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# Contemporary Aspects of Dividends: Before and During the Financial Crisis

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

CONTEMPORARY ASPECTS OF DIVIDENDS: BEFORE AND DURING THE  
FINANCIAL CRISIS

A dissertation submitted in partial fulfillment of the

requirements for the degree of

DOCTOR OF PHILOSOPHY

in

BUSINESS ADMINISTRATION

By

Gizelle Fernandez Perretti

2011

To: Dean Joyce Elam  
College of Business Administration

This dissertation, written by Gizelle Fernandez Perretti, and entitled Contemporary Aspects of Dividends: Before and During the Financial Crisis, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Date of Defense: July 14, 2011

The dissertation of Gizelle Fernandez Perretti is approved.

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Florida International University, 2011

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ABSTRACT OF THE DISSERTATION  
CONTEMPORARY ASPECTS OF DIVIDENDS: BEFORE AND DURING THE  
FINANCIAL CRISIS

by

Gizelle Fernandez Perretti

Florida International University, 2011

Miami, Florida

Professor Ali M. Parhizgari, Major Professor

The number of dividend paying firms has been on the decline since the popularity of stock repurchases in the 1980s, and the recent financial crisis has brought about a wave of dividend reductions and omissions. This dissertation examined the U.S. firms and American Depository Receipts that are listed on the U.S. equity exchanges according to their dividend paying history in the previous twelve quarters. While accounting for the state of the economy, the firm's size, profitability, earned equity, and growth opportunities, it determines whether or not the firm will pay a dividend in the next quarter. It also examined the likelihood of a dividend change. Further, returns of firms were examined according to their dividend paying history and the state of the economy using the Fama-French three-factor model.

Using forward, backward, and step-wise selection logistic regressions, the results show that firms with a history of regular and uninterrupted dividend payments are likely to continue to pay dividends, while firms that do not have a history of regular dividend payments are not likely to begin to pay dividends or continue to do so. The results of a set of generalized polytomous logistic regressions imply that dividend paying firms are more

likely to reduce dividend payments during economic expansions, as opposed to recessions. Also the analysis of returns using the Fama-French three factor model reveals that dividend paying firms are earning significant abnormal positive returns.

As a special case, a similar analysis of dividend payment and dividend change was applied to American Depository Receipts that trade on the NYSE, NASDAQ, and AMEX exchanges and are issued by the Bank of New York Mellon. Returns of American Depository Receipts were examined using the Fama-French two-factor model for international firms. The results of the generalized polytomous logistic regression analyses indicate that dividend paying status and economic conditions are also important for dividend level change of American Depository Receipts, and Fama-French two-factor regressions alone do not adequately explain returns for these securities.

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## CHAPTER 1: INTRODUCTION

### 1.1. General Introduction to Dividends

Although previous studies have identified a decline in the number of firms that distribute dividends, many firms continue to pay them. From 1990 through 2009, 111 firms paid a regular, quarterly, cash dividend in every quarter. That is a relatively small number of firms, yet the consistency exemplifies that regular quarterly dividends are important to investors, despite the triviality assigned to dividends by previous literature. The large body of literature on dividends also attests to their importance.

In the past, dividend studies largely concentrated on the dividend-earnings relationship. For example, DeAngelo, DeAngelo, and Skinner (1992) examine the relation between earnings and dividends. Among other things, they highlight the great reduction in dividends followed by losses in earnings and earnings difficulties. Past earnings problems are also related to dividend omissions. Of the firms examined in DeAngelo, DeAngelo, and Skinner (1992), 15% of negative earners omitted dividends.

After the 1990s, dividend related studies began to document declines in dividend paying firms. This trend was initially documented by Fama and French (2001). Skinner (2008) found that firms who only pay dividends (without making any repurchases) declined from 13% in 1980 to 7% in 2005. A decline in earnings, as well as an increase in the volatility of earnings has also been documented (Skinner, 2008). DeAngelo, DeAngelo, and Stulz (2006) point out that only 11.8% of firms reported negative earnings in 1978, while 50.2% of firms reported negative earnings in 2002. Despite the decline in the number of dividend paying firms, the amount paid in dividends has

increased. Firms that do pay dividends have increased the dividend amount over time (DeAngelo, DeAngelo, and Skinner, 2004).

More recent studies have found that the dividend-earnings relationship has weakened. Rather than examine the direct relation between dividends and future earnings, DeAngelo, DeAngelo, and Stulz (2006) examine the relation between earned equity and dividends. They argue that this long term measure of profitability is better than a short term measure in determining the propensity to pay dividends. Using this measure, their results indicate that dividend payment is more likely following increases in earned equity.

Stock repurchases have become the new dividend. Rather than being committed to traditional cash dividends, firms repurchase shares as a way of distributing earnings. Although the relation between dividends and earnings has weakened, Skinner (2008) points out that a strong relationship between repurchases and earnings now exists. In effect, repurchases have replaced dividends.

## 1.2. Ex-post Dividend Studies

Most studies related to dividends are ex-post studies. Ex-post studies examine past data and discuss future implications. Examples of these studies include those mentioned in the above sub-section. For example DeAngelo, DeAngelo, and Skinner (1992) relate current losses to dividend reductions. DeAngelo, DeAngelo, and Stulz (2006) relate earned equity to the propensity to pay dividends. Skinner (2008) relates past earnings to current repurchases and regular dividends. None of these studies use dividends as a predictor for future variables.

Many dividend paying studies focus on ex-dividend days. The ex-dividend day is the day which determines who receives the dividend. The individual who owns or purchases the share on the ex-dividend day will be the owner of record on the record date. This is the party who receives the dividend, even if the share is sold before the dividend payment day. Theory suggests that the price of the share will increase in an amount equal to the dividend in the days leading up to the ex-dividend day. After the ex-dividend day, the price of the share will decrease in an amount equal to the dividend. Studies on this topic attempt to measure whether dividends are in fact recaptured. What they find, for the most part, is that the change in the price of the stock is less than the amount of the dividend. Attempts to link the difference are common in dividend literature. Most studies link the difference to transaction costs, taxes, and other market frictions (Campbell and Beranek (1995), Boyd and Jagannathan (1994), and Elton, Gruber, and Blake (2005)). Ex-dividend day studies have even been extended to international firms. Gorman, Mahajan, and Weigand (2004) examine the ex-dividend behavior of American Depository Receipts.

Other dividend studies explore microstructure issues. For example, Graham, Koski, and Loewenstein (2006) study information flow and liquidity surrounding dividend announcements. They find that anticipated dividend announcements are followed by a short term increase in volume and liquidity. Adverse selection and price volatility are not affected by anticipated dividend announcements. This is consistent with previous microstructure models. However, anticipated announcements of important consequence do experience adverse information effects, with spreads remaining wide for a significant period of time. Although unanticipated dividend announcements do not

exhibit adverse information effects and price volatility long after the announcement, they are associated with wide spreads, less depth, and increased volume. This implies that dividend changes may signal fundamental firm changes.

### 1.3. Ex-ante Dividend Studies

Ex-ante studies on the topic of dividends are rare. These studies relate dividends with variables in the future, unlike the ex-post studies mentioned above.

Miller and Modigliani have authored a few ex-ante dividend studies. Miller and Modigliani (1961) and Modigliani and Miller (1959) relate dividend payment to future earnings. They introduce the “information content of dividends” hypothesis and posit that firms with temporary earnings losses are less likely to reduce dividends, compared to firms with permanent earnings problems.

Another example of this type of study is Parhizgari’s working paper “Dividends, taxes, and global financial meltdown.” This paper considers ex-ante effects by linking dividend payments and the effects of variables on payments with potential future variables, as opposed to past variables.

### 1.4. Dividends and Taxation

The controversy surrounding dual taxation of dividends has long been part of dividend literature. Income is taxed at the corporate level, and dividends to shareholders are paid from the firm’s after-tax income. Income taxes are once again applied to the dividend cash flows as part of the shareholder’s income. This is known as the dual taxation problem. Modigliani and Miller (1958 and 1963) address the dual taxation problem in terms of the optimal dividend payment policy and conclude that because dividends are taxed twice, financing with debt is optimal and firms should not distribute

dividends. They concede, however, that firms should not attempt to finance the maximum amount possible with debt because at times the cost of capital is still less expensive when dual taxation is considered.

This issue is also examined by Black (1976). Given Miller and Modigliani's (1961) conclusions that dividend policy is irrelevant, he argues that because dividends are taxed twice, the optimal dividend policy is no dividend policy.

DeAngelo and DeAngelo (2006) point out that dividend policy matters whether or not market frictions, such as taxes, exist. The reason for this is one of the fundamental theories of finance: The value (or present value) of a firm depends on the value of its future cash flows. If firms were to do away with dividends, they would, in effect, be doing away with cash flows, and thereby, driving down the present value of the firm and stockholder wealth.

### 1.5. Dividends, Governance, and Agency Theory

Management determines the dividend payout policy of the firm. They elect the amount of the dividend as well as the timing of the distributions. It should also be noted that U.S. companies predominately have dispersed ownership. This means that management is a separate party from ownership. That being the case, dividend distribution policies are affected by governance and agency theory issues.

One of the main theories for explaining why firms pay dividends, despite their unfavorable tax treatment and reduction of retained earnings, is the clientele theory. This theory states that firms pay dividends in order to attract shareholders. They will only do so, when they feel dividends will increase shareholder wealth.



Another popular and well-studied theory for explanation of dividend distributions is the signaling theory. This theory states that because managers are insiders, they are well aware of the firm's future cash flows and earnings. Outsiders, however, do not have this information available when valuing the firm. Therefore, managers disseminate information regarding the firm's future prospects through dividend distributions. Studies that examine this theory include Litner (1956), Asquith and Mullins (1983), and Fuller and Blau (2010). "The bird in hand" theory suggests that investors prefer dividends over capital gains. Once a dividend is in place, investors expect that dividend to continue into the future at regular intervals, whereas capital gains can be quite unpredictable.

The third theory that explains dividend distributions is the free cash flow hypothesis (Jensen, 1986). This theory compliments agency theory in the governance literature. It states that firms that distribute dividends do so because they have excessive stock piles of cash. Excess cash allows managers more discretion. Agency theory states that managers' interests tend to conflict with shareholder interests. Therefore, shareholders may not be comfortable with large amounts of free cash flow. That being the case, they demand free cash flow be distributed in terms of dividends.

La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) extend the free cash flow hypothesis to firms in other countries. They find that when minority shareholders have strong legal protection, they pressure management to distribute dividends. In countries where rights of minority shareholders are not adequately protected, shareholders see dividend distributions as a substitute for legal protection. Hence, these shareholders prefer dividends over promising investment opportunities the firm may otherwise have.

## 1.6. Dividends and Retained Earnings: Growth and Financing New Projects or Extending Current Projects

The Miller and Modigliani papers focus on the idea that investment policy and dividend policy go hand-in-hand. Any part of net income not paid out in dividends is available to firms for reinvestment. However, according to Miller and Modigliani, dividend policy is irrelevant because whether a firm distributes earnings or reinvests them in the firm, the value of the firm is not affected. Their framework is, of course, a frictionless market. The assumptions of Miller and Modigliani's irrelevant dividend policy do not hold in the real world. Firms have to contend with market imperfections and frictions, such as taxes, restrictions, and other costs.

The cost of issuing new stock and restrictions on debt covenants make internal financing appealing. That being the case, some companies would prefer to use retained earnings to finance all projects with a positive net present value. After all promising investment opportunities have been financed, any residual funds are used to pay dividends. This is known as a residual dividend policy.

The problem with a residual dividend policy is that once a firm has established a dividend, investors expect that dividend to continue into future periods, regardless of the earnings available after the firm's optimal capital budget has been met. Managers would have to be sure that residual funds will be relatively stable in the future before initiating a dividend. This applies to dividend increases as well.

As pointed out earlier, recent studies note the increase in earnings losses and the volatility of earnings across the cross-section of U.S. firms. According to Opler, Pinkowitz, Stulz, and Williamson (1999), this is "the main reason that firms experience

large changes in excess cash.” Rather than initiate dividends, firms with volatile earnings and high growth opportunities are more likely to hold large cash balances.

### 1.7. Description of Three Essays

In light of all the above dimensions of dividends, the scope of this dissertation is dividend payment history and economic conditions as determinants of dividend payment for U.S. firms. We also examine whether these two factors determine dividend level changes for U.S. firms and American Depository Receipts. Finally, returns according to dividend paying status are examined for both U.S. firms and ADRs.

The first essay is Chapter 2. It investigates the determinants of dividends and attempts to distinguish regular dividend paying firms from firms that do not pay cash dividends. We especially concentrate on the recent financial crisis to expose any changes in the factors that determine whether a firm pays dividends or not. We also contribute to the literature by investigating the possibility of the state of the economy as a factor in determining dividend payment.

The second essay is Chapter 3. This essay concentrates on the determinants for a change in dividend levels of US based stocks. Previous literature finds that managers rely on past dividend levels to determine dividend distributions, and they are reluctant to increase the dividend for the sake of being conservative. They will only change dividends if they feel current increases in earnings are permanent. They are also reluctant to decrease dividends, for fear of sending a distress signal to investors. Despite this, dividend levels do change, although rarely. Changes (decreases, in particular) were especially highlighted in the financial news after the summer of 2008. We also examine returns associated with announcements of dividend changes.

The final essay is Chapter 4. It is similar to the second essay in that it also examines the determinants of dividend changes, as well as their effects on returns. However, this essay concentrates on American Depository Receipts. We expect the determinants of dividend changes to be different from those of US based firms, possibly including other factors. As far as we know, this is the first study to examine the determinants of dividend changes of ADRs and their effects on returns.

The fifth and final chapter provides a comprehensive summary and conclusion of the essays. Limitations and possible areas of future research in these topics are also highlighted. These are followed by concluding remarks.

It should be emphasized that each of these essays is self-contained and complete. Each essay has its individual introduction, review of literature, and conclusion. Although the pieces are related, in that they are centered on the topic of dividends, they are considerably different. As these are stand-alone pieces, the literature review in each essay is particular to the issue examined within that essay. Therefore, it is not necessary to provide a general literature review. To that extent, the next chapter moves directly to the first essay.

## CHAPTER 2: DETERMINANTS OF DIVIDEND PAYMENT

### 2.1. Introduction

The recent market downturn was followed by announcements of firms reducing or suspending dividends. Previous literature has attempted to identify factors that determine whether a firm pays dividends or not.

Recent studies find evidence of cash dividend payments disappearing (Fama and French, 2001; DeAngelo, DeAngelo, and Skinner, 2000). Reasons for the declining number of dividend paying firms include the higher volatility of earnings, increases in frequency and magnitude of losses, and an increase in new listings (Hayn, 1995; Fama and French, 2000).

Firms that still pay dividends tend to be large and profitable (Fama and French, 2001). DeAngelo, DeAngelo, and Stulz (2006) detect a positive relation between profitability and the propensity to pay dividends. Denis and Obosov (2008) also find a positive relation between the probability of paying dividends and profitability, as well as firm size.

Reasons for paying dividends are not unanimously agreed upon in the literature. Three theories as to why firms pay dividends exist: the catering theory, the lifecycle theory, and the signaling theory. Until recently, these theories were competing theories. Fuller and Blau (2010) are able to reconcile the lifecycle theory and the signaling theory. They conclude that profitable firms with excess cash tend to pay dividends, but firms that are healthy, yet intermediate performers pay even higher dividends in order to signal that they are healthy firms.

The determinants of dividend payment identified by previous research as well as the results and conclusions in Fuller and Blau (2010) are of interest considering the recent developments in the economy. The NBER concluded that in December 2007, the United States entered a recession. In the months that followed, news reports announced various firm financial problems, dividend reductions, dividend suspensions, bank takeovers, and the downfall of many prominent firms. Have the determinants that Denis and Obosov (2008) identified changed? Did healthy firms attempt to signal by paying dividends even after the market downturn?

This study attempts to answer those questions by identifying dividend paying determinants before and during the market downturn. The remainder of this chapter is organized as follows: Section 2.2 reviews the previous literature associated with dividend distributions and determinants. Section 2.3 discusses the data available for our study. Section 2.4 discusses the methodology. Section 2.5 discusses the results, and Section 2.6 summarizes and concludes.

## 2.2. Literature Review

One of the fundamental valuation techniques taught in finance courses is Gordon's Dividend Growth Model. According to this model, we can determine the present value of common stock by discounting the future dividends of the firm in question. It would seem then, that firms would distribute dividends regularly, but as recent literature points out, regular dividend paying firms have substantially declined in numbers (Fama and French, 2001; DeAngelo, DeAngelo, and Skinner, 2000). Using data on publicly listed U.S. firms from the Compustat database for the period between 1980 and 2005, Skinner (2008) finds that only 345 firms paid regular dividends. The data

shows that the number of firms that only pay dividends (make no repurchases) fell from 13% to 7% of firms (p 583).

The literature has attempted to link the probability of paying dividends to various firm specific factors. Some argue that a large share of minority shareholders increases the probability of dividend payments (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Others point to a positive relation between earnings and dividends (DeAngelo, DeAngelo, and Skinner, 1992). Firm size has also been found to be positively related to dividend payments (Fama and French, 2001; DeAngelo, DeAngelo, and Stulz, 2006; Denis and Osobov 2008). In the Brav, Graham, Harvey, and Michaely (2005) survey, firm managers admit that past dividend levels, not target dividend ratios, are used in determining the firm's dividend distribution policy. Firms that regularly pay dividends continue to do so because they have a long history of doing so, and therefore feel an obligation to regularly distribute dividends.

Theories that relate to the propensity to pay dividends include the catering or clientele theory, the cash flow or life cycle theory, and the signaling theory. Support and evidence against each theory exists in the literature.

The catering theory states that the demands of the shareholders influence the company's policies (Baker and Wurgler, 2004). It asserts that firms cater to their investors when determining dividend distribution policies. Support for this theory is evident in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000). Li and Lee (2006) extend the study by Baker and Wurgler (2004) by providing some evidence (albeit weak) that managers' decisions regarding dividend increases and decreases are influenced by a dividend premium. They concede that the catering theory cannot fully explain dividend

policies. The majority of the recent literature refutes the catering theory. For example, most studies note the decline in dividend paying firms, which is evidence that firms are not catering to a particular group of investors.

Skinner (2008) investigates the relationship between earnings and repurchases, and finds that while this relationship has strengthened over time, the relationship between earnings and cash dividends has weakened. He observes that firms that exclusively pay dividends are almost non-existent. Rather than pay regular dividends, many firms make repurchases, probably due to their flexibility. Most firms that still pay regular dividends also use repurchases.

The life cycle theory (sometimes referred to as the cash flow theory) states that mature firms are more likely to pay dividends, while younger firms are not. As firms become mature, they tend to become more profitable, yet they have less growth opportunities, which leaves them with large cash balances. If excess cash is not paid out as dividends, managers are granted more discretion, which shareholders may not be comfortable with. Therefore, mature firms will distribute dividends to minimize excess cash. On the other hand, young firms tend to be less profitable and have more growth opportunities, so any cash they do have will be utilized for investment and growth.

Fama and French (2001) find evidence to support the life cycle theory. They observe that dividends tend to be paid by profitable firms with low growth rates, while less profitable firms with higher growth rates tend to retain earnings. DeAngelo, DeAngelo, and Stulz (2006) also support the life cycle hypothesis and refute the clientele and signaling theories. They measure profitability as the ratio of retained earnings to total equity and the ratio of retained earnings to total assets, arguing that these longer term



measures of profitability are better determinants (than short term measures) of the propensity to pay dividends. Using logistic regressions, and controlling size, growth, dividend history, and other factors, they find strong evidence that RE/TE and RE/TA are indeed positively related with the probability of dividend payment.

Denis and Obosov (2008) identify determinants of dividends on an international level. They use data from Worldscope, and the available data limits their study to developed countries. Using a logistic model, they find that the propensity to pay dividends is positively related to size and profitability, but negatively related to growth opportunities. The results in Denis and Obosov (2008) also support the lifecycle or cash flow theory of dividend distributions.

The signaling theory states that firms that pay high dividends do so in order to signal to investors that the firm's future cash flows have increased (Healy and Palepu, 1988). A decrease in dividends should be interpreted as evidence that the firm's future cash flows have decreased (Miller and Rock, 1985). Managers have insider information regarding the firm's future prospects, and they use dividend announcements as a method of providing investors with that information. The non-monotonic relation between earnings and dividends observed in previous studies served as evidence against the signaling theory.

Recently, Fuller and Blau (2010) have been able to provide evidence that reconciles the cash flow and signaling theories. They are able to justify the non-monotonic relationship between firm performance and dividend payment that previous papers have used to refute the signaling theory. They explain that good performers pay a dividend because they may have excess cash and not enough profitable investment

opportunities. Poor performers pay small dividends, but intermediate performers show evidence of signaling. Intermediate performers that are actually healthy firms pay dividends higher than dividends of good performers in order to distinguish themselves from unhealthy intermediate performers.

