

A Growth Type Explanation for Persistence in Retained Earnings and Propensity to Pay Dividends

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Abstract

We show that while firms that typically pay dividends already have high ratios of retained-earnings-to-total-equity (RE/TE) and high propensities to pay (PTP) early on, firms that typically do not pay dividends have persistently low RE/TE and low PTP even after 20 years of growth. This non-ergodic phenomenon goes beyond a lifecycle explanation. We propose a growth type view, in which low growth type can accommodate the popular distribution-retention tradeoff argument in the lifecycle explanation for high RE/TE and PTP, but high growth type is responsible for persistently low RE/TE and PTP. The growth type view can explain why low RE/TE and PTP can be surprisingly long-lived, and suggests that typical non-payers deliberately do not pay dividends even when they can, because doing so may confuse the market.

Key Words: Dividends, Propensity to Pay, Retained Earnings, Growth Type, Persistence

JEL Classification Code: G32, G35

1. Introduction

In the literature, dividend determinants such as profitability, sales growth and firm size are often used to explain firm propensity to pay dividends (e.g., Fama and French, 2001). Recent research by DeAngelo, DeAngelo and Stulz (2006) finds that the propensity to pay (PTP) is strongly related to a new variable, retained-earnings-to-total-equity ratio (RE/TE), and provides a lifecycle explanation in light of the maturity hypothesis from Grullon, Michaely and Swaminathan (2002).

Lifecycle theory contends that dividend policy is driven by the tradeoff between distribution and retention of corporate earnings and that this tradeoff depends on firm maturity stage. The firm maturity stage enters the picture because it is believed that young firms rely more on new equity (or contributed equity) for early growth while mature firms rely more on self-financing and are more able to pay dividends because of ample accumulative profits.

Lifecycle theory explicitly explains within-firm variation in PTP. To be consistent with this theory, the positive relationship between RE/TE and PTP should come largely from within-firm time variation. However, the finding of Brav, Graham, Harvey and Michaely (2005) that 77% of CFO's from non-payers indicate that they perhaps will never initiate dividends obviously falls outside the explaining power of the lifecycle theory. Similarly, this paper shows in a large sample that while typical dividend payers already pay dividends early on, typical non-payers do not pay dividends even after 20 years of growth, undermining the concept of maturity stage.

We find that high or low RE/TE ratios and PTP are strongly persistent. We sort COMPUSTAT US non-utility-and-financial firms for 1963-2006 into quartiles, according to their initial RE/TE ratios: RE/TE1 (lowest), RE/TE2 (low), RE/TE3 (medium), and RE/TE4 (high). A firm's initial RE/TE ratio is defined as the average of the firm's annual RE/TE ratios

over the first three years since the start of the firm's whole sample or hereafter in this paper, IPO year. At each cross section, we calculate the average RE/TE ratio within each quartile. We plot the annual average RE/TE ratios of individual initial-RE/TE-sorted quartiles and find a persistent pattern for the cross-section of RE/TE ratios over event years as well as calendar years. For example, for 20 event years, the high-RE/TE quartile has annual average RE/TE ratios of around 0.60. At the other extreme, the lowest-RE/TE quartile always has annual average RE/TE ratios of a negative value (due to aggressive R&D investments which are typically expensed and funded heavily by new equity, as we will show later). Firms with persistently low and often negative RE/TE ratios are common. In effect, 42% of firms in our total sample start with negative initial-RE/TE ratios.

More revealingly, the initial-RE/TE-sorted quartiles also demonstrate a persistent pattern for the cross-section of PTP. The high-RE/TE quartile always has the highest PTP where some 40% of firms start to pay dividends from IPO and, after natural attrition, some 70% pay after 20 years. In contrast, the lowest-RE/TE quartile usually do not pay dividends, where less than one percent of firms start to pay from IPO and only about 12% of firms pay after 20 years. The reluctance to pay is not confined to the lowest quartile. The low-RE/TE peer, RE/TE2, starts with a PTP of less than 3% and ends up with a PTP of less than 20% after 20 years. In short, a typical firm from the lower RE/TE quartiles, or about half the sample, is always a nonpayer. For PTP with 20-year-and-plus survivors, the persistent patterns above become even more pronounced.

It is true that the strong persistence in high RE/TE and PTP can be consistent with the lifecycle story if we believe that high RE/TE firms may already become mature at IPO. Yet it is hard to imagine that a typical young firm that starts with a low and negative RE/TE ratio is still

“young” after 20 years of growth and remains reluctant to pay dividends because of lifecycle reasons. The paucity of dividend payers among an easily identifiable group of well-seasoned firms over 20 years—an extended period much longer than a typical CEO’s tenure—calls for rethinking the theory of dividends.

In the literature, disciplining and signaling are two major reasons for dividend payments in imperfect markets fraught with agency conflicts and asymmetric information (see early models of Easterbrook, 1984, for disciplining, and Bhattacharya, 1979, and Miller and Rock, 1985, for signaling). Empirical findings largely support the disciplining role of dividends in mitigating agency problems but casts doubt on the signaling role in mitigating asymmetric information problems (see Allen and Michaely, 2003, and Kalay and Lemmon, 2008, for literature reviews). Based on earlier empirical studies (e.g., Fama and Babiak, 1968; Watts, 1973), Miller (1987) noticed that dividends are better described by lagged earnings—smoothing by themselves—instead of leading uncertain earnings, consistent with Lintner’s (1956) description of dividend smoothing. The managers recently surveyed in Brav, Graham, Harvey and Michaely (2005) confirm that dividends are sticky and they do not view dividends as a costly signaling vehicle.

The tradeoff between retention and distribution of profits that motivates the lifecycle theory of dividends is largely consistent with the disciplining explanation, and is important to firms that potentially have the agency problems such as Jensen’s (1986) free cash flow problem. In effect, the maturity hypothesis on the timing of changes in dividends in Grullon, Michaely and Swaminathan (2002) is supported in a sample of payers with noticeable levels of dividends, or typical payers.

The retention-distribution tradeoff, however, should be unimportant to high growth firms, which tend to have high valuations and are unlikely to be subject to the free cash flow problem. One may argue that the asymmetric information problem in Myers and Majluf (1984) encourages retention because of external financing being more costly than retained earnings. But this classic retention argument based on the Myers-Majluf adverse selection logic does not seem to meaningfully prevent high growth firms from external equity financing (Fama and French, 2002, 2005).

It is important to note that many high growth firms seem able to convince the market even for a long time that they are good at attracting valuable new investments, despite a lot of uncertainty about their growth opportunities (Zingales, 2000). The generalized Myers-Majluf model, developed by Cooney and Kalay (1993) and Wu and Wang (2005), shows that unlike the asymmetric information about assets-in-place, the asymmetric information about growth opportunities (which is more relevant to high growth firms) can facilitate new equity issuance, undermining Myers' (1984) pecking order in financing. As a result, high growth firms simply do not need dividend signaling to lower costs of equity financing.

Empirically, high growth firms are likely to be firms with low RE/TE ratios. Since total equity is the sum of retained earnings (or earned equity) and contributed equity, low RE/TE ratios simply reflect a lot of contributed equity for high R&D investments, which are expensed and typically have a slow payoff. It is these vigorous investments in R&D that provide an engine

for supporting high growth.¹ Thus, the classic retention concern of the RE/TE-based lifecycle theory is not really important to high growth firms.

We use a growth-type explanation for the persistent patterns for RE/TE and PTP. In view of the initial determination of leverage suggested by Lemmon, Roberts and Zender (2008), Wu and Au Yeung (2009) find that initial leverage determinants play a stable role in anchoring long-run capital structure. To understand this fundamental persistence, they provide a parsimonious explanation for leverage persistence. More importantly, they show that non-ergodic behavior, as sorted by initial growth type, is ubiquitous in corporate finance.

Firm growth type is defined based on combinations of initial market-to-book and asset tangibility, unlike combinations of updated profitability and market-to-book, commonly used, for example, in Fama and French (2001) and DeAngelo, DeAngelo and Stulz (2006). The firm growth-type view suggests that firms with similar growth types attract and accommodate similar types of human capital that is competitively available, underlying persistently distinct investment styles (of tangible versus R&D or intangible investments); this gives rise to specific market imperfections or information environments and induces persistently distinct financial policies in response. The survey results in Brav, Graham, Harvey and Michaely (2005) suggest that maintaining the dividend level (*or persistent financial policy*) is a priority on par with investment decisions, a first-order concern to managers, and hence are consistent with the growth type view.

¹ Mikkelsen and Partch (2003) also find that persistently high cash holdings for R&D intensive firms do not suffer the free cash flow problem and hinder firm performance.

Supporting the growth-type view, our initial-RE/TE sorts also demonstrate the growth-type-related persistence. Low RE/TE firms tend to be high growth type firms, and high RE/TE firms tend to be low growth type firms, and vice versa. In effect, whereas high RE/TE firms persistently focus on tangible investments funded by all the three sources roughly equally: retained earnings, debt and new equity, low RE/TE firms have persistently large R&D or intangible investments through heavy issues of new equity. Wu and Au Yeung (2009) argue that the classic adverse selection of Myers and Majluf (1984) is not necessarily in the way of high growth type firms in raising outside equity, because while the asymmetric information about assets-in-place tends to inhibit new equity issues, the asymmetric information about growth opportunities—befitting high-growth-type firms—can facilitate new equity issuance, according to the prediction by the generalized Myers-Majluf model.

There has been a popular notion that because of the last resort of new equity in Myers' (1984) pecking order of financing, high growth firms cannot afford to pay dividends (DeAngelo, DeAngelo and Stulz, 2006). The growth-type view, however, suggests that since high growth type can facilitate new equity issuance, it is unnecessary for high growth type firms to use dividends to signal their high growth type. Actually, theory predicts that money burning via dividends financed by financial slack and new equity is not an efficient signal for separation (Proposition 4, Daniel and Titman, 1995). Worse, if they paid dividends, they would confuse the market and invite noisy outside evaluations, putting themselves at risk of being pooled with low growth type firms that usually pay dividends. Thus, consistent with the growth-type view, the absence of dividends befits high growth type and does not hinder the investment plans of high

growth firms which typically have low RE/TE ratios.²

Largely circumstantial, our main results of persistence in RE/TE and PTP are robust after controlling for industry medians according to the Fama-French classification of 10 industries. In addition, we find that cross-sectional effects overwhelm within-firm effects on PTP in Logit regressions with firm-level panel data. These regression results stand the robustness check by various sub-periods and by splitting all firms into old and new firms where the latter are listed after 1978. We also show that the phenomenon of disappearing dividends in Fama and French (2001) is contributed by the new firms much more than by their old peers in terms of PTP.

The remainder of the paper proceeds as follows. Section 2 describes the sorts on initial values. Section 3 reports the main results. Section 4 runs Logit regressions with firm-level panel data to gauge cross-sectional versus within-firm effects on PTP. Section 5 concludes.

2. Description of Initially Sorted Firm Portfolios

In this section, we first describe the data (Section 2.1), and then detail the formation of initial-RE/TE quartiles and three growth types (Section 2.2). We also provide preliminary evidence to establish connections between firm growth type and the relationship of RE/TE and PTP.

2.1 The Data

We use a sample of US firms from the COMPUSTAT and CRSP databases for the period from 1963 to 2006. Similar to Fama and French (2001) and DeAngelo, DeAngelo and Stulz (2006),

² Brown, Fazzari and Petersen (2009) suggest that shifts in the supply of equity finance may have driven much of the 1990s R&D boom that they find concentrate almost entirely in young high-tech firms and imply that non-fundamentals may cause the supply shifts. In contrast, our evidence of persistently distinct investment styles and financing behavior in response across firms comes from a larger sample of almost all industries for about four

we process the data as follows. (1) We exclude utilities (SIC 4900 – 4949) and financials (SIC 6000 – 6999). (2) For each firm, we define event year 0 as the year in which COMPUSTAT reports its market equity value: stock price (Data item: 199) times common shares outstanding (25). (3) We intersect the COMPUSTAT firms in year t with CRSP (NYSE, AMEX and NASDAQ) firms that have share codes of 10 and 11 and have market equity data for December of year t to be in the CRSP sample of that year. (4) We exclude firms that have annual market equity data for less than three consecutive years. (5) We exclude firms with book equity below \$250,000 or assets below \$500,000. (6) We restrict book leverage ratio to be no greater than unity, and market-to-book ratio to be no greater than 20.

Finally, we trim firm year observations for these variables: retained earnings to total asset ratio, RE/A, retained earnings to total equity ratio, RE/TE, total equity to total asset ratio, TE/A, profitability, E/A, sales growth rate, SGR, cash holdings to total asset ratio, Cash/A, tangible investment expenditure to total asset ratio, Capex/A, R&D to total asset ratio, R&D/A, change in retained earnings to total asset ratio, $\Delta RE/A$, net debt issue to total asset ratio, $\Delta Debt/A$, and net equity issue to total asset ratio, $\Delta Equity/A$, by the top and bottom 0.5 percent of each variable, and we do this simultaneously to avoid excessive trimming. The construction of the variables we use in this paper is detailed in Appendix A.

