it is negative in the aggregate in two years during our sample period. Floyd et al. (2015) compute aggregate payout as a function of net income by setting net income to zero if negative. Operating income is also used as a measure of a firm's ability to pay out (e.g., Jagannathan et al., 2000). Aggregate operating income is never negative during our sample period and is less affected by transitory items. Consequently, we standardize payout by aggregate operating income, computed as the sum of operating income of all firms, and investigate the following relation:

$$\text{Payout} = \text{Payout rate} \times \text{Operating income}. \tag{1}$$

In this equation, payout can increase either because the payout rate increases or because operating income increases. Note that in the following analyses, we focus on payout net of equity issuance; we use the term gross payout to denote payout when we do not subtract equity issuance.

In columns (4), (5), and (6) of Panel A of Table 1, we show how aggregate real operating income, assets, and market capitalization differ in our various sub-periods. Starting with operating income, the annual average of aggregate operating income increases less than the annual average of payouts between the pre-2000s and the 2000s. Specifically, average annual operating income increases by a factor of 1.93 while annual average of net payouts increase by a factor of 3.43. The average of annual assets increases by a factor of 2.19 from the pre-2000 period to the 2000s. Lastly, annual average aggregate market capitalization increases by a factor of 3.01. Aggregate market capitalization increases much more than either operating income or assets.

Real payouts increase much more than operating income. Consequently, the payout rate must increase from the pre-2000 period to the 2000s. Fig. 2 shows the payout rate over time. In 1971, the payout rate is 18.46%. It exceeds 20% for the first time in 1984 and remains above 20% from 1984 to 1999, with the exception of 1991 to 1995. Before 2000, the highest value of the payout rate is 25.93% in 1998. It rises above 30% in 2005. After this year, the payout rate falls below 30% only in 2009 and in 2010, when it is 24.50% and 27.10%, respectively. Following the global financial crisis, the payout rate exceeds 40% for the first time in 2014 and reaches 48.72% in 2018 before falling back to 42.61% in 2019. As shown in Panel B of Table 1, the average annual payout rate is 19.19% in the pre-2000s and 33.68% in the 2000s, an increase of 75.55%. The payout rate also increases within the 2000s. From 2000–2007 to the 2010s, the average annual payout rate increases by 38.51%. Column (8) shows similar results for the payout rate computed using gross payouts instead of net payouts.

The increase in the payout rate between the pre-2000s and the 2000s is entirely due to an increase in the repurchase rate. The dividend payout rate is almost the same for both periods. However, the averages mask the fact that the dividend payout rate follows a U-shape with the lowest dividend rate in 2000. This evolution is consistent with evidence of disappearing dividends before 2000 (Fama and French, 2002) and of reappearing dividends in the 2000s (Michaely and Moin, 2020). The story for net repurchases is quite different, as shown in column (3). Before 2000, the average of net repurchases divided by operating income is 4.8%. In the 2000s, the average is 19.27%, or 4.01 times higher. Column (4) shows net repurchases as a percentage of total payouts. Before 2000, repurchases average 22.22% of aggregate payouts. In the 2000s, they average 55.88%. Column (7) shows a similar result holds for gross repurchases.

Using the statistics in Table 1, we can assess what the average aggregate real payouts would have been in the 2000s had the payout rate remained at its pre-2000 average. We find that instead of averaging \$587 billion per year, real payouts would have averaged \$325 billion per year. Because the aggregate real payouts averaged \$171 billion before 1999, it follows that the bulk of the increase in the average aggregate real payouts is due to the increase in the payout rate. The average aggregate real payouts increase by 243.4% from pre-2000 to the 2000s. With a constant payout rate, the aggregate average real payouts would have increased by 89.69%. It follows that 36.85% of the increase in the average aggregate real payouts is due to an increase in dollar operating income and 63.15% is due to an increase in the payout rate.

1.4. Can macroeconomic factors explain the increase in the payout rate?

To understand the increase in payouts, we must understand the increase in the payout rate. A simple explanation for the variation in the payout rate is that changes in macroeconomic conditions make firms more comfortable with higher payouts. To examine this possibility, we estimate a model that follows Dittmar and Dittmar (2004). However, we use annual data to avoid seasonality issues and to make our estimates comparable to our later firm-level analysis. Dittmar and Dittmar regress log changes in aggregate payouts on permanent and temporary earnings, as well as variables that capture economic conditions. For each earnings variable, they use lagged changes in the logarithm of the variable. In other words, if the change in payouts is measured from t-1 to t, the change in earnings is measured from t-2 to t-1. They use market to book as a measure of growth opportunities and again include lagged changes. They also include the return on the value-weighted market portfolio for both t-1 and $t + 1$. Firms tend to issue equity when their stock has performed well. Behavioral finance models use the lead return as a proxy for market timing, and predict that firms are more likely to issue equity when that return is low and repurchase when it is high. We include the lagged yield on the 10-year Baa bond as a proxy for the cost of borrowing. A higher yield makes issuing debt to finance payouts more expensive. Lastly, we include the lead and lagged changes in the log of GDP. The predictions associated with GDP are ambiguous. On the one hand, high growth means good investment opportunities and hence more investment, so firms pay out less. On the other hand, high growth means firms

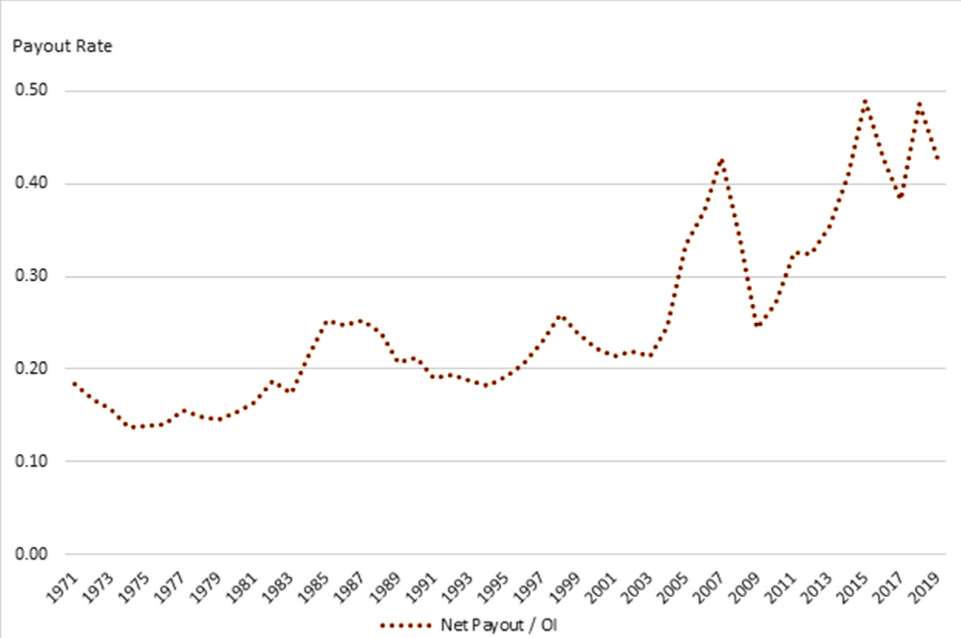

Fig. 2. Net payout rate by year. This figure shows the aggregate net payout rate from 1971 to 2019 for the sample of listed CRSP/Compustat firms described in Table 1. Repurchases are calculated as the purchase of common and preferred stock (PRSTKC) minus any reduction in the value of preferred stock; depending on availability, we use redemption (item PSTKRV), liquidating (item PSTKL), or par value (item PSTK) for the value of preferred stock. Net repurchases are equal to repurchases minus issuance of stock (item SSTK). If either calculation yields a negative value, repurchases are set to zero. Dividends are measured as cash dividends (DV). Net payout is defined as the sum of dividends and net share repurchases. The net payout rate is the sum of net payout for all firms in the sample, divided by the sum of operating income for all firms in the sample.

worry less about bad times and hence do not need a large liquidity buffer.

We estimate this model from 1971 to 1999, and then use the results to predict real aggregate payouts in the 2000s. Fig. 3 shows actual and predicted payouts. To obtain the predicted net payouts, we use the actual values of the dependent variables in each year in the 2000s and the coefficients from the model. The log change in payouts for 2000 uses the actual payouts in 1999 as the lagged value. In subsequent years, the predicted log change uses lagged predicted values to calculate the change. Because we use lead variables, we can only predict aggregate payouts until 2018. We see the path of predicted aggregate payouts is similar to the path for actual aggregate payouts, but actual and predicted payouts differ considerably in many years. The average of realized aggregate real payouts is $572.6 billion, whereas the average of predicted aggregate real net payouts is $428.1 billion. To see the importance of earnings in explaining payouts, we can freeze earnings at their 1999 level when predicting the values. When we do so, the model predicts essentially the same net real payouts in 2019 as in 2000. It follows that the macroeconomic variables do not help predict aggregate payouts once one accounts for aggregate earnings.

2. Firm changes and increased payouts

As discussed, the increase in the aggregate payout rate is a bigger contributor to the increase in payouts than the increase in aggregate earnings. In the remainder of this paper, we investigate this increase in the payout rate. The starting point is to understand how firms change over time and how these changes lead them to pay out more of their earnings. The finance literature provides guidance for the firm characteristics that affect the payout rate and why they do so.

Firm characteristics play a key role in theories of payouts and payout rates.[3] That firms should pay out funds that they cannot productively reinvest is well established. In general, because young firms have better growth opportunities, they are not expected to pay dividends or repurchase shares (DeAngelo et al., 2006). Profitable older firms have fewer growth opportunities, and thus should pay out the funds they cannot invest profitably. We therefore expect the payout rate to increase with firm age and size. Financially constrained firms need to conserve their resources to survive, so we expect the payout rate to be lower for firms with high leverage or accounting losses. Firms with more growth opportunities should pay out less (e.g., Smith and Watts, 1992). Therefore, we expect firms that invest through capital expenditures, R&D, or acquisitions to have lower payouts. Tobin's q, measured as the ratio of the market value of assets to the book value of assets, is often used as a measure of growth opportunities. However, Tobin's q could also proxy for rents (Stigler, 1964), in which case payouts would be positively

[3] The literature on payout policy is extremely large. For specific citations, we refer to recent surveys such as DeAngelo et al. (2008) and Farre-Mensa et al. (2014).

