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# Payout policy and cash-flow uncertainty ☆

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ABSTRACT

The importance of cash-flow uncertainty in payout policy has received little attention in empirical studies, while survey studies such as [Lintner, J., 1956. Distribution of incomes of operations among dividends, retained earnings, and taxes. American Economic Review 46, 97–113.] and [Brav, A., Graham, J., Harvey C., Michaely, R., 2005. Payout policy in the 21st century. Journal of Financial Economics 77, 483–527.] indicate its importance. With worldwide firm-level data, we present evidence that cash-flow uncertainty is an important cross-sectional determinant of corporate payout policy. Our results show that across countries, cash-flow uncertainty, as proxied by stock return volatility, has a negative impact on the amount of dividends as well as the probability of paying dividends. The impact of cash-flow uncertainty on dividends is generally stronger than the impact of other potential determinants of payout policy—such as the earned/contributed capital mix, agency conflicts, and investment opportunities. We also find that the effect of cash-flow uncertainty on dividends is distinct from the effect of a firm's financial life-cycle stage.



## 1. Introduction

In this study, we use worldwide firm-level data to evaluate the importance of cash-flow uncertainty as a cross-sectional determinant of corporate payout policy. The idea that dividends are related to cash-flow uncertainty is not new. Firms facing high cash-flow uncertainty are likely to pay low dividends fearing future cash shortfalls. External financing is particularly more costly than internal financing for firms with unstable cash flows because they may be financially constrained. Thus, firms with high cash-flow uncertainty are expected to be more reliant on internal funds and to pay low dividends. Furthermore, dividends are known to be sticky and firms that decrease dividends may suffer a severe decline in firm value. So managers tend to avoid paying high dividends unless they are confident of their ability to maintain high dividend levels. For these reasons, it is anticipated that dividend payouts are negatively related to the degree of cash-flow uncertainty. The survey study by Lintner (1956) indicates that managers view earnings stability as one of the most important factors in dividend decisions. Brav, Graham, Harvey, and Michaely (2005) report that more than two-thirds of the CFOs of dividend-paying firms identify the stability of future cash flows as an important factor that affects dividend decisions.

Although both theory and survey evidence point to the importance of cash-flow uncertainty in payout policy, there is a paucity of empirical studies that evaluate its

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importance. Prior studies generally do not examine cash-flow uncertainty as a major factor in payout policy, and recent studies do not include cash-flow uncertainty even as a control variable (see, e.g., Fama and French, 2001; DeAngelo, DeAngelo, and Stulz, 2006). As a result, we have limited knowledge of the role that cash-flow uncertainty plays in payout policy.

We aim to fill this research gap by conducting a comprehensive empirical study using worldwide data. Specifically, we examine the impact of cash-flow uncertainty on the cross-sectional variation of the amount of dividends and probability of paying dividends. We also compare the importance of cash-flow uncertainty with other potential determinants of payout policy. Our dataset is constructed using firm-level data from countries around the world. Our primary sample comprises more than 5,000 firms from seven major countries—Australia, Canada, France, Germany, Japan, the U.K., and the U.S.—over the 1994–2005 period.

Our use of international data is a departure from prior studies of payout policy that generally focus on U.S. firms.[1] The prediction that firms facing high cash-flow uncertainty will pay low dividends is based on managers' behavior aimed at avoiding financial trouble and a decline in the firm's stock price. Thus, this prediction should hold for firms under different institutional environments as long as managers display the same behavioral pattern across countries. Our international data allow us to conduct a comprehensive and robust test of the importance of cash-flow uncertainty and help enhance our understanding of the forces that affect corporate payout policy.

We use two main payout measures: the dividend-earnings ratio and the dividend-sales ratio, both of which represent the amount of dividends. Given the increasing importance of share repurchases as a payout method, we use additional payout measures that take share repurchases into account.

We use stock return volatility (SRVOL) as our primary proxy for the cash-flow uncertainty faced by a firm. SRVOL reflects the degree of cash-flow uncertainty because stock prices tend to fluctuate more when cash flows are unpredictable. In analyzing the importance of cash-flow uncertainty in payout policy, we evaluate its impact on payout policy in comparison with other potential determinants of payout policy. Based on prior studies, we choose three potential determinants: the earned/contributed capital mix, agency conflicts, and investment opportunities.

We conduct correlation and multiple regression analyses using proxy variables for these determinants. For our regression analyses, we employ the Fama-MacBeth (1973) approach. Specifically, we run year-by-year, cross-sectional regressions over the sample period 1994–2005 and then examine the sign and significance of the average regression coefficients. Additionally, since the average regression coefficients may conceal important details, we examine the number of times the regression coefficient has the predicted sign, as well as the number of times the coefficient has the predicted sign and is also significant. These numbers allow for a more detailed comparison of the importance of cash-flow uncertainty in payout policy with that of other potential determinants.

The results of our empirical investigation are summarized as follows. SRVOL (our primary proxy for cash-flow uncertainty) explains the cross-sectional variation of the amount of dividends as well as the probability of paying dividends. Across countries, the impact of SRVOL on the amount and probability of dividends is significantly negative over time, and is robust to the addition of control variables. Firms with high SRVOL tend to pay low dividends and are less likely to pay dividends. The impact of SRVOL on the amount and probability of dividends is generally stronger than that of other determinants of payout policy. Furthermore, SRVOL has a significantly negative impact on the payout measure that includes share repurchases, i.e., the amount of total payouts (TOTALP), which is the sum of cash dividends and repurchases.

We also use operating profit volatility (ROAVOL) as an alternative proxy for cash-flow uncertainty. Across countries, the impact of ROAVOL on dividends is significantly negative, which confirms that cash-flow uncertainty is a key determinant of payout policy. We also examine whether our cash-flow uncertainty measures help predict firms' dividend decisions. Our investigation shows that firms with lower (higher) SRVOL are more likely to initiate (omit) dividends in the following year. This evidence is consistent with the hypothesis that managers incorporate cash-flow uncertainty into their dividend decisions. Similarly, we find that the amount of dividends is negatively associated with the realized future value of ROAVOL. This suggests that future cash-flow uncertainty may factor into current-year dividend decisions.

Additionally, our results suggest that firms with high SRVOL tend to choose share repurchases, rather than dividends, as their payout method. Thus, cash-flow uncertainty may affect a firm's choice of payout method, as well as its decision on the amount of dividends. Finally, it appears that the effect of cash-flow uncertainty on dividends is distinct from the effect of a firm's life-cycle stage on dividends. In all sample countries, cash-flow uncertainty has a significantly negative impact on dividend payouts across firms that are at various stages in the life cycle.

Our main contribution to the literature is to document evidence that cash-flow uncertainty is a key determinant of payout policy. Across countries and over time, this evidence is consistently strong. While surveys such as Lintner (1956) and Brav, Graham, Harvey, and Michaely (2005) indicate its importance in payout policy, cash-flow uncertainty has received little attention in empirical studies. The only exception in the literature is Rozeff (1982) in which a stock return volatility measure, beta, is related to dividend payouts. Most published papers in the

[1] A notable exception is a recent paper by Denis and Osobov (2008). They extend the U.S. study of DeAngelo, DeAngelo, and Stulz (2006) by examining firm-level data from six developed countries. They find international evidence that the earned/contributed capital mix is an important determinant of the probability of paying dividends, which lends support to the life-cycle theory of dividends.

payout literature do not consider cash-flow uncertainty as a major factor. In this respect, our empirical results call for renewed attention to the role played by cash-flow uncertainty in payout policy.

Another important contribution of our study is that it provides comprehensive international evidence of the importance of various factors—including cash-flow uncertainties—in explaining the cross-sectional variation of dividends. Essentially, our study provides answers to why some firms pay high dividends relative to others. This question is under-researched because most prior empirical studies focus on the change in dividends, rather than on the level of dividend payouts.[2] Several recent studies examine factors that affect the decision of whether or not to pay dividends, but not the decision of how much to pay (Fama and French, 2001; Baker and Wurgler, 2004; DeAngelo, DeAngelo, and Stulz, 2006; Denis and Osobov, 2008). There are few prior studies that examine the cross-sectional determinants of the amount of payouts and as a consequence, we have a limited understanding of why some firms pay high dividends relative to others.

According to our results, the evidence that dividend payouts are related to agency conflicts as proxied by insider ownership is weak across countries. The evidence that dividend payouts are related to investment opportunities is also weak. On the other hand, we find that the earned/contributed capital mix is significantly related to the amount and probability of dividends in many countries. Thus, along with Denis and Osobov (2008), our study provides international evidence to support the life-cycle theory of dividends proposed by DeAngelo, DeAngelo, and Stulz (2006). Overall, our evidence suggests that firms that face low levels of cash-flow uncertainty and those that are at the mature stage in their life cycle tend to pay high dividends.

The organization of this paper is as follows. The next section presents hypotheses and proxy variables. Section 3 describes the data. Section 4 conducts an empirical analysis and presents the results. Section 5 concludes the paper.

## 2. Hypotheses and proxy variables

Our primary objective is to examine the relative importance of cash-flow uncertainty in explaining the cross-sectional variation in payout policy in comparison with three other potential determinants—the earned/contributed capital mix, agency conflicts, and investment opportunities. In this section, we present hypotheses associated with cash-flow uncertainty as well as the three other determinants and then introduce their proxy variables.

### 2.1. Cash-flow uncertainty

Firms facing high cash-flow uncertainty are likely to pay low dividends and keep earnings inside the firm in anticipation of funding shortfalls. In general, external financing is more costly than internal financing and could be even more so for firms with unpredictable cash flows because these firms may be financially constrained. Thus, firms with high cash-flow uncertainty will be more reliant on internal funds and will pay low dividends. Furthermore, dividends are known to be sticky and a decision to decrease dividends may trigger a severe decline in firm value. Therefore, if cash flows are unpredictable, managers tend to avoid paying high dividends because they are not confident of their ability to maintain high dividends. For these reasons, we predict that the impact of cash-flow uncertainty on dividends will be negative.

The notion that dividends are related to cash-flow uncertainty is consistent with survey evidence. Lintner (1956) reports that managers view earnings stability as one of the most important factors in dividend decisions. Brav, Graham, Harvey, and Michaely (2005) report that more than two-thirds of CFOs of dividend-paying firms view the stability of future cash flows as an important factor affecting dividend decisions.

We use SRVOL as our primary proxy for the cash-flow uncertainty faced by a firm. SRVOL is defined as the standard deviation of monthly stock returns over the most recent two years. Our rationale for using SRVOL as a proxy for cash-flow uncertainty is that stock prices tend to fluctuate more when cash flows are unpredictable. We predict that firms with high (low) stock price volatility will pay low (high) dividends. We also use ROAVOL as our supplementary proxy for cash-flow uncertainty. ROAVOL is defined as the standard deviation of operating rate of return (i.e., operating income/total assets) over the most recent four years including the current fiscal year.

### 2.2. Earned/contributed capital mix

DeAngelo, DeAngelo, and Stulz (2006) pay attention to the fact that dividends are paid usually by mature and established firms. They argue that firms with a low earned/contributed capital mix are in the capital infusion stage and thus cannot afford to pay dividends, while firms with a high earned/contributed capital mix are mature firms with large cumulative profits and thus are likely to pay dividends. Consistent with their financial life-cycle theory, they find that the probability of paying dividends tends to increase with the earned/contributed capital mix.

We use the retained earnings-to-total equity ratio (RE/TE) as a proxy for the earned/contributed capital mix. According to DeAngelo, DeAngelo, and Stulz (2006), RE/TE has a greater impact on the probability of paying dividends than alternative measures of earned/contributed capital mix such as the retained earnings-to-total assets ratio.[3] Based on the financial life-cycle theory of dividends,

[2] These studies examine questions such as why firms change dividends and whether changes in dividends convey information about a firm's future performance. See Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely and Swaminathan (2002).

[3] It should be noted that DeAngelo, DeAngelo, and Stultz (2006) and Denis and Osobov (2008) propose the earned/contributed capital mix as a determinant of the probability of paying dividends. In this study, we extend DeAngelo, DeAngelo, and Stultz (2006) to consider the earned/contributed capital mix as a determinant of the *amount* of dividends. In

we predict that the impact of RE/TE on dividends is positive.

### 2.3. Agency conflicts

As Jensen and Meckling (1976) suggest, managers can allocate resources to activities that benefit them privately, but that are not in shareholders' best interests. Jensen (1986) points out that managers have incentive to grow their firms beyond optimal size because growth increases the amount of resources under their control. Shareholders may demand high dividend payouts in order to reduce discretionary cash under managers' control that can be wasted in negative NPV projects. Easterbook (1984) views dividends as a potential solution to agency conflicts. Dividend payouts can force managers to raise funds in the external financial markets and thus subject managers to the scrutiny of outside professionals such as investment bankers, lawyers, and public accountants. Recognizing the monitoring value of external financing, shareholders may insist that managers pay dividends.

We hypothesize that the impact of agency conflicts on dividends will be negative because outside shareholders of firms with a high degree of agency conflicts will pressure firms to pay high dividends, as they try to minimize discretionary cash under managers' control and force firms to use external funds more frequently. We use the fraction of common stock owned by insiders (OWN) as a proxy variable for agency conflicts.[4] Many prior studies use OWN as a proxy for the degree of agency conflicts (see Rozeff, 1982; Crutchley and Hansen, 1989; Jensen, Solberg, and Zorn, 1992). These studies argue that agency conflicts are more likely if the fraction of common stock owned by insiders is low. We predict that firms with low OWN will pay relatively high dividends.[5]

### 2.4. Investment opportunities

Firms with many investment opportunities have large cash requirements and thus may pay low dividends. This is the standard view taken by researchers in extant payout literature (see Rozeff, 1984; Smith and Watts, 1992; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000; Fama and French, 2001; DeAngelo, DeAngelo, and Stulz, 2006).[6]

**Table 1**
Description of key variables.

| | |
|---|---|
| **Payout variables** | |
| Dividend-to-earnings ratio (DV/E) | Cash dividends/earnings |
| Dividend-to-sales ratio (DV/S) | Cash dividends/sales |
| Total payout-to-earnings ratio (TOTALP/E) | (Cash dividends+repurchases)/earnings |
| Total payout-to-sales ratio (TOTALP/S) | (Cash dividends+repurchases)/sales |
| **Explanatory variables** | |
| Stock return volatility (SRVOL) | Standard deviation of monthly stock returns over the most recent two years including the current fiscal year |
| Retained earnings-to-total equity ratio (RE/TE) | (Retained earnings/total share holder's equity)* 100 |
| Insider ownership (OWN) | (Number of closely held shares/common shares outstanding) * 100 According to the *Worldscope* variable definition, closely-held shares represent shares held by insiders. For Japanese firms, closely-held shares represent the holdings of the ten largest share holders. |
| Market-to-book ratio (MBR) | Market value of equity/book value of equity |
| Total assets (TA) | Book value of total assets |
| Operating rate of return (ROA) | EBIT/total assets, where EBIT is the earnings before interest and income taxes |
| Cash holdings (CASH) | (Cash+short-term investments)/total assets |
| Operating profit volatility (ROAVOL) | Standard deviation of operating rate of return (i.e., operating income/ total assets) over the most recent four years including the current fiscal year |

If this is the case, the impact of investment opportunities on dividends will be negative.

