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Three Essays in Empirical Corporate Finance

by

Min Thu Maung

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EXAMINING COMMITTEE

Vikas Mehrotra, Finance and Management Science, University of Alberta

Andras Marosi, Finance and Management Science, University of Alberta

David McLean, Finance and Management Science, University of Alberta

Barry Scholnick, Marketing, Business Economics and Law, University of Alberta

Denise Young, Economics, University of Alberta

Iftekhar Hasan, Finance and Accounting, Rensselaer Polytechnic Institute

DEDICATION

To my father, U Maung Maung.

ABSTRACT

This thesis presents three separate essays on credit ratings of regulated utilities, dividend signaling, and asymmetric information and security issuances and repurchases. They include: (a) investigation of the practices of credit rating companies by using the utility industry as a testing ground, (b) documentation of the importance of stock price informativeness and information asymmetry in explaining the disappearing dividend trend, and (c) investigation of the role of information asymmetry in explaining debt and equity issuances and repurchases in hot and cold markets.

In Chapter 2, we investigate the practices of credit rating agencies by using the regulated utility industry as a natural testing ground. The recent financial crisis has raised questions regarding the role credit rating agencies play in monitoring the quality of corporate debt. Following deregulation and the *Enron* scandal, the general opinion among industry professionals is that utilities are being punished by credit rating agencies. Contrary to this popular belief, we find that the utility credit ratings are significantly higher compared to those of other firms, and this significance is more pronounced in the post-deregulation period. We find that, although rating agencies often cite regulatory reasons for placing utilities on negative credit watches, these firms' ratings are rarely downgraded after being placed on negative watches.

In Chapter 3, we try to provide a rational explanation for the disappearing dividend trend. Dividends serve as signaling device and, under models of dividend signaling under information asymmetry, cost of signaling increases with

volatility of firms' cash flows. Declining propensities to pay dividends imply that (1) information asymmetries have become lower and/or (2) cost of signaling has increased. We find evidence consistent with both. Consistent with the signaling hypothesis, we find that firms with higher information asymmetries and lower stock price informativeness are more likely to pay dividends. In particular, we find that the increasing stock price informativeness has made dividend signaling less valuable, and that a significant portion of disappearing dividend trend could be explained by rising risk and increasing stock price informativeness. In Chapter 4, I investigate the motivations for debt and equity issuances and repurchases in hot and cold markets. I find that firms issue equity in hot markets to reduce adverse selection costs associated with asymmetric information. In particular, firms issuing equity in hot markets possess high asymmetric information while firms issuing equity in cold markets possess less severe asymmetric information. I also find that credit ratings and market-to-book ratios could explain why firms might repurchase equity or issue debt in hot markets rather than issue equity: firms with high credit ratings and low market-to-book ratios are more likely to issue debt even in hot equity markets, and firms with low market-to-book ratios are more likely to repurchase equity in any market.

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CHAPTER 1

INTRODUCTION

This thesis covers three seemingly unrelated topics of credit ratings, dividend signaling, and security issuances and repurchases in hot and cold markets. However, they are tied together by some of the most fundamental concepts and theories in corporate finance. Chapter 2 examines the prudence of rating agencies and their monitoring process by using utility deregulation as a natural testing ground. Our motivation comes from the numerous citing in popular press that the regulated utility industry has been unduly punished by the rating agencies. Credit ratings impact a firm's cost of debt and, subsequently, its overall cost of capital. Firms with a higher credit rating can issue lower-yield debt and vice versa. Graham and Harvey (2001) find that maintaining financial flexibility and good credit ratings are the two most important factors firms consider when deciding to issue additional debt. The recent financial crisis has raised questions regarding the role credit rating agencies play in monitoring the quality of corporate debt. In this chapter, we look for evidence that actions of rating agencies do not necessarily follow their words. Our first evidence is quantitative. By using ordered probit models, we determine whether utilities are indeed being punished by the rating agencies in the post-deregulation period. The second evidence we look for is qualitative. By using the news excerpts, we look for cases where rating agencies provide warnings of pending credit downgrades or negative credit watch placements. We then look for evidence of whether all these warnings actually result in subsequent rating changes. Finally, we also look for evidence of whether rating changes affect firms' subsequent capital structures: if ratings are important, we would expect firms to subsequently adjust their capital structures following rating changes.

Miller and Modigliani (1961) argue that, in perfect capital markets, a firm's wealth is invariant to its dividend policy. However, under models of dividend signaling under information asymmetry, dividends serve as signaling device (see Bhattacharya, 1979), and it has been consistently documented that corporations follow extremely deliberate dividend policies. The agency theory of dividend policy also suggests that dividends serve as mechanism for reducing agency costs (see Jensen and Meckling, 1976). Thus, the disappearing dividend trend documented by Fama and French (2001) directly challenges the relevance of signaling and agency hypotheses. Chapter 3 tries to provide risk and information asymmetry-based explanations of the disappearing dividend trend. First, we use different proxies of stock price informativeness and information asymmetry to corroborate the signaling theory. The intuition is straight-forward: if dividends were to serve as signaling device, we could expect that firms with higher information asymmetries and lower stock price informativeness would be more likely to pay dividends. Following this, we try to determine whether rising stock price informativeness could have contributed to the declining dividend trend. Second, we use different proxies of risk to determine whether the declining trend could be explained by rising risk. Again, under models of signaling under information asymmetry, cost of signaling increases with cash flow volatility. Thus, during times of high risk, cost of signaling could exceed benefits, and firms would cut back on dividends. By using proxies of risk and stock price informativeness, Chapter 3 attempts to reconcile the signaling story and the disappearing dividend trend.

It is now commonly accepted that equity issues are clustered around so-called hot markets. Myers and Majluf's (1984) information asymmetry theory suggests that firms issue equity in hot markets to reduce time-varying adverse selection costs. On the other hand, Baker and Wurgler (2000, 2002) suggest that firms issue equity to exploit high market- to- book values. Graham and Harvey (2001) also report survey results indicating that market valuations are very important in firms' decisions to issue equity. In Chapter 4, I investigate the different motivations for not only equity issuances but also equity repurchases, debt issuances, and debt repurchases. First, I use different proxies of information asymmetry to determine whether equity issuances in hot and cold markets are caused by asymmetric information problems. The proxies of information asymmetry are similar to those used in Chapter 3. Second, I use proxies of agency costs to determine whether security issuances and repurchases are determined by capital spending needs or agency problems. Third, I investigate whether debt overhang problems could affect security issuances and repurchases. Finally, I use the proxies of market values of debt and equity to determine whether security issuances and repurchases are caused by respective market valuations of securities. The proxy of the market value of debt is the credit ratings used in Chapter 2. In cases of missing years, I use the models from Chapter 2 to impute the credit ratings.

BIBLIOGRAPHY

Baker, M., Wurgler, J., 2000. The equity share in new issues and aggregate stock returns. Journal of Finance 55, 2219-2257

Baker, M., Wurgler, J., 2002. Market timing and capital structure. Journal of Finance 57, 1–32.

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

Fama, E., French, K., 2001. Disappearing dividends: changing firm characteristics or lower propensity to pay? Journal of Financial Economics 60, 3–44.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics 60, 187–243.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behaviour, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Miller, M., Modigliani, F., 1961. Dividend policy, growth and the evaluation of shares. Journal of Business 34, 411-433.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187–221.

CHAPTER 2

Do Credit Ratings Reflect Underlying Firm Characteristics?

Evidence from the Utility Industry

2.1 INTRODUCTION

Credit ratings impact a firm's cost of debt and, subsequently, its overall cost of capital. Firms with a higher credit rating can issue lower-yield debt and vice versa. Graham and Harvey (2001) find that maintaining financial flexibility and good credit ratings are the two most important factors firms consider when deciding to issue additional debt. Consideration of credit rating becomes especially important for firms at risk of seeing their ratings fall into non-investment grade category. For instance, Grinblatt and Titman (2002) point out that many bond portfolio managers are restricted from owning speculative-grade bonds. Therefore, receiving a speculative-grade rating carries additional stigma for firms. Although credit ratings are vital to firms' financial health, little research has been done in this area, especially with regard to credit ratings of a particular industry.

Moody's and *Standard and Poor's (S & P)*, two major rating agencies, each use nine major grades for credit ratings, often assigning additional positive and negative signs to these grades. The ordered nature of credit ratings renders *Ordinary Least Squares* (*OLS*) regression practically inapplicable. In addition, credit ratings are based not only on measurable quantitative data, but also on qualitative measures such as the nature of a firm's management team, corporate strategy, and industry position. Although Kaplan and Urwitz (1979) are the first authors to employ ordered probit models to measure credit ratings in a cross-sectional setting, it was not until 1998 that ordered probit models in a panel setting are employed by Blume, Lim and Mackinlay (1998). Since then, a number of authors have used credit ratings models in panel settings. Blume et al. find that the credit quality of U.S. corporate debt has declined in recent years. Their analysis shows that rating standards have indeed become more stringent over the 1978 to 1995 period. This is especially applicable to credit ratings of firms that are facing the risk of falling into speculative grade ratings. Their findings are echoed by Gray, Mirkovic, and Ragunathan (2005) who find that the declining credit qualities are not only a U.S. phenomenon but are also applicable to Australian firms.

Most of the previous research either excludes regulated utilities from their samples or use dummies to capture the utility effect. Our view is that regulated utilities themselves are of special interest. Utilities have undergone significant transformations since the passing of the *Public Utility Regulatory Policies Act* (*PURPA*) in 1978 and *Energy Policy Act* (*EPAct*) in 1992. Although the effects of deregulation on utilities are still unfolding, the general opinion is that deregulation has presumably negative effect on utilities' credit ratings. Before deregulation, utilities enjoyed rate protection and monopoly status within specified geographic areas. Increased competition and uncertainty associated with deregulation could be expected to drive down credit ratings. Moreover, although regulators still are concerned with credit ratings, *S & P*'s (2006) rating manual states that "…there is little basis to believe regulators would insist that a utility maintain an ‘A’ profile” (see *S & P*, 2006, pp.88). Since regulators are presumably becoming more concerned with service quality than with credit quality, decreased incentives to maintain the highest level ratings- combined with growing uncertainty- could have negative impacts on utilities’ credit ratings.

The recent financial crisis has directed attention towards the role credit rating agencies play in monitoring the risk and credit quality of complex instruments such as the mortgage-backed securities. Although the general opinion is that the rating agencies either have the tendency to over-rate the financial instruments or to be negligent, the quantitative support for these claims has remained elusive.[1] The central purpose of this chapter is to determine whether credit ratings reflect underlying firm characteristics or not. By doing so, we expect to shed some lights on the prudence of rating agencies and their monitoring process. Since credit rating process is not fully transparent and it often involves use of ‘qualitative’ information, the task at hand is not easy. Thus, we use the utility deregulation as a natural testing ground to determine whether utilities are being strictly monitored- as often claimed by industry professionals and rating agencies themselves- in the post-*EPAct* period.

While previous research has focused on the forecasting of out of sample credit ratings, our approach in this chapter is to understand the changing ratings in a particular industry and their implications. Our first goal is to investigate whether utilities experience significantly lower credit ratings following deregulation. The

[1] Following the sub-prime crisis, several lawsuits have been filed against the rating agencies for negligence. At the time of this chapter, the outcomes of lawsuits involving rating agencies remain pending.

traditional view has been that firms operating in regulated industries enjoy higher credit ratings due to lower default risk. This lower default risk arises from lessened competition enabled by regulatory protection and, in the case of utilities, guaranteed rates of returns over prudent investment outlays. Since the passing of *PURPA* and *EPAct*, utilities have been exposed to increased competition. Numerous articles in the popular press have presumed that the credit quality of utilities has been declining following deregulation. [2] The utility industry supposedly underwent another downward reassessment in 2001 following the Enron scandal. Although not often cited in academic literature, consensus among industry professionals has been that credit issuers have been extremely cautious with the utility ratings following deregulation and the Enron scandal (see Table 2.1). Therefore, utility industry and deregulation serve as a natural ground for testing whether credit rating agencies have been prudent in their rating processes.

[Insert Table 2.1 about Here]

Our results indicate that, over the full sample period of 1985-2006, the utility industry enjoys credit ratings that are higher than those of other industries. When we divide our sample to pre- and post-*EPAct* periods, our results run counter to the popular belief that the utility credit ratings have suffered following deregulation. Following deregulation, the utility credit ratings remain high compared to firms in other industries. In fact, significance (and marginal effects) is even higher compared to that of pre-*EPAct* period. When we run similar regressions with binary probit specifications, results remain robust: utilities are more likely to receive investment-grade ratings compared to other firms, and this

[2] Please refer to Table 1 for industry-related news excerpts.

likelihood is higher for the post-*EPAct* period. We also do not find evidence that, regardless of the sample period selected, utilities are facing higher likelihood of being downgraded or upgraded following deregulation. All in all, we do not find evidence that rating agencies either favor or punish utilities in comparison with other firms.

Our second goal is to investigate the effect of credit rating changes on utilities' leverage ratios. Conventional wisdom suggests that credit downgrades would cause the cost of debt to rise as firms become riskier, and credit upgrades would imply an opposite effect. If utilities are conscious of the cost of debt and subsequent financial distress, they should downwardly adjust leverage ratios following credit downgrades, and upwardly adjust leverage ratios following upgrades. We do not find evidence that utilities adjust their leverage ratios following rating changes. This is in sharp contrast to firms in other industries. Thus, rating changes do not seem to be as important for utilities as they are for other firms.

The remainder of the chapter is organized as follows. Section 2.2 provides an overview of the utility regulation and deregulation, credit ratings, and the utility capital structure. Section 2.3 provides data, methodology, and summary statistics. Section 2.4 presents the main results, and Section 2.5 concludes.

2.2 BACKGROUND

2.2.1 Utility Industry Regulation and Deregulation

There exists an extensive literature on the nature of utility regulation and deregulation. [3] Utility regulation can be traced back to late 19th century when a U.S. Supreme Court's decision validated the right of federal and state governments to regulate firms that provide electricity and related services. The *Federal Power Commission* (*FPC*), the predecessor of the *Federal Energy Regulatory Commission* (*FERC*), was founded in 1920 to coordinate federal hydropower development. Though originally intended to oversee the development of hydroelectric projects, it also came to regulate interstate natural gas and electric utilities in the following years. The *Public Utility Holding Company Act* of 1935 (*PUHCA*) limited each utility's operations to a single geographic area. Under *PUHCA*, each utility retained control over the generation, transmission, and distribution facilities in its region. Thus, the electric utility industry undertook the form of vertically integrated regulated firms within a specified geographical area.

Under *PUHCA*, utility holding companies that are engaged in regulated businesses are prevented from engaging in unregulated businesses. The *Securities and Exchange Commission* (*SEC*) was responsible for approving holding companies that wish to undertake non-utility businesses. Prices were set based on costs and a 'fair' return on investments ensuring a stable revenue stream for utilities and allowing them to pass through many costs to customers. In 1977, *FERC* was created, replacing the *FPC*. The *FERC* and state regulators (*Public Utility Commission* or *PUC*) oversee *Investor Owned Utilities* (*IOUs*) which are the primary focus of this chapter.

Utility deregulation was initiated with the passing of the *Public Utility Regulatory*

[3] Refer to Moyer (1993), and Bulan and Sanyal (2005) for more detailed accounts of utility regulation and deregulation.

Policies Act (*PURPA*) in 1978. Deregulation was aimed to promote competition by enabling customers to choose their energy services providers, a process known as 'retail wheeling.' Ideally, retail wheeling should enable consumers to choose their own energy supplier by allowing suppliers to sell energy, through the transmission grids owned by local the utility firms, to consumers not within their geographic area. Regulation requires that local utilities do not charge excessive rates for access to their transmission grids. *PURPA* intended to improve, among other things, the wholesale distribution of energy and promote 'equitable' retail rates for consumers. This act allowed 'qualifying facilities'- i.e., non-utility power generators that meet certain ownership and generation criteria- to compete with established utilities by mandating that utilities buy power from these non-utility electric power producers at the 'avoided cost" rate, the cost utilities have to incur if they were to produce extra power. Qualifying facilities consist of cogeneration facilities and small power producers. Cogeneration facilities produce electricity and thermal energy (such as heat or steam), byproduct of electricity generation, which is put to 'good' use. Small producers generally use renewable resources such as hydro, wind, solar, and geothermal. In 1992, the passing of the *Energy Policy Act* (*EPAct*) gave rise to open-access transmission grids for wholesale transactions, thereby increasing the level of competition in the generation segment. Although *EPAct* was focused primarily on wholesale competition, it also promoted increased retail competition by requiring utilities that own transmission networks to provide their transmission services to other independent power generators at cost-based non-discriminatory prices. Under *EPAct*, large holding companies are allowed to operate in multiple states more freely.[4] The regulated utilities we consider in this chapter are those with SIC codes 4911 (Electric services), 4922 (Natural gas transmission), 4923 (Gas transmission and distribution), 4924 (Natural gas distribution), 4931 (Electric and other services combined), and 4932 (Gas and other services combined).[5] We exclude SIC codes 4941 (Water supply).

2.2.2 Credit Rating Overview

Commercial rating agencies such as *Standard and Poor's* (*S & P*), and *Moody's* use publicly available and confidentially provided quantitative and qualitative information to assign ratings to firms. Credit ratings simply indicate the current opinion of the agency regarding the credit worthiness of an obligor. Ratings can be assigned as per requests by firms, or in the case of U.S. firms for public debt issuances, *S & P* assigns and publishes its ratings irrespective of issuer request. In most markets outside the U.S., ratings are assigned only upon requests. A credit rating may be assigned to a particular debt issue, or it may indicate the general ability of the firm to meet its obligations.