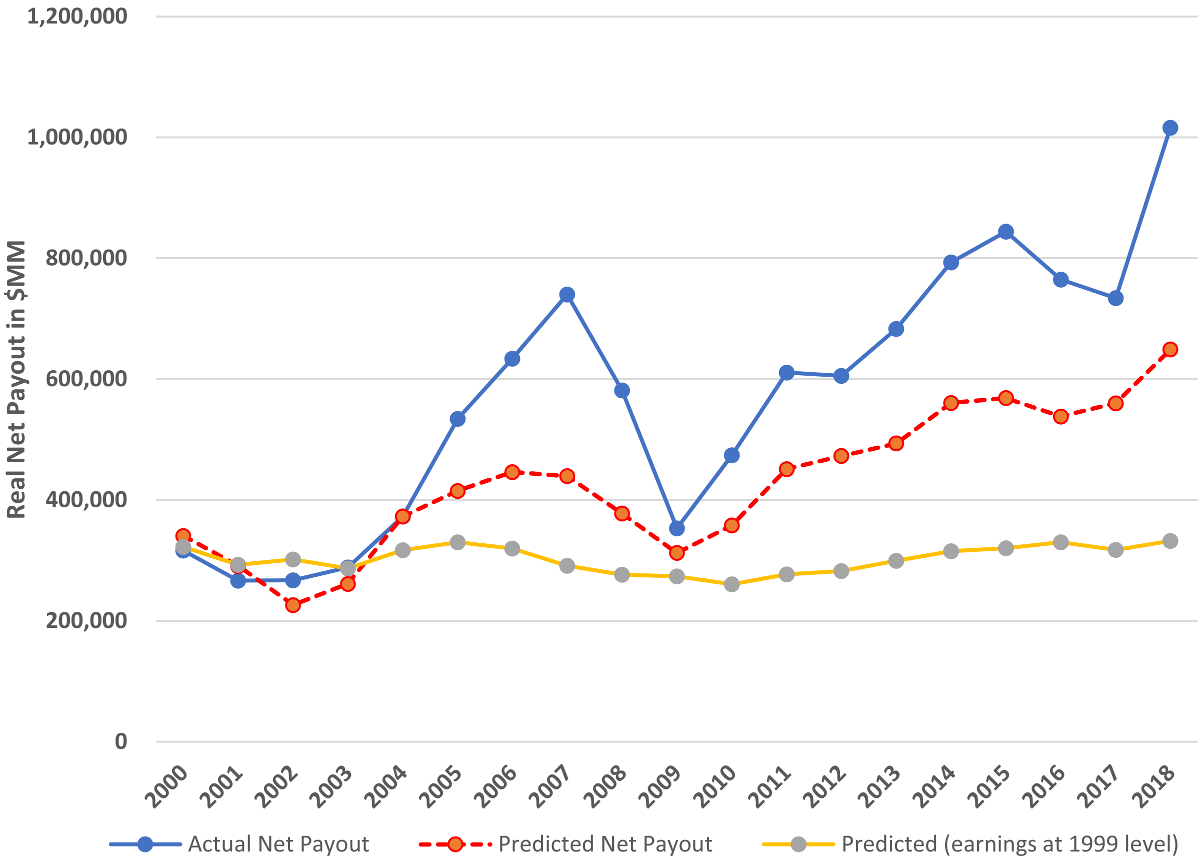

Fig. 3. Aggregate predicted versus actual net payouts by year. This figure shows actual aggregate real net payout (in 2017 $MM) and predicted net payout from 2000 to 2018. Predicted net payout is estimated by applying the coefficients from the time-series regression model of aggregate real net payouts discussed in Section 1.4 estimated using data from 1971 to 1999 to the aggregate values of the explanatory variables in each year from 2000 to 2018. The evolution of predicted net payouts measures the effects of changing aggregate characteristics on net payouts.

correlated with Tobin's q (Lee et al., 2020) or overvaluation. Undervalued firms should repurchase more, so if a low Tobin's q proxies for undervaluation, low q firms should repurchase more. Firms with large cash holdings have more internal resources, so all else equal, they are likely to pay out more. Finally, agency costs can cause firms to have a lower payout rate if management prefers to hoard cash (Jensen, 1986).

Aggregate payouts reflect the payouts of the largest firms. As DeAngelo et al. (2004) show, a small number of firms account for a large share of aggregate dividends. We classify the 200 firms with the largest dollar payouts as the top payers in each year. In our sample period, these firms account for a large fraction of the aggregate net real payouts. In our pre-2000 period, the top payers account for an average of 82.31% of aggregate payouts. In the 2000s, they account for 87.09% of aggregate payouts. In Panel A of Table 2, we examine how the top payers and other payers change. In Panel B, we show how payers and non-payers change over time. We proceed in three steps. First, we show that firm performance and payouts differ in the 2000s. Second, we examine how firms' investments and balance sheets in the 2000s compare to their investments and balance sheets in 1971–1999. Finally, we investigate whether the financing of payouts is different in the 2000s.

2.1. Firm payouts and performance

As shown in Panel A of Table 2, the payouts of the top payers are large in the 2000s, averaging $2.54 billion per firm in 2017 dollars. Prior to 2000, the payouts averaged $710 million. Though the real payouts of the top payers increase sharply, they do not increase more in percentage terms than for the other payers. Neither do their operating income, assets, or market value. However, their payout rate increases by 73.81%, from 32.95% to 57.27%. In contrast, the payout rate of the other payers increases by 56.72%, from 19.80% to 31.03%. As discussed previously, the finance literature expects that older, more successful firms have higher payout rates. We show that the top payers' average age is much higher than the other payers' both before 2000 and in the 2000s. The average age of the other payers increases from 13.63 to 20.82 years. In contrast, the average age of the top payers hardly changes; it is 38.05 years before 2000 and 37.64 years in the 2000s.

Though we do not tabulate the results, the top payers in the 2000s include firms that were top payers before 2000 as well as firms that become top payers in the 2000s. Our

Table 2

Table 2 compares the characteristics of high-payout firms with other paying firms in Panel A and the characteristics of firms with payouts with nonpaying firms in Panel B. In a given year, the firms with high payouts are firms that rank among the top 200 firms in dollar payouts for that year. Firms with payouts in a given year are firms with nonzero net payouts. We show average firm characteristics obtained by first averaging within years and then across years. Variables noted as in year t (t − 1) are measured in the same year as (year before) the determination of whether a firm is a top payer (Panel A) or payer (Panel B). The sample begins with all firms listed on Compustat from 1971 to 2019. We exclude firms not incorporated in the U.S. and financial firms and utilities (SIC codes 6000–6999 and 4900–4949, respectively). We also exclude firms with missing data for total assets (AT), dividends (DVC), and market capitalization (CSHO and PRCC_F). We then merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11. The Appendix provides detailed definitions for the variables. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively, for differences in yearly averages.

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		D2000s = 1			D2000s = 0			
	Top payer = 1	Top payer = 0	Diff. (1) vs. (2)	Top payer = 1	Top payer = 0	Diff. (4) vs. (5)	Diff. (1) vs. (4)	Diff. (2) vs. (5)
Performance & Payouts								
Net payout ($2017)	2544.38	58.98	2485.40***	710.03	15.47	694.56***	1834.36***	43.51***
Real OI ($2017)	5761.66	284.35	5477.31***	3018.62	116.76	2901.86***	2743.04***	167.59***
Assets ($2017)	39,875.24	2272.98	37,602.26***	18,672.75	884.25	17,788.50***	21,202.49***	1388.73***
Market Cap ($2017)	49,313.20	2288.90	47,024.30***	15,042.13	654.32	14,387.81***	34,271.07***	1634.57***
Net payout / OI (t)	0.5727	0.3103	0.2625***	0.3295	0.1980	0.1315***	0.2433***	0.1123***
Age (t)	37.64	20.82	16.81***	38.05	13.63	24.42***	−0.41	7.19***
OI / lagged assets (t-1)	0.1923	0.1318	0.0605***	0.1985	0.1700	0.0285***	−0.0062*	−0.0381***
NI / lagged assets (t-1)	0.0917	0.0343	0.0575***	0.0792	0.0577	0.0215***	0.0126***	−0.0234***
Investments & Balance Sheet								
Capex / lagged assets (t-1)	0.0511	0.0589	−0.0078**	0.0901	0.0921	−0.0020	−0.0390***	−0.0332***
Acq / lagged assets (t-1)	0.0283	0.0373	−0.0090***	0.0193	0.0234	−0.0042	0.0090***	0.0139***
R&D / lagged assets (t-1)	0.0283	0.0306	−0.0023**	0.0245	0.0202	0.0043**	0.0038***	0.0104***
SGA / Sales (t-1)	0.2350	0.2866	−0.0516***	0.1993	0.2276	−0.0283***	0.0357***	0.0590***
Advertising / Sales (t-1)	0.0190	0.0119	0.0071***	0.0191	0.0112	0.0079***	−0.0001	0.0007
Tobin's q (t)	1.9371	1.5434	0.3937***	1.3216	1.1859	0.1357	0.6155***	0.3575***
Cash / assets (t-1)	0.1320	0.1702	−0.0382***	0.0747	0.1156	−0.0409***	0.0573***	0.0545***
Book Leverage (t-1)	0.2636	0.2114	0.0521***	0.2327	0.2317	0.0010	0.0309***	−0.0202***
Market Leverage (t-1)	0.1426	0.1536	−0.0110	0.1826	0.2063	−0.0237***	−0.0400***	−0.0527***
Funding Payouts								
Net payout / lagged assets (t)	0.0982	0.0417	0.0565***	0.0591	0.0287	0.0303***	0.0391***	0.0129***
OCF / lagged assets (t)	0.1340	0.0773	0.0567***	0.1100	0.0620	0.0480***	0.0241***	0.0153***
Interest / lagged assets (t)	0.0150	0.0154	−0.0004	0.0232	0.0250	−0.0018	−0.0082***	−0.0096***
Taxes / lagged assets (t)	0.0389	0.0260	0.0129***	0.0534	0.0462	0.0072**	−0.0145***	−0.0202***
Capex / lagged assets (t)	0.0494	0.0561	−0.0067**	0.0887	0.0914	−0.0027	−0.0393***	−0.0353***
Acq / lagged assets (t)	0.0248	0.0355	−0.0106***	0.0189	0.0239	−0.0050	0.0059*	0.0116***
R&D / lagged assets (t)	0.0268	0.0300	−0.0032***	0.0243	0.0201	−0.0042***	0.0026***	0.0099***
FCF / lagged assets (t)	0.0737	0.0489	0.0248***	0.0356	0.0342	0.0015	0.0380***	0.0147***
ΔDebt / lagged assets	0.0437	0.0289	0.0149*	0.0359	0.0404	−0.0045	0.0079	−0.0115*
ΔCash / lagged assets	0.0049	0.0139	−0.0090**	0.0039	0.0239	−0.0201***	0.0010	−0.0100*