### 2.3. Data

The data for this study is available from the CRSP and COMPUSTAT databases. From the CRSP database we are able to gather dividend record dates for firms trading on the NYSE, AMEX, and NASDAQ exchanges. Firms are identified as dividend payers, non-dividend payers, and “switcher” firms based on their dividend paying history in the previous twelve quarters. Firms identified as dividend payers have paid a regular, quarterly, cash dividend in all of the previous twelve quarters. We identify these distributions using the CRSP database code “1232.” Firms that have not paid a single regular, quarterly, cash dividend in the previous twelve quarters are labeled as non-dividend payers. Switcher firms are those that paid regular, quarterly, cash dividends within the previous twelve quarters, but did not distribute dividends in every quarter.

Most of our data for this study is available from the COMPUSTAT database. From this database, we gather data on fundamental, firm specific variables that may be used to explain a firm’s dividend paying status. Data gathered from the COMPUSTAT database includes firm market value, operating income after depreciation, net income, book value of assets, retained earnings, and book value of equity.

The study period ranges from 1993 through 2009 (covering 19 years), but data is gathered from 1990 through 2009 in order to determine the dividend paying status of each firm as explained above. During our study period, the world markets experienced a

boom and a small crash due to tech stocks in the early 2000s, as well as a severe recession (which began in December 2007, according to NBER) that may have affected dividend paying status. We attempt to find changes in dividend paying status associated with these events, by including a variable to control for the state of the economy. Such a variable can be proxied by various measures, such as the S&P 500 Index, GDP, and NBER classifications of economic expansions and contractions.

In order to assess whether the market conditions influence dividend payment, we examine these three different indicators of market conditions.

The definition of a recession is two or more consecutive quarters of a decline in GDP. Data on GDP is available from the Bureau of Economic Analysis. This measure may not be satisfactory to some because it does not factor in other items such as unemployment and other market conditions.

The NBER uses a more broadly defined measure of recession. “The NBER does not define a recession in terms of two consecutive quarters of decline in real GDP. Rather, a recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales” (US Business Cycles and Contractions, NBER). According to the NBER, economic contractions in the United States include the time period between March 2001 and November 2001, as well as the period between December 2007 and June 2009.

Finally we examine whether the return on the S&P 500 Index affects the dividend payment policies of firms in the following quarter.

Each dividend announcement is classified according to whether it occurred during an economic recession or expansion according to the NBER, as well as the dividend paying status of the particular firm.

Table 1 displays descriptive statistics for variables that previous literature associates with dividend payment. We also include the quarterly return on the S&P 500 Index. Mean, Median, Minimum, and Maximum statistics are provided.

Total Assets, which we use as a measure of firm size, is considerably higher at \$11,474 million for firms that regularly pay dividends, as compared to “switcher” firms with average Total Assets of \$5,654 million and non-dividend paying firms with average Total Assets of \$1,343 million. We use Total Assets as our measure of size, rather than market capitalization, because market capitalization is equal to the price of the stock multiplied by the number of shares outstanding. We are attempting to single out the relation between economic conditions and the probability that a firm will pay a dividend. Using market capitalization may cause confounding results because it is influenced by price, which will be relatively high during market expansions and relatively low during recessions.

Our first measure of growth opportunity is measured as “the ratio of the market value of total capital (book value of total assets – book value of equity + market value of equity) to the book value of total assets ( $V_t/A_t$ )” (Denis and Obosov, 2008, p 64). We will henceforth refer to this measure as “Growth Opportunities 1.” This measure of growth opportunity implies that non-dividend payers, on average, have higher growth opportunities than both dividend payers and switchers. This supports the cash flow

Table 1

Descriptive Statistics for Non-Dividend Paying, Dividend Paying, and Switcher Firms,  
1993Q1 – 2009Q2

The S&P 500 Qtr. Return is the Quarterly return on the S&P 500 Index. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets - book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Variable	Mean	Median	Minimum	Maximum
	Nonpayer			
S&P 500 Qtr. Return	0.02	0.02	-0.23	0.21
Total Assets	1,343.18	84.47	0	2,363,878
Growth Opportunities 1	2.70	0.98	0	12,900
Growth Opportunities 2	-20,346.42	-0.01	-872,408,000	20.23
Earned Equity	-9.69	-0.04	-193,778.43	776.98
Profitability 1	-0.05	0	-2,132	486
Profitability 2	-0.28	0.01	-8,652.75	2,202
	Payer			
S&P 500 Qtr. Return	0.02	0.02	-0.23	0.21
Total Assets	11,474.34	1,359.01	0.01	2,358,266
Growth Opportunities 1	0.97	0.56	0	454.87
Growth Opportunities 2	-70.85	0	-2,366,619	0.36
Earned Equity	0.30	0.65	-5,459	7,665.12
Profitability 1	0.01	0.01	-8.33	33.84
Profitability 2	0.09	0.03	-1,531.50	1,023.67
	Switcher			
S&P 500 Qtr. Return	0.02	0.02	-0.23	0.21
Total Assets	5,654.43	658.58	0.02	1,888,599
Growth Opportunities 1	0.84	0.44	0.00	323.50
Growth Opportunities 2	-27.83	0	-1,009,032	0.21
Earned Equity	-0.38	0.49	-12,331	116.88
Profitability 1	0.01	0	-8.44	10.05
Profitability 2	0.15	0.03	-260.00	5,395

hypothesis and suggests that mature firms pay dividends because reinvestment opportunities may not provide enough creation of wealth. Shareholders of these firms value distribution of earnings rather than reinvestment in mediocre activities. Non-dividend payers, on the other hand, have reinvestment and growth opportunities that maximize shareholder wealth.

The second measure of growth opportunity is measured as the percentage change in assets over the quarter ( $dA_t/A_t$ ). We will henceforth refer to this measure of growth opportunities as “Growth Opportunities 2.”

Earned Equity is measured as the ratio of retained earnings to book value of equity. In line with intuition, earned equity in the prior quarter tends to be higher for firms that have consistently distributed dividends over the previous twelve quarters. This supports the notion that firms with large cash reserves tend to be dividend payers. Non-dividend payers have negative earned equity on average. This implies that on average their retained earnings are negative. Their equity may arise from raising capital through stock issues. This is common for young firms.

We also employ the two measures of profitability noted in Denis and Obosov (2008). The first measure of profitability is measured as the ratio of earnings before interest to the book value of total assets. We will refer to this measure of profitability as “Profitability 1.” Profitability1 is higher for dividend payers and switchers, on average. Non-dividend payers have negative profitability, again indicating that average earnings are negative for non-dividend payers and implying that these firms may be young firms.

The second measure of profitability is measured as the ratio of after-tax earnings to the book value of equity. We will refer to this measure of profitability as “Profitability

2.” Switcher firms have the highest value for Profitability<sub>2</sub>, with dividend payers close behind. Non-dividend payers have negative profitability using this measure, which verifies the results using Profitability<sub>1</sub>. Switcher firms and dividend paying firms have very similar means and medians of profitability. Despite the similarity in means and medians, switcher firms have a much wider distribution in profitability regardless of the measure used. This wide distribution may explain why switcher firms are not regular dividend payers.

Table 2 introduces the importance of market conditions. It displays summary statistics for determinants of dividend payment according to the firms’ dividend paying status, as well as the economic cycle, as determined by the NBER. It is a well-accepted fact that financial markets tend to increase in value over the long run; so naturally, there are more observations during expansion periods, as opposed to recession periods.

Confirming intuition, the S&P 500 has a negative average quarterly return for all types of firms during recession periods, but a positive average quarterly return for all types of firms during expansionary periods. Total assets are also higher, on average, for all firms during expansionary periods and lower during recession periods.

Growth opportunities seem to be higher for non-dividend payers and dividend payers during recessions, while lower for switchers in recessions. This may be due to the fact that some firms classified as switchers may be firms that discontinued dividend payments during the twelve quarter classification period. On average, Growth Opportunities 2 seems inappropriate as all means are negative and variability is extremely large.

During expansionary periods, the average quarterly earned equity of the prior period for dividend payers is positive, but it highly negative for non-dividend payers, and slightly negative for switchers. Prior to periods labeled as recessionary, average quarterly earned equity is positive and higher for dividend payers, positive for switchers, but negative for non-dividend payers.

On average, Profitability is highest for firms classified as dividend payers, and is slightly higher in recession periods. On the other hand, average Profitability is lowest, and negative, for firms classified as non-dividend payers, and is slightly more negative in recession periods. Average profitability is slightly lower, but still remains positive for switcher firms.

Profitability 2 has similar implications as the first profitability measure in regards to dividend payers and non-dividend payers. Implications for switcher firms differ slightly. Switcher firms have slightly higher average profitability during recessions, when using the second profitability measure.

#### 2.4. Methodology

The logistic model is a nonparametric procedure, so it is not restricted to many of the assumptions of parametric procedures. The data does not have to be “normally distributed, linearly related or of equal variance within each group” (Sheskin, 2007). The logistic regression assumes that observations in an analysis are independent of one another. Logistic regressions also require a large sample, according to Wright (1995), because small samples can lead to inaccurate coefficients that have high standard errors.

The logistic model is also appropriate here because a binary logistic model can be



Table 2

## Univariate Statistics According to Dividend Paying Status and Economic Cycle

The S&P 500 Qtr. Return is the Quarterly return on the S&P 500 Index. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they have paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm. A quarter is labeled as expansion or recession if it is classified as such by the National Bureau of Economic Research. According to the NBER recessions occurred between March 2001 and November 2001 and between December 2007 and June 2009.

Variable	Expansion				Recession			
	Nonpayer				Nonpayer			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
S&P 500 Qtr. Return	0.031	0.029	-0.176	0.209	-0.068	-0.099	-0.226	0.152
Total Assets	1,288	80	0	2,363,878	1,728	127	0	1,097,188
Growth Opportunities 1	2.65	1.00	0.00	12,900.00	3.00	0.84	0.00	9,467.15
Growth Opportunities 2	-21,196.1	-0.006	-8.72E+08	20.226	-14,446.4	-0.003	-252,708,531	4.579
Earned Equity	-9.298	-0.028	-92,317	776.982	-12.365	-0.109	-193,778.426	99.821
Profitability 1	-0.049	0.003	-2132	486	-0.055	0.000	-99.429	13
Profitability 2	-0.285	0.010	-8,652.750	2202	-0.207	0.002	-540	1,499.741
Variable	Payer				Payer			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
S&P 500 Qtr. Return	0.036	0.031	-0.176	0.209	-0.067	-0.089	-0.226	0.152
Total Assets	10,483	1,279	0	2,254,394	17,436	2,017	1	2,358,266
Growth Opportunities 1	0.96	0.57	0.00	454.87	1.05	0.48	0.00	367.24
Growth Opportunities 2	-82.217	0.000	-2,366,619	0.359	-2.501	0.000	-3,453.633	0.033
Earned Equity	0.116	0.645	-5,459	1,518.667	1.417	0.649	-63.622	7,665.115
Profitability 1	0.013	0.008	-8.326	33.842	0.015	0.005	-1.054	12.488
Profitability 2	0.094	0.031	-1,531.500	1023.667	0.084	0.025	-388.731	279.160

Table 2 (continued)

## Univariate Statistics According to Dividend Paying Status and Economic Cycle

Variable	Expansion				Recession			
	Switcher				Switcher			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
S&P 500 Qtr. Return	0.034	0.025	-0.137	0.209	-0.066	-0.099	-0.226	0.152
Total Assets	5,388	621	0	1,888,599	7,467	949	1	953,427
Growth Opportunities 1	0.85	0.45	0.00	323.50	0.73	0.37	0.00	49.76
Growth Opportunities 2	-31.785	0.000	-1,009,032	0.209	-0.910	0.000	-1,942.323	0.140
Earned Equity	-0.452	0.492	-12,331	116.883	0.112	0.493	-524.962	36.743
Profitability 1	0.009	0.005	-8.443	10.048	0.006	0.003	-1.046	1.131
Profitability 2	0.032	0.027	-260	254.3862	0.930	0.022	-19.767	5,395

employed so that the dependent variable is comprised of two categories. It allows for computation of a probability that will always fall between 0 and 1.

## 2.5. Empirical Results

The purpose of this essay is to determine the probability that a firm will or will not make a dividend payment. We expect that factors noted as significant in other related studies, such as the firms profitability, earnings, and size, will be significant in determining whether a firm will pay dividends or not.

Previous research, surveys in particular, point out that managers are reluctant to change dividend payment policies. These surveys note a general feeling of obligation to continue dividend payments for firms that have historically paid dividends. As such, we believe a firm's recent dividend paying history largely determines whether a firm will or will not pay a dividend in the coming quarter.

The recent recession and financial troubles of firms worldwide also highlights another factor that may be important in determining the probability that a firm will announce a dividend payment or not: market conditions.

As noted above, dividend paying history and market conditions have never before been studied as possible determinants for cash distribution policies.

Because the focus of this essay is on the likelihood of a specific outcome, a dividend distribution, or lack thereof, we find it appropriate to employ a binary logistic regression. In particular, we model the probability that a firm will not pay a dividend. If a firm does not pay a dividend, the dependent variable will be equal to 1. If a firm pays a dividend, the dependent variable will be equal to 0.

The null hypothesis and alternative hypothesis are stated below:

H0: Dividend non-payment cannot be predicted by firm profitability, earnings, size, dividend payment history, or market conditions.

HA: Dividend non-payment can be predicted by firm profitability, earnings, size, and dividend payment history, as well as market conditions.

Table 3 tabulates the number for cases where a firm did or did not pay a dividend according to the firms' dividend paying status and the economic climate during the dividend announcement. This table highlights the importance of dividend paying history in determining whether a firm will or will not pay a dividend. Financial markets tend to expand over the long run, so naturally there are more quarters labeled as expansionary by the NBER. According to the NBER, between 1993 and 2009, recessions occurred from March 2001 through November 2001 and December 2007 through June 2009. Therefore, our sample has ten quarters labeled as recession quarters. During recessions, most non-dividend paying firms continue to not pay dividends. In only 0.4% of cases between 1993 and 2009, did non-dividend paying firms begin to pay dividends. In the other extreme, dividend payers continued to pay dividends through recessions in 96.88% of instances, with dividends being omitted or suspended only 3.12% of the time. Switchers distributed dividends in 74.31% of cases, but did not distribute dividends 25.69% of the time.

In expansionary periods, non-dividend paying firms are a little more likely (1.53% of cases) to initiate dividend payments. For the most part, however, they continue as non-dividend payers. A high number of dividend payers continue to pay dividends (96.37% of cases), but in 3.63% instances, a dividend payer omitted or suspended dividend payments. Switchers see the most difference between expansions and recessions. This may be because their earnings and profitability have higher volatility as

Table 3

Number of Instances when Firms Paid or Did Not Pay a Dividend According to Dividend Paying Status and Economic Cycle

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm. Once classified by its previous 12 quarters, it is determined if a firm paid a dividend or not in the next quarter. If the firm paid a dividend in the next quarter, that instance is counted in the “Paid” column, whereas if a firm did not pay a dividend in the next quarter, that instance is counted in the “Did not Pay” column. A quarter is labeled as expansion or recession if it is classified as such by the National Bureau of Economic Research. According to the NBER recessions occurred between March 2001 and November 2001 and between December 2007 and June 2009.

	Recession						Expansion					
	Paid		Did not Pay		Total		Paid		Did Not Pay		Total	
Nonpayer	154	0.40%	38,475	99.60%	38,629	100%	4,103	1.53%	264,065	98.47%	268,168	100%
Payer	10,099	96.88%	325	3.12%	10,424	100%	60,410	96.37%	2,275	3.63%	62,685	100%
Switcher	5,121	74.31%	1,770	25.69%	6,891	100%	37,073	79.12%	9,785	20.88%	46,858	100%

seen in Tables 1 and 2. In expansionary periods, switcher firms paid dividends 79.12% of the time, while skipping dividends in 20.88% of cases.

In order to determine whether the factors such as earnings, profitability, growth opportunities, dividend paying history, and market conditions can predict dividend non-payment in a particular quarter, we use forward selection. Forward selection allows for variables to be added to the model one by one to determine if the factor is significant and contributes to the model. This is useful as we have two measures of profitability and growth opportunity, and three different measures of economic conditions.

The first model we test is

$$\begin{aligned} \Pr(\text{Payment}_t) = & \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{Expansion} + \beta_4 \text{Nonpayer} * \\ & \text{Expansion}_{t-1} + \beta_5 \text{Payer} * \text{Expansion}_{t-1} + \beta_6 \text{Total Assets}_{t-1} + \\ & \beta_7 \text{GrowthOpportunity1}_{t-1} + \beta_8 \text{Profitability1}_{t-1} \end{aligned} \quad (1)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer.

The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansions and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. Total Assets is the book value of total assets in the prior quarter.

Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the

book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Each variable is added to the model one by one. Panels 1 through 4 of Table 4 display the results of the forward selection process. According to Panel 1, remarkable improvements are made in the prediction of non-payment by including the variables in Equation 1. The Likelihood Ratio, the Schwarz Criterion, and the Akaike Information Criterion improve from 489,666; 486,669; and 486,679, respectively, when only the intercept is included to 116,893; 116,911; and 116,911, respectively, when the variables in equation 1 are included.

Panel 2 displays a type 3 analysis of effects based on the Wald test. All of the variables in equation 1 are statistically significant at the 5% level, indicating that these factors affect dividend non-payment in the coming quarter. In fact, all effects, except Growth Opportunity, are significant at the 0.01% level. Another interesting result, is the statistical significance of the Status\*EconomicCycle interaction effect. This indicates evidence that economic cycles affect dividend paying, non-dividend paying, and switcher firms differently.

Panel 3 displays the parameter estimates for Equation 1. The ExpEst column contains the exponentiated parameter estimates, which represent the odds ratios for the variables. If the figure in Estimate column is positive, the odds ratio indicates “the amount of increase in the Log odds for a one-unit increase in the predictor variable” (Sheskin, 2007, p 1596). If the Estimate is negative, then the odds ratio is the amount of

Table 4

Forward Selection Procedure With Growth Opportunities 1 and Profitability 1 and NBER Market Measure

The probability modeled is that Payment = ‘No’. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher’s scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486,666.46	486,668	486,679
1	117,619.38	117,625.38	117,658.23
2	117,373.39	117,381.39	117,425.20
3	117,088.93	117,100.93	117,166.64
4	117,047.78	117,061.78	117,138.44
5	116,934.43	116,950.43	117,038.03
6	116,893.22	116,911.22	117,009.77

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	Wald ChiSq	Prob ChiSq
Status	2	24462.5396	<.0001
Economic Cycle	1	213.8736	<.0001
Status*Economic Cycle	2	215.2143	<.0001
Total Assets	1	36.7924	<.0001
Growth Opportunities 1	1	126.6917	<.0001
Profitability 1	1	116.8697	<.0001



Table 4 (continued)

Forward Selection Procedure With Growth Opportunities 1 and Profitability 1 and NBER Market Measure

Panel 3: Type 3 Parameter Estimates with Effect Coding								
Variable	ClassVal0	ClassVal1	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq	ExpEst
Intercept			1	0.0795***	0.0188	17.88	<.0001	1.083
Status	Nonpayer		1	4.7417***	0.0309	23,577.36	<.0001	114.626
Status	Payer		1	-3.4546***	0.0255	18,328.36	<.0001	0.032
Economic Cycle	Expansion		1	-0.268***	0.0183	213.87	<.0001	0.765
Status*Economic Cycle	Nonpayer	Expansion	1	-0.4401***	0.0308	203.79	<.0001	0.644
Status*Economic Cycle	Payer	Expansion	1	0.3313***	0.0255	168.80	<.0001	1.393
Total Assets			1	-1.46E-06***	2.42E-07	36.79	<.0001	1
Growth Opportunities 1			1	0.039***	0.00347	126.69	<.0001	1.04
Profitability 1			1	-0.0894***	0.00827	116.87	<.0001	0.914

Panel 4: Type 3 Odds Ratio Estimates			
Effect	OddsRatioEst	LowerCL	UpperCL
Total Assets	1	1	1
Growth Opportunities 1	1.04	1.033	1.047
Profitability1	0.914	0.9	0.929

decrease in the Log odds attributable to a one-unit increase in the predictor variable. The odds ratios are also displayed in Panel 4 for non-categorical variables.

These results indicate that a firm classified as a non-payer, based on its lack of dividend distributions over the previous twelve quarters, is 114.63% more likely to not pay a dividend in the coming quarter during a recession. On the other hand, if the market is in an expansionary period, a non-dividend paying firm is 0.64% less likely to continue its non-dividend paying course. A dividend paying firm is 0.032% less likely to not pay a dividend over a switcher firm during a recession. This is relatively intuitive, since previous literature has noted managers' reluctance to change distribution policies, and discontinuation of dividend payments during a recession can be extremely damaging to a firm.

Seemingly counterintuitive, a dividend paying firm is 1.393% more likely to omit a dividend payment during an expansion, as opposed to a recession. This may be explainable if we take previous literature into account. If managers forecast that earnings cannot keep up with cash distributions, they may use an economic expansionary period (when bad news may be less damaging) to announce dividend suspensions. This new and counterintuitive finding has not previously been noted in other studies

During an expansion, a switcher firm is 0.765% less likely to omit a dividend. This is also intuitive. It is likely that many of these switcher firms began paying dividends in the recent past, or have a pattern of sporadic dividend payments. Table 1 also noted greater variability in profitability for switcher firms. Therefore, they are more likely to pay dividends, and less likely to omit or discontinue dividends, during an economic expansion.

