The Impact of SEC Rule 10b-18 on the Ratchet Effect

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SEC Rule 10b-18 in 1982 revised the Securities and Exchange Act of 1934 and led to a substantial rise in repurchase activity afterwards. We propose that this rise in repurchase activity may weaken the existence of the long-run target payout ratio, or ratchet effect, in the traditional terms of dividends and earnings. We find support for this hypothesis by demonstrating that pre-1982 payout ratios are mean reverting but post-1982 payout ratios are not mean reverting. This finding implies that SEC Rule 10b-18 has had a significant effect on the tradition of maintaining a target payout ratio. Regressions of future changes in earnings and dividends against target payout ratio deviations for both pre- and post-1982 periods reveal greater support for the ratchet effect before the adoption of SEC Rule 10b-18. These results should modify the long-standing view that all firms strive towards a long-term dividend payout ratio. Further, future dividend signaling research should account for this structural shift in dividends and repurchases.

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1. Introduction

The ratchet effect, as first introduced by Lintner (1956), suggests that firms are slow to cut dividends, and will increase dividends only if supported by higher expected future earnings growth. In other words, once managers increase, or "ratchet up", the dividend level, they do not want to be forced to reduce dividends in the future as a result of insufficient earnings. An implication of the ratchet effect is that firms strive toward maintaining a long-term target dividend payout ratio.

However, SEC Rule 10b-18 seemed to spawn a significant rise in repurchase activity, which may have provided firms with a relative substitute to dividend payouts. In fact, the dollar value of stock repurchases exceeded that of dividends issued in the U.S. for the first time in 1998 (Grullon and Ikenberrry, 2000). Prior to this rule, the Securities and Exchange Act of 1934, Section 9, banned the manipulation of securities prices. Section 9 caused firms to avoid repurchasing stock due to the risk of sparking an SEC investigation for illegally manipulating their stock prices during share repurchase programs. The Commission adopted Rule 10b-18 in 1982 which "provides that an issuer will not be deemed to have violated Sections 9(a)(2) and 10(b) of the Exchange Act, and Rule 10b-5 under the Exchange Act, *solely by* reason of the manner, timing, price, or volume of its repurchases, if the issuer repurchases its common stock in the market in accordance with the safe harbor conditions. Rule 10b-

18's safe harbor conditions are designed to minimize the market impact of the issuer's repurchases, thereby allowing the market to establish a security's price based on independent market forces without undue influence by the issuer" (Securities Exchange Act Release No. 19244, November 17, 1982).

The purpose of this paper is to provide new evidence concerning the strength of the ratchet effect in light of the rise of repurchase activity following the adoption of SEC Rule 10b-18 in 1982 which revised the Securities and Exchange Act of 1934. The substantial rise in repurchase activity may diminish the long-run target payout ratio, or ratchet effect, in the traditional terms of dividends and earnings. SEC Rule 10b-18 also allows managers to adjust capital structure through repurchases which could not be previously achieved through dividend payments. Empirical contributions are made to the scarce prior literature by investigating the role that the rise in repurchase activity has had on the existence of Lintner's ratchet effect.

This is the first paper to test the effect of SEC Rule 10b-18, which spawned a rise in repurchase activity post-1982, to determine if firms still maintain a long-run target payout ratio. The data is examined by segregating firms into pre- and post-1982 categories to test the effect of SEC Rule 10b-18. This study finds that post-1982 payout ratios are not mean reverting while pre-1982 payout ratios are mean reverting. These results should change the long-standing view that firms strive towards a long-term dividend payout ratio and have significant implications for dividend signaling models in the finance literature.

Over the sample period of 1962 to 2014, this study analyzes the results of short and long horizon Fama-MacBeth (1973) regressions of future changes in earnings and dividends against target payout ratio deviations for both pre- and post-1982 periods. Across time periods, when payout ratio deviations are higher than the target ratio, higher future earnings growth, and lower future dividend growth occur. Together, these findings suggest that the target payout ratio is maintained by allowing earnings to grow and dividends to fall relative to the higher than target payout ratio. However, this effect is more pronounced during the pre-1982 period. The lower significance of these effects found during the post-1982 period suggest that the ratchet effect has been diminished. Conversely, when payout ratio deviations are lower than the target, no relationship is found with future earnings growth, but higher future dividend growth is predicted. Once again, these relationships are less significant during the post-1982 period.

The remainder of the paper is organized as follows. Section 2 provides a review of the relevant literature. Section 3 describes the data used in the study. Section 4 describes the methodology and empirical results. Section 5 provides conclusions and areas for future research.

2. Literature Review

According to Allen and Michaely (2003), there are six important empirical results found by payout policy research studies. First, larger, more established firms pay

higher dividends and have higher repurchases than smaller firms. Second, after 1982, repurchases have become more significant as a form of payout. Third, the percentage of firms paying dividends on U.S. exchanges is in decline (Fama and French, 2001). Starting in the early 1980s, firms began their first payouts in the form of repurchases rather than dividends. Fourth, the dividend puzzle continues to exist (Black, 1976). In particular, although share repurchases are taxed less heavily than dividends which are taxed as ordinary income, companies still pay large amounts of dividends. Further, individuals in high tax brackets are paying these costly tax rates on ordinary dividends. Fifth, firms "smooth dividends relative to earnings" and "repurchases are more volatile than dividends." Firms increase dividends slowly through time, avoiding dividend cuts. From 1971 to 2001, the number of dividend cuts is much smaller than the number of dividend increases" (Allen and Michaely, 2003). Lintner (1956) finds that firms desire stable dividends and dividends are only changed when significant changes in earnings occurred. Sixth, firms receive positive stock returns in response to dividend increases and share repurchases (Pettit, 1972; Charest, 1978; Aharony and Swary, 1980; Michaely, Thaler, and Womack, 1995; Ikenberry, Lakonishok, and Vermaelen, 1995). Conversely, firms receive asymmetrically greater negative stock returns in response to dividend cuts (Bhattacharya, 1979; Miller and Rock, 1985).