2.2 Initial-RE/TE-sorted Quartiles and Three Growth Types

To demonstrate a persistent pattern for the cross section of PTP and understand the reasons behind this pattern, we start with the formation of initial-RE/TE-sorted quartiles and three initial

decades, and our growth type view takes the stand that appropriate financing behavior in response to specific investment style is a first-order concern and that financing *per se* can hardly create desired investment style.

firm growth types. For each firm, the initial value is the annual average over the first three years when firms enter the full sample. Following Lemmon, Roberts, and Zenders (2008) and Wu and Au Yeung (2009), we take a firm's first data entry year in COMPUSTAT to be year 0 (or actually the IPO year for many firms). Then the first three years are year 0, 1 and 2.

Initial-RE/TE Quartiles. We sort into quartiles, according to initial RE/TE ratios, the sample of US firms for 1963-2006. Thus, we have four portfolios: RE/TE1 (lowest), RE/TE2 (low), RE/TE3 (medium), and RE/TE4 (high).

As shown in Panel A of Table 1, these initial-RE/TE sorts clearly span the average cross-sectional dispersions of important dividend determinants for the whole sample period from 1963 to 2006. First, the average relationship between future RE/TE ratios and PTP for our four initial-RE/TE-sorted quartiles is clear. Firms from the lowest- to high-RE/TE quartiles have, on average, annual average RE/TE ratios (in fractional form) from -2.55 to 0.58, and a PTP from 3.65% to 60.34%. Second, these firm quartiles have, on average, annual average retained earnings (RE/A) from -111% to 32%, profitability (E/A) from -14% to 7%, sales growth rate (SGR) from 46% to 13%, firm size percentile (in fractional form) from 0.10 to 0.29, and cash holdings (Cash/A) from 24% to 10%, all in a clear order. In other words, on average, low RE/TE firms tend to have negative earnings but high sales growth and cash holdings; conversely, high RE/TE firms tend to have positive and high earnings but low sales growth and cash holdings.

The fact that low RE/TE firms tend to have a low PTP and high cash holdings immediately suggests that they are likely to have high investment opportunities, similar to firms of high growth type in Wu and Au Yeung (2009) where firm growth type has connotations of persistence.

Wu and Au Yeung (2009) argue that firm growth type gives rise to distinct market imperfection in terms of asymmetric information and related agency conflicts. The growth type

theory suggests that growth type predetermines persistently distinct investment styles, giving rise to specific market imperfections and hence firm financing behavior in response.

Three firm growth-types. Similar to Wu and Au Yeung (2009), we use a two-way independent sort on initial market-to-book and asset tangibility of all firms for the total sample period. With breakpoints at medians, the two-way sort generates four portfolios of firms in terms of initial value: low market-to-book ratio and high tangibility (LH), low market-to-book ratio and low tangibility (LL), high market-to-book ratio and high tangibility (HH), and high market-to-book ratio and low tangibility (HL). We then rearrange the four portfolios into three firm groups. The lopsided LH firms are low-growth-type firms (G1). The lopsided HL firms are high-growth-type (G3). The remaining less lopsided LL and HH firms are firms of mixed-growth-type firms (G2).

Wu and Au Yeung (2009) argue that in a world with asymmetric information, firms of low-growth-type (G1) are most likely to have more asymmetric information about assets-in-place than about investment opportunities; conversely, firms of high-growth-type (G3) are most likely to have more asymmetric information about growth opportunities than about assets-in-place—likely characterizing Zingales' (2000) New Firm with predominant intangibles including growth opportunities that are not necessarily firm specific and whose attachment to the firm can be very uncertain. For the remaining less lopsided LL and HH firms, as it is unclear which type of asymmetric information predominates, these firms are of mixed-growth-type (G2).

As shown in Panel B of Table 1, there is a clear pattern that low-growth firms (G1) have high leverage, high-growth firms (G3) have low leverage, and firms of mixed growth (G2) are in the middle, confirming the growth-type story in Wu and Au Yeung (2009) which parsimoniously explains leverage persistence documented by Lemmon, Roberts, and Zender (2008). Interestingly, both RE/TE and PTP also line up well with growth type in the cross section. More

precisely, G1 firms have high RE/TE ratios (with an average value of 0.30) and a high PTP (of 48.50%) while G3 firms have low RE/TE ratios (with an average value of -0.78) and a low PTP (of 15.16%). There is a strong indication that the relationship between RE/TE and PTP is related to growth type.

The growth-type view in Wu and Au Yeung (2009) contends that firm growth type predetermines firm investment style and financing behavior. We confirm this in Panel B of Table 1. As we can see, on average, low-growth firms, G1, have large tangible investments scaled by total assets, $Capax/A$, at 8.1%, and very small R&D or intangible investments at 1.3%. In contrast, high-growth firms, G3, have lower tangible investments at 5.6% (compared to 8.1%) and much higher R&D investments at 8.0% (compared to 1.3%). In other words, while low-growth firms, G1, tend to focus on tangible investments, high-growth firms, G3, make aggressive investments in R&D or intangibles. In short, most R&D activities tend to take place in G3 firms.

As also shown in Panel B of Table 1, the three funding sources for new investments: changes in retained earnings, $\Delta RE/A$, issues of new debt, $\Delta Debt/A$, and new equity, $\Delta Equity/A$, are, on average, 1.4%, 1.3% and 1.8% for low-growth firms, G1, compared to -5.8%, 0.9% and 9.6% for high-growth firms, G3, respectively. Thus, confirming the findings of Wu and Au Yeung (2009), while low-growth firms, G1, fund their new investments rather evenly from all the three sources, high-growth firms, G3, have large negative changes in retained earnings which tend to be balanced mainly by heavy issues of new equity. Wu and Au Yeung (2009) point out that the large negative changes in retained earnings reflect the expensing or amortizing of the relentless R&D investments that pay off slowly; firms with high-growth-type are able to make large intangible investments because of their external financing ability through heavy issues of new

equity. Befitting high-growth firms, according to the generalized Myers-Majluf model developed by Cooney and Kalay (1993) and Wu and Wang (2005), new equity can have much lower costs than predicted by the classic adverse selection model of Myers and Majluf (1984), defying Myers' (1984) pecking order in financing.

In summary, we have clearly seen an average relationship of RE/TE and PTP in the cross section, and that this strong relationship is related to firm growth type. The link is important because growth type predetermines persistently distinct firm investment style and financing behavior, including PTP. If the relationship is persistent over, say, 20 years, firm growth type will be an alternative explanation to a lifecycle explanation for PTP. For example, if many firms start with a low, negative RE/TE ratio and pay no dividends, and if these firms remain with a low RE/TE after 20 years and are still reluctant to pay dividends, a RE/TE-based lifecycle explanation, if driven by the free cash flow concern, seems misplaced, and if driven by the retention indication of Myers and Majluf (1984), seems problematic.

3. A Growth Type Explanation for the Persistence in RE/TE and PTP

In this section, we first report the persistent relationship of RE/TE and PTP in the cross section of the panel data (Section 3.1), check industry-adjusted results for such persistence (Section 3.2), and explain why this relationship is consistent with a firm growth type view (Section 3.3).

3.1 Persistence in RE/TE and PTP

The literature has already shown a strong relationship between RE/TE and PTP (DeAngelo, DeAngelo and Stulz, 2006). We emphasize that this relationship arises largely from cross-sectional variation that indicates non-ergodic corporate behavior. The cross-sectional pattern for this relationship, as shown in Panel A of Table 1, is an average result for the whole sample

period. To study persistence, we need to examine the evolutions of RE/TE and PTP in detail. If there is indeed strong persistence in RE/TE and PTP, our initial-RE/TE-sorted firms will demonstrate persistent patterns for future RE/TE and PTP.

Event Year. In Fig. 1, year 0 can be considered as the IPO year, and firms are only sorted once according to their initial RE/TE ratios. At each cross section, we calculate the annual mean RE/TE ratios and a PTP for firms within a particular quartile.

In Panel A of Fig. 1, we plot the annual mean RE/TE ratios of individual quartiles over 20 event years after IPO. The RE/TE ratios turn out to be strongly persistent. The high-RE/TE quartile shows persistently high RE/TE ratios above 0.5, and the medium-RE/TE quartile, RE/TE3, tends to have persistently lower but still positive RE/TE ratios. The low, RE/TE2, and lowest quartiles remain mainly in negative territory. The annual mean RE/TE ratios of the low-RE/TE quartile, starting with a negative value, deteriorate for more than 5 years after IPO and remain negative all the way up to 20 years. The lowest-RE/TE quartile has indisputably the lowest RE/TE ratios despite steady improvement over time from the all-time-low of -3.5 just a couple of years after IPO. Later on, we will show that the deterioration of already negative RE/TE ratios of low- and lowest-RE/TE firms soon after IPO reflects the continuation of vigorous R&D investments through heavy issues of new equity; and these intangible investments cause typically large immediate expenses but seem to pay off explicitly mainly in the long run.

In Panel B of Fig. 1, we plot annual percentage of payers (in fractional form), a measure for PTP, of initial-RE/TE-sorted quartiles over event years. We immediately see a persistent pattern for PTP as well. The PTP of the high-RE/TE quartile is always the highest, and the PTP of the medium-RE/TE quartile is a distant second. This is then followed by the low- and lowest-quartiles, together, as a distant third and fourth. While the PTP looks improving over time, yet

less than 20% of the low-RE/TE firms pay dividends even after 20 years. Likewise, the lowest-RE/TE firms always have a meager PTP, lower than the PTP of their low-RE/TE peers. It is of little surprise that firms with higher initial RE/TE ratios are more likely to pay dividends if one believes that they always face the free cash flow problem because they may already become mature at IPO. But the fact that the low- and lowest-RE/TE firms always have a very low PTP over their whole listed life as long as 20 years questions the notion that RE/TE ratio is simply a proxy for lifecycle stage.

Survivorship of listed firms may confound the patterns in Panel A and B due to attrition in the total sample over time. In Panel C and D of Fig. 1, we examine the sample of firms that survive for at least 20 years. We find that the persistent patterns for RE/TE ratios and the corresponding PTP remain evident. Persistence in PTP is stronger among these survivors. For one thing, the high-RE/TE quartile start with a PTP of 64% and end up with a PTP of 69%, where the evolution of PTP over time is much flatter than that in Panel B of Fig. 1. On the other hand, the low- and lowest-RE/TE quartiles still always have similarly negative RE/TE ratios, and a PTP of less than 20% even after 20 years. Note that significant improvement over time in negative RE/TE ratios of the lowest-RE/TE quartile, as also shown in Panel C of Fig. 1, does not seem to affect PTP drastically. The RE/TE-based lifecycle theory of dividends will find it difficult to explain this evidence of persistence. The main message here is that the huge differences in PTP among listed firms are largely determined initially. Note that initially determined leverage persistence documented by Lemmon, Roberts and Zender (2008) is another similar phenomenon in corporate finance.

Calendar Year. New firms enter the sample every year. Fama and French (2001) find a structural break regarding PTP around 1978, followed by a drastic disappearing of dividend

payers. DeAngelo, DeAngelo and Stulz (2006) find that these newly listed firms typically have negative RE/TE ratios. Thus, it is necessary to look at the relationship between RE/TE and PTP by calendar year. We will see if the persistent patterns survive this structural break.

As shown in Panel A and B of Fig. 2, our initial-RE/TE quartiles still show persistent patterns for the cross-section of RE/TE ratios (Panel A) and PTP (Panel B) by calendar year. In Panel B of Fig. 2, the percentage of payers in each quartile drastically declines after a temporary peak in 1978 and tend to level off starting in the late 1980s. Fama and French (2001) call this long-lasting widespread decline in dividend payers as “disappearing dividends” and attribute this phenomenon to (1) the inclusion of newly listed firms which are mostly lacking payer characteristics—changing characteristics, and (2) changing propensity-to-pay, PTP, of firms even with the same payer characteristics as before. It is the second reason that Fama and French (2001) find most perplexing.

When we limit the sample to old firms which are listed in or before 1978, we find that the old firms have the least to do with the dividend disappearing after 1978. It is true that as shown in Panel C of Fig. 2, the cross sectional patterns for RE/TE ratios after 1978 become unclear for the old firms due to a much smaller sample size of the old firms in the low- and lowest-RE/TE quartiles (detailed later in Table 2). Yet, as shown in Panel D of Fig. 2, the post-1978 PTP of the old firms in all quartiles does not drop drastically, compared to the pattern for all firms in Panel B of Fig. 2. This suggests that the new firms are the main reason for the dividend disappearing and that the apparent difference in PTP between the old and new firms may not simply reflect changing PTP in general. This is consistent with the claim that the aggregate dividends paid have not declined due to the dividend concentration in old big payers (DeAngelo, DeAngelo, and Skinner, 2004).