We use the market-to-book ratio (MBR) as a proxy variable for investment opportunities. Prior studies use the MBR or its variant, Tobin's q, as a proxy for investment opportunities (see e.g., Fama and French, 2001; Grullon and Michaely, 2002; DeAngelo, DeAngelo, and Stulz, 2006). We predict that firms with high (low) MBRs will pay low (high) dividends.

### 2.5. Control variables

In addition to the aforementioned proxy variables for four potential determinants of payout policy, we use several control variables in our investigation. These control variables are firm size measured by the logarithm of total assets (Log(TA)), operating profitability (ROA) measured by operating income scaled by total assets (ROA), and cash holdings measured by cash plus short-term investments scaled by total assets (CASH).

(*footnote continued*)
our supplementary analysis, however, we consider the impact of the earned/contributed capital mix on the probability of paying dividends.

[4] Our source of insider ownership data is *Worldscope*, which La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) use as the primary source of ownership data.

[5] It should be noted that the above hypothesis examines the form of agency conflicts that exist between management and shareholders. However, there are other forms of agency conflicts that may be important to dividend policy. For example, dividends may be affected by the kind of agency conflicts that exist between controlling and minority shareholders. Controlling shareholders who manage a firm can extract cash through salaries or transactions with related parties. If controlling shareholders trade off dividends versus other means of extracting cash from the firm, the relationship between insider ownership and dividends may become weak or even positive.

[6] On the other hand, one can also argue that the relationship between investment opportunities and dividend payouts can be positive. Survey evidence suggests that managers are highly conservative when it comes to changing dividends and they increase dividends only when higher sustainable earnings are expected (see e.g., Lintner, 1956; Brav, Graham, Harvey, and Michaely, 2005). This conservatism raises the possibility that firms with many investment opportunities will pay high dividends because these firms can expect to maintain high dividends using cash earned from those opportunities.

Table 1 provides definitions of the variables we use in this study.

## 3. Data

The source of our data is the *Worldscope* database. Our sample period covers the 1994–2005 period. In constructing our sample, we apply the same procedure to each year's sample. To elaborate, we begin by collecting data for every firm that is covered by the database, except for ADRs and foreign firms. We discard firms in financial and utilities industries. We also drop firms whose dividends are greater than their sales; firms whose dividends, net income or sales are missing; and firms with negative book value of equity or negative sales.

Our analysis is conducted separately on each individual country. Our primary sample is comprised of seven major countries—Australia, Canada, Japan, France, Germany, the U.K., and the U.S. These countries have the largest stock markets among developed countries. Most of our analysis focuses on this primary sample. We also construct a sample of 26 countries that are not included in the primary sample. We examine this supplementary sample to determine whether the results from seven major countries extend to other countries in the world.

Our main payout variables are the dividend-to-earnings ratio (DV/E) and the dividend-to-sales ratio (DV/S), both of which measure the amount of dividend payouts. When we use DV/E as the payout measure in the analysis, we drop negative-earnings firms that pay dividends because a negative DV/E is difficult to interpret. However, we do not drop negative-earnings firms if they pay no dividends. We treat the DV/E of these firms as zero, even if their earnings are negative.[7] Next, when we use DV/S as the payout measure, we do not drop negative earnings firms whether or not the firm pays dividends. Thus, using DV/S in this manner allows us to include many more firms in our sample.

At times, dividends paid by firms are much higher than their earnings. In particular, when earnings are close to zero, extremely high DV/Es can occur. In our raw data, some firms have a DV/E as high as 240,000%. To cope with extreme values, we winsorize dividend payout variables, DV/E and DV/S, at the top two percent of their respective distributions.[8] Some of the key variables we use as determinants of dividend policy also pose outlier problems. To address these problems, we winsorize SRVOL and MBR at the top two percentile, and retained-earnings-to-equity ratio (RE/TE) at the top and bottom two percentiles of their respective distributions.

**Table 2**
Summary statistics.

The table presents summary statistics of dividend payout ratios and key variables for seven major countries for the period 1994–2005. Two measures of dividends are DV/E, the dividend-to-earnings ratio and DV/S, the dividend-to-sales ratio. The four key variables are: (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, and (iv) MBR, market-to-book ratio. The table reports mean, standard deviation (in parentheses), and median values for these variables. *N* is the number of observations.

| Country | DV/E | DV/S | SRVOL | RE/TE | OWN | MBR |
|---|---|---|---|---|---|---|
| *Australia* | | | | | | |
| Mean | 0.386 | 0.025 | 0.139 | −1.157 | 0.416 | 2.622 |
| (St. dev.) | (0.468) | (0.031) | (0.089) | (3.149) | (0.263) | (2.976) |
| Median | 0.285 | 0.012 | 0.112 | 0.056 | 0.424 | 1.712 |
| *N* | 3,365 | 3,457 | 2,580 | 3,457 | 3,275 | 3,386 |
| *Canada* | | | | | | |
| Mean | 0.192 | 0.012 | 0.152 | −0.933 | 0.285 | 2.748 |
| (St. dev.) | (0.472) | (0.025) | (0.092) | (2.950) | (0.245) | (2.985) |
| Median | 0.000 | 0.000 | 0.126 | 0.012 | 0.219 | 1.859 |
| *N* | 3,961 | 4,065 | 2,850 | 4,065 | 1,528 | 3,775 |
| *France* | | | | | | |
| Mean | 0.257 | 0.012 | 0.124 | −0.434 | 0.571 | 2.891 |
| (St. dev.) | (0.367) | (0.018) | (0.072) | (2.485) | (0.221) | (3.274) |
| Median | 0.179 | 0.006 | 0.103 | 0.105 | 0.602 | 1.823 |
| *N* | 4,258 | 4,397 | 3,263 | 4,397 | 3,085 | 4,009 |
| *Germany* | | | | | | |
| Mean | 0.295 | 0.010 | 0.131 | −0.502 | 0.563 | 2.627 |
| (St. dev.) | (0.443) | (0.018) | (0.083) | (2.441) | (0.247) | (2.916) |
| Median | 0.000 | 0.001 | 0.106 | 0.145 | 0.572 | 1.724 |
| *N* | 4,685 | 4,820 | 3,617 | 4,820 | 3,134 | 4,445 |
| *Japan* | | | | | | |
| Mean | 0.381 | 0.007 | 0.117 | 0.203 | 0.460 | 1.742 |
| (St. dev.) | (0.482) | (0.008) | (0.060) | (1.639) | (0.158) | (2.209) |
| Median | 0.238 | 0.005 | 0.104 | 0.481 | 0.441 | 1.138 |
| *N* | 27,197 | 30,321 | 25,313 | 30,321 | 19,411 | 29,130 |
| *U.K.* | | | | | | |
| Mean | 0.353 | 0.019 | 0.131 | −0.513 | 0.322 | 3.484 |
| (St. dev.) | (0.476) | (0.023) | (0.075) | (2.583) | (0.229) | (3.917) |
| Median | 0.260 | 0.012 | 0.111 | 0.282 | 0.293 | 2.109 |
| *N* | 7,938 | 8,531 | 6,515 | 8,531 | 8,169 | 8,349 |
| *US* | | | | | | |
| Mean | 0.094 | 0.005 | 0.179 | −1.339 | 0.311 | 3.682 |
| (St. dev.) | (0.278) | (0.014) | (0.109) | (3.790) | (0.236) | (4.083) |
| Median | 0.000 | 0.000 | 0.148 | 0.135 | 0.268 | 2.251 |
| *N* | 27,210 | 27,820 | 21,790 | 27,820 | 25,839 | 26,547 |

Table 2 provides summary statistics for our dividend payout variables as well as key variables for each of the seven countries in our primary sample.

In addition to dividends, we consider share repurchases as an alternative means by which firms return cash to shareholders. Our additional measure of payout is TOTALP, which is the sum of cash paid through dividends and repurchases. The amount of share repurchases, which is part of TOTALP, is calculated as the amount of cash that firms expend to reduce common shares in circulation to either retain as treasury shares or cancel. Our approach to obtaining the amount of share repurchases is similar to

[7] Our primary reason for retaining these negative earnings firms that do not pay dividends is to maximize the number of observations for the test. However, results remain unchanged even if we drop these firms.

[8] We choose to winsorize the top two percent because a winsorization at the top one percent yields rather high dividend payout levels. For example, the maximum value of the dividend-to-earnings ratio is as high as 413% after a winsorization at the top one percent. The maximum value declines to 224% when a winsorization at the top two percent is applied. We find, however, that our key results—for example, the importance of cash-flow uncertainty in payout policy—remain unchanged when we apply a winsorization to the top one percent. We winsorize the top two percent combining all 12 years of observations from seven major countries, when it comes to the primary sample. A similar top-two-percent winsorization is applied to the supplementary sample on the dataset that combines all 12 years of data from 26 countries.

that of Grullon and Michaely (2002). To calculate the amount of share repurchases, they subtract Compustat #56 (reduction in the value of the net number of preferred shares outstanding) from Compustat #115 (total expenditure on the purchase of common and preferred shares). A problem that we encounter when using *Worldscope*, however, is that the database does not provide an item that corresponds to Compustat #56, though it has an item that corresponds to Compustat #115. The *Worldscope* item that corresponds to Compustast #115 is 'common/preferred, retired, converted, etc. (#04751)'—a cash-flow statement item. This item includes cash disbursed to reduce preferred shares outstanding. Since we are not able to identify the amount of cash used to reduce preferred shares, we drop firms from the analysis of TOTALP if they have preferred stock on the balance sheet—even if they might have repurchased common shares during a given year.[9]

## 4. Empirical results

### 4.1. Correlations between dividend payouts and four key factors

Our empirical investigation begins with a simple correlation analysis to examine the relationship between dividend payouts and four key determinants. Table 3 presents the results of correlation analysis for each of the seven major countries over the 1994–2005 period. We use two dividend payout measures: the DV/E and the DV/S. The table reports the average correlation coefficients for each country over the sample period. It also reports the number of times the correlation coefficient takes the predicted sign, as well as the number of times the correlation coefficient takes the predicted sign and is also statistically significant. Our hypotheses predict that the amount of dividends is negatively correlated with SRVOL and ROAVOL (i.e., our proxies for cash-flow uncertainty), positively correlated with RE/TE, negatively correlated with OWN, and negatively correlated with MBR.

The results in Table 3 suggest that dividend payouts are negatively correlated with our cash-flow uncertainty proxies. In the first panel for which DV/E is the dividend payout measure, the average correlation between DV/E and SRVOL is negative and significant without exception in all seven countries. For example, Australia's average correlation coefficient is −0.447. Furthermore, in all seven countries, this correlation has the predicted negative sign in each of the individual years (i.e., 12 times). This correlation in each individual year is also statistically significant with only one or two exceptions across countries. Similarly, in the second panel for which DV/S is the dividend payout measure, the average correlation between DV/S and SRVOL is negative without exception in all seven countries. The correlation between DV/S and SRVOL is negative and significant in all sample years with only one or two exceptions. Thus, our correlation analysis indicates that the amount of dividends is significantly and negatively correlated with SRVOL, our primary proxy for cash-flow uncertainty.

Table 3 also provides evidence that the amount of dividends is negatively correlated with ROAVOL—our alternate proxy for cash-flow uncertainty. The average correlation coefficient between the amount of dividends (DV/E or DV/S) and ROAVOL is negative and significant in all countries. This correlation is negatively significant in the majority of individual years with only a few exceptions.

The results in Table 3 also suggest that the amount of dividends is positively correlated with the RE/TE. In Panel A of Table 3, the average correlation between DV/E and the RE/TE has the predicted positive sign in all seven countries. With the exception of two countries, Canada and France, this average correlation between DV/E and RE/TE is positive and significant in almost all individual years. A similar result is found in Panel B of the same table for which DV/S is the dividend payout measure. Thus, correlation analysis provides evidence that the amount of dividends is negatively correlated with firms' financial life-cycle stages.

On the other hand, the correlation between dividends and OWN is weak or not consistent across countries and over time. For example, in Panel A, for which DV/E is the dividend payout measure, the average correlation has the predicted positive sign in only three countries—Canada, France and Germany. Moreover, in many countries such as Australia, Canada, France and Germany, the correlation is negative and significant in only a few individual years or none. A similar result is found in Panel B for which DV/S is the dividend payout measure. Thus, there is little international evidence that dividends are associated with agency conflicts.

Finally, according to the results in Table 3, the correlation between dividends and investment opportunities (MBR) is rather weak. In Panel A, the average correlation between DV/E and MBR is negative, as predicted, in all countries. However, with the exception of two countries, Japan and the U.S., this correlation is not statistically significant in the majority of individual years. Further, in Panel B, the average correlation between DV/S and MBR is positive in many countries, which is not consistent with the prediction. Across countries, the number of years in which the correlation is significant and has the predicted negative sign is very small—none in France, for example. Thus, the evidence to suggest that firms with many investment opportunities pay low dividends is rather weak.

In summary, our correlation analysis shows that dividend payouts are correlated with cash-flow uncertainty and the earned/contributed capital mix. It appears that firms that face high levels of cash-flow uncertainty and are at the early stage of their financial life cycle tend to pay low dividends. On the other hand, the evidence to suggest that dividends are correlated with agency conflicts and investment opportunities is weak.

[9] The use of preferred stock may vary in extent from country to country. We lose only a small fraction of firms as a result of removing firms with preferred stock. There is no reason to believe that excluding firms with preferred stock will bias our results.