If a firm experiences a one unit increase in total assets, it is 1% less likely to not pay a dividend compared to a firm whose asset size did not change. Profitability also shows similar evidence. A one unit increase in profitability implies that a firm is 0.014% less likely to not pay a dividend. These results support previous literature, where large size and profitability have been linked with dividend payment. On the other hand, a one unit increase in growth opportunities increases the likelihood that a firm will not pay a dividend in the coming quarter by 1.04%. This is also intuitive and supports previous literature. Firms with more growth opportunities are more likely to retain earnings for reinvestment, rather than distribute them in the form of dividends.

The second model we test is

$$\begin{aligned} \Pr(\text{Payment}_t) = & \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{Payer} + \beta_4 \text{Nonpayer} * \text{Expansion}_{t-1} + \\ & \beta_5 \text{Payer} * \text{Expansion}_{t-1} + \beta_6 \text{Total Assets}_{t-1} + \\ & \beta_7 \text{GrowthOpportunity}_{t-1} + \beta_8 \text{Profitability}_{t-1} \end{aligned} \quad (2)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the standard definition of a recession. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if GDP has not declined for two or more consecutive quarters, and 0 otherwise. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio

of the market value of total capital to the book value of total assets  $((\text{book value of total assets} - \text{book value of equity} + \text{market value of equity}) / \text{book value of total assets})$  in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Each variable is added to the model one by one. Panels 1 through 5 of Table 5 display the results of the forward selection process. The Likelihood Ratio, the Schwarz Criterion, and the Akaike Information Criterion improve from 486,667; 486,668; and 486,679, respectively, when only the intercept is included to 117,580; 117,588; and 117,632, respectively, once the forward selection process is complete.

Panel 2 displays Type 3 analysis of effects based on the Wald test. Of the five variables in Model 2, only dividend paying Status and Size, proxied by Total Assets, significantly contribute to a firm's lack of payment in the coming quarter. In this model, dividend paying history is an important determinant of dividend payment, but the state of the economy is not. This may be due to the fact that this model defines an economic recession as two or more consecutive declines in Gross Domestic Product (GDP). This definition does not include other pertinent information such as unemployment or consumer confidence, which also contribute to overall market conditions.

Panel 4 displays odds ratios for the statistically significant variables in Model 2. According to this model, a non-dividend payer is 265% more likely to omit a dividend than a switcher firm. A dividend payer is 0.136% less likely, than a switcher firm, to omit a dividend. As in Model 1, a one unit increase in Total Assets is associated with a 1% decrease in the likelihood that the firm will not pay a dividend in the coming quarter.

Table 5

Forward Selection Procedure With Growth Opportunities 1 and Profitability 1 and GDP Market Measure

The probability modeled is that Payment = ‘No’. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher’s scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the standard definition of a recession. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if GDP declines for two or more consecutive quarters and 0 otherwise. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486666.5	486668	486679
1	117619.4	117625.4	117658.2
2	117580.2	117588.2	117632

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	WaldChiSq	ProbChiSq
Status	2	113633.77	<.0001
Total Assets	1	38.4835	<.0001

  

Panel 3: Type 3 Parameter Estimates with Effect Coding							
Variable	ClassVal0	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq	ExpEst
Intercept		1	-0.0983***	0.00943	108.7589	<.0001	0.906
Status	Nonpayer	1	4.3868***	0.0131	112804.254	<.0001	80.387
Status	Payer	1	-3.1928***	0.0151	44665.3225	<.0001	0.041
Total Assets		1	-1.50E-06***	2.42E-07	38.4835	<.0001	1

  

Panel 4: Type 3 Odds Ratio Estimates				
Effect		OddsRatioEst	LowerCL	UpperCL
Status	Nonpayer vs Switcher	265.305	255.554	275.429
Status	Payer vs Switcher	0.136	0.129	0.142
Total Assets		1	1	1

Table 6

## Forward Selection Procedure With Growth Opportunities 1 and Profitability 1 and S&amp;P 500 Market Measure

The probability modeled is that Payment = 'No'. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher's scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable "Nonpayer" is equal to 1 if the firm has not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable "Payer" is equal to 1 if the firm has paid a regular cash dividend (distribution code "1232" in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure economic conditions as the return on the S&P 500 from the previous quarter. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486666.5	486668	486679
1	117619.4	117625.4	117658.2
2	117489.4	117497.4	117541.2
3	117452.1	117462.1	117516.9

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	Wald ChiSq	Prob ChiSq
Status	2	113,232.64	<.0001
S&P 500 Qtr. Return	1	127.89	<.0001
Total Assets	1	36.59	<.0001

  

Panel 3: Type 3 Parameter Estimates with Effect Coding							
Variable	ClassVal0	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq	ExpEst
Intercept		1	-0.1222***	0.00967	159.51	<.0001	0.885
Status	Nonpayer	1	4.3935***	0.0131	112,427.48	<.0001	80.921
Status	Payer	1	-3.1967***	0.0151	44,687.38	<.0001	0.041
S&P 500 Qtr. Return		1	1.1364***	0.1005	127.89	<.0001	3.116
Total Assets		1	-1.46E-06***	2.41E-07	36.59	<.0001	1

Table 6 (continued)

Forward Selection Procedure With Growth Opportunities 1 and Profitability 1 and S&P 500 Market Measure

Panel 4: Type 3 Odds Ratio Estimates				
Effect		OddsRatioEst	LowerCL	UpperCL
Status	Nonpayer vs Switcher	267.79	257.917	278.04
Status	Payer vs Switcher	0.135	0.129	0.142
S&P 500 Qtr. Return		3.116	2.559	3.794
Total Assets		1	1	1

The third model we test is

$$\Pr(\text{Payment}_t) = \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{S\&P500Ret} + \beta_4 \text{Total Assets}_{t-1} + \beta_5 \text{GrowthOpportunity1}_{t-1} + \beta_6 \text{Profitability1}_{t-1} \quad (3)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure economic conditions using the return on the S&P 500 from the previous quarter. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Each variable is added to the model one by one. Panels 1 through 4 of Table 6 display the results of the forward selection process. Of the five variables in Model 3, only three of them are determined to be significant using the forward selection process: Status, S&P 500 Return in the previous quarter and Total Assets. Although this model excludes factors such Profitability and Growth Opportunities, it does imply that the dividend paying history of a firm as well as its size and opportunities for growth are likely to determine whether or not the firm will make a dividend payment in the following quarter. Panel 3 indicates that these factors are statistically significant at the 0.01% level.



The fourth model we test is

$$\begin{aligned} \Pr(\text{Payment}_t) = & \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{Expansion} + \beta_4 \text{Nonpayer} * \\ & \text{Expansion}_{t-1} + \beta_5 \text{Payer} * \text{Expansion}_{t-1} + \beta_6 \text{Total Assets}_{t-1} + \\ & \beta_7 \text{GrowthOpportunity2}_{t-1} + \beta_8 \text{Profitability2}_{t-1} \end{aligned} \quad (4)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer.

The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Each variable is added to the model one by one. Panels 1 through 5 of Table 7 display the results of the forward selection process. In this model, four of the five variables are selected as significant in the forward selection process. Panel 2 displays the Type 3 analysis of effects based on the Wald test. Status, Economic Cycle, the interaction term Status\*Economic Cycle, and Total Assets in the previous period are determined to

Table 7

Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and NBER Market Measure

The probability modeled is that Payment = ‘No’. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher’s scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486575.77	486578	486589
1	117599.86	117605.86	117638.71
2	117354.46	117362.46	117406.26
3	117070.09	117082.09	117147.79
4	117028.98	117042.98	117119.64

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	Wald ChiSq	Prob ChiSq
Status	2	24735.246	<.0001
Economic Cycle	1	209.4451	<.0001
Status*Economic Cycle	2	214.1404	<.0001
Total Assets	1	40.6038	<.0001

Table 7 (continued)

Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and NBER Market Measure

Panel 3: Type 3 Parameter Estimates with Effect Coding								
Variable	ClassVal0	ClassVal1	DF	Estimate	StdErr	WaldChiSq	ProbChiSq	ExpEst
Intercept			1	0.125***	0.0184	46.2754	<.0001	1.133
Status	Nonpayer		1	4.7663***	0.0308	23888.46	<.0001	117.481
Status	Payer		1	-3.4633***	0.0255	18432.852	<.0001	0.031
Economic Cycle	Expansion		1	-0.2652***	0.0183	209.4451	<.0001	0.767
Status*Economic Cycle	Nonpayer	Expansion	1	-0.439***	0.0308	202.7307	<.0001	0.645
Status*Economic Cycle	Payer	Expansion	1	0.3305***	0.0255	168.0346	<.0001	1.392
Total Assets			1	-1.54E-06***	2.42E-07	40.6038	<.0001	1

Panel 4: Type 3 Odds Ratio Estimates			
Effect	OddsRatioEst	LowerCL	UpperCL
Total Assets	1	1	1

be significant (at the 0.01% level) in determining whether a firm will or will not make a cash dividend distribution.

Panel 3 of Table 7 displays the Type 3 parameter estimates as well as the odds ratios. According to the sign of the estimates and odds ratios, a non-dividend paying firm is 117.48% more likely to not pay a dividend than a switcher firm. On the other hand, a dividend paying firm is 0.031% less likely to omit a dividend. If the economy is in an expansionary period, switcher firms are 0.767% less likely to omit a dividend in the coming period. The results imply that a non-dividend paying firm is 0.645% less likely to omit a dividend in an expansionary period. This is not really so counterintuitive. It makes sense that firms that were previously non-dividend payer will initiate dividend payments when economic conditions are optimal and prospects look promising.

Similar to findings in Table 4, dividend payers are 1.392% more likely to omit or discontinue cash dividends during an economic expansion. Reasons for this somewhat surprising outcome may relate to the damaging impacts of dividend omission during an economic recession. It may be that firms that can no longer sustain regular cash distributions choose to make this evident during more favorable economic times so as not to severely damage the firm.

As in the other models, a one unit increase in Total Assets is 1% less likely to be related to a lack of dividend payment in the next period.

The fifth model we test is

$$\begin{aligned} \Pr(\text{Payment}_t) = & \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{Payer} + \beta_4 \text{Nonpayer} * \text{Expansion}_{t-1} + \\ & \beta_5 \text{Payer} * \text{Expansion}_{t-1} + \beta_6 \text{Total Assets}_{t-1} + \\ & \beta_7 \text{GrowthOpportunity}_{t-1} + \beta_8 \text{Profitability}_{t-1} \end{aligned} \quad (5)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the standard definition of a recession. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if GDP does not decline for two or more consecutive quarters and 0 otherwise. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Each variable is added to the model one by one. Panels 1 through 5 of Table 8 display the results of the forward selection process. As in Model 2, the market conditions proxied by two consecutive quarters of GDP decline are not significant determinants as to whether a cash dividend payment will be made or not. The only statistically significant variables found in the forward selection process are Status and Total Assets. Panel 2 displays the Type 3 analysis of effects based on Wald tests, which indicate that Status and Total Assets are statistically significant at the 0.01% level.

Panel 3 displays the parameter estimates along with the odds ratios for each variable. According to the signs of the parameter estimates and the odds ratios, a non-dividend paying firm is 265.33% times more likely than a switcher to omit a dividend

Table 8

Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and GDP Market Measure

The probability modeled is that Payment = ‘No’. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher’s scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the standard definition of a recession. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if GDP declines for two or more consecutive quarters and 0 otherwise. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486575.8	486578	486589
1	117599.9	117605.9	117638.7
2	117560.8	117568.8	117612.6

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	Wald ChiSq	Prob ChiSq
Status	2	113,611.7	<.0001
Total Assets	1	38.44	<.0001

  

Panel 3: Type 3 Parameter Estimates with Effect Coding							
Variable	ClassVal0	DF	Estimate	StdErr	WaldChiSq	ProbChiSq	ExpEst
Intercept		1	-0.0983***	0.00943	108.68	<.0001	0.906
Status	Nonpayer	1	4.3868***	0.0131	112,783.17	<.0001	80.384
Status	Payer	1	-3.1927***	0.0151	44,659.26	<.0001	0.041
Total Assets		1	-1.50E-06***	2.42E-07	38.44	<.0001	1

Table 8 (continued)

Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and GDP Market Measure

Panel 4: Type 3 Odds Ratio Estimates				
Effect		OddsRatioEst	LowerCL	UpperCL
Status	Nonpayer vs Switcher	265.329	255.575	275.454
Status	Payer vs Switcher	0.136	0.13	0.142
Total Assets		1	1	1

Table 9

## Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and S&amp;P 500 Market Measure

The probability modeled is that Payment = 'No'. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher's scoring optimizing technique, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable "Nonpayer" is equal to 1 if the firm has not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable "Payer" is equal to 1 if the firm has paid a regular cash dividend (distribution code "1232" in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the return on the S&P 500 from the previous quarter. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486,575.77	486,578.00	486,589.00
1	117,599.86	117,605.86	117,638.71
2	117,469.48	117,477.48	117,521.28
3	117,432.22	117,442.22	117,496.97

  

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	DF	WaldChiSq	ProbChiSq
Status	2	113,209.18	<.0001
S&P 500 Qtr. Return	1	128.29	<.0001
Total Assets	1	36.54	<.0001

  

Panel 3: Type 3 Parameter Estimates with Effect Coding							
Variable	ClassVal0	DF	Estimate	StdErr	WaldChiSq	ProbChiSq	ExpEst
Intercept		1	-0.1222***	0.00967	159.53	<.0001	0.885
Status	Nonpayer	1	4.3935***	0.0131	112,405.06	<.0001	80.921
Status	Payer	1	-3.1966***	0.0151	44,681.42	<.0001	0.041
S&P 500 Qtr. Return		1	1.1383***	0.1005	128.29	<.0001	3.121
Total Assets		1	-1.46E-06***	2.41E-07	36.54	<.0001	1



Table 9 (continued)

Forward Selection Procedure With Growth Opportunities 2 and Profitability 2 and S&P 500 Market Measure

Panel 4: Type 3 Odds Ratio Estimates				
Effect		OddsRatioEst	LowerCL	UpperCL
Status	Nonpayer vs Switcher	267.822	257.947	278.074
Status	Payer vs Switcher	0.135	0.129	0.142
S&P 500	Qtr. Return	3.121	2.563	3.801
Total Assets		1	1	1

in the coming quarter. A dividend payer, on the other hand, is 0.136% less likely than a switcher to omit a dividend in the coming quarter. Again, a one unit increase in total assets implies a 1% decrease in the likelihood that a firm will not pay a dividend. However, just as the previous models have shown, dividend payers are more likely to omit dividends during economic expansions, while nonpayers and switchers are less likely to omit during expansions.

The sixth model we test is

$$\begin{aligned} \Pr(\text{Payment}_t) = & \alpha + \beta_1 \text{Nonpayer} + \beta_2 \text{Payer} + \beta_3 \text{S\&P500Ret} + \beta_4 \text{Nonpayer} * \\ & \text{S\&P500Ret}_{t-1} + \beta_5 \text{Payer} * \text{S\&P500Ret}_{t-1} + \beta_6 \text{Total Assets}_{t-1} + \\ & \beta_7 \text{GrowthOpportunity2}_{t-1} + \beta_8 \text{Profitability2}_{t-1} \end{aligned} \quad (6)$$

The Status effect is represented by the two binary variables: Nonpayer and Payer.

The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the return on the S&P 500 from the previous quarter. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Each variable is added to the model one by one. Panels 1 through 5 of Table 9 display the results of the forward selection process. Of the five variables in Model 6, only three of them are determined to be significant using forward selection: Status, S&P 500 Return in the previous quarter, and Total Assets. Although this model excludes factors such as Profitability and Growth Opportunities, it does imply that the dividend paying history of a firm as well as its size and opportunities for growth are likely to determine whether or not the firm will make a dividend payment in the following quarter. Panel 2 indicates that these factors are statistically significant at the 0.01% level.

Panel 3 displays the parameter estimates for Model 6, and Panel 4 displays the odds ratios. According to the estimates and the odds ratios, a non-dividend payer is 267.82% more likely than a switcher firm to omit a cash dividend in the next quarter. Conversely, a dividend payer is 0.135% less likely than a switcher firm to omit or suspend dividends in the next quarter.

A one unit increase in the S&P 500 index return is associated with a 3.121% increase in the likelihood that a firm will not pay a dividend. This is a bit surprising as we would expect that good economic conditions would foster the likelihood of dividend payments. It may be that the S&P500 quarterly return is not a complete measure of market conditions. Another explanation relates to findings in Tables 4 and 7. It may be that firms that cannot maintain regular dividend payment choose to omit or suspend them during good economic conditions, so as to mitigate the negative effects surrounding a dividend omission or suspension.

We also employ step wise selection to determine which variables serve as the best predictor variables. Table 10 displays the results of the stepwise analysis. According to

Table 10

Stepwise Selection Procedure With NBER Market Measure

The probability modeled is that Payment = ‘No’. There were 309,742 instances between the first quarter of 1993 and the second quarter of 2010 in which firms did not pay a dividend. There were 111,420 instances between the first quarter of 1993 and the second quarter of 2010 in which firms paid a dividend. Using a binary logit model and Fisher’s scoring optimizing technique, variables are selected using stepwise selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable “Nonpayer” is equal to 1 if the firm has not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable “Payer” is equal to 1 if the firm has paid a regular cash dividend (distribution code “1232” in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity.

Panel 1: Fit Statistics			
Step	-2 Log L	AIC	SC
0	486,576	486,578	486,589
1	117,599.86	117,605.86	117,638.71
2	117,354.46	117,362.46	117,406.26
3	117,070.09	117,082.09	117,147.79
4	117,028.98	117,042.98	117,119.64
5	116,915.77	116,931.77	117,019.37
6	116,874.57	116,892.57	116,991.13
7	116,668.04	116,688.04	116,797.54
8	116,874.57	116,892.57	116,991.13

Table 10 (continued)

## Stepwise Selection Procedure With NBER Market Measure

Panel 2: Type 3 Analysis of Effects with Effect Coding			
Effect	D	Wald ChiSq	Prob ChiSq
	F		
Status	2	24,460.95	<.0001
Economic Cycle	1	213.62	<.0001
Status*Economic Cycle	2	215.13	<.0001
Total Assets	1	36.75	<.0001
Growth Opportunities 1	1	126.60	<.0001
Profitability 1	1	116.80	<.0001

  

Panel 3: Type 3 Parameter Estimates with Effect Coding								
Variable	ClassVal0	ClassVal1	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq	ExpEst
Intercept			1	0.0794***	0.0188	17.85	<.0001	1.083
Status	Nonpayer		1	4.7416***	0.0309	23,576.40	<.0001	114.621
Status	Payer		1	-3.4543***	0.0255	18,325.13	<.0001	0.032
Economic Cycle	Expansion		1	-0.2679***	0.0183	213.62	<.0001	0.765
Status*Economic Cycle	Nonpayer	Expansion	1	-0.4401***	0.0308	203.77	<.0001	0.644
Status*Economic Cycle	Payer	Expansion	1	0.3312***	0.0255	168.62	<.0001	1.393
Total Assets			1	-1.46E-06***	2.42E-07	36.75	<.0001	1
Growth Opportunities 1			1	0.039***	0.00347	126.60	<.0001	1.04
Profitability 1			1	-0.0894***	0.00828	116.80	<.0001	0.914

  

Panel 4: Type 3 Odds Ratio Estimates			
Effect	OddsRatioEst	LowerCL	UpperCL
Total Assets	1	1	1
Growth Opportunities 1	1.04	1.033	1.047
Profitability 1	0.914	0.9	0.929

Panel 2, the variables that serve as the best predictors are dividend paying status, economic cycle, the interaction term between Status and Economic Cycle, Total Assets, Growth Opportunities 1, and Profitability 1. Parameter estimates and odds ratios are shown in Panels 3 and 4. Non-dividend payers are 114% more likely than switchers to not pay a dividend in the next quarter, while regular dividend payers are 0.03% less likely to pay a dividend than switcher firms. During an economic expansion, firms are 0.765% less likely to omit or suspend dividend payments than they are in a recession. During an expansion, non-dividend paying firms are 0.644% less likely, than a switcher, to not pay a dividend. Corroborating preliminary findings in Table 3, dividend payers are 1.393% more likely than switcher firms to discontinue or omit dividends during an expansion. As in the previous models, a one unit increase in Total Assets is associated with a 1% decrease in the likelihood that a firm will not pay a dividend. A one unit increase in Growth Opportunities 1 increases the likelihood that a firm will not pay a dividend. On the other hand, a one unit increase in profitability decreases the likelihood that a firm will not pay a dividend by 0.914%.

## 2.6. Summary and Conclusions

Previous studies that concern dividend payments relate dividend payments to earnings, size, and growth opportunities. More recent literature finds that the relation between dividends and earnings is deteriorating. Managers have admitted their reluctance to deviate from their dividend paying history. Those firms that pay dividends continue to do so because these firms have historically paid dividends regularly and managers feel obligated to continue those cash distributions. Repurchases have become the new way to distribute earnings.