Firm propensities to pay do drastically change occasionally, but largely in tandem. As shown in Panel B of Fig. 2, the notable rises and declines in PTP occur around 1965 and 1978; and 2003 witnesses a recent rise from the long decay in PTP since 1978. Such waves in PTP may reflect the fact that firms optimally respond to changing regulation and market imperfections. For example, the Jobs and Growth Tax Relief Reconciliation Act of 2003 is the likely reason for the recent upward trend of PTP since 2003 (Julio and Ikenberry, 2004; Chetty and Saez, 2005; Brown, Liang and Weisbenner, 2007). More precisely, this tax reform has at least two implications on dividend policy in the same direction. First, it lowers the dividend tax to 15% for most investors, possibly facilitating firms to pay dividends due to the standard tax reason. Second, in the wake of the breakouts of corporate scandals during 2001-2002, firms that have high cash holdings and seem to be able to pay dividends have to yield to the market and perhaps implicitly regulatory pressures for perceived good practices in corporate governance, in which paying out cash to shareholders is deemed to be shareholder value oriented.

Interestingly, the two implications affect drastically the old firms that mainly belong to the low- and lowest-RE/TE quartiles, as shown in Panel C of Fig. 2. These old firms which were already listed by 1978 typically did not pay dividends. We are not sure if this recent change in PTP is permanent in view of the rises and declines in PTP in history. In particular, if a typical nonpayer initiates dividends under duress because of the pressure for popularly perceived good governance practices, its heightened PTP may not be as sustainable as the high PTP for a traditional payer unless we truly understand why a typical nonpayer does not pay dividends.

Put together, Fig. 1 and 2 have shown strong persistence in PTP, in part because RE/TE ratios are largely persistent. Despite noted improvement in RE/TE ratios especially for the lowest-RE/TE firms over time, the fact that the low- and lowest-RE/TE firms, which consist of

half of the sample, maintain a meager PTP suggests that firms that start with negative RE/TE ratios typically continue to ignore the lifecycle indication to initiate dividends even after 20 years of growth. By implication, there must be some long-lasting cross-sectional factor(s) behind this persistence in PTP.

3.2 Persistence in Industry-adjusted RE/TE and PTP

One may suspect that the persistent patterns for RE/TE and PTP may simply reflect an industry effect, because individual initial-RE/TE quartiles may exclusively contain a cluster of industries. But as shown in Panel A of Table 2 for the total sample period of 1963-2006, firms from each industry, according to the Fama-French classification of 10 industries (excluding utilities in our sample), do not heavily concentrate in a particular initial-RE/TE quartile. From the lowest- to high-RE/TE quartile, the distribution of firms of a particular industry, on average, is 16.7, 26.3, 29.5, and 27.5 percent (as shown in the last column). The fact that fewer firms appear in the lowest-RE/TE quartile (16.7%) than the high-RE/TE quartile (27.5%) for the total period is mainly due to the situation of the early years of 1963-1978 (Panel B). Singled out in Panel B, the lowest- and low-RE/TE quartiles contain, on average, only 3.3% and 8.3% of all firms of a particular industry. We already mentioned this small sample problem when explaining the noisy part of the cross sectional RE/TE patterns in Panel C of Fig. 2. Industry concentration, however, seems to become muted for the post-1978 period (Panel C), where the distribution of firms of a particular industry is, on average, 19.1, 30.0, 32.1, and 18.8 percent.

The results shown in Fig. 3 directly address the concern for an industry effect. As shown in Fig. 3, where we control for individual industry medians, the persistence patterns are still evident for industry-adjusted RE/TE (Panel A) and PTP (Panel B) across the initial industry-adjusted RE/TE quartiles. Note that industry-adjusted RE/TE and PTP (%Payers in fractional

form) are defined as RE/TE and PTP minus industry median RE/TE and PTP , respectively; and initial industry-adjusted RE/TE is initial RE/TE minus initial industry median RE/TE . The results of Fig. 3 suggest that, controlling for industry medians, a firm with a marginally lower initial RE/TE will always have a marginally lower future RE/TE ratio and PTP .

It is worth mentioning that the patterns shown in Panel B of Fig. 3, while still preserving a meaningful cross-sectional persistence for PTP , are a manifestation of disappearing dividends in Fama and French (2001). They document that all kinds of firms before 1979 were likely to pay dividends. This means that an industry median or a typical firm's PTP then is likely to be 1. Consequently, a payer will have a marginal PTP of 0 (deviated from the industry median PTP) and a non-payer will have a marginal PTP of -1. This explains why the plots of the industry-adjusted PTP concentrate between 0 and -1 in those early years, as shown in Panel B of Fig. 3. As dividends disappearing, more firms become unlikely to pay dividends as Fama and French (2001) emphasize. This means that an industry median PTP is likely to be 0. A payer will have a marginal PTP of 1 and a non-payer will have a marginal PTP of 0. This explains why the plots of the industry-adjusted PTP stay above 0 in the late years. Put together, all this suggests that despite the structure break around 1978, there must be a persistent cross sectional factor, more fundamental than simply an industry identity, in determining PTP .

3.3 A Growth Type View through RE/TE on PTP

The persistence in RE/TE ratios and PTP may reflect persistence in firm fundamentals in general. In this section, we show that the initial- RE/TE quartiles have explicit growth-type characteristics because RE/TE ratios are outcomes of investment styles and financing behavior.

In Table 3, event years are packed for four periods: 1-5, 6-10, 11-15 and 16-20; and an annual average (pooled mean) is defined as the average taken over firms within each initial-

RE/TE quartile and over event years in each period. As shown in Panel A, from the lowest- to high-RE/TE quartile (1 to 4), market-to-book ratios always decrease while asset tangibility always increases, regardless of which period we examine. For example, for the period of event years 6-10, annual average market-to-book decreases from 2.21 to 1.10 while annual average tangibility ratio increases from 0.36 to 0.57. The relationships are monotonic and significant across RE/TE quartiles. Thus, low RE/TE firms always have high market-to-book and low tangibility; conversely, high RE/TE firms always have low market-to-book and high tangibility. As such combinations of market-to-book and tangibility parsimoniously characterize firm growth type as described in Wu and Au Yeung (2009), it is reasonable to say that low RE/TE firms tend to be high growth type and high RE/TE firms low growth type.

Since RE/TE ratios bear explicit growth-type characteristics, like initial-growth-type-sorted firm groups in Wu and Au Yeung (2009), the initial-RE/TE-sorted quartiles should predict persistently distinct firm fundamentals as well. As shown in Panel B of Table 3, from the lowest- to high-RE/TE quartile (1 to 4), both sales growth rates and cash holdings decrease significantly in each period. For example, for the period of event years 6-10, the annual average sales growth rate decreases steadily from 29.68% to 14.80%, and the annual average cash holdings decline steadily from 21.86% to 9.91%. We already know, from Panel A of Table 1, that low RE/TE firms have, on average, high sales growth and cash holdings while high RE/TE firms have, on average, low sales growth and cash holdings. The new findings here suggest that this strong cross sectional relationship is persistent over 20 years after IPO.

Is the free cash flow problem lurking in high growth firms in view of their high cash holdings? In a sample of 89 US firms, Mikkelsen and Partch (2003) find that persistently high cash holdings do not hinder firm performance and that firms with high cash holdings actually

make vigorous investments in R&D. Our evidence from a large sample here also shows that high market-to-book (Panel A), high cash holdings (Panel B), and aggressive investments in R&D (detailed in Panel C next) can persistently go together.

As further shown in Panel C of Table 3, there is also persistently distinct investment style across the initial-RE/TE quartiles in each period. For example, again for the period of event years 6-10, from the lowest- to high-RE/TE quartile (1 to 4), annual average capital expenditure, $Capex/A$, a measure for tangible investment, increases from 5.89% to 7.03%, and $R\&D/A$, a measure for intangible investment, decreases from 8.00% to merely 1.79%. While the difference in tangible investments between the two extreme RE/TE quartiles is always smaller than 2%, the difference in intangible investments is much larger, for example, at 6.21% ($=8.00\%-1.79\%$). The relentless investments in R&D or intangibles by low RE/TE firms are likely to provide an engine for persistently high sales growth and help support persistently high market-to-book ratios.

As shown in Panel D of Table 3, both profitability and change in retained earnings monotonically increase across firms. For example, for the period of event years 6-10, from the lowest- to high-RE/TE quartile (1 to 4), annual average profitability, E/A , increases from -6.26% to 6.60%, and annual average change in retained earnings, $\Delta RE/A$, increases from -9.23% to 2.34% across initial RE/TE quartiles. Thus, persistently low RE/TE firms tend to have low, negative earnings and changes in retained earnings whereas high RE/TE firms tend to have high earnings and changes in retained earnings. This means that the persistently large R&D or intangible investments by low RE/TE firms, as shown in Panel C of Table 3, must be funded mainly through external finance (see also Kim and Weisbach, 2008).

As shown in Panel E of Table 3, while new debt issues across firms do not show much difference, new equity issues decrease noticeably and profoundly. For example, again for the

period of event years 6-10, from the lowest- to high-RE/TE quartile (1 to 4), annual average issues of net debt, $\Delta\text{Debt}/A$, change from 1.06% to 0.88%, hardly significant, but annual average issues of net equity, $\Delta\text{Equity}/A$, decrease drastically from 8.13% to merely 0.88% across the initial-RE/TE quartiles. Thus, while high RE/TE firms raise roughly equal new debt and equity where annual average issues of net debt are close to the level for low RE/TE firms, it is a pronounced phenomenon that low RE/TE firms persistently rely on heavy issues of new equity. Thus, it is the ability of low RE/TE firms to tap into outside equity that supports their persistently large R&D or intangible investments, compatible with their persistently high market-to-book ratios. This also explains why low RE/TE firms tend to have persistently high sales growth and cash holdings. All this goes on despite the typical nonpayer status for low RE/TE firms.

Recent literature seems to have reached a consensus that dividends do not signal future earnings (see the survey paper by Allen and Michaely, 2003). Yet most studies have offered little explanation for that if high growth firms are especially keen to convince capital markets that they have valuable investment opportunities to finance, why don't they use dividends as a costly signal to separate them from firms with fewer investment opportunities? Can dividends-paying lower the costs of new equity financing which is much needed for their vigorous investments? Perhaps contrary to the belief of some researchers, high growth firms on average have high cash holdings that come typically from new equity issues, and hence appear to be able to pay dividends. In theory, money burning, such as paying dividends, financed by new equity and cash holdings is not an efficient signal for separation (Daniel and Titman, 1995). Worse, increases in payouts tend to convey the information that firms have free cash flows (Lie, 2000, Allen and Michaely, 2003) and a decrease in future firm operating volatility (Lie, 2005). All this suggests

that entering the province of dividend paying may invite noisy outside evaluations only to confuse the market regarding the growth type of high growth firms, because firms with a lot of growth options should have high future volatility (Cao, Simin and Zhao, 2008). These are legitimate concerns even to well-seasoned firms of high growth type.

In summary, the initial-RE/TE quartiles line up with persistently distinct investment styles and financing behavior related to growth type as described in Wu and Au Yeung (2009). In effect, the initial-RE/TE quartiles have explicit growth-type characteristics. All this indicates that RE/TE ratios may contain more information about growth type than simply maturity stage in determining PTP. It is likely an equilibrium result that growth type is persistent and predetermines persistently distinct firm investment style and financing behavior, including PTP. As a result, if low RE/TE firms, normally reflecting high growth type, paid dividends, their out-of-equilibrium move would confuse the market, putting themselves at risk of being pooled with low growth type firms that are typically dividend payers.

One may argue that the retention indication of Myers and Majluf (1984) can already explain the reluctance to pay dividends by high growth firms. But the problem is that the same asymmetric information argument cannot explain why these firms do not seem to raise new equity under duress (Fama and French, 2002, 2005) and why they enjoy high cash holdings which do not necessarily come from retention as documented, for example, in this paper. Our growth type view, based on the generalized Myers-Majluf model, can integrate the lifecycle argument for high RE/TE firms, because these firms are likely to be firms of low growth type—many being mature firms—and hence are likely to have the agency conflicts due to free cash flows and suffer from the asymmetric information problem mainly regarding assets-in-place, all being the important ingredients to the distribution-retention tradeoff. What is totally new in this

paper is that the growth type view can fundamentally address why low RE/TE firms are typically non-payers regardless of maturity stages of their listed life. The insight is that these firms are likely to be high growth type firms and hence the absence of dividend paying, befitting their high growth type, does not hinder their vigorous investment plans through new equity financing.

4. Cross-sectional versus Within-Firm Effects in Panel Data Regression

We have seen strong persistent patterns for RE/TE and PTP in the previous section. More fundamentally, there is also persistently distinct investment style and financing behavior across the initial-RE/TE-sorted quartiles. Since Wu and Au Yeung (2009) document a similar pattern for these firm fundamentals sorted by growth type, we expect RE/TE ratio to contain significant information about firm growth type, a cross-sectional concept with connotations of persistence.