**Table 3**
Correlations between dividend payout and key variables.

The table reports the correlations between dividend payout and key variables over the period 1994–2005. The first panel reports the correlations of DV/E, the dividend-to-earnings ratio, with key variables. The second panel reports the correlations of DV/S, the dividend-to-sales ratio, with key variables. The five key variables are: (i) SRVOL, stock return volatility, (ii) ROAVOL, operating profitability volatility, (iii) RE/TE, retained earnings-to-total equity ratio, (iv) OWN, insider ownership, and (v) MBR, market-to-book ratio. Each reported correlation denoted as 'Ave Corr' is the average of the 12 correlation coefficients over the 12-year sample period. '#−'('#+') denotes the number of times the correlation coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the correlation coefficient is statistically significant (at the 10% level) with the predicted sign. Ave *N* is the average number of observations.

| | SRVOL | | | ROAVOL | | RE/TE | | | OWN | | | MBR | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | Ave Corr | #− [# sig] | Ave *N* | Ave Corr | #− [# sig] | Ave Corr | #+ [# sig] | Ave *N* | Ave Corr | #− [# sig] | Ave *N* | Ave Corr | #− [# sig] | Ave *N* |
| *Panel A: DV/E as the payout variable* | | | | | | | | | | | | | | |
| Australia | −0.447 | 12 [12] | 208.8 | −0.359 | 12 [11] | 0.316 | 12 [11] | 280.4 | −0.099 | 9 [4] | 265.3 | −0.031 | 9 [3] | 274.5 |
| Canada | −0.314 | 12 [11] | 230.4 | −0.146 | 10 [8] | 0.031 | 8 [2] | 330.1 | 0.063 | 5 [2] | 123.6 | −0.084 | 12 [5] | 306.1 |
| France | −0.236 | 12 [10] | 261.2 | −0.161 | 11 [8] | 0.024 | 7 [2] | 354.8 | 0.014 | 5 [1] | 247.4 | −0.066 | 10 [3] | 322.7 |
| Germany | −0.287 | 12 [12] | 215.0 | −0.277 | 12 [12] | 0.205 | 12 [12] | 390.4 | 0.117 | 1 [0] | 252.3 | −0.108 | 10 [7] | 359.3 |
| Japan | −0.139 | 12] [11] | 1875.1 | −0.151 | 12 [12] | 0.104 | 12 [12] | 2266.4 | −0.089 | 12 [10] | 1457.0 | −0.155 | 12 [12] | 2168.2 |
| UK | −0.247 | 12 [12] | 497.8 | −0.247 | 12 [12] | 0.191 | 12 [11] | 661.5 | −0.155 | 12 [12] | 632.3 | −0.074 | 12 [6] | 647.0 |
| US | −0.320 | 12 [12] | 1768.2 | −0.183 | 12 [12] | 0.089 | 12 [11] | 2267.5 | −0.117 | 12 [11] | 2104.8 | −0.042 | 11 [6] | 2161.8 |
| *Panel B: DV/S as the payout variable* | | | | | | | | | | | | | | |
| Australia | −0.445 | 12 [12] | 215.0 | −0.356 | 12 [12] | 0.312 | 12 [11] | 288.1 | −0.017 | 6 [1] | 272.9 | 0.088 | 4 [0] | 282.2 |
| Canada | −0.331 | 12 [11] | 237.5 | −0.121 | 9 [6] | 0.067 | 9 [6] | 338.8 | 0.044 | 6 [1] | 127.3 | 0.008 | 7 [1] | 314.6 |
| France | −0.209 | 12 [10] | 271.9 | −0.041 | 8 [5] | 0.057 | 10 [5] | 366.4 | 0.009 | 6 [1] | 257.1 | 0.137 | 0 [0] | 334.1 |
| Germany | −0.229 | 12 [10] | 301.4 | −0.166 | 12 [8] | 0.176 | 12 [12] | 401.7 | 0.164 | 6 [1] | 261.2 | 0.053 | 2 [1] | 370.4 |
| Japan | −0.132 | 12 [11] | 2109.4 | −0.068 | 12 [10] | 0.132 | 12 [12] | 2526.8 | −0.006 | 6 [1] | 1617.6 | −0.007 | 6 [4] | 2427.5 |
| UK | −0.367 | 12 [12] | 542.9 | −0.248 | 12 [12] | 0.236 | 12 [12] | 710.9 | −0.161 | 6 [1] | 680.8 | 0.028 | 4 [1] | 695.8 |
| US | −0.350 | 12 [12] | 1815.8 | −0.188 | 12 [12] | 0.094 | 12 [11] | 2318.3 | −0.132 | 6 [1] | 2153.3 | 0.034 | 3 [1] | 2212.3 |

### 4.2. *Multiple Tobit regressions on dividend payouts*

Now, we estimate a multiple Tobit regression model to examine the simultaneous impact of the four key factors on dividend payouts. We also use three control variables: firm size (Log(TA)), ROA, and cash holdings (CASH). Fama and French (2001) and DeAngelo, DeAngelo, and Stulz (2006) use these same control variables to examine the factors that affect the probability of paying dividends.[10] Our purpose is to evaluate the impact of cash-flow uncertainty on dividends in comparison with the impact of other potential determinants. We use SRVOL as a proxy for cash-flow uncertainty in this regression.

Table 4 presents results from multiple Tobit regressions using proxy variables for the four key factors and the control variables as explanatory variables. As in the preceding correlation analysis, we use two dividend payout measures: DV/E and DV/S.

The dependent variable in Panel A of Table 4 is DV/E. We find that the results are qualitatively similar to those obtained from the preceding correlation analysis. First, SRVOL has a strong impact on the amount of dividends in all seven countries. The average of the regression coefficients for SRVOL is significant with the predicted negative sign in all countries. With no exception across seven countries, the sign of the SRVOL coefficient is also negative in nearly all individual years. Except for Germany, this coefficient is significant in all or almost all individual years. The regression results suggest that firms with high SRVOL tend to pay low dividends.

Second, firms' financial life-cycle stage (proxied by RE/TE) has some impact on the amount of dividends, but its impact appears not as great as the impact of SRVOL. The average coefficient for RE/TE has the predicted positive sign in all seven countries and is significant in many countries with the exceptions of Canada and France.

[10] We also estimate a regression model without the control variables. The regression results (provided in Appendix A) are qualitatively similar to the results reported here, with respect to the importance of the four key determinants in payout policy.

**Table 4**
Tobit regressions to explain the dividend payout ratio.

The table reports Tobit regression results on dividend payout over the period 1994–2005. Each reported number is the average of the 12 regression coefficients over the 12-year sample period. The dependent variables in the first and second panels are DV/E, the dividend-to-earnings ratio, and DV/S, the dividend-to-sales ratio, respectively. The explanatory variables are: (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Tobit coefficients and test the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (at the 10% level) with the predicted sign. LK is the average log likelihood ratio. *N* is the average annual number of observations.

| | Intercept | SRVOL | | RE/TE | | OWN | | MBR | | Log(TA) | | ROA | | CASH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | # − [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] | LK |
| *Panel A: DV/E as the dependent variable* | | | | | | | | | | | | | | | | |
| Australia | −0.07 | −3.62 | 12 | 0.22 | 11 | −0.14 | 7 | 0.01 | 7 | 0.04 | 11 | 1.30 | 10 | −0.32 | 3 | −118.2 |
| (*N* = 204.2) | (−0.30) | (−7.09) | [10] | (3.36) | [7] | (−1.35) | [3] | (0.50) | [0] | (4.93) | [7] | (2.70) | [9] | (−2.50) | [0] | |
| Canada | −0.71 | −6.64 | 11 | 0.12 | 7 | 0.07 | 5 | −0.03 | 9 | 0.07 | 10 | 0.30 | 9 | −0.22 | 5 | −49.1 |
| (*N* = 94.7) | (−1.59) | (−4.61) | [10] | (1.60) | [2] | (0.49) | [1] | (−0.96) | [2] | (3.47) | [6] | (0.71) | [2] | (−0.69) | [1] | |
| France | −0.22 | −2.91 | 12 | 0.01 | 8 | 0.07 | 3 | −0.01 | 5 | 0.04 | 12 | 0.23 | 12 | 0.22 | 10 | −119.6 |
| (*N* = 219.1) | (−1.79) | (−9.64) | [10] | (1.81) | [1] | (1.41) | [0] | (−1.25) | [2] | (6.50) | [7] | (3.98) | [5] | (1.78) | [2] | |
| Germany | 0.00 | −3.23 | 12 | 0.24 | 12 | 0.21 | 1 | −0.03 | 9 | 0.02 | 8 | 1.31 | 12 | 0.09 | 9 | −151.8 |
| (*N* = 218.4) | (0.02) | (−7.51) | [8] | (3.82) | [8] | (5.43) | [0] | (−2.28) | [4] | (2.03) | [2] | (7.75) | [11] | (1.38) | [0] | |
| Japan | 0.55 | −1.62 | 12 | 0.30 | 12 | −0.19 | 11 | −0.03 | 11 | 0.00 | 7 | −0.89 | 3 | −0.22 | 3 | −1010.4 |
| (*N* = 1326.4) | (6.99) | (−6.52) | [11] | (7.22) | [12] | (−4.87) | [6] | (−3.90) | [8] | (0.90) | [2] | (−2.34) | [1] | (−3.54) | [0] | |
| UK | −0.23 | −2.06 | 12 | 0.07 | 11 | −0.03 | 8 | 0.01 | 6 | 0.04 | 12 | 0.99 | 12 | −0.45 | 0 | −356.0 |
| (*N* = 490.8) | (−2.72) | (−5.37) | [11] | (4.16) | [9] | (−1.12) | [0] | (1.66) | [1] | (11.43) | [10] | (9.04) | [11] | (−5.95) | [0] | |
| US | −0.66 | −7.07 | 12 | 0.00 | 6 | −0.05 | 10 | −0.01 | 11 | 0.07 | 12 | 0.38 | 11 | −0.18 | 1 | −727.3 |
| (*N* = 1693.2) | (−4.85) | (−21.41) | [12] | (−0.07) | [2] | (−0.96) | [3] | (−3.65) | [3] | (9.27) | [12] | (4.58) | [8] | (−4.68) | [0] | |
| *Panel B: DV/S as the dependent variable* | | | | | | | | | | | | | | | | |
| Australia | −0.08 | −0.19 | 12 | 0.01 | 12 | 0.01 | 2 | 0.00 | 1 | 0.01 | 12 | 0.17 | 12 | −0.00 | 4 | 236.3 |
| (*N* = 210.3) | (−13.46) | (−9.02) | [11] | (4.46) | [4] | (3.80) | [0] | (3.59) | [0] | (19.17) | [12] | (9.89) | [10] | (−0.11) | [0] | |
| Canada | −0.06 | −0.32 | 11 | 0.01 | 8 | −0.00 | 7 | 0.00 | 4 | 0.00 | 11 | 0.06 | 11 | 0.01 | 7 | 67.9 |
| (*N* = 98.0) | (−3.97) | (−4.57) | [9] | (3.12) | [0] | (−0.30) | [2] | (0.80) | [0] | (6.51) | [5] | (3.83) | [4] | (0.49) | [1] | |
| France | 0.00 | −0.13 | 12 | 0.00 | 8 | 0.00 | 5 | 0.00 | 1 | 0.00 | 11 | 0.02 | 10 | 0.04 | 12 | 387.9 |
| (*N* = 228.4) | (−1.32) | (−8.94) | [11] | (2.80) | [3] | (1.26) | [0] | (4.59) | [0] | (4.25) | [4] | (4.34) | [8] | (7.41) | [11] | |
| Germany | −0.01 | −0.14 | 12 | 0.00 | 8 | 0.01 | 0 | 0.00 | 5 | 0.00 | 9 | 0.10 | 12 | 0.03 | 12 | 318.5 |
| (*N* = 227.0) | (−0.75) | (−6.56) | [11] | (2.30) | [7] | (8.97) | [0] | (0.49) | [4] | (1.27) | [1] | (6.44) | [12] | (11.13) | [10] | |
| Japan | 0.01 | −0.03 | 12 | 0.00 | 12 | −0.00 | 12 | 0.00 | 3 | −0.00 | 0 | 0.03 | 12 | 0.02 | 12 | 4362.0 |
| (*N* = 1481.0) | (17.13) | (−7.28) | [12] | (3.98) | [12] | (−10.61) | [9] | (2.85) | [1] | (−13.90) | [0] | (8.49) | [12] | (13.33) | [12] | |
| UK | −0.02 | −0.12 | 12 | 0.00 | 12 | −0.00 | 5 | 0.00 | 1 | 0.00 | 12 | 0.07 | 12 | 0.00 | 6 | 865.4 |
| (*N* = 535.7) | (−4.16) | (−8.98) | [12] | (6.51) | [11] | (−0.11) | [0] | (3.84) | [0] | (12.58) | [12] | (10.66) | [12] | (0.58) | [1] | |
| US | −0.04 | −0.35 | 12 | 0.00 | 6 | −0.00 | 9 | 0.00 | 1 | 0.00 | 12 | 0.02 | 12 | 0.01 | 10 | 804.3 |
| (*N* = 1739.1) | (−5.65) | (−18.29) | [12] | (0.58) | [2] | (−0.43) | [3] | (5.48) | [0] | (13.02) | [12] | (6.89) | [11] | (2.17) | [4] | |

The results generally support the hypothesis that firms in the mature life-cycle stage tend to pay high dividends. However, when we examine the number of times the RE/TE coefficient is significant and has the predicted positive sign, it appears that the impact of RE/TE is somewhat weak. In Canada and France, for example, the RE/TE coefficient is significantly positive only twice and once, respectively. In the U.S., the RE/TE coefficient is significantly positive only twice. Thus, compared to SRVOL whose impact on dividends is very strong across countries and over time, the impact of RE/TE on dividends appears relatively weak.

Finally, the other two key factors, OWN and MBR, do not seem to fare well as cross-sectional determinants of dividends. In many countries, the average coefficient for OWN does not have the predicted positive sign or is not statistically significant. In the majority of individual years across countries, the coefficient for OWN is not significantly negative. The same can be said of the coefficient for MBR. In many countries, the average MBR coefficient is not negative as predicted or not significant. With the exception of Japan, the MBR coefficient is not significantly negative in the majority of years.

Panel B of Table 4 shows that the use of DV/S as the dependent variable—instead of DV/E—yields similar results. In all countries, the impact of SRVOL on DV/S is strong in terms of the sign and significance of the average coefficient as well as the number of times the coefficient is significant with the predicted sign. In the U.S., for example, the average SRVOL coefficient is −0.35, which is significant. The individual SRVOL coefficient is negative and significant in all 12 individual years. The impact of RE/TE on DV/S is strong as well across countries, but not as strong as the impact of SRVOL. For example, while the average RE/TE coefficient is positive and significant in all countries except for the U.S., the number of times the coefficient is significant with the predicted positive sign is relatively small in several countries, including Canada, France, and the U.S. Finally, the impacts of OWN and MBR on DV/S are weak or inconsistent across countries. Their average coefficients have the wrong sign or are not significant in many countries. Moreover, it is very rare that their coefficients are significant with the predicted signs in individual years.

According to the regression results in Table 4, among the four key proxy variables, SRVOL has the greatest impact on dividends. Note also that the impact of SRVOL appears to be as great as or greater than the impact of the control variables. Firm size (Log(TA)) and profitability (ROA) are cited as important predictors of dividends in prior studies—for example, Fama and French (2001). Close inspection shows that the impact of SRVOL is greater than the impact of these variables in terms of the sign and significance of the average coefficient as well as the number of times the coefficient has the predicted sign and is also significant. This provides further evidence that cash-flow uncertainty is a key factor that explains the cross-section variation of dividends.

Based on the regression results, we evaluate the economic significance of the impact of cash-flow uncertainty on dividends by estimating the marginal effect of SRVOL on the amount of dividend payouts.[11] We find that, in the year 2005, a 10 percentage point increase in SRVOL is expected to decrease the DV/E by as much as 26.7 percentage points for Australian firms. Across seven major countries, the magnitude of the expected dividend (DV/E) decrease due to a 10 percentage point increase in SRVOL ranges from 3.7 to 34.9 percentage points in the year 2005. Similarly, we find that the magnitude of the expected dividend (DV/E) decreases due to a one-standard-deviation increase in SRVOL ranges from 3.7 to 26.9 percentage points in the same year. The range of the marginal effect of SRVOL is similar for other sample years.

To summarize, our Tobit regressions suggest that cash-flow uncertainty is an important factor that explains the cross-sectional variation of the amount of dividends.[12] A firm's financial life-cycle stage is also an important factor that affects the amount of dividends in many countries. On the other hand, the evidence that dividend payouts are related to agency conflicts[13] or investment opportunities is weak in the majority of countries.

### 4.3. Logit regression on the probability of paying dividends

Now, we examine whether cash-flow uncertainty can explain the probability of paying dividends. We estimate a Logit regression model to assess the impact of cash-flow uncertainty along with three other determinants on the probability of paying dividends. In constructing the dependent variable for this Logit regression, we assign a value of one to firms that pay dividends and a value of zero to firms that do not pay dividends during a given fiscal year. Essentially, this Logit regression model examines whether firms with a high level of cash-flow uncertainty are less likely to pay dividends.[14]

Table 5 reports the results of the Logit regression analysis for each of the seven major countries. In these regressions, we use three variables, Log(TA), ROA, and CASH, as control variables. First, it is clear from Table 5 that SRVOL, our proxy for cash-flow uncertainty, has a strong impact on the probability of paying dividends. The average coefficient for SRVOL has the predicted negative sign in all countries and is also significant with the only exception of Canada. In all or the majority of individual years, the SRVOL coefficient is negative and significant. Thus, our evidence suggests that firms facing high levels of cash flow uncertainty are less likely to pay dividends.