Of particular interest is Allen and Michaely's (2003) finding that firms "smooth dividends relative to earnings." This discovery lends itself to the Lintner's (1956) proposed ratchet effect. Using cross-sectional data for the period 1962-2012, Wann and Jones (2014) find strong evidence of a ratchet effect at the firm level. The authors examine deviations from long-term target payout ratios and their relationship with future earnings and dividends. Wann and Jones find that when current payout ratios are above the target, future earnings growth tends to be higher, which in effect brings the payout ratio down closer to the long-term target ratio. Conversely, when current payout ratios are below the target, future earnings growth tends to be minimal or nonexistent, which in effect boosts the payout ratio up closer to the long-term target. Thus, Wann and Jones conclude that through the ratchet effect, firms do indeed strive to maintain a long-term payout ratio. Likewise, Wann and Long (2009) find that on the aggregate level, payout ratios again signal future earnings growth and that positive liquidity shocks play a key role in this. However, these studies ignored the possible influence of Rule SEC 10b18-5 on the ratchet effect.

Dividends and repurchases have different roles and are not viewed as substitutes (John and Williams, 1985; Allen, Bernardo, and Welch, 2000). This view predicts that firms facing higher information asymmetry and greater agency issues will choose dividends over repurchases in order to inform the market. However, Long, Da, and Priestley (2012) questioned the informational content of dividends, because they found that firms tend to smooth dividends per share post-war (post-1945), making dividend growth less predictable. They suggest a reason for this is that firms do not target dividends but net payout (dividends + repurchases – equity issuances).

Interestingly, they find that, unlike dividends per share, the net payout is not more smoothed in the post-war period. This combined result implies that firms are more inclined to affect net payouts through changes in repurchases and stock issuances than changes in dividends. This reduced focus on dividends also suggests we should find that the long-run target payout ratio, or the ratchet effect, is less important post-1982.

In a survey of executives, Brav, Graham, Harvey, and Michaely (2005) found that maintaining the level of dividends per share was a primary concern in forming dividend policy, while the payout ratio was only secondary. However, one may expect that payout ratios would be more important pre-1982 because SEC Rule 10b-18 kept firms from effectively using repurchases to help maintain a target dividend per share. Liu and Mehran (2016) argue that because repurchases are more flexible than dividends, repurchases could be used to help meet or beat the target dividend thresholds. Using data from 2004-2010, Liu and Mehran (2016) find that firms who just meet or beat their dividends per share targets are much more likely to repurchase a greater number of shares than other firms. They suggest that these repurchases are to ensure that dividends per share targets are met. This finding implies that long-term payout ratios (ratchet effect) should become less important post-1982.

An empirical study by Block (2006) covering the period 1995-2004, finds that the primary motivation behind share repurchases is not to signal that the stock is undervalued, as prior research has suggested. His survey of 113 *Fortune* 1000 companies indicates that the main reason the companies choose share repurchases is to avoid the increase or initiation of cash dividends. Block (2006) surmises that the reason for this was that the excess cash flow was temporary and to increase cash dividends would "tie up funds in a dividend-paying (or -increasing) strategy." Skinner (2008) looks at the relationship between earnings, dividends, and repurchases between the years 1980 and 2005. He concludes that repurchases are in effect replacing dividends, in that dividend policies are becoming progressively more conservative while repurchases are becoming progressively more linked to earnings. Skinner suggests that this would indicate that repurchases are becoming a substitute for dividends and becoming the dominant form of payout.

In another survey of executives, Brav, Graham, and Harvey (2008) examine the impact that the May 2003 dividend tax cut had on dividend payout policy. The expectation among economists was we should observe a significant increase in dividend payout and stock prices. However, while Brav, Graham, and Harvey (2008) find a significant increase in share repurchases, they only find a brief increase in actual dividend payouts following the May 2003 tax cut. Thus, it appears that the tax cut had a minimal long-term impact on dividend payout policy. Based on the survey, they find executives gave much more weight to the stability of future cash flow, cash holdings, and historic dividend levels than tax policy. The fact that the May 2003 tax cut failed to increase dividend payout and led to increases in repurchases is

consistent with the findings of dividend smoothing shown by Long, Da, and Priestley (2012). These results further suggest a weakening of the ratchet effect post-1982.

3. Data

3.1 Construction of Sample

Financial data for U.S. firms for the years 1962 to 2014 are obtained from Compustat. Firms in the financial services industry (SIC codes in the 6000s), American Depository Receipts (ADRs), utilities (with SIC codes 4911-4971), and those that do not pay dividends or those that experience negative earnings are excluded from the sample. Financial companies are excluded because regulators have the ability to influence dividend policy, and utilities are excluded due to the regulation of cash levels by some state utility commissions. To control for inflation, all dollar values are converted into constant 2014 dollars using the CPI provided by the Bureau of Labor Statistics.

The payout ratio is equal to dividends divided by earnings before interest, taxes, depreciation and amortization. Target payout is equal to the five-year rolling average payout ratio by three-digit SIC industry (Wann and Jones, 2014). Deviations from the target equal the current payout ratio minus the target payout ratio.

We conduct Bai and Perron's (1998) test to identify unknown structural breakpoints in the payout ratio and repurchase ratio over time. Consistent with the timing of SEC Rule 10b-18 in 1982, we find strong evidence of a structural break at 1981Q4 for payout ratios and 1982Q1 for repurchase ratios. Therefore, the passage of SEC Rule 10b-18 is used as a breakpoint to separate the time series stream into two categories: pre-1982 and post-1982.