If persistence prevails, regression results from firm-level panel data in corporate finance tend to capture mainly variations across firms rather than over time as firms grow from young to old. Thus, in a regression such as in DeAngelo, DeAngelo and Stulz (2006), if the within-firm effect by RE/TE on PTP is much smaller over a long period than the cross-sectional effect, RE/TE ratio cannot be simply a proxy for firm maturity stage which has an explicit implication of a within-firm effect.

In this section, we use detailed firm-level panel data to gauge a cross-sectional effect, reflecting a type story, versus a within-firm effect, reflecting a RE/TE-based lifecycle story. As illustrated in Fig. 4, the slope estimate, \mathbf{b} , in panel data regressions suggests a cross-sectional effect of an explanatory variable X (such as RE/TE ratio) on a dependent variable Y (such as PTP). If there is strong firm-fixed effect in the panel data where X is correlated with individual intercepts, unless we know reasonably what underpins different individual intercepts, X is still the best proxy for measuring an explainable cross-firm effect. On the other hand, the slope

estimate, \mathbf{b}' , simply indicates a within-firm effect.³ If there is strong firm-fixed effect in the panel data as a result of cross sectional persistence in Y and, to some extent, X , the estimate, \mathbf{b}' , will be notably different from (and in our illustrated case, much smaller than) \mathbf{b} , as shown in Fig. 4. In short, both estimates of \mathbf{b} and \mathbf{b}' can have economic meanings.⁴

Following the literature, we run Logit regressions to explain PTP. We use the Fama-MacBath (FM) method to measure an average cross-sectional effect for a sample period based on Logit regression estimates. In the Logit regression, the dependent variable, PTP, is the payer status with payer =1 and non-payer =0 at year t . The key independent variable is annual RE/TE ratio, a proxy for maturity stage as interpreted by DeAngelo, DeAngelo and Stulz (2006). To see if RE/TE ratio conveys cross-sectional information beyond that contained by growth type in terms of the three initially determined firm groups, we take the mixed group type (G2) as the baseline case in an intercept specification. Thus, the intercept is the level estimate for G2 firms and the two growth type dummies pick up the marginal effects of low (G1) and high (G3) growth types, respectively. The list of control variables, as used by DeAngelo, DeAngelo and Stulz (2006), is (1) total equity to asset ratio, TE/TA, a control for variation in total equity in RE/TE, (2) earnings, E/A, (defined the same way as return on assets, ROA, used by many), measuring

³ We thank Cheng Hsiao for his suggestion to include this illustration.

⁴ In panel data for corporate finance research, it is not obvious that the estimate, \mathbf{b} , is “biased” given the existence of unobserved firm heterogeneity. For example, Himmelberg, Hubbard, and Palia (1999) suggest that the unobserved firm heterogeneity affects insider ownership, making the observed relationship between firm value (Y) and insider ownership (X) spurious. However, controlling for unobserved firm heterogeneity, which is typically correlated with X , may not really address the issue, as Zhou (2002) finds that the use of firm fixed effect in Himmelberg, Hubbard, and Palia (1999) may simply throw away the genuine incentive alignment effect of insider ownership across firms.

profitability, (3) sales growth rate, SGR, (4) book asset sizes at the percentiles of all NYSE firms, NYP, and (5) cash holdings divided by assets, Cash/A.

To estimate the within-firm effects of dividend determinants on PTP, we run a within-firm demeaned pooled Logit regression (equivalent to a panel regression with firm-fixed effect):

$$PTP = \text{Logit}\{1 * E(PTP) + \sum \text{slope} * [X - E(X)]\}, \quad (1)$$

where $E(PTP)$ and $E(X)$ are time-series averages of PTP and an X-variable, respectively, for individual firms. Note that the X variables in regression (1) include RE/TE and the control variables listed above.

We report and examine the main results regarding the RE/TE effects on PTP in subsection 4.1, the growth type group dummies in subsection 4.2, and effects of other dividend determinants in subsection 4.3.

4.1. The Effects of RE/TE Ratios on PTP

In Table 4, we report Logit regression estimates for all firms from three periods: the total period from 1963 to 2006 (Panel A), the early period from 1963 to 1978 (Panel B), and the post-1978 period from 1979 to 2006. We find an overarching pattern for slope estimates for RE/TE ratio: slope estimates for the RE/TE cross-sectional effects (FM Regression, w/o and w/ Control) are overwhelmingly larger than slope estimates for the RE/TE within-firm effects (Within-firm Demeaned Pool).

As a result, all one can say is, as Zhou (2002) points out, that the tiny within-firm effect simply reflects a slow temporal improvement (time variation) in incentive alignment effect of insider ownership.

As shown in Panel A of Table 4, for the total period, the slope estimate for RE/TE ratio (FM w/ Control) is 2.89, with a t-value of 19.40, indicating a significant cross-sectional effect. In contrast, the estimate for RE/TE ratio (Within-firm Demeaned Pool) is merely 0.03, though significant with a t-value of 4.64, suggesting a tiny within-firm effect. The R-square statistics provide a startling contrast: 0.35 versus 0.01. And the results hold for sub-periods. One can see the similarly huge contrasts also for the earlier period (Panel B) and the post-1978 period (Panel C). In short, the effects of RE/TE ratios on PTP in firm-level panel data arise overwhelmingly from the cross-sectional variation instead of the time-variation.

In Table 5, we further report the results by splitting firms into old firms (listed in or before 1978) and new firms (listed after 1978). The predominance of the cross-sectional RE/TE effect remains. Among the old firms for the total period (Panel A), the slope estimates are 2.87 (t-value=18.67) for the cross-sectional RE/TE effect and merely 0.24 (t-value=12.56) for the within-firm RE/TE effect. Likewise, for the post-1978 period (Panel B), the slope estimates are 2.36 (t-value=14.92) versus 0.14 (t-value=7.27). New firms (Panel C) are qualitatively similar: the slope estimates are 1.89 (t-value=16.33) for the cross-sectional RE/TE effect but insignificant for the within-firm RE/TE effect. It seems that the significant within-firm RE/TE effect arises mainly among the old firms. But it is still tiny, compared to the cross-sectional RE/TE effect, as indicated convincingly by R-square statistics, for example, with a value of 0.35 versus 0.03 in Panel A of Table 5.

4.2 Firm Group Dummies for Growth Type

As shown in Panel A of Table 4, growth type dummies, only relevant in FM regressions, are also significant, regardless of with or without control variables. For example, with controls, the marginal intercept estimate is 0.59 (t-value=13.80) for G1 and -0.41 (t-value=-7.44) for G3,

suggesting that, on average, firms with low growth type (G1) have significantly higher PTP and firms with high-growth type (G3) have significantly lower PTP than firms with mixed growth type (G2). Thus, both RE/TE ratio and growth type dummies together are able to capture the cross-sectional variation significantly.

However, G3 tends to be insignificant for the old firms. The results are consistent in the total period (Panel A of Table 5), the early period (Panel B of Table 4), and the post-1978 period (Panel B of Table 5) where the estimate for G3, with controls, is -0.63 (t-value=-1.26), for example. Since G1 is always significant, the marginal insignificance of G3 may mean that for the PTP implication, only G2 and G3 are less clearly cut for the old firms than the new firms. We already know from Panel B of Table 2 that there is a small sample problem in the early years due to too few firms for the lowest- and low-RE/TE quartiles which are likely to be G3 firms. The insignificant estimate for G3 here may also mean that RE/TE ratio is likely to contain much stronger information about firm growth type among the old firms than the new firms. Since our focus is RE/TE ratio, the good news is that the strong cross-sectional RE/TE effect is robust even in the presence of the growth type dummies, parsimonious measures for capturing growth type.

4.3 Control Variables

We focus our discussion only on significant control variables. The slope estimates for the well-known control variables in dividend determination: profitability, E/A, sales growth rate, SGR, and firm size percentile, NYP, are always significant in the FM regressions, as shown in both Table 4 and 5. The signs of the slope estimates are consistent with those reported in DeAngelo, DeAngelo and Stulz (2006) and Fama and French (2001).

What we find new is that, like RE/TE, profitability and sales growth have generally small within-firm effects on PTP. For example, as shown in Panel A of Table 4, the slope estimate for

E/A drops to an insignificant number of 0.09 with the within-firm regression from an estimate of 3.29 with the FM regression; similarly, the slope estimate for SGR drops in magnitude to a small number of -0.06, though significant at the t-value of -4.70, from an estimate of -1.12.

A reliable within-firm effect consistently comes from firm size. Although smaller than their cross-sectional effects, the within-firm size effects have the same magnitude regardless of samples and sample periods. As shown in Table 4, the slope estimates for NYP with within-firm regressions are 1.62 (Panel A), 1.68 (Panel B), and 1.23 (Panel C); likewise as shown in Table 5, the estimates are 1.92 (Panel A), 1.36 (Panel B), and 1.10 (Panel), all reliably significant as well. Thus, firm size, instead of RE/TE, should be a much more important proxy for maturity stage in a lifecycle explanation for PTP.

Finally, unlike other control variables which are commonly used dividend determinants in the literature, TE/A is used in DeAngelo, DeAngelo and Stulz (2006) mainly for controlling the total equity in RE/TE. Consistent with their results, the estimates for TE/A are significant in many situations in Table 4 and 5.

Taken together, other dividend determinants than RE/TE also capture overwhelmingly much larger cross-sectional variation than within-firm variation in firm-level panel data regressions to explain PTP. In FM regressions, these control variables increase the combined explanatory power, for example, from 0.24 to 0.35 in terms of R-square statistics, as shown in Panel A of Table 4. In contrast, the R-square statistics in within-firm regressions remain tiny, with the biggest value of 0.03 as shown in Panel A of Table 5. Consistent with the notion of sticky dividends, the findings indicate that a type story explains much more variation than a time-variation-compatible lifecycle story in dividend determination.

5. Conclusion

Using a sample of US nonutility-and-nonfinancial firms for 1963-2006, we find that while firms that typically pay dividends have persistently high RE/TE and PTP, firms that typically do not pay dividends have persistently low RE/TE and PTP even after 20 years of growth.

We suggest that firm growth type can explain this non-ergodic corporate phenomenon. Low growth type firms tend to have a lot of tangible assets and face the asymmetric information about firm valuations that are mainly derived from assets-in-place, whereas high growth type firms tend to have a lot of intangible assets and face the asymmetric information that mainly arises from growth opportunities. Recent research has shown that growth type is surprisingly persistent and suggested growth type compatibility in corporate finance. This growth type framework argues that firms with similar growth types attract and accommodate similar types of human capital that is competitively available, underlying persistently distinct investment styles (of tangible versus R&D or intangible investments); this gives rise to specific market imperfections or information environments and induces distinct financial policies in response. In this growth type view, high growth type firms can be surprisingly long-lived.

We find that low RE/TE firms tend to be high growth type firms, and high RE/TE firms low growth type firms. Consequently, persistently different RE/TE ratios reflect persistently distinct firm investment styles as well as financing behaviors, again non-ergodic patterns similar to those based on a growth-type sort. More precisely, high RE/TE firms, like low growth type ones, always tend to focus on tangible investments which are funded by all the three sources roughly equally: retained earnings, new debt and equity, and have low sales growth and market-to-book ratios. In contrast, low RE/TE firms, like high growth type firms, tend to undertake relentless investments in R&D whenever corporate investments arise. Funded typically by a lot of new equity, these vigorous R&D activities are likely to provide an engine for high sales

growth and help support high market-to-book ratios. All this goes on despite the fact that low RE/TE firms typically do not pay dividends.

In the literature, the nonpaying behavior of high growth firms has often been viewed as being consistent with the implication of valuable financial slack in Myers and Majluf (1984); but the problem is that this retention concern, based on the classic asymmetric information problem, does not seem to meaningfully prevent high growth firms from raising new equity in the first place. In effect, these firms can even enjoy high cash holdings through new equity issuance. All this is not puzzling, however, in the generalized Myers-Majluf framework that explains why an increase in the asymmetric information about growth opportunities can facilitate new equity issuance such that high growth firms can enjoy much lower costs of new equity than predicted by the original adverse selection model. Thus, it is high growth type that underlies the ability of low RE/TE firms to rely heavily on new equity to finance their vigorous investments in intangibles. This explains why the absence of dividend paying does not hinder their investment plans.

The growth type view, based on the generalized Myers-Majluf model, can accommodate the high PTP persistence in high RE/TE firms as well, because these firms are likely to be low growth type firms which have (1) the asymmetric information problem mainly regarding assets-in-place and (2) agency conflicts because of free cash flows, all being the ingredients to the distribution-retention tradeoff as addressed in the lifecycle explanation. The novelty of the growth type view, however, lies in its ability to address why low RE/TE firms are typically non-payers for at least 20 years, an extended period much longer than a typical CEO's tenure in the US.