Based on the Logit regression estimates, we can evaluate the economic significance of the impact of SRVOL on the probability of paying dividends. We evaluate the marginal effect of SRVOL by holding all explanatory variables—including SRVOL—constant at their medians. We find that, in the year 2005, a 10 percentage point increase in SRVOL is expected to decrease the probability of paying dividends by 22 percentage points for Australian

[11] Since coefficient estimates of Tobit regressions are not exactly the same as marginal effects, we use the following transformation (see Greene, 2003, pp. 764–766).

$$\frac{\partial E(DIV_i|X_i)}{\partial X_i} = \beta \cdot \Phi\left(\frac{\beta' X_i}{\sigma}\right)$$

where $i$ represents a firm, $DIV_i$ the amount of dividend relative to either earnings or sales, $X_i$ the vector of explanatory variables, $\beta$ the vector of regression coefficients, $\sigma$ the standard deviation of the dependent variable (i.e., $DIV_i$), and $\Phi$ the standard normal cumulative density function. In evaluating the marginal effect of stock return volatility, we hold all explanatory variables—including stock return volatility—constant at their medians.

[12] Our evidence of the strong impact of stock return volatility on dividends is not affected by a potential multicollinearity problem. In our data, SRVOL is correlated rather highly with a couple of explanatory variables such as RE/TE and log(TA) in some countries. We have tried many different model specifications with and without these explanatory variables. All of these model specifications consistently show that stock return volatility is a key variable that explains the cross-sectional variation of dividend payouts.

[13] It may be necessary to reconcile our lack of support for the agency conflict explanation of dividends with La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000), who argue that agency conflicts explain variations in the amount of dividend payouts across countries. The focus of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) is a cross-country comparison of dividend payouts, while our focus is the cross-sectional variation of dividend payouts in individual countries. We do not attempt to explain why the amount of dividend payouts differs across countries. Thus, our results do not invalidate the La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) proposition that the amount of dividend payouts varies across countries depending on the type of legal system in each country.

[14] Recent empirical studies of Fama and French (2001), DeAngelo, DeAngelo, and Stulz (2006), and Denis and Osobov (2008) consider the probability of paying dividends, rather than the amount of dividends, as the dependent variable in regression analysis.

**Table 5**
Logit regressions to explain the likelihood of paying dividends.

The table reports Logit regression results on dividend payout over the period 1994–2005. Each reported coefficient is the average of the 12 regression coefficients over the 12-year sample period. The dependent variable is the log odd of a firm paying dividends. To construct the dependent we use a 0–1 indicator variable for which dividend-payers take 1 and non-dividend-payers take 0. The explanatory variables are: (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Logit coefficients and test the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (at the 10% level) with the predicted sign. *N* is the average number of observations.

| | Intercept | SRVOL | | RE/TE | | OWN | | MBR | | Log(TA) | | ROA | | CASH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #− [# sig] | Pseudo $R^2$ |
| Australia | 4.64 | −68.36 | 12 | 2.19 | 11 | −6.45 | 8 | 2.13 | 3 | 0.28 | 10 | 57.46 | 12 | −28.28 | 0 | 0.54 |
| ($N = 210.3$) | (0.48) | (−2.43) | [7] | (1.42) | [4] | (−2.01) | [0] | (1.82) | [0] | (0.77) | [7] | (2.14) | [9] | (−1.81) | [0] | |
| Canada | −103.50 | −2.13 | 9 | 13.63 | 11 | 3.04 | 6 | 1.08 | 6 | 4.54 | 12 | 70.08 | 9 | 3.01 | 6 | 0.56 |
| ($N = 98.0$) | (−1.69) | (−0.07) | [7] | (1.83) | [2] | (0.91) | [0] | (0.66) | [0] | (1.86) | [8] | (1.04) | [2] | (0.39) | [0] | |
| France | −5.40 | −22.26 | 12 | 0.07 | 8 | 0.55 | 4 | −0.01 | 6 | 0.43 | 12 | 2.79 | 12 | 4.44 | 12 | 0.29 |
| ($N = 228.3$) | (−6.29) | (−8.39) | [12] | (2.60) | [5] | (1.68) | [0] | (−0.41) | [1] | (12.04) | [11] | (10.05) | [10] | (4.76) | [7] | |
| Germany | −6.84 | −16.63 | 12 | 0.28 | 7 | 0.59 | 1 | −0.14 | 9 | 0.44 | 12 | 14.28 | 12 | 2.14 | 11 | 0.40 |
| ($N = 227.0$) | (−9.14) | (−6.89) | [10] | (1.34) | [3] | (3.11) | [0] | (−2.31) | [5] | (12.03) | [11] | (5.50) | [12] | (4.38) | [1] | |
| Japan | −4.20 | −10.75 | 12 | 2.94 | 12 | 0.09 | 4 | 0.03 | 3 | 0.29 | 12 | 16.23 | 12 | 3.06 | 12 | 0.27 |
| ($N = 1480.7$) | (−5.23) | (−9.14) | [12] | (9.45) | [12] | (0.61) | [0] | (0.70) | [2] | (7.51) | [11] | (5.13) | [12] | (6.24) | [10] | |
| UK | −3.74 | −12.75 | 12 | 0.51 | 12 | −0.24 | 8 | 0.16 | 2 | 0.37 | 12 | 6.24 | 12 | −2.24 | 0 | 0.37 |
| ($N = 535.7$) | (−5.10) | (−8.61) | [12] | (8.31) | [11] | (−0.95) | [0] | (4.42) | [0] | (9.76) | [11] | (8.49) | [12] | (−9.64) | [0] | |
| US | −4.02 | −24.54 | 12 | 0.09 | 11 | −0.22 | 9 | −0.04 | 12 | 0.34 | 12 | 1.40 | 12 | −0.83 | 1 | 0.38 |
| ($N = 1739.1$) | (−12.19) | (−13.63) | [12] | (5.52) | [9] | (−1.24) | [3] | (−7.81) | [4] | (21.12) | [12] | (6.89) | [10] | (−4.92) | [0] | |

firms. Across seven major countries, the expected change in the probability of paying dividends due to a 10 percentage point increase in SRVOL ranges from −3.2 to −64.2 percentage points in the same year. Similarly, the expected change in the probability of paying dividends due to a one-standard-deviation increase in SRVOL ranges from −16.6 to −47.4 percentage points in the same year. The range of the marginal effect of SRVOL is similar for other sample years.

Next, the results on Table 5 also show that the impact of RE/TE on the probability of paying dividends is strong in many countries. The average coefficient for RE/TE is positive and significant in all countries, except for Australia and Germany. The number of times the RE/TE coefficient is positive and significant varies across countries. In three countries, Japan, the U.K., and the U.S., the RE/TE coefficient is positive and significant in all or the majority of years. But it is positive and significant in only a few years in the other countries. Thus, while RE/TE has a strong impact on the probability of paying dividends in many countries, its impact appears relatively uneven across countries and years.

Finally, agency conflicts and investment opportunities do not have substantial impacts on the probability of paying dividends. The average coefficients for OWN and MBR do not have the predicted negative sign in several countries. The number of times their coefficients are negative and significant is very small or even zero. Thus, it appears that these two factors are not important determinants of the probability of paying dividends, just as they are not important determinants of the amount of dividends.

In summary, among the four key proxy variables, SRVOL stands out as the most important factor that affects the probability of paying dividends across countries. Combined with the previous results, cash-flow uncertainty appears to be an important determinant not just of the amount of dividends, but also of the probability of paying dividends. Similar to Denis and Osobov (2008), our Logit regressions lend support to the financial life-cycle theory of dividends, given that the impact of RE/TE on the probability of paying dividends is strong in many countries.

### 4.4. Results for additional countries

Thus far, our investigation is focused on seven major countries. We now extend our analysis to other countries by examining our supplementary sample. Our challenge is that some countries do not have a sufficient number of observations for many individual years[15] and thus, year-by-year multiple regressions are not feasible for these

[15] Due to the back-filling problem of the *Worldscope* database, the number of observations tends to decline as we move backward in time. Our supplementary sample comprises 26 countries, excluding countries that do not have at least 100 usable firm-year observations for Tobit regression over the 1994–2005 period.

countries. To avoid this problem, we run regressions after we combine observations from 12 years into one dataset for analysis over the period 1994–2005.

Table 6 reports the results of multiple Tobit regressions for the 26 countries in our supplementary sample. The dependent variable is DV/E.[16] Results show that the impact of cash-flow uncertainty on dividend payouts is significantly negative in almost all countries. The coefficient for SRVOL is negative in all 26 countries and also significant in 24 countries. Table 6 also shows that RE/TE is an important factor that explains the cross-sectional distribution of dividend payouts. The coefficient for RE/TE is significantly positive, as predicted, in 18 countries. Thus, it appears that RE/TE is an important determinant of dividends, although its impact is somewhat weaker than that of SRVOL in several countries.

On the other hand, regression results for OWN and MBR do not support the related hypotheses. In many countries, the coefficients for OWN and MBR do not have the predicted negative sign. They are significant and negative in only a few countries. Thus, according to our results, it appears that agency conflicts and investment opportunities are not key determinants of dividend payouts for many countries in the world.

In summary, the results from 26 additional countries are similar to those seen repeatedly from the seven major countries. The impact of cash-flow uncertainty on dividends is negative and significant in most countries. The impact of RE/TE is positive and significant in many countries, though its impact on dividends is weaker than the impact of cash-flow uncertainty. Among the four factors we consider as the potential determinants of dividends, cash-flow uncertainty appears to be the most important factor, followed by RE/TE.

### 4.5. Cash-flow uncertainty and TOTALP

Our next analysis takes into account firms' use of repurchases by using a payout measure that includes the amount of repurchases. Recent studies show that, in the U.S., share repurchases have replaced dividends as the most important form of distribution.[17] Many firms in our sample may repurchase shares.[18] We cannot rule out the possibility that firms with repurchase programs pay lower dividends than they would without such programs.[19] Our payout measure in this analysis is the amount of total payouts—i.e., the sum of dividends and repurchases—scaled by earnings (TOTALP/E). We test whether cash-flow uncertainty explains the cross-sectional variation of total payouts in each of the seven major countries.

Table 7 reports Tobit regression results for which TOTALP/E is the dependent variable. The results show that SRVOL has a significantly negative impact on TOTALP/E. The average of the SRVOL coefficients over the sample period is negative and significant in all countries without exception. The SRVOL coefficient is negative and significant in the majority of individual years across countries. It appears that the impact of SRVOL on TOTALP/E is generally stronger than the impact of other key variables such as RE/TE in terms of the number of individual years the regression coefficient is significant with a predicted sign.[20]

There are a few reasons why cash-flow uncertainty has a substantial influence on TOTALP as well as on dividends. First, in our data, we find that TOTALP are dominated by dividends in many countries over the sample period. For each of the seven countries under study, Table 8 presents the key statistics for SRVOL for the four groups of firms classified by their payout policy. The table shows that, in countries such as Australia, France, Germany, and the U.K., the number of firms that repurchase shares, either solely or in conjunction with dividends—i.e., type (B) and (D) firms—is relatively small. This may be the results of the fact that repurchases are either illegal or difficult to implement in these countries over the majority of time during our sample period.[21] This observation is consistent with Lee and Suh (2008) who document that dividends remain the principal payout method in terms of the frequency and amount in major countries outside the U.S.

Another important reason for the substantial influence of cash-flow uncertainty on TOTALP is that firms that do not make any payouts experience higher SRVOL when compared to firms that make payouts either through dividends or repurchases, or both. Table 8 shows that, in most of the seven major countries (except for Germany), the mean and/or median values for SRVOL are greatest for firms that make no payouts (A), followed by firms that only repurchase shares (C), firms that only pay dividends (B), and, finally, firms that both pay dividends and repurchase shares (D).[22] It appears that firms that make no payouts face higher cash-flow uncertainties relative to firms that make payouts.

[16] We also consider DV/S as the dependent variable. Our results remain similar. For example, the coefficient for SRVOL is negative in all countries with only one exception, Argentina, and is significant in 22 countries.

[17] See, for example, Jagannathan, Stephens, and Weisbach (2000) and Grullon and Michaely (2002).

[18] Lee and Suh (2008) document that repurchases are not widely used in countries outside the U.S. In our data, we also find that the use of repurchases is relatively small in countries outside the U.S.

[19] Grullon and Michaely (2002), for example, document that U.S. firms repurchase shares using funds that might otherwise have been used to increase dividends.

[20] We also consider an alternate total payout measure, the amount of total payouts scaled by sales (TOTALP/S), as the dependent variable. Our results remain unchanged in that the impact of SRVOL on total payouts is negatively significant in the majority of individual years across countries and is generally stronger than the impact of other explanatory variables.

[21] Kim, Schremper, and Varaiya (2005) report that share repurchases were illegal until 1998 in Germany. In some countries, there still exist a few restrictions that make the implementation of share repurchases difficult. For example, in France, Germany, and the U.K., firms must obtain shareholder approval before implementing share repurchases, whereas board approval is sufficient in the U.S.

[22] Lee and Suh (2008) report similar results for major countries in the world over the period 2000–2005. These results are also consistent with Grullon and Michaely (2002) who report that U.S. firms that make zero payouts experience high operating profit volatility on average, as compared to firms that make payouts through dividends or repurchases or both (see Table II in their paper).