3.2 Variable Descriptive Statistics

Descriptive statistics for the variables analyzed in this study are reported in Table 1. Reported variables have been inflation adjusted to constant 2014 dollars. Post-1982, firms paid higher median and average cash dividends and higher average repurchase dollars. Post-1982, firms paid an average (median) of $164.37 ($11.96) million in dividends versus $71.73 ($9.52) million paid pre-1982. A result expected by the SEC Rule 10b-18 is the significant increase in average repurchases to $111.18 million post-1982 from $4.42 million pre-1982. This combined evidence does show an overall increase in both forms of payouts as discussed by Floyd, Li, and Skinner (2015).

Average and median profits before tax also increased after 1982. Average (median) profits before tax are $334.28 ($27.61) million after 1982 and $155.71 ($27.90) before 1982. Interestingly, average dividend payout ratios are slightly higher post-1982 while median dividend payout ratios are much higher pre-1982. Before 1982, median payout ratios are 33.19% versus 23.83% after 1982. Conversely, average payout ratios are 45.41% before 1982 and 48.78% after 1982.

Similar to the results found for average repurchase dollars, average repurchase ratios are higher after 1982. Post-1982 the average repurchase ratio is 22.58% relative to 4.82% average pre-1982. Median payout ratio deviations from target are 0% as

expected. This observation also implies that the 5-year rolling average target payout ratio is appropriate for the study. Another implication is that payout ratios do revert to the target payout ratio. Average payout ratio deviations are 9.85% pre-1982 and 22.57% post-1982. The greater difference after 1982 reflects wider standard deviations which could result from the increased usage of repurchases as a possible substitute for dividends.

Table 1: Descriptive Statistics

Variable	Sample	Mean	Median	Standard Deviation	*N*
Cash dividends	Pre-1982	71.73	9.52	372.76	35,525
($million)	Post-1982	164.37	11.96	675.74	53,152
Repurchases	Pre-1982	4.42	0.00	52.02	35,525
($million)	Post-1982	111.18	0.00	728.64	53,152
Profits before tax	Pre-1982	155.71	27.90	681.48	35,496
($million)	Post-1982	334.28	27.61	1,744.88	53,016
Payout Ratio	Pre-1982	45.41	33.19	449.29	35,488
%	Post-1982	48.78	23.83	1767.08	52,994
Repurchase Ratio	Pre-1982	4.82	0.00	75.33	35,488
%	Post-1982	22.58	0.00	592.38	52,994
Payout - Target Payout	Pre-1982	9.85	0.00	367.72	35,488
%	Post-1982	22.57	0.00	1633.49	52,994
$\Delta\ln(Earnings_{t+1})$	Pre-1982	1.29	4.89	70.63	31,007
%	Post-1982	2.81	6.07	81.91	42,104
$\Delta\ln(Dividends_{t+1})$	Pre-1982	2.29	0.40	44.84	33,860
%	Post-1982	2.06	1.17	69.06	46,209

Notes: This table provides descriptive statistics that summarize the sample data for the period 1962-2014. N is the number of non-missing observations for each variable in the sample.

3.3 Variance Ratio Tests

In order to test for a long-run target payout ratio, the study utilizes the variance ratio test with aggregate quarterly income statement and balance sheet data from table F.102 in the Federal Reserve's Flows of Funds Release for Nonfarm Nonfinancial Corporate Business Quarterly. We use this aggregate data for two reasons. First, quarterly data increases the number of observations to calculate the variance ratio test. Second, the quarterly data in Compustat results in many missing observations. The aggregate data covers the period of 1951 Q4 to 2015 Q4, similar to the research study. To control for inflation, all dollar values are converted into constant 2014 Q3 dollars using the CPI provided by the Bureau of Labor Statistics.

Lo and MacKinlay's (1988) variance ratio test is used to determine if aggregate payout ratio deviations from the aggregate target payout ratio are mean reverting. Table 2 reports the variance ratios for aggregate payout ratio deviations for the full

sample and two sub-samples. The variance ratio tests demonstrate that payout ratio deviations from target are autocorrelated negatively (i.e., the unreported heteroskedastic robust test statistics are negative in sign). If firms adjust current payout ratios to a target long-run payout ratio, then deviations above the target should be followed by downward adjustments and vice versa. If target payout ratios are not perfectly and constantly maintained, then deviations from the target payout ratio can convey information about future earnings growth.

Table 2. Variance Ratio Tests.

Dividends/Earnings Variance Ratio	Number nq of base observations	Number q of base observations aggregated to form variance ratio				
		4	8	12	16	20
Full Sample	257	0.78	0.41*	0.46	0.39	0.30
Pre-1982 Sample	121	0.64*	0.45**	0.33**	0.30**	0.30*
Post-1982 Sample	136	0.80	0.44*	0.49	0.44	0.33

Notes: Dividends and earnings are stated in constant 2015 Q4 dollars, and are used in variance ratio tests for the random walk. Dividends exclude net share issues and earnings are profits before tax. *n* denotes the total number of quarterly observations over the period 1951Q4 to 2015Q4 in the variance ratio test. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

