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Dividend Smoothing and Firm Valuation

Paul Brockman
Lehigh University Department of Finance
pab309@lehigh.edu (corresponding author)

Jan Hanousek
CERGE-EI and CEPR
jan.hanousek@cerge-ei.cz

Jiri Tresl
University of Mannheim Department of Finance and CERGE-EI
jtresl@gmail.com

Emre Unlu
University of Nebraska Department of Finance
emre@unl.edu

Abstract

We examine the relationship between dividend smoothing and firm valuation across 21 countries using several empirical methods and smoothing measures. Our main results show that dividends are capitalized at significantly larger values for high-smoothing firms than for low-smoothing firms. We also find that dividend-smoothing premiums are higher in countries with weak shareholder protection – suggesting that smoothing serves as a substitute mechanism to reduce agency costs. Overall, our findings support the view that managers use dividend smoothing predominantly as a bonding mechanism to reduce agency costs (Leary and Michaely (2011)), and not as a rent extraction mechanism (Lambrecht and Myers (2012)).

I. Introduction

The widespread practice of dividend smoothing represents one of the most puzzling phenomena in corporate finance. Berk and DeMarzo ((2007), p. 556) summarize the situation succinctly with their claim that "While perhaps a good description of how firms do set dividends … there is no clear reason why firms should smooth their dividends, nor convincing evidence that investors prefer this practice."[1] Although it has been clear for over 50 years that firms do in fact smooth

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[1]This citation is also used by Leary and Michaely ((2011), p. 3198) to support their assessment that "Despite the prevalence and importance of dividend smoothing, there is little agreement about why firms smooth their dividends or what determines a firm's propensity to smooth."

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their dividend payout streams (Lintner (1956)) and that managers believe this practice to be important (Brav, Graham, Harvey, and Michaely (2005)), few studies to date investigate whether investors actually value such practice. Using U.S. stock market data, Larkin, Leary, and Michaely (2017) find that while some investors show a preference for dividend-smoothing stocks, this preference does not lead to higher market valuations. The primary objective of our study is to examine the relation between dividend smoothing and firm valuation in a global setting across 21 stock markets. In addition to increasing the sample size and expanding the scope of the investigation, our cross-country setting includes larger variations in agency and information costs than available in a single-market setting – and previous studies suggest that smoothing is associated with agency and information costs.

In the frictionless world of Miller and Modigliani (1958), (1961), payout policy is a passive consequence of an active investment policy. In the real world of market frictions (e.g., agency and information costs), managers can potentially use discretionary payout policies to minimize frictions and maximize firm valuation. Although one such discretionary policy (i.e., dividend smoothing) has been widely documented in the literature, no study to date has confirmed its relevance to firm valuation. As stated in Larkin et al. ((2017), p. 4133), "Our finding that smoothing is unrelated to prices and cost of capital is puzzling. These results suggest that despite management's strong convictions, investors are not willing to pay more for firms that smooth dividends." Our study is designed with this puzzle in mind.

We focus on answering 2 related questions. First, do global investors prefer a dividend-smoothing payout policy over a nondividend-smoothing payout policy? After answering this question in the affirmative, we move to the second question: Does the practice of dividend smoothing increase agency costs (as argued by Lambrecht and Myers (2012)), or reduce agency costs (as argued by Leary and Michaely (2011))?

Our main empirical analyses are based on a global database of 19,022 firm-year observations from 21 countries between 2001 and 2015. Since previous studies suggest that dividend smoothing is linked to agency or information costs, our cross-country approach allows us to examine wide variations across these 2 costs. Using a similar argument, Rangvid, Schmeling, and Schrimpf (2014) find a significant relation between current dividend yields and future dividend growth rates based on a cross-country sample, whereas Chen, Da, and Priestley (2012) find no such evidence based on a single country sample (i.e., the United States). Rangvid et al. conclude that "the picture painted by U.S. data changes quite a bit when using aggregate data from other countries worldwide" (p. 1275).

Our study provides two main empirical results, corresponding to each of the 2 questions posed previously. We answer the first question in the affirmative by showing that dividend smoothing is associated with higher market valuations, consistent with the notion that investors are willing to pay higher prices for firms that smooth their dividend payouts. One set of empirical analyses is based on Fama and French's (1998) dividend valuation model adjusted for an international setting following Pinkowitz, Stulz, and Williamson (2006). A second set of analyses is based on Larkin et al.'s (2017) model using changes in market-to-book values. The adjusted Fama and French model uses a variation of the market-to-book variable as

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a proxy for firm value. While one advantage of this approach is that it can directly relate dividend smoothing to firm valuation, one disadvantage is that the market-to-book proxy also captures future growth opportunities that have been shown to be inversely related to dividend smoothing (Leary and Michaely (2011)). We use the approach developed by Larkin et al. to address this endogeneity concern.

The results from both empirical models show that the relationship between dividend smoothing and firm valuation is statistically and economically significant. The adjusted Fama and French (1998) point estimates, while subject to endogeneity concerns, imply that $1 of dividends is capitalized at $3.10 for high-smoothing firms (i.e., speed of adjustment in the 25th percentile) versus $2.44 for low-smoothing firms (i.e., speed of adjustment in the 75th percentile).[2] Similarly, the results using Larkin et al.'s (2017) approach suggest that the dividends of a high-smoothing firm (i.e., speed of adjustment in the 25th percentile) are valued at a premium of approximately 13% compared to the dividends of a low-smoothing firm (i.e., speed of adjustment in the 75th percentile).

In addition to examining the relationship between dividend smoothing and firm valuations, we also investigate the relationship between dividend smoothing and expected returns using an international asset pricing model. Consistent with our valuation results that investors pay higher prices for high-smoothing firms, the international asset pricing finding suggests that investors demand lower rates of return for high-smoothing firms.

Overall, the findings related to the first question provide consistent support for widespread managerial beliefs that investors reward smooth, steady dividend patterns and punish volatile, erratic dividend patterns (Brav et al. (2005)). When firms smooth their dividend streams, investors seem to capitalize the smoothed dividends at lower discount rates similar to the valuation of a stable perpetuity and less similar to the valuation of a series of volatile cash flows.

Our second question addresses two competing views on the relationship between agency costs and dividend smoothing. One view argues that dividend smoothing is a manifestation or consequence of high agency costs. Managers smooth dividends to extract higher rents from shareholders and thereby exacerbate agency costs (Fudenberg and Tirole (1995), Lambrecht and Myers (2012)). Lambrecht and Myers, for example, argue that "Payout is smoothed because managers want to smooth their flow of rents. Rents and payouts move in lockstep" (p. 1763). A second (opposite) view is that dividend smoothing is used by managers to reduce agency costs. Managers smooth dividends to demonstrate their commitment (i.e., a bonding mechanism) to disgorging the firm of free cash flows (Leary and Michaely (2011), Knyazeva and Knyazeva (2014)). As argued by Knyazeva and Knyazeva ((2014), p. 1), "Stable dividends limit managerial discretion and free cash flow at the manager's disposal." In summary, one view is that dividend smoothing will exacerbate agency problems, whereas the other view is that dividend smoothing will reduce agency problems.

We conduct two empirical analyses to help shed light on the role of agency costs. First, we examine the differential effects of dividend smoothing on firm valuation in high-versus-low shareholder rights countries. The rent extraction hypothesis

[2]These results correspond to model 1 in Table 2.

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suggests that investors will pay less for high-dividend-smoothing firms in weak shareholder rights environments (i.e., where agency costs are high) relative to strong rights environments (i.e., where agency costs are low). In contrast, the bonding hypothesis predicts that investors will pay more for high-dividend-smoothing firms in weak rights environments relative to strong rights environments. Using an anti-self-dealing index to differentiate high-versus-low shareholder rights countries (Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)), our empirical results show that high-dividend-smoothing firms are more valuable in weak protection environments than in strong protection environments – consistent with the bonding hypothesis and inconsistent with the rent extraction hypothesis.

Although this cross-sectional approach captures significant variation in dividend payouts, this approach can also raise potential concerns about omitted correlated variables. We address this endogeneity issue in our second empirical analysis by using a change in Canada's insider trading laws as a plausibly exogenous shock to country-level agency costs.[3] Since the enforcement of Canada's insider trading laws reduces agency costs between managers and outside investors (Bhattacharya and Daouk (2002)), the demand for (and valuation of) dividend smoothing should decline in the post-enforcement period. Our diff-in-diff results confirm that dividend smoothing is reduced among Canadian firms in the post-enforcement period. Additional analyses also show that investors pay lower dividend-smoothing premiums after enforcement. Overall, our findings related to the second question provide consistent evidence in support of the bonding hypothesis over the rent extraction hypothesis. Investors appear to treat dividend smoothing as a mechanism for reducing, and not increasing, agency costs.

In addition to the direct evidence used to address our two main questions (i.e., do investors value dividend smoothing? and what is the role of agency costs?), we perform additional tests to further explore our main findings. First, we rerun our main results using an alternative proxy for the speed of adjustment variable (i.e., relative volatility) that includes both dividends volatility and earnings volatility without imposing a partial adjustment process (Leary and Michaely (2011)). The results confirm our earlier findings. Second, we use random sampling techniques to examine the small sample properties of estimated coefficients associated with unbalanced panel data. The results show that our earlier findings are insensitive to such small sample issues.