As stated in *S & P Corporate Rating Criteria* (*S & P*, 2006), a credit rating is "Standard & Poor's opinion of the general creditworthiness of an obligor, or the creditworthiness of an obligor with respect to a particular debt security or other financial obligation, based on relevant risk factors" (pp. 8). Thus, credit ratings fall under two broad categories; ratings that are applicable to specific debt issues,

[4] At the time of this chapter, approximately half of the U.S. states have undergone some form of deregulation. Our results are similar when we control for the state and regulated state dummies.
[5] Our results are robust when we separate gas and electric utilities. Gas utility deregulation began a few years earlier than the electric utility deregulation.

i.e. issue credit ratings, and ratings that are applicable to overall creditworthiness of the issuer, i.e., issuer credit ratings. Each category of rating can be subdivided into long-term and short-term. In this chapter, we look at the overall long-term creditworthiness of the issuer, i.e., issuer credit rating with regard to long-term debt securities. Long-term credit ratings range from 'AAA', the highest quality, to 'D', the lowest. Long-term ratings from 'AA' to 'CCC' could be further given a plus or minus sign. Issuer credit ratings are provided "in response to a need for rating evaluations on a company when no public debt is outstanding" (pp.9).

Previous research has utilized either issue or issuer credit ratings but not both. As both issuer and issue ratings measure the ability of an entity to meet its obligations, either rating is acceptable for our study. Both issuer and issue ratings are assigned identical definitions. Since we are not only interested in firms that have outstanding debt but are also interested in firms that do not, we prefer to use issuer credit rating. However, for junior debt issues, issue credit rating is usually lower than issuer credit rating. We control for this by including a subordinated debt dummy in all our regressions. From Figure 2.1, we could see that the percentage of firms that are rated investment-grade has been declining over the past two decades for both non-utility and utility firms. In addition, we see from Figure 2.2 that percentage of firms that received rating downgrades dramatically increased in the late 1990s and sharply declined after 2001-2002. This finding is applicable to both utility and non-utility firms. For non-utility firms, the percentage of firms that received rating upgrades also declined in the above-mentioned period. However, we could see that percentage of firms that receive credit upgrades does not exhibit any particular trend for utilities.

[Insert Figures 2.1 & 2.2 about Here]

2.2.3 Utility Capital Structure Overview

Bradley, Jarell, and Kim (1984) document that regulated firms such as telephone, electric and gas utilities, and airlines are consistently among the most highly levered firms. Our Figure 2.3 shows that leverage ratios of regulated utilities have been steadily declining since the late 1970s. Authors such as Bulan and Sanyal (2005) attribute this decline to deregulation. To calculate the leverage ratios, we simply aggregate the total book debt (Compustat data 9 + Compustat data 34) over all firms for each year and divide these yearly aggregates by yearly aggregated total assets (Compustat data 6). Several studies have shown that regulated utilities choose high debt levels to induce rate or price increases. Authors such as Taggart (1985), Spiegel and Spulber (1994), and Rao and Moyer (1994) argue that assuming debt would cause regulators set rates at a higher level to mitigate the potential costs of financial distress. The predominant argument in the literature is that a stricter regulatory environment increases the leverage ratios. If regulation causes firms to hold high leverage ratios, deregulation could be expected to cause downward readjustments of leverage ratios as uncertainties associated with a market environment and the absence of regulation may have forced firms to be more conservative in their capital structure decision.

[Insert Figure 2.3 about Here]

2.3 DATA & METHODOLOGY

Issuer credit rating (Compustat data 280), which measures the senior long-term debt obligations, is readily available in Compustat database starting from 1985. Compustat long-term issuer credit rating assigns numerical values to S&P ratings. The values range from 2, S&P equivalent of AAA, to 90, suspended debt. As these values are too numerous to develop any meaningful credit rating model, previous authors re-group numerical ratings into certain classes. To be consistent with previous research, the multiple ratings are classified into seven categories as provided in Table 2.2.

[Insert Table 2.2 about Here]

Previous research has used both issue and issuer credit ratings. For instance, Bhojraj and Sengupta (2003) use a sample of 1,005 industrial bond issues (issue-specific) over 1991–1996 period to show that better corporate governance mechanisms lead to higher bond ratings and lower bond yields. On the other hand, Ashbaugh-Skaif, Collins, and LaFond (2006) use issuer credit rating to show that firms with stronger corporate governance benefit from higher credit ratings relative to firms with weaker governance. While some authors use investment-grade ratings only, others use all available ratings. For instance, Blume et al. and Gray et al. use samples of investment-grade ratings for the U.S. and Australian firms while Ashbaugh-Skaife et al. use all firms. In this chapter, we include all available firms and ratings.

Explanatory variables included in our models are the ones previously found to be significant in explaining credit ratings. These variables are also comprised of accounting variables applied by *S & P*. We closely follow Blume et al. and Ashbaugh-Skaif et al. for these variables. To be consistent with agencies' rating process known as "rating through the cycle", we use three-year averages of the financial ratios– except in cases of dummy variables- in our models using data from 1983-2006. In cases where three years of data are not available (e.g., newly listed companies), we use averages of two years or just single year depending on data availability. *LEVERAGE*, or leverage, is the total debt (Compustat data 9 + Compustat data 34) divided by total assets (Compustat data 6). Higher leverage is associated with higher risk and, therefore, high-leveraged firms are expected to have lower ratings. Return on assets (*ROA*) is the net income before extraordinary items (Compustat data 18) divided by total assets. *LOSS* is a dummy variable assigned one if the net income before extraordinary items is negative in the current fiscal year, zero otherwise. While *ROA* might be able to capture the upside of credit ratings, the *LOSS* dummy could further capture the downside potential of firms that are currently facing losses. *INTCOV* is the interest coverage, or operating income before depreciation (Compustat data 13) divided by interest expense (Compustat data 15). As pointed out by Blume et al, interest coverages that exceed a certain level and negative coverages are not meaningful. Thus, three-year average of the interest rate coverage that exceeds 100 is set to 100 and negative coverages are set to zero.

The coefficient of *SIZE*, natural log of total assets, is expected to be positive as larger firms are also older firms with more established product lines and more diversified sources of revenues. We remove firms that have total assets values lower than \$500,000. *SUBORD* is a dummy variable that takes on the value of one if a firm has subordinated debt (Compustat data 80), zero otherwise. *CAPINT* is the capital intensity measured by gross property, plant and equipment (PPE, Compustat data 7) divided by total assets. The hypothesis is that firms with high capital intensity pose lower risk as tangible assets make better collateral.[6] Some authors have suggested other measures of capital intensity such as PPE-capital expenditure (Compustat data 30) divided by sales. PPE-capital expenditure excludes spending on acquisitions on existing operations. Since utilities are increasingly engaging in mergers and acquisitions, this measure fails to capture the current trends in regulated utilities, which is our primary interest. Thus, we decide to use gross PPE as our primary measure of capital intensity. Firms with PPE to total assets ratios of one or greater are removed. The S&P credit rating manual suggests that 'moderate' capital intensity is regarded favorably by the agency. Therefore, we could not assume a monotonic relationship between capital intensity and credit ratings. As capital intensity increases, firms also lose their operational flexibility. To capture this effect, we include the squared term of capital intensity measure.

Following Blume et al., we also use beta coefficients (*FIRMβ*) and (*FIRMσ*) - or idiosyncratic risk- from the market model. Firm betas are estimated from

$$r_{j,t} = \alpha_j + \beta_j r_{m,t} + \varepsilon_{j,t} \qquad (2.1)$$

where firm j's monthly returns are regressed on value-weighted market returns for each month t. From 1983 to 2006, monthly returns are collected for each

[6] When we replace gross PPE with net PPE (Compustat data 8), results are almost identical.

Compustat firm and the market. Firms that do not have twelve observations within each year are removed. For each year i, idiosyncratic risk for firm j is

$$FIRM\sigma_{j,i} = \sum_{t=1}^{12} (\varepsilon_{j,t})^2 \tag{2.2}$$

where $FIRM\sigma_{j,i}$ is the idiosyncratic risk of firm j at year i.[7] We do not average the firm betas and volatilities. Therefore, we have a panel data of betas and idiosyncratic risks and firm characteristics from 1983 to 2006. As equity risk increases, a firm's ability to meet its debt obligations will deteriorate. Firm-specific volatility could provide information on firm-specific factors such as competency of management while systematic risk could provide information on a firm's position vis-à-vis the market. The expected signs of coefficients for both measures of risk are negative. Figure 2.4 exhibits the time trend of idiosyncratic risk for utility and non-utility firms as measured by Equation 2.2. As expected utility firms exhibit significantly lower idiosyncratic risk compared to non-utilities. While idiosyncratic risk has been steadily rising for non-utilities over the past four decades, we could see that the rise is more abrupt for utilities in the 1990s, coinciding with the ongoing deregulation in that decade.

[Insert Figure 2.4 about Here]

Next, we consider leverage as another proxy of risk. During times of high volatility, leverage exacerbates firm's performance. Some might argue that effect of leverage might already be incorporated in stock return volatility. However, our opinion is that managers are also inclined to consider the level of leverage in addition to firm-specific volatility. We also consider other measures such as

[7] Our results are similar when we use the standard deviation and variance of regression residuals.

Research and Development (R & D) intensity. However, R & D data are very limited and we also do not wish to over-stress our credit rating models. *FIN* and *UTIL* are dummies that take on values of one if firm is a financial institution (one-digit SIC code 6) or a utility (as defined in Section 2.2.1), zero otherwise. Though regulatory environment and higher capital intensity distinguish utilities from other industrials, they are nonetheless similar to other industrials in many aspects. However, financials are different in many aspects. While variables such as profitability, size, and volatility are applicable to all firms, variables such as capital intensity and assumption of subordinated debt are not applicable to financials. On the other hand, variables such as non-performing loans and capital adequacy become more important in determining their credit risk. Furthermore, financial institutions are more sensitive to macroeconomic factors such as interest rates. As a result, prior research usually excludes financials, in addition to utilities, from their datasets. Our results are virtually the same whether we exclude financials or not. For ordered probit results, we estimate

$$y_i^* = x_i \beta + e_i, \; e_i \sim N(0,1), \; \forall i = 1,\ldots,N \tag{2.3}$$

where y_i, the observed credit ratings, takes on values of 0 through 6 according to $y_i = j \Leftrightarrow \mu_{j-1} < y_i^* \leq \mu_j$, where $j=0,\ldots,6$, and x_i's are a set of aforementioned characteristics.

[Insert Table 2.3 about Here]

Table 2.3 presents the correlation matrices of our variables. As expected, ratings are significantly positively correlated with capital intensity, interest coverage, profitability, and size. On the other hand, they are negatively correlated with leverage, and both measures of risk. Although many correlations appear significant, none is excessively large enough to raise concerns about the possibility of inflated standard errors of the regression estimates.[8] As *S & P* states in its rating manual, it also considers "industry prospects for growth and vulnerability to technological change, labor unrest, or regulatory actions" (pp.9). Therefore, industry-specific factors, in addition to firm-specific factors, are also important in determining firms' credit ratings. To control for industry effects, we also run our regressions including Fama-French 48 industries.[9]

In the absence of industry-specific effects, firms with similar characteristics should receive similar ratings. An obvious approach to would be to predict the ratings by using coefficients from ordered probit models in a base period and to compare predicted ratings in each category with actual ratings for the forecast period. In addition to this approach, Blume et al. also use intercept coefficients from yearly probit regressions to show that rating standards have become more stringent (as indicated by lower intercept coefficients) over time. The intuition is that year dummies should measure the changes in propensities to receive higher or lower ratings after controlling for all other characteristics. Probit predictions have varying accuracies depending on the variables included and the base period on which the forecast is built upon. In addition, our independent variables also could have time-varying explanatory powers. Therefore, we follow the latter approach to determine whether the rating standards have become more stringent over time for utilities and for all other firms.

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[8] This is confirmed by low *Variance Inflation Factors* (*VIF*). *VIFs* are not tabulated here to conserve space. *VIF* greater than 10 is considered as indicative of multicollinearity in this chapter.
[9] See Fama and French (1997).

2.4 FINDINGS

The full sample consists of over 3,000 firms and 19,000 firm years. We run our regressions with and without financial, utility, and other industry dummies. Although we follow Fama and French's 48 industry classification, we add an additional dummy variable for regulated utilities as defined in Section 2.2.1. The original Fama and French utilities (SIC 4000-4999) are divided into regulated utilities -as defined earlier- and other utilities. Therefore, there are altogether 49 industry dummies in our regressions. While including all individual industry dummies enables us to determine each industry's position vis-à-vis the base industry, we are mainly interested in the coefficients of utilities. Thus, we only include *FIN* and *UTIL* dummies in most of our other regressions. To be consistent with prior research, we also examine our models with financials and utilities removed from the sample. Where applicable, we use standard errors that are robust to clustering.[10]

2.4.1 Ordered Probit Regression Results

[Insert Table 2.4 about Here]

To be consistent with prior research, we first estimate our models by initially excluding financials and utilities. From Table 2.4 (A), all variables are highly significant and have expected signs. Leverage, market and firm risks, and presence of subordinated debt significantly lower credit ratings while interest coverage, capital intensity, profitability, and size raise credit ratings significantly.

[10] These are White standard errors adjusted to account for possible correlation within a cluster (also known as Rogers standard errors). Our results are similar when we use standard errors that are robust to heteroscedasticity.

Different from Ashbaugh-Skaife et al. who find capital intensity negative and insignificant, we find that capital intensity is positive and significant. The squared term of capital intensity is negative and significant, confirming our prediction of the non-linear effect of capital intensity. Thus, while moderate levels of capital intensity are viewed favorably by rating agencies, excessive reliance on capital intensity is considered risky by rating agencies. Including financials and utilities does little to change the significance of our variables. While the utility dummy is highly significant at 1% level, our financial dummy is not significant at conventional levels. Table 2.4 (C) reports regression results that include 49 industry dummies as defined earlier. Joint test shows that industry dummies are significant at 1% level. Including all industry dummies does little to change the significance of our other coefficients. We separately report them in Table 2.5 for readers who might be interested in them.

[Insert Table 2.5 about Here]

We next divide the sample period into pre- and post-deregulation periods. The pre-deregulation period consists of 1983 to 1992 inclusive. Excluding 1992 from our regressions does not change our results. As with our previous regressions, the coefficient on the utility dummy is our primary interest. Contrary to popular belief, we find that the coefficient on the utility dummy is more significant in the pre-*EPAct* period (1% level) compared to the post-*EPAct* period (5% level). Table 2.4 (A) regression also provides us with the year dummy coefficients from 1986 to 2006 for all firms excluding financials and utilities. In order to understand the declining credit qualities with regard to the utilities, we repeat the ordered probit regression for utilities only (results are reported in Table 2.7, Panel A). We plot the time dummy coefficients of the utility credit rating models alongside those of the full sample (excluding financials and utilities) credit rating models.

[Insert Figure 2.5 about Here]

Figure 2.5 reports the plot of year dummy coefficients for utilities and all firms (from Table 2.4 (A) and Table 2.7 (A) probit estimations). Plots of year dummy coefficients confirm findings from previous research that the credit ratings have declined even after controlling for firm characteristics. From a visual inspection of Figure 2.5, it is apparent that while utilities also experience a significant drop in their credit ratings, this decline is much less pronounced compared to other firms in the sample. This is especially true of post-1990s. Therefore, at the very least, we could say that utilities, when compared to other firms, do not seem to be suffering undue hardship and lower credit ratings following deregulation.

2.4.2 Binary Probit Regression Results

When we replace the dependent variable with investment-grade dummies, results are similar. Investment-grade is coded one if the firm's credit rating is BBB or better, zero otherwise. Table 2.6 reports the standard binary probit regression results. Firms with higher capital intensity, interest coverage, profitability, and bigger size are more likely to be rated investment-grade while firms with higher leverage, firm volatility and systematic risk are more likely to be rated speculative-grade. The presence of subordinated debt and loss also significantly reduces the likelihood of being rated investment-grade. Our financial and utility dummies are significantly positive, indicating that, after controlling for firm characteristics, being a financial or the utility firm increases the probability of being rated investment-grade. From calculations of marginal effects (not reported here to conserve space), being a utility increases the probability of receiving an investment-grade rating by almost 20%. All in all, results are similar to those of the ordered probit model reported in Table 2.4. When we divide our sample to pre- and post-*EPAct* periods, results remain robust: utilities are more likely to receive investment-grade rating compared to other firms. In the pre-*EPAct* period, being a utility increases the probability of receiving an investment-grade rating by 12%. On the other hand, the effect is 15% for the post-*EPAct* period.

[Insert Table 2.6 about Here]

Since the propensity to receive an investment-grade rating for utilities is higher in the post-*EPAct* period, utilities with speculative-grade ratings seem to have improved their ratings after this period. One possible explanation is that, after deregulation, utilities- especially those with credit ratings in speculative grades- are becoming more concerned with cost of capital and are striving harder to maintain their ratings. It should be stressed that this improvement does not mean that utility ratings are improving *per se*. This is the result of a less pronounced decline in utility ratings compared to other firms. In addition, while systematic risk is insignificant for the pre-*EPAct* period, it becomes highly significant in the post-*EPAct* period. This is applicable to all firms and not only to utilities since we are using the full sample firms. If utility ratings are improving vis-à-vis other firms in the post-*EPAct* period, we would expect that, after deregulation has been initiated, utilities would experience fewer downgrades compared to other firms. In the next section, we formally test this intuition. In summary, both the overall credit rating and the propensity to receive investment-grade ratings do not show deterioration after deregulation. In fact, after controlling for firm characteristics and risks, utilities historically enjoy much higher credit ratings than other firms in any sample period.