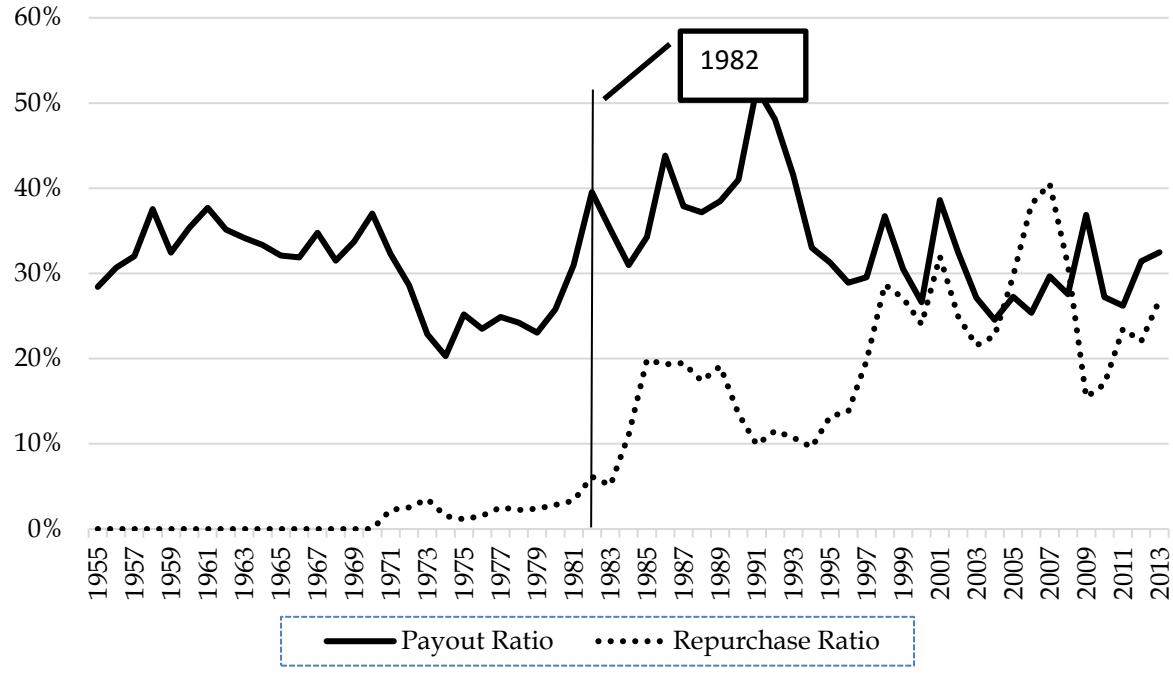
Table 2 reveals that aggregate payout ratio changes do not show much meaningful evidence of mean reversion from 1951Q4 to 2015Q4. However, pre-1982, aggregate payout ratios are mean reverting up to 20 quarters or five years into the future at p = 0.10. And, during the post-1982 sample, aggregate payout ratios only show a significance for mean reversion at eight quarters or 2 years. Therefore, the payout ratio deviations seem to revert to zero mainly before the substantial rise of repurchase activity. These results imply that the rise in repurchase activity has changed the traditional role of the payout ratio. We use the 5-year rolling average payout ratio as a proxy for the long-run target ratio to provide sufficient time to evaluate a long-run mean reversion. This is consistent with the results for the pre-1982 sample and with that used by Wann and Jones (2014). The target payout ratio is then used to calculate the degree actual payout deviations from the target.

3.4 The Rise in Repurchase Activity

Figure 1 shows the possible effects of the 1982 SEC Rule 10b-18 on repurchase activity. The dividend, repurchase, and earnings data are obtained from Compustat and aggregated each year. Figure 1 plots the payout ratio and the repurchase ratio (repurchase ratio = repurchases divided by profits before tax). The repurchase ratio shows a significant increase around 1982 concurrent with the 1982 SEC Rule 10b-18. Dividend payout ratios are more stable before 1982. Due to several changes in tax policy, the information content of payout ratios may be slightly different post-1982. From the tests that will ensue, it will become evident that tax policy has moderately affected the information content about short-run movements in future earnings.

Figure I

Dividend Payout Ratio and Repurchase Payout Ratio



Notes: The dividend, repurchase, and earnings data are obtained from Compustat and aggregated each year. The payout ratio is equal to dividends divided by profits before tax. Likewise, the repurchase ratio is equal to repurchases divided by profits before tax. Bai and Perron's (1998) test confirms a structural breakpoint for the payout ratio and repurchase ratio in 1982.

4. Methodology and Empirical Results

The primary focus of the study is to examine if the payout ratio is mean reverting both before and after the substantial rise in repurchase activity in 1982. This study also examines if there are differences in the signaling power of payout ratio changes based upon differing results during the periods of pre-1982 and post-1982. Further, the study suggests that there should be differences between payout ratio signaling significance before and after 1982. Contrary to traditional dividend signaling models (e.g., Bhattacharya, 1979; Miller and Rock, 1985), the results should indicate that dividends and share repurchases are not perfect substitutes in maintaining a long-run payout ratio.

4.1 Does the rise in repurchase activity affect dividend signaling?

In light of the rise in repurchase activity, the study examines the relative predictability of the payout ratio both pre- and post-1982. The payout ratio may not contain the same predictive content after repurchase activity increased significantly during the mid-1980s. The wave of repurchase activity may weaken the signaling power of the payout ratio post-1982.

The results of short and long horizon Fama-MacBeth (1973) regressions of future changes in earnings against target payout ratio deviations for both pre- and post-1982

periods are analyzed. These regressions are estimated over the sample period of 1962 to 2014 using Maximum Likelihood estimation and corrected for autocorrelated errors. The Maximum Likelihood Model is appropriate for the nonlinear patterns observed in earnings (Brooks and Buckmaster, 1976; Elgers and Lo, 1994; Fama and French, 2000). The time horizon ranges from one to five years. The following regression will report the time-series average slope coefficients and t-statistics of annual cross-sectional regressions of future cumulative changes in earnings against current changes in corporate cash dividends over the 52-year period.