Our study contributes to the corporate payout literature by showing that investors pay a statistically and economically significant premium for firms that practice dividend smoothing. These results help to shed light on our understanding of why managers are willing to bear the costs of creating smooth dividend streams. Our findings also help to distinguish between two competing agency cost models of dividend smoothing: an agency cost reduction versus an agency cost exacerbation model. Our findings show that dividend-smoothing premiums are

[3]Previous studies using a similar exogenous-shock setting (e.g., Hail, Tahoun, and Wang (2014); Brockman, Tresl, and Unlu (2014)) have shown that the enforcement of insider trading rules leads to a reduction in agency costs. Related studies by Beny (2005), (2008) and Bhattacharya and Daouk (2002) also show significant relationships among country-level insider trading laws, agency costs, and dividend payouts.

higher in countries with weaker investor protection in a global cross-sectional analysis, and that dividend smoothing is perceived as a mechanism for reducing agency costs when examining the change in the enforcement of Canadian insider trading laws as an exogenous shock to agency costs.

The remainder of this article proceeds as follows: Section II discusses related research, and Section III describes the sample construction and methods of analysis. Section IV presents the empirical results, and Section V concludes the study.

II. Related Research

A. Dividend Smoothing and Firm Valuation

Although one of the most central issues related to the widespread practice of dividend smoothing is whether it has any impact on firm valuation, the question remains unresolved. As expressed by Leary and Michaely ((2011), p. 3198), "Dividend smoothing is one of the most well-documented phenomena in corporate financial policy," and yet "there is surprisingly little consensus on what economic forces lead firms to behave this way" (p. 3201). Most studies that examine the role of dividend smoothing do not perform direct tests for firm valuation effects. Easterbrook (1984), for example, argues that firms might maintain a consistent (smooth) dividend payout policy to mitigate agency costs. DeAngelo and DeAngelo (2007) argue that a record of high, stable dividend payouts conveys a firm-level commitment to pay high future dividend payouts. This commitment mitigates agency costs and, implicitly, should lead to lower costs of capital and higher market valuations.

Unlike previous studies, Larkin et al. (2017) examine the relation between dividend smoothing and firm valuation using U.S. data. They find no evidence that firms are able to increase their stock prices or decrease their capital costs by implementing a dividend-smoothing strategy. These findings lead to the puzzling implication that a widespread managerial practice (i.e., dividend smoothing) imposes costs on firms while providing no discernable benefits (e.g., lower capital costs and higher market valuations). One possible solution is that managers are destroying firm value through an ill-conceived payout policy of dividend smoothing. A second possibility is that there are real, value-enhancing benefits to smoothing, but that these benefits have yet to be detected empirically. It is this latter possibility that motivates our study.

B. Determinants of Dividend Smoothing

Recent studies suggest that dividend smoothing is directly related to agency costs. Dewenter and Warther (1998) compare dividend payout policies of U.S. and Japanese firms. They find that closely held Japanese companies (i.e., keiretsu member firms), faced with less asymmetric information and agency conflicts than their U.S. counterparts, display greater variation (i.e., less smoothing) in their dividend payout policies. This evidence is consistent with both an asymmetric information and agency cost explanation of dividend smoothing. Michaely and Roberts (2012) investigate dividend-smoothing differences between public and private companies in the United Kingdom. They show that public companies

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smooth more than private companies, and that diffusely owned private companies smooth more than tightly owned private companies. Similarly, Aivazian, Booth, and Cleary (2006) find greater smoothing among firms that regularly access the public debt markets, relative to firms that regularly access the private debt markets. This evidence is also consistent with both an asymmetric information and agency cost explanation of dividend smoothing.

Although these recent studies have examined the relation between agency costs and dividend smoothing in the U.S. (e.g., Leary and Michaely (2011), Knyazeva and Knyazeva (2014)) and international markets (Javakhadze, Ferris, and Sen (2014)), no study to date has measured and used the firm valuation effects of dividend smoothing in a global setting to shed light on the role of agency costs in determining payout policies.

III. Sample and Methodology

A. Dividend Smoothing: Speed of Adjustment (SOA)

We construct our dividend-smoothing sample from Compustat North America and Compustat Global, using data over the 15-year period from 2001 to 2015. To enter our sample, each firm must have a fully consolidated accounting statement (CONSOL = C), be a member of a nonregulated industry (i.e., all industries except North American Industry Classification System (NAICS) codes 22 and 52), and have nonmissing data for all variables used in the analyses. We exclude firms involved in mergers or acquisitions, and we require that dividends per share data are reported in the local currency, since Baker and Wurgler (2015) show that dividend smoothing can be blurred when dividends are reported in a nonlocal currency. This filter eliminates American Depositary Receipts from our sample.

Following Leary and Michaely (2011), we estimate the speed of dividend adjustment using a 2-step procedure. The estimation period from 1998 to 2015 is longer than the sample period, due to the need for the creation of rolling windows to calculate the speed of adjustment. First, we calculate the median target payout ratio (TPR_i) using a 5-year rolling window from time $t-4$ to time t. We require at least 3 observations within each window. Then, at time t, we construct deviations (dev_{it}) from the target in each window. Second, we regress these deviations on the actual dividend changes to estimate the speed of dividend adjustments, β (SOA5 and SOA10), as follows:

$$(1) \qquad \Delta DPS_{it} = \alpha + \beta \times dev_{it} + \varepsilon_{it}; \text{where } dev_{it} = TPR_i \times EPS_{it} - DPS_{it-1}.$$

Dividends per share (DPS) are calculated as dividends (DVC) divided by common shares (CSHPRI) for observations from Compustat North America. For observations from Compustat Global, dividends per share are calculated as dividends (DVC) divided by common shares (CSHPRIA). Earnings per share (EPS) exclude extraordinary items (EPSPX) for observations from Compustat North America, as well as for observations from Compustat Global (EPSEXCON). Dividends per share and earnings per share are then adjusted by their adjustment factors AJEX and AJEXI, respectively. We restrict the SOA5 between 0 and 1 as suggested

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by Leary and Michaely (2011)[4] and require that each country has at least 40 observations. The payout ratio (PAYOUT_RATIO) is calculated as dividends (DVC) divided by income before extraordinary items (IB).[5]

B. Dividend Smoothing and Firm Valuation

We begin with Fama and French's (1998) original model and then make adjustments for an international application following Pinkowitz et al. (2006).[6] Fama and French (1998) show that dividends have a positive contribution to firm value despite their unfavorable tax treatment in comparison to repurchases. They argue that smooth dividends portray information about profitability because earnings are noisy. Specifically, Fama and French ((1998), p. 842) state that "if measured earnings are noisy and dividends are smoothed versions of earnings (Lintner (1956)), dividends can have information about profitability." The resulting regression is as follows:

$$\begin{aligned}(2)\quad \frac{V_t}{A_t} &= \alpha_0 + \alpha_1\frac{E_t}{A_t} + \alpha_2\frac{\mathrm{dE}_t}{A_t} + \alpha_3\frac{\mathrm{dE}_{t+1}}{A_t} + \alpha_4\frac{\mathrm{dA}_t}{A_t} + \alpha_5\frac{\mathrm{dA}_{t+1}}{A_t} + \alpha_6\frac{\mathrm{CX}_t}{A_t} + \alpha_7\frac{\mathrm{dCX}_t}{A_t}\\ &+ \alpha_8\frac{\mathrm{dCX}_{t+1}}{A_t} + \alpha_9\frac{I_t}{A_t} + \alpha_{10}\frac{\mathrm{dI}_t}{A_t} + \alpha_{11}\frac{\mathrm{dI}_{t+1}}{A_t} + \alpha_{12}\frac{D_t}{A_t} + \alpha_{13}\frac{\mathrm{dD}_t}{A_t} + \alpha_{14}\frac{\mathrm{dD}_{t+1}}{A_t}\\ &+ \alpha_{15}\frac{\mathrm{dV}_{t+1}}{A_t} + \alpha_{16}\mathrm{SOA} + \alpha_{17}\frac{D_t}{A_t}\mathrm{SOA} + \alpha_{18}\frac{\mathrm{dD}_t}{A_t}\mathrm{SOA} + \alpha_{19}\frac{\mathrm{dD}_{t+1}}{A_t}\mathrm{SOA} + \varepsilon_t.\end{aligned}$$

The regression variables are constructed as follows: For companies from Compustat North America, V is the number of shares outstanding (CSHO) multiplied by either the fiscal year-end closing price (PRCC_F), if available, or the fiscal year-end monthly closing price from the Compustat Merged Monthly Security File (PRCCM). For companies from Compustat Global, V is the number of current common shares outstanding (CSHOC) multiplied by the appropriate fiscal year-end price (PRCCD) from the Merged Global Security Daily File. We adjust stock prices by the price quotation unit (QUNIT).[7]

The remaining variables include the following: A is the book value of total assets (AT); E is earnings before extraordinary items (IB) plus interest (XINT), deferred tax credits, and investment tax credits (TXDITC); dE_t is the change in earnings from the previous year, calculated as $E_t - E_{t-1}$; dE_{t+1} is the 1-year ahead change in earnings calculated as $E_{t+1} - E_t$; CX is capital expenditures (CAPX); dCX_{t-1} is the change in capital expenditures from previous year, calculated as

[4]Alternatively, Leary and Michaely (2011) suggest that the speed of adjustment estimate (SOA) can also be truncated at the 2.5 and 97.5 percentiles. Employing this truncated speed of adjustment estimate (SOA) in our analyses yields comparable empirical results and statistical significance levels.