It is likely a result of separating equilibrium that high and low growth types and hence dividend policies are persistent. Costly signaling may work for high RE/TE firms where firm valuations are based largely on assets-in-place, but dividends cannot signal for low RE/TE firms where firm valuations are based largely on intangibles including growth opportunities which are mainly funded by new equity. If low RE/TE firms made an out-of-equilibrium move and paid dividends, they would confuse the market and invite noisy outside evaluations, putting themselves at risk of being pooled with low growth type firms that usually pay dividends. This confusion undermines growth type compatibility in corporate finance. Thus, unlike low growth type firms as typical payers as well understood in the literature, high growth type firms, which can be surprisingly long-lived, deliberately do not pay dividends even when they can.

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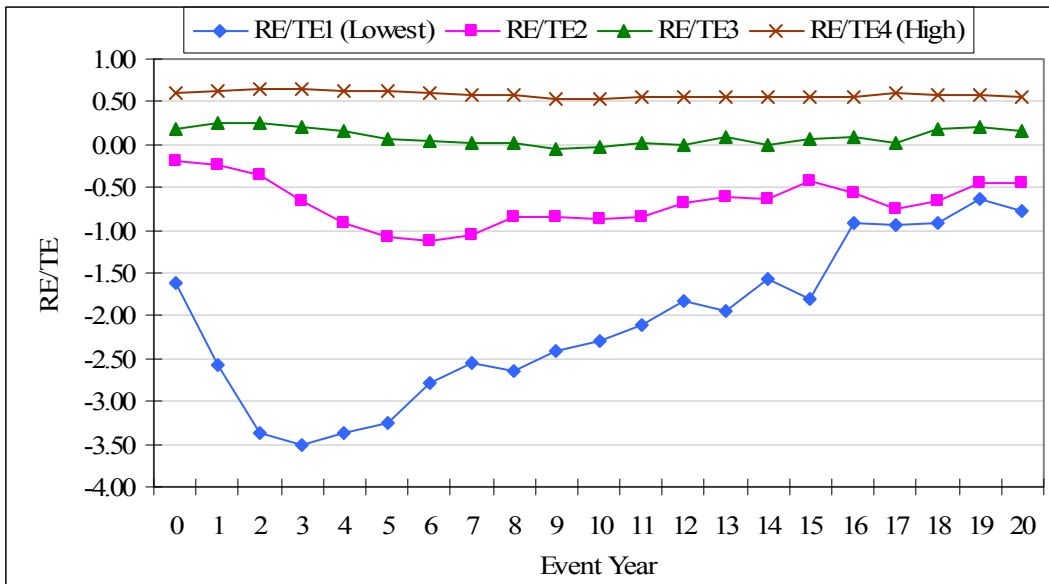
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Appendix: Definition of Annual Variables

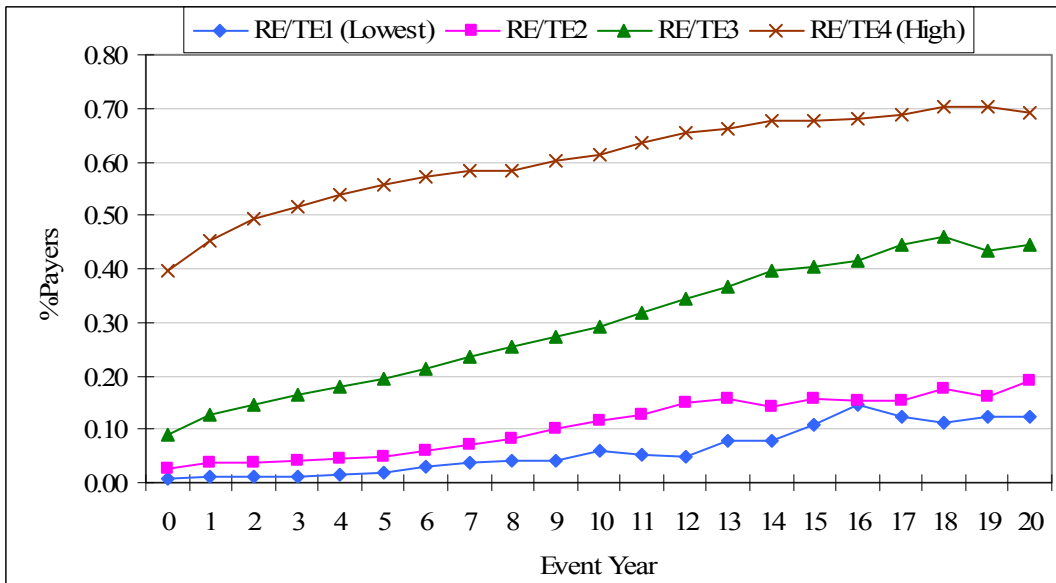
| | |
|-------------------|---|
| Payer | A dividend payer dummy = 1 in year t, if it has positive dividends per share by the ex date (26), equal zero otherwise |
| Book Equity | Shareholder's Equity (216) [or Common Equity (60) + Preferred Stock Par Value (130) or Assets (6) – Liabilities (181)] – Preferred Stock + Balance Sheet Deferred Taxes and Investment Tax Credit (35) if available – Post Retirement Asset (330) if available. |
| Market Equity | Stock Price (199) * Common Shares Outstanding (25) |
| RE/TE | Retained Earnings (36) / Book Equity, in year t |
| RE/A | Retained Earnings (36) / Asset (6), in year t |
| TE/A | Book Equity / Asset (6), in year t |
| E/A | Earnings Before Extraordinary Items (18) + Interest Expense (15) + Income Statement Deferred Taxes (50) if available / Asset (6), in year t |
| SGR | $Sales_t (12) - Sales_{t-1} / Sales_{t-1}$ |
| Firm size, NYP | The percentile of NYSE firms for the same or lower market capitalization, in year t |
| Cash/A | Cash (1) / Asset (6), in year t |
| Capex/A | Capital Expenditure (128) / Asset (6), in year t |
| R&D/A | R&D (46) / Asset (6) (Note that missing values are replaced by zero), in year t |
| $\Delta RE/A$ | Changed in Retained Earnings (36) from year t-1 to year t / Asset (6) in year t |
| $\Delta Debt/A$ | Net Debt Issue (111 – 114) / Asset (6), in year t |
| $\Delta Equity/A$ | Net Equity Issue (108 – 115) / Asset (6), in year t |
| Leverage | [Short-term Debt (34) + Long-term Debt (9)] / Asset (6), in year t |
| Market-to-Book | [Market Equity + Total Debt + Preferred Stock (10) – Deferred Tax (35)] / Asset (6), in year t |
| Asset Tangibility | [Inventory (3) + Property, Plant and Equipment (8)] / Asset (6), in year t |

Fig. 1: Mean RE/TE Ratios and %Payers for Initial-RE/TE-sorted Quartiles in Event Year

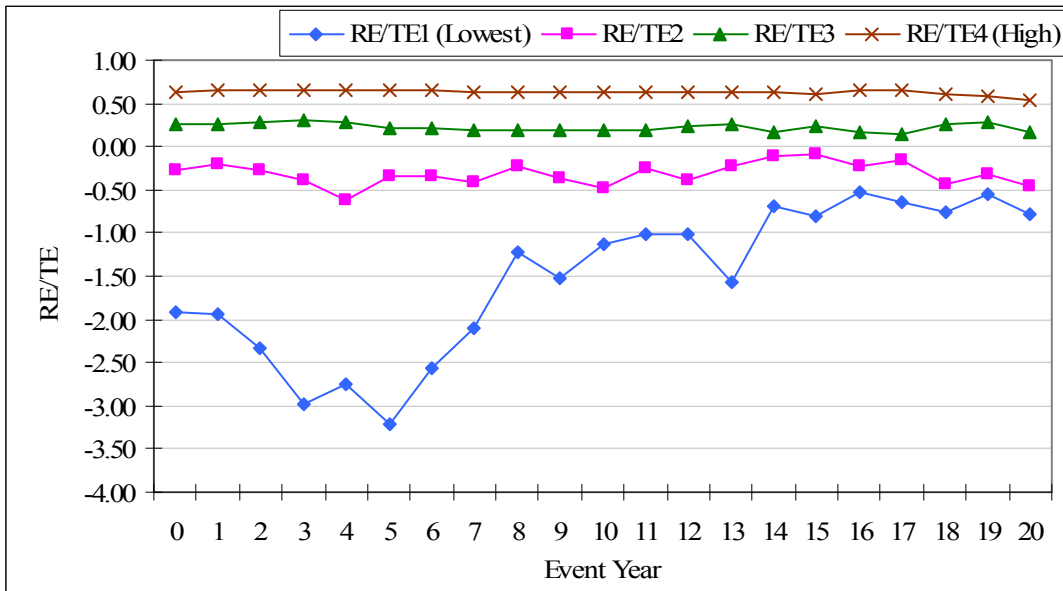
Panel A: Annual Mean RE/TE Ratios for All Firms



Panel B: Annual %Payers for All Firms



Panel C: Annual Mean RE/TE Ratios for 20+Years Survivors



Panel D: Annual %Payers for 20+Years Survivors

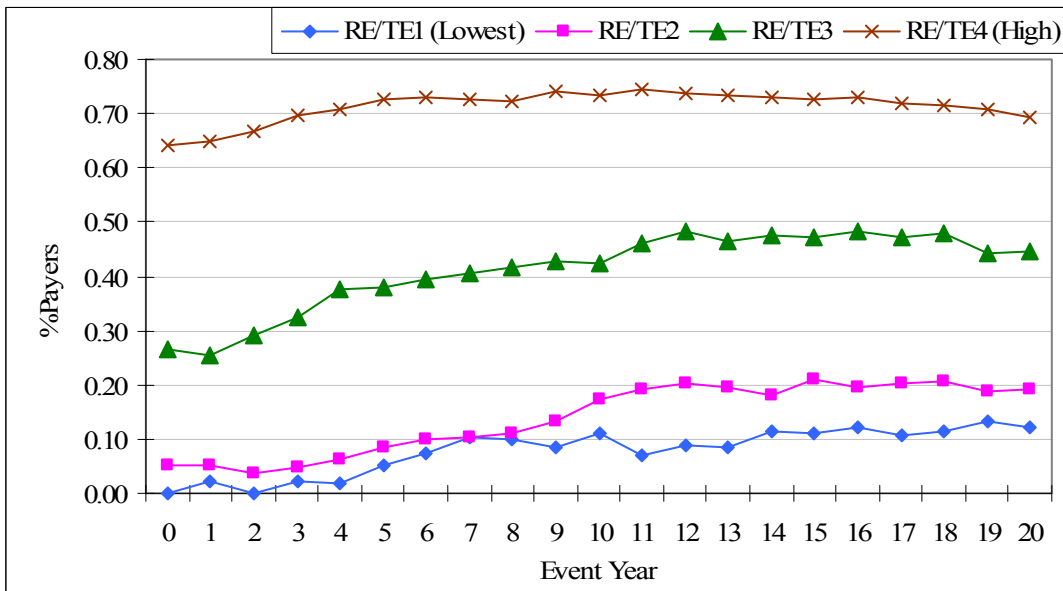
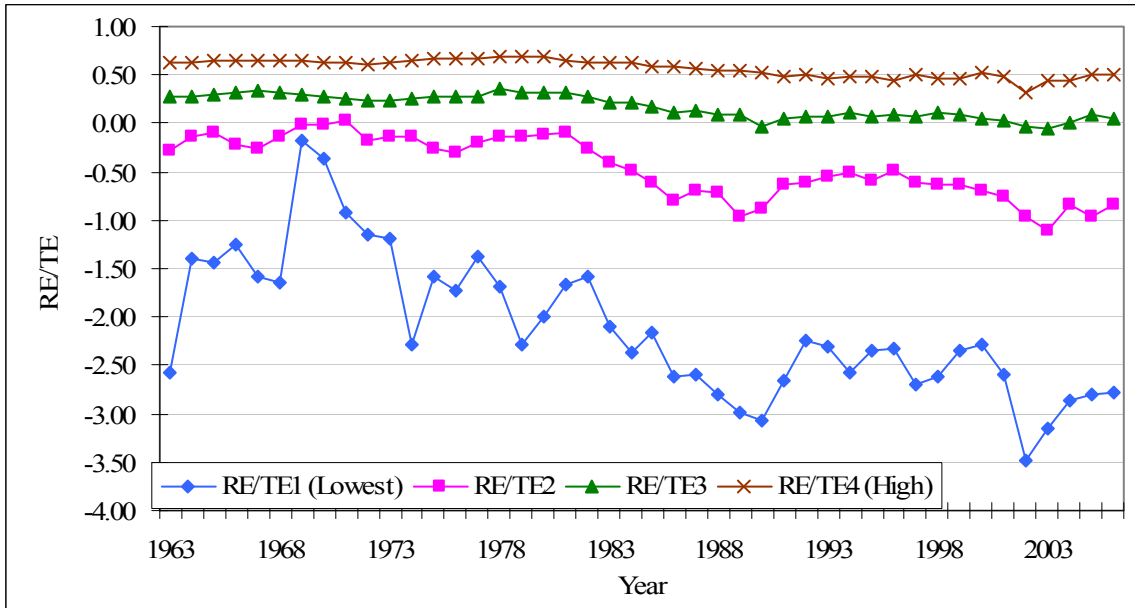
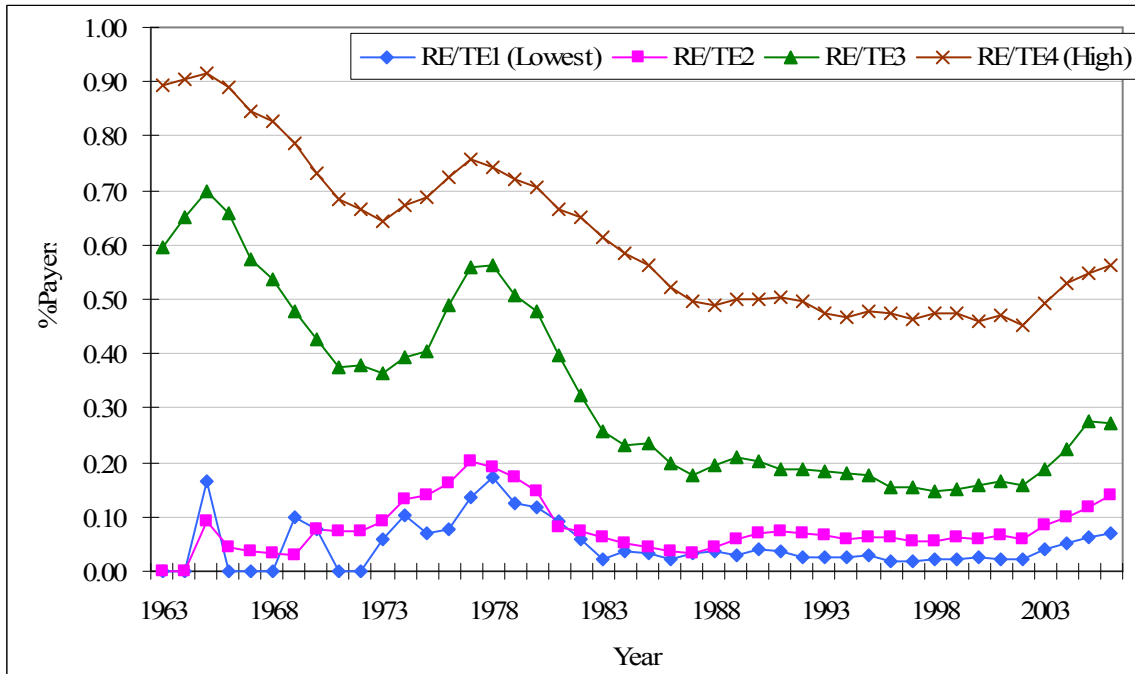