**Table 6**
Tobit regressions for other countries.

The table reports Tobit regression results on dividend payout for 26 countries over the period 1994–2005. Regressions are run on a pooled sample from the 12-year sample period. The dependent variable is DV/E. The explanatory variables are: (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The table reports Tobit regression coefficients. Numbers in parentheses are the chi-square statistics. $^{*}$, $^{**}$ and $^{***}$ indicate significance at the 10%, 5%, and 1% levels, respectively. LK is the average log likelihood ratio. *N* is the total number of observations.

| Country | Intercept | SRVOL | RE/TE | OWN | MBR | Log(TA) | ROA | CASH | LK | *N* |
|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 1.29$^{***}$ | −1.87$^{***}$ | 0.21$^{***}$ | 0.22 | 0.02 | −0.06$^{***}$ | 1.19 | 0.43 | −56.0 | 164 |
| | (10.96) | (7.96) | (8.76) | (2.04) | (0.67) | (11.27) | (2.35) | (1.53) | | |
| Brazil | −1.14$^{*}$ | −1.06$^{**}$ | 0.05$^{***}$ | 0.41 | −0.05 | 0.08$^{**}$ | 0.38 | 0.87$^{**}$ | −413.2 | 390 |
| | (3.02) | (4.73) | (7.53) | (6.02) | (2.10) | (6.45) | (0.87) | (4.91) | | |
| Chile | 1.21$^{***}$ | −1.28$^{***}$ | 0.10$^{*}$ | 0.21$^{*}$ | 0.01 | −0.04$^{***}$ | 1.50$^{***}$ | 0.30 | −175.2 | 382 |
| | (10.80) | (9.25) | (2.90) | (3.82) | (0.51) | (6.80) | (22.91) | (1.29) | | |
| China | −1.42$^{***}$ | −0.38 | 0.06$^{***}$ | 0.17 | −0.04$^{***}$ | 0.06$^{***}$ | 3.54$^{***}$ | 0.87$^{***}$ | −919.0 | 1,294 |
| | (10.70) | (2.36) | (20.16) | (2.17) | (15.72) | (9.31) | (122.52) | (32.12) | | |
| Denmark | 0.34 | −2.83$^{***}$ | 0.01 | −0.09 | −0.05$^{***}$ | 0.01 | 0.90$^{***}$ | 0.02 | −311.0 | 521 |
| | (1.50) | (33.20) | (0.43) | (1.19) | (16.74) | (0.81) | (12.76) | (0.01) | | |
| Finland | −0.03 | −2.25$^{***}$ | 0.09$^{***}$ | 0.17$^{*}$ | 0.01 | 0.03$^{**}$ | 1.04$^{***}$ | −0.25 | −408.9 | 603 |
| | (0.01) | (25.64) | (11.79) | (3.16) | (0.45) | (5.21) | (14.07) | (2.06) | | |
| Greece | 0.40 | −0.82$^{**}$ | 0.02 | 0.31$^{**}$ | −0.03$^{**}$ | −0.01 | 1.58$^{***}$ | 0.56$^{**}$ | −225.8 | 338 |
| | (0.68) | (4.57) | (1.38) | (4.73) | (4.97) | (0.17) | (15.84) | (4.06) | | |
| Hong Kong | −0.97$^{***}$ | −2.08$^{***}$ | 0.03$^{***}$ | −0.06 | −0.03$^{***}$ | 0.07$^{***}$ | 2.21$^{***}$ | 0.22$^{***}$ | −1,648.9 | 2,909 |
| | (37.57) | (266.70) | (26.57) | (1.01) | (15.28) | (91.72) | (319.16) | (8.10) | | |
| India | 0.44$^{***}$ | −1.30$^{***}$ | −0.01 | 0.07 | 0.02$^{***}$ | −0.01 | 0.55$^{***}$ | −0.02 | −204.1 | 865 |
| | (7.65) | (78.63) | (1.94) | (1.77) | (15.74) | (1.53) | (16.34) | (0.05) | | |
| Indonesia | −0.48$^{**}$ | −0.95$^{***}$ | 0.11$^{***}$ | 0.18$^{**}$ | 0.03$^{***}$ | 0.02 | 1.49$^{***}$ | 0.85$^{***}$ | −485.3 | 951 |
| | (4.46) | (31.22) | (55.49) | (4.06) | (10.36) | (1.85) | (86.88) | (46.20) | | |
| Ireland | 0.43 | −2.07$^{***}$ | 0.08$^{*}$ | −0.03 | 0.00 | 0.00 | 0.29 | −0.24 | −92.0 | 253 |
| | (1.44) | (15.19) | (3.12) | (0.06) | (0.05) | (0.00) | (0.72) | (1.91) | | |
| Korea | −0.27 | −1.96$^{***}$ | 0.03$^{***}$ | 0.16$^{**}$ | −0.02 | 0.03$^{***}$ | 1.39$^{***}$ | −0.04 | −711.5 | 1,265 |
| | (1.45) | (121.68) | (19.61) | (4.44) | (1.62) | (6.98) | (55.61) | (0.08) | | |
| Malaysia | −0.69$^{***}$ | −1.63$^{***}$ | 0.00 | 0.37$^{***}$ | 0.00 | 0.04$^{***}$ | 1.54$^{***}$ | 0.32$^{***}$ | −2,109.3 | 3,193 |
| | (27.24) | (165.12) | (0.61) | (66.82) | (0.16) | (42.13) | (148.02) | (19.32) | | |
| Netherlands | −0.22 | −1.03$^{***}$ | −0.02$^{**}$ | −0.02 | −0.02$^{***}$ | 0.02$^{***}$ | 1.17$^{***}$ | 0.15 | −110.0 | 510 |
| | (1.35) | (9.64) | (5.64) | (0.11) | (15.84) | (8.81) | (36.80) | (1.77) | | |
| New Zealand | 1.31$^{***}$ | −6.13$^{***}$ | 0.01 | −0.30$^{**}$ | 0.04$^{**}$ | −0.02 | 1.25$^{***}$ | −0.68$^{**}$ | −163.3 | 278 |
| | (7.26) | (35.85) | (0.17) | (6.55) | (4.04) | (0.39) | (10.22) | (5.45) | | |
| Norway | 0.04 | −3.53$^{***}$ | −0.02$^{*}$ | 0.31$^{**}$ | 0.03$^{*}$ | 0.00 | 1.93$^{***}$ | 0.29 | −331.3 | 469 |
| | (0.01) | (31.90) | (2.99) | (4.57) | (2.88) | (0.02) | (32.92) | (1.43) | | |
| Philippines | −0.57 | −2.13$^{***}$ | 0.04 | −0.01 | 0.07$^{**}$ | 0.02 | 0.81$^{**}$ | 2.18$^{***}$ | −218.7 | 374 |
| | (0.92) | (18.46) | (1.19) | (0.00) | (5.07) | (0.56) | (5.07) | (34.88) | | |
| Portugal | −0.44 | −0.54 | 0.12$^{**}$ | −0.13 | 0.00 | 0.03 | 2.64$^{***}$ | −0.30 | −124.8 | 178 |
| | (0.46) | (0.35) | (4.40) | (0.55) | (0.01) | (1.35) | (10.58) | (0.20) | | |
| Singapore | −0.67$^{***}$ | −1.52$^{***}$ | 0.01$^{*}$ | 0.20$^{***}$ | −0.06$^{***}$ | 0.05$^{***}$ | 2.31$^{***}$ | 0.31$^{***}$ | −1,217.7 | 1,871 |
| | (14.10) | (81.52) | (2.94) | (9.46) | (34.33) | (33.15) | (186.31) | (9.95) | | |
| South Africa | −0.53$^{**}$ | −1.27$^{***}$ | 0.13$^{***}$ | 0.11$^{**}$ | 0.02$^{***}$ | 0.04$^{***}$ | 0.48$^{***}$ | 0.21$^{*}$ | −352.8 | 850 |
| | (6.00) | (28.76) | (29.95) | (4.42) | (10.07) | (13.49) | (12.65) | (3.26) | | |
| Spain | −0.60$^{**}$ | −2.67$^{***}$ | 0.06$^{*}$ | 0.13$^{*}$ | 0.00 | 0.04$^{***}$ | 1.86$^{***}$ | −0.06 | −259.4 | 516 |
| | (4.30) | (35.83) | (2.90) | (2.76) | (0.14) | (10.57) | (30.46) | (0.09) | | |
| Sweden | −0.23 | −2.99$^{***}$ | 0.19$^{***}$ | 0.25$^{***}$ | 0.00 | 0.03$^{***}$ | 0.54$^{***}$ | 0.12 | −511.9 | 932 |
| | (1.06) | (64.90) | (21.09) | (11.97) | (0.16) | (10.10) | (6.78) | (0.87) | | |
| Switzerland | −0.03 | −2.37$^{***}$ | 0.06$^{***}$ | 0.04 | −0.01$^{*}$ | 0.02$^{*}$ | 1.11$^{***}$ | 0.02 | −488.2 | 977 |
| | (0.02) | (65.48) | (11.96) | (0.43) | (3.23) | (3.84) | (27.75) | (0.02) | | |
| Taiwan | 0.02 | −2.48$^{***}$ | 0.03$^{***}$ | 0.37$^{***}$ | −0.05$^{***}$ | 0.02 | 2.63$^{***}$ | 0.43$^{***}$ | −1,046.2 | 1,700 |
| | (0.00) | (155.10) | (7.40) | (21.31) | (14.49) | (2.13) | (188.91) | (14.34) | | |
| Thailand | 1.42$^{***}$ | −2.89$^{***}$ | 0.01 | −0.05 | 0.00 | −0.05$^{***}$ | 1.65$^{***}$ | 0.93$^{***}$ | −914.3 | 1,345 |
| | (41.36) | (204.90) | (0.91) | (0.60) | (0.03) | (20.09) | (95.56) | (40.75) | | |
| Turkey | −1.52$^{***}$ | −0.91$^{**}$ | 0.49$^{***}$ | −0.39$^{**}$ | 0.04$^{***}$ | 0.08$^{***}$ | 1.72$^{***}$ | 0.70$^{***}$ | −652.9 | 795 |
| | (10.16) | (4.43) | (48.47) | (5.18) | (6.80) | (12.10) | (28.13) | (7.18) | | |

In summary, our key finding that cash-flow uncertainty has a substantial influence on the amount of payouts remains unchanged when we incorporate share repurchases into our payout measure. Our results suggest that cash-flow uncertainty is a dominant cross-sectional determinant of total payouts as well as dividends.

### 4.6. *Predictive power of cash-flow uncertainty for changes in dividend policy*

In our next analysis, we examine whether SRVOL predicts a firm's decision to initiate or omit dividends in the subsequent year. Assessing the predictive power of

**Table 7**
Tobit regressions to explain the total payout ratio.

The table reports Tobit regression results on total payout over the period 1994–2005. Each reported number is the average of the 12 regression coefficients over the 12-year sample period. The dependent variable is the total payout-to-earnings ratio (TOTALP/E). The explanatory variables are: (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Tobit coefficients and test the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (two-tailed significance at the 10% level) with the predicted sign. *N* is the average number of observations.

| | Intercept | SRVOL | | RE/TE | | OWN | | MBR | | Log(TA) | | ROA | | CASH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] |
| Australia | −0.44 | −4.03 | 12 | 0.27 | 11 | −0.24 | 8 | 0.00 | 6 | 0.07 | 11 | 1.48 | 10 | −0.28 | 4 |
| (*N* = 184) | (−1.15) | (−6.18) | [9] | (2.84) | [6] | (−1.73) | [3] | (0.29) | [0] | (3.70) | [8] | (2.98) | [8] | (−1.14) | [0] |
| Canada | −2.13 | −4.72 | 10 | 0.24 | 9 | 0.07 | 3 | −0.01 | 7 | 0.13 | 10 | 0.87 | 10 | 0.46 | 10 |
| (*N* = 78) | (−2.02) | (−2.42) | [7] | (1.86) | [3] | (0.40) | [1] | (−0.35) | [0] | (3.00) | [4] | (2.01) | [3] | (2.56) | [0] |
| France | −0.24 | −3.72 | 12 | −0.01 | 6 | 0.01 | 5 | −0.01 | 7 | 0.04 | 12 | 0.19 | 9 | 0.17 | 9 |
| (*N* = 148) | (−1.26) | (−8.91) | [9] | (−1.05) | [0] | (0.12) | [1] | (−1.15) | [0] | (5.32) | [6] | (2.63) | [2] | (1.42) | [3] |
| Germany | 0.31 | −3.49 | 12 | 0.34 | 12 | 0.11 | 2 | −0.02 | 9 | 0.01 | 7 | 0.82 | 10 | 0.07 | 7 |
| (*N* = 153) | (0.95) | (−7.92) | [7] | (3.59) | [7] | (1.60) | [1] | (−1.07) | [1] | (0.69) | [1] | (2.66) | [3] | (0.33) | [3] |
| Japan | 1.29 | −2.10 | 12 | 0.29 | 12 | −0.34 | 12 | −0.02 | 7 | −0.02 | 2 | −2.70 | 2 | 0.09 | 8 |
| (*N* = 689) | (7.01) | (−6.53) | [7] | (6.27) | [10] | (−5.67) | [2] | (−1.71) | [4] | (−2.15) | [0] | (−3.15) | [0] | (0.96) | [2] |
| UK | −0.49 | −2.74 | 12 | 0.10 | 10 | 0.05 | 5 | 0.01 | 5 | 0.06 | 12 | 1.34 | 12 | −0.40 | 1 |
| (*N* = 394) | (−4.05) | (−6.29) | [10] | (4.12) | [8] | (0.87) | [0] | (1.17) | [0] | (9.31) | [9] | (7.66) | [11] | (−3.43) | [0] |
| US | −0.97 | −6.27 | 12 | 0.04 | 12 | −0.03 | 7 | 0.00 | 4 | 0.09 | 12 | 0.48 | 12 | 0.18 | 10 |
| (*N* = 1,367) | (−4.94) | (−20.99) | [12] | (9.38) | [9] | (−0.42) | [2] | (0.10) | [2] | (11.07) | [12] | (14.80) | [12] | (2.92) | [4] |

SRVOL over changes in dividend policy can address one concern that arises from our use of SRVOL as a proxy of cash-flow uncertainty. There is a question of whether SRVOL reflects outsiders' perceptions of cash-flow uncertainty, rather than managers' perceptions of cash-flow uncertainty.[23] On the other hand, if SRVOL is an appropriate proxy for the cash-flow uncertainty faced by managers, then we should observe that firms with low (high) SRVOL initiate (omit) dividends in the subsequent year. Such an observation would be consistent with the hypothesis that managers initiate (omit) dividends if they are more (less) confident in cash flow stability. In other words, it would imply that managers incorporate cash-flow uncertainty into their dividend decisions.

In this analysis, we choose firms that initiate or omit dividends over the 1994–2005 period. Dividend-initiating firms are those that do not pay dividends in year $t-1$, but that pay dividends in year $t$ (i.e., $DV(t)>0$, $DV(t-1)=0$). Dividend-omitting firms are those that pay dividends in year $t-1$, but that do not pay dividends in year $t$ (i.e., $DV(t)=0$, $DV(t-1)>0$). For comparison, we choose two more groups of firms, which are those firms that continue to not pay dividends (i.e., $DV(t)=0$, $DV(t-1)=0$), and those firms that continue to pay dividends (i.e., $DV(t)>0$, $DV(t-1)>0$).

For each of the seven sample countries, Table 9 reports the mean and median values of lagged SRVOL (SRVOL_L) for dividend-initiating and dividend-omitting firms along with their comparison firms. Lagged SRVOL is the standard deviation of monthly stock returns over two years, $t-1$ and $t-2$. The figures in the first panel suggest that, across countries, dividend-initiating firms display low lagged SRVOL, as compared to those firms that continue to not pay dividends. On the other hand, the second panel shows that dividend-omitting firms display high lagged SRVOL, as compared to those firms that continue to pay dividends. For example, in the U.S., the mean and median values of SRVOL_L for dividend-initiating firms (15.4% and 13.8%, respectively) are less than the corresponding values for those firms that continue to not pay dividends (21.7% and 18.1%, respectively). In the same country, the mean and median values of SRVOL_L for dividend-omitting firms (14.7% and 13.2%, respectively) are greater than the corresponding values for

[23] We thank the anonymous referee for pointing out this concern to us. A related issue is the possibility that dividend policy itself can affect SRVOL. To elaborate, a firm's decision on the amount of dividend payouts conveys a positive or negative outlook about the stability of the firm's future profitability and thus can cause the firm's stock price to become less or more volatile. To account for this possibility of reverse causality, we run Tobit regressions using an instrumental variable for stock return volatility. The instrument we use is lagged SRVOL (SRVOL_L), which is the standard deviation of monthly stock returns over two years, $t-1$ and $t-2$. This lagged volatility is not affected by a firm's current-year dividend policy, because current-year stock returns are not included in the calculation of lagged SRVOL. The results of Tobit regressions suggest that lagged SRVOL enter negatively and significantly across countries. Thus, evidence suggests that our main result—the importance of cash-flow uncertainty in dividend policy—is not necessarily driven by the reverse causality. Results of this analysis are available upon request.