This begs the question as to whether a firm's dividend paying history can be used to determine the likelihood of future dividend payments.

The recent financial crisis brought on announcements of dividend reductions and suspensions, so we also investigate the possibility that the state of the economy affects a firm's likelihood of distributing dividends.

This study has found that firms perceived as dividend payers are likely to continue to pay dividends, while firms that do not have a history of paying cash dividends are not likely to begin dividend payments. In times of expansion, switcher firms are more likely to pay dividends than when a recession is occurring. Non-dividend payers are more likely to initiate dividends in an expansion than in a recession. Surprisingly, all models found that dividend payers are more likely to omit a dividend during an expansionary period. Although this seems surprising at first glance, managers are reluctant to change dividend policy, and pay dividends out of a feeling of obligation. If firms are not able to sustain dividend payments in the long run, it seems a better strategy for the manager to announce dividend omissions or suspensions during relatively healthy economic circumstances. This new and counterintuitive finding has not been documented in previous literature and is an important contribution of this dissertation.

## CHAPTER 3: DETERMINANTS OF DIVIDEND INCREASES OR DECREASES OF U.S. STOCKS AND THE EFFECTS ON RETURNS

### 3.1. Introduction

Examination of typical dividend paying firm will reveal that dividends are paid quarterly and the amount of cash dividend per share does not fluctuate, in fact it usually remains at the same level for very long periods of time. In most cases, a dividend paying firm has a very long history of paying dividends. Brav, Graham, Harvey, and Michaely (2005) find that most regular, dividend-paying firms continue to pay dividends because they feel obligated to do so due to their long history of paying dividends. In fact, they no longer adhere to target dividend payout ratios, instead they rely on past dividend levels when determining the firm's distribution policy.

Many studies have found a decreasing number of dividend paying firms (Skinner (2008); DeAngelo, DeAngelo, and Skinner (2004); Fama and French (2001)). Instead of cash dividends, more and more firms are using stock repurchases.

However, if regular-dividend paying firms are relying on past dividend levels in determining the firm's distribution policy, then a change in the dividend level of these firms should imply important information about the firm itself. This is especially true when investors are uncertain about future market conditions. The recent market downturn also increased uncertainty, implying that any dividend changes indicate fundamental changes of important consequences for the firm's future.

During the recent financial crisis, in addition to the free fall in stock prices, the financial news was filled with reports of decreasing dividends. In some cases, companies even suspended dividends. Prior literature has established that dividends convey



information about future firm prospects (see, for instance, Lee (1996)). Thus, there seemed to be more bad news for stock prices in the downturn spirals.

The grim dividend news may have been pushing stock prices down further. Lee (1995) found that stock prices respond strongly to temporary shocks to dividends. Investors cannot distinguish the temporary shock components from the permanent ones, so they tend to consider temporary components as permanent components, creating a strong reaction to temporary dividend shocks.

Previous literature has also pointed to fundamental changes in firms. The number of firms paying dividends has declined dramatically since the 1970s (DeAngelo, DeAngelo, & Skinner, 2000; DeAngelo, DeAngelo, & Skinner, 2004; Hayn, 1995; Graham, Koski, & Loewenstein, 2006). Instead, firms that are distributing earnings are using stock repurchases that became popular in the 1980s (Skinner, 2008). The current financial crisis is sure to bring about further changes in the fundamentals, which should be reflected in the dividend distributions, but the relatively small number of regular dividend payers makes Litner's (1956) findings more important. He notes that managers are reluctant to change regular cash dividends because a dividend decrease in the future will have negative effects for the firm. Therefore, any change in the firm's dividend level is of great consequence, and should reveal significant information.

More recently, Fuller and Blau (2010) find evidence of signaling in dividend paying firms. They find the firms perceived as high quality firms due to their previous earnings pay dividends to eliminate the free cash flow problem, while firms that are perceived as low quality because of low earning in previous periods pay small dividends. However, firms that are perceived as intermediate quality firms, pay higher dividends

than firms perceived as high quality firms. The evidence suggests that healthy firms with intermediate earnings are attempting to distinguish themselves from poor quality firms.

In this chapter, we will divide firms into dividend paying, non-dividend paying, and switchers. We will investigate the relation between dividends and stock prices in each group and among the groups. The questions that will be answered in this study are as follows: What is the reaction of firms around the world to the current crisis? Have firms become fundamentally different as a result of the crisis? Are firms reducing their dividends because of current losses and persistent earnings problems? If so, are dividend reductions decreasing their stock prices? Have the investors been giving preference to holding dividend paying stocks in anticipation that during the downturn such stocks may hold up better in terms of their prices?

The remainder of this chapter is organized as follows: Section 3.2 provides a brief review of literature. Section 3.3 contains a brief description of the data. Section 3.4 presents the methodology. Section 3.5 discusses the results. The last section summarizes the findings and concludes.

### 3.2. Review of Literature

Lee (1996) decomposes dividends into temporary and permanent components and finds that dividends are only affected by the permanent component of earnings. He asserts that changes in dividends anticipate changes in permanent earnings, so dividends convey information about future firm prospects. In addition, investors react strongly to temporary dividend shocks because they cannot distinguish between temporary and permanent components. This position is supported by previous literature, which finds that persistent earnings problems cause reductions in dividends. DeAngelo, DeAngelo, and

Skinner (1992) found that 50.9% of NYSE firms with reported losses during 1980-1985 reduced dividends.

The composition of dividends themselves is also changing. Skinner (2008) points out the substitution effect between dividends and repurchases that began emerging in the 1980s for the U.S. firms. Using Lintner model regressions, Skinner (2008) finds the relation between repurchases and earnings becomes stronger over time, while the relation between dividends and earnings weakens over time.

DeAngelo, DeAngelo, and Skinner (2004) find that although aggregate dividends distributed by firms are increasing, the number of firms that are paying out dividends is actually decreasing. This implies that dividends are concentrated to a few firms. They find that about half of dividends reported in Compustat for the year 2000 were paid out by top 25 earning firms. In their earlier paper (2000), they show that special dividends have been disappearing since the 1960s. DeAngelo, DeAngelo, and Stulz (2006), Fama and French (2001), and Skinner (2008) also observe similar declines in dividend paying firms. Related to this position, Hayn (1995) finds that the earnings of firms have changed in recent times. The frequency and magnitude of losses has increased so that earnings are more volatile. Firms are fundamentally different, and a difference in fundamentals manifests itself as a difference in firm distributions.

Graham, Koski, and Loewenstein (2006) examine liquidity, volume, price volatility, adverse selection, and price impact for very anticipated, anticipated, and unanticipated events, particularly dividend announcements. They look at two samples of firms: Firms that announce they will begin paying dividends, and firms that regularly (predictably) make quarterly dividend announcements. Examining the period between

1990 and 1998 and using CRSP data, LexisNexis announcements, Dow Jones News Retrieval, and the Wall Street Journal Index, they find that for very predictable events, liquidity and volume increase before the event, and liquidity returns to normal levels after the event. After the event, they do not find evidence of asymmetric information. For anticipated events, there is some evidence that the spread remains wider after the announcement, which implies asymmetric information. For unanticipated events, the evidence of asymmetric information prior to the event is more evident. The data shows a decline in adverse information and price volatility after the event. The spread widens, depth shrinks, and volume is high, implying that information is being priced and portfolios are being rebalanced. Contrary to previous literature, they do not find information asymmetry effects in stocks predominantly held by institutional investors.

Graham, Koski, and Loewenstein (2006) point out that the increased activity after a dividend initiation announcement implies that the firm is fundamentally different. This may be what leads to the increase in trading, which reflects portfolio rebalancing and possibly purchases by institutional investors. A reverse process may be observed in the market downturn spiral in the Fall of 2008, which was a surprise to most. Many firms were fundamentally changed by the financial crisis. Many firms announced dividend suspensions or decreases. By extension, the surprise declining dividend announcements may be followed by large institutional investor sell-offs.

Graham, Koski, and Loewenstein (2006) also find that high content information, even if the event was anticipated, leads to high volume and spreads and a decrease in liquidity after the event occurs. Although the market downturn was a surprise, there was a lot of information revealed regarding firms and the market. Volatility was, and still is, at

historically high levels, volume and spreads are high, and liquidity is low. At this time, announcements that dividends are being suspended or decreased are very high content information, and signal that the firm is fundamentally different.

Few studies have examined dividend changes and their effects on returns. Li and Lie (2006) expand the catering theory hypothesis of Baker and Wurgler (2004) to explain changes in dividends. They find that managers are influenced by investor demands for dividends. When the dividend premium is high, dividend initiations increase, while a low dividend premium is associated with dividend omissions. They do find some evidence that dividend increases are related to high dividend premiums, while dividend decreases are related to low dividend premiums, but the evidence is statistically weak. Another problem with the study is that the measure of dividend premium (measured as the log difference between the value weighted market to book value on dividend paying firms and non-dividend paying firms) is measured at the beginning of the year, while dividends are paid quarterly. The study does cover a large time span (1963 – 2000) and includes controls for firm specific factors such as dividend yield, size, and various fundamental ratios, but it does not control for structural breaks, nor does it take into account the state of the economy. The literature has shown fundamental changes in firms, as well as in their dividend policies and returns, during the 1960s and the 1980s, and the state of the economy has fluctuated dramatically during the sample period. These factors may be important determinants of dividend policy changes, and may explain the irregular dividend increase pattern observed in Li and Lie (2006) after the 1980s.

Benartzi, Michaely, and Thaler (1997) find evidence against the signaling theory using dividend changes. They find instead that dividend changes simply signal

information about what has happened, namely increases in permanent earnings. What is surprising is that they observe negative future earnings in firms that have increased dividends. The positive relation between dividend changes and future earnings is insignificant despite a large number of control variables. Other studies also fail to find a relation between dividend changes and future earnings (Watts, 1973; Gonedes, 1978, Penman, 1983, and others).

Grullon, Michaely, and Swaminathan (2002) use return on assets as a measure of profitability to examine firm characteristics related to dividend changes. Their results also strongly conflict with the signaling theory, but support the life cycle hypothesis. Like Benartzi, Michaely, and Thaler (1997) and others, they fail to find a relation between dividend changes and future earnings. In fact, they find that dividend increasing (decreasing) firms exhibit higher (lower) profitability prior to the dividend increase (decrease), but profitability declines (recovers) in the years following the announcement. This study is the first we know of to relate the dividend increase (decrease) to the firm's decrease (increase) in cost of capital. They use the Fama and French three-factor model to characterize dividend increasing firms from decreasing firms before and after dividend changes. Their study period is also quite long, and structural breaks or market cycles are not controlled for. Although they attempt to control for profitability, given the recent study by Fuller and Blau (2010), it would seem that a more appropriate control for profitability would involve creating groups of high profit, intermediate profit, and low profit firms.

The findings against the signaling theory in Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, and Swaminathan (2002) seem very strong, but they may

be related to the fact that in measuring profitability, they adjusted for drift, but did not address measurement error associated with their adjustment for drift on profitability, nor did they address the omitted correlated variables that should control for expected changes in future earnings (Nissim and Ziv, 2001). Contrary to their findings, Brickley (1983), Aharony and Dotan (1994), Nissim and Ziv (2001), as well as others find that dividend changes are related to future earnings. They find that increases in earnings continue in to the following year.

Koch and Sun (2004) also examine dividend changes, but relate them to earnings. Their results imply that reactions to dividend changes may be delayed reactions to recent earnings announcements. They find that dividends convey information to investors. They relate information regarding the persistence of past earnings. If management expects earnings increases to continue, an increase in dividends may signal this information to the market, and investors will revise their expectations creating positive abnormal returns. On the other hand, if dividend changes contradict previous earnings, the market will experience a reversal. These findings are of interest because most recent dividend literature discounts the relation between earnings and dividends. It seems that although the relation between earnings and repurchases has become stronger (Skinner, 2008), repurchases may convey short-term information about the firm, while cash dividend changes convey fundamental changes in the firm itself.

### 3.3. Data

The data for this study comes from the Center for Research in Security Prices (CRSP) and Compustat database. Quarterly returns data for all securities in the CRSP database are gathered for the 1990-2009 calendar years. In order to classify firms as

dividend payers, non-dividend payers, or “switchers,” data is gathered on annual dividends for the period 1990 – 2009 from CRSP.

As in Chapter 1, firms are identified as dividend payers, non-dividend payers, and “switcher” firms based on their dividend paying history in the previous twelve quarters. Firms identified as dividend payers have paid a regular, quarterly, cash dividend in all of the previous twelve quarters. We identify these distributions using the CRSP database code “1232.” Firms that have not paid a single regular, quarterly, cash dividend in the previous twelve quarters are labeled as non-dividend payers. Switcher firms are those that paid regular, quarterly, cash dividends within the previous twelve quarters, but did not distribute dividends in every quarter.

Data on firm fundamentals and information from financial statements are obtained from the Compustat database. This data is used to sort returns into portfolios and develop the quarterly factors SMB and HML from the Fama and French three-factor model, as described in the methodology section.

In order to determine whether dividends mattered during the 2008 market downturn, we have to examine whether the three types of firms (dividend paying, non-dividend paying, and switchers) are different based on their returns. This has important implications for investors. In particular, we would like to investigate which one of the three groups of firm stocks may hold up better in terms of their prices during a downturn spiral. In order to proxy the state of the economy we use NBER classifications of recessions and expansions.



### 3.4. Methodology

One of the main contributions of this study is to determine if the state of the economy matters in determining dividend distribution changes. Such investigation has been rare since downturn spirals have been historically few in the US financial markets.

Table 11 shows how rare dividend changes are. Of the 117,722 dividends paid throughout our sample period, only 4,757 of them were lower than the previous dividend. During this same time period, there were 19,917 instances where dividend levels were increased, but in almost 80% of cases, dividend levels did not change from the previous quarter. There were a number of firms that were classified as nonpayers, but began paying dividends. They are included in this table as “nonpayers.” It is notable that these nonpayer firms that initiated dividends have a higher likelihood of decreasing dividends, while switcher firms have a higher likelihood of increasing dividends.

Table 12 shows how dividend levels have changes over the course of our study period. Not much can be said of the number of decreases or increases of non-dividend payers during economic recessions, as there were very few in each quarter. On the other hand, dividend payers saw a decline in dividend level decreases and increases during the recession of 2001. This is consistent with the idea that managers are reluctant to change

Table 11

#### Number of Dividend Changes (1993Q1 – 2009Q2)

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Status	Decrease		Increase		No Change	
Nonpayer	210	6.56%	556	17.36%	2,437	76.08%
Payer	2,754	3.88%	11,322	15.93%	56,982	80.19%
Switcher	1,793	4.13%	8,039	18.50%	33,629	77.38%

dividend payment policies. However, the recession in late 2007 paints a different picture. Dividend decreases increase dramatically as the recession gets deeper. The number of decreases almost doubles between the fall and winter of 2008. Dividend increases also show signs of a recession. They experience a serious drop off as the recession deepens. The pattern for switcher firms is similar to that of regular dividend paying firms.

We employ a logistic regression analysis in order to identify the determinants of dividend changes. We model the probability that the dividend will increase, decrease, or not change. The factors recognized by previous literature include earnings, profitability, and size. We include these in our model. We also include a binary variable to control for economic conditions, as well as the firms' dividend paying status.

Previous literature on dividend paying firm characteristics has established that dividend paying firms tend to be of large size. Market value and book equity are also found to be related to the propensity to pay dividends. That being the case, we felt it appropriate to use the Fama-French three-factor model in examining excess returns across dividend paying groups. We also use the Fama-French three-factor model in examining excess returns before and during the downturn to see if changes have occurred in the relations between excess return and the market, size, and book-to-market factors:

$$r_i = a_i + b_i(R_m - R_f) + s_iSMB + h_iHML + e_i \quad (7)$$

Where  $r_i$  is the return on portfolio  $i$ ,  $R_f$  is the T-bill rate, and  $R_m$  is the market return proxied by the return on the CRSP value-weighted index. Six size-BM portfolios are formed in June of each year to create the SMB and HML factors. The SMB factor is calculated as the difference between the average return on the three small size portfolios and the three big size portfolios. The HML factor is calculated as the difference between

Table 12

## Number of Dividend Changes Over Time (1993Q1 – 2009Q2)

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Panel 1: Dividend Changes for Non-Dividend Payers							
Year & Quarter	Decrease	Increase	No Change	Year & Quarter	Decrease	Increase	No Change
1993Q1	1	4	15	2001Q2	1	3	5
1993Q2		3	15	2001Q3	1	1	7
1993Q3				2001Q4	29	85	529
1993Q4	6	6	6	2002Q1		3	7
1994Q1	2	10	22	2002Q2			5
1994Q2	5	5	36	2002Q3	30	135	726
1994Q3	32	120	580	2002Q4	1		10
1994Q4	2	4	21	2003Q1	2	5	6
1995Q1	8	2	18	2003Q2	2	2	7
1995Q2	3	7	18	2003Q3	5	8	13
1995Q3	4	1	6	2003Q4	1	3	24
1995Q4	5	5	13	2004Q1	1	5	17
1996Q1	6	8	5	2004Q2	5	5	14
1996Q2	2	7	15	2004Q3	1	3	11
1996Q3	1		13	2004Q4	1	6	12
1996Q4	4	3	11	2005Q1	2	10	14
1997Q1	4	1	7	2005Q2	3	10	24
1997Q2	2	2	13	2005Q3	2	2	7
1997Q3	2	3	5	2005Q4	1	8	5
1997Q4	1	4	10	2006Q1		4	10
1998Q1	2	6	5	2006Q2		3	11
1998Q2	4	2	11	2006Q3	2	2	7
1998Q3	1	2	6	2006Q4		3	3
1998Q4	1	2	12	2007Q1	2	5	2
1999Q1		1	10	2007Q2	1	2	12
1999Q2	1	3	16	2007Q3	3	2	7
1999Q3	1	1	7	2007Q4	4	4	8
1999Q4		4	4	2008Q1	3	6	7
2000Q1	1	3	2	2008Q2	1	1	6
2000Q2	1	1	1	2008Q3		3	3
2000Q3		2	3	2008Q4	1	1	
2000Q4	1	1	1	2009Q1	1		3
2001Q1			2	2009Q2	2		1

Table 12 (continued)

Panel 2: Dividend Changes for Dividend Payers							
Year & Quarter	Decrease	Increase	No Change	Year & Quarter	Decrease	Increase	No Change
1993Q1	35	143	596	2001Q2	10	49	484
1993Q2	45	156	941	2001Q3	13	55	513
1993Q3	47	140	899	2001Q4			
1993Q4	63	201	1000	2002Q1	24	122	513
1994Q1	61	225	988	2002Q2	22	81	579
1994Q2	46	180	1059	2002Q3	22	74	576
1994Q3	31	178	1048	2002Q4	16	115	570
1994Q4	33	209	1016	2003Q1	12	162	554
1995Q1	34	250	1030	2003Q2	22	99	681
1995Q2	42	213	1119	2003Q3	18	150	633
1995Q3	33	179	1157	2003Q4	30	171	755
1995Q4	52	222	1065	2004Q1	41	228	746
1996Q1	55	256	1061	2004Q2	43	170	933
1996Q2	57	220	1140	2004Q3	35	193	994
1996Q3	49	174	1184	2004Q4	38	217	984
1996Q4	36	255	1106	2005Q1	38	299	939
1997Q1	51	297	1080	2005Q2	56	205	981
1997Q2	74	188	1144	2005Q3	35	179	1018
1997Q3	73	196	1072	2005Q4	28	231	958
1997Q4	84	213	924	2006Q1	25	311	908
1998Q1	62	198	767	2006Q2	45	236	999
1998Q2	72	107	662	2006Q3	50	188	1018
1998Q3	56	112	676	2006Q4	23	239	1029
1998Q4	30	108	595	2007Q1	28	315	941
1999Q1	23	150	564	2007Q2	29	230	1055
1999Q2	25	95	590	2007Q3	21	200	1051
1999Q3	33	93	568	2007Q4	26	221	1037
1999Q4	17	85	536	2008Q1	45	269	962
2000Q1	11	126	491	2008Q2	50	194	1084
2000Q2	16	72	502	2008Q3	55	160	1050
2000Q3	7	48	443	2008Q4	91	130	998
2000Q4	13	55	359	2009Q1	156	116	903
2001Q1	13	86	397	2009Q2	135	87	935

Table 12 (continued)

Panel 3: Dividend Changes for Switchers							
Year & Quarter	Decrease	Increase	No Change	Year & Quarter	Decrease	Increase	No Change
1993Q1	44	99	533	2001Q2	40	185	827
1993Q2	23	42	346	2001Q3	33	122	843
1993Q3	23	59	409	2001Q4	37	147	752
1993Q4	27	106	434	2002Q1	31	180	705
1994Q1	27	142	399	2002Q2	40	140	751
1994Q2		107	541	2002Q3			
1994Q3	20			2002Q4	24	155	682
1994Q4	27	141	523	2003Q1	30	175	632
1995Q1	33	177	530	2003Q2	17	148	627
1995Q2	24	107	577	2003Q3	28	156	598
1995Q3	19	138	555	2003Q4	30	120	505
1995Q4	21	131	548	2004Q1	22	135	454
1996Q1	18	162	433	2004Q2	15	93	425
1996Q2	30	111	504	2004Q3	13	103	340
1996Q3	26	101	508	2004Q4	15	86	314
1996Q4	17	129	498	2005Q1	16	136	321
1997Q1	18	131	433	2005Q2	19	102	360
1997Q2	29	82	447	2005Q3	22	104	395
1997Q3	16	93	450	2005Q4	23	109	409
1997Q4	48	83	370	2006Q1	15	135	366
1998Q1	49	143	399	2006Q2	20	105	392
1998Q2	84	139	542	2006Q3	17	81	406
1998Q3	73	143	741	2006Q4	10	111	366
1998Q4	51	223	810	2007Q1	15	127	285
1999Q1	41	208	823	2007Q2	14	101	310
1999Q2	45	173	885	2007Q3	6	86	343
1999Q3	24	116	908	2007Q4	13	89	324
1999Q4	20	171	764	2008Q1	7	92	285
2000Q1	32	226	778	2008Q2	19	79	265
2000Q2	41	162	882	2008Q3	19	69	277
2000Q3	22	128	852	2008Q4	30	48	237
2000Q4	46	202	797	2009Q1	39	34	204
2001Q1	37	208	758	2009Q2	27	25	223

the average returns on the two high book-to-market portfolios and the two low book-to-market portfolios. These factors are available on Kenneth French's website in monthly, weekly, and daily frequencies. However, we construct the factors on a quarterly basis to examine quarterly returns.