Fig. 2: Mean RE/TE Ratios and %Payers for Initial-RE/TE-sorted Quartiles in Calendar Year

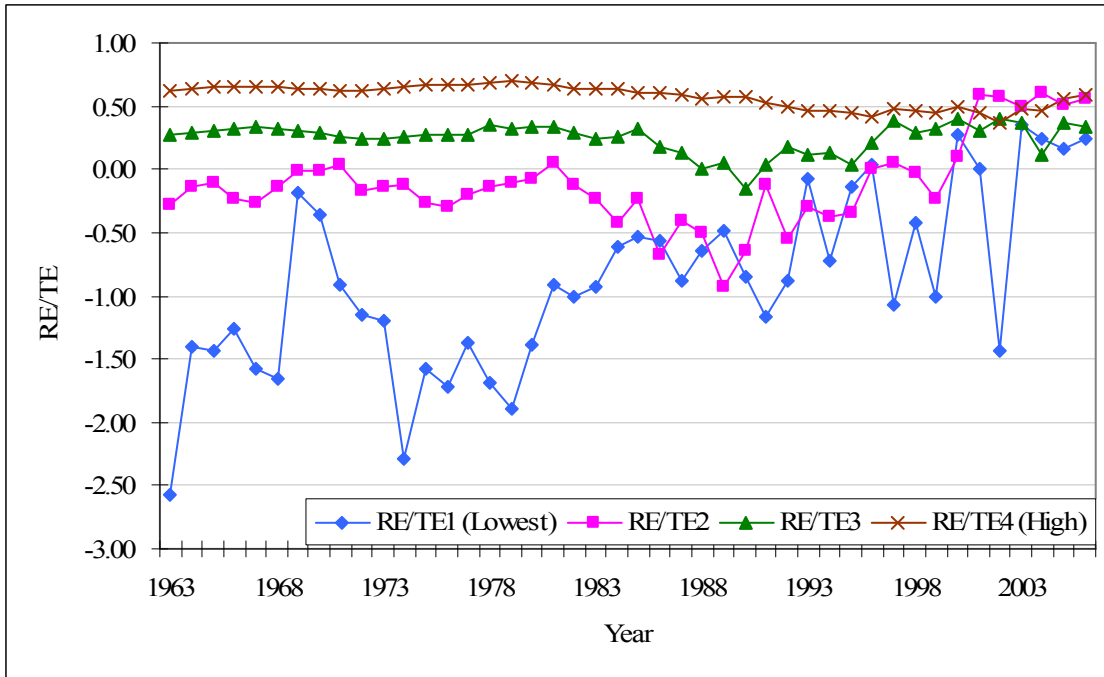
Panel A: Annual Mean RE/TE Ratios for All Firms



Panel B: Annual %Payers for All Firms



Panel C: Annual Mean RE/TE Ratios for Firms Already Listed by 1978 (Old Firms)



Panel D: Annual %Payers for Firms Already Listed by 1978 (Old Firms)

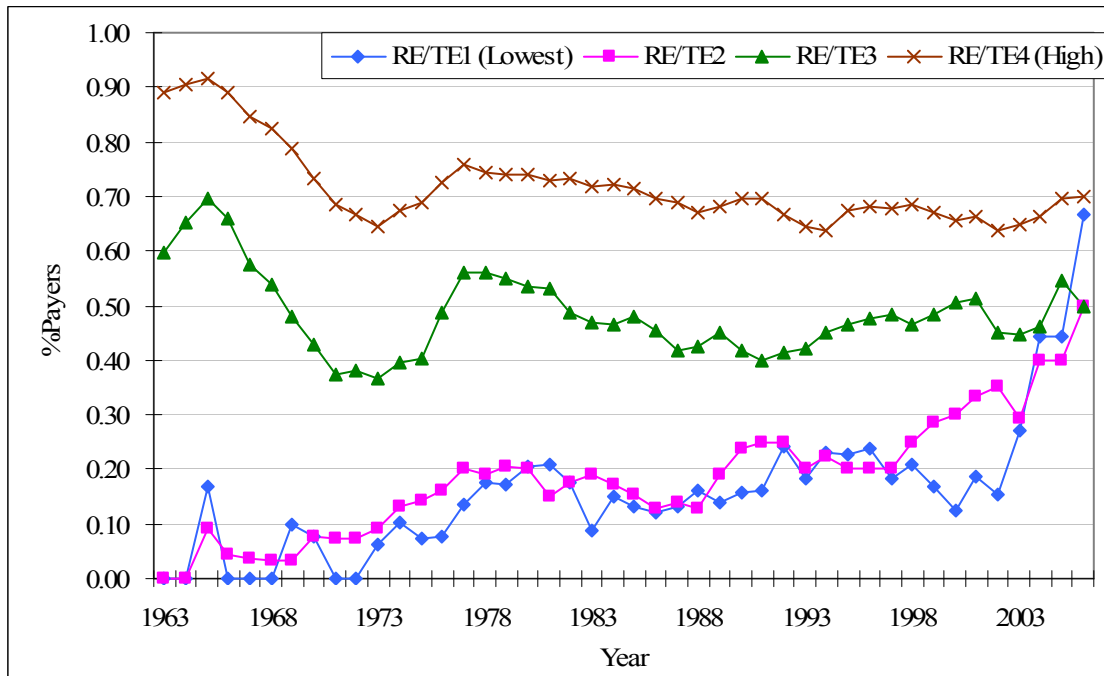
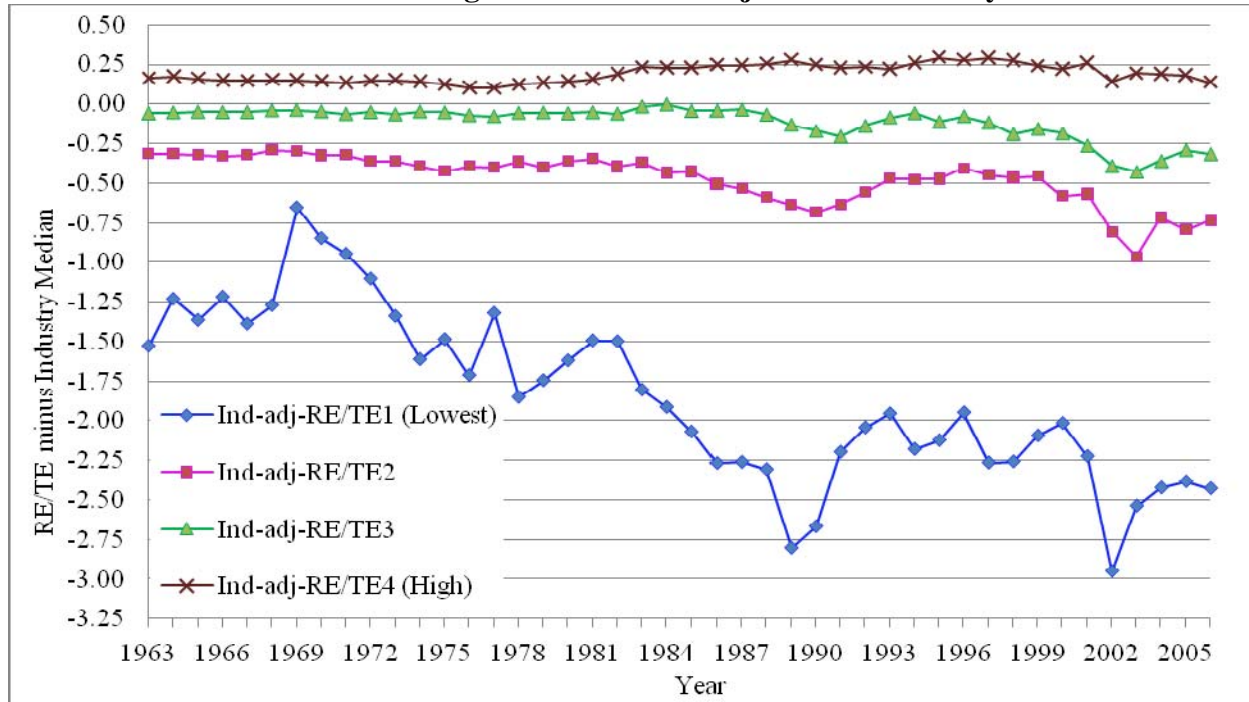


Fig. 3: Annual Average RE/TE Ratios and %Payers Adjusted for Industry Medians

For each firm, we subtract the variable in question by the firm's industry median according to the Fama-French classification of 10 industries. We form firm quartiles the same way as in Figure 1 and 2 except that initial-RE/TE ratios are adjusted for initial industry medians accordingly. The full sample is used.