[Insert Table 2.7 about Here]

Although our main interest lies in comparing the credit ratings of utility firms vis-à-vis firms in other industries, it is useful to track changes within the industry itself. Table 2.7 (A-C) reports the results with utility firms only. Panel A reports the estimates with year dummies, and Panels B-C report estimates without year dummies but with the post-*EPAct* dummy. For ordered credit ratings, the post-*EPAct* dummy is significantly negative (Panel B). However, the significance is weak at 10% level. On the other hand, the coefficient of the post-*EPAct* dummy is neither statistically nor economically significant when the dependent variable is the investment-grade dummy (Panel C).[11] Thus, although utilities are receiving lower ratings compared to pre-deregulation period, the effect is limited. When we include all firms and interact the utility dummy with the post-*EPAct* dummy (Table 2.7, Panels D-E), the interaction term (*POST-EPACT * UTIL*) is insignificant, and its marginal effect is -4.5%.[12] Thus, being a utility in the post-deregulations effect does not seem to have significant impact on credit ratings. We do, however, see that all firms in general are receiving significantly lower

[11] The marginal effect of *POST-EPACT* is -2%.

[12] This setup is essentially the difference-in-difference estimate where utilities belong to the treatment group. However, we could not infer causality here as the treatment group is not randomly selected.

credit ratings. For the sample including all firms, coefficients of *POST-EPACT* are significantly negative whether we are considering general or investment-grade ratings. For binary probit regressions, the calculated marginal effect of *POST-EPACT* for all firms (Panel E) is -16%.

2.4.3 Utility Downgrades and Upgrades

We consider two potential definitions for credit downgrades and upgrades. Credit ratings rarely change from one full letter grade to another (e.g., from BBB to AAA). Rather, they usually change in smaller notches (e.g., from BBB to BBB+). For ordered probit models, several ratings are classified into one group for model estimation. For instance, Compustat data 280 of rating 9 represents letter-grade A- (or rating of 4 in our model) while Compustat data 280 of rating 10 represents letter-grade BBB+ (or rating of 3 in our model). Thus, changes from BBB+ to A are accounted for in our ordered probit models as rating changes from 3 to 4. On the other hand, suppose a firm's rating is upgraded from BBB to BBB+. However, according to our classification, both BBB and BBB+ represent coding of 3 in our ordered probit models. For our binary probit model, we consider partial rating changes.

[Insert Table 2.8 about Here]

DOWNGRADE is a dependent variable that takes on the value of one if a firm's rating has been downgraded over two consecutive years. We define *UPGRADE* similarly. A limitation of binary probit model is that it ignores the level of credit changes. There are several instances where a firm's rating was downgraded or upgraded by more than one notch. In addition, rating changes are not binary in nature. A firm could either retain its current rating, could be downgraded, or be upgraded. Thus we remove firms that have been upgraded from our downgrade regressions, and vice versa. We exclude firms with single-year observations or with no two consecutive years of available data. We also lose the first year of our sample (year 1985) when we calculate changes in ratings. Similar to our previous regressions, our interest lies in the utility dummy coefficients. Since upgrades and downgrades measure the changes in credit ratings, we also compute the changes in firm characteristics. We remove the dummy variables for loss and subordinated debt from our regressions. For downgrades, we expect the coefficients to have opposite signs when compared to those of our ordered probit or binary probit regression models. For upgrades, we expect the signs to be of same direction.

From Table 2.8, we see that all coefficients have the expected signs. Increases in capital intensity, profitability, interest coverage, and size are negatively associated with propensities to be downgraded while increases in leverage, firm volatility, and beta are positively associated with higher propensities to be downgraded. While all other coefficients are significant at a 5% level or lower, our *FIN* and *UTIL* dummies are insignificant. Therefore, being a utility does not result in higher likelihood to be downgraded. Our regression results with upgrade dummy also confirm our intuition. Increases in capital intensity, profitability, interest coverage, and size are positively associated with higher propensities to be upgraded while increases in leverage and firm volatility are negatively associated with lower propensities to be upgraded. Capital intensity, while positive, is insignificant. Once again, *FIN* and *UTIL* dummies are not significant. Evidence seems to suggest credit rating agencies neither favor not punish utilities when deciding to alter their credit ratings.

[Insert Table 2.9 about Here]

While an increase in capital intensity reduces the likelihood of being downgraded, it has no effect on credit upgrades. This is consistent with our findings from ordered probit regressions: while capital intensity is viewed favorably up to a certain level, excessive levels of capital intensity negatively affect credit ratings. Firm betas also play a similar role. While increases in firm betas are associated with higher propensities to be downgraded, reductions in firm betas do not result in credit upgrades. On the other hand, the reverse seems true for firm-specific volatility. As with the previous regressions, we divide the sample into pre- and post-deregulation periods. After controlling for the usual explanatory variables, utilities are neither more likely to be downgraded nor upgraded for any period. These results are not upgrades and downgrades *per se* but are relative to other firms in the sample.

Table 2.9 (A-B) reports results from our ordered and binary probit regressions for utility firms only. From 9 (A), the post-deregulation dummy (*POST-EPACT*) is insignificant for credit downgrades. The marginal effect of *POST-EPACT* is 5.7%. However, we do find that utilities are becoming less likely to receive credit upgrades following deregulation (Panel B). While this effect is statistically significant (10% level), its economic significance is weak. In particular, being in the post-deregulation period decreases the probability of receiving a credit upgrade by merely 2%. When we include all firms and interact the utility dummy with the post-*EPAct* dummy (Table 2.9, C-D), the interaction term (*POST-EPACT* * *UTIL*) is insignificant for both credit downgrades and upgrades. Thus, being a utility in the post-deregulations effect does not seem to have significant impact on credit downgrades and upgrades. The marginal effects are also small (1% and -0.5% respectively). For the sample including all firms, coefficient of *POST-EPACT* is insignificant for credit downgrades but significantly negative for credit upgrades.

As mentioned before, rating changes are not binary in nature. A firm could maintain its current credit rating, receive a downgrade, or receive an upgrade. To address this concern, we recode the credit downgrades and upgrades and estimate them in a single regression. Table 2.10 reports the regression results. The dependent variable, change in credit rating (*RATING CHANGE*), is an ordered variable that takes on value of 0-2. Firms that have received credit downgrades over two consecutive years are assigned ratings of zero. Firms that have not experienced any changes in their credit ratings are assigned values of one, and firms that have received credit upgrades are assigned ratings of two. Once again, we see that the coefficient of utility dummy is insignificant, implying that utilities are neither more nor less likely to receive rating changes compared to other firms, and this is true for any sample period.

[Insert Table 2.10 about Here]

2.4.4 Additional Evidence from Credit Watch Placements and Downgrades

Firms are often placed on Credit Watch if they are likely to face rating changes in foreseeable future pending outcomes of certain actions such as "mergers, recapitalizations, regulatory actions, or unanticipated operating developments" (see *S & P*, 2006, pp. 14). *S & P* and *Moody's* use *Credit Watch* negative, positive, and *Credit Watch* developing to describe potential rating changes while Fitch uses Rating Watch negative, positive, or evolving. Credit or rating watch data are not readily available in programmable format, and rating agency websites only contain information on credit watch placement data for the most recent year. Thus, we searched for news excerpts of credit watch placements using *FACTIVA*. We use 'rating watch' and 'credit watch' to search for news covering the energy industry in the entire post-deregulation period. Though firms could be placed on different types of credit watches, we are mainly interested in firms that have been placed on non-positive (negative and developing) watches. Our purpose is to identify ratings that have been placed on non-positive watches due to regulatory reasons.

From Table 2.1, we see that cases of rate hearing and other regulatory actions play a very significant role in determining whether or not firms are placed on credit watch. In almost all credit watch cases we identified using *FACTIVA*, pending rate hearing cases and other regulatory actions, utilities are placed on negative watch rather than on watch evolving or watch developing. Thus, uncertainties associated with regulation seem to have a negative impact on credit rating outlooks. Several non-positive credit watch placements are also attributed to tightening credit standards and more contentious regulatory environment. Apart from earnings reasons and the reasons explored above, the most common reasons for credit watch placements in our sample period are acquisitions and restructuring. Almost all cases of restructuring and acquisitions result in negative watch placements. We do not report these instances here to conserve space.

In principle, firms that have been placed on negative credit watches are either subsequently downgraded or are removed from the watch. To assess the claim of the negative impacts of regulatory actions on rating changes, we look for instances where firms' ratings that were placed on non-positive credit watches are actually downgraded. Rather than searching in *FACTIVA* for instances of removals from negative watches, we simply assume that firms that are not subsequently downgraded are removed from the watches. From *FACTIVA* searches, we find 24 instances of *S & P* negative watch placements in the post-deregulation period. When we expand our search to include all credit watch placements by all rating agencies, we find approximately 110 instances, with most placements clustering in post-2000 period. We limit our analysis to S&P watch placements since we are able to combine these placements with Compustat rating data. We match these negative watches to S&P credit data on Compustat for years t and t+1. Since the S&P manual (2006) states that credit watch issues are normally resolved within 90 days upon placement, the two-year windows we impose should be more than sufficient to capture the subsequent developments.

Out of 24 instances, we find just one instance of a credit downgrade in the same year as placement on negative watch. For year t+1, we find additional 4 downgrades. Therefore, all other ratings that were placed on negative watches were either removed from the watches or were downgraded at a much later time.

We are not concerned with rating changes that might occur beyond year t+2 since other factors rather than those cited for original placements are most likely to be the contributing factors. Though the sample is relatively small and a formal analysis could not be conducted, comparisons of credit watch placements to actual credit downgrades give us useful insight into the severity of credit downgrades often attributed to deregulation: despite numerous citations of credit watch placements pending rate hearings and regulatory actions, the actual downgrades are much less frequent.

2.4.5 Credit Ratings and Endogeneity of Leverage

So far, we have assumed that leverage is exogenous. In this section, we allow for the possibility that leverage is endogenously determined. While we are also interested in the robustness of our previous estimates when leverage is endogenously determined, our primary interest is in the effect of credit rating changes on leverage. Credit downgrades increase the cost of borrowing while credit upgrades decrease the borrowing cost. Thus, all else equal, we could hypothesize that rating changes could lead to capital structure changes. Although leverage affects credit ratings contemporaneously, subsequent readjustments in leverage due to rating changes could occur with a lagged effect. We consider the lagged effect since capital structures are highly persistent and it would require reasonable time for firms to adjust their leverage ratios. To the best of our knowledge, no prior research has considered the simultaneous nature of credit ratings and capital structure.

Changes in credit ratings are credit upgrades and downgrades as defined earlier.

In order to track changes in leverage ratios following credit changes, we include lagged dummies for 3 years following downgrades and upgrades. Nothing prevents us from using lagged dummies for more than three years. However, our intuition is that rating changes would prompt firms to readjust their leverage ratios within a reasonable period of time. As has been well-documented, leverage itself is determined by a number of variables such as asset tangibility, growth, profitability, size, and risk. Asset tangibility reduces the risk for lenders, and thus firms with more tangible assets could assume more debt. Our measure of asset tangibility is simply the capital intensity ratio (PPE/A) measured earlier. Rajan and Zingales (1995) find a positive relationship between tangibility and leverage for all the G-7 countries in their sample. Our results indicate a positive, though insignificant, relationship between capital intensity and leverage.

We use market- to- book as measure of growth opportunities. Growth companies are usually smaller, less profitable, and riskier companies. Therefore, one side of argument is that these companies should borrow less as high levels of debt may hinder their ability to undertake positive net present value projects. This is in line with debt overhang argument. On the other hand, since these companies have high investment requirements and low cash flows, internal financing is not likely to be sufficient to meet the cash flow needs. Since internal financing is not sufficient, these companies will borrow at a higher level. This is in line with pecking order argument: firms would issue debt before they issue equity. Therefore, these companies are likely to hold more debt. While Titman and Wessels (1988) do not find any connection, Rajan and Zingales (1995) report a negative relationship between growth and leverage. We find positive and significant results for growth and leverage.

After controlling for growth opportunities and other financial constraints, firms with low profitability have less retained earnings, and these firms would have higher need to issue more debt. In contrast, profitable firms would have fewer needs to issue debt. The counter argument to the above proposition is that since profitable firms face higher marginal tax rates and have more ability to service debt payments, they could assume higher levels of debts. Agency-based theories also predict that more profitable firms should hold more debt to prevent managers from investing free cash flows in negative net present value projects. Rajan and Zingales (1995) and Titman and Wessels (1988) find a negative relationship between profitability and leverage. Our results also report negative effect of profitability on leverage. Our measure of profitability, as denoted by E/A, follows that of Fama and French (2001). We find that profitability has significantly negative impact on leverage ratios. Bigger firms are more stable and less risky. Therefore, they could assume higher level of debt. Rajan and Zingales (1995) find a positive relationship between size and leverage for the US, UK, Japan and Canada. Other authors like Titman and Wessels (1988) find no relationship for the U.S. Our results indicate significantly positive effect of size on leverage. The expected cost of financial distress increases with risk. Firms that have high variability in cash flows should hold lower leverage. Titman and Wessels (1988) report a negative but non-significant relationship. Our measure of systematic risk, betas from market model regressions is negatively significant while unsystematic risk, sums of squared residuals, is insignificant.

We develop the following two simultaneous models of rating changes and leverage:

$$DOWNGRADE_{it} = B_0 + B_1\Delta LEVERAGE_{it} + B_2\Delta CAPINT_{it} + B_3\Delta INTCOV_{it} + B_4\Delta ROA_{it} + B_5\Delta SIZE_{it} + B_6\Delta FIRM\sigma_{it} + B_7\Delta FIRM\beta_{it} + \varepsilon_{it} \quad (2.4)$$

where

$$\Delta LEVERAGE_{it} = B_0 + B_1 DOWNGRADE_{it} + B_2\Delta CAPINT_{it} + B_3\Delta M/B_{it} + B_4\Delta CASH_{it} + B_5\Delta E/A_{it} + B_6\Delta SIZE_{it} + B_7\Delta FIRM\sigma_{it} + B_8\Delta FIRM\beta_{it} + B_9 DOWNGRADE_{it-1} + B_{10} DOWNGRADE_{it-2} + B_{11} DOWNGRADE_{it-3} + \varepsilon_{it}$$

and

$$UPGRADE_{it} = B_0 + B_1\Delta LEVERAGE_{it} + B_2\Delta CAPINT_{it} + B_3\Delta INTCOV_{it} + B_4\Delta ROA_{it} + B_5\Delta SIZE_{it} + B_6\Delta FIRM\sigma_{it} + B_7\Delta FIRM\beta_{it} + \varepsilon_{it} \quad (2.5)$$

where

$$\Delta LEVERAGE = B_0 + B_1 UPGRADE_{it} + B_2\Delta CAPINT_{it} + B_3\Delta M/B_{it} + B_4\Delta CASH_{it} + B_5\Delta E/A_{it} + B_6\Delta SIZE_{it} + B_7\Delta FIRM\sigma_{it} + B_8\Delta FIRM\beta_{it} + B_9 UPGRADE_{it-1} + B_{10} UPGRADE_{it-2} + B_{11} UPGRADE_{it-3} + \varepsilon_{it}$$

where *DOWN*- and *UP-GRADE* $_{t-1\ to\ t-3}$ are lagged dummies of credit downgrades and upgrades for years t-1 to t-3. *CASH* is defined as cash and short-term investments (Compustat data 1) scaled by total assets. Profitability (*E/A*) and market-to-book ratios (*M/B*) are defined as in Fama and French's (2001). All other variables are measured as in our previous credit rating models. We also include year dummies in our simultaneous models. Similar to previous models, all our variables are measured in changes to correspond to changes in credit ratings. Thus, it would not be practical to directly compare our results with those of leverage models from previous research. One challenge with our simultaneous models is the nature of dependent variables. While leverage is continuous in nature, our dummies- *DOWNGRADE* and *UPGRADE*- are binary. Fortunately, *STATA* provides simultaneous models where one endogenous variable is continuous and the other is binary.[13] Another difficulty is that we cannot estimate both *DOWNGRADE* and *UPGRADE* in the same simultaneous model. Thus, when we develop simultaneous models of credit downgrades (upgrades) and leverage changes, we need to exclude observations that have undergone credit upgrades (downgrades).

[Insert Tables 2.11 & 2.12 about Here]

We initially run regressions covering all firms in our sample period. Table 2.11 reports the regression results for simultaneous models of downgrades and upgrades for all firms and for utilities. Just as in the case of exogenous leverage models, our results from simultaneous models remain the same whether leverage is considered endogenously determined or not. The instrumented downgrade dummy variable is significantly positive, indicating that firms increase their leverage ratios in the year of downgrades. When we track the leverage ratios in years following downgrades, the signs of coefficients reverse. In years following downgrades, firms decrease their leverage ratios. The coefficient is significant for t+1, t+2, and t+3. We also see consistent results for credit upgrades. Following upgrades, firms increase their leverage ratios, and the effect is highly significant for all three years following upgrades.

For robustness, we also estimate the coefficients by removing the instrumented upgrade and downgrade dummies. The advantage of this approach is we are able

[13] Please refer to *STATA* manual for '*CDSIMEQ*' command.

to estimate the lagged upgrade and downgrade dummies concurrently in a single *OLS* model. Table 2.12 reports the results from the *OLS* model. Although the effects of leverage adjustments are not as pronounced as in the simultaneous models, we still see that firms adjust their leverage ratios following rating changes. For utilities, the coefficients of lagged variables are not significant. In addition, we also see that, regardless of rating changes, the leverage ratios continue to decline, though the decline is insignificant. We offer a few potential explanations for this finding. The utility sample is limited with just over 1,000 firm years. Thus, it is possible that our regression models could not estimate their coefficients with precision. The second possibility is that utility capital structure is actually independent of credit ratings: i.e., credit ratings do not matter to utilities as they do to other firms.

2.5 CONCLUDING REMARKS

Our research confirms the previous finding that, after controlling for firm characteristics, credit quality of U.S. corporate debt has declined in recent years. Although we do not predict propensities from ordered probit regressions, plots of our year dummy coefficients from all firms and utilities confirm the previous finding that credit ratings have declined for all firms and for utilities. Although utilities have experienced a significant drop in their credit ratings, this decline is much less pronounced compared to those of all other firms in the sample. This finding is important given that most popular press and industry professionals have promoted the view that utilities, after deregulation, have undergone a series of downgrades and are facing ‘lower-than-deserved’ ratings (see Conrad, 2007).