As in Fama-MacBeth (1973), cross-sectional regressions are estimated each year in the period 1962-2014. Values reported are the time-series averages of the annual coefficients related to pre- and post-1982 payout ratio deviations and their associated *t*-statistics.

$$\Delta\ln(Earnings)_{i,t+n} = \alpha_i + \varphi_i\left[\ln(Payout_{i,t}/Target\ Payout_{i,t}) * PRE\right] + \gamma_i\left[\ln(Payout_{i,t}/Target\ Payout_{i,t}) * POST\right] + \varepsilon_{i,t} \quad (1)$$

Earnings are the natural log of the cumulative sum of changes in profits before tax in future periods t+n where n denotes the number of future years used in the summation. The payout ratio is defined as dividends divided by profits before tax. *PRE* and *POST* are dummy variables representing the periods pre- and post-1982. The coefficients Φ and γ reflect the impact of pre-1982 payout deviations and post-1982 payout deviations, respectively, on future earnings growth. The results of the equation (1) regressions are presented in Table 3.

Table 3: Pre- and Post-1982 Payout Ratio Signaling

Independent Variable	$\Delta\ln(Earnings_{t+1})$	$\Delta\ln(Earnings_{t+2})$	$\Delta\ln(Earnings_{t+3})$	$\Delta\ln(Earnings_{t+4})$	$\Delta\ln(Earnings_{t+5})$
Intercept	0.0269	0.0593**	0.0739**	0.0676**	0.0579
$\ln(Payout_t/Target\ Payout)*PRE$	0.1185***	0.1878***	0.2004***	0.1949***	0.2006***
$\ln(Payout_t/Target\ Payout)*POST$	0.1003***	0.1451***	0.1558***	0.1783***	0.1897***
Average R^2	4.02%	6.03%	6.67%	6.60%	6.26%
Average n per year	1,194	1,142	1,083	1,033	988
Number of yearly regressions	52	51	50	49	48
Wilcoxon Test: $\Phi > \gamma$	0.136	0.034	0.010	0.291	0.448

Notes: Over the period 1962 to 2014, this table reports the average coefficients of firm-level regressions of the growth in future profits before tax against the natural log of yearly payout ratio deviations. PRE is a dummy variable, where PRE=1 represents the period before 1982. POST is a dummy variable, where POST=1 represents the period including 1982 and afterward. The number of yearly regressions performed and the average number of observations used in the yearly regressions are reported. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

Reported coefficients reflected the average coefficients across all available annual regressions, and t-statistics are computed as described in Fama and Macbeth (1973). Of particular interest are the sign, magnitude, statistical significance, and differences between Φ and γ. Both coefficients Φ and γ are positive which indicates that payout ratio deviations are positively related to future earnings growth during both time periods. However, pre-1982 coefficients are statistically larger than post-1982 coefficients for two and three years of future earnings growth. This provides some evidence that pre-1982 payout ratio deviations are more predictive of short-run future earnings growth than post-1982 deviations. This is consistent with the hypothesis that the rise in repurchase activity in 1982 may have affected the ratchet effect of payout ratios.

This section provides support for the signaling theory of dividends through the mechanism of payout ratio deviations from target. Larger positive deviations from the target payout ratio signal higher future earnings growth. However, after SEC Rule 10b-18, the rate at which payout ratio deviations signal future earnings growth is diminished in the short-run.

4.2 Has the ratchet effect been weakened by SEC Rule 10b-18?

4.2.1 Future Earnings Growth

The ratchet effect should still exist during both time periods. However, this study argues that there may be a weakened ratchet effect for firms due to an increased use of repurchases as opposed to dividends after 1982.

Over the period 1952 to 2014, Table 4 reports regressions of the growth in future earnings against yearly payout ratio deviations during times of high and low payout ratios over pre- and post-1982 periods. Accordingly, the following cross-sectional regression is estimated:

$$\begin{aligned}\Delta ln(Earnings)_{i,t+n} = {} & \alpha_{1,i} * PRE + \alpha_{2,i} * POST + \\ & \varphi_{1,i}\left[\ln(Payout_{i,t}/Target\ Payout_{i,t}) * PRE * H\right] + \\ & \varphi_{2,i}\left[\ln(Payout_{i,t}/Target\ Payout_{i,t}) * PRE * L\right] + \\ & \gamma_{1,i}\left[\ln(Payout_{i,t}/Target\ Payout_{i,t}) * POST * H\right] + \\ & \gamma_{2,i}\left[ln(Payout_{i,t}/Target\ Payout_{i,t}) * POST * L\right] + \varepsilon_{i,t}\end{aligned} \quad (2)$$

Earnings are the natural log of the cumulative sum of changes in profits before tax in future periods $t+n$ where n denotes the number of future years used in the summation. The payout ratio is defined as dividends divided by profits before tax. The variable *PRE* represents the period before 1982, while *POST* represents the period after 1982. The dummy variable H (L) represents firms with higher (lower) than target payout ratios. A firm is classified each year as having a higher (lower) than target payout if the current payout ratio is above (below) the 2-digit SIC industry median target payout ratio. The target payout ratio is equal to the five-year rolling average payout ratio. The first deviation from the target payout ratio used to test the ability to predict future earnings growth is from 1952.