(*continued on next page*)

Table 2
(*continued*)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		D2000s = 1			D2000s = 0			
	Payer = 1	Payer = 0	Diff. (1) vs. (2)	Payer = 1	Payer = 0	Diff. (4) vs. (5)	Diff. (1) vs. (4)	Diff. (2) vs. (5)
Performance & Payouts								
Net payout ($2017)	382.55	0.00	382.55***	83.17	0.00	83.17***	299.39***	0
Real OI ($2017)	997.33	102.44	894.89***	396.80	26.28	370.52***	600.53***	76.16***
Assets ($2017)	7225.82	1270.90	5954.92***	2706.32	260.06	2446.25***	4519.50***	1010.84***
Market Cap ($2017)	8441.01	1448.61	6992.40***	2141.61	221.55	1920.07***	6299.40***	1227.06***
Net payout / OI (t)	0.3472	0.0000	0.3472***	0.2120	0.0000	0.2120***	0.1352***	0
Age (t)	23.00	11.23	11.77***	15.98	6.82	9.17***	7.02***	4.41***
OI / lagged assets (t-1)	0.1398	−0.1010	0.2407***	0.1730	0.0627	0.1103***	−0.0332***	−0.1637***
NI / lagged assets (t-1)	0.0418	−0.2002	0.2420***	0.0599	−0.0446	0.1046***	−0.0181***	−0.1556***
Investments & Balance Sheet								
Capex / lagged assets (t-1)	0.0578	0.0636	−0.0057	0.0919	0.1139	−0.0220***	−0.0341***	−0.0503***
Acq / lagged assets (t-1)	0.0362	0.0337	0.0026	0.0230	0.0233	−0.0003	0.0132***	0.0104**
R&D / lagged assets (t-1)	0.0303	0.1408	−0.1105***	0.0207	0.0580	−0.0373***	0.0096***	0.0828***
SGA / Sales (t-1)	0.2800	0.6321	−0.3521***	0.2249	0.4104	−0.1855***	0.0551***	0.2217***
Advertising / Sales (t-1)	0.0128	0.0126	0.0002	0.0120	0.0125	−0.0005	0.0008	0.0001
Tobin's q (t)	1.5936	2.1475	−0.5539***	1.1991	1.8354	−0.6363***	0.3945***	0.3121**
Cash / assets (t-1)	0.1652	0.3147	−0.1496***	0.1113	0.1521	−0.0408***	0.0538***	0.1626***
Book Leverage (t-1)	0.2183	0.1956	0.0228***	0.2318	0.2753	−0.0435***	−0.0135**	−0.0797***
Market Leverage (t-1)	0.1522	0.1366	0.0156**	0.2039	0.2265	−0.0226	−0.0517***	−0.0899***
Funding Payouts								
Net payout / lagged assets (t)	0.0490	0.0000	0.0490***	0.0317	0.0000	0.0317***	0.0173***	0
OCF / lagged assets (t)	0.0847	−0.1480	0.2327***	0.0668	−0.0620	0.1287***	0.0179***	−0.0861***
Interest / lagged assets (t)	0.0153	0.0206	−0.0052***	0.0248	0.0328	−0.0080***	−0.0094***	−0.0122***
Taxes / lagged assets (t)	0.0277	0.0101	0.0176***	0.0469	0.0290	0.0178***	−0.0192***	−0.0189***
Capex / lagged assets (t)	0.0552	0.0588	−0.0036	0.0911	0.1127	−0.0216***	−0.0359***	−0.0539***
Acq / lagged assets (t)	0.0342	0.0325	0.0017	0.0234	0.0244	−0.001	0.0107***	0.0081**
R&D / lagged assets (t)	0.0296	0.1403	−0.1107***	0.0205	0.0612	−0.0407***	0.0091***	0.0790***
FCF / lagged assets (t)	0.0519	0.0265	0.0254***	0.0343	0.0259	0.0084***	0.0175***	0.0006
ΔDebt / lagged assets	0.0308	0.0292	0.0017	0.0400	0.0500	−0.0100	−0.0092	−0.0208***
ΔCash / lagged assets	0.0127	0.1322	−0.1195***	0.0219	0.0984	−0.0765***	−0.0092*	0.0338

sample contains 1096 unique firms that are top payers for at least one year from 1971 to 2019. Of these, 385 become top payers for the first time in the 2000s. These firms are smaller and younger, but surprisingly they have a very high payout rate in the 2000s of 75.30%, versus 48.08% for firms that become top payers before 2000.

Panel B shows similar results when examining nonpayers versus payers. Strikingly, real operating income, real assets, and real market value increase much more for nonpayers than payers. For example, the average real dollar market value of nonpayers increases by 554% from 1971–1999 to 2000–2019, versus an increase of 294% for payers. This evolution is, in part, the outcome of a sharp drop in the number of listed firms in the 2000s that results in an increase in the average size of firms (Doidge et al., 2017). Further, the abnormally low level of IPOs causes an increase in the age of firms. We see the average age of payers and nonpayers increases, but more so for nonpayers than payers.

We now turn to firm performance. We report these values in year t-1 relative to when the firm is classified as a top payer to avoid having our inferences muddied by an exceptional year when a firm becomes a top payer. First, we report operating income to lagged assets. Operating income is higher for the top payers than for other payers both before 2000 and in the 2000s. The difference in operating income between the two groups widens in the 2000s, however. Specifically, operating income to lagged assets of the top payers is slightly lower in the 2000s than before, but lower by 3.82 percentage points for the other payers. The net income of the top payers increases in the 2000s, whereas it decreases for the other payers. The firms that become top payers in the 2000s have higher operating income to lagged assets and net income to lagged assets than the firms that become top payers before 2000 (untabulated).

The clear picture that emerges is that top payers are large, successful firms, which becomes obvious if we focus on the highest payer. In general, the highest payer is a firm that has been, is, or will become the firm with the highest market capitalization. For the last six years, the highest payer is Apple. Top payers are large, profitable firms compared with other payers or nonpayers before 2000 as well. The most frequent top payer before 2000 is AT&T, which ranks as the top payer in 13 years. Exxon Mobil is the top payer six times before 2000 and eight times after. The size of top payers relative to the size of other payers is not larger in the 2000s, but their performance is. In 1971–1999, their average operating income to lagged assets is only 16.76% higher than for the other payers. In the 2000s, it is 45.90% higher.

2.2. Investment and balance sheet characteristics

As discussed in the introduction, there is much concern that firms reduce investments to make payouts. Relative to young firms, older firms invest less because they have fewer growth opportunities (Loderer et al., 2017). Hence, the finding that payers invest less is expected because payers are older firms. However, if firms decrease investment to pay out, we would expect investment to fall more for the top payers than other firms. Consequently, Table 2 also examines the investments of top payers versus other payers, and payers versus nonpayers. In Panel A, we see the top payers have a lower capital-expenditures-to-lagged-assets ratio than the other payers both before and after 2000. However, this ratio decreases for both types of payers. Before 2000, the average ratio of capital expenditures to lagged assets is 9.01% for the top payers and 9.21% for the other payers. In the 2000s, the ratio decreases to 5.11% for the top payers and 5.89% for the other payers. The difference between the two ratios is not significant before the 2000s but is in the 2000s. When we compare payers with nonpayers, capital expenditures are significantly lower for payers than for nonpayers before 2000, but not in the 2000s. Further, in both percent and percentage points, capital expenditures decrease less for payers (−37.11% and 3.41 percentage points) than for nonpayers (−44.16% and 5.03 percentage points). It follows that the drop in capital expenditures is similar for top payers and other payers, as well as for payers and nonpayers.

Acquisitions are another component of investment. In contrast to capital expenditures, acquisitions increase slightly for all groups. However, the ratio of acquisitions to lagged assets is the same both before 2000 and after for top payers and other payers, as well as for payers and nonpayers.

R&D expenditures are not capitalized under GAAP, but from an economic perspective, they are investments. R&D is often used as a measure of growth opportunities (e.g., Billett et al., 2007). Younger firms have more growth opportunities and invest more in R&D (Loderer et al., 2017). A large difference in R&D exists between payers and nonpayers before 2000, and this difference grows in the 2000s. Nonpayers (payers) have an average ratio of R&D to lagged assets of 5.80% (2.07%) before 2000. This ratio increases in the 2000s for both payers and nonpayers, but the ratio for payers increases from 2.07% to 3.03%, while the ratio for nonpayers increases from 5.80% to 14.08%. For nonpayers, R&D is roughly half of capital expenditures before 2000 and more than twice the capital expenditures in the 2000s. Because R&D expenses increase for payers, changes in R&D obviously do not generate funds for payouts. Selling, general, and administrative (SG&A) and advertising expenses are used as proxies for intangible investment (Peters and Taylor, 2017). Nonpayers have much greater SG&A than payers. Their ratio of SG&A to sales increases by 54.02%. The ratio for payers increases by half that amount.