Our results from the ordered probit models indicate that the utility industry enjoys credit ratings that are higher than those of other industries, and the significance of positive utility coefficient is more pronounced in the post-*EPAct* period. We also find from binary probit regressions that utilities are more likely to be rated investment-grade compared to other firms, and this likelihood is higher in the post-*EPAct* period. One interesting finding is that some of the variables, such as systematic risk, become more significant in determining the utility credit rating after deregulation. For instance, while systematic risk is insignificant in explaining the propensity to receive investment-grade rating for pre-*EPAct* period, it becomes highly significant in post-*EPAct* period.

Probit regressions from downgrades and upgrades further confirm our findings indirectly. Following deregulation, utilities are neither more likely nor less likely to be downgraded. This is also true of credit upgrades. We also find that although rating agencies often cite regulatory reasons for placing utilities on negative credit watches, these firms' ratings are rarely downgraded after being placed on negative watches. This finding, combined with the finding that utilities' debt ratios do not respond to rating changes, seem to suggest that utilities' credit ratings might not convey as meaningful information as those of other firms. Rather, credit ratings of utilities seem more of a product of interactions between utilities and rating agencies than of firm characteristics. Thus, our findings suggest that credit ratings might not always be reflective of the underlying firm characteristics.

BIBLIOGRAPHY

Ashbaugh-Skaife, H., Collins, D., LaFond, R., 2006. The effects of corporate governance on firms' credit ratings. Journal of Accounting and Economics 42, 203–243.

Bhojraj, S., Sengupta, P., 2003. Effect of corporate governance on bond ratings and yields: the role of institutional investors and the outside directors. Journal of Business 76, 455–475.

Blume, M., Lim, F., Mackinlay, C., 1998. The declining credit quality of U.S. corporate debt: myth or reality? Journal of Finance 53, 1389 – 1413.

Bradley, M., Jarrell, G, Kim, E., 1984. On the existence of an optimal capital structure: theory and evidence. Journal of Finance 39, 857-878.

Bulan, L., Sanyal, P., 2005. Regulatory risk, market risk and capital structure: evidence from U.S. electric utilities. Unpublished working paper. Brandies University.

Conrad, R. (2007). US Interest rates and credit ratings of utilities. Retrieved July 21, 2007 from http://www.marketoracle.co.uk/Article1159.html

Fama, E., French, K., 1997. Industry costs of equity. Journal of Financial Economics 43. 153-194.

Fama, F., French, K., 2001. Disappearing dividends: changing firm characteristics or lower propensity to pay? Journal of Financial Economics 60, 3–44.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics 60, 187–243.

Gray, S., Mirkovic, A., Ragunathan, V., 2005. The determinants of credit ratings: Australian evidence. Unpublished working paper. University of Queensland.

Grinblatt, M., Titman, S., 2002. Financial markets and corporate strategy. McGraw-Hill Irwin, New York.

Kaplan, R., Urwitz, G., 1979. Statistical models on bond ratings: a methodological inquiry. Journal of Business 52, 231 – 261.

Moyer, C., 1993. The impending restructuring of the electric utility industry: causes and consequences. Business Economics 28, 40-44.

Moyer, C., Rao, R., 1994. Regulatory climate and electrical utility capital structure decisions. Financial Review 29, 97-124.

Rajan, R., Zingales, L., 1995. What do we know about capital structure? some evidence from international data. Journal of Finance 50, 1421 – 1460.

Spiegel, Y., Spulber, D., 1994. The capital structure of a regulated firm. Rand Journal of Economics 25, 424-440.

Standard and Poor's (2006). Corporate ratings criteria. Retrieved May 11, 2007 from www2.standardandpoors.com/spf/pdf/fixedincome/corporateratings_052007 pdf

Taggart, R., 1985. Effects of regulation on utility financing: theory and evidence. Journal of Industrial Economics 33, 257-276.

Titman, S., Wessels, R., 1988. The determinants of capital structure choice. Journal of Finance 43, 1-19.

Table 2.1: Selected Articles from *FACTIVA* Search (1992 through 2006).
For this table, we use 'rating watch' and 'credit watch' to search for news covering the energy industry in the entire post-deregulation period.

Article Date	Source	Quotation
Apr 09, 2008	Electric Power Daily	Fitch put [the company] on Rating Watch Negative on February 1 after the state's political and regulatory environment became more contentious.
Apr 07, 2006	The Washington Times	Moody's Investors Service yesterday cut the ratings of Baltimore Gas & Electric Co. (BGE) and warned that it will further downgrade the utility and its parent Constellation Energy Group if Maryland legislators follow through on threats to prevent them from recouping soaring fuel costs.
Jun 07, 2006	Platts Commodity News	Standard & Poor's Wednesday said ratings on Constellation Energy Group and its subsidiaries will remain on CreditWatch with developing implications, pending resolution of significant regulatory and legislative uncertainties ...
Sep 28, 1998	Associate Press Newswires	Standard & Poor's said Monday it had placed GMP on a "credit watch with negative implications," due to the company's high power costs and …Vermont's "increasingly contentious regulatory environment."
May 27, 2005	Platts Commodity News	Fitch Ratings Friday removed the ratings of Entergy New Orleans Inc from Rating Watch Negative...[S]table outlook reflect "the substantial improvement in the credit quality over the past 18 months" attributable in large part to... increase in the utility's rates.
Sep 05, 2005	Natural Gas Week	Some utilities have already had to face intense opposition from state regulators and officials when seeking rate increases …Standard & Poor's (S&P) put Entergy on credit watch with negative implications last week.
Nov 18,2004	Platts Commodity News	MichCon was placed on rating watch negative due to uncertainty surrounding the final outcome of its rate case.
Aug 24,1992	Reuters News	Duff & Phelps Credit Rating Co said it downgraded Commonwealth Edison Co's debt securities because recent regulatory and judicial decisions have increased the company's financial risks.
Dec 20, 2001	The Wall Street Journal	The credit rating of Mirant Corp. was downgraded… making the power generator the latest in a growing list of energy companies to suffer from tightening credit standard.
Jan 08, 2003	Gas Daily	S&P said it is re-evaluating the relationship between Coral and the owners due to Coral's higher level of merchant gas and power trading activity ``at a time of much greater sector volatility."
Nov 17, 2006	Business Wire	Fitch Ratings has placed the ratings of Commonwealth Edison Co. (ComEd) on Ratings Watch Negative following the latest legislative actions supporting rate freeze legislation in Illinois.
Aug 16, 2000	Capital Markets Report	Fitch said it downgraded the credit ratings of Consolidated Edison Co. of New York (Con Ed)... following the recent passage of state legislation prohibiting Con Ed's collection of replacement power costs...

Table 2.2: Credit Rating Classifications.
In this table, Compustat and S&P debt ratings are converted to rating scores of 0-6.

All Ratings				Investment-grades Only			
S&P Debt Rating	Compustat Data 280	Assigned RATING Score	Grade	S&P Debt Rating	Compustat Data 280	Assigned RATING Score	Grade
AAA	2	6	Investment	AAA	2	3	Investment
AA+	4	5	Investment	AA+	4	2	Investment
AA	5	5	Investment	AA	5	2	Investment
AA-	6	5	Investment	AA-	6	2	Investment
A+	7	4	Investment	A+	7	1	Investment
A	8	4	Investment	A	8	1	Investment
A-	9	4	Investment	A-	9	1	Investment
BBB+	10	3	Investment	BBB+	10	0	Investment
BBB	11	3	Investment	BBB	11	0	Investment
BBB-	12	3	Investment	BBB-	12	0	Investment
BB+, BB, BB-	13,14,15	2	Speculative				
B+,B,B-	16,17,18	1	Speculative				
CCC+	19	0	Speculative				
CCC or CC	20,23	0	Speculative				
C	21,24	0	Speculative				
D or SD	27,29,90	0	Speculative				

Table 2.3: Correlation Matrix.

The table presents the correlation matrices involving the dependent and selected independent variables. The dependent variable, credit rating (*RATING*), is an ordered variable that takes on values of 0-6. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression. The significance of the correlation coefficients is based on two-tail P-value. ***, ** and * indicate the significance of coefficient at the 1%, 5%, and 10% level, respectively.

	RATING	CAPINT	LEVERAGE	INTCOV	ROA	SIZE	FIRMσ	FIRMβ
RATING	1	.085(***)	-.462(***)	.314(***)	.436(***)	.520(***)	-.446(***)	-.266(***)
CAPINT	.085(***)	1	.091(***)	-.078(**)	-.014(**)	-0.013(*)	-.062(***)	-.154(***)
LEVERAGE	-.462(***)	.091(***)	1	-.434(***)	-.350(***)	-.233(***)	.278(***)	.048(***)
INTCOV	.314(***)	-.078(***)	-.434(***)	1	.302(***)	.150(***)	-.119(***)	.022(***)
ROA	.436(***)	-.014(**)	-.350(***)	.302(***)	1	.166(***)	-.403(***)	-.208(***)
SIZE	.520(***)	-0.013(*)	-.233(***)	.150(***)	.166(***)	1	-.226(**)	0.009
FIRMσ	-.446(***)	-.062(***)	.278(***)	-.119(***)	-.403(***)	-.226(***)	1	.339(***)
FIRMβ	-.266(***)	-.154(***)	.048(***)	.022(***)	-.208(***)	0.009	.339(***)	1

Table 2.4: Estimates from Panel Ordered Probit Regressions of the Effects of Firm Characteristics on Credit Rating.

The dependent variable, credit rating (*RATING*), is an ordered variable that takes on values of 0-6. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; ($CAPINT^2$), the squared term of capital intensity; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; (*LOSS*), a dummy variable assigned one if the net income before extraordinary items is negative in the current fiscal year, zero otherwise; presence of subordinated debt (*SUBORD*), a dummy variable that takes on the value of one if a firm has subordinated debt, zero otherwise; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: Financials and Utilities Excluded	Panel B: All Firms	Panel C: All Firms with 49 Industry Dummies	Panel D: Pre-*EPAct* Period	Panel E: Post-*EPAct* Period
	Dependent= Credit Rating	Dependent= Credit Rating	Dependent= Credit Rating	Dependent= Credit Rating	Dependent= Credit Rating
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
CAPINT	0.44	0.41	0.79	0.45	0.36
	(4.06)***	(4.22)***	(7.06)***	(3.00)***	(2.89)***
$CAPINT^2$	-0.20	-0.16	-0.22	-0.17	-0.13
	(-4.36)***	(-3.95)***	(-5.20)***	(-4.00)***	(-2.12)**
LEVERAGE	-1.62	-1.54	-2.03	-2.10	-1.38
	(-11.05)***	(-11.66)***	(-13.88)***	(-8.41)***	(-9.77)***
INTCOV	0.01	0.01	0.01	0.02	0.02
	(6.14)***	(6.92)***	(6.87)***	(3.20)***	(7.43)***
ROA	3.47	3.41	4.48	8.28	2.91
	(5.3)***	(5.68)***	(6.39)***	(5.61)***	(5.06)***
SIZE	0.52	0.46	0.48	0.42	0.49
	(22.43)***	(22.65)***	(22.96)***	(13.27)***	(22.06)***
FIRMσ	-17.42	-19.26	-20.20	-50.16	-16.13
	(-5.61)***	(-5.87)***	(-5.81)***	(-7.51)***	(-5.15)***
FIRMβ	-0.18	-0.16	-0.12	-0.17	-0.24
	(-6.67)***	(-6.23)***	(-4.21)***	(-2.92)***	(-8.76)***
LOSS	-0.64	-0.67	0.79	-0.34	-0.69
	(-12.71)***	(-14.41)***	(7.06)***	(-4.00)***	(-14.04)***
SUBORD	-0.45	-0.43	-0.22	-0.48	-0.37
	(-10.94)***	(-11.17)***	(-5.20)***	(-7.46)***	(-8.3)***
FIN	-	0.16	-	0.45	0.18
	-	(1.77)*	-	(2.66)***	(1.8)*
UTIL	-	0.33	-	0.26	0.34
	-	(3.37)***	-	(2.04)**	(3.2)***
Firm Years	15,878	19,125	19,125	5,248	13,877
Firms	2,698	3,141	3,141	1,223	2,682
Log Pseudo-likelihood	-18058	-22316	-21659	-6075	-15420
Pseudo R^2	0.2884	0.3027	0.3065	0.3408	0.3123

Table 2.5: Estimates from Panel Ordered Probit Regressions of the Effects of Industry Characteristics on Credit Rating.

Other regression estimates are separately reported Table 2.4, Panel C. The reported results are the coefficients of the industry dummies and their corresponding test statistics. The base industry is the regulated utility industry as defined in Section 2.2.1 and the base year is 1985. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

Industry	Coefficient	t-stat	Industry	Coefficient	t-stat
AERO	-0.30	(-2.05)**	HSHLD	-0.16	(-0.98)
AGRIC	-1.02	(-2.92)***	INSUR	-0.18	(-1.16)
AUTO	-0.72	(-4.50)***	LABEQ	-0.30	(-2.10)**
AUTOS	0.12	(0.39)	MACH	-0.19	(-1.21)
BANKS	-0.16	(-0.82)	MEALS	-0.62	(-3.14) ***
BEER	-0.45	(-2.34)**	HLTH	-0.82	(-5.39)***
BLDMT	0.32	(2.09)**	MEDEQ	-0.07	(-0.44)
BOOKS	-0.36	(-1.62)	MINES	-0.64	(-3.07)***
BOXES	-0.28	(-2.07)**	MISC	-0.11	(-0.31)
BUSSV	-0.43	(-3.50)***	PAPER	-0.35	(-2.40)**
CHEMS	-0.67	(-4.07)***	PERSV	-0.88	(-3.55)***
CHIPS	-0.45	(-2.40)**	RLEST	-0.72	(-1.93)*
CLTHS	-0.47	(-2.41)**	RTAIL	-0.57	(-4.67) ***
CNSTR	-1.29	(-5.85)***	RUBBR	-0.36	(-1.90)*
COAL	-0.77	(-3.30)***	SHIPS	-0.78	(-4.01)***
COMPS	0.42	(2.40)**	SMOKE	-0.54	(-1.74)*
DRUGS	0.18	(0.99)	SODA	0.56	(2.33)**
ELCEQ	-0.70	(-5.29)***	STEEL	-0.91	(-4.51)***
ENRGY	-0.45	(-2.25)**	TELCM	-0.39	(-3.05)***
FIN	-0.10	(-0.49)	TOYS	-0.56	(-2.93)***
FOOD	-0.02	(-0.12)	TRANS	-0.80	(-5.74)***
FUN	-0.91	(-6.98)***	TXTLS	-0.70	(-3.63)***
GOLD	-0.76	(-3.21)***	UTIL (OTHERS)	0.42	(1.60)
GUNS	-0.98	(-5.11)***	WHLSL	-0.33	(-1.92)*

Table 2.6: Estimates from Panel Probit Regressions of the Effects of Firm Characteristics on Investment-grade Credit Ratings.

The dependent variable is a dummy variable that takes on the value of one for investment-grade ratings, zero otherwise. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; ($CAPINT^2$), the squared term of capital intensity; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; (*LOSS*), a dummy variable assigned one if the net income before extraordinary items is negative in the current fiscal year, zero otherwise; presence of subordinated debt (*SUBORD*), a dummy variable that takes on the value of one if a firm has subordinated debt, zero otherwise; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: All Period	Panel B: Pre-*EPAct*	Panel C: Post- *EPAct*
	Dependent= Investment-grade Rating	Dependent= Investment-grade Rating	Dependent= Investment-grade Rating
	Coefficient	Coefficient	Coefficient
INTERCEPT	-2.15	-2.27	-1.99
	(-8.26)***	(-5.63)***	(-6.63)***
CAPINT	0.62	1.86	0.41
	(2.86)***	(3.87)***	(1.78)*
$CAPINT^2$	-0.23	-0.80	-0.15
	(-1.84)*	(-2.64)***	(-1.19)
LEVERAGE	-2.41	-2.87	-2.23
	(-9.21)***	(-6.97)***	(-7.64)***
INTCOV	0.01	0.01	0.01
	(1.88)*	(1.26)	(2.09)**
ROA	6.60	10.50	5.43
	(3.90)***	(7.18)***	(3.26)***
SIZE	0.54	0.53	0.53
	(19.04)***	(10.82)***	(16.48)***
FIRMσ	-70.33	-114.20	-73.50
	(-12.75)***	(-13.78)***	(-9.69)***
FIRMβ	-0.18	-0.12	-0.19
	(-4.16)***	(-1.24)	(-3.96)***
LOSS	-0.42	-0.25	-0.44
	(-5.09)***	(-2.51)**	(-4.97)***
SUBORD	-0.71	-0.68	-0.73
	(-10.87)***	(-5.85)***	(-9.43)***
FIN	0.45	1.11	0.39
	(3.09)***	(4.02)***	(2.49)**
UTIL	0.44	0.40	0.44
	(3.28)***	(1.96)**	(2.92)***
Firm Years	19,125	5,248	13,877
Firms	3,141	1,223	2,682
Log Pseudo-likelihood	-5182	-1105	-4013
Pseudo R^2	0.5926	0.6701	0.5727

Table 2.7: Estimates from Panel Probit Regressions of the Effects of Firm Characteristics on Ordered Credit Ratings and Investment-grade Ratings.