[5]We also estimate the speed of adjustments using a 10-year rolling window (SOA10). The estimation is identical except that we require that we calculate the median target payout ratio (TPR_i) using a 10-year rolling window from time $t - 9$ to time t. We require at least 7 observations within each window.

[6]This model is also used by Dittmar and Mahrt-Smith (2007) to estimate the impact of cash holdings on firm value.

[7]We follow Standard & Poor's Xpressfeed Guide for calculating the market capitalization for non-North American companies.

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$CX_t - CX_{t-1}$; dCX_{t+1} is the 1-year ahead change in capital expenditures, calculated as $CX_{t+1} - CX_t$; I is the annual interest expense (XINT), which helps to control for the effect of debt tax shields on firm values; dI_{t-1} is the change in interest expense from the previous year, calculated as $I_t - I_{t-1}$; dI_{t+1} is the 1-year ahead change in interest expense, calculated as $I_{t+1} - I_t$; D is the annual dividend amount (DVC); dD_{t-1} is the change in dividend amount from the previous year, calculated as $D_t - D_{t-1}$; and dD_{t+1} is the 1-year ahead change in dividends, calculated as $D_{t+1} - D_t$. All firm characteristics are trimmed at 0.50th and 99.50th percentiles. The Appendix provides detailed descriptions of the variables used in our analyses.

The dependent variable (i.e., the market value of equity (V)) and all independent variables are scaled by the book value of assets (A) to control for heteroscedasticity (following Fama and French (1998)). The coefficients of interest include the main effect of dividends on firm valuation (D_t/A_t) and its interaction with the speed of dividend adjustment (SOA $\times$ (D_t/A_t)). The main-effect coefficient captures the capitalized value of \$1 of dividends in the value of equity when the speed of adjustment is 0 or when dividends are perfectly smooth. The interaction term captures the impact of SOA on the main-effect term. In other words, the interaction term captures how smoothing affects the valuation of dividends, all else being equal. If investors reward managers for dividend smoothing (i.e., implying low SOA), then we should find a negative and significant coefficient for this interaction term.[8]

Our main dividend valuation database contains 19,022 firm-year observations from 21 countries between 2001 and 2015. Panel A of Table 1 reports the number of observations by country, and Panel B reports the number of observations by year. Japan, the United States, and the United Kingdom are the top 3 countries with the most representation. Japan has the most observations with 6,984 observations. The United States has the second-highest number of observations with 4,792, and the United Kingdom has 1,061 observations. Inclusion or exclusion of these countries in estimations does not change our findings.[9] Table 1 of the Supplementary Material provides additional details on our sample, including summary statistics in Panel A and the number of observations by industry, country, and year in Panels B–D, respectively.

[8]To construct a complete interactive model of dividend smoothing, we also interact SOA with the past (dD_{t-1}/A_t) and future changes (dD_{t+1}/A_t) in dividends. Consistent with Pinkowitz et al. (2006), we draw our inferences based only on level variables (D_t/A_t and SOA $\times$ D_t/A_t), because change variables are intended to capture the valuation effect of dividend growth expectations, not the market value of the current level of dividends. Similar to Pinkowitz et al. (2006), we also find that the level variables are dominant in capturing the main valuation effects of dividends. We implement time effects and firm fixed effects, which control for the confounding effects of unobserved time-invariant factors at the firm level. Another advantage of firm fixed effects is that it subsumes the effect of unobserved fixed effects at the country level (i.e., culture and legal background), because the firm's nationality remains unchanged during our sample period.

[9]Recall that to enter our sample, a firm must first be a dividend-paying company. Therefore, these observation rankings reflect not just the size of the national market (i.e., number of firms), but also distributional differences of dividend-paying versus nondividend-paying companies among the national markets.

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TABLE 1

Summary Statistics for Dividend Valuation Sample

Table 1 contains the summary statistics for the dividend valuation sample. The valuation sample period is from 2001 to 2015. Panels A and B show the number of observations with respect to country and year. Additional statistics are provided in Table 1 of the Supplementary Material.

Panel A. Number of Observations by Country

	N
Country	SOA5
AUS	565
CAN	732
CHE	109
CHN	1,021
DEU	210
DNK	46
FIN	109
FRA	48
GBR	1,061
HKG	161
IND	397
JPN	6,984
KOR	873
MYS	952
NLD	119
NOR	72
PAK	55
SGP	345
SWE	297
USA	4,792
ZAF	74
Total	19,022

Panel B. Number of Observations by Year

	N
Fiscal Year	SOA5
2001	54
2002	400
2003	706
2004	941
2005	1,121
2006	1,248
2007	1,391
2008	1,603
2009	1,980
2010	2,062
2011	2,221
2012	2,130
2013	1,677
2014	1,269
2015	219
Total	19,022

IV. Empirical Results

A. Dividend Smoothing and Firm Valuation

This section examines the relation between dividend smoothing and firm valuation. The results presented in Table 2 measure the relationship between dividend smoothing and firm valuation using panel regressions with firm and time fixed effects to control for firm and time invariant, unobserved heterogeneity. Models 1 and 2 estimate the main regression model (i.e., equation (2)) for the main sample (model 1), and for the subsample where the 3 largest countries are dropped (model 2).

The coefficient on the main effect (D_t/A_t) is positive (3.259) in model 1 and statistically significant at the 1% level, suggesting that when dividends are perfectly

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TABLE 2

Dividend Smoothing and Firm Valuation Using a 5-Year SOA Rolling Estimate

Table 2 shows the impact of dividend smoothing on the change of firm valuation using a regression model with firm and year fixed effects. The sample covers 15 years from 2001 to 2015. The results using the 10-year SOA Rolling Estimate are provided in Table 3 of the Supplementary Material. ***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Variable descriptions are provided in the Appendix. Standard errors are reported in parentheses. Bolded entries represent the main variables of interest.

	Dependent Variable = V_t/A_t	
Independent Variables	Model 1	Model 2
D_t/A_t	**3.259*** (0.309)**	**5.982*** (0.576)**
$D_t/A_t \times$ SOA5	**−1.354*** (0.375)**	**−1.933*** (0.704)**
E_t/A_t	4.974*** (0.113)	5.294*** (0.247)
dE_{t-1}/A_t	−0.617*** (0.067)	−0.858*** (0.157)
dE_{t+1}/A_t	2.634*** (0.072)	2.648*** (0.161)
dA_{t-1}/A_t	−0.072*** (0.027)	0.067 (0.053)
dA_{t+1}/A_t	0.272*** (0.026)	0.296*** (0.051)
CX_t/A_t	1.223*** (0.168)	0.237 (0.297)
dCX_{t-1}/A_t	−0.183 (0.114)	−0.105 (0.198)
dCX_{t+1}/A_t	0.953*** (0.101)	0.372** (0.167)
I_t/A_t	−13.414*** (0.774)	−10.398*** (1.451)
dI_{t-1}/A_t	0.400 (0.752)	−0.991 (1.250)
dI_{t+1}/A_t	−4.565*** (0.835)	−2.932** (1.351)
dD_{t-1}/A_t	2.294*** (0.339)	1.551*** (0.592)
dD_{t+1}/A_t	2.314*** (0.266)	2.869*** (0.470)
dV_{t+1}/A_t	−0.444*** (0.006)	−0.452*** (0.009)
SOA5	0.022 (0.013)	0.117*** (0.030)
$dD_{t-1}/A_t \times$ SOA5	−1.115*** (0.407)	−3.018*** (0.866)
$dD_{t+1}/A_t \times$ SOA5	−0.773** (0.380)	−1.067 (0.703)
Constant	0.627*** (0.014)	0.579*** (0.033)
Firm and year FEs	Yes	Yes
R^2 within	0.432	0.476
R^2 between	0.423	0.335
R^2 overall	0.435	0.386
N	19,022	6,185
USA, JPN, GBR	Incl.	Excl.

smooth (i.e., SOA = 0), \$1 in dividends is capitalized to the value of the firm as \$3.3.[10] Additionally, the coefficient on the interaction term between the speed of adjustment and dividend valuation (SOA $\times$ (D_t/A_t)) is negative (−1.354) and

[10]Fama and French (1998) document the positive impact of dividends on firm valuation.

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statistically significant at the 1% level. This finding suggests that as dividends become less smooth (i.e., higher values of SOA), the capitalization of $1 in dividends in the market value of the firm declines. We find similar results for model 2 after dropping the 3 largest countries.[11] Overall, these findings show that smoothing is associated with higher market valuations after controlling for a comprehensive set of variables commonly used in the literature. All of the control variables have the expected signs and significance levels (Pinkowitz et al. (2006), Fama and French (1998)).[12]

In addition to statistical significance, Figure 1 of the Supplementary Material suggests that our results are also economically significant, although it should be noted that these point estimates are subject to endogeneity concerns which are further examined later in the article. For model 1 in Table 2, decreasing the speed of adjustment (i.e., making dividends smoother) from 75th percentile to 25th percentile increases the capitalized value of $1 of dividends from $2.44 to $3.10.[13] We also re-estimate the same models from Table 2 but use a speed of adjustment variable estimated over 10-year rolling windows. The results are virtually identical (see Table 3 of the Supplementary Material).