We next examine Tobin's q. The q-theory of investment predicts payers have a lower Tobin's q because they invest less. Table 2 shows the top payers have a higher q than the other payers both before 2000 and in the 2000s. This result is surprising because if Tobin's q is a measure of growth opportunities, the top payers have better growth opportunities and should invest more and pay out less than other payers. From before 2000 to the 2000s, the q of top payers increases by 46.57%, while the q of other payers increases by 30.15%. When we turn to payers versus nonpayers, we find that the q of nonpayers is much higher than the q of payers in both periods. Though we do not tabulate the results for the firms that enter the top 200 payers in the 2000s, these firms have especially high q's. Specifically, the average Tobin's q of firms that enter the top 200 in the 2000s is 2.21, versus 1.78 for firms that enter before 2000. Noticeably, the firms that enter the top 200 payers in the 2000s have a higher q than nonpayers. These firms are a puzzle for the traditional q theory. Arguing that these firms suffer from undervaluation is also difficult. A more plausible explanation is that, for these firms, Tobin's q is more a measure of rents than a measure of investment opportunities (Lee et al., 2020).

Firms can also invest in cash holdings. Not surprisingly, cash holdings are higher in the 2000s for all types of firms considered. The percentage increase is highest for nonpayers, whose average cash-holdings-to-assets ratio doubles from 1971–1999 to the 2000s. At the same time, nonpayers are less levered than payers, whether we examine book or market leverage.

2.3. How do firms fund their payouts?

Firms must fund their payouts somehow. The cash flow (CF) identity provides a useful tool to explore how firms fund increased payouts. According to this identity:

$$\text{CF from operations} + \text{CF from investing activities} + \text{CF from financing} = \Delta\text{Cash} + \text{Payouts}. \qquad (2)$$

Usually, payouts are included in CF from financing, but we remove them and consider them separately. Note that CF from investing activities is typically negative, so if firms spend less on investment, CF from investing activities increases. With this identity, an increase in payouts has to be funded through an increase in CF from operations (OCF), an increase in CF from investment, an increase in CF from financing, or a decrease in cash holdings. This identity does not imply causality. In particular, if CF from investing activities becomes less negative and payouts increase, the increase in payouts is not necessarily causing investing activities to decrease. Investment is endogenous. Firms could choose to cut investment in order to pay out more. However, the pattern of changes in investment documented in Section 2.2 is inconsistent with the view that top payers decrease investment to fund payouts, because the drop in capital expenditures does not differ across firms depending on whether they are top payers, other payers, or nonpayers.

To assess how firms fund their payouts, we use variables as of date t, in contrast to using variables as of date t-1 in the previous section. The reason is straightforward: we are assessing how firms fund payouts as of date t, whereas before we were assessing firm characteristics for groups of firms and we did not want selection into those groups to be affected by those characteristics. We normalize all variables by lagged assets. We show next the payout-over-lagged-assets ratio. Not surprisingly, this ratio increases a lot for both the top payers and the other payers. It increases most for the top payers (by 3.91 percentage points, or 66.16%). OCF for top payers increases by 2.40 percentage points, even though operating income does not, because firms pay less taxes and less interest in the 2000s. The increase in OCF is not sufficient to fund the increase in payouts. However, investment (defined as capital expenditures plus acquisitions) for the top payers falls by 3.34 percentage points, so the combination of the increase in OCF plus the decrease in investment equals 5.74 percentage points and is more than enough to fund the increase in payouts. For the other payers, OCF plus investment is close to zero.

Firms for which OCF plus investment is close to zero can still make payouts, but they have to issue debt or reduce cash holdings to do so. In general, firms issue debt if they grow. Debt increases enable firms to pay out more (Farre-Mensa et al., 2020). Before 2000, we find no difference in the change in debt for top payers versus other payers. In the 2000s, top payers increase debt normalized by lagged assets significantly more than other payers. Therefore, unsurprisingly, cash increases for top payers as well as for the other payers, but it increases more for other payers both before 2000 and in the 2000s. However, the difference in the increase in debt over lagged assets between top payers and other payers is only approximately a quarter of the difference in payouts over lagged assets—1.49 percentage points versus 5.65 percentage points—so absent increases in debt, a large difference in payouts would still exist between top payers and other payers.

Turning to payers versus nonpayers, the average OCF for payers is roughly equal to their investment in the 2000s but is less than that before. For nonpayers, the average OCF is negative both in the 2000s and before. The low OCF of nonpayers is largely explained by the high R&D. Both before 2000 and in the 2000s, the sum of R&D and OCF for nonpayers is roughly zero. Hence, if R&D expenses were capitalized, operating CF would be zero for these firms. Both payers and nonpayers increase debt. We find no differences in the change in debt between payers and nonpayers before 2000 or in the 2000s. As we see in Panel B, cash holdings increase much more for nonpayers than payers. The increase in debt cannot explain that difference. Though we do not tabulate the results, an important contributor to the increase in cash is equity issuance. In the 2000s, the average rate of equity issuance over lagged assets is 3.6% for payers and 28.3% for nonpayers.

An alternative approach is to compute average free cash flow (FCF) directly, where FCF is defined as

$$\text{Free cash flow (FCF)} = \text{Max[OCF - investment, 0]}. \qquad (3)$$

Investment includes capital expenditures and acquisitions. If firms pay out some of their CF in excess of investment, FCF measures what a firm has available to pay out, absent CF from financing and using its cash holdings. Before 2000, the ratio of FCF to lagged assets for top payers is not different than the ratio for other payers. FCF for top payers more than doubles from before 2000 to the 2000s, increasing by 107.02% from 3.56% to 7.37%. For other payers, FCF increases by 42.99% from 3.42% to 4.89%. Not surprisingly, in the 2000s, FCF of top payers is significantly higher than FCF of other payers. Turning to payers versus nonpayers, FCF does not change for nonpayers but increases by 51.31% for payers. Overall, the average FCF is much higher in the 2000s for payers, and especially for top payers.

In summary, payers—especially top payers—are more profitable in the 2000s than before on a CF basis. They spend less on investment, so they have more FCF. They could choose to hoard that FCF. Instead, they increase their payout rate and their payouts. The nonpayers also invest less. Their FCF does not increase, because their expenses increase as a result of higher R&D. Had payers increased R&D expenses as much as non-payers, their OCF would be lower and they would have no FCF. However, payers are older and spend substantially less on R&D than nonpayers. By making large payouts, the payers enable investors to fund the R&D expenses of the younger firms.

3. Can firm changes explain the increase in payout rates?

Section 1 shows that the most important factor in explaining the increase in payouts from the pre-2000s to the 2000s is an increase in payout rates. Section 2 shows how changes in firm characteristics between the pre-2000 period and the 2000s imply an increase in payout rates based on the life-cycle theory. In this section, we use two different approaches to investigate whether changing firm characteristics can explain the increase in payout rates. Both approaches start from regressions that relate firms' payout rates to lagged firm characteristics motivated by the financial economics literature. In the first approach, we use the coefficients from regressions estimated from 1971 to 1999 to predict net payout rates during the 2000s, conditional on the realizations of the explanatory variables. With the second approach, we estimate the same regressions over the whole period but allow for intercept changes in the 2000s. Significant intercept changes would indicate firm characteristic changes are not sufficient to explain changes in payout rates. Finally, we use the regression models to assess which changes in firm characteristics between 1971–1999 and 2000–2019 are most important in explaining why the net payout rate is higher in the 2000s.

3.1. Predicting payouts in the 2000s

In our first approach to examining whether changes in firm characteristics can explain changes in payout rates, we estimate the relation between payout rates and lagged firm characteristics in the pre-2000 period. We then use that regression to predict payout rates in the 2000s, given realized firm characteristics. The use of lagged characteristics gives our regression the interpretation of a forecasting regression. In Table 3, we show estimates of these models, with standard errors clustered by firm and year. The regressions address the question: given a firm's characteristics in one year, what are its expected payouts the next year? Note our model does not include a firm's stock performance as an explanatory variable, simply because a firm's stock price is the present value of future payouts.

Column (1) presents estimates using all firms with positive operating income. As expected, the payout rate increases with asset size and firm age. From our discussion in Section 2, the payout rate should be negatively related to variables that proxy for financial constraints. We find negative and significant coefficients both on leverage and on an indicator variable for accounting loss. The payout rate is lower for firms with a higher Tobin's q ratio, which is what one would expect if Tobin's q proxies for growth opportunities. As predicted by models that emphasize growth opportunities, greater investment in R&D and capital expenditures is associated with a lower payout rate. The payout rate also increases with cash holdings. Surprisingly, lagged OCF does not have a significant coefficient. We include an indicator variable for high-tech firms given the importance of option compensation for these firms, at least prior to the 2005 adoption of FAS 123R, which changed the accounting treatment of option compensation. This indicator variable is significantly negative. Firms with higher SG&A expenses and higher advertising expenses have higher payouts. These variables could proxy for intangible assets that are associated with rents that established firms harvest. Column (2) shows estimates of the regression when run on the sample of payers only. A few coefficients lose significance or even change sign. Specifically, OCF has a significantly negative coefficient, the accounting loss indicator variable has a significantly positive coefficient, and the high-tech indicator variable is insignificant.

We use the models in columns (1) and (2) to forecast payout rates conditional on realized firm characteristics. In other words, we forecast a firm's payout rate in year t using the coefficients in columns (1) and (2) and the actual values for the independent variables for that firm in year t-1. In Fig. 4, we plot the predicted average payout rate for each year in the 2000s from our regressions estimated before 2000. Panel A shows the predicted payout rates from a regression that uses all firms. On average, the predicted values for the 2000s are close to, but lower than, the actual values. More precisely, the average of the predicted values is 17.86% and the average of the actual values is 21.85%. The model underpredicts payouts by an average of 3.99 percentage points or by 18.26%. Because the average pre-2000s payout rate is 12.93%, the regression predicts an increase in payout rates in the 2000s. If firms made payout decisions in the 2000s in the same way as they did earlier, the average net payout rate would have increased by 36.66%. However, as is evident from Panel A, the regression model does not do a good job of capturing the high payout rates in 2007–2008 and 2014–2019. Further, the difference between the average actual payout rate (25.81%) and the predicted payout rate (19.10%) is larger in the 2010s.