Finally, we examine the daily returns and excess returns surrounding dividend declarations to detect the effect of dividend changes on returns. Examining quarterly returns is informative, but examining returns surrounding the day of announcement will help us isolate the effect on returns from the dividend change. In order to do this, we calculate the cumulative stock return during days -1, 0, and +1, where day 0 is the dividend declaration date. We also calculate the return in excess of the risk free rate, and compare across the types of firms and economic cycles.

### 3.5. Empirical Results

To reiterate our purpose briefly, we are identifying determinants of dividend level changes, and then comparing the returns on dividend paying, non-dividend paying, and switcher firms during the market downturn, which took a major dive in the late summer of 2008, and became very volatile in the months that followed.

Table 13 displays summary statistics on dividend levels, dividend changes, and dividend percent changes for non-dividend payers, regular dividend payers, and switcher firms. Dividend payers tend to payout higher dividends, while non-dividend payers that recently began paying dividends tend to have the highest level of dividend changes, as well as percentage changes.

Table 14 displays the average dividend levels, level changes, and percentage changes throughout our study period. It does not show evidence of major average

dividend changes or percentage changes during the recession of 2001. On the other hand, the recent recession is marked by average decreases in dividend levels and negative percentage changes, on average, no matter the dividend paying status of the firm. It is also evident that non-dividend paying firms, that recently began paying dividends, seem to experience the most volatility in their dividend payment levels during recessionary periods.

Table 15 provides summary statistics for various determinants of dividend payment identified by previous literature. Summary statistics are divided according to dividend paying status and based on whether the firm increased, decreased, or did not change the dividend payment. On average, dividend payers have higher total assets, market value, profitability, and earned equity. Dividend payers that decrease dividends have lower market value, but their growth opportunities tend to be much higher. In fact, firms that decrease dividend payments have higher growth opportunities regardless of their dividend paying status.

Table 16 also presents summary statistics of various dividend determinants, but they are sorted according to the economic conditions present when the dividend announcement took place. It is notable, that dividend paying firms have the highest total assets and market value, and firms that decrease dividends during a recession have, by far, the highest total assets. On the other hand, the firms that increase dividends during a recession have the highest average market value, even higher than the average market value during an expansion. This implies that increasing dividends during a recession is accepted as a positive signal by the market.

Table 13

## Summary Statistics of Dividend Payment Level, Change, and Percentage Change

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Panel 1: Dividend Payment				
Status	Mean	Median	Minimum	Maximum
Nonpayer	0.15	0.10	0.000	2.00
Dividend Payer	0.21	0.16	0.003	5.98
Switcher	0.17	0.11	0.002	4.45

  

Panel 2: Dividend Change				
Status	Mean	Median	Minimum	Maximum
Nonpayer	0.003	0	-1.00	1.60
Dividend Payer	0.000	0	-5.30	5.30
Switcher	0.001	0	-2.73	5.30

  

Panel 3: Dividend Percent Change				
Status	Mean	Median	Minimum	Maximum
Nonpayer	10.22%	10.22%	-99.98%	2100%
Dividend Payer	1.01%	1.01%	-98.40%	6566%
Switcher	3.25%	3.25%	-98.02%	6356%



Table 14

## Average Dividend Payment Level, Change, and Percentage Change

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a "Switcher" firm.

Year & Quarter	NonPayer			Payer			Switcher		
	Payment	Change	Percent Change	Payment	Change	Percent Change	Payment	Change	Percent Change
1993Q1	0.104	0.019	14.85%	0.239	-0.001	0.44%	0.175	-0.007	0.05%
1993Q2	0.068	0.030	17.20%	0.229	-0.002	0.38%	0.123	-0.001	1.30%
1993Q3				0.232	-0.002	-0.11%	0.118	0.000	1.47%
1993Q4	0.136	0.025	64.66%	0.222	-0.001	0.35%	0.123	0.003	3.82%
1994Q1	0.146	0.014	11.32%	0.222	0.000	1.38%	0.128	0.007	10.01%
1994Q2	0.139	-0.001	3.81%	0.220	-0.001	0.66%	0.133	0.002	3.11%
1994Q3	0.138	0.002	3.54%	0.221	0.002	2.29%	0.143	0.003	5.59%
1994Q4	0.199	0.006	7.40%	0.221	0.001	1.29%	0.150	0.004	5.22%
1995Q1	0.124	-0.017	-11.90%	0.221	0.002	1.68%	0.145	0.001	2.51%
1995Q2	0.103	0.005	16.06%	0.220	0.001	1.22%	0.151	0.004	4.48%
1995Q3	0.125	-0.008	-5.12%	0.219	0.002	1.51%	0.159	0.003	5.46%
1995Q4	0.119	0.006	81.70%	0.218	-0.001	1.22%	0.155	0.002	4.60%
1996Q1	0.106	-0.010	6.59%	0.218	0.001	0.80%	0.156	0.000	2.05%
1996Q2	0.128	0.004	5.54%	0.216	-0.002	0.81%	0.156	0.000	2.45%
1996Q3	0.109	-0.003	-4.76%	0.214	-0.001	0.42%	0.161	0.003	3.57%
1996Q4	0.098	-0.016	-10.13%	0.215	0.002	1.55%	0.152	0.004	4.84%
1997Q1	0.135	-0.076	-18.41%	0.218	0.002	2.34%	0.146	-0.002	1.24%
1997Q2	0.143	0.001	0.43%	0.217	-0.004	0.41%	0.148	0.002	3.43%
1997Q3	0.119	0.029	26.28%	0.212	-0.003	0.00%	0.147	0.008	5.86%
1997Q4	0.160	0.041	23.82%	0.213	-0.002	-0.58%	0.153	-0.001	1.64%
1998Q1	0.136	0.046	144.62%	0.212	-0.001	-0.21%	0.163	-0.006	-1.02%
1998Q2	0.134	-0.013	-9.34%	0.203	-0.006	-1.91%	0.163	-0.003	-0.21%
1998Q3	0.138	0.005	-0.26%	0.191	-0.004	-1.23%	0.168	0.000	1.63%
1998Q4	0.140	-0.009	8.50%	0.190	-0.001	0.06%	0.169	0.000	1.28%
1999Q1	0.122	0.013	18.18%	0.195	0.001	0.91%	0.172	0.000	0.75%
1999Q2	0.100	0.000	4.94%	0.188	0.000	0.95%	0.175	0.000	0.83%
1999Q3	0.065	-0.001	-0.37%	0.188	-0.002	-0.82%	0.175	0.002	3.61%
1999Q4	0.191	0.009	6.79%	0.184	-0.001	0.69%	0.175	0.002	4.08%
2000Q1	0.146	0.001	-1.33%	0.184	0.002	2.02%	0.175	-0.001	0.26%
2000Q2	0.109	0.130	126.67%	0.185	0.000	0.29%	0.177	0.001	1.17%
2000Q3	0.100	0.007	8.48%	0.182	0.001	0.49%	0.181	0.000	2.76%
2000Q4	0.123	-0.010	-7.19%	0.182	0.002	0.81%	0.182	0.002	3.17%

Table 14 (continued)

Year & Quarter	NonPayer			Payer			Switcher		
	Payment	Change	Percent Change	Payment	Change	Percent Change	Payment	Change	Percent Change
2001Q1	0.075	0.000	0.00%	0.179	0.001	1.03%	0.186	0.000	0.86%
2001Q2	0.116	0.007	4.67%	0.184	0.001	0.63%	0.181	0.000	0.69%
2001Q3	0.209	-0.039	4.45%	0.181	-0.001	0.38%	0.184	-0.001	0.95%
2001Q4	0.187	-0.003	-0.94%	0.184	0.000	1.62%	0.177	0.000	1.31%
2002Q1	0.137	0.012	42.50%	0.185	0.000	0.40%	0.181	0.001	0.39%
2002Q2	0.120	0.000	0.00%	0.185	-0.001	-0.14%	0.185	0.002	2.47%
2002Q3	0.178	0.000	2.74%	0.185	0.000	3.82%	0.185	0.001	1.95%
2002Q4	0.087	-0.011	-7.27%	0.189	0.003	1.93%	0.184	0.006	5.87%
2003Q1	0.106	-0.004	101.90%	0.191	0.000	0.78%	0.185	0.002	6.34%
2003Q2	0.114	0.028	25.65%	0.195	0.003	3.17%	0.178	-0.001	2.65%
2003Q3	0.105	-0.002	93.79%	0.204	0.006	4.44%	0.164	0.004	4.99%
2003Q4	0.100	0.023	58.93%	0.205	-0.001	2.24%	0.157	0.001	2.99%
2004Q1	0.085	0.023	161.52%	0.203	0.000	1.32%	0.153	0.010	10.02%
2004Q2	0.110	-0.011	24.03%	0.202	0.000	1.63%	0.150	0.007	7.24%
2004Q3	0.102	0.051	92.46%	0.205	0.002	2.08%	0.140	0.007	7.62%
2004Q4	0.105	-0.004	14.76%	0.214	0.005	2.33%	0.149	0.002	5.56%
2005Q1	0.140	0.030	29.85%	0.214	0.000	1.16%	0.154	0.003	5.10%
2005Q2	0.165	0.066	50.72%	0.214	-0.001	0.96%	0.156	-0.002	3.47%
2005Q3	0.097	-0.001	0.72%	0.214	0.004	1.87%	0.160	0.011	11.03%
2005Q4	0.164	0.042	91.88%	0.223	0.006	3.16%	0.167	0.005	9.74%
2006Q1	0.129	0.033	46.30%	0.222	0.001	1.24%	0.165	-0.001	2.02%
2006Q2	0.116	0.018	24.22%	0.220	0.000	1.65%	0.167	0.008	6.05%
2006Q3	0.078	-0.012	-7.27%	0.218	0.002	1.64%	0.172	0.006	4.97%
2006Q4	0.177	0.058	26.34%	0.223	0.003	2.77%	0.182	0.013	10.05%
2007Q1	0.137	-0.096	4.13%	0.224	0.001	1.89%	0.184	0.008	4.07%
2007Q2	0.128	0.001	5.58%	0.225	0.004	4.63%	0.189	0.001	2.43%
2007Q3	0.167	-0.011	-7.85%	0.227	0.005	2.42%	0.196	0.013	6.63%
2007Q4	0.137	-0.007	6.08%	0.236	-0.002	2.71%	0.208	-0.001	23.28%
2008Q1	0.138	0.051	123.91%	0.231	0.000	0.01%	0.205	0.000	1.10%
2008Q2	0.102	-0.003	43.06%	0.232	0.000	0.88%	0.199	-0.015	-0.61%
2008Q3	0.184	0.178	46.66%	0.232	-0.006	-1.85%	0.192	-0.011	-3.35%
2008Q4	0.440	0.216	341.67%	0.221	-0.022	-7.15%	0.171	-0.012	-3.41%
2009Q1	0.050	-0.127	-22.07%	0.208	-0.015	-5.46%	0.160	0.000	2.46%
2009Q2	0.234	-0.071	-36.41%	0.204	-0.002	-1.03%	0.169	0.005	3.23%

In order to determine the factors affecting dividend changes, we employ a polytomous logistic regression. A polytomous logistic regression allows for a dependent variable that has more than two categorical responses. Therefore, our response row is

$$y_i = (y_{i1}, y_{i2}, \dots, y_{ir})^T \quad (8)$$

We assume a multinomial distribution with index  $n_i = \sum_{j=1}^r y_{ij}$  and parameter  $\pi_i = (\pi_{i1}, \pi_{i2}, \dots, \pi_{ir})^T$ . We relate  $\pi_i$  to covariates through a set of  $r-1$  baseline-category logits. Taking  $j^*$  as the baseline category, the model is

$$\log\left(\frac{\pi_{ij}}{\pi_{ij^*}}\right) = x_i^T \beta_j, \quad j \neq j^*. \quad (9)$$

If  $x_i$  has length  $p$ , then the model has  $(r-1) \times p$  free parameters, which we can arrange as a matrix or a vector. The last category is the baseline ( $j^* = r$ ), so the coefficients are

$$\beta = [\beta_1, \beta_2, \dots, \beta_{r-1}] \quad (10)$$

Or

$$\text{vec}(\beta) = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_{r-1} \end{bmatrix}. \quad (11)$$

The  $k$ th element of  $\beta_j$  can be interpreted as: the increase in log-odds of falling into category  $j$  versus category  $j^*$  resulting from a one-unit increase in the  $k$ th covariate, holding the other covariates constant.

Table 17 displays results of a polytomous logistic regression where the response variable is

$$Y_i = \begin{cases} 1 & \text{if the dividend increases} \\ 2 & \text{if the dividend decreases} \\ 3 & \text{if the dividend remains unchanged} \end{cases} \quad (12)$$

Table 15

## Summary Statistics of Dividend Determinants According to Dividend Paying Status

The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a "Switcher" firm.

	Nonpayer			Payer			Switcher		
	Decrease	Increase	NoChange	Decrease	Increase	NoChange	Decrease	Increase	NoChange
Total Assets	4,405.60	6,808.85	7,065.50	16,115.15	13,237.46	11,148.12	9,085.64	8,055.03	5,809.01
Market Value	1,796.23	3,588.59	3,211.76	4,799.14	6,401.24	5,142.08	4,128.56	3,589.07	3,069.75
Profitability 1	0.016	0.014	0.010	0.043	0.025	0.010	0.026	0.016	0.010
Profitability 2	0.041	0.043	0.064	1.069	0.323	0.042	3.491	0.182	0.031
Earned Equity	0.353	0.314	0.379	0.534	0.643	0.786	0.187	0.447	0.437
Growth Opportunities 1	1.124	0.799	0.725	2.443	1.322	0.820	1.582	0.889	0.773
Growth Opportunities 2	-19.420	-6.760	-1.389	-14.505	-3.214	-1.680	-9.867	-1.221	-0.269

Table 16

Summary Statistics of Dividend Determinants According to Dividend Paying Status and Economic Cycle

The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a "Switcher" firm. A quarter is labeled as expansion or recession if it is classified as such by the National Bureau of Economic Research. According to the NBER recessions occurred between March 2001 and November 2001 and between December 2007 and June 2009.

	Expansion			Recession		
	Decrease	Increase	No Change	Decrease	Increase	No Change
Nonpayer						
Total Assets	4,496.70	4,255.23	7,043.33	3,130.30	78,982.07	8,329.52
Market Value	1,752.57	3,111.91	3,163.78	2,407.42	17,061.22	5,948.07
Profitability 1	0.01	0.01	0.01	0.04	0.04	0.01
Profitability 2	0.04	0.03	0.06	0.08	0.30	0.03
Earned Equity	0.38	0.31	0.38	-0.03	0.37	0.53
Growth Opportunities 1	1.10	0.78	0.73	1.40	1.45	0.60
Growth Opportunities 2	-20.79	-4.88	-1.41	-0.25	-59.89	-0.01
Payer						
Total Assets	7,904.54	12,900.51	10,364.01	45,971.93	15,691.21	15,706.58
Market Value	5,034.00	6,049.81	4,963.28	3,945.10	8,960.50	6,181.54
Profitability 1	0.04	0.02	0.01	0.07	0.05	0.01
Profitability 2	1.30	0.27	0.05	0.24	0.68	-0.04
Earned Equity	0.58	0.64	0.64	0.38	0.69	1.59
Growth Opportunities 1	2.21	1.24	0.84	3.29	1.92	0.73
Growth Opportunities 2	-6.12	-2.75	-1.66	-45.00	-6.59	-1.82
Switcher						
Total Assets	6,949.95	7,490.64	5,423.61	21,454.82	12,261.51	8,478.20
Market Value	4,132.21	3,369.97	2,857.71	4,107.45	5,222.01	4,538.30
Profitability 1	0.03	0.02	0.01	0.03	0.02	0.01
Profitability 2	0.48	0.12	0.03	20.95	0.67	0.02
Earned Equity	0.43	0.45	0.44	-1.31	0.40	0.42
Growth Opportunities 1	1.60	0.89	0.79	1.46	0.85	0.69
Growth Opportunities 2	-10.56	-1.28	-0.29	-5.87	-0.76	-0.11

The predictors of interest include the firm's dividend paying status, as described above, the state of the economy, the firm's total assets, growth opportunities, earned equity, and profitability.

The results of Panel 2 in Table 17 show that dividend paying status, economic conditions, and total assets have a discernable effect on dividend changes at the 0.01% level, and profitability has discernable effects on dividend changes at the 10% level. Growth opportunities and earned equity have no discernable effect on dividend changes.

The parameter estimates are displayed in Panel 3. The intercepts give the estimated log-odds for the reference group Status = Switcher. The estimated log-odds of a decrease versus not changing the dividend level is -4.60, and the estimated log-odds of an increase versus not changing the dividend level is -3.5. Therefore, switchers are less likely to change the dividend level. Just as the Type III analysis implies, earned equity is not significant in determining a dividend increase, decrease, or no change. However, a one unit increase in growth opportunities is significantly related to a decrease in dividend levels.

Although the logistic regression results find a significant difference between dividend paying status, in terms of the change in dividend level, the difference between nonpayers and switcher is economically insignificant. On the other hand, dividend payers show more volatility in changing dividend levels. A dividend payer is 1.51% more likely than a switcher to decrease a dividend and 1.067% more likely to increase a dividend. The economy also plays a role in changes in the dividend level. In an expansion, a firm is 0.74% less likely to decrease a dividend and 1.38% more likely to increase a dividend, versus leaving the dividend level unchanged. An increase in total assets leads to volatility

in dividend changes. A one unit increase in total assets, implies that firms are 1% more likely to both decrease or increase the dividend level, as opposed to not changing the dividend. As pointed out in previous literature, and implied by various results in this dissertation, an increase in growth opportunities implies a 1% increase in the likelihood that a firm will decrease a dividend, while a one unit increase in profitability implies a 1.01% increase in the likelihood that a firm will increase the dividend level.

The results provided above as well as those in chapter 1 of this dissertation, imply that dividend characteristics of firms are significantly different across dividend paying status and economic cycles. We now investigate differences in returns between regular dividend payers, non-dividend payers and switcher firms using the Fama and French three factor model.

The Fama and French factors, SMB and HML, are formed on a monthly basis. Because we employ quarterly, rather than monthly returns, we form the factors on a quarterly basis using the Fama and French (1993) procedure.

In order to sort the stocks according to dividend paying classification, we use the distribution code “1232” in the CRSP database. The description for this distribution code in the CRSP Data Description Guide is: U.S. cash dividend, quarterly, taxable same rate as dividend. We sort the stocks in 3 different categories as described previously: Regular Dividend Payer, Nonpayer, and Switcher.