Our first set of results suggests that dividend smoothing is associated with higher market valuations, which is consistent with the notion that investors prefer this practice. The advantage of this approach is that we can directly test the relationship between dividend smoothing and firm value, either through the cost of capital or cash flows, based on an established model in the literature. However, in this analysis, we use a variation of the market-to-book ratio, namely the market value of equity scaled by the book value of assets, as a proxy for firm valuation. Leary and Michaely (2011) show that firms with higher growth opportunities also tend to engage in less dividend smoothing. This finding suggests that both our firm value proxy (i.e., dependent variable) and dividend-smoothing proxy (i.e., speed-of-adjustment treatment variable) are dependent on the same underlying growth opportunities, thus leading to endogeneity concerns.

We address this issue by following the research design suggested by Larkin et al. (2017). This model captures within-firm changes in value over a relatively long time period (i.e., 5 years), while controlling for growth opportunities and life cycle stages. Specifically, we estimate the following model and include year fixed

[11]The results are unchanged if we drop one country at a time.

[12]In addition to these symmetric effects, we also examine whether there are asymmetric effects depending on whether dividends are above or below their target levels. First, we calculate the median target payout ratio using a 5-year rolling window from time $t-4$ to time t. We define above- and below-target payouts relative to these median payout ratios, and then rerun our Table 2 results for these two subsamples. The results (see Table 2 of the Supplementary Material) show that dividend smoothing is higher (lower) and valuation effects are lower (higher) when dividend payouts are above (below) their target levels. These results are consistent with the notion that while smoothing is more difficult to implement when dividends are below target levels, it is also more valuable when dividends are relatively low. We thank an anonymous referee for suggesting this additional test.

[13]Our interaction model estimates imply that the sensitivity of market value of equity to dividends ($\partial MVE/\partial D$) can be expressed as a function of SOA as follows: $\partial MVE/\partial D = 3.259 - 1.354\ SOA$. We then evaluate this equation at the 25th and 75th percentiles using the sample distribution of SOA (i.e., SOA = 0.606 at the 75th percentile, and SOA = 0.119 at the 25th percentile).

effects to account for aggregate time trends and firm fixed effects to control for within-firm variation:[14]

$$
\begin{aligned}
(3)\quad \mathrm{M/B}_t - \mathrm{M/B}_{t-4} = {} & \alpha_0 + \alpha_1 \mathrm{SOA}_t + \alpha_2 D_{t-4}/A_{t-4} + \alpha_3 (D_t/A_t - D_{t-4}/A_{t-4}) \\
& + \alpha_4 (D_t/A_t - D_{t-4}/A_{t-4}) \times \mathrm{SOA}_t + \alpha_5 \mathrm{LOGSALE}_{t-4} \\
& + \alpha_6 (\mathrm{LOGSALE}_t - \mathrm{LOGSALE}_{t-4}) + \alpha_7 (\mathrm{EBITDA}_t - \mathrm{EBITDA}_{t-4}) \\
& + \alpha_8 (\mathrm{TANG}_t - \mathrm{TANG}_{t-4}) + \alpha_9 (LEV_t - LEV_{t-4}) + \alpha_{10} \mathrm{STD_EBITDA}_t \\
& + \alpha_{11} (\mathrm{CAPEX}_t - \mathrm{CAPEX}_{t-4}) + \alpha_{12} (\mathrm{RD}_t - \mathrm{RD}_{t-4}) + \varepsilon_t,
\end{aligned}
$$

where the dependent variable is a 5-year change in the market-to-book ratio (M/B), and the main independent variables capture the dividend level 4 years ago (D_{t-4}/A_{t-4}), its change ($D_t/A_t - D_{t-4}/A_{t-4}$), and the interacted speed of adjustment variable with this change ($D_t/A_t - D_{t-4}/A_{t-4}) \times \mathrm{SOA}_t$). The control variables are described in the Appendix.

The results are presented in Table 3. They confirm our earlier findings. Specifically, we find that firm values are increasing in dividends, changes in dividends, and most importantly, dividend smoothing. The estimated coefficients for D_{t-4}/A_{t-4} are positive and significant at the 1% level across all 3 models, and the estimated coefficients for $D_t/A_t - D_{t-4}/A_{t-4}$ are positive and significant at the 1% level in models 2 and 3. Most importantly, the coefficient for the interaction term ($(D_t/A_t - D_{t-4}/A_{t-4}) \times \mathrm{SOA}_t$) is negative (−10.408) and significant at the 1% level in model 3, suggesting that a smooth growth in dividends is positively associated with firm value.[15] Similar to the adjusted Fama and French's (1998) findings in Table 2, these results are also economically significant. For example, the dividends of high-smoothing firms (i.e., 25th percentile of the SOA distribution) are valued at a premium of approximately 13% compared to the dividends of low-smoothing firms (i.e., 75th percentile of the SOA distribution).[16]

Overall, our empirical findings in this section show that dividend smoothing is positively associated with firm value using the adjusted Fama and French's (1998)

[14]The market-to-book ratio (M/B) is calculated as the market value of assets divided by the book value of assets; the market value of total assets is calculated as the book value of total assets plus the market value of equity minus the book value of shareholder's equity (CEQ) or the liquidation value of common equity (CEQL), if CEQ is unavailable; the market value of equity is calculated as the number of shares outstanding (CSHO) multiplied by either the fiscal year-end closing price (PRCC_F), if available, or the fiscal year-end monthly closing price from the Compustat Merged Monthly Security File (PRCCM). For the Compustat Global firms, we calculate the market value of equity as the number of current common shares outstanding multiplied by the appropriate closing month-end price based on the Merged Global Security Daily file. We adjust stock prices by the price quotation unit (QUNIT). D, A, LOGSALE, EBITDA, LEV, CAPEX, and RD represent the amount of dividends paid, book value of assets, logarithmic transformation of firm sales (ln(SALE)), leverage ratio ((DLC + DLTT)/TA), capital expenditures (CAPEX), and research and development expenses (XRD), respectively. TANG measures asset tangibility, and STD_EBITDA measures the standard deviation of EBITDA over the past 5 years. The subscripts t and $t - 4$ represent the current and 4-year lagged fiscal years, respectively.

[15]Recall that the SOA variable is inversely related to smoothing, so that its negative coefficient is interpreted as a positive relationship between smoothing and valuations.

[16]We use the estimated coefficients at the mean dividend level (D_{t-4}/A_{t-4}) and the mean dividend change ($D_t/A_t - D_{t-4}/A_{t-4}$) in column 3 of Table 3, and then evaluate the speed of adjustment variable at its 25th and 75th percentiles.

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TABLE 3

Dividend Smoothing and Firm Valuation Using Change Regressions

Table 3 shows the impact of dividend smoothing based on alternative specifications in Larkin et al. (2017).

$$M/B_t - M/B_{t-4} = \alpha_0 + \alpha_1 SOA_t + \alpha_2 D_{t-4}/A_{t-4} + \alpha_3 (D_t/A_t - D_{t-4}/A_{t-4}) + \alpha_4 (D_t/A_t - D_{t-4}/A_{t-4}) \times SOA_t + \alpha_5 LOGSALE_{t-4} + \alpha_6 (LOGSALE_t - LOGSALE_{t-4}) + \alpha_7 (EBITDA_t - EBITDA_{t-4}) + \alpha_8 (TANG_t - TANG_{t-4}) + \alpha_9 (LEV_t - LEV_{t-4}) + \alpha_{10} STD_EBITDA_t + \alpha_{11} (CAPEX_t - CAPEX_{t-4}) + \alpha_{12} (RD_t - RD_{t-4}) + \varepsilon_t.$$

***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Variable descriptions are provided in the Appendix. Standard errors are reported in parentheses. Bolded entries represent the main variables of interest.

	Dependent Variable = $M/B_t - M/B_{t-4}$		
Independent Variables	1	2	3
SOA	0.086*	0.094*	0.102**
	(0.050)	(0.049)	(0.049)
D_{t-4}/A_{t-4}	4.305***	8.491***	7.169***
	(1.027)	(1.438)	(1.462)
$D_t/A_t - D_{t-4}/A_{t-4}$		3.966***	7.183***
		(0.995)	(1.228)
$(D_t/A_t - D_{t-4}/A_{t-4}) \times$ SOA			−10.408***
			(2.352)
$LOGSALE_{t-4}$	0.500***	0.485***	0.496***
	(0.083)	(0.083)	(0.082)
$LOGSALE_t - LOGSALE_{t-4}$	0.166**	0.187**	0.202**
	(0.077)	(0.079)	(0.079)
$EBITDA_t - EBITDA_{t-4}$	1.323***	1.175***	1.123***
	(0.239)	(0.240)	(0.240)
$TANG_t - TANG_{t-4}$	0.032	0.000	0.009
	(0.104)	(0.104)	(0.103)
$LEV_t - LEV_{t-4}$	−0.164	−0.152	−0.132
	(0.125)	(0.125)	(0.125)
STD_EBITDA_t	2.180**	1.882**	2.052**
	(0.877)	(0.878)	(0.875)
$CAPEX_t - CAPEX_{t-4}$		−0.444	−0.358
		(0.309)	(0.308)
$RD_t - RD_{t-4}$		−2.127	−2.294*
		(1.391)	(1.385)
Constant	−3.436***	−3.425***	−3.484***
	(0.540)	(0.539)	(0.536)
Firm and year FEs	Yes	Yes	Yes
R^2 within	0.135	0.145	0.154
R^2 between	0.003	0.003	0.003
R^2 overall	0.005	0.006	0.007
N	3,490	3,490	3,490

dividend valuation model, and the alternative model specification in Larkin et al. (2017). We further address the issue of using the market-to-book ratio as a proxy for firm valuation in Section IV.B.