When we redo the analysis for the payers only, the model again predicts an increase in average payout rates in the 2000s, as shown in Fig. 4, Panel B. The model predicts an increase in the average annual payout rate from 20.56% in the pre-2000 period to 25.76% in the 2000s. However, the model systematically underpredicts the payout rate and performs worse than the model that includes all firms. Specifically, the actual average payout rate is 34.58% in the 2000s, or 68.19% higher than the pre-2000 average and 34.24% higher than the predicted average payout rate. The underprediction is worse in the 2010s, when the predicted average payout rate is 26.49% and the actual payout rate is 36.43%. Panel B of Fig. 4 shows the predicted net payout rate of payers is below the actual net payout rate every year. As with the whole sample, the model does not explain the increase in net payout rates in 2007 and 2015.

We use the same approach to estimate predicted median payout rates. We limit this analysis to the payers be-

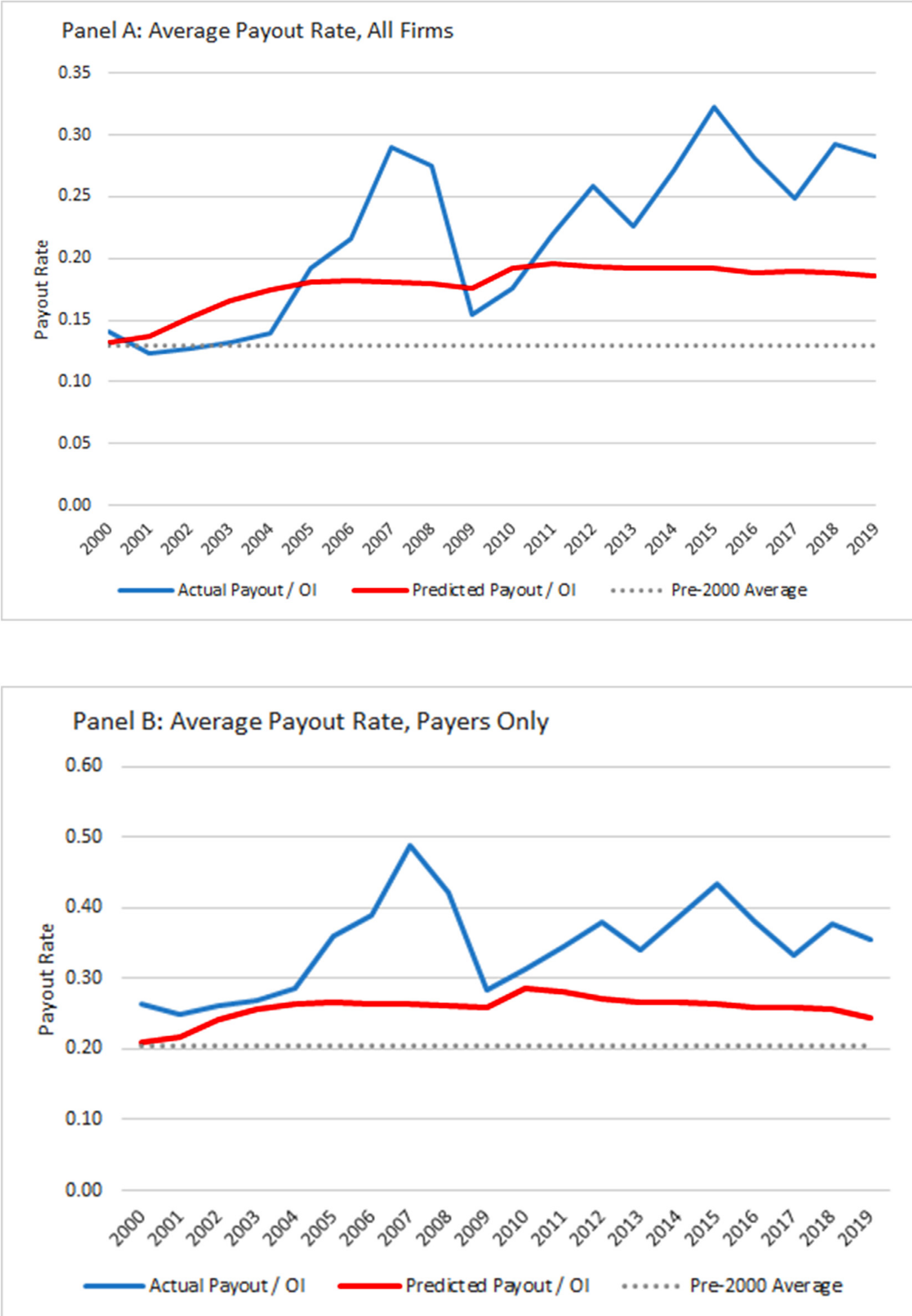

Fig. 4. Predicted versus actual payout rates by year. This figure shows the average actual net payout rates and predicted values of payout, where the payout rate is the ratio of net payout to operating income. Predicted values are calculated from the regression model shown in column (1) of Table 3 estimated from 1971 to 1999 without fixed effects. The coefficients from the regression model are then used to calculate the predicted values from 2000 to 2019. In Panel A (B), the regression model is estimated for the full sample of firms (firms with positive payout) with available data and the average predicted payout in each year is presented. In Panel C, the model is estimated based on firms with positive payouts and the median predicted payout in each year is presented.

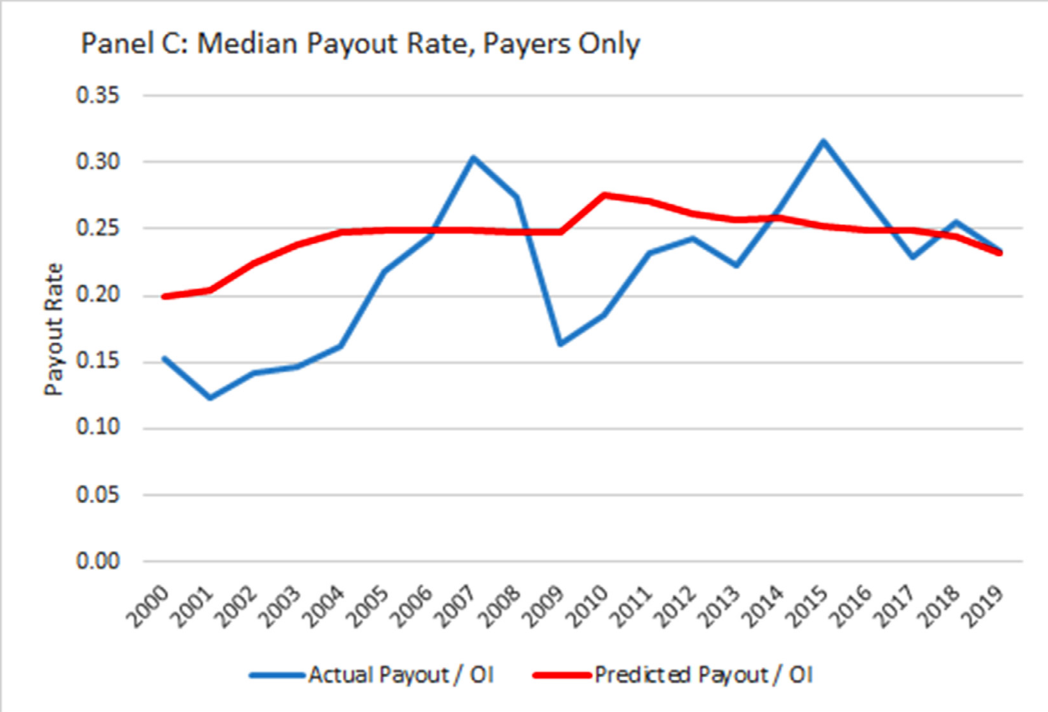

Fig. 4. Continued

cause the median payout rate is zero in some years for the whole sample. Whereas the model underpredicts the mean, it overpredicts the median in most years. Fig. 4, Panel C, shows predicted and actual median payouts. The average annual median payout rate is 21.93% and the average annual predicted median payout rate is 24.53%. Not surprisingly, the model still underpredicts median payouts in 2007 and 2015. However, the underpredictions are smaller than the underpredictions using the means. In 2007, the actual median payout rate is 30.29% and the predicted median payout rate is 24.91%, an underprediction of 17.76%. In contrast, the underprediction of the mean in 2007 is 46.19%.

A concern with these results is that the predicted payout rate could be negative even though a firm cannot have a negative payout rate given the way we define the payout rate. To investigate whether negative predicted net payout rates affect our results, in untabulated results, we set negative predicted rates to zero. Because we identify few negative payout rates, making this change has no discernible impact on Fig. 4.

3.2. Testing for intercept changes

In this section, we test whether the regression models in columns (1) and (2) of Table 3 can explain payout rates from 1971 to 2019. To do so, we estimate the models in columns (1) and (2) over the whole sample period, but we add period indicator variables. The indicator variables are for the 2000s, for the 2010s, and for 2018. The indicator variable for the 2000s (2010s) takes value one for any year in the 2000s (2010s). Consequently, a significant positive indicator variable for the 2010s indicates that the payout rate is higher in the 2010s than in the 2000s. A significantly positive indicator variable indicates payout rates are significantly higher than predicted using firm characteristics. Columns (3) and (4) of Table 3 report estimates of these models with firm fixed effects, and columns (5) and (6) show results without firm fixed effects.

Column (3) presents estimates using all firms. The model in column (1) shows some differences. First, lagged OCF has a negative and significant coefficient. Second, the indicator variable for high-tech firms is not significant. Third, the coefficient on advertising expenses is not significant. We find that the indicator variables are insignificant except for those for 2018. Not surprisingly, the payout rate is significantly higher in 2018, when firms could repatriate foreign funds under advantageous conditions. These results indicate that there is no exogenous change in the level of the net payout rate except for 2018. In other words, firms do not set their payout rate differently in the 2000s and 2010s than they do before 2000.

Column (4) shows estimates when we use the sample of payers. The explanatory power of the regression increases, but the sign and significance of coefficients change for only two variables. Specifically, the coefficient on fixed assets becomes significantly negative and the coefficient on the accounting loss indicator variable is now insignificant. Again, the indicator variables for the 2000s and for the 2010s are not significant, but the indicator variable for 2018 is significantly positive.