Panel A: Annual Average RE/TE Ratios Adjusted for Industry Median



Panel B: %Payers Adjusted for Industry Median

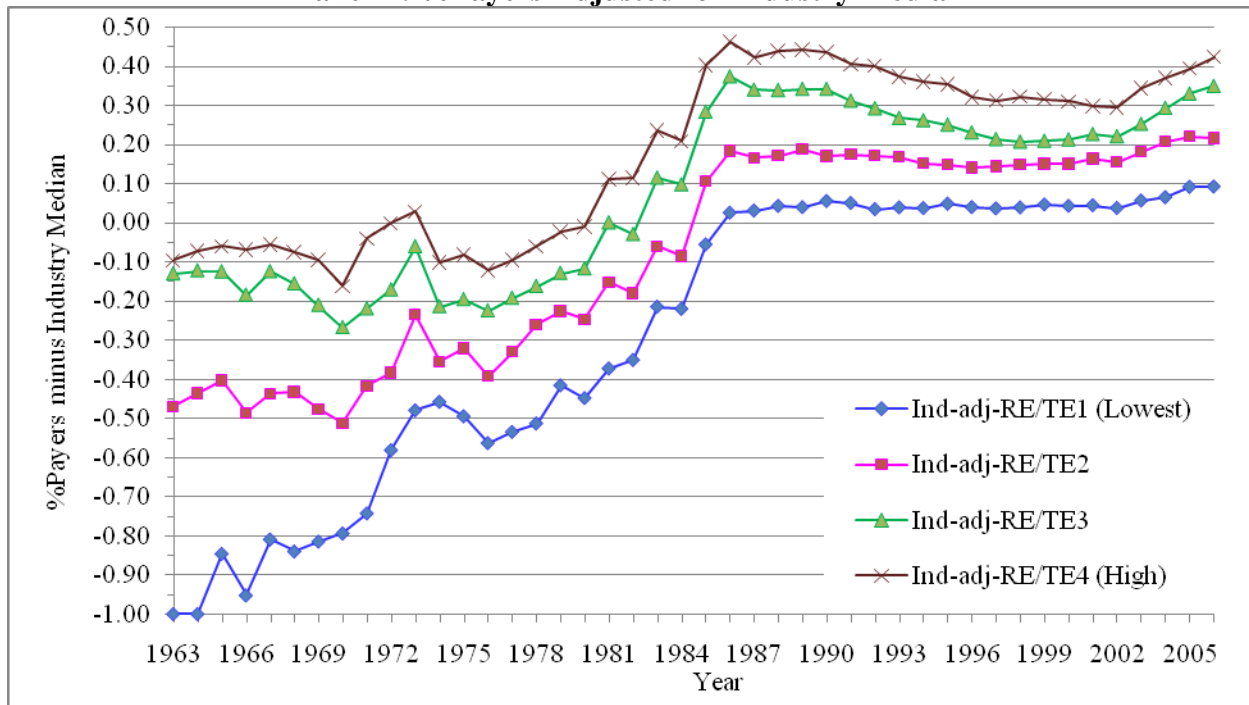


Fig. 4: Illustration of Cross- vs. Within-firm Variations in Panel Regressions

This figure shows panel data with a strong firm-fixed effect where X is correlated with individual firm intercepts due to strong persistence in Y and, to some extent, X . One can imagine that data for individual firms scatter along individual b' -sloped regression lines accordingly.

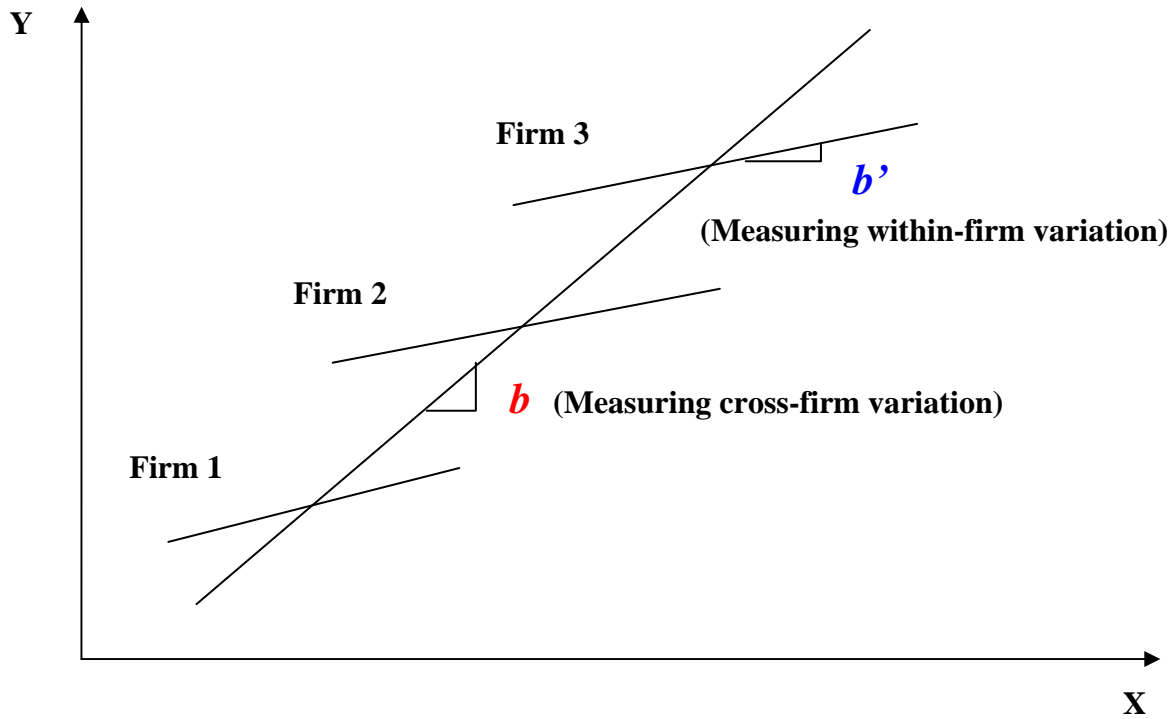


Table 1: A First Look at both Initial-RE/TE-sorted Quartiles and Three Growth Types

This table shows annual average dividend determinants for initial-RE/TE-sorted quartiles (Panel A) and annual average growth-type-related firm characteristics (Panel B). Initial RE/TE ratios are the annual average RE/TE ratios over the first three event years since IPO (literately). Firm quartiles with the lowest (1), low (2), medium (3), and high (4) RE/TE ratios are sorted, earlier on, according to the initial RE/TE ratios. %Payers (=PTP) in year t is the percentage of dividend payers within a firm group. Dividend determinants in year t include RE_t/TE_t (retained-earnings-to-total equity ratio), RE_t/A_t (retained earnings), TE_t/A_t (total equity), E_t/A_t (profitability), SGR_t (annual sales growth rate), NYP_t (firm size percentile of the NYSE stocks), $Cash_t/A_t$ (cash holdings), where A_t is total assets in year t. Firms of three growth types: low- (G1), mixed- (G2) and high-growth (G3), are sorted, earlier on, according to a two-way sort on initial market-to-book and asset tangibility as in Wu and Au Yeung (2009). Growth-type-related firm characteristics in year t include leverage (book debt and equity over total asset), $Capex_t/A_t$ (tangible capital expenditure), $R\&D_t/A_t$ (R&D expenditure), $\Delta RE_t/A_t$ (change in retained earnings), $\Delta Debt_t/A_t$ (net debt issue), and $\Delta Equity_t/A_t$ (net equity issue). N is the number of firms in year t. All the reported annual variables are averaged for the total sample period from 1963 to 2006.

| Panel A: Dividend Determinants | | | | | | | | | |
|--|--------------|-----------------|----------------|----------------|----------------|------------------|---------------------------------|-----------------------------------|-------------------------------------|
| Initial RE/TE | N | RE/TE | %Payers | RE/A | TE/A | E/A | SGR | NYP | Cash/A |
| | | | (%) | (%) | | (%) | (%) | | (%) |
| Lowest (1) | 2,238 | -2.55 | 3.65 | -110.54 | 0.53 | -13.93 | 45.52 | 0.10 | 24.27 |
| Low (2) | 2,688 | -0.64 | 7.22 | -25.98 | 0.55 | -1.82 | 35.16 | 0.15 | 19.44 |
| Medium (3) | 2,928 | 0.12 | 24.93 | 10.85 | 0.51 | 4.97 | 22.78 | 0.22 | 13.12 |
| High (4) | 2,973 | 0.58 | 60.34 | 32.13 | 0.51 | 7.37 | 13.28 | 0.29 | 10.04 |
| Panel B: Growth Type and Related Firm Characteristics | | | | | | | | | |
| Growth Type | N | Leverage | RE/TE | %Payers | Capex/A | R&D/A | $\Delta RE/A$ | $\Delta Debt/A$ | $\Delta Equity/A$ |
| | | | | (%) | (%) | (%) | (%) | (%) | (%) |
| Low (G1) | 3,606 | 0.29 | 0.30 | 48.50 | 8.09 | 1.26 | 1.38 | 1.27 | 1.76 |
| Mixed (G2) | 3,884 | 0.23 | -0.11 | 32.77 | 7.62 | 2.86 | -0.49 | 1.16 | 4.35 |
| High (G3) | 3,337 | 0.15 | -0.78 | 15.16 | 5.60 | 7.96 | -5.81 | 0.87 | 9.63 |

Table 2: The Number of Firms and Distribution of Industries across Initial-RE/TE-sorted Quartiles

This table reports the number of firms in year 0 of each industry across the initial-RE/TE-sorted quartiles, shown in each column except the last column of each panel where the percentages indicate an average distribution of industries. Year 0 means either the IPO year or the first data entry year of the sample in each panel. The 9 industries we use are the Fama-French 10 industries excluding utilities. Initial RE/RE ratios are the annual average RE/TE ratios over the first three event years since year 0 from the total sample. Firm quartiles with the lowest (1), low (2), medium (3), and high (4) RE/TE ratios are sorted once, earlier on, according to the initial RE/TE ratios. Panel A shows the results of the total period of 1963-2006; Panel B and C show the split sample period results for 1963-1978 and 1979-2006, respectively.

| Initial-RE/TE | Industry | | | | | | | | | 100% |
|--|----------|-------|-------|-------|-------|-------|-------|------|--------|-------|
| | NoDur | Durbl | Manuf | Enrgy | HiTec | Telcm | Shops | Hlth | Others | |
| Panel A: 1963-2006 (Total Period) | | | | | | | | | | |
| Lowest (1) | 43 | 15 | 98 | 33 | 331 | 70 | 106 | 151 | 133 | 16.7% |
| Low (2) | 75 | 33 | 165 | 63 | 456 | 93 | 209 | 200 | 233 | 26.3% |
| Medium (3) | 131 | 65 | 272 | 70 | 512 | 20 | 344 | 149 | 349 | 29.5% |
| High (4) | 198 | 86 | 396 | 57 | 262 | 16 | 271 | 76 | 232 | 27.5% |
| Panel B: 1963-1978 (Early Period) | | | | | | | | | | |
| Lowest (1) | 1 | 2 | 4 | 3 | 7 | 1 | 4 | 0 | 5 | 3.3% |
| Low (2) | 7 | 4 | 11 | 7 | 13 | 1 | 5 | 7 | 10 | 8.3% |
| Medium (3) | 20 | 5 | 55 | 17 | 34 | 6 | 19 | 9 | 34 | 22.2% |
| High (4) | 108 | 44 | 212 | 29 | 62 | 9 | 116 | 24 | 81 | 66.2% |
| Panel C: 1979-2006 (Post-1978 Period) | | | | | | | | | | |
| Lowest (1) | 42 | 13 | 94 | 30 | 324 | 69 | 102 | 151 | 128 | 19.1% |
| Low (2) | 68 | 29 | 154 | 56 | 443 | 92 | 204 | 193 | 223 | 30.0% |
| Medium (3) | 111 | 60 | 217 | 53 | 478 | 14 | 325 | 140 | 315 | 32.1% |
| High (4) | 90 | 42 | 184 | 28 | 200 | 7 | 155 | 52 | 151 | 18.8% |

Table 3: Persistently Distinct Firm Fundamentals across Initial-RE/TE-sorted Quartiles:

This table reports the evolutions of firm characteristics across initial-RE/TE-sorted quartiles. Firm characteristics include fundamental characteristics of growth type: combinations of market-to-book and asset tangibility (Panel A), sales growth and cash holdings (Panel B), investment style (Panel C), earnings and change in retained earnings (Panel D), and external finance (Panel E). Cash holdings is a balance sheet variable, Cash in year t , divided by total assets in year t . Investment style refers to tangible and intangible investments measured by Capex and R&D in year t divided by total assets in year t , respectively. External finance refers to net issues of debt and equity in year t divided by total assets in year t , namely, $\Delta\text{Debt}_t/A_t$ and $\Delta\text{Equity}_t/A_t$. Firm quartiles with the lowest- (1), low- (2), medium- (3), and high-RE/TE (4) ratios are sorted, earlier on, according to the initial RE/TE ratios, which are the annual average RE/TE ratios over the first three event years since IPO (literately). The event years are packed into four periods, and annual averages are taken over these periods, respectively. We use all firms for the total sample period from 1963 to 2006. The definition of all variables is detailed in Appendix.