**Table 8**
Stock return volatility (SRVOL) by payout policy.

The table reports key statistics of stock return volatility (SRVOL) by payout policy for seven major countries for the period 1994–2005. SRVOL is stock return volatility measured by the standard deviation of two-year monthly stock returns. In each year, a firm is divided into four categories according to its payout policy: (A) a policy that makes no payout (DV = 0,REP = 0); (B) a policy that distributes cash only through dividends (DV > 0, REP = 0); (C) a policy that distributes cash only through share repurchases (DV = 0, REP > 0); and (D) a policy that uses both dividends and share repurchases (DV > 0, REP > 0). *N* is the number of firm-year observations that belong to each category.

| Country | Policy type | *N* | Mean | (St. dev.) | Median |
|---|---|---|---|---|---|
| *Australia* | | | | | |
| | (A) DV = 0, REP = 0 | 921 | 0.212 | (0.099) | 0.189 |
| | (B) DV > 0, REP = 0 | 1,172 | 0.094 | (0.048) | 0.083 |
| | (C) DV = 0, REP > 0 | 46 | 0.176 | (0.060) | 0.162 |
| | (D) DV > 0, REP > 0 | 184 | 0.090 | (0.044) | 0.076 |
| *Canada* | | | | | |
| | (A) DV = 0, REP = 0 | 911 | 0.192 | (0.094) | 0.169 |
| | (B) DV > 0, REP = 0 | 512 | 0.086 | (0.041) | 0.078 |
| | (C) DV = 0, REP > 0 | 212 | 0.150 | (0.077) | 0.130 |
| | (D) DV > 0, REP > 0 | 209 | 0.084 | (0.035) | 0.078 |
| *France* | | | | | |
| | (A) DV = 0, REP = 0 | 512 | 0.172 | (0.089) | 0.154 |
| | (B) DV > 0, REP = 0 | 1,236 | 0.100 | (0.045) | 0.089 |
| | (C) DV = 0, REP > 0 | 52 | 0.167 | (0.069) | 0.162 |
| | (D) DV > 0, REP > 0 | 232 | 0.087 | (0.040) | 0.077 |
| *Germany* | | | | | |
| | (A) DV = 0, REP = 0 | 708 | 0.184 | (0.095) | 0.164 |
| | (B) DV > 0, REP = 0 | 1,194 | 0.096 | (0.048) | 0.088 |
| | (C) DV = 0, REP > 0 | 76 | 0.193 | (0.086) | 0.185 |
| | (D) DV > 0, REP > 0 | 148 | 0.116 | (0.048) | 0.099 |
| *Japan* | | | | | |
| | (A) DV = 0, REP = 0 | 780 | 0.151 | (0.061) | 0.140 |
| | (B) DV > 0, REP = 0 | 3,949 | 0.107 | (0.048) | 0.098 |
| | (C) DV = 0, REP > 0 | 422 | 0.150 | (0.071) | 0.137 |
| | (D) DV > 0, REP > 0 | 4,463 | 0.103 | (0.050) | 0.093 |
| *UK* | | | | | |
| | (A) DV = 0, REP = 0 | 1,386 | 0.202 | (0.089) | 0.184 |
| | (B) DV > 0, REP = 0 | 3,273 | 0.112 | (0.056) | 0.100 |
| | (C) DV = 0, REP > 0 | 75 | 0.155 | (0.068) | 0.144 |
| | (D) DV > 0, REP > 0 | 507 | 0.095 | (0.036) | 0.090 |
| *US* | | | | | |
| | (A) DV = 0, REP = 0 | 9,043 | 0.224 | (0.114) | 0.195 |
| | (B) DV > 0, REP = 0 | 2,302 | 0.106 | (0.050) | 0.096 |
| | (C) DV = 0, REP > 0 | 4,005 | 0.173 | (0.092) | 0.150 |
| | (D) DV > 0, REP > 0 | 3,159 | 0.095 | (0.043) | 0.087 |

**Table 9**
Lagged stock return volatility (SRVOL_L) for dividend initiating and omitting firms.

The table reports key statistics of lagged stock return volatility (SRVOL_L) for dividend initiating and omitting firm-years for seven major countries over the period 1994–2005. In Panel A, dividend initiating firm-years are those in which firms do not pay dividends in year $t-1$, but pay in year $t-1$ (i.e., DV($t$) > 0, DV($t-1$) = 0). Comparison firm-years are those in which firms continue not paying dividends (i.e., DV($t$) = 0, DV($t-1$) = 0). In Panel B, dividend-omitting firm-years are those in which firms pay dividends in year $t-1$, but do not pay in year $t$ (i.e., DV($t$) = 0, DV($t-1$) > 0). Comparison firm-years are those in which firms continue to pay dividends (i.e., DV($t$) > 0, DV($t-1$) > 0). Lagged SRVOL is stock return volatility measured by the standard deviation of monthly stock returns over two years, $t-1$ and $t-2$. *N* is the number of firm-year observations that belong to each category of firms.

| Country | Dividend Policy | *N* | Mean | (St. dev.) | Median |
|---|---|---|---|---|---|
| *Panel A: Dividend initiating firm-years vs. comparison firm-years* | | | | | |
| Australia | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 97 | 0.175 | (0.107) | 0.147 |
| | DV($t$) = 0, DV($t-1$) = 0 | 690 | 0.220 | (0.120) | 0.187 |
| Canada | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 77 | 0.126 | (0.056) | 0.115 |
| | DV($t$) = 0, DV($t-1$) = 0 | 1,408 | 0.197 | (0.108) | 0.173 |
| France | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 107 | 0.138 | (0.065) | 0.117 |
| | DV($t$) = 0, DV($t-1$) = 0 | 715 | 0.184 | (0.095) | 0.164 |
| Germany | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 165 | 0.132 | (0.075) | 0.109 |
| | DV($t$) = 0, DV($t-1$) = 0 | 1,128 | 0.182 | (0.099) | 0.163 |
| Japan | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 748 | 0.143 | (0.062) | 0.132 |
| | DV($t$) = 0, DV($t-1$) = 0 | 3,025 | 0.160 | (0.081) | 0.141 |
| UK | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 148 | 0.175 | (0.084) | 0.160 |
| | DV($t$) = 0, DV($t-1$) = 0 | 1,243 | 0.207 | (0.103) | 0.185 |
| US | | | | | |
| | DV($t$) > 0, DV($t-1$) = 0 | 296 | 0.154 | (0.097) | 0.138 |
| | DV($t$) = 0, DV($t-1$) = 0 | 13,066 | 0.217 | (0.133) | 0.181 |
| *Panel B: Dividend omitting firm-years* vs. *comparison firm-years* | | | | | |
| Australia | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 68 | 0.137 | (0.088) | 0.112 |
| | DV($t$) > 0, DV($t-1$) > 0 | 1,311 | 0.091 | (0.053) | 0.079 |
| Canada | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 42 | 0.135 | (0.052) | 0.118 |
| | DV($t$) > 0, DV($t-1$) > 0 | 936 | 0.082 | (0.036) | 0.075 |
| France | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 126 | 0.123 | (0.051) | 0.109 |
| | DV($t$) > 0, DV($t-1$) > 0 | 2,162 | 0.101 | (0.044) | 0.090 |
| Germany | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 198 | 0.112 | (0.069) | 0.092 |
| | DV($t$) > 0, DV($t-1$) > 0 | 1,900 | 0.092 | (0.044) | 0.084 |
| Japan | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 845 | 0.135 | (0.063) | 0.124 |
| | DV($t$) > 0, DV($t-1$) > 0 | 21,188 | 0.110 | (0.050) | 0.102 |
| UK | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 180 | 0.155 | (0.067) | 0.141 |
| | DV($t$) > 0, DV($t-1$) > 0 | 4,959 | 0.106 | (0.052) | 0.095 |
| US | | | | | |
| | DV($t$) = 0, DV($t-1$) > 0 | 175 | 0.147 | (0.071) | 0.132 |
| | DV($t$) > 0, DV($t-1$) > 0 | 6,837 | 0.097 | (0.042) | 0.089 |

those firms that continue to pay dividends (9.7% and 8.9%, respectively).

Next, we estimate a Logit regression model to examine whether lagged SRVOL predicts a change in dividend policy, after controlling for other potential determinants of dividend policy changes. To construct the dependent variable in this Logit regression model, we use a zero-one indicator variable that represents a firm's decision to initiate or omit dividends in year $t$. The key explanatory variable is lagged SRVOL (SRVOL_L). The other explanatory variables are the lagged values (i.e., year $t-1$ values) of RE/TE, OWN, MBR, Log(TA), ROA, and CASH.

Panel A of Table 10 reports the results of Logit regressions on firms' decisions to initiate dividends for seven major countries. These Logit regressions include firm-years in which firms initiate dividends as well as firms-years in which firms continue to not pay dividends. The results show that the coefficient for SRVOL_L is negative in all seven countries. In four countries—France, Germany, Japan, and the U.S.—the coefficient is significant as well. The bottom row of Panel A reports the results when we pool observations from all seven countries and control for country-specific effects. SRVOL_L enters negatively and significantly in this pooled regression. Overall, the results suggest that the impact of SRVOL on a firm's decision to initiate dividends in the following year is negative and significant.

Panel B of Table 10 reports Logit regression results on firms' decisions to omit dividends. These regressions include firm-years in which firms omit dividends as well as firm-years in which firms continue to pay dividends. The results show that the coefficient for SRVOL_L is positive and significant in all seven sample countries. The bottom row of Panel B shows that the coefficient for SRVOL_L is positive and significant in the regression for which we pool observations from all seven countries and control for country-specific effects. Thus, in all seven countries, the impact of SRVOL on a firm's decision to omit dividends in the subsequent year is positive and significant.

In summary, SRVOL has a considerable predictive power over the likelihood that a firm initiates or omits

**Table 10**

Logit regressions to explain the ability of the lagged stock return volatility (SRVOL_L) to predict dividend initiations/omissions.

The table reports Logit regression results on the likelihood of dividend initiations or omissions over the period 1994–2005. In Panel A, the dependent variable is the log odd of initiating dividends. To construct this dependent variable, we assign one to the dividend-initiating firm-years (i.e., those firm-years in which firms do not pay dividends in year $t-1$ but pay dividends in year $t$), and zero to those firm-years in which firms do not pay dividends in years $t$ and $t-1$. In Panel B, the dependent variable is the log odd of omitting dividends. To construct this dependent variable, we assign one to the dividend-omitting firm-years (i.e., those firm-years in which firms pay dividends in year $t-1$ but do not pay dividends in year $t$), and zero to those firm-years in which firms pay dividends in both years $t$ and $t-1$. The key explanatory variable is the lagged value of stock return volatility (i.e., the standard deviation of monthly stock returns over two years, $t-1$ and $t-2$). Other explanatory variables are the lagged values (i.e., year $t-1$ values) of RE/TE, OWN, MBR, Log(TA), ROA, and CASH. The last rows of each panel are the results on the pooled sample of all firm-years from the seven sample countries. To control for country-specific effects in this pooled regression, we subtract the actual observations of explanatory variables from their respective country means before running the regression. The numbers in parentheses are $\chi^2$ statistics for the regression coefficient. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

| Country | Intercept | SRVOL_L | RE/TE_L | OWN_L | MBR_L | Log(TA) _L | ROA_L | CASH_L | Pseudo $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| *Panel A: Likelihood of initiating dividends* | | | | | | | | | |
| Australia | −5.79*** | −0.60 | 0.07 | 1.04** | 0.01 | 0.23*** | 2.02*** | −0.55 | 0.087 |
| ($N = 733$) | (11.61) | (0.24) | (1.61) | (5.47) | (0.02) | (6.73) | (9.45) | (0.56) | |
| Canada | −8.01** | −2.97 | 0.37 | 0.47 | −0.07 | 0.30* | 4.84* | −0.94 | 0.067 |
| ($N = 466$) | (6.19) | (0.59) | (0.68) | (0.30) | (0.43) | (3.82) | (3.54) | (0.55) | |
| France | −5.55*** | −5.02** | 1.12* | 0.71 | −0.14** | 0.23*** | 4.24** | 0.52 | 0.090 |
| ($N = 619$) | (11.71) | (6.34) | (3.67) | (1.36) | (4.40) | (8.65) | (4.12) | (0.17) | |
| Germany | −6.02*** | −7.19*** | 0.30*** | 0.39 | 0.04 | 0.26*** | 5.23*** | 1.92*** | 0.120 |
| ($N = 845$) | (17.23) | (15.21) | (6.95) | (0.71) | (1.31) | (14.37) | (17.36) | (9.10) | |
| Japan | −4.44*** | −2.70*** | 0.50*** | −0.86** | −0.02 | 0.19*** | 0.57 | 0.37 | 0.051 |
| (N = 2,537) | (22.68) | (6.94) | (28.23) | (5.25) | (0.32) | (22.17) | (0.39) | (0.40) | |
| UK | −2.69** | −1.60 | 0.11** | 1.15*** | −0.01 | 0.05 | 2.84*** | −0.98* | 0.061 |
| ($N = 1,350$) | (5.05) | (1.90) | (4.86) | (6.75) | (0.08) | (0.81) | (19.89) | (3.70) | |
| US | −6.95*** | −3.92*** | 0.11 | 1.04*** | −0.06** | 0.17*** | 4.41*** | 0.67** | 0.107 |
| ($N = 11,954$) | (63.24) | (16.74) | (2.68) | (13.48) | (6.25) | (17.84) | (39.61) | (3.96) | |
| All obs. | 0.00*** | −1.63*** | 0.27*** | 0.93*** | 0.07*** | 0.06*** | −3.56*** | −0.43*** | 0.136 |
| ($N = 18,504$) | (0.00) | (100.41) | (730.95) | (148.59) | (195.92) | (33.73) | (1614.12) | (27.98) | |
| *Panel B: Likelihood of omitting dividends* | | | | | | | | | |
| Australia | 4.50** | 3.83*** | −0.16 | 0.36 | −0.32** | −0.36*** | −8.20*** | 1.91* | 0.058 |
| ($N = 1,348$) | (5.28) | (6.97) | (1.13) | (0.48) | (3.94) | (13.57) | (16.76) | (3.39) | |
| Canada | 7.52 | 27.39*** | −0.69 | 1.88 | 0.06 | −0.70** | −11.75*** | 0.01 | 0.108 |
| ($N = 432$) | (1.24) | (13.28) | (0.48) | (1.50) | (0.09) | (4.97) | (7.40) | (0.00) | |
| France | 2.09 | 7.12*** | −0.82 | 0.54 | −0.07 | −0.25*** | −6.53*** | −2.95** | 0.036 |
| ($N = 1,852$) | (2.15) | (13.12) | (1.21) | (0.93) | (0.85) | (14.79) | (7.68) | (6.48) | |
| Germany | 2.92** | 5.10*** | −0.13 | −0.25 | −0.04 | −0.25*** | −5.18*** | −1.49 | 0.033 |
| ($N = 1,773$) | (5.27) | (8.83) | (0.47) | (0.37) | (0.44) | (17.93) | (10.30) | (2.67) | |
| Japan | 0.38 | 7.02*** | −2.07*** | −0.25 | −0.14*** | −0.12*** | −15.18*** | −2.72*** | 0.046 |
| ($N = 17,100$) | (0.19) | (81.49) | (168.25) | (0.59) | (15.43) | (9.65) | (240.82) | (30.57) | |
| UK | 0.50 | 6.63*** | −0.28*** | 0.72* | −0.20*** | −0.21*** | −3.90*** | −1.35* | 0.045 |
| ($N = 5,077$) | (0.19) | (38.32) | (11.08) | (2.83) | (12.26) | (14.44) | (45.30) | (3.68) | |
| US | 0.63 | 10.29*** | −0.15 | 0.11 | −0.29*** | −0.20*** | −10.93*** | −1.31* | 0.054 |
| ($N = 6,633$) | (0.29) | (53.60) | (1.11) | (0.07) | (11.62) | (13.57) | (145.22) | (2.88) | |
| All obs. | 0.00*** | 3.40*** | −1.35*** | −0.69*** | 0.02 | −0.70*** | −9.93*** | 0.21 | 0.504 |
| ($N = 34,215$) | (0.00) | (107.49) | (772.39) | (37.72) | (2.55) | (2410.26) | (1015.42) | (2.24) | |

dividends in the following year. Our results suggest that firms with relatively predictable cash flows are more likely to initiate dividends, while firms with relatively unpredictable cash flows are more likely to omit dividends. These results are consistent with the hypothesis that managers incorporate cash-flow uncertainty into their dividend decisions.