The dependent variables are ordered credit ratings and investment-grade ratings. The ordered credit rating is an ordered variable that takes on values of 0-6. Investment-grade is a dummy variable that takes on the value of one for investment-grade ratings, zero otherwise. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; ($CAPINT^2$), the squared term of capital intensity; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; (*LOSS*), a dummy variable assigned one if the net income before extraordinary items is negative in the current fiscal year, zero otherwise; presence of subordinated debt (*SUBORD*), a dummy variable that takes on the value of one if a firm has subordinated debt, zero otherwise; post- Energy Policy Act period (*POST-EPACT*), a dummy variable that takes on the value of one if the corresponding period is from 1992-2006, zero otherwise; post-*EPACT* utility dummy (*POST-EPACT * UTIL*), the interaction term between the post-*EPACT* and utility dummies; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. All standard errors are clustered by firm. Except Panel A, we exclude year dummies from all other regressions. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: Utilities Only Dependent= Ordered Credit Rating Coefficient	Panel B: Utilities Only Dependent= Ordered Credit Rating Coefficient	Panel C: Utilities Only Dependent= Investment-grade Rating Coefficient	Panel D: All Firms Dependent= Ordered Credit Rating Coefficient	Panel E: All Firms Dependent= Investment-grade Rating Coefficient
INTERCEPT	-	-	2.49	-	-2.14
	-	-	(2.49)**	-	(-10.06)***
CAPINT	-1.09	0.84	-1.27	0.50	0.77
	(-1.25)	(0.18)	(-1.28)	(5.17)***	(3.67)***
$CAPINT^2$	0.91	0.96	0.92	-0.18	-0.29
	(1.99)**	(2.24)**	(2.16)**	(-4.63)***	(-2.37)**
LEVERAGE	-2.08	-1.68	-1.77	-1.54	-2.32
	(-2.53)**	(-2.17)**	(-1.62)	(-11.99)***	(-10.06)***
INTCOV	0.14	0.13	0.01	0.01	0.001
	(1.29)	(1.32)	(0.21)	(5.98)***	(0.60)
ROA	17.38	17.83	12.6	3.22	6.55
	(3.05)***	(3.35)***	(2.47)**	(5.53)***	(6.55)***
SIZE	-0.02	-0.03	0.03	0.43	0.51
	(-0.34)	(-0.48)	(0.38)	(23.06)***	(21.62)***
FIRMσ	-72.00	-56.68	-71.69	-16.73	-49.68
	(-8.79)***	(-7.87)***	(-5.85)***	(-6.12)***	(-13.28)***
FIRMβ	-0.26	-0.30	-0.36	-0.25	-0.34
	(-1.63)	(-2.59)***	(-2.3)**	(-11.34)***	(-9.94)***
LOSS	-0.07	-0.08	-0.39	-0.62	-0.37
	(-0.42)	(-0.54)	(-2.3)**	(-13.67)***	(-6.23)***
SUBORD	-0.94	-0.91	-1.33	-0.41	-0.68
	(-3.25)***	(-3.80)***	(-3.52)***	(-10.91)***	(-10.94)***
POST-EPACT	-	-0.23	-0.28	-0.49	-0.44
	-	(-1.77)*	(-1.39)	(-12.61)***	(-8.27)***
POST-EPACT* UTIL	-	-	-	-0.13	-0.13
	-	-	-	(-1.30)	(-0.68)
FIN	-	-	-	0.15	0.47
	-	-	-	(1.66)*	(3.45)***
UTIL	-	-	-	0.37	0.50
	-	-	-	(3.05)***	(2.87)***
Year Dummies	YES	NO	NO	NO	NO
Firm Years	2,055	2,055	2,055	19,125	19,125
Firms	179	179	179	3,141	3,141
Log Pseudo-likelihood	-2013	-2069	-377	-23031	-5710
Pseudo R^2	0.2587	0.2349	0.3984	0.28	0.5514

Table 2.8: Estimates from Panel Probit Regressions of the Effects of Firm Characteristics on Credit Downgrades and Upgrades.

The dependent variable is a dummy variable that takes on the value of one for credit downgrades (upgrades), zero otherwise. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. Except for *FIN* and *UTIL* dummies, all other independent variables are measured as changes. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: All Period Dependent= Downgrade Coefficient	Panel B: Pre-*EPAct* Dependent= Downgrade Coefficient	Panel C: Post- *EPAct* Dependent= Downgrade Coefficient	Panel D: All Period Dependent= Upgrade Coefficient	Panel E: Pre-*EPAct* Dependent= Upgrade Coefficient	Panel F: Post- *EPAct* Dependent= Upgrade Coefficient
INTERCEPT	-1.15	-1.07	-1.60	-1.67	-1.73	-1.71
	(-15.53)***	(-13.34)***	(-17.06)***	(-17.05)***	(-15.70)***	(-18.49)***
Δ CAPINT	-0.40	0.59	-0.75	0.35	-0.53	0.62
	(-1.28)	(1.02)	(-2.17)**	(0.85)	(-0.57)	(1.3)
Δ LEVERAGE	2.93	2.99	2.84	-4.43	-5.73	-4.18
	(6.15)***	(4.19)***	(4.14)***	(-9.27)***	(-6.08)***	(-7.53)***
Δ INTCOV	-0.02	-0.02	-0.02	0.01	0.00	0.01
	(-6.16)***	(-2.11)**	(-5.67)***	(2.87)***	(0.31)	(2.94)***
Δ ROA	-4.90	-2.68	-6.34	4.17	7.21	3.86
	(-4.18)***	(-1.73)*	(-7.23)***	(6.25)***	(4.30)***	(5.58)***
Δ SIZE	-0.63	-0.70	-0.65	0.71	0.81	0.73
	(-4.67)***	(-2.74)***	(-4.09)***	(4.62)***	(2.41)**	(4.25)***
Δ FIRMσ	4.16	1.61	6.11	-10.08	-20.89	-9.14
	(2.30)**	(1.20)	(1.84)*	(-4.79)***	(-3.20)***	(-4.13)***
Δ FIRMβ	0.10	-0.19	0.16	0.05	0.04	0.05
	(2.18)**	(-2.02)**	(3.16)***	(0.82)	(0.31)	(0.74)
FIN	-0.10	0.15	-0.14	0.05	0.13	0.02
	(-1.28)	(0.95)	(-1.72)*	(0.63)	(0.71)	(0.19)
UTIL	0.02	-0.06	0.06	0.02	0.10	-0.02
	(0.34)	(-0.60)	(1.15)	(0.33)	(1.01)	(-0.18)
Firm Years	14,960	3,794	11,166	14,465	3,666	10,799
Firms	2,098	890	1,859	2,071	878	1,842
Log Pseudo-likelihood	-3635	-1008	-2601	-2394	-690	-1698
Pseudo R^2	.0832	0.0685	0.0964	.0632	0.0619	0.0653

Table 2.9: Estimates from Panel Probit Regressions of the Effects of Firm Characteristics on Credit Downgrades and Credit Upgrades.

The dependent variables are credit downgrades and upgrades. Downgrade (*upgrade*) is a dummy variable that takes on the value of one for credit downgrades (upgrades), zero otherwise. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regressions; post- Energy Policy Act period (*POST-EPACT*), a dummy variable that takes on the value of one if the corresponding period is from 1992-2006, zero otherwise; post-*EPACT* utility dummy (*POST-EPACT * UTIL*), the interaction term between the post-*EPACT* and utility dummies; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. All independent variables except *POST-EPACT*, *POST-EPACT * UTIL*, *FIN*, and *UTIL* dummies are measured as changes. All standard errors are clustered by firm. We exclude year dummies for all regressions. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

	Panel A: Utilities Only	Panel B: Utilities Only	Panel C: All Firms	Panel D: All Firms
	Dependent= Downgrade	Dependent= Upgrade	Dependent= Downgrade	Dependent= Upgrade
Variable	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-1.73	-1.54	-2.56	-3.11
	(-14.81)***	(-16.62)***	(-36.65)	(-35.99)***
Δ CAPINT	-0.44	-2.47	-1.13	0.84
	(-0.41)	(-1.49)	(-1.76)*	(0.88)
Δ LEVERAGE	3.60	-3.58	5.90	-8.54
	(1.93)*	(-1.15)	(6.71)***	(-9.41)***
Δ INTCOV	0.00	-0.09	-0.04	0.02
	(0.02)	(-1.10)	(-5.65)***	(3.01)***
Δ ROA	-20.65	1.04	-12.35	7.23
	(-3.62)***	(0.18)	(-6.48)***	(4.98)***
Δ SIZE	1.03	-2.11	-1.25	1.53
	(1.91)*	(-2.07)**	(-4.66)***	(4.74)***
Δ FIRMσ	25.94	-32.35	9.69	-16.32
	(2.04)**	(-2.19)**	(1.14)	(-4.47)***
Δ FIRMβ	0.47	0.07	0.26	0.05
	(3.42)***	(0.38)	(3.11)***	(0.5)
POST-EPACT	0.04	-0.24	-0.06	-0.45
	(0.37)	(-2.07)**	(-0.84)	(-4.62)***
POST-EPACT* UTIL	-	-	0.20	-0.13
	-	-	(0.82)	(-0.47)
FIN	-	-	-0.14	0.10
	-	-	(-0.84)	(0.540)
UTIL	-	-	-0.11	0.12
	-	-	(-0.5)	(0.6)
Firm Years	1,788	1,733	14,960	14,465
Firms	153	153	2,098	2,071
Log Pseudo-likelihood	-404	-275	-3668	-2427
Pseudo R^2	0.0976	0.0405	0.0748	0.0503

Table 2.10: Estimates from Panel Ordered Probit Regressions of the Effects of Firm Characteristics on Credit Rating Changes.

The dependent variable, change in credit rating (*RATING CHANGE*), is an ordered variable that takes on value of 0-2. Firms that have received credit downgrades over two consecutive years are assigned ratings of zero. Firms that have not experienced any changes in their credit ratings are assigned ratings of one, and firms that have received credit upgrades are assigned ratings of two. The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; (*FIN*), a dummy variable that takes on the value of one if a firm is a financial firm, zero otherwise; (*UTIL*), a dummy variable that takes on the value of one if a firm is a utility, zero otherwise. Except for *FIN* and *UTIL* dummies, all other independent variables are measured as changes. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: All Period Dependent= Rating Change Coefficient	Panel B: Pre-*EPAct* Dependent= Rating Change Coefficient	Panel C: Post- *EPAct* Dependent= Rating Change Coefficient
Δ CAPINT	0.41	-0.59	0.75
	(1.490)	(-1.15)	(2.50)**
Δ LEVERAGE	-3.51	-3.54	-3.45
	(-8.38)***	(-5.40)***	(-6.53)***
Δ INTCOV	0.02	0.02	0.02
	(6.93)***	(2.14)**	(6.85)***
Δ ROA	4.63	3.32	5.15
	(6.20)***	(2.04)**	(8.07)***
Δ SIZE	0.66	0.63	0.72
	(6.16)***	(3.01)***	(6.26)***
Δ FIRMσ	-5.05	-2.50	-7.10
	(-2.71)***	(-1.65)*	(-2.53)**
Δ FIRMβ	-0.04	0.12	-0.08
	(-1.15)	(1.59)	(-1.83)*
FIN	0.08	-0.02	0.09
	(1.70)*	(-0.14)	(1.73)*
UTIL	0.00	0.06	-0.04
	(0.00)	(1.09)	(-0.79)
Firm Years	15,579	3,980	11,599
Firms	2,103	894	1,864
Log Pseudo-likelihood	6097	-1730	-4341
Pseudo R^2	0.0716	0.0565	0.0818

Table 2.11: Estimates from Simultaneous Models of Leverage and Credit Downgrades (Upgrades) for All Firms Excluding Financials and Utilities.

The dependent variables are change in leverage (*ΔLEVERAGE*) and credit downgrades (*upgrades*). The independent variables include: instrumented downgrade (*upgrade*) dummy (*I_DOWN(UP)GRADE*); instrumented leverage (*I_LEVERAGE*); capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; market-to-book ratios (*M/B*); profitability (*E/A*); cash holdings (*CASH*), measured by the ratio of cash and short-term investments to total asset; return on assets (*ROA*), measured by the ratio of net income before extraordinary items to total assets; interest coverage (*INTCOV*), measured by the ratio of operating income before depreciation to interest expense. Lags 1-3 indicate credit downgrades (*upgrades*) at times t-1, t-2, and t-3 respectively. Except for the instrumented and lagged variables, all other independent variables are measured as changes. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

	Panel A: Simultaneous Downgrade and Leverage		Panel B: Simultaneous Upgrade and Leverage	
	Dependent = *Downgrade*	Dependent = Δ *Leverage*	Dependent = *Upgrade*	Dependent = Δ *Leverage*
Variable	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-6.98	0.70	-7.43	-0.83
	(-81.42)***	(8.4)***	(-76.75)***	(-6.77)***
I_DOWN(UP)GRADE	-	0.1	-	-0.12
	-	(8.36)***	-	(-6.85)***
I_LEVERAGE	4.22	-	1.61	-
	(2.84)***	-	(1.01)	-
Δ CAPINT	-0.87	0.07	-0.15	0.01
	(-2.84)***	(3.79)***	(-0.84)	(0.38)
Δ SIZE	-0.94	0.11	0.76	0.15
	(-8.93)***	(10.87)***	(6.80)***	(8.81)***
Δ FIRMσ	3.14	-0.29	-2.53	-0.29
	(5.53)***	(-4.07)***	(-3.69)***	(-3.17)***
Δ FIRMβ	0.04	-0.01	0.005	-0.0015
	(3.61)***	(-3.78)***	(0.31)	(-0.88)
Δ M/B	-	0.002	-	0.0033
	-	(4.32)***	-	(6.11)***
Δ E/A	-	-0.05	-	-0.15
	-	(-1.73)*	-	(-4.68)***
Δ CASH	-	-0.09	-	0.07
	-	(-3.18)***	-	(1.81)*
Δ ROA	-0.56	-	1.53	-
	(-1.32)	-	(3.00)***	-
Δ INTCOV	-0.01	-	0.01	-
	(-3.04)***	-	(4.15)***	-
LAG1	-	-0.05	-	0.03
	-	(-6.54)***	-	(3.52)***
LAG2	-	0.03	-	0.05
	-	(-4.48)***	-	(5.48)***
LAG3	-	-0.01	-	0.02
	-	(-1.71)*	-	(2.35)**
Firm Years	13,222	13,222	12,702	12,702
Firms	2,025	2,025	2,011	2,011
Pseudo/ Adjusted R^2	0.0553	0.1627	0.0440	0.1542

Table 2.12: Estimates from Ordinary Least Squares Models.

The dependent variable is the change in leverage (*ΔLEVERAGE*). The independent variables include: capital intensity (*CAPINT*), measured by the ratio of property, plant, and equipment to total assets; firm size (*SIZE*), measured by log of total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression; systematic risk (*FIRMβ*), calculated from the market model regression; market-to-book ratios (*M/B*); profitability (*E/A*); cash holdings (*CASH*), measured by the ratio of cash and short-term investments to total asset. *DOWN*- and *UP-GRADES* $_{t\text{-}1\ to\ t\text{-}3}$ are lagged dummies of credit downgrades and upgrades for years t-1 to t-3 respectively. Except for the lagged variables, all other independent variables are measured as changes. All standard errors are clustered by firm. We include year dummies for all regressions but are not reported here. The z-statistics are given in the parentheses: ***, ** and * imply the significance of coefficient at the 1%, 5% and 10%, respectively.

(see next page)

Variable	Panel A: Utilities Only Dependent= Δ Leverage Coefficient	Panel B: All Other Firms Dependent= Δ Leverage Coefficient
INTERCEPT	0.0015	0.0084
	(0.33)	(2.3)**
Δ CAPINT	0.1127	0.0014
	(4.61)***	(0.12)
Δ SIZE	0.0492	0.0528
	(2.97)***	(8.18) ***
Δ FIRMσ	0.1669	0.0199
	(0.42)	(0.43)
Δ FIRMβ	0.0004	-0.0016
	(0.16)	(-2.67)***
Δ M/B	0.0043	0.0027
	(1.26)	(6.28)***
Δ E/A	-0.1415	-0.2497
	(-2.17)**	(-16.19)***
Δ CASH	-0.0622	-0.0402
	(-0.56)	(-2.23)**
$DOWNGRADE_{t-1}$	-0.0047	0.0027
	(-1.36)	(0.83)
$DOWNGRADE_{t-2}$	0.0017	0.0010
	(0.46)	(0.34)
$DOWNGRADE_{t-3}$	-0.0048	-0.0093
	(-1.22)	(-3.24)***
$UPGRADE_{t-1}$	-0.0068	-0.0041
	(-1.01)	(-1.17)
$UPGRADE_{t-2}$	-0.01	(0.01)
	(-1.52)	(2.33**)
$UPGRADE_{t-3}$	-0.004	(0.000)
	(-0.92)	(0.09)
Firm Years	1,648	14,375
Firms	146	2,712
Pseudo/ Adjusted R^2	0.1360	0.1285
Fixed Effects	Yes	Yes

Figure 2.1: Percent of Firms with Investment-grade Credit Ratings.
Investment-grade rating is coded one if the firm's credit rating is BBB or better, zero otherwise.