Table 18 displays summary statistics for the average excess return, market value, and book-to-market ratio. The results show average excess return to be highest for non-dividend paying firms, which drives up the average for the sample including all types of

Table 17

Generalized Logarithmic Regression With Growth Opportunities 1 and Profitability 1 and  
NBER Market Measure

The probability modeled is that Change = 'No Change'. Using a polytomous logit model, variables are selected using forward selection process. The Status effect is represented by the two binary variables: Nonpayer and Payer. The binary variable "Nonpayer" is equal to 1 if the firm has not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the previous 12 quarters, and it is equal to 0 otherwise. The binary variable "Payer" is equal to 1 if the firm has paid a regular cash dividend (distribution code "1232" in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions defined by the NBER. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total assets to the book value of total assets ((book value of total assets - book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Panel 1: Fit Statistics			
Criterion	Intercept Only	Intercept And Covariates	
AIC	207,509	149,422	
SC	207,531	149,600	
-2 Log L	207,505	149,390	

  

Panel 2: Analysis of Effects			
Effect	DF	Wald ChiSq	Prob ChiSq
Status	4	15,154.93	<.0001
Economic Cycle	2	231.58	<.0001
Total Assets	2	45.15	<.0001
Growth Opportunities 1	2	3.83	0.147
Earned Equity	2	1.01	0.605
Profitability 1	2	5.45	0.066



Table 17 (continued)

Panel 3: Parameter Estimates							
Variable	ClassVal0	Response	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq
Intercept		Decrease	1	-4.601	0.029	24,571.74	<.0001
Intercept		Increase	1	-3.501	0.019	35,904.48	<.0001
Status	Nonpayer	Decrease	1	-2.870	0.049	3,427.29	<.0001
Status	Nonpayer	Increase	1	-3.197	0.030	11,676.20	<.0001
Status	Payer	Decrease	1	1.506	0.029	2,730.20	<.0001
Status	Payer	Increase	1	1.631	0.017	9,535.32	<.0001
Economic Cycle	Expansion	Decrease	1	-0.151	0.020	55.61	<.0001
Economic Cycle	Expansion	Increase	1	0.161	0.013	161.32	<.0001
Total Assets		Decrease	1	0.000	0.000	23.66	<.0001
Total Assets		Increase	1	0.000	0.000	29.41	<.0001
Growth Opportunities 1		Decrease	1	0.000	0.000	3.39	0.066
Growth Opportunities 1		Increase	1	0.000	0.000	0.54	0.464
Earned Equity		Decrease	1	0.000	0.000	0.32	0.571
Earned Equity		Increase	1	0.000	0.000	0.68	0.411
Profitability 1		Decrease	1	0.011	0.007	2.35	0.125
Profitability 1		Increase	1	0.010	0.005	3.94	0.047

  

Panel 4: Odds Ratio Estimates					
Effect		Response	OddsRatioEst	LowerCL	UpperCL
Status	Nonpayer vs Switcher	Decrease	0.014	0.012	0.017
Status	Nonpayer vs Switcher	Increase	0.009	0.008	0.009
Status	Payer vs Switcher	Decrease	1.151	1.08	1.228
Status	Payer vs Switcher	Increase	1.067	1.033	1.101
EconomicCycle	Expansion vs				
Recession		Decrease	0.74	0.683	0.801
EconomicCycle	Expansion vs				
Recession		Increase	1.38	1.313	1.45
LTOTALASSETS		Decrease	1	1	1
LTOTALASSETS		Increase	1	1	1
LGROWTHOPPORTUNITIES		Decrease	1	1	1.001
LGROWTHOPPORTUNITIES		Increase	1	1	1.001
LEARNEDEQUITY		Decrease	1	1	1.001
LEARNEDEQUITY		Increase	1	1	1
LPROFITABILITY1		Decrease	1.011	0.997	1.025
LPROFITABILITY1		Increase	1.01	1	1.021

firms. Firms that regularly pay dividends and firms that initiate dividends earn the lowest excess returns.

Market value of the regular dividend paying group is far greater than the market value of all other groups. It is followed by the switcher group. This implies that large size is associated with dividend payments, as has been noted in previous literature.

Variation in excess returns for non-dividend payers is very high, relative to its mean and to the standard deviation of other groups. It is also driving up the standard deviation of the sample that includes all firms. Average book-to-market ratio for non-dividend payers is also much higher than for other groups, which seems to be driving up the average book-to-market ratio for the total sample. This implies that “value” stocks are concentrated in the nonpayer group, while the other groups consist of “growth” stocks.

Table 19 displays the average excess return, market value, and book-to-market ratio as in Table 18, but divides the statistics by economic cycle, as classified by the NBER. According to the NBER, economic contractions in the United States include the time period between March 2001 and November 2001, as well as the period between December 2007 and June 2009.

The results show that average excess return was highest for the non-dividend paying group in both the expansions and recessions. Average excess returns actually decrease for all groups except nonpayers. In fact, the average book-to-market ratio increased for all firms except nonpayers. In a market downturn, we would assume this implies a decrease in market value, but the data shows an increase in average market value. This implies that book value must have increased. An increase in book value can arise from an increase in assets or a decrease in liabilities. Increases in book value are

Table 18

Summary Statistics: Excess Return, Market Value and Book-to-Market Ratio by Dividend-Paying Status (1990 - 2009)

Excess return is calculated as the difference between the firms quarterly return and the three-month T-bill rate. Market value is calculated as the product of the number of shares outstanding and the close price at the end of the quarter. Book-to-market ratio is calculated as the ratio of Book Equity to Market Value at the end of the quarter. Book Equity is the sum of common equity and deferred taxes on the balance sheet at the end of the quarter. During the period between 1993 and 2009 the number of regular dividend payers ranged from a minimum of 427 in the fourth quarter of 2000 to a maximum of 1,428 in the first quarter of 1997. During the same time period, the number of switchers ranged from a minimum of 275 in second quarter of 2009 to maximum of 1,103 in the second quarter of 1999. Non-dividend payers ranged from 3,103 in the second quarter of 2009 to 5,226 in the first quarter of 1997.

Sample	Avg Excess Return	StdDev Excess Return	Avg Market Value	Avg Book-to-Market Ratio
All	0.13	22.26	1813	4.89
Regular	0.01	0.16	11470	0.56
Switcher	0.02	0.39	3778	0.75
Nonpayer	0.19	27.49	900	8.32

usually related to increases in earnings. This is surprising considering the market downturn.

Table 20 shows regression results for the Fama-French three-factor model regressions by type of dividend payer. Although nonpayers had higher excess returns, as show in Tables 18 and 19, regular dividend payers have significantly higher abnormal returns than other types of firms. Although not significant, the abnormal return for nonpayers is -0.005, while regular payers have an abnormal return of 0.007 at the 1% level. Switchers also experience significantly higher abnormal returns of 0.009 at the 10% level. The R-square for switcher firms may be low due to the type of firms in those groups and the number of observations in each group. Although the market factor is significant for the switcher firms, the size and book-to-market ratio factors are not. It may be that the switcher firms, may be midsize or larger firms that do not have returns related

Table 19  
Summary Statistics: Excess Return, Market Value and Book-to-Market Ratio by  
Dividend-Paying Status and Time (1990 - 2009)

Excess return is calculated as the difference between the firms quarterly return and the three-month T-bill rate. Market value is calculated as the product of the number of shares outstanding and the close price at the end of the quarter. Book-to-market ratio is calculated as the ratio of Book Equity to Market Value at the end of the quarter. Book Equity is the sum of common equity and deferred taxes on the balance sheet at the end of the quarter. During the period between 1993 and 2009 the number of regular dividend payers ranged from a minimum of 427 in the fourth quarter of 2000 to a maximum of 1,428 in the first quarter of 1997. During the same time period, the number of switchers ranged from a minimum of 275 in second quarter of 2009 to maximum of 1,103 in the second quarter of 1999. Non-dividend payers ranged from 3,103 in the second quarter of 2009 to 5,226 in the first quarter of 1997. We divide the samples into two time periods to distinguish between recession and non-recession periods. According to the NBER, the US experienced economic contractions in the periods March 2001 – November 2001 and December 2007 – June 2009.

Economic Cycle	Avg Excess Return	StdDev Excess Return	Avg Market Value	Avg Book-to-Market Ratio
All				
Expansion	0.141	23.396	1718	5.879
Recession	0.063	2.280	2675	6.188
Regular				
Expansion	0.005	0.153	10996	0.542
Recession	0.001	0.226	15370	0.669
Switcher				
Expansion	0.017	0.394	3563	0.723
Recession	-0.003	0.391	6173	1.011
Nonpayer				
Expansion	0.204	28.874	851	8.524
Recession	0.339	19.661	1412	6.557

to small size. They may also not have high book-to-market ratios, as seen in Table 18.

Once we divide the samples according to economic cycle, in Table 21, abnormal return no longer seems significant. However, it is interesting that during recessions, regular dividend payers have a positive abnormal return of 0.006 at the 5% level.

Although the results show an abnormal return of 0.402 for non-dividend payers, it is not significantly different from zero.

The Fama-French factors do not seem to be significant for other groups, except the regular dividend payers.

Table 20  
Fama-French Three Factor Regressions by Dividend-Paying Status (1990-2009)

Quarterly returns are calculated for every NYSE, AMEX, and Nasdaq firms. They are then sorted by size and book-to-market to form six portfolios to generate the factors SMB and HML. Size is the market value for each firm at the end of the quarter and BE/ME is the ratio of book equity to market equity, where BE is calculated from the Compustat database as in Fama and French (1993). Regression results for the Fama-French three-factor model  $R_i = a_i + b_i(R_m - R_f) + s_i \text{SMB} + h_i \text{HML} + e_i$  are shown below. During the period between 1993 and 2009 the number of regular dividend payers ranged from a minimum of 427 in the fourth quarter of 2000 to a maximum of 1,428 in the first quarter of 1997. During the same time period, the number of switchers ranged from a minimum of 275 in second quarter of 2009 to maximum of 1,103 in the second quarter of 1999. Non-dividend payers ranged from 3,103 in the second quarter of 2009 to 5,226 in the first quarter of 1997.

Sample	Estimated Parameter Values				T-Values				R-Sq
	a	b	s	h	a	b	s	h	
All	0.049	0.747	0.381	-0.189	1.665	2.663	2.823	-2.071	25.73
Regular	0.007	0.616	-0.093	0.064	2.520	22.677	-7.636	7.937	22.91
Switcher	0.009	0.600	0.011	0.007	1.676	11.053	0.496	0.484	7.37
Nonpayer	-0.005	1.287	0.732	-0.084	-0.182	4.955	6.316	-1.095	78.40

There is a concern with the data. There were only a few quarters that the NBER classified as economic contractions. On the other hand, we have many observations during economic expansions. Regression results for the recession periods may be affected by the limited number of periods classified as contractions. However, there are a large number of firms in each group. Of course, the non-dividend payers have a much higher number of observations in each quarter. Therefore, the data for nonpayer is more approximate to normal.

Table 22 provides descriptive statistics regarding the dividend changes and daily returns associated those changes. Panel 1 of Table 22 provides descriptive statistics for the rate of change in the dividend levels, the average returns, and excess returns. The largest dividend decreases seem to come from Switcher firms. The largest dividend increases can also be attributed to Switcher firms. It may be that firms do not have a history of paying dividends regularly, and only pay in instances when it benefits the firm. For example, Switcher firms may pay dividends when the firm has excess cash flow or

Table 21  
Fama-French Three Factor Regressions by Dividend-Paying Status and Time (1990-2009)

Quarterly returns are calculated for every NYSE, AMEX, and Nasdaq firms. They are then sorted by size and book-to-market to form six portfolios to generate the factors SMB and HML. Size is the market value for each firm at the end of the quarter and BE/ME is the ratio of book equity to market equity, where BE is calculated from the Compustat database as in Fama and French (1993). Regression results for the Fama-French three-factor model  $R_i = a_i + b_i(R_m - R_f) + s_i \text{SMB} + h_i \text{HML} + e_i$  are shown below. During the period between 1993 and 2009 the number of regular dividend payers ranged from a minimum of 427 in the fourth quarter of 2000 to a maximum of 1,428 in the first quarter of 1997. During the same time period, the number of switchers ranged from a minimum of 275 in second quarter of 2009 to maximum of 1,103 in the second quarter of 1999. Non-dividend payers ranged from 3,103 in the second quarter of 2009 to 5,226 in the first quarter of 1997. We divide the samples into two time periods to distinguish between recession and non-recession periods. According to the NBER, the US experienced economic contractions in the periods March 2001 – November 2001 and December 2007 – June 2009.

Sample	Estimated Parameter Values				T-Values				R-Sq
	a	b	s	h	a	b	s	h	
All									
Expansion	-0.009	1.029	0.506	-0.058	-0.442	4.622	5.798	-0.995	77.98
Recession	0.086	1.573	0.112	-0.015	1.287	4.778	0.249	-0.032	92.39
Regular									
Expansion	-0.006	0.841	-0.080	0.437	-0.360	10.561	-0.738	3.862	65.02
Recession	0.006	0.497	-0.074	0.051	1.986	16.308	-6.192	6.466	14.88
Switcher									
Expansion	0.011	0.597	-0.025	0.021	1.406	7.291	-0.791	0.970	44.64
Recession	-0.014	1.016	0.076	0.524	-0.313	4.643	0.255	1.685	94.52
Nonpayer									
Expansion	-0.016	1.218	0.763	-0.103	-0.516	3.853	6.155	-1.253	78.32
Recession	0.402	0.477	-0.582	1.305	1.022	0.245	-0.218	0.471	0.51

when firm managers see the need to signal to investors (Fuller and Blau, 2010). In examining the average returns on day -1, day 0, and day 1 (day 0 is the declaration day), we can see that the average return is higher surrounding a dividend increase, and lower (even negative in some cases) surrounding a dividend decrease. The same can be said when examining excess return.

Panels 2 and 3 are similar to Panel 1, but Panel 2 examines economic expansions, while Panel 3 examines economic recessions. In Panel 2, average returns are lowest

surrounding a dividend decrease, but for the most part, remain positive. On the other hand, average returns and excess returns are all negative surrounding a dividend decrease in Panel 3. Comparing returns surrounding dividend increases across Panels 1 through 3, we can see that returns are much higher in Panel 3. Returns and excess returns are also higher during the recessions for firms that did not change their dividend. It may be that investors saw steady dividend levels as positive signs and dividend increases, as extremely positive signals.

The results in Panel 2, during expansions, imply that investors are not too concerned with dividend decreases during expansions. When economic conditions are promising, negative information such as dividend decreases may not be highlighted in the financial news, and therefore, it may be dismissed by investors. On the other hand, economic contractions increase uncertainty and volatility. Any information, such as dividend announcements, is followed by large reactions in returns. This supports the study by Lee (1995) that finds investor overreaction to temporary dividend changes. Because investors cannot distinguish between permanent or temporary changes, they react strongly especially in times of uncertainty.

Table 22

## Descriptive Statistics for Dividend Changes and Associated Returns

RΔDiv is the rate of change in quarterly dividend per share. R is cumulative stock return during days -1, 0, and 1 relative to the dividend declaration. ER is R minus contemporaneous return on the CRSP index.

Panel 1: Descriptive Statistics for Dividend Event Changes							
	All Sample		Regular		Switcher		
	Mean	SD	Mean	SD	Mean	SD	
Dividend Decreases							
RΔDiv	-0.144	0.185	-0.144	0.116	-0.146	0.185	
R	0.000	0.036	0.002	0.032	0.000	0.034	
ER	0.000	0.033	0.001	0.030	0.000	0.032	
No Change							
R	0.001	0.029	0.001	0.024	0.001	0.028	
ER	0.001	0.028	0.001	0.022	0.001	0.027	
Dividend Increases							
RΔDiv	0.073	0.145	0.023	0.033	0.080	0.151	
R	0.003	0.031	0.002	0.024	0.002	0.027	
ER	0.002	0.030	0.002	0.022	0.002	0.026	
All Dividend Events							
RΔDiv	0.000	0.105	-0.001	0.036	0.000	0.113	
R	0.002	0.030	0.001	0.025	0.001	0.028	
ER	0.001	0.029	0.001	0.023	0.001	0.027	
Panel 2: Descriptive Statistics for Dividend Event Changes during Economic Expansion							
	All Sample		Regular		Switcher		
	Mean	SD	Mean	SD	Mean	SD	
Dividend Decreases							
RΔDiv	-0.142	0.218	-0.140	0.098	-0.159	0.253	
R	0.001	0.030	0.003	0.025	0.001	0.030	
ER	0.000	0.029	0.003	0.024	0.000	0.029	
No Change							
R	0.001	0.026	0.001	0.022	0.001	0.026	
ER	0.001	0.026	0.001	0.021	0.001	0.026	
Dividend Increases							
RΔDiv	0.088	0.189	0.026	0.057	0.095	0.211	
R	0.002	0.026	0.002	0.021	0.002	0.026	
ER	0.002	0.025	0.002	0.021	0.002	0.026	
All Dividend Events							
RΔDiv	-0.007	0.144	-0.001	0.041	-0.010	0.164	
R	0.002	0.026	0.001	0.022	0.002	0.026	
ER	0.001	0.026	0.001	0.021	0.001	0.026	



Table 22 (continued)

Panel 3: Descriptive Statistics for Dividend Event Changes during Economic Recession						
	All Sample		Regular		Switcher	
	Mean	SD	Mean	SD	Mean	SD
Dividend Decreases						
RΔDiv	-0.145	0.177	-0.144	0.118	-0.145	0.174
R	-0.001	0.050	-0.005	0.059	-0.002	0.052
ER	-0.002	0.044	-0.007	0.053	-0.002	0.044
No Change						
R	0.002	0.047	0.000	0.042	0.001	0.046
ER	0.002	0.042	0.001	0.033	0.001	0.040
Dividend Increases						
RΔDiv	0.072	0.139	0.023	0.030	0.079	0.146
R	0.003	0.057	0.003	0.042	0.002	0.035
ER	0.003	0.054	0.004	0.034	0.001	0.028
All Dividend Events						
RΔDiv	0.001	0.100	-0.001	0.036	0.001	0.108
R	0.001	0.050	0.001	0.043	0.001	0.044
ER	0.001	0.045	0.001	0.034	0.001	0.038

### 3.6. Summary and Conclusions

Using logistic regressions, and controlling for various determining factors of dividend payment identified in previous literature, we found that the dividend paying history of a firm as well as the economic cycle determines whether a firm will change the level of the dividend. Switcher firms are less likely to change dividend levels, but when they do change dividend levels, they tend to change them by large amounts. Regular dividend payers, on the other hand, are more likely to change dividend levels, but by smaller amounts. Expansions are also likely to cause increases in dividend levels, but this may be due to the likelihood of switchers and nonpayers initiating and increasing dividend levels.

We have seen that the importance of the factors that are used to explain returns, namely, the market risk premium, SMB, and HML, change with the dividend paying

status of the firms. These factors seem to be significant for firms that regularly pay dividend, or sporadically pay dividends (switcher firms), but are not significant for nonpayer firms.

Although non-dividend paying firms have higher returns in excess of the risk free rate, dividend paying firms and switcher firms have positive and significant abnormal returns. Nonpayer firms have abnormal returns that are not significantly different from zero.

We established that Switcher firms issue the largest average dividend decreases, as well as the largest average dividend increases. The results also show that average returns and average excess returns are lower surrounding a dividend decrease declaration, and higher surrounding a dividend increase declaration. In comparing average returns and average excess returns (daily frequency) before and during the market downturn, we see that the market reacts more to dividend events during the downturn. In fact, returns were much lower and always negative surrounding a dividend decreases. On the other hand, they were much higher surrounding a dividend increase. Even if firms did not change their dividend levels, returns surrounding dividend declarations were higher during the downturn. Apparently, the effect of a dividend change is affected by the state of the economy. The results show a magnification effect when the economy is in a bad state.

## CHAPTER 4: DETERMINANTS OF DIVIDEND INCREASES OR DECREASES OF ADRs AND THE EFFECTS ON RETURNS

### 4.1. Introduction

Examination of a typical dividend paying firm will reveal that dividends are paid quarterly and the amount of cash dividend per share does not fluctuate, in fact it usually remains at the same level for very long periods of time. In most cases, a dividend paying firm has a very long history of paying dividends. Brav, Graham, Harvey, and Michaely (2005) find that most regular, dividend-paying firms continue to pay dividends because they feel obligated to do so due to their long history of paying dividends. In fact, they no longer adhere to target dividend payout ratios, instead they rely on past dividend levels when determining the firm's distribution policy.

Many studies have found a decreasing number of dividend paying firms (Skinner (2008); DeAngelo, DeAngelo, and Skinner (2004); Fama and French (2001)). Instead of cash dividends, more and more firms are using stock repurchases.

However, if regular-dividend paying firms are relying on past dividend levels in determining the firm's distribution policy, then a change in the dividend level of these firms should imply important information about the firm itself. This is especially true when investors are uncertain about future market conditions. Uncertainty is even greater for a foreign based firm, especially if the firm is based in an emerging market. The recent market downturn also increased uncertainty, implying that any dividend changes indicate fundamental changes of important consequences for the firm's future.

The literature regarding American Depository Receipts is abundant. There are many studies that examine the reasons for foreign firms cross-listing in the US. Other

studies examine the differences between firms in the various ADR levels. A few examine returns behavior of ADRs surrounding the ex-dividend day. Denis and Osobov (2008) provide evidence on the determinants of dividend policy on an international scale, but only look at developed markets. Very few studies have examined the determinants of dividend changes, and as far as we know, this is the first study to identify the determinants of dividend changes in both developed and emerging markets. Even fewer studies have examined the effect of dividend changes on returns.

This study identifies determinants of a change in dividend levels of foreign firms trading on US exchanges in the forms of American Depository Receipts (ADRs) (See the Appendix for a primer on ADRs). An additional innovative aspect of this paper is our examination the effects of changes in dividend levels on returns based on the dividend paying status of the firm (regular, switcher, or nonpayer).