### 4.7. Alternative proxy for cash-flow uncertainty

In our study, we use SRVOL as a primary proxy for cash-flow uncertainty. On the other hand, many prior studies use profit volatility—such as the standard deviation of operating profitability over four or five years—as a proxy for cash-flow uncertainty (see, e.g., Jagannathan, Stephens, and Weisbach, 2000; Guay and Harford, 2000; Jensen, Solberg, and Zorn, 1992; Crutchley and Hansen, 1989). Our choice of SRVOL as a primary proxy for cash-flow uncertainty is motivated by a desire to maximize the number of usable observations for year-by-year regressions across countries. Computation of SRVOL requires only two years of observations. In our international study, using a profit volatility measure that requires at least four or five years of observations can substantially reduce the number of usable observations for many individual years in several countries.

We examine whether profit volatility has a substantial influence on the amount of dividends. Table 11 reports Tobit regression results using the volatility of operating

**Table 11**
Tobit regressions to explain the dividend payout ratio with ROAVOL as a measure for cash-flow uncertainty.

The table reports Tobit regression results on dividend payout over the period 1994–2005. Each reported number is the average of the 12 regression coefficients over the 12-year sample period. The dependent variables in the first and second panels are DV/E, the dividend-to-earnings ratio, and DV/S, the dividend-to-sales ratio, respectively. The explanatory variables are: (i) ROAVOL, operating profitability volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Tobit coefficients and test the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (at the 10% level) with the predicted sign. *N* is the average annual number of observations.

| | Intercept | ROAVOL | | RE/TE | | OWN | | MBR | | Log(TA) | | ROA | | CASH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | # − [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | # − [# sig] | coef (*t*-stat) | # − [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] |
| *Panel A: DV/E as the dependent variable* | | | | | | | | | | | | | | | |
| Australia | −0.33 | −1.38 | 9 | 0.23 | 11 | −0.26 | 10 | −0.02 | 9 | 0.05 | 9 | 1.92 | 10 | −0.36 | 1 |
| (*N* = 134.8) | (−0.92) | (−2.13) | [8] | (2.93) | [6] | (−2.55) | [4] | (−1.32) | [1] | (2.85) | [5] | (4.17) | [9] | (−2.16) | [0] |
| Canada | −2.28 | −2.23 | 9 | 0.25 | 10 | 0.08 | 5 | −0.03 | 9 | 0.11 | 12 | 0.69 | 9 | −0.39 | 4 |
| (*N* = 76.5) | (−6.45) | (−2.57) | [4] | (2.81) | [2] | (0.69) | [0] | (−1.12) | [2] | (5.92) | [9] | (1.44) | [2] | (−1.07) | [2] |
| France | −0.46 | −2.49 | 12 | 0.00 | 5 | 0.34 | 3 | −0.04 | 12 | 0.03 | 12 | 2.29 | 12 | 0.04 | 6 |
| (*N* = 202.5) | (−3.68) | (−8.98) | [10] | (−0.39) | [1] | (1.71) | [0] | (−4.49) | [7] | (5.12) | [6] | (12.72) | [12] | (0.27) | [2] |
| Germany | −0.04 | −3.32 | 12 | 0.21 | 12 | 0.34 | 0 | −0.04 | 10 | 0.01 | 7 | 2.08 | 12 | −0.02 | 6 |
| (*N* = 206.7) | (−0.22) | (−8.07) | [12] | (3.69) | [6] | (8.00) | [0] | (−4.46) | [6] | (0.95) | [2] | (8.83) | [10] | (−0.22) | [0] |
| Japan | 0.50 | −4.81 | 12 | 0.30 | 12 | −0.20 | 11 | −0.03 | 9 | 0.00 | 5 | −1.18 | 3 | −0.13 | 3 |
| (*N* = 1,272.8) | (4.66) | (−5.85) | [12] | (7.94) | [12] | (−4.04) | [6] | (−3.56) | [6] | (0.66) | [1] | (−2.55) | [1] | (−2.04) | [2] |
| UK | −0.40 | −1.44 | 12 | 0.08 | 10 | −0.05 | 9 | 0.01 | 5 | 0.04 | 12 | 1.01 | 12 | −0.31 | 1 |
| (*N* = 472.4) | (−5.16) | (−12.89) | [12] | (4.09) | [8 | (−2.49) | [0] | (1.91) | [0] | (11.88) | [10] | (6.37) | [9] | (−4.16) | [0] |
| US | −2.34 | −2.55 | 12 | 0.00 | 4 | 0.00 | 11 | −0.01 | 11 | 0.11 | 12 | 1.33 | 12 | −0.46 | 0 |
| (*N* = 1,313.9) | (−11.84) | (−10.98) | [12] | (0.50) | [2] | (−2.81) | [2] | (−4.53) | [4] | (15.24) | [12] | (6.07) | [10] | (−8.12) | [0] |
| *Panel B: DV/S as the dependent variable* | | | | | | | | | | | | | | | |
| Australia | −0.11 | −0.08 | 10 | 0.01 | 10 | 0.01 | 3 | 0.00 | 3 | 0.01 | 12 | 0.21 | 12 | −0.02 | 4 |
| (*N* = 139.8) | (−11.44) | (−2.78) | [6] | (2.22) | [5] | (2.86) | [0] | (3.24) | [0] | (15.66) | [11] | (12.86) | [11] | (−1.23) | [0] |
| Canada | −0.14 | −0.07 | 9 | 0.02 | 10 | −0.00 | 6 | 0.00 | 4 | 0.01 | 12 | 0.08 | 10 | −0.01 | 7 |
| (*N* = 79.5) | (−8.41) | (−1.54) | [4] | (3.97) | [3] | (−0.45) | [1] | (1.28) | [0] | (7.57) | [9] | (2.95) | [4] | (−0.47) | [1] |
| France | −0.04 | −0.03 | 11 | 0.00 | 6 | 0.00 | 3 | 0.00 | 9 | 0.00 | 12 | 0.18 | 12 | 0.02 | 12 |
| (*N* = 211.1) | (−13.81) | (−1.98) | [4] | (0.98) | [0] | (2.36) | [0] | (−2.16) | [0] | (9.88) | [9] | (21.24) | [12] | (3.61) | [3] |
| Germany | −0.02 | −0.09 | 12 | 0.00 | 5 | 0.02 | 0 | 0.00 | 8 | 0.00 | 9 | 0.14 | 12 | 0.03 | 12 |
| (*N* = 214.5) | (−3.14) | (−6.78) | [10] | (−0.05) | [2] | (10.68) | [0] | (−1.16) | [4] | (2.21) | [3] | (13.18) | [12] | (6.20) | [6] |
| Japan | 0.00 | 0.00 | 8 | 0.00 | 12 | −0.00 | 11 | 0.00 | 3 | 0.00 | 3 | 0.05 | 12 | 0.02 | 12 |
| (N = 1,425.7) | (3.02) | (−0.90) | [4] | (3.94) | [11] | (−7.40) | [9] | (1.43) | [2] | (−1.95) | [0] | (17.91) | [12] | (12.18) | [12] |
| UK | −0.04 | −0.03 | 12 | 0.00 | 12 | −0.00 | 8 | 0.00 | 0 | 0.00 | 12 | 0.08 | 12 | 0.01 | 9 |
| (*N* = 515.8) | (−10.29) | (−5.68) | [9] | (4.35) | [10] | (−0.77) | [0] | (3.64) | [0] | (16.66) | [12] | (9.15) | [12] | (1.88) | [1] |
| US | −0.12 | −0.09 | 12 | 0.00 | 7 | −0.00 | 9 | 0.00 | 4 | 0.01 | 12 | 0.08 | 12 | −0.01 | 1 |
| (*N* = 1,357.2) | (−31.95) | (−10.11) | [12] | (0.55) | [1] | (−2.00) | [0] | (2.10) | [0] | (48.27) | [12] | (14.78) | [12] | (−3.67) | [0] |

profitability (ROAVOL) as a proxy for cash-flow uncertainty, in place of the SRVOL. Overall, this alternative measure of cash-flow uncertainty has a negative and significant impact on the cross-sectional variation of dividends. When DV/E is the dividend payout measure, the average ROAVOL coefficient is negative and significant in all countries. Further, in all countries except for Canada, ROAVOL enters negatively and significantly in all or the majority of individual years over the 12-year sample period. When DV/S is the dividend payout measure, the average ROAVOL coefficient is negative in all countries and also significant in all but two countries. The ROAVOL coefficient is significantly negative in many individual years across countries. Thus, according to our results, use of ROAVOL as a measure of cash-flow variability adds to evidence that firms that face high (low) levels of cash-flow uncertainty tend to pay out less (more) dividends.

We also examine whether the future ROAVOL has an impact on the amount of current-year dividend payouts. The contention here is that, if managers correctly predict future profit variability, they will incorporate it into the current dividend decisions. If so, we should observe that firms with high (low) future profit variability pay low (high) dividends in the current year. We use four-year ahead ROAVOL (ROAVOL_4) as a measure of future profit variability. In essence, we use ROAVOL_4 as a proxy for

**Table 12**

Tobit regressions to explain the dividend payout ratio with four-year ahead operating profit volatility as a measure for cash-flow uncertainty.

The table reports Tobit regression results on dividend payout over the period 1990–2001. Each reported number is the average of the 12 regression coefficients over the 12-year sample period. The dependent variables in the first and second panels are DV/E, the dividend-to-earnings ratio, and DV/S, the dividend-to-sales ratio, respectively. The explanatory variables are: (i) ROAVOL_4, four-year ahead operating profitability volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. ROAVOL_4 is calculated as the standard deviation of operating profitability (ROA) over the next four years. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Tobit coefficients and tests the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (at the 10% level) with the predicted sign. *N* is the average annual number of observations.

| | Intercept | ROAVOL_4 | | RE/TE | | OWN | | MBR | | Log(TA) | | ROA | | CASH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #+ [# sig] |
| Panel A: DV/E as the dependent variable | | | | | | | | | | | | | | | |
| Australia | −0.50 | −0.96 | 11 | 0.28 | 11 | −0.31 | 11 | −0.01 | 8 | 0.05 | 11 | 2.13 | 12 | −0.66 | 2 |
| (*N* = 117.8) | (−2.70) | (−2.28) | [6] | (4.59) | [6] | (−4.49) | [5] | (−2.13) | [1] | (6.22) | [5] | (7.37) | [8] | (−4.10) | [0] |
| Canada | −2.17 | −3.54 | 11 | 0.48 | 12 | −0.16 | 6 | −0.04 | 7 | 0.12 | 11 | 0.98 | 9 | −1.49 | 2 |
| (*N* = 50.8) | (−3.15) | (−2.44) | [3] | (3.88) | [4] | (−0.88) | [1] | (−1.26) | [2] | (3.97) | [6] | (3.15) | [1] | (−2.99) | [0] |
| France | −0.32 | −1.31 | 9 | 0.00 | 7 | 0.03 | 6 | −0.05 | 11 | 0.03 | 10 | 1.78 | 11 | −0.09 | 5 |
| (*N* = 161.0) | (−1.63) | (−3.08) | [5] | (0.56) | [0] | (0.53) | [0] | (−3.80) | [6] | (3.15) | [4] | (6.22) | [9] | (−0.67) | [1] |
| Germany | 0.23 | −1.45 | 10 | 0.11 | 12 | 0.26 | 2 | −0.04 | 11 | 0.00 | 7 | 1.79 | 11 | −0.18 | 5 |
| (*N* = 177.3) | (1.03) | (−3.67) | [7] | (2.51) | [5] | (4.34) | [0] | (−4.96) | [6] | (0.27) | [1] | (6.43) | [10] | (−1.36) | [0] |
| Japan | 0.46 | −1.94 | 12 | 0.25 | 12 | −0.29 | 12 | −0.02 | 11 | 0.01 | 10 | −1.77 | 2 | −0.22 | 0 |
| (*N* = 1,370.3) | (5.20) | (−4.11) | [9] | (4.74) | [10] | (−9.13) | [10] | (−3.89) | [8] | (2.48) | [4] | (−4.97) | [0] | (−5.68) | [0] |
| UK | −0.52 | −0.52 | 9 | 0.04 | 10 | −0.10 | 9 | −0.02 | 9 | 0.05 | 12 | 1.34 | 12 | −0.35 | 0 |
| (*N* = 444.1) | (−6.16) | (−3.92) | [8] | (3.45) | [5] | (−2.87) | [1] | (−3.03) | [6] | (14.92) | [11] | (9.16) | [11] | (−4.16) | [0] |
| US | −2.76 | −2.10 | 12 | 0.01 | 8 | −0.20 | 12 | −0.03 | 12 | 0.14 | 12 | 1.46 | 12 | −0.51 | 0 |
| (*N* = 1,241.3) | (−22.44) | (−8.89) | [11] | (1.30) | [2] | (−7.04) | [6] | (−8.44) | [11] | (27.30) | [12] | (13.45) | [12] | (−11.03) | [0] |
| *Panel B: DV/S as the dependent variable* | | | | | | | | | | | | | | | |
| Australia | −0.09 | −0.04 | 10 | 0.01 | 11 | −0.00 | 5 | 0.00 | 3 | 0.01 | 12 | 0.21 | 12 | 0.01 | 8 |
| (*N* = 122.8) | (−9.72) | (−2.25) | [5] | (3.66) | [1] | (−0.10) | [0] | (2.20) | [0] | (11.58) | [9] | (21.08) | [11] | (0.78) | [0] |
| Canada | −0.13 | −0.15 | 9 | 0.01 | 9 | −0.01 | 7 | 0.00 | 6 | 0.01 | 12 | 0.09 | 9 | −0.03 | 4 |
| (*N* = 53.6) | (−7.46) | (−2.11) | [5] | (2.68) | [3] | (−1.53) | [5] | (0.51) | [1] | (8.19) | [9] | (2.84) | [4] | (−1.21) | [0] |
| France | −0.03 | 0.03 | 5 | −0.00 | 5 | 0.00 | 4 | −0.00 | 9 | 0.00 | 12 | 0.17 | 12 | 0.02 | 12 |
| (N = 167.0) | (−8.14) | (1.13) | [2] | (−1.31) | [0] | (0.62) | [0] | (−1.55) | [2] | (6.87) | [6] | (12.86) | [12] | (3.89) | [3] |
| Germany | 0.00 | −0.01 | 7 | −0.00 | 6 | 0.01 | 1 | −0.00 | 10 | −0.00 | 6 | 0.13 | 12 | 0.02 | 10 |
| (*N* = 184.5) | (0.17) | (−0.89) | [2] | (−0.46) | [1] | (4.60) | [0] | (−3.17) | [6] | (−0.76) | [1] | (13.43) | [12] | (3.93) | [7] |
| Japan | 0.01 | −0.01 | 7 | 0.00 | 11 | −0.00 | 12 | −0.00 | 9 | −0.00 | 4 | 0.04 | 12 | 0.01 | 12 |
| (*N* = 1,507.3) | (3.11) | (−1.08) | [6] | (3.28) | [8] | (−9.32) | [12] | (−2.85) | [8] | (−1.14) | [0] | (17.28) | [12] | (22.40) | [12] |
| UK | −0.04 | −0.01 | 10 | 0.00 | 12 | −0.00 | 7 | −0.00 | 7 | 0.00 | 12 | 0.11 | 12 | 0.00 | 7 |
| (*N* = 476.3) | (−11.92) | (−3.76) | [3] | (4.34) | [6] | (−1.59) | [0] | (−0.37) | [1] | (13.72) | [12] | (17.50) | [12] | (0.54) | [4] |
| US | −0.14 | −0.06 | 12 | 0.00 | 7 | −0.01 | 12 | −0.00 | 7 | 0.01 | 12 | 0.09 | 12 | −0.01 | 0 |
| (*N* = 1,280.9) | (−34.26) | (−7.45) | [9] | (0.69) | [2] | (−5.93) | [7] | (−2.13) | [3] | (38.78) | [12] | (23.34) | [12] | (−7.34) | [0] |