Table 4: Test of the Ratchet Effect: Future Earnings Growth

Independent Variable	$\Delta\ln(\text{Earnings}_{t+1})$	$\Delta\ln(\text{Earnings}_{t+2})$	$\Delta\ln(\text{Earnings}_{t+3})$	$\Delta\ln(\text{Earnings}_{t+4})$	$\Delta\ln(\text{Earnings}_{t+5})$
Intercept*PRE	-0.0485**	0.0040	-0.0218	-0.0148	-0.0359
Intercept*POST	-0.0125	-0.0344	0.0214	0.0235	0.0231
$\ln(\text{Payout}_t/\text{Target Payout})$*PRE*H	0.2506***	0.3001***	0.3293***	0.3480***	0.4052***
$\ln(\text{Payout}_t/\text{Target Payout})$*PRE*L	-0.0254	0.0106	0.0671	0.0217	0.0199
$\ln(\text{Payout}_t/\text{Target Payout})$*POST*H	0.1488***	0.2458***	0.2432***	0.2725***	0.2929***
$\ln(\text{Payout}_t/\text{Target Payout})$*POST*L	0.0320	0.0228	0.0017	0.0238	0.0140
Average R^2	10.51%	12.69%	14.09%	14.14%	13.70%
Average n per year	1,193	1,141	1,083	1,032	987
Number of yearly regressions	52	51	50	49	48
Wilcoxon Test: $\Phi_1=\Phi_2$	0.000	0.000	0.000	0.000	0.000
Wilcoxon Test: $\gamma_1=\gamma_2$	0.000	0.000	0.000	0.000	0.000
Wilcoxon Test: $\Phi_1>\gamma_1$	0.002	0.050	0.004	0.030	0.004
Wilcoxon Test: $\Phi_2>\gamma_2$	0.037	0.472	0.213	0.366	0.111
Wilcoxon Test: $\alpha_1=a_2$	0.205	0.595	0.760	0.655	0.554

Notes: Over the period 1962 to 2014, this table reports the average coefficients of firm-level regressions of the growth in future profits before tax against the natural log of yearly payout ratio deviations. PRE is a dummy variable, where PRE=1 represents the period before 1982. POST is a dummy variable, where POST=1 represents the period including 1982 and afterward. H is a dummy variable, where H=1 represents a payout ratio higher than the target payout ratio. L is a dummy variable, where L=1 represents a payout ratio lower than the target payout ratio. The target payout ratio is the five-year rolling average payout ratio. The number of yearly regressions and the average number of observations used in the yearly regressions are reported. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

Reported coefficients reflected the average coefficients across all available annual regressions similar to those reported in Table 3. Important insights can be obtained by examining differences in the sign, magnitude, and statistical significance of Φ_1, Φ_2, γ_1, and γ_2. Similar to the results found in Table 3, coefficients Φ_1, Φ_2, γ_1, and γ_2 are all positive in sign. In Table 4, however, Φ_2 and γ_2 represent times when the payout ratio is less than the target payout ratio. Therefore, those positive coefficients represent a negative relationship with future earnings growth. Since Φ_2 and γ_2 are never statistically significant, this implies that lower than target payout ratio deviations contain no informative content regarding future earnings growth. During times of lower than target payout ratios, future dividend growth should be significant in

order to restore the target payout ratio. These regression results are reported next in Table 5.

Of greater interest is the high statistical significance of Φ_1 and γ_1, which provides partial support for a ratchet effect. Positive statistical significance implies that higher than target payout ratio deviations predict higher future earnings growth. Future dividend growth must also be examined to find full support for the ratchet effect. The significance of Φ_1 and γ_1 indicates that payout ratio deviations are positively related to future earnings growth during both time periods. For higher than target payout ratio deviations, pre-1982 coefficients are statistically larger than post-1982 coefficients for up to 5 years of future earnings growth. For lower than target payout ratio deviations, the only significant difference in coefficients occurs for earnings growth one year into the future when comparing pre- and post-1982 coefficients.

This section provides support for the signaling theory of dividends through the mechanism of payout ratio deviations from target. Larger positive deviations from the target payout ratio signal higher future earnings growth. However, after SEC Rule 10b-18, the rate at which payout ratio deviations signal future earnings growth is diminished in the short- and long-run.

4.2.2 Future Dividends Growth

Over the period 1952 to 2014, Table 5 reports regressions of the growth in future dividends against yearly payout ratio deviations for the during times of high and low payout ratios over pre- and post-1982 periods. Accordingly, the following cross-sectional regression is estimated:

$$\begin{aligned} \Delta ln(Dividends)_{i,t+n} = {} & \alpha_{1,i} * PRE + \alpha_{2,i} * POST \\ & + \varphi_{1,i}\left[ln(Payout_{i,t}/Target\ Payout_{i,t}) * PRE * H\right] \\ & + \varphi_{2,i}\left[ln(Payout_{i,t}/Target\ Payout_{i,t}) * PRE * L\right] \\ & + \gamma_{1,i}\left[ln(Payout_{i,t}/Target\ Payout_{i,t}) * POST * H\right] \\ & + \gamma_{2,i}\left[ln(Payout_{i,t}/Target\ Payout_{i,t}) * POST * L\right] + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Dividends are the natural log of the cumulative sum of changes in dividends in future periods $t+n$ where n denotes the number of future years used in the summation. The payout ratio is defined as dividends divided by profits before tax. The variable *PRE* represents the period before 1982, while *POST* represents the period after 1982. The dummy variable H (L) represents firms with higher (lower) than target payout ratios. A firm is classified each year as having a higher (lower) than target payout if the current payout ratio is above (below) the 2-digit SIC industry median target payout ratio. The target payout ratio is equal to the five-year rolling average payout ratio. The first deviation from the target payout ratio used to test the ability to predict future earnings growth is from 1952.

The results in Table 5 reveal support for a weakening of the ratchet effect post-1982. The mechanism by which the target payout ratio adjusts is through a rise in dividend growth during times of lower than target payout ratios. Since the payout ratio difference from the target payout ratio is negative during lower than target payout

ratios, the expected sign on coefficients Φ_2 and γ_2 should be negative. A negative independent variable with a negative regression coefficient sign indicates a positive relationship with the dependent variable. In this case, Φ_2 and γ_2 both signify a positive relationship between lower than target payout ratios and higher future dividend growth for up to five years. But, future dividend growth is more significantly related to pre-1982 lower than target payout ratio deviations from the target than post-1982 deviations from the target for up to five years in the future. In other words, Φ_2 is significantly higher than γ_2 indicating a weaker effect of payout ratio deviations on future dividend growth during the post-1982 period. Overall, these results indicate a weaker ratchet effect during the post-1982 period.