The models estimated in columns (3) and (4) demonstrate that a firm that is in the sample in the 1990s and the 2000s does not change the way it sets its payouts in the 2000s compared with how it does so in the 1990s. With firm fixed effects, the period indicator variables are estimated within firms, and some firms enter the sample in the 2000s. We therefore estimate the models without firm fixed effects in columns (5) and (6). The 2010s indicator variable is now significant for the whole sample, and the 2000s indicator variable is significant for the sample of payers. The economic magnitudes of the coefficients on the period indicator variables for the 2000s and the 2010s is large. The indicator variable for the 2010s for the whole sample has a coefficient of 4.3 percentage points. For the whole sample, the difference between the average payout rate for 2000–2009 and the average payout rate in the 2010s is 7.8 percentage points, so the indicator variable corresponds to 54.43% of the actual increase in the average annual payout rate between 2000–2009 and the 2010s. Finally, for the payers, the indicator variable for the 2000s has a coefficient of 6.3%. The average payout rate increases by 14.20 percentage points from 1971 to 2000 to the 2000s, so the indicator variable corresponds to 44.37% of the increase in the payout rate.

The evidence from Table 3 shows changes in firm characteristics help explain changes in payout rates. Further, firms do not suddenly decide to pay out more in the 2000s given their characteristics. In other words, accounting for changes in a firm's characteristics, its level of payouts is not different in the 2000s than it is before 2000. However, when we drop firm fixed effects, we observe changes in the intercepts for the 2000s and the 2010s, indicating that new firms enter the sample in the 2000s with elevated payout rates given their characteristics. This evidence is consistent with Michaely and Moin (2020), who examine the phenomenon of reappearing dividends and conclude newer firms drive dividend trends.

3.3. Which firm characteristics matter most?

We can use the regression models in columns (1) and (2) of Table 3 to assess which changes in firm characteristics are most important in explaining the increase in payout rates. To do so, we use the coefficients from these models to estimate how the payout rate changes for a firm of average characteristics, given the change in average firm characteristics between the pre-2000s and the 2000s. We report the average value of the dependent variable (payout) and the explanatory variables in Table 4. Panel A examines all firms with positive operating income; Panel B examines the subset of firms that have positive payouts. Column (1) shows the average firm characteristics for the 2000s, and column (2) for the 1971–1999 period. Column (3) reports the differences in firm characteristics between the two periods.

The first row of each panel reports the average net payout rate for the sample of firms for which we have data for all the variables used in the regression model. The payout rate increases by 8.17 percentage points for the whole sample and by 14.20 percentage points for the payers. The next rows examine firm characteristics that help explain payouts. In Panel A, we see that in the 2000s, firm leverage, tangible assets, and capital expenditures are lower than before. The drop in capital expenditures of 36.73% is substantial. This decrease in capital expenditures concerns some economists and, as discussed in the Introduction, politicians argue repurchases may be responsible for this decrease. However, as discussed in Section 2, capital expenditures decrease equally for non-payers (the decrease for non-payers is 39.82%). Cash flow to assets increases. Tobin's q is sharply higher in the 2000s. In contrast to capital expenditures, R&D expenses increase, as do SG&A expenses. The fraction of firms with accounting losses is greater in the 2000s, as is the percentage of high-tech firms. As noted earlier, listed firms have become older. Results in Panel B for the net payers are similar. In light of Kahle and Stulz (2017), the differences in firm characteristics are not surprising.

In column (4), we report regression coefficients for the model estimated from 1971 to 1999. We multiply the change in the firm characteristic in column (3) by its regression coefficient to obtain the column (5) "impact," that is, the change in the net payout rate predicted by the change in that characteristic. In Panel A, the payout rate increases by 8.17 percentage points, and changes in firm characteristics explain an increase of 4.65 percentage points, so firm characteristics explain 56.79% of the increase. The four most important firm characteristics that explain the change in payout rates are assets, age, cash holdings, and leverage. All variables except market leverage are positively related to payout rates and increase from before 2000 to the 2000s. Market leverage is negatively related to payout rates and decreases from before 2000 to the 2000s. These four variables account for an increase in the payout rate of 5.11 percentage points.

For the sample of payers in Panel B, the payout rate increases by 14.20 percentage points, and changes in firm characteristics predict a change of 5.07 percentage points. Whereas asset size has a large coefficient in the regression for the whole sample, size is not one of the four most important variables in explaining the increase in the payout rate for payers. The four most important variables are, in order of importance, cash holdings, leverage, age, and capital expenditures.

We repeat this analysis after excluding the last two years of the sample period, because the TJCA results in large payouts in 2018 that are outside of our regression model. When we do so, the model is more successful. Specifically, we explain 84.56% of the increase in the payout rate for the whole sample and 59.32% of the increase for payers.

4. Does the sensitivity of payout rates to firm characteristics increase?

In Section 1, we show repurchases drive the growth in payout rates. The fact that firms find cutting dividends is costly is well known. However, repurchases are more flexible, so firms can vary their payout rate more easily. When institutional investors push them to pay out funds they cannot invest profitably, they can pay these funds out quickly through repurchases. Hence, if institutional in-

Table 3

Table 3 shows estimates of firm-level net payout rate regressions. Net payout rate is calculated as net payout as a fraction of operating income, for firms with positive operating income. The sample begins with all firms listed on Compustat from 1971 to 2019. We exclude firms not incorporated in the U.S. and financial firms and utilities (SIC codes 6000–6999 and 4900–4949, respectively) because of their statutory capital requirements and other regulatory restrictions. We also exclude firms with missing data for total assets (AT), dividends (DVC), and market capitalization (CSHO and PRCC_F). We then merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11. Odd columns present results for all firms with available data and even columns present results for firms with positive net payout. All control variables are lagged relative to the dependent variable and all continuous variables are winsorized at the 1% and 99% levels. Details on all variables are provided in the Appendix. P-values are in parentheses; ***, **, and * denote significance at 1%, 5% and 10% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Market Leverage	−0.230***	−0.272***	−0.299***	−0.405***	−0.245***	−0.294***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log(assets)	0.015***	0.003**	0.047***	0.045***	0.021***	0.011***
	(0.000)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)
OCF / lagged assets	−0.007	−0.120***	−0.037***	−0.103***	0.011	−0.125***
	(0.245)	(0.000)	(0.000)	(0.000)	(0.168)	(0.000)
Fixed assets	0.003	0.011	−0.020	−0.067***	−0.007	0.008
	(0.680)	(0.352)	(0.215)	(0.007)	(0.378)	(0.539)
Tobin's q	−0.014***	−0.011***	−0.014***	−0.013***	−0.004*	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.093)	(0.874)
RD / lagged assets	−0.258***	−0.255***	−0.354***	−0.526***	−0.355***	−0.190***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)
SGA / sale	0.022**	0.131***	0.064***	0.257***	0.053***	0.191***
	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Advert. / sales	0.257***	0.037	0.130	0.047	0.312***	0.064
	(0.000)	(0.655)	(0.230)	(0.744)	(0.000)	(0.464)
Capex / lagged assets	−0.148***	−0.216***	−0.123***	−0.192***	−0.204***	−0.295***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash / assets	0.241***	0.449***	0.310***	0.450***	0.299***	0.554***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Acct Loss	−0.014***	0.062***	−0.022***	0.006	−0.034***	0.028***
	(0.000)	(0.000)	(0.000)	(0.406)	(0.000)	(0.002)
Hitech dummy	−0.030***	−0.007	−0.007	−0.001	−0.021***	0.002
	(0.000)	(0.281)	(0.395)	(0.966)	(0.000)	(0.749)
Log(age)	0.032***	0.026***	0.030***	0.030***	0.033***	0.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2000s dummy			−0.012	0.013	−0.004	0.063***
			(0.343)	(0.431)	(0.798)	(0.004)
2010s dummy			0.034	−0.007	0.043**	0.012
			(0.134)	(0.772)	(0.040)	(0.622)
2018 dummy			0.039***	0.029**	0.042***	0.022*
			(0.002)	(0.011)	(0.003)	(0.080)
Constant	0.040***	0.144***	−0.130***	−0.081***	−0.005	0.103***
	(0.000)	(0.000)	(0.000)	(0.006)	(0.671)	(0.000)
Observations	75,839	47,702	116,766	71,978	118,170	73,405
Adjusted R-squared	0.096	0.088	0.232	0.288	0.122	0.151
Fixed Effect	No	No	Firm	Firm	No	No
Cluster	Firm&Year	Firm&Year	Firm&Year	Firm&Year	Firm&Year	Firm&Year

vestors pressure firms to maximize shareholder wealth more aggressively in the 2000s than for much of our pre-2000 sample period, we expect payout rates to be more sensitive to changes in characteristics that determine their payout rate.[4] A simple approach to test this conjecture is to investigate whether the slopes of our regression models differ in the 2000s from before and whether the differences are consistent with firms' payout rates being more responsive to changes in firm characteristics.

In Table 5, we re-estimate the models in columns (3) through (6) of Table 3, but we allow the slopes and the intercepts to change in the 2000s by including period indicator variables and interacting the 2000s indicator with firm characteristics. The odd columns contain the coefficients with no interactions and the even columns contain the coefficients on the interaction terms. The interactions are significant across all four models for five variables. These variables are market leverage, the log of assets, Tobin's q, capital expenditures, and cash holdings. Each of the interactions magnifies the effect of a change in the variable, except for Tobin's q, which has a negative and significant coefficient, whereas the interaction has a positive and significant coefficient. Further, in the regressions for the whole sample, the interactions for R&D have a negative and significant coefficient, so that the coefficient on R&D is magnified. Lastly, OCF has a significantly negative coefficient for three regressions and a significant positive interaction for two interactions. It follows that when interactions with market leverage, log of assets, capital expenditures, cash

[4] Holmstrom and Kaplan (2001) write, "Shareholder value is back because it is the most efficient form of corporate governance." They attribute much of this evolution to the greater influence of institutional investors.