Dividend Smoothing and Firm Valuation: The Role of Agency Costs

In this subsection, we examine the relationship between agency costs and dividend smoothing. One view argues that dividend smoothing is a manifestation or consequence of high agency costs (Fudenberg and Tirole (1995), Lambrecht and Myers (2012)), and the other view argues that it is used by managers to reduce agency costs (Leary and Michaely (2011), Knyazeva and Knyazeva (2014)). Our cross-country database and firm valuation model allow us to directly test the

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implications of these competing views.[17] If dividend smoothing reduces (exacerbates) agency problems, then investors would be willing to pay a larger (smaller) premium in a weak shareholder protection environment with high agency costs.

We test the implications of these two competing views by dividing countries into a weak shareholder protection group (i.e., *Low Anti-Self-Dealing*) and a strong shareholder protection group (i.e., *High Anti-Self-Dealing*). According to Djankov et al. ((2008), p. 461), the anti-self-dealing "index specifically addresses the protection of minority shareholders against self-dealing transactions benefiting controlling shareholders." One advantage of using this country-level variable is that the anti-self-dealing index tends to be influenced by the country's legal tradition and is therefore likely to be an endogeneity-robust predetermined proxy for agency costs.

The individual country classifications are presented in Panel A of Table 4, along with each country's index score and the number of observations. Consistent with previous international governance literature (La Porta et al. (1998)), common law countries (e.g., the United States and the United Kingdom) tend to have stronger shareholder rights than civil law countries (e.g., France, Germany). The low and high anti-self-dealing index countries have 9,319 and 9,703 observations for the SOA5 sample. We provide additional details in Panels A–D of Table 4 of the Supplementary Material.[18]

In Panel B of Table 4 we examine the relationship between dividend smoothing and firm valuation in high-versus-low shareholder rights countries. The regression models 1 and 2 present the coefficient estimates for high and low anti-self-dealing countries for the entire sample based on the 5-year rolling SOA (SOA5). The primary coefficients of interest include the main-effect term (D_t/A_t) and the interaction term between the speed of adjustment and dividend valuation (SOA $\times$ (D_t/A_t)).[19] In low shareholder rights countries, dividends are positively associated with firm valuation with a coefficient of 7.253, while in high shareholder rights countries the coefficient is 3.197. Both coefficients are statistically significant at the 1% level, and they are statistically different from each other at the 1% level. This result suggests that dividends are more valuable in low protection countries – consistent with the argument that dividend payments reduce agency costs (Pinkowitz et al. (2006)).

The interaction term between the speed of adjustment and the main-effect term (SOA5 $\times$ (D_t/A_t)) allows us to quantify the differential dividend-smoothing premium between weak and strong investor protection environments. The results

[17]Similar to the findings in Tables 2 and 3, the results in this section are also subject to identification issues that we address in Sections IV.C and IV.D.

[18]Panel A of Table 4 of the Supplementary Material presents the number of observations per country for the *SOA10* sample, and Panel B presents the number of annual observations between the low and high anti-self-dealing index groups. Panels C and D show that countries with strong (weak) shareholder protection have the following contemporaneous values: $V_t/A_t = 1.166$ (0.635), $E_t/A_t = 0.072$ (0.04), and $D_t/A_t = 0.027$ (0.014). These differences between strong-versus-weak protection countries mirror the findings in the previous literature. Specifically, countries with strong investor protection have significantly higher firm valuations (La Porta et al. (2002)) and dividend payouts (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000)). In addition, countries with strong investor protection have higher earnings than those with weak investor protection.

[19]We report the full results (i.e., including coefficients for all independent variables) in Panel A of Table 5 of the Supplementary Material.

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TABLE 4

Dividend Smoothing and Firm Valuation in High and Low Shareholder Rights Countries

Panel A of Table 4 shows the level of anti-self-dealing index for each country and their respective numbers of observation. Additional sample statistics are provided in Table 4 of the Supplementary Material. Panel B shows the relationship between dividend smoothing and firm valuation in high and low shareholder rights countries, as proxied by the anti-self-dealing index, using a regression model with firm and year fixed effects. The sample period is from 2001 to 2015 for the 5-year rolling estimate of the speed of adjustment (SOA5). ***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Variable descriptions are provided in the Appendix. Standard errors are reported in parentheses. Table 5 of the Supplementary Material provides additional details including full model results in Panel A and 10-year SOA rolling results in Panel B. Bolded entries represent the main variables of interest.

Panel A. Summary Statistics

Countries with Low Anti-Self-Dealing Index (HIGH_ANTI-SELF-DEALING_INDEX = 0)			Countries with High Anti-Self-Dealing Index (HIGH_ANTI-SELF-DEALING_INDEX = 1)		
Country	SOA5	Anti-Self-Dealing Index	Country	SOA5	Anti-Self-Dealing Index
CHE	109	0.267	AUS	565	0.79
DEU	210	0.279	CAN	732	0.651
DNK	46	0.466	CHN	1,021	0.778
FIN	109	0.46	GBR	1,061	0.927
FRA	48	0.382	HKG	161	0.964
IND	397	0.549	MYS	952	0.948
JPN	6,984	0.483	SGP	345	1
KOR	873	0.461	USA	4,792	0.651
NLD	119	0.209	ZAF	74	0.814
NOR	72	0.435			
PAK	55	0.408			
SWE	297	0.34			
Total	9,319		Total	9,703	

Panel B. Valuation Regressions

	Dependent Variable = V_t / A_t					
	HIGH_ANTI-SELF-DEALING_INDEX			HIGH_ANTI-SELF-DEALING_INDEX		
Selected Independent Variables	0	1	*p*-Value for the Difference	0	1	*p*-Value for the Difference
	Model 1	Model 2		Model 3	Model 4	
D_t/A_t	**7.253*** (0.640)**	**3.197*** (0.403)**	**0.000**	**8.221*** (1.183)**	**5.810*** (0.677)**	**0.077**
$D_t/A_t \times$ SOA5	**−9.919*** (1.565)**	**−1.742*** (0.494)**	**0.000**	**−6.261*** (2.018)**	**−2.695*** (0.701)**	**0.092**
Firm and year FEs	Yes	Yes		Yes	Yes	
R^2 within	0.474	0.428		0.482	0.496	
R^2 between	0.600	0.370		0.595	0.209	
R^2 overall	0.578	0.394		0.586	0.305	
N	9,319	9,703		2,335	3,850	
USA, JPN, GBR	Incl.	Incl.		Excl.	Excl.	

show that a high speed of adjustment (i.e., low level of smoothing) is associated with a lower dividend premium in weak shareholder rights countries (i.e., *Low Anti-Self-Dealing*) by −9.919. In contrast, a high speed of adjustment decreases the dividend premium in strong shareholder rights countries (i.e., *High Anti-Self-Dealing*) by only −1.742. Both interaction terms are statistically significant at the 1% level, and they are statistically different from each other at the 1% level. Models 3 and 4 exclude the largest 3 countries based on the number of observations. The results are very similar. In addition to statistical significance, Figure 2 of the Supplementary Material presents evidence of economic significance.[20]

[20]The estimates suggest that among countries with high agency costs (i.e., Anti-Self-Dealing = 0), the capitalized value of $1 in dividend payouts is $4.95 for high-smoothing firms (i.e., 25th percentile)

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Overall, the results in Table 4 shed light on two issues. First, they provide additional evidence suggesting that investors pay a premium for firms that smooth their dividend streams. Second, these results allow us to compare the two competing agency cost explanations of dividend smoothing. Since investors in weak protection environments with high agency costs are willing to pay larger smoothing premiums, the results support the view that dividend smoothing is used as an agency-reducing bonding mechanism.

B. Dividend Smoothing and Expected Returns

In this section, we examine the relationship between dividend smoothing and expected returns using an asset pricing model. In addition to providing alternative tests for our main hypothesis, this approach also addresses concerns about the use of market-to-book proxies for firm values. The proposition that investors are willing to pay higher prices for high-smoothing firms is roughly equivalent to the proposition that investors are willing to accept lower required returns for high-smoothing firms. To examine this second proposition, we investigate the relation between dividend smoothing and the cost of equity capital in an international setting. Although previous research shows that the performance of international asset pricing models is inferior to that of comparable models in a purely domestic setting (e.g., Fama and French (2012)), we believe it is still possible to extract some useful results from our international database.