Table 5: Test of the Ratchet Effect: Future Dividend Growth

Independent Variable	$\Delta\ln(\text{Dividends}_{t+1})$	$\Delta\ln(\text{Dividends}_{t+2})$	$\Delta\ln(\text{Dividends}_{t+3})$	$\Delta\ln(\text{Dividends}_{t+4})$	$\Delta\ln(\text{Dividends}_{t+5})$
Intercept*PRE	0.0329**	0.0559**	0.0776***	0.0514**	0.0883***
Intercept*POST	0.0348*	0.0578***	0.1279***	0.1432***	0.1086***
$\ln(\text{Payout}_t/\text{Target Payout})$*PRE*H	-0.1026***	-0.0481	-0.0135	0.0180	0.0020
$\ln(\text{Payout}_t/\text{Target Payout})$*PRE*L	-0.1120***	-0.1491***	-0.1758***	-0.2027***	-0.2327***
$\ln(\text{Payout}_t/\text{Target Payout})$*POST*H	-0.0724***	-0.0960***	-0.1134***	-0.1485***	-0.1441***
$\ln(\text{Payout}_t/\text{Target Payout})$*POST*L	-0.1048***	-0.1337***	-0.1455***	-0.1571***	-0.1861***
Average R^2	8.78%	8.36%	9.33%	9.72%	10.02%
Average n per year	1,264	1,216	1,151	1,093	1038
Number of yearly regressions	52	51	50	49	48
Wilcoxon Test: $\Phi_1=\Phi_2$	0.155	0.000	0.000	0.000	0.000
Wilcoxon Test: $\gamma_1 = \gamma_2$	0.004	0.008	0.025	0.019	0.001
Wilcoxon Test: $\Phi_1 > \gamma_1$	0.243	0.003	0.000	0.000	0.000
Wilcoxon Test: $\Phi_2 > \gamma_2$	0.073	0.036	0.029	0.037	0.009
Wilcoxon Test: $\alpha_1 = a_2$	0.945	0.935	0.700	0.324	0.469

Notes: Over the period 1962 to 2014, this table reports the average coefficients of firm-level regressions of the growth in future dividends against the natural log of yearly payout ratio deviations. PRE is a dummy variable, where PRE=1 represents the period before 1982. POST is a dummy variable, where POST=1 represents the period including 1982 and afterward. H is a dummy variable, where H=1 represents a payout ratio higher than the target payout ratio. L is a dummy variable, where L=1 represents a payout ratio lower than the target payout ratio. The target payout ratio is the five-year rolling average payout ratio. The number of yearly regressions and the average number of observations used in the yearly regressions are reported. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively.

Since the payout ratio difference from the target payout ratio is positive during higher than target payout ratios, the coefficients Φ_1 and γ_1 should be insignificant. In

other words, during times of higher than target payout ratios, the ratchet effect is upheld when dividends remain constant while higher earnings growth occurs. However, post-1982, there is a significant negative relationship ($-\gamma_1$) between higher than target payout ratio deviations with future dividend growth up to five years. This suggests that dividend growth is cut during the post-1982 period. This result may reflect the interchangeability of dividends and repurchases post-1982. If the dividend payout ratio is higher than the target, companies simply increase repurchase activity and decrease future dividend growth to maintain the target payout ratio.

This is not the case for pre-1982. The regression results for the pre-1982 period indicate that dividend growth is held constant during times of higher than target payout ratios for two to five years into the future. As discussed in Table 4, the mechanism by which the pre-1982 target payout ratio is achieved by higher than target payout ratios which lead to higher future earnings growth.

These findings suggest that SEC Rule 10b-18 has affected firm behavior with respect to dividend policy. Similarly, other literature suggests that firms are no longer as concerned about maintaining a long-run target payout ratio as they were in the past (Brav, Graham, Harvey, and Michaely, 2005). Firms give consideration to repurchases as substitutes to dividends when making payout policy decisions (Dittmar and Dittmar, 2004).

5. Conclusion

Early work by Lintner (1956) suggests that firms strive to maintain a long-term dividend payout ratio by making dividends changes as predicted by the ratchet effect. This is the first paper to test the effect of SEC Rule 10b-18, which spawned a rise in repurchase activity post-1982, to determine what types of firms still maintain a long-run target payout ratio. The substantial rise in repurchase activity in 1982 should diminish the importance of the long-run target payout ratio, or ratchet effect, in the traditional terms of dividends and earnings. Using cross-sectional analysis of U.S. firms from 1962-2014, we examine the relationship of deviations from target dividend payout ratios with future changes in earnings and future changes in dividends for both pre- and post-1982 periods.

Using firm-level data, this study finds that post-1982 payout ratios are not mean reverting while pre-1982 payout ratios are mean reverting. Regressions of future changes in earnings and dividends against target payout ratio deviations for both pre- and post-1982 periods reveal significantly greater support for the ratchet effect before 1982.

Future research should attempt to identify if there are certain types of firms that still maintain the traditional long run payout ratio. Firms can be segregated into high- and low-market-to-book categories. Post-1982, firms with more information asymmetry (high market-to-book) should strive to maintain a long-run target payout ratio. Essentially high market-to-book firms have a stronger incentive to signal in order to avoid a pooling equilibrium. The payout ratios of these firms should exhibit

a stronger ratchet effect, with less reliance upon share repurchases. Also, post-1982, firms subject to more agency problems (low market-to-book) may not have a consistent target payout ratio. Share repurchases subject firms to the asymmetric information costs of externally financing their future investments but is a less costly signal than cash dividends because only cash dividends represent long-term commitments (Williams, 1996). Low market-to-book firms may display a great tendency to disburse temporary excess cash in the form of repurchases due to lower growth opportunities.