| Initial-RE/TE Quartiles | Pooled Mean | | | | <i>t</i> -value for Mean Difference | | | Pooled Mean | | | | <i>t</i> -value for Mean Difference | | |
|--|----------------------|-------|-------|-------|-------------------------------------|-------|-------|--|-------|-------|-------|-------------------------------------|--------|--------|
| | 1 | 2 | 3 | 4 | 1-2 | 2 - 3 | 3 - 4 | 1 | 2 | 3 | 4 | 1-2 | 2 - 3 | 3 - 4 |
| Panel A: Growth Type | | | | | | | | | | | | | | |
| Event Year | Market-to-Book Ratio | | | | | | | Asset Tangibility Ratio | | | | | | |
| 1 to 5 | 2.50 | 1.79 | 1.50 | 1.36 | 18.69 | 12.54 | 7.89 | 0.36 | 0.42 | 0.49 | 0.56 | -14.93 | -21.11 | -24.06 |
| 6 to 10 | 2.21 | 1.70 | 1.20 | 1.10 | 10.48 | 16.89 | 6.47 | 0.36 | 0.43 | 0.50 | 0.57 | -12.03 | -14.02 | -20.38 |
| 11 to 15 | 2.00 | 1.69 | 1.19 | 1.03 | 4.40 | 12.87 | 9.21 | 0.38 | 0.44 | 0.51 | 0.57 | -5.91 | -11.49 | -12.13 |
| 16 to 20 | 1.75 | 1.75 | 1.20 | 1.08 | -0.01 | 8.42 | 4.77 | 0.39 | 0.42 | 0.50 | 0.56 | -2.57 | -8.35 | -9.27 |
| Panel B: Sales Growth and Cash Holdings | | | | | | | | | | | | | | |
| Event Year | Sales Growth Rate, % | | | | | | | Cash _t /A _t for Cash Holdings, % | | | | | | |
| 1 to 5 | 53.47 | 41.17 | 29.04 | 18.08 | 6.40 | 10.91 | 18.73 | 25.71 | 19.51 | 13.22 | 10.98 | 14.13 | 21.42 | 11.73 |
| 6 to 10 | 29.68 | 21.89 | 14.80 | 12.24 | 4.13 | 6.53 | 4.78 | 21.86 | 17.32 | 11.98 | 9.91 | 8.02 | 14.35 | 9.40 |
| 11 to 15 | 24.29 | 21.93 | 14.15 | 11.73 | 0.84 | 4.94 | 3.45 | 19.65 | 17.40 | 11.72 | 9.82 | 2.88 | 10.74 | 7.04 |
| 16 to 20 | 20.12 | 15.09 | 11.80 | 9.31 | 1.46 | 1.75 | 2.91 | 16.64 | 17.27 | 12.61 | 9.37 | -0.57 | 6.09 | 8.61 |

Table 3 Cont'd

| Initial- RE/TE Quartiles | Pooled Mean | | | | <i>t</i> -value for Mean Difference | | | Pooled Mean | | | | <i>t</i> -value for Mean Difference | | |
|--|---|-------|------|------|--|--------|--------|---|-------|-------|------|--|--------|--------|
| | 1 | 2 | 3 | 4 | 1-2 | 2 - 3 | 3 - 4 | 1 | 2 | 3 | 4 | 1-2 | 2 - 3 | 3 - 4 |
| Panel C: Investment Style | | | | | | | | | | | | | | |
| Event Year | Capex _{<i>t</i>} /A _{<i>t</i>} for Tangible Investment, % | | | | | | | R&D _{<i>t</i>} /A _{<i>t</i>} for Intangible Investment, % | | | | | | |
| 1 to 5 | 6.63 | 8.03 | 8.55 | 8.34 | -9.62 | -4.17 | 2.00 | 9.91 | 5.24 | 2.80 | 1.58 | 21.98 | 21.62 | 18.75 |
| 6 to 10 | 5.89 | 6.87 | 6.93 | 7.03 | -5.21 | -0.41 | -0.89 | 8.00 | 5.32 | 3.01 | 1.79 | 10.35 | 14.69 | 14.53 |
| 11 to 15 | 5.69 | 6.67 | 7.04 | 6.89 | -3.73 | -1.81 | 1.17 | 7.27 | 5.16 | 3.21 | 1.79 | 5.65 | 8.59 | 13.02 |
| 16 to 20 | 5.55 | 5.81 | 6.78 | 6.95 | -0.66 | -3.47 | -1.04 | 5.66 | 5.51 | 3.34 | 1.85 | 0.30 | 6.47 | 10.26 |
| Panel D: Earnings and Change in Retained Earnings | | | | | | | | | | | | | | |
| Event Year | E _{<i>t</i>} /A _{<i>t</i>} for Profitability, % | | | | | | | ΔRE _{<i>t</i>} /A _{<i>t</i>} for Change in Retained Earnings, % | | | | | | |
| 1 to 5 | -21.18 | -4.32 | 5.22 | 8.57 | -35.96 | -42.72 | -27.98 | -24.28 | -7.11 | 2.09 | 4.65 | -35.77 | -39.90 | -20.36 |
| 6 to 10 | -6.26 | -0.66 | 3.47 | 6.60 | -10.35 | -12.99 | -17.51 | -9.23 | -3.58 | -0.07 | 2.34 | -9.83 | -10.48 | -12.93 |
| 11 to 15 | -3.58 | 2.17 | 4.52 | 7.00 | -8.25 | -6.16 | -11.53 | -6.40 | -0.71 | 0.86 | 2.45 | -7.81 | -3.94 | -7.08 |
| 16 to 20 | -0.93 | 1.12 | 4.89 | 6.90 | -2.01 | -6.06 | -7.39 | -3.95 | -2.15 | 0.95 | 2.05 | -1.67 | -4.62 | -3.91 |
| Panel E: External Financing | | | | | | | | | | | | | | |
| Event Year | ΔDebt _{<i>t</i>} /A _{<i>t</i>} for New Debt Issue, % | | | | | | | ΔEquity _{<i>t</i>} /A _{<i>t</i>} for New Equity Issue, % | | | | | | |
| 1 to 5 | 1.27 | 2.13 | 2.62 | 2.05 | -4.58 | -3.18 | 4.22 | 13.43 | 5.98 | 3.20 | 1.18 | 19.16 | 14.20 | 17.28 |
| 6 to 10 | 1.06 | 1.27 | 0.88 | 0.88 | -0.81 | 2.03 | 0.03 | 8.13 | 3.81 | 1.44 | 0.51 | 9.80 | 10.72 | 8.82 |
| 11 to 15 | 1.29 | 1.06 | 1.20 | 0.75 | 0.62 | -0.55 | 2.74 | 5.53 | 2.61 | 1.14 | 0.35 | 5.27 | 5.16 | 6.08 |
| 16 to 20 | 0.38 | 0.80 | 0.51 | 0.68 | -0.74 | 0.78 | -0.79 | 3.15 | 1.88 | 0.63 | 0.53 | 1.97 | 3.24 | 0.61 |

Table 4: Estimates for Cross-sectional and Within-firm Effects on PTP: All Firms

We run a Logit model using the Fama-Macbeth (FM) method to estimate the cross sectional effects of dividend determinants on propensity to pay (PTP=1 if payer or 0 if non-payer), and the within-firm demeaned pooled Logit regression: $PTP = \text{Logit}\{1 * E(PTP) + \sum \text{slope} * [X - E(X)]\}$, to estimate within-firm effects of dividend determinants on PTP. G1 (low) and G3 (high) are growth type group dummies. N is the annual average number of firms for the FM regressions, or firm-year observations for pooled regressions. Other variables are defined in Table 1. *t*-values are in parentheses.

| | Intercept | G1 | G3 | RE/TE | TE/A | E/A | SGR | NYP | Cash/A | N | R ² |
|--|--------------|-------------|--------------|-------------|-------------|-------------|--------------|-------------|--------------|--------|----------------|
| Panel A: 1963 - 2006 (Total Period) | | | | | | | | | | | |
| FM w/o | -2.08 | 0.40 | -0.36 | 3.68 | | | | | | | |
| | (-29.69) | (12.33) | (-6.17) | (21.03) | | | | | | 2,129 | 0.26 |
| FM w/ Control | -3.03 | 0.59 | -0.41 | 2.89 | 0.70 | 3.29 | -1.12 | 3.52 | -0.59 | | |
| | (-19.38) | (13.80) | (-7.44) | (19.40) | (3.48) | (4.65) | (-11.93) | (30.28) | (-3.35) | 2,129 | 0.35 |
| Within-firm Demeaned Pool | | | | 0.03 | 0.61 | 0.09 | -0.06 | 1.62 | -0.13 | | |
| | | | | (4.64) | (9.25) | (1.24) | (-4.70) | (22.76) | (-1.66) | 95,786 | 0.01 |
| Panel B: 1963 - 1978 (Early Period) | | | | | | | | | | | |
| FM w/o | -1.86 | 0.34 | -0.02 | 4.79 | | | | | | | |
| | (-14.20) | (4.82) | (-0.26) | (29.11) | | | | | | 1,170 | 0.23 |
| FM w/ Control | -3.91 | 0.77 | -0.23 | 3.80 | 1.98 | 5.88 | -0.74 | 3.66 | 0.36 | | |
| | (-14.90) | (10.01) | (-1.84) | (26.04) | (8.83) | (3.36) | (-6.25) | (30.88) | (1.15) | 1,170 | 0.33 |
| Within-firm Demeaned Pool | | | | 0.34 | 0.22 | 1.81 | -0.17 | 1.68 | 0.31 | | |
| | | | | (6.40) | (1.00) | (4.31) | (-3.26) | (8.13) | (0.95) | 18,726 | 0.01 |
| Panel C: 1979 - 2006 (Post-1978 Period) | | | | | | | | | | | |
| FM w/o | -2.20 | 0.42 | -0.54 | 3.06 | | | | | | | |
| | (-29.95) | (13.98) | (-11.34) | (18.08) | | | | | | 2,657 | 0.28 |
| FM w/ Control | -2.54 | 0.50 | -0.51 | 2.39 | 0.00 | 1.87 | -1.33 | 3.44 | -1.12 | | |
| | (-20.46) | (11.73) | (-12.08) | (15.84) | (-0.00) | (5.54) | (-11.73) | (20.50) | (-8.15) | 2,657 | 0.35 |
| Within-firm Demeaned Pool | | | | 0.02 | 0.50 | 0.03 | -0.05 | 1.23 | -0.18 | | |
| | | | | (2.74) | (6.85) | (0.36) | (-3.30) | (14.52) | (-2.25) | 77,060 | 0.00 |

Table 5: Estimates for Cross-sectional and Within-firm Effects on PTP: Old versus New Firms (Listed after 1978)

We run a Logit model using the Fama-Macbeth (FM) method to estimate the cross-sectional effects of dividend determinants on PTP (=1 if payer or 0 if non-payer), and the within-firm-demeaned pooled Logit regression: $PTP = \text{Logit}\{1 * E(PTP) + \sum \text{slope} * [X - E(X)]\}$, to estimate within-firm effects of dividend determinants on PTP. G1 (low) and G3 (high) are growth type group dummies. N is the annual average number of firms for the FM regressions, or the number of firm-year observations for pooled regressions. The variables are defined in Table 1. *t*-values are in parentheses.

| | Intercept | G1 | G3 | RE/TE | TE/A | E/A | SGR | NYP | Cash/A | N | R² |
|--|------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|----------------------|
| Panel A: Old Firms for 1963 - 2006 (Total Period) | | | | | | | | | | | |
| FM w/o | -1.41 | 0.24 | -0.35 | 3.48 | | | | | | 949 | 0.24 |
| | (-15.65) | (6.41) | (-1.19) | (18.44) | | | | | | | |
| FM w/ Control | -2.84 | 0.50 | -0.49 | 2.87 | 0.91 | 4.58 | -0.84 | 3.45 | -0.31 | 949 | 0.35 |
| | (-17.31) | (10.93) | (-1.50) | (18.67) | (4.19) | (5.77) | (-6.42) | (39.21) | (-1.33) | | |
| Within-firm Demeaned Pool | | | | 0.24 | 0.92 | 1.19 | -0.11 | 1.92 | 0.12 | 42,705 | 0.03 |
| | | | | (12.56) | (9.00) | (6.69) | (-3.35) | (19.23) | (0.77) | | |
| Panel B: Old Firms for 1979 - 2006 (Post-1978 Period) | | | | | | | | | | | |
| FM w/o | -1.16 | 0.18 | -0.53 | 2.77 | | | | | | 827 | 0.25 |
| | (-12.65) | (4.58) | (-1.17) | (16.77) | | | | | | | |
| FM w/ Control | -2.24 | 0.34 | -0.63 | 2.36 | 0.32 | 3.86 | -0.89 | 3.34 | -0.69 | 827 | 0.36 |
| | (-22.71) | (11.25) | (-1.26) | (14.92) | (1.25) | (5.08) | (-4.64) | (28.77) | (-2.26) | | |
| Within-firm Demeaned Pool | | | | 0.14 | 1.11 | 0.74 | -0.01 | 1.36 | -0.27 | 23,979 | 0.02 |
| | | | | (7.27) | (7.78) | (3.60) | (-0.11) | (8.84) | (-1.37) | | |
| Panel C: New Firms for 1979 - 2006 (Post-1978 Period) | | | | | | | | | | | |
| FM w/o | -2.42 | 0.31 | -0.53 | 2.37 | | | | | | 1,830 | 0.15 |
| | (-27.20) | (6.61) | (-11.58) | (20.47) | | | | | | | |
| FM w/ Control | -2.55 | 0.32 | -0.49 | 1.89 | -0.09 | 2.99 | -1.39 | 2.57 | -1.29 | 1,830 | 0.20 |
| | (-15.81) | (7.17) | (-8.63) | (16.33) | (-0.43) | (6.11) | (-9.35) | (10.59) | (-6.62) | | |
| Within-firm Demeaned Pool | | | | 0.01 | 0.24 | -0.06 | -0.05 | 1.10 | -0.09 | 53,081 | 0.00 |
| | | | | (1.12) | (2.73) | (-0.81) | (-3.15) | (10.77) | (-1.00) | | |