We first estimate a Fama and French's (1993) 3-factor model augmented with Carhart's (1997) momentum factor with international factors from 4 regions (North America, Europe, Japan, and Asia Pacific – Ex Japan),[21] with the same rolling windows used to calculate the speed of adjustment (SOA) variables. The dependent variable is the monthly return over the region's risk-free rate. We then construct the average excess return (EXCESS_RET) for each firm-year observation using the residuals from the 4-factor model. Finally, we regress the SOA on the mean excess return using Fama–MacBeth regressions over the 15-year sample period (i.e., 2001–2015).

We report the empirical results in Table 5 and summarize the main findings herein. Consistent with Larkin et al.'s (2017) argument, we generally find that higher SOA is associated with higher required returns, or stated differently, that higher dividend smoothing is negatively related to required rates of returns. For the full sample, the estimated SOA coefficient is positive but insignificant at conventional levels. When we divide the sample into high anti-self-dealing (i.e., weak investor protection) countries and low anti-self-dealing (i.e., strong investor

and \$0.07 for low-smoothing firms (i.e., 75th percentile). Consistent with expectations, this differential smoothing effect is weaker among countries with low agency costs (i.e., Anti-Self-Dealing = 1); specifically, the capitalized value of \$1 in dividend payout is \$3.08 (\$2.34) for high-(low-)smoothing firms. We replicate these full sample results based on a reduced sample after excluding the United States, the United Kingdom, and Japan (bottom graph). The reduced sample patterns are consistent with, although less pronounced than, the full sample results. We also re-estimate the models with the speed of adjustment obtained from the 10-year rolling window (SOA10). The results are presented in Panel B of Table 5 of the Supplementary Material, and we again find similar results. Smooth dividends are positively associated with firm value, and this contribution is stronger when agency costs are high.

[21]The factors are provided on Ken French's data library website.

TABLE 5

Dividend Smoothing and Firm Valuation Based on Fama–MacBeth Regressions

Table 5 shows the relationship between speed of adjustment and mean excess equity returns (EXCESS_RET) estimated using Fama–MacBeth regressions. Variable descriptions are provided in the Appendix. ***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are reported in parentheses.

	Dependent Variable = EXCESS_RET		
	Entire Sample	High Anti-Self-Dealing = 0	High Anti-Self-Dealing = 1
Independent Variables	1	2	3
SOA	0.081	0.138*	0.034
	(0.063)	(0.072)	(0.097)
Constant	0.344***	0.307***	0.412***
	−0.017	−0.018	−0.018
Industry Fixed effects (FE)	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
R^2	0.010	0.003	0.036
N	19,022	9,319	9,703

protection) countries, we find a positive and significant coefficient (at the 10% level) for the weak protection subsample, and a positive and insignificant coefficient for the strong protection subsample.[22] Overall, these results are consistent with expectations. If dividend smoothing leads to lower required rates of return, then this relationship should be most pronounced in an environment with relatively high agency costs. It is also worth noting, however, that the hypothesized relation between expected returns and dividend-smoothing firms subject to high agency costs is only marginally significant in our data.

C. Insider Trading Law Changes: An Exogenous Shock to Agency Costs

In this section, we address endogeneity concerns inherent in testing the relationship between dividend smoothing and firm valuation. Dividend changes tend to vary slowly over time for individual firms, so time series tests are difficult to implement. Although our cross-sectional test captures significant variation in dividend payouts, this approach also raises potential concerns about omitted correlated variables. In an attempt to address such concerns, we use a change in Canada's insider trading laws to examine the impact of a plausibly exogenous (country-level) shock to agency costs on the relationship between dividend smoothing and firm valuation. One limitation of this analysis is that since the results apply directly to only one country, it is not clear how generalizable the findings are to a broader global setting.

Our previous empirical results suggest that managers use dividend smoothing to reduce agency costs, and thereby increase firm values. If an exogenous shock leads to an increase (decrease) in agency costs, then we would expect a stronger (weaker) relationship between dividend smoothing and firm valuations. For example, if an exogenous shock were to significantly increase agency costs, then managers would have a stronger incentive to smooth their dividend payouts in an effort

[22] In addition to statistical significance, we also examine the economic significance of these results. Our findings show that moving from the 25th to the 75th SOA percentile in our low shareholder protection countries corresponds to a higher required return by roughly 80 basis points per year.

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to allay investor concerns. As a consequence, dividend-smoothing firms should experience higher valuations in the high agency cost (post shock) environment. Previous studies using a similar exogenous-shock setting (e.g., Hail et al. (2014), Brockman et al. (2014)) have shown that the enforcement of insider trading rules leads to a reduction in agency costs.[23] The initial enforcement of a country's insider trading laws sends a country-level, agency-cost-reducing shock across the corporate sector.

The hypothesized chain of causation goes roughly as follows: i) from insider trading law enforcement to reduced agency costs, ii) from reduced agency costs to less incentive for dividend smoothing, and iii) from less incentive for dividend smoothing to lower (i.e., less positive) valuation effects associated with dividend smoothing. We first examine the post-enforcement impact on dividend smoothing to verify that the change in insider trading laws (agency-cost-reducing shock) encouraged firms to engage in less dividend smoothing. Second, we show the post-enforcement impact of dividend smoothing on firm value.

1. Post-Enforcement Effects on Dividend Smoothing

We use Canada's 1976 initial enforcement to examine its impact on dividend smoothing.[24] The sample covers 5 years before and after 1976, during which the insider trading laws were first enforced in Canada. If enforcement reduces agency costs, then managers should have less incentive to smooth dividends in the post-enforcement environment. To examine this issue, we perform a matched sample diff-in-diff analysis to estimate the impact of insider trading laws enforcement on dividend smoothing. We first perform propensity score matching by estimating a probit model to find similar firms in Canada (treatment group) to those in the United States (control group). We match on industry using 2-digit NAICS codes, year, and 3 firm characteristics that proxy for agency costs including size, tangibility, and market-to-book ratio. We match with replacement, allow up to 5 nearest neighbors, and use a relatively tight caliper of 0.005. We calculate the speed of adjustment using the original Lintner (1956) model to maximize the sample, due to more stringent data requirements of the rolling windows approach.[25] The model is calculated as follows:

$$\text{DPS}_t = \alpha_0 + \alpha_1 \text{EPS}_t + \alpha_2 \text{DPS}_{t-1} + \varepsilon_t, \tag{4}$$

where DPS and EPS are dividends per share and earnings per share, respectively. The speed of adjustment is then calculated as SOA = $(1 - \alpha_2)$. We calculate the SOA for each firm during a 5-year pre-enforcement period from 1970 to 1974, and

[23]Related studies by Beny (2005), (2008) and Bhattacharya and Daouk (2002) also show significant relationships among country-level insider trading laws, agency costs, and dividend payouts.

[24]Although our research design has similar features to that of La Porta et al. (2000), there are important differences. La Porta et al. use a cross-sectional setting to distinguish between two competing agency models of dividends: an "outcome model" where higher dividends are paid as a consequence (outcome) of strong investor protection, and a "substitute model" where higher dividends are paid as a substitute for weak investor protection. In contrast, we examine the impact of a positive shock to the agency costs of a single (high-investor-protection-rights) country.

[25]Using a rolling 5-year window approach reduces the sample to roughly 10 observations per year, which does not allow sufficient degrees of freedom for estimation purposes.

TABLE 6

Insider Trading Law Change: An Exogenous Shock to Agency Costs and Dividend Smoothing

Table 6 shows a matched sample diff-in-diff analysis to estimate the impact of insider trading laws enforcement on dividend smoothing. The sample covers 5 years around the year of 1976, when the insider trading laws were first enforced in Canada. Firms in the Canada sample are the treatment group, and their *p*-score matched counterpart firm comes from the United States. We use exact matching on industry, and year, in addition to matching on 3 firm characteristics. The firm characteristics are size, tangibility, and market-to-book ratio. The regression model uses industry and time fixed effects, and the standard errors are clustered at the firm level. Variable descriptions are provided in the Appendix. ***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are reported in parentheses. In Table 6 of the Supplementary Material, we also present summary statistics in Panel A, tests for covariate balance in Panel B, and parallel trend assumptions in Panel C.

	Dependent Variable = SOA			
Independent Variables	1	2	3	4
Diff-in-Diff Variables				
TREAT × POST	0.137***	0.131***	0.137***	0.089**
	(0.049)	(0.049)	(0.049)	(0.050)
TREAT	0.057	0.257***	0.061	0.156**
	(0.071)	(0.044)	(0.071)	(0.071)
POST	−0.014	−0.018	−0.015	−0.070***
	(0.021)	(0.021)	(0.021)	(0.021)
Control Variables				
M/B	0.070***	0.062***	0.065***	0.082***
	(0.020)	(0.020)	(0.020)	(0.020)
CASH	−0.181			
	(0.171)			
SIZE	−0.103***	−0.100***	−0.103***	
	(0.007)	(0.007)	(0.007)	
TANGIBILITY	−0.135**		−0.114**	−0.211***
	(0.054)		(0.054)	(0.056)
STD(ROA)	2.074***	2.095***	2.105***	3.503***
	(0.416)	(0.417)	(0.419)	(0.409)
PAYOUT_RATIO	−0.032***	−0.034***	−0.031***	−0.043***
	(0.006)	(0.006)	(0.006)	(0.008)
Constant	1.024***	0.934***	0.997***	0.540***
	(0.075)	(0.070)	(0.079)	(0.066)
Industry and year FEs	Yes	Yes	Yes	Yes
R^2	0.119	0.114	0.118	0.065
N	3,814	3,814	3,814	3,814

a 5-year post-enforcement period from 1978 to 1981. We exclude data from the year of the enforcement (1976), as well as 1 year before (1975) and 1 year after (1977) the enforcement. The SOA (i.e., dividend smoothing) is our dependent variable.