Another area of future research should examine whether dividend and repurchase commitments influence firms' investments in capital assets, research, and acquisitions. Such research could calculate a measure of excess liquidity and examine what subsequent changes are made in capital expenditures, research and development, and acquisitions during both the pre- and post-1982 periods. Further, stock price reactions can also be measured based upon the firm's choice of investment related to excess liquidity both pre- and post-1982. These research results could provide interesting insights as to whether increased repurchase activity has had an actual adverse impact on other investment alternatives and whether these effects have been perceived negatively after the 1982 Rule SEC 10b-18.

References

Aharony, J. and Swary, I., 1980, Quarterly dividend and earnings announcements and stockholders' returns: An empirical analysis, *Journal of Finance*, 35 (1), 1-12.

Allen, E., Bernardo, A., and Welch, I., 2000, A theory of dividends based on tax clientele, *Journal of Finance*, 55 (6), 2499-2536.

Allen, F., and Michaely, R., 2003, Handbook of the Economics of Finance, Vol. 1, Part A, pp. 337-429. Chapter 7 – Payout Policy.

Bai, J. and Perron, P., 1998, Estimating and testing linear models with multiple structural changes." *Econometrica*, 66 (1), 47-78.

Bhattacharya, S., 1979, Imperfect information, dividend policy, and 'the bird in the hand fallacy, *Bell Journal of Economics and Management Science*, 10 (1), 259-270.

Black, F., 1976, The dividend puzzle, *Journal of Portfolio Management*, 2 (2), 5-8.

Block, S., 2006, An empirical study of stock repurchase programs among Fortune 100 companies, *Corporate Finance Review*, 11 (2), 22-31.

Brav, A., Graham, J. R., and Harvey, C. R., 2008, The effect of the May 2003 dividend tax cut on corporate dividend policy: Empirical and survey evidence, *National Tax Journal*, 61 (3), 381-396.

Brav, A., Graham, J. R., Harvey, C. R., and Michaely, R., 2005, Payout policy in the 21st century, *Journal of Financial Economics*, 77 (3), 483-527.

Brooks, L. D. and Buckmaster, D.A., 1976, Further evidence of the time series properties of accounting income, *The Journal of Finance*, 31, 1359-1373.

Charest, G., 1978, Dividend information, stock returns and market efficiency II, *Journal of Financial Economics*, 6 (2), 297-330.

Dittmar, A. K. and Dittmar, R. F., 2004, Stock repurchase waves: An explanation of the trends in aggregate corporate payout policy, working paper, University of Michigan.

Elgers, P. T., and Lo, M. H., 1994, Reductions in analysts' annual earnings forecast errors using information in prior earnings and security returns, *Journal of Accounting Research,* 32, 290-303.

Fama, E. F. and French, K. R., 2000, Forecasting profitability and earnings, *The Journal of Business*, 73 (2), 161-175.

Fama, E. F. and French, K. R., 2001, Disappearing dividends: Changing firm characteristics or lower propensity to pay?, *Journal Applied Corporate Finance*, 14 (1), 67-79.

Fama, E. F. and MacBeth, J. D., 1973, Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy*, 81 (3), 607-636.

Floyd, E., Li, N., and Skinner, D. J., 2015, Payout policy through the financial crisis: The growth of repurchases and the resilience of dividends, *Journal of Financial Economics*, 118 (2), 299-316.

Grullon, G. and Ikenberry, D. L., 2000, What do we know about stock repurchases, *Journal of Applied Corporate Finance*, 13 (1), 31-51.

Ikenberry, D., Lakonishok, J., and Vermaelen, T., 1995, Market underreaction to open market share repurchases, *Journal of Financial Economics*, 39 (2), 181-208.

John, K. and Williams, J., 1985, Dividends, dilution, and taxes: A signaling equilibrium, *Journal of Finance*, 40 (4), 1053-1070.

Lintner, J., 1956, Distributions of incomes of corporations among dividends, retained earnings, and taxes, *American Economic Review*, 46 (2), 97-113.

Liu, N. and Mehran, J., 2016, Does dividend policy drive repurchases? An empirical study, *Managerial Finance*, 42 (1), 13-22.

Lo, A. W. and MacKinlay, C., 1988, Stock market prices do not follow random walks: Evidence from a simple specification test, *The Review of Financial Studies*, 1 (1), 41-66.

Long, C., Da, Z., and Priestley R., 2012, Dividend smoothing and predictability, *Management Science*, 58 (10), 1834-1853.

Michaely, R., Thaler, R. H., and Womack, K., 1995, Price reactions to dividend initiations and omissions: Overreaction or drift?, *Journal of Finance*, 50 (2), 573-608.

Miller, M. H. and Rock, K., 1985, Dividend policy under asymmetric information, *Journal of Finance*, 40 (4), 1031-1051.

Pettit, R. R., 1972, Dividend announcements, security performance, and capital market efficiency, *Journal of Finance*, 27 (5), 993-1007.

Securities Exchange Act Release No. 19244 (November 17, 1982), 47 FR 53333, 53334 (November 26, 1982) (1982 Adopting Release).

Skinner, D. J., 2008, The evolving relation between earnings, dividends, and stock repurchases, *Journal of Financial Economics*, 87 (3), 582.

U.S. Securities and Exchange Commission, 1934, Securities and Exchange Act of 1934, Washington, DC: Government Printing Office.

Wann, C. R. and Jones, J. S., 2014, Does a dividend ratchet effect exist at the firm level?, *Banking and Finance Review*, 6 (1), 91-101.

Wann, C., and Long, D. M., 2009, Do liquidity induced changes in aggregate dividends signal aggregate future earnings growth?, *Journal of Financial Economics*, 33, 1-12.

Williams, M. G., 1996, Dividends and stock repurchases: A model of commitment, UCLA, Anderson Graduate School of Management, Accounting Working Paper.