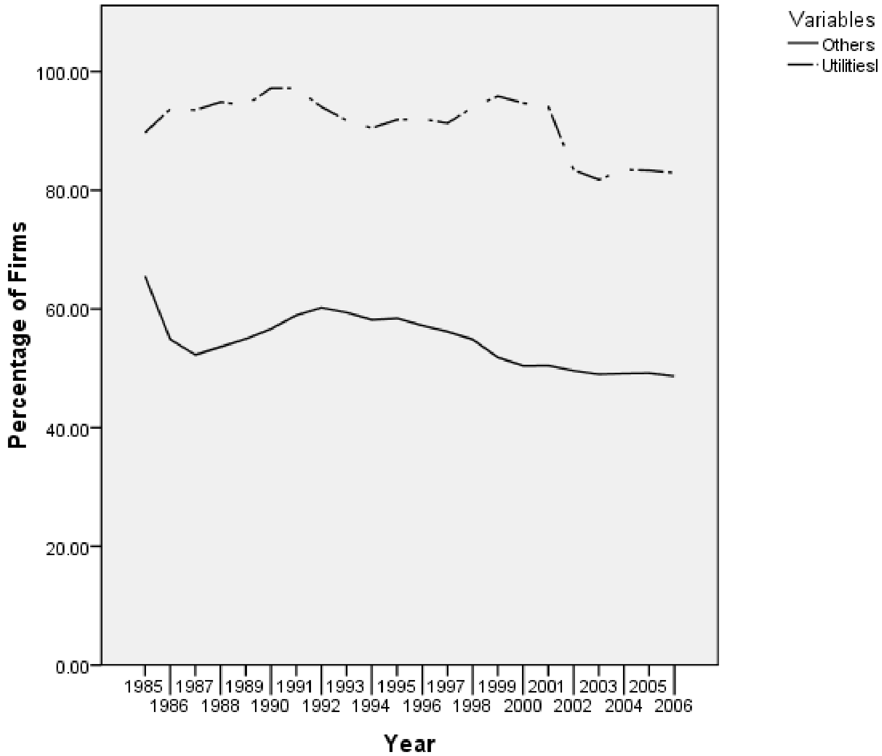
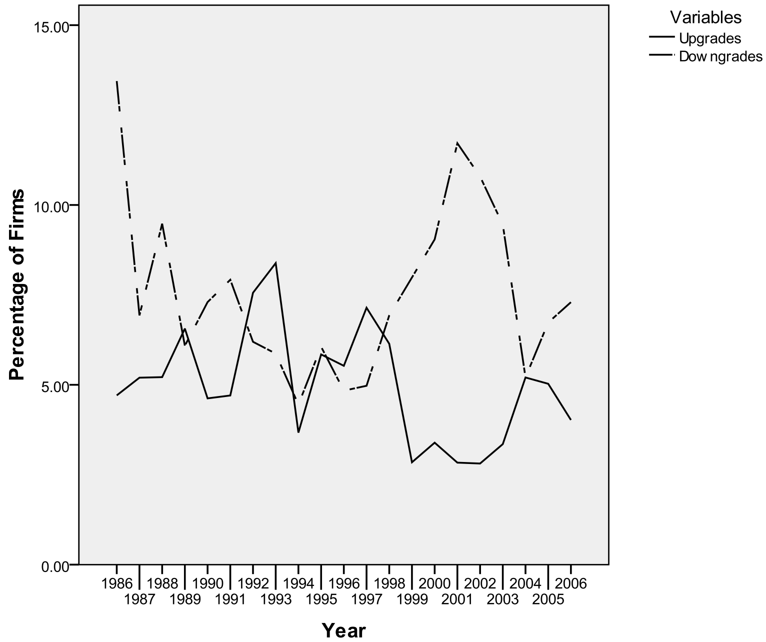


Figure 2.2: Percent of Firms Upgraded and Downgraded.
Downgrade is a variable that takes on the value of one if a firm's credit rating has been downgraded over the two consecutive years. We define upgrade similarly.

Panel (A): All Firms Excluding Utilities



Panel (B): Utilities Only

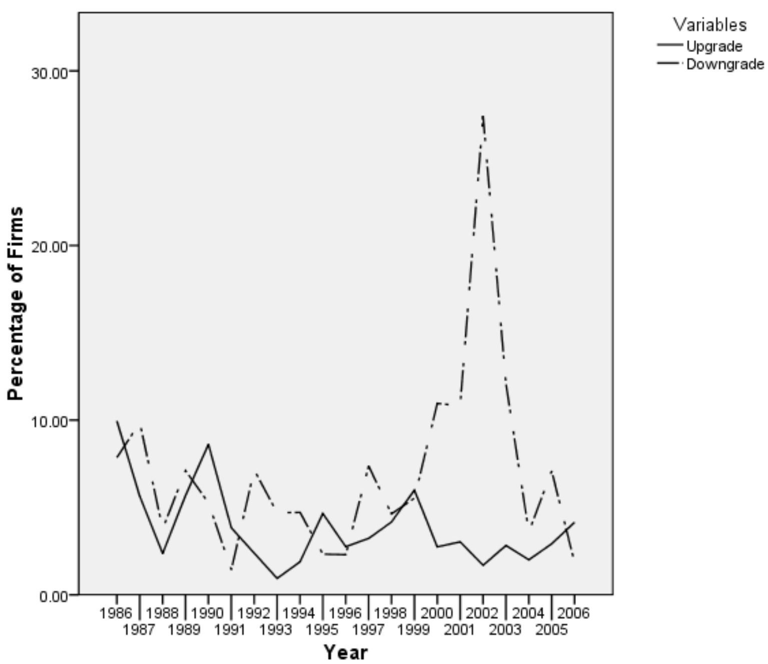


Figure 2.3: Aggregate Leverage Ratios of Utilities and All Firms.

To calculate leverage ratios, we aggregate total book debts (Compustat data 9 + Compustat data 34) over all utilities (firms) for each year and scale them by yearly aggregates of total asset (Compustat data 6).

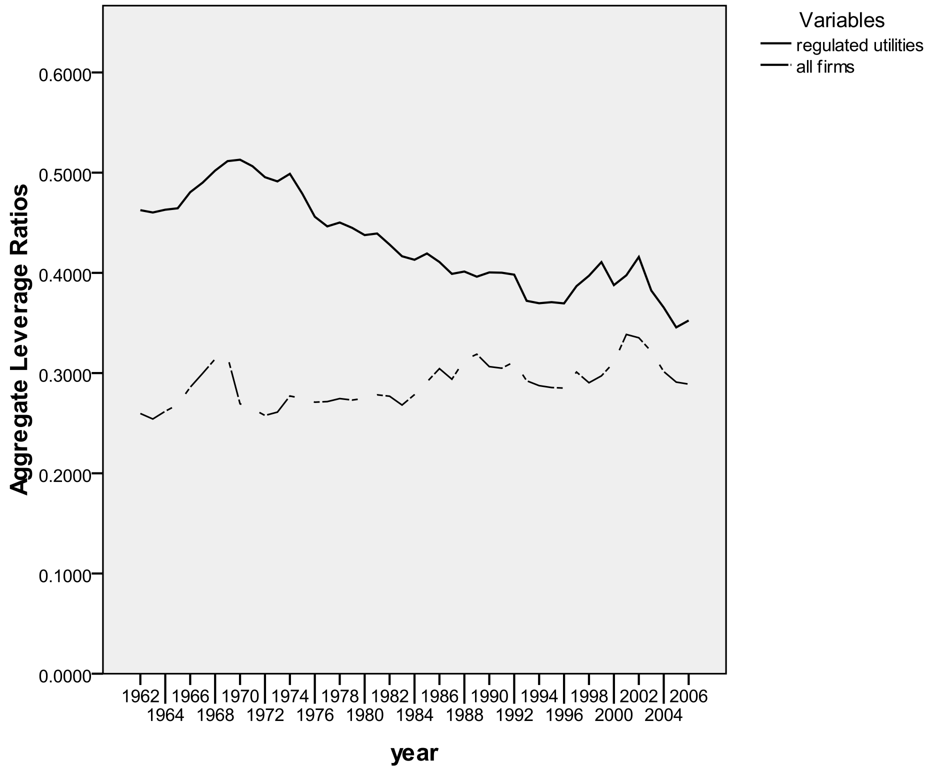


Figure 2.4: Average Idiosyncratic Risk (1963 through 2006).

For each firm in a given year, idiosyncratic risk is proxied by the sum of squared residuals from the market model regression using monthly data (Equation 2.2). For each year, we average these ratios over all firms.

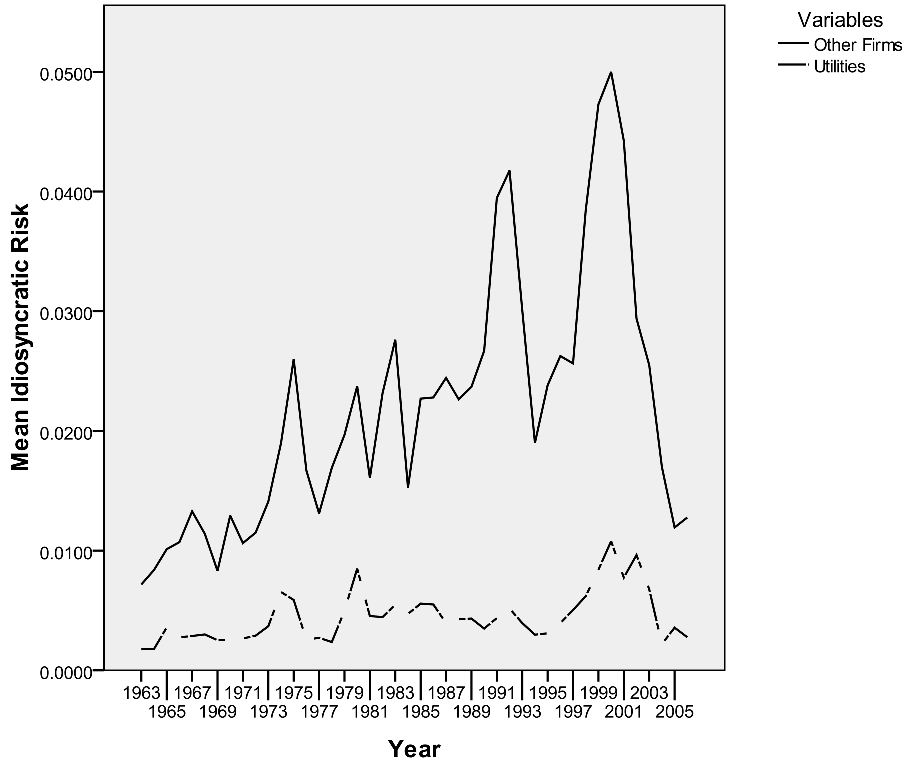
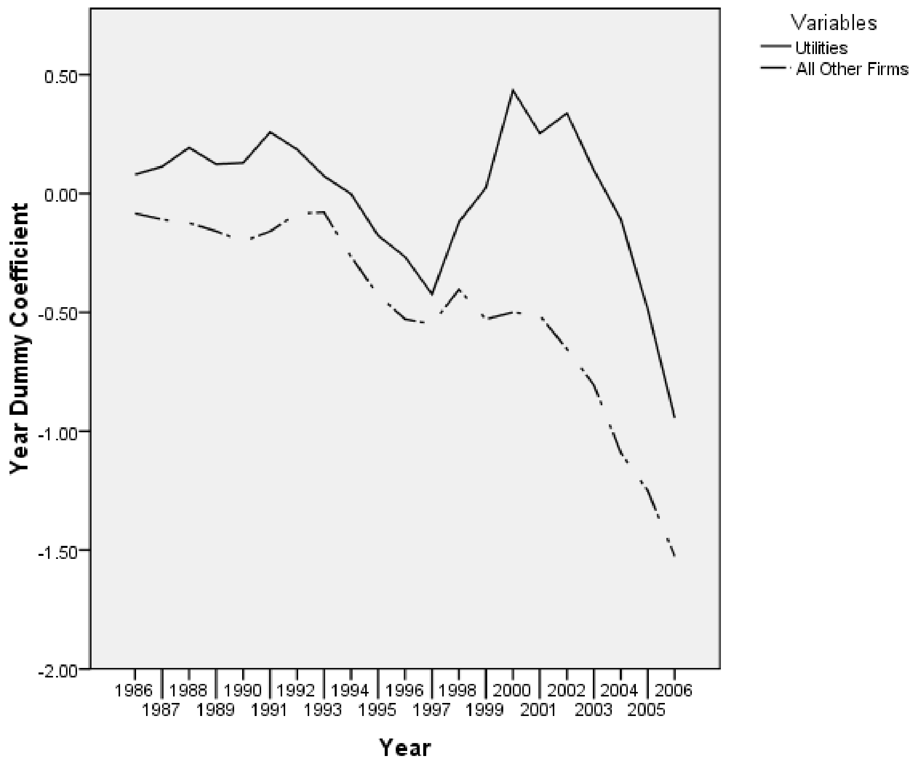


Figure 2.5: Plot of Time Dummy Coefficients from Ordered Probit Regressions.
Here, rating = $\beta_0 + \beta_1$CAPINT + B_2LEVERAGE + B_3INTCOV + B_4ROA + B_5SIZE + B_6FIRMσ + B_7FIRMβ + B_8LOSS + B_9SUBORD + $\delta_{1...21}$ YEAR INDICATOR $_{it}$ + ε_{it}, where δ's are the year dummy coefficients from 1986 to 2006. We run this regression for all firms and for utilities. The base year is 1985. Time dummies are expected to capture time-specific component not captured by firm characteristics. All standard errors are clustered by firm.



CHAPTER 3

Disappearing Dividends: A Rational Explanation and Implications

3.1 INTRODUCTION

Miller and Modigliani (1961) argue that, in perfect capital markets, a firm's wealth is invariant to its dividend payout decision. Nevertheless, it has been consistently documented that corporations follow extremely deliberate dividend payout strategies. Subsequent empirical analyses suggest that share prices indeed react to changes in dividend payments (see Aharony and Swary, 1980; Asquith and Mullins, 1983; and Kalay and Loewenstein, 1985). In a market where retrieving inside information is difficult and agency conflicts between managers and stakeholders are pronounced, dividend payments play an important role in reducing agency costs and in revealing inside information.[1] In particular, many researchers suggest that, if insiders have better information about a firm's future cash flows while outsiders are less aware of it, dividend payments might convey valuable information about the firm's prospects of future earnings.[2] Following this line of argument, Bhattacharya (1979) and Miller and Rock (1985) advocate the dividend signaling theory, which argues that an increase in dividends typically signals that the firm would become more profitable, and a decrease in dividends

[1] Other examples include tax effect, incomplete contracting, and transaction cost. However, we limit our discussion to information asymmetry and agency costs.

[2] See Grullon, Michaely, and Swaminathan (2002), Healy and Palepu (1988), and Asquith and Mullins (1983).

would suggest otherwise. Therefore, by paying dividends to shareholders, firms' management signals the quality (profitability) of their firms (see Nissim and Ziv, 2001).

The agency theory of dividend policy suggests that dividends serve as a mechanism for reducing agency costs (see Jensen and Meckling, 1976; Easterbrook, 1984; and La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Jensen and Meckling (1976) argue that managers of publicly-held firms can allocate abundant resources to activities that enhance their private benefits. Thus, an excessive amount of free cash in a firm may result in non-essential expenses ranging from managerial perks to unjustifiable acquisitions and expansions. Grossman and Hart (1980), Easterbrook (1984), and Jensen (1986) suggest that the adverse effect of excessive cash in managers' control can be minimized by distributing free cash flows in the form of dividend payments to shareholders. Thus, dividend payouts may increase firm value by reducing over-investment.[3] In particular, the agency theory posits that by distributing resources in the form of dividends, internally generated cash flows become less sufficient to satisfy the needs of the firm. Regular dividend payouts force firms to constantly return to capital markets to raise additional funds for their investment needs, and thereby they become subject to strict monitoring by outside stakeholders. In summary, dividends serve dual purposes of reducing agency costs of free cash flows and revealing inside information to outsiders in order to secure new funding.

Fama and French (2001) show that the propensity to pay dividends declined significantly in the 1978-1998 period even after controlling for firm

[3] See Lang and Litzenberger (1989) for some empirical evidence.

characteristics such as profitability, size, and investment. This so-called disappearing dividend phenomenon inevitably raises questions regarding the role dividends play in signaling and in reducing agency costs. If dividends were to serve as signaling device, the first question arises whether they are losing their importance as a signaling mechanism.[4] Second, we are led to raise the question of whether declining dividends are a result of higher agency problems. In this chapter, we try to answer the first question whether dividends are losing importance as signaling device, and if so, we also try to explore the reasons as to why. While trying to answer the first question, we also attempt to provide a rational explanation for the declining dividend trend. To a lesser extent, we attempt to provide some insight into the role of dividends as mechanism to reduce agency costs.

The extant literature has provided some insights into the disappearing trend documented by Fama and French (2001). Grullon and Michaely (2002) argue that, at the aggregate level, firms have become more likely to substitute dividends with share repurchases. DeAngelo, DeAngelo, and Skinner (2004) show that the aggregate level of real dividends paid by dividend-paying firms has not declined over the period during which firm-level dividends have disappeared. They document that real dividend payments increased among the highest payers and that the observed decline in number is due to omissions by smaller firms that usually pay meager amount of dividends. Therefore, the declining propensity to pay can be attributed to smaller firms that do not strive for dividend- paying status.

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[4] Firms' reluctance to pay dividends implies dividends are becoming irrelevant or less important. An alternative, and non- mutually exclusive, explanation is that they are becoming prohibitively expensive; i.e., cost of paying exceeds benefits.

Chetty and Saez (2003) also document a 20% increase in dividend payments by industrials following the 2003 tax cut, proposing that tax cuts induced firms to initiate or increase payments. Nevertheless, at the firm level, the declining propensities to pay or initiate dividends have been left unexplained.

A number of other studies- both behavioral and efficient- market based- have tried to explain the disappearing dividend phenomenon at the firm level. Baker and Wurgler (2004a), and Baker and Wurgler (2004b) propose a 'catering' theory where firms cater to investor demands or 'sentiments' when deciding whether to initiate dividends. Thus, when investors pay premiums for dividend-paying firms, firms initiate dividends; otherwise, they omit. In contrast, Hoberg and Prabhala (2009) show that idiosyncratic risk explains a significant fraction of the disappearing dividend puzzle. [5] The authors also show that catering becomes insignificant when idiosyncratic risk is controlled for. Our hypothesis is that dividends serve as a signaling device and that declining propensities could be attributed to higher stock price informativeness: higher stock price informativeness makes signaling less valuable than it would otherwise would be.