**Table 13**
Tobit regressions to explain the dividend payout ratio for firms of different levels of RE/TE.

The table reports Tobit regression results on dividend payout for six subgroups of firm-years classified by the level of RE/TE over the period 1994–2005. We pool all firm-year observations from seven major countries into one dataset before dividing them into six subgroups by the level of RE/TE. The dependent variable is DV/E, the dividend-to-earnings ratio. # = 0 includes firm-years with negative RE/TE. # = 1,2,3,4 and 5 are the quintiles of positive RE/TE firm-years classified by the level of RE/TE. The seven explanatory variables include (i) SRVOL, stock return volatility, (ii) RE/TE, retained earnings-to-total equity ratio, (iii) OWN, insider ownership, (iv) MBR, market-to-book ratio, (v) Log(TA), log of total assets, (vi) ROA, operating income divided by total assets, and (vii) CASH, cash holdings scaled by total assets. The numbers in parentheses are $\chi^2$ statistics for the regression coefficient. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. *N* is the number of observations.

| # | Mean of RE/TE | Intercept | SRVOL | RE/TE | OWN | MBR | Log(TA) | ROA | CASH | *N* |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | −3.18 | −1.93*** | −8.77*** | −0.02*** | −0.19** | 0.00 | 0.11*** | 4.23*** | −0.92*** | 13,453 |
| | | (59.39) | (515.32) | (13.59) | (4.94) | (0.21) | (92.27) | (414.69) | (43.74) | |
| 1 | 0.13 | −0.58*** | −4.54*** | 0.56*** | 0.30*** | −0.01 | 0.05*** | 0.63*** | −0.11* | 7,501 |
| | | (23.16) | (770.15) | (16.91) | (64.34) | (2.34) | (97.44) | (73.65) | (2.73) | |
| 2 | 0.33 | −0.72*** | −3.09*** | 0.18 | 0.50*** | −0.03*** | 0.06*** | 0.29*** | −0.07 | 7,502 |
| | | (33.03) | (447.02) | (1.56) | (171.20) | (49.28) | (122.55) | (18.84) | (1.53) | |
| 3 | 0.51 | −0.09 | −2.82*** | −0.00 | 0.35*** | −0.03*** | 0.03*** | −0.18*** | −0.06 | 7,502 |
| | | (0.55) | (416.27) | (0.00) | (112.40) | (54.35) | (50.67) | (7.00) | (1.58) | |
| 4 | 0.67 | 0.22* | −2.45*** | −0.07 | 0.16*** | −0.02*** | 0.02*** | −0.23*** | −0.07 | 7,502 |
| | | (3.57) | (365.52) | (0.31) | (31.04) | (52.98) | (24.69) | (16.62) | (2.20) | |
| 5 | 0.90 | 0.38*** | −2.57*** | −0.13** | −0.05** | −0.00 | 0.01*** | −0.24*** | −0.01 | 7,501 |
| | | (19.69) | (428.48) | (5.09) | (4.55) | (0.57) | (20.88) | (32.87) | (0.06) | |

cash-flow uncertainty in this analysis. ROAVOL_4 is calculated as the standard deviation of ROA over the subsequent four years and thus the current-year ROA is not included in the calculation of ROAVOL_4.

Table 12 reports the results of Tobit regressions over the sample period 1990–2001, using ROAVOL_4 as our proxy for cash-flow uncertainty. The first panel shows that the impact of future profit variability on DV/E is negative and strong across countries. Without exception, the average coefficient for ROAVOL_4 is negative and its *t*-statistic is significant. In the second panel for which the DV/S is the payout measure, the impact of ROAVOL_4 on dividend payouts is somewhat weaker in some countries. However, in the majority of countries, the average coefficient for ROAVOL_4 is negative and significant.

Overall, these results suggest that future cash-flow variability has a significant impact on current-year dividend payouts. Under the assumption that managers have perfect foresight over future cash-flow variability, the results are consistent with the hypothesis that managers incorporate cash-flow uncertainties into their current payout decisions.

### 4.8. Cash-flow uncertainty and life-cycle stage

Finally, we contemplate the possibility that SRVOL, our primary measure of cash-flow uncertainty, may vary with a firm's life-cycle stage.[24] Firms at the mature life-cycle stage have relatively stable cash flows and thus, their stock will experience less price volatility than firms at the early life-cycle stage. Therefore, the relationship between dividend payouts and stock price volatility may reflect the life-cycle effect on dividend payouts.

In light of this possibility, we examine whether the effect of cash-flow uncertainty on dividend payouts is distinct from the life-cycle stage effect on dividend payouts. To do so, we test whether SRVOL has an impact on dividend payouts across firms at different stages in their financial life cycles. To divide our sample firms into different groups by their life-cycle stages, we first divide all sample firm-years into two groups: negative RE/TE firm-years and positive RE/TE firm-years. Then we further divide the positive RE/TE firm-years into five quintiles according to the level of RE/TE.

Table 13 reports Tobit regression results for each of these six subgroups of firm-years over the 1994–2005 period. We pool all firm-year observations from seven major countries into one dataset before dividing them into six subgroups by the level of RE/TE.[25] Results show that, across different subgroups of firms classified by RE/TE, SRVOL enters significantly and negatively for our measure of dividend payout, DV/E.[26] Thus, it appears that the impact of cash-flow uncertainty on dividend payouts is pervasive for early- to mature-stage firms. Therefore, our results suggest that the effect of cash-flow uncertainty on dividends is distinct from the effect of life-cycle stage on dividends.

[24] Grullon, Michaely and Swaminathan (2002) use a stock return volatility variable, namely, beta, as a proxy for firm maturity.

[25] We also conduct the same analysis on each individual country, but results remain qualitatively unchanged. Results for each individual country are available upon request.

[26] Our results remain the same when we use the DV/S as the dependent variable.

**Table A1**
Tobit regressions to explain the dividend payout ratio with four key variables.

The table reports the Tobit regression results on dividend payout over the period 1994–2005. Each reported number is the average of the 12 regression coefficients over the 12-year sample period. The dependent variables in the first and second panels are DV/E, the dividend-to-earnings ratio, and DV/S, the dividend-to-sales ratio, respectively. The four explanatory variables are: (i) SRVOL, the stock return volatility, (ii) RE/TE, the retained earnings-to-total equity ratio, (iii) OWN, insider ownership, and (iv) MBR, the market-to-book ratio. The numbers in parentheses are *t*-statistics for the average regression coefficient. The *t*-statistics are calculated following the Fama-MacBeth approach from the time series of fitted Tobit coefficients and tests the hypothesis that the expected coefficient is zero. '#−'('#+') denotes the number of times the regression coefficient takes the predicted negative (positive) sign. '#sig' denotes the number of times the regression coefficient is statistically significant (two-tailed significance at the 10% level) with the predicted sign. LK is the average log likelihood ratio. *N* is the average annual number of observations.

| | Intercept | SRVOL | | RE/TE | | OWN | | MBR | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Country | coef (*t*-stat) | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #+ [# sig] | coef (*t*-stat) | #− [# sig] | coef (*t*-stat) | #− [# sig] | LK |
| *Panel A: DV/E as the payout variable* | | | | | | | | | | |
| Australia | 0.952 | −4.754 | 12 | 0.333 | 12 | −0.165 | 7 | 0.013 | 4 | −129.1 |
| ($N = 204.2$) | (11.965) | (−9.465) | [10] | (5.023) | [10] | (−1.543) | [5] | (1.660) | [0] | |
| Canada | 0.736 | −7.925 | 12 | 0.141 | 8 | −0.020 | 5 | −0.018 | 9 | −54.0 |
| ($N = 94.7$) | (5.189) | (−6.482) | [10] | (1.562) | [3] | (−0.144) | [2] | (−0.983) | [0] | |
| France | 0.607 | −3.354 | 12 | 0.005 | 8 | −0.017 | 8 | −0.006 | 5 | −124.8 |
| ($N = 219.1$) | (19.216) | (−11.128) | [11] | (1.218) | [1] | (−0.341) | [0] | (−0.812) | [2] | |
| Germany | 0.475 | −3.464 | 12 | 0.308 | 12 | 0.188 | 1 | −0.009 | 8 | −156.5 |
| ($N = 218.4$) | (5.565) | (−7.895) | [10] | (4.482) | [11] | (6.046) | [0] | (−0.736) | [3] | |
| Japan | 0.601 | −1.587 | 12 | 0.235 | 12 | −0.205 | 10 | −0.034 | 12 | −1022.1 |
| ($N = 1{,}326.4$) | (9.739) | (−6.111) | [10] | (6.663) | [12] | (−4.293) | [7] | (−6.032) | [10] | |
| UK | 0.714 | −3.237 | 12 | 0.108 | 12 | −0.204 | 12 | 0.018 | 2 | −371.1 |
| ($N = 490.8$) | (23.285) | (−8.340) | [12] | (4.657) | [9] | (−5.636) | [4] | (2.900) | [0] | |
| US | 0.849 | −8.391 | 12 | 0.013 | 10 | −0.253 | 10 | −0.002 | 6 | −754 |
| ($N = 1{,}693.2$) | (11.953) | (−26.802) | [12] | (3.668) | [4] | (−3.858) | [10] | (−0.874) | [1] | |
| *Panel B: DV/S as the payout variable* | | | | | | | | | | |
| Australia | 0.047 | −0.311 | 12 | 0.018 | 12 | 0.008 | 3 | 0.004 | 0 | 213.7 |
| ($N = 210.3$) | (20.284) | (−11.369) | [12] | (8.402) | [12] | (2.398) | [0] | (5.713) | [0] | |
| Canada | 0.037 | −0.411 | 12 | 0.011 | 10 | −0.007 | 7 | 0.002 | 5 | 63.0 |
| ($N = 98.0$) | (5.637) | (−6.943) | [10] | (4.005) | [4] | (−1.042) | [3] | (2.102) | [0] | |
| France | 0.023 | −0.149 | 12 | 0.001 | 10 | −0.002 | 8 | 0.002 | 1 | 376.4 |
| ($N = 228.4$) | (13.867) | (−9.146) | [10] | (3.309) | [5] | (−1.455) | [0] | (5.187) | [0] | |
| Germany | 0.012 | −0.148 | 12 | 0.005 | 12 | 0.014 | 0 | 0.001 | 1 | 297.7 |
| ($N = 227.0$) | (7.254) | (−7.842) | [12] | (3.605) | [11] | (15.380) | [0] | (3.501) | [0] | |
| Japan | 0.005 | −0.027 | 12 | 0.007 | 12 | −0.001 | 9 | 0.001 | 1 | 4237.3 |
| ($N = 1{,}481.0$) | (7.572) | (−6.961) | [11] | (6.210) | [12] | (−1.246) | [3] | (4.615) | [0] | |
| UK | 0.037 | −0.186 | 12 | 0.006 | 12 | −0.008 | 12 | 0.002 | 0 | 838.0 |
| ($N = 535.7$) | (28.378) | (−12.668) | [12] | (8.407) | [12] | (−6.364) | [3] | (7.094) | [0] | |
| US | 0.040 | −0.405 | 12 | 0.001 | 11 | −0.011 | 10 | 0.001 | 0 | 773.5 |
| ($N = 1{,}739.1$) | (12.851) | (−22.748) | [12] | (4.439) | [7] | (−3.948) | [9] | (8.043) | [0] | |

## 5. Concluding remarks

In this paper, we document evidence that cash-flow uncertainty is a dominant cross-sectional determinant of payout policy across countries. Our investigation also reveals that the earned/contributed capital mix is an important determinant of payout policy in many countries, which corroborates the findings of DeAngelo, DeAngelo, and Stulz (2006) and Denis and Osobov (2008). On the other hand, our results do not lend strong support to hypotheses that agency conflicts and investment opportunities affect payout policy.

Our evidence calls for renewed attention to the role that is played by cash-flow uncertainty in payout policy. Cash-flow uncertainty has received little attention in empirical studies, while surveys such as Lintner (1956) and Brav, Graham, Harvey, and Michaely (2005) indicate its importance in payout policy. Most prior studies in the payout literature do not consider cash-flow uncertainty as a major factor. This neglect of the importance of cash-flow uncertainty must be rectified, given our evidence that cash-flow uncertainty has a significant impact on the amount and probability of dividends in each country.

In conclusion, it is worth noting that some recent studies suggest that cash-flow uncertainty is also important in explaining a firm's choice of payout method. Lee and Suh (2008) report that, across seven major countries, firms that repurchase shares but do not pay dividends experience a significantly high volatility of operating profitability (i.e., a measure of cash-flow uncertainty), compared to firms that only pay dividends. Similarly, Grullon and Michaely (2002) report a similar finding for U.S. firms. Overall, these studies provide further evidence as to the importance of cash-flow uncertainty in payout policy. Combined with our results, these studies suggest that firms facing high cash-flow uncertainty may avoid paying dividends (which are sticky) and instead use share repurchases (which are flexible). Cash-flow uncertainty appears to be an important factor, not only in explaining the cross-sectional variation of the amount and probability of dividends, but also in explaining a firm's choice of payout method.

## Appendix A

Tobit regressions explaining the dividend payout ratio with four key variables are given in Table A1.

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