We report these regression results in Table 6.[26] We employ several model specifications in columns 1–4 which proxy for agency costs and degrees of information asymmetry similar to Leary and Michaely (2011). Across all 4 models, the estimated coefficients for Canadian firms in the post-enforcement period (i.e., TREAT × POST) are positive and highly significant. The interpretation is that Canadian firms reduced their dividend-smoothing practices in the post-enforcement period after the agency costs of equity had been reduced at the country

[26]We include additional background information in Table 6 of the Supplementary Material. Panel A provides the number of observations by year for the Canadian sample; Panel B shows that there are no significant differences between treated and control samples across the 3 firm characteristics (i.e., a covariate balance test); Panel C confirms that the parallel trend assumptions in the pre-enforcement period cannot be rejected.

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level through the enforcement of insider trading laws (i.e., a substitute effect). Overall, the results in Table 6 show that a negative shock to country-level agency costs reduces managerial incentives to engage in dividend smoothing.

2. Post-Enforcement Effects on Firm Valuations

In addition to examining the post-enforcement effect on dividend smoothing, we next investigate the post-enforcement impact on dividend valuation. We posit that this agency-reducing shock will lead to a weaker impact of dividend smoothing on firm valuation because of reduced investor demand for dividend smoothing. Our empirical approach is to compare the impact of dividend smoothing on firm values before and after the initial enforcement of insider trading laws. We then run the international version of Fama and French's (1998) valuation model (i.e., Pinkowitz et al. (2006)) and estimate the main coefficient of interest, $D_t/A_t \times$ SOA $\times$ IT_ENFORCED.

We present the results in Table 7.[27] The estimated coefficients for single variables D_t/A_t and SOA are 15.263 and 0.147 (with statistical significance at the 1% and 10% levels), respectively. The estimated coefficients for 2-variable interaction terms $D_t/A_t \times$ IT_ENFORCED, SOA $\times$ IT_ENFORCED, and $D_t/A_t \times$ SOA are −5.928 (insignificant), −0.137 (significant at the 10% level), and −6.869 (significant at the 5% level), respectively. More importantly, the estimated coefficient for the 3-variable interaction term $D_t/A_t \times$ SOA $\times$ IT_ENFORCED

TABLE 7

Insider Trading Law Change: An Exogenous Shock to Agency Costs, Dividend Smoothing, and Firm Valuation

Table 7 shows the impact of dividend smoothing on the change of firm valuation for the regime-shift sample. The sample covers 5 years around the year of 1976, when the insider trading laws were first enforced in Canada. SOA is the speed of adjustment, which was estimated using the Lintner (1956) model on the pre- and post-enforcement period using 5 years of data. Selected coefficients are provided from the dividend valuation regression model. Variable descriptions are provided in the Appendix. Table 7 of the Supplementary Material provides additional information on summary statistics. ***, **, and * indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are reported in parentheses.

Selected Independent Variables	Dependent Variable = V_t/A_t
D_t/A_t	15.263***
	(4.120)
$D_t/A_t \times$ IT_ENFORCED	−5.928
	(4.326)
SOA	0.147*
	(0.071)
SOA $\times$ IT_ENFORCED	−0.137*
	(0.069)
$D_t/A_t \times$ SOA	−6.869**
	(2.346)
$D_t/A_t \times$ SOA $\times$ IT_ENFORCED	7.143*
	(3.785)
Year FE	Yes
Industry FE	Yes
Adj. R^2/R^2	0.49/0.53
N	1,233

[27] We include additional background information in Table 7 of the Supplementary Material. Panel A reports the number of observations by year, and Panel B provides detailed descriptive statistics for all dependent and independent variables.

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(i.e., the main variable of interest) is 7.143, which is positive and significant at the 10% level. The interpretation of this result is that dividend smoothing has a significantly lower impact (i.e., equivalent to SOA having a significantly higher impact) on firm valuations in the post-enforcement period. Overall, these results confirm our expectation that a negative shock to country-level agency costs (i.e., a shock that reduces country-wide agency costs) will reduce the impact of dividend smoothing on firm valuation.

D. Additional Tests

1. Alternative Proxies: Speed of Adjustment and Agency Costs

Following Leary and Michaely (2011), we utilize an alternative proxy for the speed of adjustment, which includes both dividends volatility and earnings volatility without imposing a partial adjustment process. Low (high) values of this ratio imply a high (low) degree of smoothing due to lower fluctuations in dividends relative to earnings. REL is measured as the ratio of the root-mean-squared errors from the following 2 regression specifications (REL = $\sigma_\varepsilon/\sigma_\delta$):

$$\text{DPS}_{i,t} = \alpha_1 + \beta_1 t + \beta_2 t^2 + \varepsilon_{i,t}, \tag{5}$$

$$\text{TPR}_i \times \text{EPS}_{i,t} = \alpha_2 + \gamma_1 t + \gamma_2 t^2 + \delta_{i,t}, \tag{6}$$

where t and t^2 capture the time and quadratic time trends, respectively; $\text{DPS}_{i,t}$ and $\text{EPS}_{i,t}$ are split-adjusted dividends and earnings per share, respectively; and TPR_i is the target payout ratio as defined previously. Again, we employ 5-year and 10-year rolling windows to estimate REL5 and REL10.

In the interest of space, we report the empirical results in Table 8 of the Supplementary Material and provide a brief summary in this subsection. Panel A presents the correlation coefficients between all estimation variables; Panel B reports the estimation results using the relative volatility variables, REL5 and REL10, as our proxies for dividend smoothing in regression equation (2); Panel C examines the relationship between dividend smoothing and firm valuations for low shareholder rights countries (model 1, where High Anti-Self-Dealing = 0) versus high shareholder rights countries (model 2, where High Anti-Self-Dealing = 1) using REL5 as our smoothing proxy; and Panel D re-estimates all 4 regression models from Panel C using REL10 as our smoothing variable. Overall, the empirical findings in Table 8 of the Supplementary Material confirm our earlier results using a relative volatility measure as an alternative proxy for the speed of adjustment.

2. Small Sample Distribution of Coefficients

To ensure that our prior findings are not driven by an unbalanced panel data structure, we randomly select 45 observations from each of the 21 countries and then run the valuation model on each of these subsamples.[28] Since we do not restrict firms from appearing multiple times in the sample (but not in the same year), we run

[28]We thank an anonymous referee for suggesting this alternative approach.

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the valuation model with country, industry, and year fixed effects. We do not include firm fixed effects, in order to eliminate perfect collinearity among the firm dummies. We conduct this analysis 1,000 times and plot the distribution of the impact of dividends on firm value (D_t/A_t) and on the interaction term (SOA $\times$ D_t/A_t).

Again, in the interest of space, we report the empirical results in Table 9 of the Supplementary Material and provide a brief summary in this subsection. Panel A provides summary statistics for D_t/A_t and SOA $\times$ D_t/A_t coefficient estimates, and Figure 3 of the Supplementary Material displays their corresponding histograms. In Panel B, we report selected coefficients from the valuation regressions estimated by a 2-stage residual approach. Consistent with Leary and Michaely (2011), we project firm characteristics on SOA in a first stage regression as follows:

$$\begin{aligned}(7)\qquad \mathrm{SOA}_t = {} & \alpha_0 + \alpha_1 \mathrm{M/B}_t + \alpha_2 \mathrm{LOGSIZE} + \alpha_3 \mathrm{TANG} + \alpha_4 \mathrm{ROA}_t \\ & + \alpha_5 \mathrm{PAYOUT_RATIO}_t + \mathrm{YEAR_EFFECTS} + \mathrm{FIRM_FE} + \varepsilon_t,\end{aligned}$$

where SOA, M/B, LOGSIZE, TANG, ROA, and PAYOUT_RATIO are based on a 5-year rolling speed of adjustment. In the second stage regression, we estimate the valuation equation (2) using the residuals obtained from equation (7). We estimate valuation equation (2) for the full sample, as well as for subsamples based on high and low anti-self-dealing. Panel B presents the coefficient estimates for selected coefficients (D_t/A_t and D_t/A_t $\times$ SOA). Overall, the results in Table 9 of the Supplementary Material confirm our earlier findings that dividend smoothing is positively related to higher firm valuations.

V. Conclusion

The underlying motivation of our study is Berk and DeMarzo's ((2007), p. 556) statement that, to date, "there is no clear reason why firms should smooth their dividends, nor convincing evidence that investors prefer this practice." Although it has been clear for well over 50 years that firms smooth their dividends (Lintner (1956)) and that managers believe this practice to be important for investors (Brav et al. (2005)), no previous study has shown that investors actually prefer dividend smoothing. Our study helps to fill this void.

We use a global database within a cross-country setting and a well-established firm valuation model to examine the relation between dividend smoothing and firm value. If investors prefer smooth dividends, then they should be willing to pay a premium for this costly practice. If, on the other hand, investors disapprove of this practice, then dividend-smoothing firms will trade at a discount; and if investors are indifferent to payout patterns, then there will be no significant relation between dividend smoothing and firm value. The results of such testing can also be informative about competing agency cost models related to the practice of dividend smoothing.