Our contributions are two-fold. First, we find evidence that dividends in general are losing their importance as a signaling device as indicated by the declining abnormal announcement returns associated with dividend initiations. If dividends were to serve as a signaling device, decline in abnormal returns associated with dividend announcements would imply that the signaling power of dividends has

[5] The terms idiosyncratic risk, firm-specific risk, and firm-specific stock return volatility are used interchangeably in this chapter.

also declined.[6] In particular, we find that inter-temporal variations in abnormal returns could predict dividend initiations: higher announcement returns in year t result in higher dividend initiations in year t+1. Since the abnormal returns have been declining over time, we could attribute part of the declining trend to lower abnormal returns. Amihud and Li (2005) also have similar findings with dividend increases and decreases. The authors find that dividend increases (decreases) are experiencing lower positive (negative) abnormal returns at aggregate level. However, as noted by DeAngelo et al., the aggregate level of dividends has not disappeared. Therefore, the declining dividend phenomenon is mainly at the initiation level- i.e., firms are becoming less likely to initiate and/or pay dividends. Accordingly, we limit our analysis to dividend payments at the firm level. Second , our results show that firms with higher stock price informativeness and lower asymmetric asymmetry- proxied by lower firm-level R^2s, lower abnormal announcement returns, lower analyst forecast dispersions, and lower forecast errors- are less likely to pay dividends. Considering that stock price informativeness has also increased over time, we could infer that increasing stock price informativeness results in lower announcement returns which in turn result in lower dividend initiations and payments.

By using a somewhat different set of controls and methodology, we also obtain results that are consistent with the risk-based explanation of Hoberg and Prabhala (2009). We find that firm-specific stock return variations could explain a significant fraction of the disappearing dividend trend. This variable's

[6] An alternative explanation suggests that investors could be putting less emphasis on dividend payments. This is consistent with the 'catering incentives' proposed by Baker and Wurgler (2004a, 2004b).

explanatory power remains strong even after cash flow volatility is controlled for. Regression results indicate that all our risk variables- cash holdings, leverage, tangibility, and cash flow volatility- are highly significant. Our findings on cash holdings are novel. Although cash holdings are not significant in explaining dividend initiations in the 1970s, they become highly significant in the late 1980s and 1990s. Surprisingly, the coefficient on cash holding for the latter period is negative: firms that hold more cash are less likely to pay dividends. A number of authors have documented that cash holdings have increased over the past two decades. Increased cash holdings in the past two decades coincide with increased firm volatility and declining dividend payments. In addition, we document that while cash flow volatility has increased, average asset tangibility has decreased. All these point to increasing riskiness of firms. Our hypothesis is that during periods of high uncertainty, cash holdings would increase, and dividend payments would decrease. In times of reduced volatility, large cash holdings increases dividend payments. The negative coefficient of cash holdings is both consistent with models of signaling under asymmetric information and with precautionary motive claimed by Opler, Pinkowitz, Stulz, and Willimason (1999) who find that firms with more volatile cash flows and better investment opportunities hold more cash.

We do not find evidence that repurchases are substituting dividends at the firm level. The repurchase dummy is significantly positive in explaining dividend initiations: firms that repurchase are also more likely to pay dividends. We do not find evidence that higher institutional holdings result in higher dividend payments.

Rather, evidence suggests otherwise. The remainder of the chapter is organized as follow. Section 3.2 provides data, methodologies, and summary statistics. Section 3.3 presents the main results. Section 3.4 offers robustness checks and Section 3.5 concludes.

3.2 DATA & METHODOLOGY

We replicate Fama and French (2001) results by using coefficients from panel regressions to predict propensities. As Petersen (2009) points out, Fama-MacBeth (F-M here onwards) statistics can be inflated in the presence of fixed firm effects. Accordingly, we use standard errors that are robust to clustering.[7] This replication provides very similar test statistics and the declining trend. Our second methodology involves plotting year dummy test statistics from our regressions. Logit predictions have varying accuracies depending on the variables included and the base period on which the forecast is built upon. In addition, our independent variables also could have time-varying explanatory powers. For instance, in our replication of Fama and French (2001) results, the original Fama and French (FF) explanatory variables return pseudo-R^2s of 29% and 37% respectively for the base period (1963-1977) and the forecast period (1978-1998). Their coefficients and test statistics are also different. Therefore, forecasting propensities by using variables that have time-varying explanatory powers is, at best, inaccurate. Fama and French (2001) address this issue by forming portfolios

[7] These are White standard errors adjusted to account for possible correlation within a cluster (also known as Rogers standard errors). Our results are similar when we use standard errors that are robust to heteroscedasticity.

based on portability, investment, and size to calculate frequencies of payers. We address this issue by including time dummies in all our regressions.

The basic Fama and French equation estimates

$$Pr\,(Payer_{it} = 1) = logit(\beta_0 + \beta_1 NYP_{it} + \beta_2 M/B_{it} + \beta_3 dA/A_{it} + \beta_4 E/A_{it} + \varepsilon_{it}) \qquad (3.1)$$

where *NYP* is the New York Stock Exchange percentile, defined as the percent of firms that have the same or smaller market capitalization, *M/B* is the market-to-book ratio, *dA/A* is the change in assets scaled by total assets, and *E/A* is earnings scaled by total assets. In our regressions, we replace *dA/A* with capital expenditure, *CAPEX* , capital expenditure (Compustat data 128) scaled by total assets (Compustat data 6). We do not use change in assets scaled by total assets as in Fama and French (2001) since we would like to consider additional firm characteristics such as leverage (both short- and long-term) in our subsequent regressions. Since change in assets scaled by total assets also implies change in leverage, we do not use this measure to avoid collinearity. All other variables are computed as in Fama and French (2001). We first replicate the original Fama and French (2001) equation. We estimate

$$Pr(Payer_{it} = 1) = logit\,(\beta_0 + \beta_1 NYP_{it} + \beta_2 M/B_{it} + \beta_3 CAPEX_{it} + \beta_4 E/A_{it} + \delta_{1\ldots35} YEAR\ INDICATOR_{it} + \varepsilon_{it}) \qquad (3.2)$$

where δ's are the year dummy coefficients from 1964 to 1998. The pattern of coefficients on year dummy variables are of primary importance. After controlling for all characteristics, year dummy coefficient should measure the changes in propensities to pay dividends over the years.[8] Therefore, plots of year

[8] Refer to Blume, Lim, and Mackinlay (1998) for a similar method. Our primary measure is based on logit predictions. Time dummies are plotted as an alternative measure only.

dummy coefficients provide us with the time trend in propensities to pay dividends. The dependent variable is a dummy variable equal to one if firm pays dividend in a given year (Compustat data 21), zero otherwise. Market capitalization is calculated as fiscal year closing share prices (Compustat data 199) multiplied by number of outstanding shares (Compustat data 25). We remove all share prices and number of shares that are zero or arbitrarily close to zero. For market-to-book, we do not deduct post-retirement assets (Compustat data 330) as these data are not available for many firms. As in Baker and Wurgler (2004b), we also exclude firms with book equity below $250,000 and assets below $500,000. Utilities and financials are excluded from all our data sets.

3.2.1 Measures of Risk

Bhattacharya (1979) and Eades (1982) provide models of dividend signaling under information asymmetry. According to these models, the cost of signaling increases with volatility of firms' cash flows: as cash flow volatility increases, the probability of realized cash flows falling below the commitment level of dividends increases, which in turn increases the need to raise external financing. As the composition of firms leans towards smaller, riskier, and less profitable firms, dividend initiations are expected to become less common. Therefore, we add additional variables to control for the nature of changing risk. First, we consider leverage as a proxy for risk. To the best of our knowledge, there is no previous research documenting the trending nature of leverage and, accordingly, we do not expect leverage to explain the trending nature of dividend payments. However, during times of high volatility, leverage exacerbates a firm's performance by interacting with other measures of risk. Thus, managers are also inclined to consider the level of leverage in addition to other risk measures for dividend initiations and dividend status changes. In this chapter, we interact the leverage variable with other two measures of risk- cash flow volatility and firm-specific risk. Leverage is defined as long-term debt (Compustat data 9) plus debt due in one year (Compustat data 44), both scaled by total assets. Some authors prefer the use of long-term debt only. However, in our opinion, short-term debt also contributes to the riskiness of the firms. As these debts become due in less than a year, firms will need to meet these obligations with either cash reserves or with other liquid assets.

Next, we consider asset tangibility as another proxy of risk. As Fama and French (2004) point out, composition of firms are tilting towards smaller and riskier firms. These firms in general are more research- and knowledge-based rather than capital-intensive. Asset tangibility is measured as gross property, plant and equipment (PPE, Compustat data 7) scaled by total assets. The hypothesis is that firms with high capital intensity pose lower risk as tangible assets make better collateral.[9] Cash holdings are also considered as a proxy for risk. Cash is defined as cash and short-term investments (Compustat data 1) scaled by total assets (Compustat data 6). Following Jensen's (1986) argument, higher levels of cash holdings should induce firms to increase dividend payments to reduce free cash flow problems. However, cash is the most liquid form of asset and firms could hold cash for precautionary motives in addition to investment reasons (see Keynes, 1936). Naturally, a prediction of such managerial behavior is that in

[9] When we replace gross PPE with net PPE (Compustat data 8), results are almost identical.

times of greater volatility and higher risks, firms should adopt a more cautious approach by omitting dividends and taking precautionary measures such as hoarding cash. Cash holdings provide us with some grounds for testing whether agency or precautionary motive dominates. An alternative method would be to estimate the effects of cash holdings on dividend payments by conditioning the cash holdings on some proxies of agency costs such as corporate governance G index or insider holdings (managerial ownership). Our results (not reported here) indicate little differences in the effects on cash holdings on dividend payments when we interact the cash holdings with different quintiles of insider holdings. As both insider holding and other corporate governance data are limited, we decide not to explore this further. In this chapter, we consider levels of cash holdings rather than changes.

In the sense of Hoberg and Prabhala (2009), we also consider the possibility that a significant fraction of the disappearing dividend puzzle can be explained by firm-specific risk factors. Irvine and Pontiff (2005) argue that rise in firm-specific risk is accompanied by rise in idiosyncratic cash flow volatility. Thus, in addition to firm-specific risk, we also consider cash flow volatility as our final proxy of risk. Cash flow volatility is defined as the standard deviation of quarterly earnings (as defined by earnings before extraordinary items scaled by total assets) over three-year rolling windows. Availability of quarterly data used for cash flow volatility is very limited prior to 1970s. We remove firms that do not have 12 full observations (three consecutive years with four quarters of observations in every year) for calculating cash flow volatilities. We also remove firms that have cash flow volatilities above one.[10] We lose the first two years' data for calculating averages. Note that adding additional variables significantly reduces our sample size: our sample size is reduced from over 110,000 observations to 60,000 after cash flow volatility and firm-specific risk variables are added. From Figure 3.2 (C), we see that average cash flow volatility has also been increasing over the years.

While Hoberg and Prabhala (2009) show that idiosyncratic risk explains a significant fraction of the disappearing dividend puzzle, our opinion is that cash flow volatility- a more fundamental measure of firm risk- would also play a strong role. Nevertheless, we also control for firm-specific stock return volatility. A firm's idiosyncratic risk in a given year is the sum of squared residuals from the market model regression using daily data for that year. We impose the 200 minimum trading day requirements for calculation of idiosyncratic risk. We do not average the firm volatilities across all firms in a given year since we are interested in studying the idiosyncratic risks at the firm level. As a result, we obtain an unbalanced panel of idiosyncratic risks and firm characteristics from 1963 to 2004. We remove firms with squared residual values above one.

3.2.2 Measures of Stock Price Informativeness & Information Asymmetry

We use two proxies of stock price informativeness. The first measure we use is the R^2 measure of Roll (1988). Following Morck, Yeung, and Yu (2000), R^2 measure is being increasingly used as a measure of stock price informativeness.

[10] Fewer than 0.1% of observations have cash flow volatilities above one.

Morck et al. (2000) provide evidence of higher R^2s in poor economies than in rich economies, arguing that stronger public investor property rights in rich economies promote informed arbitrage, which allows the incorporation of firm-specific information into asset prices. Similarly, Bushman, Piotroski, and Smith (2005) show that stocks exhibit lower R^2s in countries with a freer press and a more developed financial analysis industry. Durnev, Morck, Yeung, and Zarowin (2003) show that firms with lower R^2s exhibit a higher association between current returns and future earning: i.e., lower R^2 suggests greater stock price informativeness. Piotroski and Roulstone (2004) show that R^2s are inversely related to insider trading. Firm level R^2s are computed by using the monthly data.[11] *UNINFORM*, a proxy of stock price uninformativess, is computed by log-transforming $R^2/(1-R^2)$. Since dividends serve as a signaling device, our hypothesis is that firms with higher price informativeness, denoted by lower *UNINFORM* values, are less likely to initiate dividends. Therefore, the coefficient of *UNINFORM* is expected to be positive. Figure 1(E) illustrates the average R^2 of all Compustat firms from 1965 to 2004. We see that the average R^2 has been declining over the years. Morck et al. also document a similar trend.

Our second measure of stock price informativeness is the average yearly abnormal announcement returns which simply are the yearly Cumulative Average Abnormal Returns (CAARs) associated with dividend initiations. If dividends were to signal private (inside) information, the abnormal announcement returns associated with dividend initiations convey the magnitude of this inside

[11] We use the monthly data as R^2s derived from daily data shows high correlations with idiosyncratic risk.

information. High abnormal announcement returns imply that high information asymmetry exists between insiders and outsiders: i.e., the surprise component of dividend initiations is high for these firms. Low abnormal returns imply otherwise. Therefore, the magnitude of abnormal announcement returns proxy the degree of stock price informativeness. We calculate the announcement day abnormal returns from 1963 to 2004 to determine whether dividend initiations are accompanied by less pronounced abnormal returns over more recent years. The intuition behind this is straight-forward: higher abnormal announcement returns (low stock price informativeness or high asymmetry) imply more powerful signaling and lower announcement returns imply otherwise. Compustat conveniently provides *EVENTUS* to calculate announcement day abnormal returns based on the market and Fama-French models. Following Bulan, Subramanyam, and Tanlu (2006), dividend initiations are defined as the first appearance on Compustat of an ordinary cash dividend of non-monthly frequency (distribution codes 1212, 1232, 1242, and 1252). We remove financials and utilities from this sample. We then use the declaration dates to retrieve yearly excess returns from *EVENTUS*. The event period is defined to be days t = 0 and t= l, where t = 0 is the dividend announcement date documented in CRSP. We do not impose minimum trading day requirements (except for computational requirements) as in Michaley, Thaler, and Womack (1995). We use 255 trading days (ending two months or 46 trading days before the announcement date) to estimate the market model and the Fama-French parameters used in excess return calculation. If an announcement falls on weekends or on a non-trading day, we use the next trading day's security returns.

Following Bhagat, Marr, and Thompson (1985), Blackwell and Kidwell (1988), and Dierkens (1991), we consider the information asymmetry of a firm to be high when the managers have a relatively large amount of firm-specific information that is not shared by outsiders. Our two measures of information asymmetry involve use of *Institutional Brokers' Estimate System* (*IBES*) data. For each firm, analysts' earnings forecasts, actual earnings, and the standard deviation of forecasts are obtained from *IBES* summary files. For each year, we only include the end-of-year mean forecasts and standard deviation of forecasts. Standard deviation of forecasts represents the dispersion among analysts about a consensus estimate of the forecast. Since disagreement among analysts is an indication of the lack of available information about the firm, higher standard deviation implies higher asymmetry. Standard deviation of analysts' forecasts has been used as proxy for information asymmetry by authors such as Krishnaswami and Subramaniam (1999) and Lowry (2003). Average standard deviation of forecasts in the last month of a particular year is used as proxy of information asymmetry for the following year. We remove observations that have standard deviations above one. Out of over 20,000 observations, we lose fewer than 100 observations. The coefficient of forecast dispersions is expected to be positive.

The forecast error is the absolute value of actual less mean forecast reported in the last month of the year. Firms with larger levels of information asymmetry between the managers and the outsiders regarding their cash flows and value are expected to have higher forecast errors. As Krishnaswami and Subramaniam

(1999) point out, forecast errors could also be affected by earnings volatility in addition to information asymmetry problems. Thus, we normalize the forecast errors by cash flow volatility (defined earlier). The normalized forecast errors time t are used as proxies of information asymmetry for time t+1. Values of normalized forecast errors range from zero to multiples of hundred.[12] We remove observations that are have normalized forecast error values above 100. From signaling perspective, firms with higher information asymmetry are more likely to pay dividends as dividends would reduce the information gap between insiders and outsiders. Therefore, we expect the coefficients of our information asymmetry measures to be positive.

3.2.3 Repurchases

From both textbook theory and empirical evidence, shares repurchases are substitutes for dividends, and some authors have shown that repurchases surged in 1980s.[13] However, share repurchases, unlike dividends, are temporary and firms repurchasing shares do not need to commit their future operating cash flows to divided payments. For instance, Jagannathan, Stephens, and Weisbach (2000) argue that dividends are paid by firms with higher 'permanent' cash flows. Grullon and Michaely (2002) also show that, at the aggregate level, firms are substituting dividends with repurchases, and that younger firms are becoming more likely to pay out cash in the form of repurchases. However, as Fama and French (2001) points out, firms repurchasing are also mainly dividend-paying

[12] We observe very few firms with forecast errors above 100. The average normalized forecast error value is approximately 20.
[13] E.g., Grullon and Michaely (2002).

firms. Thus, we do not expect repurchases to significantly explain a portion of disappearing trend at the firm level. Following Grullon and Michaely (2002), we define repurchase (*REPODUMMY*) as net of total expenditure on purchase of common and preferred stocks (Compustat data 115) and reduction in value of preferred stocks (Compustat data 56).