#### 4.2. Review of Literature

It is widely accepted that cross-listing increase market integration, and many argue that it can improve market quality in emerging markets. Forester and Karolyi (1998, 2000) and Domowitz, Glen, and Madhavan (1998), as well as others find that cross-listing increases competition for order flow, which improves liquidity. Decreases in cost of capital due to stricter disclosure standards and better legal protection in the US have also been associated with cross-listing (Moel, 1999). More recent studies (Moel, 2001) have found that ADRs originating from emerging markets are related to the weakening of the home markets.

Karolyi (2004) reexamines the role of ADRs in the development of emerging markets. Contrary to previous findings that ADRs lead to the deterioration of the

financial markets in the emerging markets, he finds evidence that firms list abroad because of the poor and deteriorating quality of financial markets in the home country. ADRs are an effect of weakening home markets rather than a cause of them.

Although, markets have become increasingly open and capital flows have become more fluid, the degree of market segmentation may still be an important determinant of ADR returns. Harvey (1995) finds that local information plays a larger role in emerging markets than in developed markets. Choi and Kim (2000) also find the MSCI Index to have low explanatory power for emerging markets.

Previous studies have found that country factors and macro-economic factors are significant factors that differentiate returns on US stocks and returns on ADRs. Jiang (1998) and Bekaert and Urias (1999) make the case for ADRs as diversification tools. Jiang (1998) identifies a “country” element and a “currency” element that provide diversification. Lessard (1974) and Roll (1992) argue that diversification benefits come from industrial structure, while Heston and Rouwenhorst (1994), Griffin and Karolyi (1998), and Choi and Kim (2000) find that diversification also comes from country factors or economic policy differences such as interest rate policies, national deficits, monetary policies, and economic growth. Using different multifactor models to explain ADR returns, Patro (2000) also notes that home country returns are important. He finds that a model with home country returns and world returns as risk factors performs better than a model with either factor alone.

Studies related to dividends with respect to ADRs only examine the ex-dividend day in an attempt to measure dividend recapture. Gorman, Mahajan, and Weigand (2004) compare dividend recapture in ADRs to dividend recapture in US stocks. They find that

ex-day returns for ADRs are higher than the returns for comparable US firm. Also, volume is lower for ADRs than for US firms. They present evidence that a foreign risk premium cannot be the only cause for the higher returns. This implies that dividend recapture is being hindered by other factors. Although they do not expand on the idea, they suggest that differences in dividend payment policies among the different countries may be causing the differences between US stock and ADR ex-day returns.

#### 4.3. Data

Daily data on returns of US stocks and ADRs trading on the NYSE, Nasdaq, and AMEX exchanges, and issued by the Bank of New York Mellon, is gathered from the CRSP database. Data on dividend announcement dates is also available from the CRSP database. Data on the cash dividend amounts are available from the Compustat database.

In order to be included in our sample, data on returns must be available from the CRSP database and fundamental data must be available from the COMPUSTAT database. As in the previous chapters, a firm is classified as a dividend payer if it has paid a dividend classified as a “regular, quarterly, cash dividend” and coded as “1232” by the CRSP database in every quarter for the previous twelve quarters. If the firm paid dividends sporadically over the previous twelve quarters, then it is classified as a switcher firm. If a firm paid no dividends coded as “1232,” in the previous twelve quarters, then it is classified as a non-dividend paying firm.

As previous studies have shown, country factors have high explanatory powers for ADR returns. This leads us to believe that such country factors may also be important determinants of dividend changes for ADRs. Therefore, we create a quarterly measure for economic recession for each country using various macro-economic factors. From the

Datastream database, we gather data on various economic indicators in order to determine the economic conditions in the various home countries of the ADRs. We gather data on unemployment, GDP, GNI, retail sales, and industrial production. We define an economic recession as two consecutive quarters of a decline in GDP, GNI, retail sales, and industrial production, along with two consecutive quarters of an increase in the unemployment rate. This measure is used in attempt to examine whether these factors are related to the propensity to pay dividends and to dividend level changes.

#### 4.4. Methodology

The main contribution of this chapter is to identify the determinants of dividend payment and dividend level changes for American Depository Receipts. This is especially challenging because these securities represent ownership in shares of non-U.S. companies. Although they're priced in dollars and pay dividends in dollars, the value of ADRs really depends on the value of the foreign firm and conditions in foreign markets. Another difficulty is introduced by the very few regular, quarterly, cash dividends paid by ADRs.

Table 23 shows that between 1990 and 2009, there were only a couple hundred dividend payments made by regular dividend payers and switchers each. Between 1993 and 2009, only 549 regular, cash dividend distributions were paid by American Depository Receipts. Most were classified as switchers, implying that very few paid dividends regularly. Of those firms that paid dividends, only a handful changed the dividend level. About seven percent of payers and just two percent of switchers increased the dividend level, while not even 1% of either regular payers or switchers decreased dividend payments.

Table 23

Number of Dividend Changes, ADRs (1993Q1 – 2009Q2)

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Status	Decrease		Increase		No Change	
Nonpayer	1	33.33%	0	0.00%	2	66.67%
Payer	2	0.83%	17	7.05%	222	92.12%
Switcher	3	0.98%	7	2.30%	295	96.72%

Table 24 shows how some quarters had no dividends paid by an ADR. In most cases, only a few firms paid dividends. The number of firms that paid a regular, quarterly cash dividend ranged from zero to just twelve between 1993 and 2009. One noticeable trend is that the number of dividend payments from American Depository Receipts increased through time. This is surprising, as studies have shown the number of dividend paying firms to be decreasing among U.S. firms.

Although regular, quarterly cash dividends are not common among ADRs, they are quite volatile, and are paid without consistency by the firms. Table 25 displays summary statistics for dividend payments made between 1993 and 2009. Panel 1 focuses on the dividend payment per share. Regular, quarterly cash dividend payments of ADRs are similar in amount to those of U.S. firms.

Panel 2 highlights changes in the dividend level from one quarter to the another, while Panel 3 shows summary statistics of the percentage change in dividend levels from quarter to quarter. Although the average change in dividends is only 1% for regular dividend payers, it is a large 12.41% for a firm that pays dividends sporadically. Large



Table 24

## Number of Dividend Changes Over Time, ADRs (1993Q1 – 2009Q2)

Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Panel 1: Dividend Changes for Dividend Payers							
Year & Quarter	Decrease	Increase	No Change	Year & Quarter	Decrease	Increase	No Change
1993Q1			2	2001Q2			
1993Q2			3	2001Q3			
1993Q3			1	2001Q4			2
1993Q4			1	2002Q1			
1994Q1			1	2002Q2			1
1994Q2			2	2002Q3			1
1994Q3			5	2002Q4	1		3
1994Q4			3	2003Q1			2
1995Q1			2	2003Q2			4
1995Q2				2003Q3			4
1995Q3			3	2003Q4			4
1995Q4		1	1	2004Q1			4
1996Q1			1	2004Q2		1	6
1996Q2			5	2004Q3			4
1996Q3			2	2004Q4			5
1996Q4				2005Q1		1	3
1997Q1				2005Q2		1	6
1997Q2				2005Q3			4
1997Q3			2	2005Q4			6
1997Q4		1		2006Q1		2	3
1998Q1			1	2006Q2		1	7
1998Q2			1	2006Q3			5
1998Q3				2006Q4			7
1998Q4				2007Q1	1	2	4
1999Q1			2	2007Q2			8
1999Q2			1	2007Q3			6
1999Q3			1	2007Q4			7
1999Q4			2	2008Q1		2	5
2000Q1				2008Q2		1	6
2000Q2			1	2008Q3			6
2000Q3				2008Q4			6
2000Q4			1	2009Q1		2	5
2001Q1			2	2009Q2		1	6

Table 24 (continued)

Panel 2: Dividend Changes for Switchers							
Year & Quarter	Decrease	Increase	No Change	Year & Quarter	Decrease	Increase	No Change
1993Q1			2	2001Q2			4
1993Q2			2	2001Q3			
1993Q3			2	2001Q4			4
1993Q4			2	2002Q1			3
1994Q1			1	2002Q2			
1994Q2			2	2002Q3			3
1994Q3			2	2002Q4		1	9
1994Q4				2003Q1			4
1995Q1				2003Q2		1	7
1995Q2			1	2003Q3			4
1995Q3				2003Q4			5
1995Q4			1	2004Q1			4
1996Q1			1	2004Q2			6
1996Q2			2	2004Q3			4
1996Q3				2004Q4		1	2
1996Q4			1	2005Q1			6
1997Q1				2005Q2			6
1997Q2			3	2005Q3		1	4
1997Q3			1	2005Q4			8
1997Q4			5	2006Q1			4
1998Q1				2006Q2			6
1998Q2			3	2006Q3			5
1998Q3			3	2006Q4			8
1998Q4			1	2007Q1			3
1999Q1			4	2007Q2			9
1999Q2			2	2007Q3			6
1999Q3			3	2007Q4			9
1999Q4			1	2008Q1			8
2000Q1			3	2008Q2		1	11
2000Q2			5	2008Q3			10
2000Q3			2	2008Q4	2		10
2000Q4				2009Q1			12
2001Q1			3	2009Q2	1	1	7

Table 25

Summary Statistics of Dividend Payment Level, Change, and Percentage Change, ADRs  
 Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

Panel 1: Dividend Payment				
Status	Mean	Median	Minimum	Maximum
Nonpayer	0.30	0.18	0.03	0.84
Dividend Payer	0.34	0.34	0.02	1.00
Switcher	0.20	0.13	0.02	0.84

  

Panel 2: Dividend Change				
Status	Mean	Median	Minimum	Maximum
Nonpayer	0.039	0	0	0.116
Dividend Payer	0.002	0	0	0.120
Switcher	0.019	0	0	0.253

  

Panel 3: Dividend Percent Change				
Status	Mean	Median	Minimum	Maximum
Nonpayer	5.36%	0.00%	0.00%	16.09%
Dividend Payer	1.05%	0.00%	0.00%	71.43%
Switcher	12.41%	0.00%	0.00%	139.55%

swings in dividend payments are also evident among all types of firms. Even regular dividend paying firms have changed their dividend by as much as 71.43%, while switchers have made a 139.55% change. Such wide swings stem from the very few dividend payments among ADRs.

In order to determine if an American Depository Receipt will increase, decrease, or leave the dividend level unchanged, a polytomous logistic regression is used. This type of regression allows us to use a dependent variable of two or more responses.

As in Chapter 2, our response row is

$$y_i = (y_{i1}, y_{i2}, \dots, y_{ir})^T \tag{8}$$

We assume a multinomial distribution with index  $n_i = \sum_{j=1}^r y_{ij}$  and parameter  $\pi_i = (\pi_{i1}, \pi_{i2}, \dots, \pi_{ir})^T$ . We relate  $\pi_i$  to covariates through a set of  $r-1$  baseline-category logits. Taking  $j^*$  as the baseline category, the model is

$$\log\left(\frac{\pi_{ij}}{\pi_{ij^*}}\right) = x_i^T \beta_j, \quad j \neq j^*. \quad (9)$$

If  $x_i$  has length  $p$ , then the model has  $(r - 1) \times p$  free parameters, which we can arrange as a matrix or a vector. The last category is the baseline ( $j^* = r$ ), so the coefficients are

$$\beta = [\beta_1, \beta_2, \dots, \beta_{r-1}] \quad (10)$$

Or

$$\text{vec}(\beta) = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_{r-1} \end{bmatrix}. \quad (11)$$

The  $k$ th element of  $\beta_j$  can be interpreted as: the increase in log-odds of falling into category  $j$  versus category  $j^*$  resulting from a one-unit increase in the  $k$ th covariate, holding the other covariates constant.

#### 4.5. Empirical Results

The predictors of interest include the firm's dividend paying status, the state of the economy, the firm's total assets, growth opportunities, earned equity, and profitability. Table 26 displays the mean values for total assets, market value, profitability, earned equity, and growth opportunities according to the dividend paying status of the firm and whether the firm has increased, decreased, or left the dividend level unchanged. Because there were only three instances where a non-dividend paying firms paid dividends, there is also a column labeled "Never Paid" for the nonpayer status, which allows for comparison of firms that never paid dividends.

Of the firms that paid dividends, regular dividend paying firms had the highest average total assets, market value, profitability, earned equity, and even growth opportunities. This is a bit surprising because high growth opportunities have been associated with a lower probability of dividend payment. This may be explained by the fact that these ADR firms are still expanding into the world markets, so reimbursement, rather than distribution, of earnings is more important. Also, the table shows that regular dividend paying firms with the highest growth opportunities decreased dividends, most likely to increase reinvestment and take advantage of the growth opportunities available. The same can be said of switcher firms, which seem to exhibit the same pattern.

Non-dividend paying ADRs that have never paid a dividend display some surprising characteristics. They have, by far, the highest total assets, market value, profitability, and earned equity; all characteristics that are associated with dividend payment. Growth opportunities are high, but similar to those of regular dividend payers.

Table 27 introduces economic conditions and allows us to see how determinants of dividends are different depending on the state of the economy and the dividend paying status of the firm. Naturally, during a recession, total assets and market value are lower, on average. Surprisingly, profitability, earned equity, and growth opportunities are higher, on average, during a recession. Average profitability and earned equity are also higher for regular dividend payers during a recession. What is surprising, however, is the increase in average total assets seen during recessions. This is also exhibited in Chapter 2 with U.S. firms. Dividend paying firms may be viewed as safer stocks during a recession.

This may be occur even more so for ADRs. ADRs tend to be the largest, most profitable within their home country. Cross-listing on a major exchange like the NYSE,

Table 26

## Summary Statistics of Dividend Determinants According to Dividend Paying Status, ADRs

The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code “1232” in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a “Switcher” firm.

	Nonpayer				Payer			Switcher		
	Decrease	Increase	No Change	Never Paid	Decrease	Increase	No Change	Decrease	Increase	No Change
Total Assets	5,116.00	-	9,767.90	69,908.67	16,115.15	13,237.46	11,148.12	9,085.64	8,055.03	5,809.01
Market Value	3,619.50	-	2,516.17	19,542.77	4,799.14	6,401.24	5,142.08	4,128.56	3,589.07	3,069.75
Profitability 1	0.022	-	-0.004	0.014	0.043	0.025	0.010	0.026	0.016	0.010
Profitability 2	0.043	-	-0.030	76.225	1.069	0.323	0.042	3.491	0.182	0.031
Earned Equity	0.136	-	-0.048	2198.762	0.534	0.643	0.786	0.187	0.447	0.437
Growth Opportunities 1	0.707	-	0.769	1.579	2.443	1.322	0.820	1.582	0.889	0.773
Growth Opportunities 2	0.000	-	-0.002	-1.201	-14.505	-3.214	-1.680	-9.867	-1.221	-0.269

Table 27

## Summary Statistics of Dividend Determinants According to Dividend Paying Status and Economic Cycle, ADRs

The Total Assets are reported in millions of US dollars and are equal to the book value of total assets. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets). Growth Opportunities 2 is calculated as the percent change in assets over the quarter. Earned Equity is calculated as ratio of retained earnings to the book value of equity. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets. Profitability 2 is calculated as the ratio of after-tax earnings to the book value of equity. Firms are identified as non-dividend payers if they have not paid a regular cash dividend (distribution code "1232" in the CRSP database) within the last 12 quarters. Firms are identified as dividend payers if they paid a regular cash dividend in the previous 12 quarters. If a firm has paid dividends irregularly within the most recent 12 quarters, it is identified as a "Switcher" firm. A quarter is labeled as expansion or recession if it is classified as such by the National Bureau of Economic Research. According to the NBER recessions occurred between March 2001 and November 2001 and between December 2007 and June 2009.

	Expansion				Recession			
	Decrease	Increase	No Change	Never Paid	Decrease	Increase	No Change	Never Paid
	Nonpayer							
Total Assets	5,116.00	-	9,767.90	40,263.70	-	-	-	39,235.04
Market Value	3,619.50	-	2,516.17	17,461.39	-	-	-	17,054.64
Profitability 1	0.02	-	0.00	0.02	-	-	-	0.02
Profitabilty 2	0.04	-	-0.03	0.02	-	-	-	0.04
Earned Equity	0.14	-	-0.05	0.21	-	-	-	0.34
Growth Opportunities 1	0.71	-	0.77	2.04	-	-	-	1.22
Growth Opportunities 2	0.00	-	0.00	-0.84	-	-	-	-0.24

Table 27 (continued)

	Expansion				Recession			
	Decrease	Increase	No Change	Never Paid	Decrease	Increase	No Change	Never Paid
Payer								
Total Assets	764.63	41,912.65	20,281.76	-	-	42,611.03	23,351.02	-
Market Value	541.29	27,491.15	29,990.14	-	-	19,382.33	29,155.29	-
Profitability 1	0.04	0.01	0.01	-	-	0.01	0.03	-
Profitabilty 2	0.04	0.03	0.04	-	-	0.05	0.07	-
Earned Equity	0.28	0.77	0.29	-	-	0.74	0.85	-
Growth Opportunities 1	0.71	0.70	1.60	-	-	0.60	1.03	-
Growth Opportunities 2	-0.99	0.00	-12.00	-	-	0.00	0.00	-
Switcher								
Total Assets	-	-	16,029.08	-	57,347.06	56,801.30	14,895.19	-
Market Value	-	-	13,628.66	-	25,733.97	38,610.95	6,745.16	-
Profitability 1	-	-	0.02	-	-0.04	0.04	0.01	-
Profitabilty 2	-	-	0.05	-	-0.06	0.06	0.04	-
Earned Equity	-	-	0.34	-	0.74	0.42	0.46	-
Growth Opportunities 1	-	-	1.71	-	0.45	0.68	0.41	-
Growth Opportunities 2	-	-	-4.93	-	0.00	0.00	0.00	-



NASDAQ, or AMEX increases these firms association with financial security. Another point of interest is that no dividend payer decreased a dividend payment during a recession. On the other hand, decreases were seen in expansionary periods. This is also similar to results in Chapter 2, where U.S. firms were more likely to decrease a dividend during an expansionary period. Average growth opportunities also decreased during economic contractions, limiting what firms could earn with reinvestment, which may have allowed for a dividend increase.

Switcher firms neither increased nor decreased dividends during economic expansions. These sporadic dividend payers were more likely to make changes during economic contractions. Total assets, market value, profitability, and growth opportunities decreased for switcher firms during economic recessions, but firms that increased or decreased dividend levels had market values and total assets that were far higher than those of the average switcher firm. Firms that increased dividends also had growth opportunities higher than those of the average firm.

Table 28 displays results of a polytomous logistic regression where the response variable is

$$Y_i = \begin{cases} 1 & \text{if the dividend increases} \\ 2 & \text{if the dividend decreases} \\ 3 & \text{if the dividend remains unchanged} \end{cases} \quad (12)$$

Predictor variables include dividend paying status, the state of the economy, total assets, earned equity, growth opportunities, and profitability. Non-dividend payers are excluded from this analysis as there are only three instances where a non-dividend payer distributed dividends.

Table 28

Generalized Logarithmic Regressions with Growth Opportunities 1 and Profitability 1,  
ADRs

The probability modeled is that Change = 'No Change'. Using a polytomous logit model, variables are selected using a generalized logit procedure and Newton-Raphson optimization technique. The Status effect is represented by a two binary variables: Payer. The binary variable "Payer" is equal to 1 if the firm has paid a regular cash dividend (distribution code "1232" in the CRSP database) in all of the previous 12 quarters, and it is equal to 0 otherwise. We measure the effect of the market according to the expansion and contractions measured through GDP, GNI, Unemployment, Industrial Production, and Retail Sales. The Economic Cycle effect is introduced as a binary variable called Expansion that is equal to 1 if the market is in an expansionary quarter and 0 when the market is in a contraction or recession period. Total Assets is the book value of total assets in the prior quarter. Growth Opportunities 1 is calculated as the ratio of the market value of total capital to the book value of total assets ((book value of total assets-book value of equity + market value of equity)/book value of total assets) in the prior quarter. Profitability 1 is calculated as the ratio of earnings before interest to the book value of total assets in the prior quarter.