Table 4
Table 4 examines the role of changing firm characteristics on the ratio of net payout to operating income for firms with positive operating income by estimating the regression models of columns (1) and (2) in Table 3 over the period 1971–1999. We show for these models how the payout rate changes given the change in average firm characteristics between the pre-2000 and the post-2000 periods. Columns (1) and (2) show the mean value of firm characteristics in the post-2000 and pre-2000 periods, respectively, for firms with available data to estimate the regression and calculate predicted values. Column (3) shows the difference between the two and whether they are significantly different. Column (4) provides the coefficient estimate of the regression model estimated from 1971 to 1999. Column (5) examines the impact of each variable by multiplying the coefficient estimate by the change in mean value of the variables from the pre- to the post-2000 period. Panel A provides the results for all firms with available data, and Panel B estimates the regression and predicted values for firms with positive payout only. Details on all variables are provided in the Appendix.

Panel A: All firms	(1)	(2)	(3)	(4)	(5)
	Mean (D2000s=1)	Mean (D2000s=0)	Diff.	Coefficient	Impact
Net payout / OI	0.2111	0.1293	0.0817***		
Market Leverage	0.1669	0.2151	−0.0482***	(0.2302)	0.0111
Log (Assets)	6.659	5.536	1.1230***	0.0148	0.0166
OCF / lagged assets	0.0987	0.069	0.0298***	(0.0074)	(0.0002)
Fixed assets	0.2564	0.3229	−0.0665***	0.0032	(0.0002)
Tobin's q	1.6059	1.2647	0.3412***	(0.0142)	(0.0048)
R&D / lagged assets	0.0327	0.0271	0.0056***	(0.2585)	(0.0014)
SGA / sales	0.2548	0.2231	0.0317***	0.0217	0.0007
Advertising / sales	0.012	0.0116	0.0004**	0.2575	0.0001
Capex / lagged assets	0.0584	0.0923	−0.0339***	(0.1482)	0.0050
Cash / assets	0.1583	0.108	0.0503***	0.2409	0.0121
Fraction with acct losses	0.2114	0.1462	0.0652***	(0.0138)	(0.0009)
High tech dummy	0.2841	0.1882	0.0959***	(0.0300)	(0.0029)
Log(age)	2.715	2.3606	0.3543***	0.0319	0.0113
Panel B: Net Payers only	(1)	(2)	(3)	(4)	(5)
	Mean (D2000s=1)	Mean (D2000s=0)	Diff.	Coefficient	Impact
Net payout / OI	0.3476	0.2056	0.1420***		
Market Leverage	0.1606	0.2094	−0.0488***	(0.2723)	0.0133
Log (Assets)	7.1452	6.0681	1.0770***	0.0032	0.0034
OCF / lagged assets	0.1083	0.0814	0.0270***	(0.1200)	(0.0032)
Fixed assets	0.263	0.3386	−0.0756***	0.0115	(0.0009)
Tobin's q	1.5991	1.1304	0.4687***	(0.0109)	(0.0051)
R&D / lagged assets	0.0244	0.0188	0.0056***	(0.2550)	(0.0014)
SGA / sales	0.2367	0.2041	0.0325***	0.1311	0.0043
Advertising / sales	0.0129	0.0126	0.0003	0.0371	0.0000
Capex / lagged assets	0.0539	0.0876	−0.0337***	(0.2165)	0.0073
Cash / assets	0.1455	0.0982	0.0473***	0.4488	0.0212
Fraction with acct losses	0.1492	0.0944	0.0549***	0.0616	0.0034
High tech dummy	0.2288	0.1265	0.1023***	(0.0071)	(0.0007)
Log(age)	2.9359	2.5799	0.3560***	0.0258	0.0092

holdings, and R&D have significant coefficients, the interactions imply changes in these variables have a larger effect in the 2000s on the predicted payout rate than before.

We can compute the impact of the change in a variable on the payout rate for the 2000s using the same approach as in Table 4, but now we have to add the effect of the interaction for the 2000s. Because the most challenging sample is the sample of payers only, we focus on that sample. We do not tabulate these results. The predicted change in the average payout rate due to changes in firm characteristics is equal to 9.23 percentage points when the actual change is 14.20 percentage points. We find five variables contribute more than one percent of the increase in the average payout rate. These variables are, in order of importance, size, cash holdings, market leverage, capital expenditures, and age. Allowing the slopes to change in the 2000s has a large effect on our measure of the impact of the change in firm size and capital expenditures on the predicted payout rate. In Table 4, the impacts of the change in firm size and capital expenditures on the predicted payout rate are, respectively, 0.34 and 0.73 percentage points. With the interactions, the impact of the size change is 2.09 percentage points, and the impact of the capital expenditures change is 1.73 percentage points. With Tobin's q, the impact goes from a small negative to a positive impact of 0.43 percentage points. A positive relation between Tobin's q and the payout rate is challenging for theories of payouts that argue undervalued firms pay out more.

The regression models of Table 5 do not allow us to examine the sensitivity of payouts to FCF. In Table 6, we estimate regressions of payouts over lagged assets on FCF, allowing the intercept and the slope to differ in the 2000s. We measure FCF as in Section 2, namely as Max(OCF – investment, 0) divided by lagged assets. We estimate the regressions with and without fixed effects for the sample of all firms. The indicator variable for the 2000s is not significant. The slope on FCF is economically small before the 2000s. In the model with firm fixed effects, an increase in FCF from 0% to 10% increases payouts from 1.7% to 1.702%. The same change in the 2000s increases payouts to 2.76%. It thus follows that the sensitivity of payouts to FCF is much higher in the 2000s. Though payouts are sensitive to FCF before 2000, this sensitivity is not economically significant. However, it is in the 2000s.

Table 5
Table 5 shows estimates of firm-level net payout rate regressions. Net payout rate is calculated as net payout as a fraction of operating income, for firms with positive operating income. The sample begins with all firms listed on Compustat from 1971 to 2019. We exclude firms not incorporated in the U.S. and financial firms and utilities (SIC codes 6000–6999 and 4900–4949, respectively) because of their statutory capital requirements and other regulatory restrictions. We also exclude firms with missing data for total assets (AT), dividends (DVC), and market capitalization (CSHO and PRCC_F). We then merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11. Numbered columns present results for the uninteracted variables, and the next column shows results for the variable interacted with an indicator for observations in the 2000s. All control variables are lagged relative to the dependent variable and all continuous variables are winsorized at the 1% and 99% levels. Details on all variables are provided in the Appendix. P-values are in parentheses; ***, **, and * denote significance at 1%, 5% and 10% respectively.

	(1a)	x2000	(2a)	x2000	(3a)	x2000	(4a)	x2000
Market Leverage	−0.250***	−0.164***	−0.337***	−0.276***	−0.230***	−0.105***	−0.272***	−0.182***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
Log(assets)	0.036***	0.016***	0.036***	0.018***	0.015***	0.015***	0.003*	0.016***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.064)	(0.000)
OCF / lagged assets	−0.041***	0.054***	−0.108***	0.059	−0.007	0.087***	−0.120***	−0.016
	(0.000)	(0.008)	(0.000)	(0.240)	(0.401)	(0.000)	(0.000)	(0.734)
Fixed assets	−0.016	0.009	−0.062**	0.004	0.003	0.013	0.011	0.024
	(0.308)	(0.658)	(0.017)	(0.888)	(0.699)	(0.434)	(0.496)	(0.354)
Tobin's q	−0.021***	0.013**	−0.023***	0.016**	−0.014***	0.018***	−0.011**	0.020***
	(0.000)	(0.012)	(0.000)	(0.014)	(0.000)	(0.001)	(0.010)	(0.006)
RD / lagged assets	−0.242***	−0.178**	−0.453***	−0.026	−0.258***	−0.196***	−0.255***	0.164
	(0.000)	(0.013)	(0.000)	(0.843)	(0.000)	(0.002)	(0.000)	(0.214)
SGA / sale	0.039***	0.056**	0.259***	−0.017	0.022**	0.067***	0.131***	0.105***
	(0.010)	(0.016)	(0.000)	(0.752)	(0.017)	(0.001)	(0.000)	(0.007)
Advert. / sales	0.035	0.347*	−0.035	0.355	0.257***	0.140	0.037	0.177
	(0.741)	(0.084)	(0.813)	(0.175)	(0.000)	(0.311)	(0.645)	(0.342)
Capex / lagged assets	−0.087***	−0.165***	−0.157***	−0.176**	−0.148***	−0.253***	−0.216***	−0.296***
	(0.000)	(0.000)	(0.000)	(0.017)	(0.000)	(0.000)	(0.000)	(0.000)
Cash / assets	0.240***	0.163***	0.348***	0.243***	0.241***	0.109***	0.449***	0.164***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.001)
Acct Loss	−0.008**	−0.028***	0.028***	−0.041***	−0.014***	−0.036***	0.062***	−0.064***
	(0.029)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hitech dummy	−0.009	0.003	−0.004	−0.007	−0.030***	0.012	−0.007	0.002
	(0.268)	(0.790)	(0.766)	(0.622)	(0.000)	(0.155)	(0.262)	(0.835)
Log(age)	0.032***	0.010	0.035***	−0.003	0.032***	0.002	0.026***	−0.030***
	(0.000)	(0.133)	(0.000)	(0.739)	(0.000)	(0.647)	(0.000)	(0.000)
2000s dummy	−0.155***		−0.096**		−0.118***		0.016	
	(0.000)		(0.013)		(0.000)		(0.596)	
2010s dummy	0.019		−0.015		0.033		0.008	
	(0.416)		(0.553)		(0.113)		(0.744)	
2018 dummy	0.035***		0.029**		0.040***		0.022*	
	(0.003)		(0.011)		(0.004)		(0.090)	
Constant	−0.070***		−0.030		0.040***		0.144***	
	(0.000)		(0.304)		(0.000)		(0.000)	
Observations	116,766		71,978		118,170		73,405	
Adjusted R-squared	0.238		0.295		0.132		0.163	
Fixed Effect	Firm		Firm		No		No	
Cluster	Firm&Year		Firm&Year		Firm&Year		Firm&Year	

5. Extensions and robustness

We perform 11 investigations to assess the robustness of our results, and we report the results in the Internet Appendix (IA). First, a concern with the regressions in Table 3 is that the payout rate is skewed. The average ratio of the mean to median is 1.63 for firms with positive operating income. Consequently, Table IA 1 estimates the regressions using the log of one plus the payout rate. When we do so, the results are similar except that the indicator variable for the 2010s becomes significant in the regression using the whole sample with fixed effects, but its coefficient is similar to the one in Table 3.