Our empirical analyses are based on a global database of 19,022 firm-year observations from 21 countries between 2001 and 2015. Our cross-country approach allows us to examine wider variations across agency costs than possible using a single country approach (Rangvid et al. (2014)), and our use of a country-level plausible

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exogenous shock to agency costs (i.e., changes in Canadian insider trading law enforcement) allows us to address identification concerns.

Overall, our study provides two main empirical results. First, we show that dividend smoothing is positively related to firm value. This finding supports the widespread belief among managers that investors prefer smooth dividend payout streams (Brav et al. (2005)), and helps to explain managers' willingness to bear the costs of creating smooth dividend streams. Second, we examine two competing views of the relation between dividend smoothing and agency costs. One view is that smoothing exacerbates agency problems, and the other is that smoothing reduces agency problems. We find that investors in weak protection environments are willing to pay a larger smoothing premium than those in strong protection environments. This evidence supports the agency-reducing view of dividend smoothing. Taken together, these new results can hopefully shed new light on some aspects of the dividend-smoothing puzzle.

Appendix. Variable Definitions

This appendix provides detailed descriptions of variables used in this article. Valuation variables used throughout the article are the ones described below, as for Table 2.

Variables Used in Table 2

DPS: Dividends per share. Calculated as dividends (DVC) divided by common shares (CSHPRI) for observations from Compustat North America. For observations from Compustat Global, dividends per share are calculated as dividends (DVC) divided by common shares (CSHPRIA). DPS is adjusted for splits using AJEX.

EPS: Earnings per share. Calculated as earning per share excluding extraordinary items (EPSPX) for observations from Compustat North America, as well as for observations from Compustat Global (EPSEXCON). EPS is adjusted for splits using AJEXI.

PAYOUT_RATIO: Payout ratio. Calculated as dividends (DVC) divided by income before extraordinary items (IB).

TPR: Target payout ratio. Median target payout ratio based on a 5-year (10-year) rolling window from time $t-4$ to time t for SOA5 (SOA10).

SOA5, SOA10: Speed of adjustment. Estimated slope coefficient (β) from the following regression $\Delta DPS_{it} = \alpha + \beta \times dev_{it} + \varepsilon_{it}$ where $dev_{it} = TPR_i \times EPS_{it} - DPS_{it-1}$ for the appropriate rolling window length (i.e., 5 years and 10 years).

V: Market value of equity. For companies from Compustat North America, *V* is the number of shares outstanding (CSHO) multiplied by either the fiscal year-end closing price (PRCC_F), if available, or the fiscal year-end monthly closing price from the Compustat Merged Monthly Security File (PRCCM). For companies from Compustat Global, *V* is the number of current common shares outstanding (CSHOC) multiplied by the appropriate fiscal year-end price (PRCCD) from the Merged Global Security Daily File. We adjust stock prices by the price quotation unit (QUNIT). We follow Standard & Poor's Xpressfeed Guide for calculating the market capitalization for non-North American companies.

A: Book value of assets. Compustat item AT.

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E: Earnings. Calculated as earnings before extraordinary items (IB) plus interest (XINT), deferred tax credits, and investment tax credits (TXDITC).
dE_t: Calculated as $E_t - E_{t-1}$.
dE_{t+1}: Calculated as $E_{t+1} - E_t$.
CX: Capital expenditures. Compustat item CAPX.
dCX_t: Calculated as $CX_t - CX_{t-1}$.
dCX_{t+1}: Calculated as $CX_{t+1} - CX_t$.
I: Interest expense. Compustat item XINT.
dI_t: Calculated as $I_t - I_{t-1}$.
dI_{t+1}: Calculated as $I_{t+1} - I_t$.
D: Dividends. Compustat item DVC.
dD_t: Calculated as $D_t - D_{t-1}$.
dD_{t+1}: Calculated as $D_{t+1} - D_t$.

Variables Used in Table 3

M/B: Market-to-book. Calculated as the market value of assets divided by the book value of assets; the market value of total assets is calculated as the book value of total assets plus the market value of equity minus the book value of shareholder's equity (CEQ) or the liquidation value of common equity (CEQL), if CEQ is unavailable; the market value of equity is calculated as the number of shares outstanding (CSHO) multiplied by either the fiscal year-end closing price (PRCC_F), if available, or the fiscal year-end monthly closing price from the Compustat Merged Monthly Security File (PRCCM). For the Compustat Global firms, we calculate the market value of equity as the number of current common shares outstanding multiplied by the appropriate closing month-end price based on the Merged Global Security Daily file. We adjust stock prices by the price quotation unit (QUNIT).
D: Dividends. Compustat item DVC.
A: Book value of assets. Compustat item AT.
LOGSALE: Logarithmic transformation of sales. ln(SALE), where SALE is the Compustat item.
LEV: Debt ratio. Calculated based on Compustat items as (DLC + DLTT)/AT.
CAPEX: Capital expenditures. Compustat item CAPX.
RD: Research and development expense. Compustat item XRD.
TANG: Asset tangibility. Calculated as net property, plant and equipment (PPENT) scaled by total assets (AT).
STD_EBITDA: Cash flow volatility. Standard deviation of EBITDA scaled by AT over the past 5 years.

Variables Used in Table 4

HIGH_ANTI-SELF-DEALING_INDEX: Shareholders' rights dummy. Equals 1 if anti-self-dealing index is greater than the sample median, 0 otherwise. Anti-self-dealing index is from Andrei Shleifer's website.

Variables Used in Table 5

EXCESS_RET: Excess return. Compustat Global – Security Daily file is used to obtain month-end stock prices for the global sample. Stock prices are adjusted

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using the price quotation unit. Monthly returns are then calculated as changes in month-end stock prices adjusted for dividends if present. For the North American sample, Compustat Security Monthly file and the monthly total return variable are used. We first estimate a Fama and French (1993) 3-factor model augmented with Carhart's (1997) momentum factor with international factors from 4 regions (North America, Europe, Japan, and Asia Pacific – Ex Japan), over the same rolling windows used to calculate the speed of adjustment (SOA) variables. The dependent variable is the monthly return over the region's risk-free rate. Finally, we construct the average excess return (EXCESS_RET) for each firm-year observation using the residuals from the 4-factor model.

SOA: Speed of adjustment. Speed of adjustment calculated over 5-year rolling window as described in the first section of this Appendix.

HIGH_ANTI-SELF-DEALING_INDEX: Shareholders' rights dummy. Equals 1 if anti-self-dealing index is greater than the sample median, 0 otherwise. Anti-self-dealing index is from Andrei Shleifer's website.

Variables Used in Table 6

POST: Post-enforcement dummy. Equals 1 if the firm-year observation occurs post-1976, 0 otherwise.

TREAT: Treatment sample dummy. Equals 1 if the firm-year observation belongs to Canadian firms, 0 otherwise.

SOA: Speed of adjustment. Estimated based on the slope coefficient $(1 - \alpha_2)$ from the following regression consistent with Lintner (1956): $\mathrm{DPS}_t = \alpha_0 + \alpha_1 \times \mathrm{EPS}_t + \alpha_2 \times \mathrm{DPS}_t + \varepsilon_t$, where EPS and DPS are dividends and earnings per share, respectively. This regression is estimated for each firm during a 5-year pre-enforcement period from 1970 to 1974 and a 5-year post-enforcement period from 1978 to 1981.

M/B: Market-to-book. Calculated as the market value of assets divided by the book value of assets (AT). The market value of total assets is calculated as the book value of total assets (AT) plus the market value of equity minus the book value of shareholder's equity (CEQ) or the liquidation value of common equity (CEQL) if not available. The market value of equity for observations from Compustat North America is calculated as the number of shares outstanding (CSHO) multiplied by either the fiscal year-end closing price (PRCC_F), if available, or the fiscal year-end monthly closing price from the Compustat Merged Monthly Security File (PRCCM).

CASH: Cash holdings. Calculated as cash and short-term investments balance (CHE) scaled by the book value of assets (TA).

SIZE: Size of assets. Calculated as the natural logarithm of book value of assets based on Compustat item AT.

TANGIBILITY: Calculated as net property, plant, and equipment (Compustat item PPENT) scaled by total assets (Compustat item AT).

STD_EBITDA: Cash flow volatility. Standard deviation of EBITDA scaled by AT over the past 3 years.

PAYOUT_RATIO: Calculated as dividends (DVC) divided by income before extraordinary items (IB).

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Variables Used in Table 7

SOA: Speed of adjustment. Estimated based on the slope coefficient $(1 - \alpha_2)$ from the following regression consistent with Lintner (1956): $DPS_t = \alpha_0 + \alpha_1 \times EPS_t + \alpha_2 \times DPS_t + \varepsilon_t$, where EPS and DPS are dividends and earnings per share, respectively. This regression is estimated for each firm during a 5-year pre-enforcement period from 1970 to 1974 and a 5-year post-enforcement period from 1978 to 1981.

IT_ENFORCED: Post-enforcement dummy. Equals 1 if the firm-year observation occurs post 1976, 0 otherwise.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109021000673.

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