Panel 1: Fit Statistics							
Criterion	Intercept Only	Intercept And Covariates					
AIC	74	73					
SC	81	120					
-2 Log L	70	45					

  

Panel 2: Analysis of Effects with Effect Coding				
Effect	DF	Wald ChiSq	Prob ChiSq	
Status	2	3.55	0.1697	
Economic Cycle	2	10.34	0.0057	
Total Assets	2	4.79	0.0911	
Growth Opportunities1	2	2.23	0.328	
Earned Equity	2	0.95	0.621	
Profitability1	2	3.19	0.203	

  

Panel 3: Parameter Estimates with Effect Coding							
Variable	ClassVal0	Response	DF	Estimate	StdErr	Wald ChiSq	Prob ChiSq
Intercept		Decrease	1	-4.21	1.54	7.43	0.0064
Intercept		Increase	1	-3.22	1.45	4.94	0.0262
Status	Payer	Decrease	1	0.40	0.81	0.24	0.6241
Status	Payer	Increase	1	1.64	0.89	3.40	0.0652
Economic Cycle	Expansion	Decrease	1	-1.36	0.77	3.10	0.0781
Economic Cycle	Expansion	Increase	1	-1.98	0.70	7.99	0.0047
Total Assets		Decrease	1	0.00	0.00	0.51	0.4742
Total Assets		Increase	1	0.00	0.00	4.44	0.0352
Growth Opportunities		Decrease	1	-0.73	1.69	0.18	0.668
Growth Opportunities		Increase	1	-4.51	3.12	2.09	0.1479
Earned Equity		Decrease	1	0.40	1.20	0.11	0.7371
Earned Equity		Increase	1	0.84	0.90	0.89	0.346
Profitability1		Decrease	1	16.89	24.24	0.49	0.486
Profitability1		Increase	1	39.68	23.67	2.81	0.0937

Table 28 (continued)

Panel 4: Odds Ratio Estimates					
	Effect	Response	OddsRatioEst	LowerCL	UpperCL
Status	Payer vs Switcher	Decrease	2.203	0.094	51.886
Status	Payer vs Switcher	Increase	26.556	0.813	867.069
Economic Cycle	Expansion vs Recession	Decrease	0.066	0.003	1.357
Economic Cycle	Expansion vs Recession	Increase	0.019	0.001	0.297
Total Assets		Decrease	1	1	1
Total Assets		Increase	1	1	1
Growth Opportunities		Decrease	0.484	0.018	13.342
Growth Opportunities		Increase	0.011	<0.001	4.949
Earned Equity		Decrease	1.494	0.143	15.575
Earned Equity		Increase	2.327	0.402	13.49
Profitability1		Decrease	2.16E+07	<0.001	2.16E+07
Profitability1		Increase	1.71E+17	0.001	1.71E+17

The Type III analysis of effects in Panel 2 shows the change in fit that results in excluding one of the covariates. Only the state of the economy has a significant effect on dividend level changes at the 1% level. This is far different from the results in Chapter 2 for U.S. firms, where most of the dividend determinants were significant in determining dividend level changes. Total assets also has a discernable effect of dividend changes, but only at the 10% level.

The estimates for intercepts in Panel 3 are the log-odds ratios for Switchers during Recessions. The log-odds of a decrease in the dividend versus no change for switcher firms during a recession is -4.21, while the log-odds of an increase in the dividend versus no change for switcher firms during a recession is -3.22. This implies a switcher firm is unlikely to change a dividend level during a recession.

According to the odds ratios in Panel 4, a dividend paying firm is 26.556% more likely than a switcher to increase a dividend. An economic expansion is likely to cause

less movement in the dividend levels for ADRs. In an expansion, a firm is 0.066% less likely to decrease, and 0.019% less likely to increase, the dividend level than leave it unchanged. A one unit increase in Total Assets increases the likelihood of an increase in the dividend by 1% over leaving the dividend unchanged. An increase in growth opportunities decreases the likelihood that the dividend level will change. On the other hand a one unit change in profitability, drastically increases the likelihood that the dividend will increase. This result may be a product of the few ADR firms that actually pay dividends and the wide variability in profitability that exists between them.

In order to examine returns of ADRs across dividend paying groups and economic cycles, we employ the Fama-French two-factor model for explaining international returns:

$$R - F = a + b[M - F] + c[H - LB/M] + e \quad (13)$$

Where  $R - F$  is the return, in excess of the US T-bill, on any portfolio,  $M - F$  is the excess return on the global market, and  $H - LB/M$  is the difference between the return on the high book-to-market international portfolio and the low book-to-market international portfolio. Monthly data for the factors in this model is available on Professor Kenneth R. French's data library website.

Table 29 displays parameter estimates for the Fama – French two-factor model for international firms. According to the model, American Depository Receipt firms have significant negative abnormal returns, regardless of the dividend paying status of the firm. The very low R-squares for all ADRs, regular dividend payers, switchers, and non-dividend paying ADRs highlight the fact that the Fama-French two-factor model does not adequately explain returns for ADRs. Although this model does very well at explaining

Table 29

## Fama-French Two Factor Regressions by Dividend-Paying Status, ADRs (1993-2009)

Monthly returns of ADRs are from the CRSP database. Monthly market and book-to-market factors for international firms are from Professor Kenneth French's data library. Regression results for the Fama-French two-factor model  $R_i = a_i + b_i(R_m - R_f) + h_iHML + e_i$  are shown below. The number of regular dividend payers ranges from just one in several quarters to a maximum of seven in the second quarter in 2006 through the second quarter in 2008. The number of switchers ranges from one in several quarters to a maximum of ten in the second quarter of 2008, the fourth quarter of 2009, and the first quarter of 2009. The number of nonpayers ranges from a minimum of 28 in the first quarter in 1993 to 257 in the second quarter of 2009.

Sample	Estimated Parameter Values			T-Values			R-Sq
	a	b	h	a	b	h	
All	-0.290	0.011	0.007	-297.84	59.30	19.22	0.081
Regular	-0.252	0.011	0.008	-27.34	6.29	2.61	0.111
Switcher	-0.229	0.014	0.001	-25.21	8.24	0.38	0.121
Nonpayer	-0.232	0.013	0.005	-155.54	44.31	9.7	0.113

returns of international firms (R-square of 97% (see Fama and French, 1998, Table IV, p 1983)), it can only explain about 8% of ADR returns. The market and book-to-market factors are statistically significant (except for the book-to-market factor for switcher firms), but the intercept is largely significant in all cases, implying misspecification or missing explanatory terms.

Table 30 displays results for two-factor Fama-French regressions for all ADRs, regular dividend payers, and switchers according to the change in dividend levels. Non-dividend payers are excluded because there were only three cases where a non-dividend payer paid a dividend. In all cases, except switchers who decreased the dividend level, the model shows significant negative abnormal returns, with dividend payer experiencing the largest negative abnormal returns. Despite these findings, explanatory power is low in most cases. Although dividend payers and switchers who decreased dividends have R-squares of 0.90 and 0.80 the book-to-market factor in the Fama-French two factor model is insignificant. The same can be said of switchers who increased dividends.

Table 30

Fama-French Two Factor Regressions by Dividend-Paying Status and Dividend Change, ADRs (1993-2009)

Monthly returns of ADRs are from the CRSP database. Monthly market and book-to-market factors for international firms are from Professor Kenneth French's data library. Regression results for the Fama-French two-factor model  $R_i = a_i + b_i(R_m - R_f) + h_iHML + e_i$  are shown below.

Sample	Estimated Parameter Values			T-Values			R-Sq
	a	b	h	a	b	h	
All							
Decrease	-0.222	0.019	-0.005	-3.7	2.32	-0.4	0.29
Increase	-0.199	0.012	0.008	-6.72	2.1	0.86	0.16
No Change	-0.250	0.009	0.012	-24.28	4.61	3.37	0.11
Regular							
Decrease	-0.454	0.037	0.009	-15.48	4.8	1.1	0.90
Increase	-0.212	0.010	0.000	-5.94	1.54	0.03	0.07
No Change	-0.262	0.010	0.012	-23.4	4.67	3.06	0.12
Switcher							
Decrease	-0.059	0.013	0.012	-1.27	2.58	1.38	0.80
Increase	-0.188	0.014	0.019	-2.11	1.07	1.48	0.56
No change	-0.175	0.005	0.024	-6.82	1.12	1.98	0.15

Table 31 displays results for Fama-French two-factor regressions for all firms according to the dividend paying status of the firm and the state of the economy. Again, all firms, regardless of dividend paying status and economic conditions are shown to have significant negative abnormal returns. In most cases, except for all firms and switchers during economic expansions, the book-to-market factor is insignificant. Once again, we can draw the conclusion that the Fama-French two-factor model to explain returns of international firms cannot explain returns for American Depository Receipts, despite the fact that these are international equity securities. The lack of goodness of fit can be

Table 31

Fama-French Two Factor Regressions by Dividend-Paying Status and Economic Cycle, ADRs (1993-2009)

Monthly returns of ADRs are from the CRSP database. Monthly market and book-to-market factors for international firms are from Professor Kenneth French's data library. Regression results for the Fama-French two-factor model  $R_i = a_i + b_i(R_m - R_f) + h_iHML + e_i$  are shown below. divide the samples into two economic periods to distinguish between recession and non-recession periods. Recessions are defined as two consecutive quarterly declines in GDP, GNI, Industrial Production, and Retail Sales, with the simultaneous increase of Unemployment.

Sample	Estimated Parameter Values			T-Values			R-Sq
	a	b	h	a	b	h	
All							
Expansion	-0.34	0.01	-0.01	-136.03	22.16	-10.01	0.09
Recession	-0.26	0.01	0.00	-30.00	3.02	-1.42	0.02
Regular							
Expansion	-0.39	0.01	0.00	-26.57	3.62	-0.79	0.10
Recession	-0.27	0.02	0.04	-3.83	1.41	0.92	0.36
Switcher							
Expansion	-0.35	0.02	-0.01	-20.93	5.92	-1.48	0.17
Recession	-0.23	0.01	0.00	-4.02	0.75	0.29	0.03
Nonpayer							
Expansion	-0.34	0.01	-0.01	-132.24	21.23	-9.90	0.09
Recession	-0.26	0.01	0.00	-29.71	2.70	-1.61	0.02

explained by the small sample of international firms that are ADRs, and there are only a handful of them that pay dividends.

#### 4.6. Summary and Conclusions

In terms of dividend determinants and dividend properties, American Depository Receipts are very different from equity securities issued by U.S. firms. Although payment amounts are similar in value, regular, quarterly cash dividend distributions are rare among ADRs. There was evidence that dividend payments were increasing in recent times, but they are still very few.

This study on American Depository Receipts is limited by the lack of regular, quarterly cash dividends, as well as the limited data availability on ADRs. In order to examine dividend determinants, data is needed on firm fundamentals. Although the Datastream database is rich in data on ADRs, key accounting variables needed for this study could only be found on the COMPUSTAT database, which is somewhat limited in that it covers only ADRs that are traded on the NYSE, NASDAQ, and AMEX exchanges. Future research in this area may involve examining all dividends paid by ADRs, rather than just those coded as regular, quarterly cash dividends.

Using the data available, the analysis above implies differences in determinants of dividend level changes. The analysis shows dividend paying status, implied by the dividend policies of the firm within the previous twelve quarters, economic conditions, size, measured by total assets, growth opportunities, and profitability can determine whether a firm will change the dividend level of the firm.

Analysis of returns using the Fama-French two-factor model for international firms found that American Depository Receipts have significant negative abnormal returns. However, the R-squares of the Fama-French regressions showed a lack of fit, with the two-factor model only being able to predict about 8% of the variability in ADR returns.



## CHAPTER 5: FINAL SUMMARY AND CONCLUSIONS

### 5.1. Summary of Empirical Findings

This dissertation examines dividend payments in a manner not studied before. The objectives of this dissertation are: 1) to determine whether dividend payment history and the state of the U.S. economy can be used to predict dividend payment for U.S. companies, 2) to determine whether dividend payment history and the state of the U.S. economy can be used to predict changes in the dividend level of U.S. companies, 3) to determine whether changes in dividend payments of ADRs are affected by the dividend payment history of the firm and the home country's economic state, and finally, 4) to examine returns according to the dividend paying status of the firm.

In the second chapter of this dissertation we examine the probability of dividend payment for U.S. firms. The importance of a firm's dividend payment history and the economic situation are the determinants focused on in this study. Their contribution to the likelihood that a dividend will be paid is analyzed, while controlling for various determinants already identified in previous literature. We control for size, earned equity, growth opportunities, and profitability.

Status is a variable constructed within this dissertation to summarize the dividend payment history of a firm. The last twelve quarters of dividend distributions are employed to create this variable. If, within the past twelve quarters, a firm paid a dividend classified as a regular, quarterly, cash dividend by the CRSP database, then the firm is classified as a regular dividend paying firm. If the firm did not pay any dividends in the previous twelve quarters, the firm is classified as a non-dividend payer. However,

if the firm occasionally paid dividends in the previous twelve quarters, the firm is identified as a switcher firm.

In order to evaluate economic conditions, we use three different measures: The first measure we use is the NBER's classifications of economic contractions and expansion. According to the NBER, economic contractions occurred from March 2001 through November 2001 and December 2007 through June 2009. In our study, we label these periods as economic recessions, and all other periods are classified as economic expansions. We also use the classic definition of GDP. If two consecutive quarterly declines in GDP occur, we classify the following period as an economic recession. All other periods are classified as economic expansions. Finally, we use the return on the S&P 500 index to measure economic conditions.

Using a binary logisitic regression we find that, in fact, the firm's dividend payment history and the economic conditions at the time of the announcement are important factors in determining dividend payment. Whether the NBER classifications of economic contractions and expansions are used or the return on the S&P 500 Index is used to measure economic conditions, logistic regressions find that including this effect in the model for determining dividend payment considerable improves the fit of the model. In other words, economic conditions have a discernable effect on dividend payment.

The third chapter of this dissertation examines dividend level changes of U.S. companies that trade on the NYSE, NASDAQ, and AMEX exchanges. The focus of this chapter is to determine whether dividend paying status and economic conditions affect dividend level changes. Firms are classified according to dividend paying status, as in

Chapter 1. Economic conditions are measured using the NBER classifications for economic expansions and contractions.

Results of polytomous logistic regressions imply that dividend paying firms are most likely to change dividends. All firms are likely to adjust dividend payments during economic expansions, although increases are more likely than decreases.

Polytomous logistic regressions are also used to determine the probability of dividend changes of American Depository Receipts. In order to measure economic conditions in the home country we construct an effect called Economic Cycle. This effect is measured using gross domestic product (GDP), gross national income (GNI), industrial production, retail sales, and unemployment. If GDP, GNI, industrial production, and retail sales decline for two consecutive quarters, while unemployment increases, we classify the next quarter as a recession. All other periods are classified as economic expansions. Results of the polytomous logistic regressions imply that regular dividend paying ADRs are more likely to change dividend levels. Also, healthy economic conditions in the home country are more likely to induce changes in the dividend level.

Quarterly returns of all U.S. stocks, regular dividend paying stocks, non-dividend paying stocks, and switcher stocks are regressed against the three Fama-French factors. Fama-French three-factor regressions for reveal that regular dividend paying U.S. firms earn substantially higher abnormal returns, as compared to non-dividend paying firms and switcher firms. In order to examine returns on American Depository Receipts, the Fama-French two-factor model for international firms is employed. Two-factor regressions using returns for all ADRs, regular dividend paying ADRs, non-dividend

paying ADRs, and switcher ADRs imply that all ADRs, regardless of their dividend paying status, earn significant negative returns.

This dissertation is important to investors holding dividend paying securities in their portfolios because the empirical results show that dividend payments are dependent upon the firm's dividend payment history and the current economic conditions. Firms are likely to continue according to the dividend payment patterns established within the previous twelve quarters. However, firms that are dividend payers, but can no longer sustain dividend payments are likely to discontinue dividend payments during relatively good economic conditions. In terms of dividend changes, more volatility is seen in payments of regular dividend paying firms. Also, good economic conditions are likely to bring about more volatility. Although firms are most likely to increase dividends during expansions, a decrease in dividends is still more likely than no change. Implications are similar for American Depository receipts.

Implications regarding the returns aspect of this dissertation are meaningful for investors who are concerned with the risk-return relationship. Returns of regular dividend paying firms are much higher than the returns of other firms with similar risk. This implies that dividend paying firms are excellent securities for risk-averse investors. On the other hand, American Depository Receipts earn negative abnormal returns. The returns on these securities do not compensate investors for the level of riskiness associated with ADRs.

## 5.2. Limitations

A limitation common to the study in Chapter 2 and the study in Chapter 3 is related to the classification of dividend paying status. We determined the status based on

the firm's dividend payments in the previous twelve quarters. We concluded that based on its recent dividend paying patterns, the market would either identify it as a firm that regularly pays dividends, a firm that does not pay dividends at all, or a firm that pays dividends occasionally, but not regularly. This may classify a few firms incorrectly in some periods. For example, a firm that has never paid a dividend will be classified as a nonpayer. However, if that firm should pay a dividend the next period, then according to our classification, a nonpayer paid a dividend. In the next quarter, this firm would be classified as a switcher because it only paid one dividend in the past twelve quarters, even if it will continue as a regular dividend payer in the future. Although we have a few of these instances, for the most part, firms are classified correctly, as the market would identify them.

Another limitation is the lack of data available of American Depository Receipts. COMPUSTAT is limited to equity securities that trade on the NYSE, NASDAQ, and AMEX exchanges. Therefore, ADRs trading on other exchanges are not examined in this study.

The small number of regular, quarterly, cash dividend payments by American Depository Receipts compounds the data availability problem. This problem can be overcome by examining all cash distributions paid by ADRs. However, new limitations of the study will arise. Examining all types of dividends will complicate the study by possibly introducing multiple dividend payments in the same quarter. Other dividends, such as special dividends or monthly dividends tend to be in very different amounts than regular, quarterly dividends. This will also bring about more variability in the dividend

change. The question of comparability is also introduced because the dividends have different classifications.

### 5.3. Future Research

Future research regarding dividend payment could focus on a distress variable. This would be of special interest during the recent financial crisis. Although there were only a few firms that omitted dividends, they were highlighted extensively in the financial news as distressed firms. Distress variables have been examined in the past in terms of the probability of bankruptcy. A similar approach can be used to determine dividend payment.

Dividend changes can also be examined in an event study where cumulative abnormal returns are calculated after the dividend announcement. This type of study would be similar to the event studies mentioned in the literature review in Chapter 3. These types of studies are commonly used for examining tax impacts and dividend recapture of ex-dividend dates.

The study on American Depository receipts, in Chapter 4, can be conducted at a future date to obtain more conclusive results. American Depository Receipts have recently become a popular vehicle for international investment, and more and more international firms are becoming part of ADR programs. However, at the present time, data availability seems to be the greatest hindrance in making certain conclusions.

### 5.4. Concluding Remarks

The recent financial crisis highlighted changes in dividend payment policy. The financial news was filled with reports of dividend reductions, omissions, and suspensions. After examining various dividend related variables highlighted by previous literature, this

study finds that dividend paying history, at least within the previous twelve quarters, is especially important in determining the probability that a firm will pay a regular, quarterly, cash dividend in the next quarter. The state of the economy is also important in determining dividend payment. Although the financial news highlighted changes in dividend downgrades during the recent recession, it is more likely that regular dividend paying firms will discontinue or omit dividends in good economic states.

Dividend paying history and the economic climate are also important for determining the probability of dividend level changes, whether the firm is a U.S. firm or an American Depository Receipt. Increases in total assets and profitability were related to an increase in the likelihood of a change in dividend levels, while increases in growth opportunities were related to the likelihood of a dividend decrease.

The study involving American Depository Receipts is limited by the few number of regular, quarterly, cash dividend payments, as well as limited data availability of key accounting data used for creating the dividend determinant measures.

Analysis of returns of U.S. stocks using the Fama-French three-factor model reveals that regular dividend paying firms have positive and significant abnormal returns, despite the fact that non-dividend payers have higher average returns. This implies that, on average, dividend paying stocks are earning more return for their level of risk. On the other hand, the Fama-French two-factor model for international firms reveals that all American Depository Receipts earn significant negative abnormal returns, regardless of their dividend paying status. However, the results for the ADRs are questionable due to the weaknesses mentioned above, and the fact that the R-squares for the Fama-French two-factor models are very low.

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## APPENDIX

### APPENDIX A

#### A PRIMER ON AMERICAN DEPOSITORY RECEIPTS

American Depositary Receipts, usually referred to as ADRs, represent ownership of shares of a foreign company. Investors tend to shy away from foreign stocks because of the risks and costs associated with buying and selling foreign securities. ADRs eliminate some of those obstacles. They are convenient for U.S. investors because they are priced in U.S. Dollars, pay dividends in U.S. Dollars, and trade like U.S. shares. However, foreign exchange risk still exists because the price of the security tracks the price of the foreign stock it is derived from.

ADRs are issued by U.S. depository banks. At the present time, there are five of depository banks: JPMorgan, Citibank, Deutsche Bank, the Bank of New York Mellon, and the Computershare Trust Company of New York. The shares issued by these banks can represent a share, a fraction of a share, or multiple shares of the foreign firm. An investor who owns an ADR can also choose to obtain the foreign stock, but it is more convenient to hold an ADR.

There are different levels of ADR firms, which determine their regulations and characteristics. An unsponsored ADR is one that trades on over-the-counter markets. The foreign firm has no formal agreement with a depository bank. These are the least regulated. Therefore, most ADRs are unsponsored. A Level I ADR is also an over-the-counter ADR, but the foreign firm has a formal agreement with a depository bank to act as its transfer agent. Regulations and reporting are also minimal for Level I ADRs.

A Level II ADR requires far more regulation than Level I because these are traded on exchanges. They fall under SEC regulation and must file annual reports and follow Generally Accepted Accounting Principles or International Financial Reporting Standards. A Level III ADR is also heavily regulated because these types of ADRs are traded on exchanges and are able to issue shares to raise new capital within the U.S.

Dividend payments of ADRs can be inconvenient for U.S. investors because of the regulations and procedures involved. Dividend payments are issued by the foreign firm in the foreign currency. They then have to be converted to U.S. Dollars. The amount a U.S. investor receives is less than the actual dividend paid because conversion expenses and foreign taxes must be paid. Withholding tax is also a problem in some instances, but it may be recoverable on U.S. tax filings.

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