Second, Table IA 2 shows our regression results separately for dividends and repurchases. Most firm characteristics have similar coefficients in both. However, the coefficients on firm characteristics are smaller in absolute value in the dividend regressions, suggesting dividends are less sensitive to changes in firm characteristics. This evidence is consistent with the established view that repurchases are a more flexible mechanism for payouts than dividends. The indicator variables for the 2000s and the 2010s are not significant for repurchases when using firm fixed effects, but the indicator variables for the 2010s are significant for dividends.

Third, we estimate the regressions on a sample of firms that are in Compustat for at least 10 years to verify that the difference in results between regressions with and without firm fixed effects are not driven by firms that are in Compustat for a short time. The results are similar (Table IA 3).

Fourth, Table IA 4 uses two additional definitions of payers. In Table 3, a firm is defined as a payer if it pays out in the same year that we measure the payout. We re-

Table 6

In Table 6, the dependent variable is net payouts over lagged assets. FCF is calculated as Max(OCF – investment, 0) divided by lagged assets. Investment is the sum of capital expenditures and acquisitions. The sample begins with all firms listed on Compustat from 1971 to 2019. We exclude firms not incorporated in the U.S. and financial firms and utilities (SIC codes 6000–6999 and 4900–4949, respectively) because of their statutory capital requirements and other regulatory restrictions. We also exclude firms with missing data for total assets (AT), dividends (DVC), and market capitalization (CSHO and PRCC_F). We then merge these observations with data from the Center for Research in Security Prices (CRSP) and restrict the sample to NYSE, AMEX, and NASDAQ firms with CRSP shares codes 10 or 11. Details on all variables are provided in the Appendix. P-values are in parentheses; ***, **, and * denote significance at 1%, 5% and 10% respectively.

	(1)	(2)
2000s dummy	−0.001	0.002
	(0.248)	(0.328)
FCF	0.014***	0.002***
	(0.000)	(0.000)
2000s dummy x FCF	0.200***	0.106***
	(0.000)	(0.000)
Constant	0.019***	0.017***
	(0.000)	(0.000)
Observations	165,469	163,991
Adjusted R-squared	0.076	0.305
Fixed Effect	No	Firm
Cluster	Firm&Year	Firm&Year

define a firm as a payer if it pays out (1) in the previous year or (2) in any of the past three years. These changes do not affect our conclusions.

Fifth, Table IA 5 re-estimates Table 3 using gross instead of net payouts. Using gross payouts does not affect the regressions with firm fixed effects. In the regressions without firm fixed effects, when all three period indicator variables are used, only the 2018 indicator variable is significant for the whole sample.

Sixth, we replace cash/assets with a measure of excess cash. We estimate a model of cash holdings similar to the one in Bates et al. (2009) and use the residual from that model as our estimate of excess cash.[5] The results (in Table IA 6) are not meaningfully different.

Seventh, we investigate the extent to which our results depend on whether a firm initiates payouts with dividends or with repurchases (Table IA 7). Our results are the same for both groups of firms when using firm fixed effects. Without firm fixed effects, when we consider all firms, the indicator variable for the 2010s is positive and significant, but not the one for the 2000s. The coefficients are similar for firms that initiate payouts with dividends and those that initiate payouts with repurchases. For payers, we find that the indicator variables for the 2000s are positive and significant for firms that initiate payouts with dividends and for firms that initiate with repurchases, but the coefficient is larger for firms that initiate with repurchases. These results suggest that whether a firm initiates payouts with dividends or with repurchases makes little difference in how firm payouts increase in the 2000s and 2010s given firm characteristics.

Eighth, we allow for slow adjustment of dividends and repurchases by re-estimating the regressions of Table 3 but including the lagged payout rate as an independent variable to account for slow adjustment. None of our results differ meaningfully with this alternative specification (Table IA 8).

Ninth, we explore whether market-timing theories (Baker and Wurgler, 2002) can help explain years with high payout rates. In Table IA 9, we add the one-year forward excess return of the firm's stock to our regressions; firms that time the market with repurchases should do so before positive performance. The coefficient on the forward excess return is positive. It is only statistically significant for regressions with firm fixed effects, but it is never economically significant.

Tenth, we estimate regressions on payouts net of net debt issuance. Doing so allows us to eliminate the impact of cross-market arbitrage (Ma, 2019) and of debt-financed payouts (Farre-Mensa et al., 2020) in Table IA 10. Our baseline analysis ignores these issues as the life-cycle model has nothing to say about cross-market arbitrage and debt-financed payouts. We therefore expect our models to perform better if we examine payouts in excess of net debt issuance. Doing so slightly improves the explanatory power of the regression, but has little impact on the coefficients of the temporal indicator variables.

Lastly, multinationals benefitted from tax holidays both before the crisis and as a result of the TJCA.[6] In Table IA 11, we investigate whether our models perform better for domestic firms than multinationals. We define a firm as a multinational firm if its pre-tax foreign income in any of the last three years exceeds 3% of sales. With that criterion, we can estimate our regressions from 1987 to 2019. We add indicator variables for 2007 and 2015 since these years have abnormal high payout rates. The payout policies of multinationals are not different from those of domestic firms in general, but they do differ in 2018. The indicator variable for that year interacted with the indicator variable for multinationals has a much larger positive coefficient than the indicator variable for that year alone. This evidence is consistent with Bennett and Wang (2021), who show the increase in repurchases in 2018 is largely the result of increases by multinationals who were able to repatriate foreign cash advantageously due to the TJCA. The indicator variable for 2007 is much higher than the interaction for multinationals for the whole sample for all regressions. The interaction for multinationals is not significant for payers. Both the indicator variable for 2015 and its interaction with the multinational indicator variable are positive and significant for the whole sample in all regres-

[5] The model differs from the model in Bates et al. (2009) in that we use firm age instead of IPO indicator variables and include asset growth and tangible assets as additional variables.

[6] The Homeland Investment Act of 2004 provided firms a one-time tax holiday on the repatriation of foreign earnings. The literature reaches mixed conclusions on the extent to which the Act caused an increase in equity payouts. Dharmapala et al. (2011) find that firms with repatriated earnings experienced a substantial increase in payouts (up to 92 cents per dollar repatriated, depending on their estimates), but Faulkender and Petersen (2012) conclude that at most 25% of the cash repatriated by financially constrained firms goes to equity payouts.

sions. It follows that whether a firm is a multinational or not is most important for its payout rate in 2018. However, payouts of multinationals do not explain why the payout rates in 2007 and 2015 are higher than can be explained by firm characteristics.

6. Conclusion

In this paper, we show payouts in the 2000s are sharply higher than from 1971 to 1999, whether measured as constant dollar aggregate payouts or firm-level payouts. The increase in payouts results from both an increase in payout rates and an increase in funds available for payouts. Thirty-seven percent of the increase in aggregate constant dollar payouts is explained by an increase in constant dollar aggregate operating income, whereas 63% of the increase is explained by an increase in payout rates.

We investigate how firms change from 1971–1999 to 2000–2109 and whether these changes can explain the increase in payout rates. The finance literature tells us that successful older firms pay out more. We find that firms in the 2000s are larger and older. Payers, and especially top payers, have higher operating cash flow and higher free cash flow. The increase in free cash flow results from a decrease in investment. This decrease is not specific to payers or top payers, however. Capital expenditures fall across the board and do not fall more for payers or top payers. It is implausible to blame the increase in payouts in the 2000s for the decrease in investment in the 2000s when firms with no payouts decrease investment by as much or more. The difference between payers and nonpayers is that payers use the funds released by the reduction in investment to increase payouts and the nonpayers use it to increase R&D. This difference has a simple two-part explanation. First, young, small firms spend more on intangibles to build the intangible capital they require to operate successfully. Second, the importance of investment in intangible assets increases in the 2000s (Kahle and Stulz, 2017). Thus, as intangible capital becomes more important, young and small firms spend much more on intangibles. Older firms increase spending on intangibles by a much smaller amount because they have already built much if not all of their intangible capital.

To investigate how much of the increase in payouts can be explained by changes in firm characteristics, we estimate models using data from 1971 to 1999 that relate payouts to firm characteristics. We then use these models to predict payout rates in the 2000s given actual firm characteristics. These models predict an increase in payout rates for the 2000s because of changes in firm characteristics, but they do not predict an increase as large as the actual increase. For all firms with available data, the average payout rate increases by 8.17 percentage points from before the 2000s to the 2000s. Changes in firm characteristics explain 56.79% of that increase. For the sample of payers, the payout rate increases by 14.20 percentage points, but changes in firm characteristics explain only 35.74% of the increase. However, the predicted average payout rate for payers is always lower than the actual payout rate in the 2000s. In contrast, the predicted median payout rate for payers is too high. Perhaps not surprisingly, the models estimated from 1971 to 1999 predict payouts better when we exclude 2018 and 2019, the years impacted by the TCJA. These models explain 84.56% of the increase in the payout rate from 2000 to 2017 for the whole sample and 59.32% of the increase for payers. Further research should help understand better why average payout rates increase more than can be explained by changes in firm characteristics.

The question this paper tries to answer is why payouts are so high in the 2000s. The answer is that a sizeable fraction of the increase in payouts can be explained by changes in firm characteristics. However, evidence also suggests part of the increase in payout rates can be explained by the fact that firms are more sensitive to determinants of payouts in the 2000s. In other words, if a firm's payout rate is positively related to a firm characteristic before 2000, it is more strongly related to that firm characteristic in the 2000s. An increase in the sensitivity of payouts could be a positive development if it means that firms are less likely to hoard funds internally that could be invested more profitably outside the firm. Alternatively, such an increase could be problematic if it means that firms are more reluctant to take advantage of valuable internal investment opportunities. Although our study does not provide tests that would establish or reject a causal relation between capital expenditures and payouts, it does show that it is not plausible to blame the increase in payouts for the decrease in investment.

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