[Insert Figure 3.1 about Here]

3.3 FINDINGS

3.3.1 Discussion of Summary Statistics

From Figure 3.1 (A), we see that average cash holdings have been increasing over the years for both dividend payers and non-payers. Bates, Kahle, and Stulz (2007) also document a similar finding. We see the time-varying characteristics of cash holdings. For instance, prior to 1980s, dividend payers on average have higher cash holdings than non-payers. However, the trend reverses in the post-1980s: average cash holdings of dividend payers in general are lower than those of non-payers. This is surprising given that we would expect firms with more cash holdings to be dividend payers as well. From Figure 3.1 (B), we also see that while dividend status changes (from non-paying to paying) are accompanied by higher average cash holdings prior to 1980s, status changes are accompanied by lower cash holdings in the 1990s and onwards. From the plots of other characteristics (Figure 3.1, C-E), dividend payers on average have lower firm-specific volatilities, lower cash flow volatilities, and higher R^2s. While the average R^2s of dividend-paying firms are consistently higher than average R^2s of non-paying firms, differences of cash flow and firm-specific volatilities between payers and non-payers are more pronounced mainly in the 1990s.

Table 3.1 provides the pair-wise *Pearson* correlation coefficients between the dependent variable and each of the independent variables (excluding analyst forecast and time series data) in all our models. The correlations between the dummy *DIVPAY* and various determinants of dividend payment suggest strongly positive associations between dividend payments and firm size, profitability, asset tangibility, and uninformative stock prices. We also see strongly negative associations between dividend payments and capital expenditure, growth prospects, cash holdings, leverage, firm-specific risk, and cash flow volatility. Surprisingly, the correlation between the dividend-paying and repurchasing dummy is significantly positive. How strong is the collinearity between our independent variables? We see that the correlation coefficient between cash flow volatility and firm-specific risk is only 2%. This is surprising given that we would expect cash flow volatility to be more strongly associated with firm-specific stock price volatility. The correlations between the cash flow volatility and other independent variables exhibit much stronger associations than the correlations between firm-specific stock return volatility and other independent variables. For instance, we see very strong negative correlations between cash flow volatility and size, and between cash flow volatility and earnings (-0.35 and -0.54 respectively). We also see highly positive correlation between cash holdings and cash flow volatility. Whether or not firms with higher cash flow volatility tend to hoard cash remains an empirical matter.

Although many correlations appear significant, none is large enough to raise concerns about the possibility of inflated standard errors of the regression estimates, which is confirmed by not excessively high *Variance Inflation Factors* (*VIF*) that are estimated following regression analyses (*VIFs* are not tabulated).[14] We also see the trending nature of both our dependent and independent variables. Figure 3.2 (A) plots the percent of dividend payers as documented in Fama and French (2001). Figure 3.2 (B) plots the average asset tangibility of firms from 1963-2004. We see that the average asset tangibility has been declining over the years. In the 1960s, the average tangibility is above 50%. In the 2000's, it has declined to 35%. From Figure 3.2 (C-D), we see that firm-specific risk, cash flow volatility have also shown an upward. On the other hand, we see that stock prices are becoming more informative (as indicated by the downward trend of average R^2s in Figure 3.2, E) and that the abnormal announcement returns surrounding dividend initiations have been declining over the years (Figure 3.2, F). Table 3.3 provides details of yearly average abnormal returns associated with dividend initiations from 1971 to 2004 which we will discuss further in subsequent sections.

[Insert Tables 3.1 & 3.2 about Here]

[Insert Figure 3.2 about Here]

Table 3.2 reports the descriptive statistics of firm characteristics based on dividend-paying status and time periods. Here, we divide firms based on time period as well to see the changing nature of firm characteristics based on time period. For instance, in 1963-1977 period, average cash holdings of dividend

[14] *VIF* measures the degree of linear association between a particular independent variable and the remaining independent variables in the analysis. *VIF* greater than 10 is considered as indicative of multicollinearity in this chapter. Tolerance levels range from 0.2 to 0.7.

payers are slightly higher than non-payers (8% vs. 7%). After 1977, we see the opposite: average cash holdings of dividend-payers are significantly lower than non-paying firms (9% vs. 17%, 1% significant level). We see that firms, whether payers or non-payers, hold more cash in the post-1977 period compared to before. We also see interesting results for R^2s. Before 1978, the difference between average R^2s of payers and non-payers is just a bit over 2% (significant at 10% level). On the other hand, in 1978-2004 period, the difference is close to 9%, and the difference is significant at 1% level. Leverage is lower for dividend payers regardless of the sample period. However, in the 1963-1977 period, the difference between average leverage ratios of payers and non-payers is -13%. On the other hand, the difference is merely below -1%. Nevertheless, both differences are significant at 1% level. One plausible reason is that firms have become more sensitive to leverage changes in the post-1977 period. The differences between payers and non-payers for all other variables have expected signs and significances regardless of the sample period.

From Table 3.3, we see that early 1970s exhibit high abnormal returns (both in terms of cumulative average abnormal returns and the respective test statistics) surrounding dividend initiations. Similar to the declining dividend trend, years in 1980s and 1990s have lower CAARs and less significant accompanying test statistics. Note that while 1970s' announcement returns are accompanied by high significance levels of test statistics (1% level or lower), for 1981-1999 period, we see that just slightly over half of the sample years have abnormal announcement returns test statistics that are significant at 5% level or lower. From Table 3.4, we see that the full sample period of 1963-2004 has CAAR (market model) of 1.87%, and the pre- and the post-1978 periods have CAARs of 2.2% and 1.72% respectively. The difference between the CAAR's for the latter two periods is statistically significant at a 1% level. The results are more pronounced when we repeat the tests with market-adjusted and Fama and French models. We also note that higher numbers of initiations are accompanied by more pronounced abnormal returns. The results remain robust when we repeat the analysis with different sample periods.

[Insert Tables 3.3 & 3.4 about Here]

3.3.2 Regression Results

3.3.2.1 Original F-F Variables & Idiosyncratic Risk

Table 3.5 (Panels A-C) reports results of our replication of original FF regression (Equation 3.2 with extended sample period in this chapter) with time dummies and clustered coefficients. All coefficients, including that of market-to-book, are similar for all three periods and are highly significant. We include market-to-book in all our regressions for two reasons. First, market-to-book could be capturing legitimate growth prospects. Second, since this explanatory variable is highly significant, excluding it would bias other coefficients. All variables- including our substitute variable- *CAPEX*, have similar test statistics. Therefore, panel regressions with clustered standard errors produce similar predictions and test statistics compared to those of FM.[15] We could also see that different sample periods report different model fit measures and coefficients. Size, measured by

[15] Please refer to Fama and French (2001) for Fama-MacBeth test statistics.

NYP, has a test statistic of 30 for the base period. However, for the 1978-2004 period, its test statistic is above 50. The same can be said of market-to-book and profitability. Therefore, we see temporal variations in the explanatory power of our independent variables: a variable that is highly significant in explaining the dividend payments for a particular sample period might cease to be significant if we were to choose a different sample period. This poses a major problem for our logit regressions and predictions of propensities. Our calculated probabilities could be inaccurate if the variables for the base and the forecast periods have different coefficients. Table 3.5 (Panels D-F) reports results with the original Fama and French variables combined with the idiosyncratic risk measure of Hoberg and Prabalah (2009). Once again, the our estimations report similar coefficients and test statistics.

[Insert Tables 3.5 about Here]

3.3.2.2 Additional Risk Proxies

For our first main equation, we estimate

$$Pr\ (Payer_{it} = 1) = logit\ (\beta_0 + \beta_1 NYP_{it} + \beta_2 M/B_{it} + \beta_3 CAPEX_{it} + \beta_4 E/A_{it} + \beta_5 CASHHOLD_{it} + \beta_6 LEVERAGE_{it} + \beta_7 TANGIBILITY_{it} + \delta_{1 \ldots 41} YEAR\ INDICATOR_{it} + \varepsilon_{it}) \quad (3.3)$$

where δ's are the year dummy coefficients from 1964 to 2004. Table 3.6 reports the regression results. Adding risk proxies does little to change the significance of the original variables. We see that cash holding is not significant (and positive) for the base period of 1963-1977. However, for the forecast period and full sample periods, it is highly significant (and negative). This lends evidence to the increasing riskiness of firms in 1990s and support our previous hypothesis that risk effects dominate agency effects in the 1990s. Other variables- i.e., leverage and tangibility- remain quite consistent for both periods. As hypothesized earlier, we also see that firms with more tangible assets are significantly more likely to pay dividends.[16] Considering that new listings in the 1990's are smaller firms with less tangible assets, the changing nature of newly-listed firms could have contributed to the declining dividend trend.

3.3.2.3 Stock Price Informativeness

[Insert Tables 3.6 & 3.7 about Here]

Coefficients and test statistics of FF variables, idiosyncratic and additional risk measures remain consistent after adding our first measure of stock price informativeness, R^2s. Our measure of stock price un-informativeness (*UNINFORM*) is significantly positive (at 1% level) for the full and sub-sample period of 1978-2004: firms with more (less) informative stock prices are less (more) likely to pay dividends (Table 3.6, Panels D-F). However, it is insignificant for the 1963-1977 period. This finding is similar to that of cash holdings. Thus, stock price informativeness is also more of a latter period phenomenon. Our second measure of information asymmetry is the yearly abnormal announcement returns as described in Section 3.2. We see that this proxy of stock price informativeness is significantly positive only in the post-1990 period: firms are more likely to initiate dividends following higher abnormal announcement returns in the previous year (Table 3.7). Although we regard

[16] Refer to the latter section for marginal effects.

abnormal announcement returns as a proxy of stock price informativeness, an alternative explanation deserve some exploration. Abnormal announcement returns in a given year could proxy catering incentives proposed by Baker and Wurgluer (2004). During years where demand for dividend-paying firms is high among investors, investors reward dividend initiations by driving up demand for dividend-paying firms, which result in high abnormal announcement returns.

3.3.2.4 Cash Flow Volatility & Repurchases

To address the concern that stock price volatility stems from cash flow volatility, we control for the cash flow volatility (as defined in Section 3.2) in the next regression. We also add repurchase dummy to our regressions to control for the argument that repurchases are substituting dividend payments at the firm level. Here, *REPODUMMY* is a dummy variable equal to one if a firm has made a repurchase, zero otherwise. Unlike that of Fama and French (2001), our regression directly controls for the repurchase variable. As discussed in Section 3.2, adding cash flow volatility reduces our sample size significantly. Since our sample period starts from 1973, we divide our samples into pre- and post-1990s. Table 3.8 reports the regression results.

While firm-specific stock return volatility should be compounded in firm characteristics such as cash flow volatility, we see that it remains significant even after controlling cash flow volatility. Cash flow volatility is also highly significant for all sample periods. The repurchase dummy is significantly positive for all sample periods: firms that are repurchasing are also dividend payers. This finding is consistent with that of Fama and French (2001) who showed that firms repurchasing are mainly in the domain of dividend payers. Finally, as hypothesized earlier, we also find that leverage exacerbates firms' performance in times of high volatility: the interaction term between firm-specific volatility and leverage is negatively significant at 1% level (Table 3.8). However, this finding is true only for the full sample and the post-1990 period. We find that the significance of leverage coefficient disappears once we include the interaction terms. Thus, leverage seems to affect dividend payments indirectly through other types of risk.

[Insert Tables 3.8 & 3.9 about Here]

3.3.2.5 Information Asymmetry

Why are dividends losing their importance as a signaling device? An obvious answer would be that firms have substituted dividend signaling with other signaling mechanisms. Analyst forecast data are not available in the first half of 1970s and, even in the years reported, the coverage is not comprehensive. Therefore, using the *IBES* database reduces our sample size to fewer than 20,000 firm years. Merging the analysts' forecast dispersions with other variables further reduces our sample to 14,620 firm years. Extreme outliers exist in dispersion of forecasts: forecast dispersions range from zero to multiple of hundreds, with the mean value of 0.18 and standard deviation of 3.6. We remove observations that are above the 97^{th} percentile. As a result, we lose approximately 450 observations. Table 3.9 reports the results. As hypothesized, firms with higher forecast dispersions in a given year are more likely to pay dividends in the following year. The signs of other variables remain unchanged. However, we do see that our proxies of stock price informativeness lose their significances. Firm-specific risk and cash flow volatilities remain negatively significant in this reduced sample. We then repeat our analysis with analysts' forecast errors. Similar to findings with forecast dispersions, firms with higher errors in a particular year are more likely to pay dividends in the following year, and the significance remains after controlling for all other variables. While the lagged abnormal returns lose their significance, firm-level R^2s remain significant. Finally, inclusion of asymmetry proxies renders market –to- book variable insignificant.

In order to estimate the economic significances of our explanatory variables, we calculate the marginal effects based on the coefficients form all regression estimates. The marginal effects are not separately reported here to conserve space. We see that the probability of being a payer declines by 16% as cash holdings moves from the minimum to maximum value (0 to 0.99 in this case). Changing cash holdings by one standard deviation increases the probability of being a payer by approximately 4%. Firm-specific risk and cash flow volatilities also have high economic significances (-30 % and -10% respectively) while R^2 measure reports 4%. Abnormal announcement returns have low economic significance (below 1%). When we repeat the estimates with 1973-1990 coefficients from Table 3.8, we find that changing abnormal announcement returns by one standard deviation increases the probability of being a payer by approximately 6%.

3.3.3 Predicting Probabilities

So far, we have presented evidence supporting the signaling hypothesis of dividends. Although we also use the risk measures- cash holdings, leverage, tangibility, firm-specific risk, and cash flow volatility- these measures are also supportive of the signaling hypothesis in the sense of Bhattacharya (1979): as firms become riskier, the cost of signaling increases. Now, the question remains as to how much the signaling hypothesis could explain the disappearing dividend trend documented by Fama and French (2001). For prediction purposes, we remove analyst forecast- based information asymmetry measures for two reasons. First, our sample size is significantly reduced due to data attritions. Second, the time span is also shortened to 1981-2004 once we include the analyst forecast data. Since we need a reliable base period to predict our propensities, we decide to retain only variables that span a longer time horizon. Original Fama and French variables, risk proxies, and stock price informativeness measures are available for the full 1963-2004 period, and cash flow volatility and repurchase measures are not available prior to 1971.[17] In addition, our predictor variables also have time-varying explanatory powers. For instance, cash holdings and R^2s are insignificant in the 1963-1977 period although they are highly significant for 1963-2004 and 1978-2004 periods. Therefore, we construct two sets of base and forecast periods. The first base period follows that of Fama and French (2001) and covers 1963-1977. The first forecast period spans from 1978 to 2004. The second base period covers 1963-1990, and the second forecast period ranges from 1991 to 2004. By using the regression coefficients from the base periods, we estimate the propensities for the forecast periods. We first replicate the dividend time trend documented in Fama and French (2001). From Figure 3.3, we could

[17] The quarterly ROA data are few prior to 1970s. When we merge these data with other characteristics, very few observations remain.

see that the dividend trend exhibits very similar results to that of Fama and French (2001). However, in our sample, the first decline initiated in 1979-1980 period. Regardless of the method used, the declining trend in propensities to pay dividends is apparent throughout 1980's and 1990's.

3.3.3.1 Prediction Results

We add our additional risk and information asymmetry proxies to the original variables and predict the propensities based on 1963-1977 period. From Figure 3.4, we see that adding risk and information asymmetry proxies greatly reduces the gap between actual and predicted numbers of payers. The arithmetic averages of the yearly percentages of actual less predicted payers (with and without risk and information asymmetry measures) are -13 % and -3 % respectively for the forecast period of 1978 to 1998. When we extend our forecast to include the 1978 to 2004 period, the numbers are -15 % and -7 % respectively. It should, however, be noted that 1990s are indeed a period of declining propensities, even after controlling for the additional variables. The declining propensities reached a trough in 1997, and sharply reversed in 1998 until the end of millennium. We see another downward trend after the year 2000. Thus, although the actual number of payers increased in the early 2000s, the propensities remain below those of 1970 levels. Surges in actual number of payers could be due to 2003 tax cuts. Although adding these proxies significantly reduces the declining propensity to pay, we do not find evidence of the 'reappearing' trend in the post-2000 period claimed by some authors such as Julio and Ikenberry (2004). The percentage of the declining trend incrementally explained by additional variables is calculated from

$$\sum_{t=1978}^{1998}[(Actual_{it} - Predicted_{it}) - (Actual_{jt} - Predicted_{jt})]/(Actual_{it} - Predicted_{it}) \quad (3.4)$$

where actual and predicted are the numbers of actual and predicted payers for each forecast year, and i and j denotes the predicted numbers of payers from regressions without and with our additional risk and information asymmetry measures.[18] We also place subscript i for the actual number of payers for both regressions since these numbers are slightly different due to attritions from data additions. From Equation 3.4, we find that risk and information asymmetry variables can incrementally explain almost 50 % of the disappearing dividend trend from 1978 to 1998. When we extend our sample to 2004, they could explain 65 % of the trend. Figure 3.5 (A) plots the time dummy coefficients of the regression equations with original FF variables, with original FF variables and firm-specific risk, and with the previous variables combined with cash holdings, leverage, tangibility, and measures of information asymmetry. The plots are consistent with the predictions from the preceding paragraph: adding risk and information asymmetry measures significantly reduces the disappearing dividend trend. From Figure 3.5 (A), we see little trend of declining propensities in 1980s after controlling for the Fama and French (2001) firm characteristics and our risk and information asymmetry measures. A declining trend, however, becomes apparent in the 1990s and continues into early 2000's. Figure 3.5 (B) plots the year dummy coefficients from regressions with and without repurchases. The two plots are virtually indistinguishable for most years. However, we do see that in

[18] The equation is not meaningful for situations where the actual number of payers are greater than the predicted number of payers. We do not see this case in our sample.

the 1990s, repurchase variables deepen the disappearing trend rather than making it less pronounced. Therefore, this confirms our previous finding that firms that repurchase are also more likely to pay dividends.

[Insert Figures 3.3 & 3.4 about Here]

Although a major fraction of disappearing dividends can be explained by risk and stock price informativeness factors, we do not rule out other explanations, especially for the post-1990 period where the sharpest decline took place. The 1990s are a period of great market activities and uncertainties. Market volatilities and surges in IPO issuances to take advantage of the 'new economy' could have led firms to conserve their cash flows for future investment opportunities. Although we control for contemporaneous capital expenditure, this does little to control for the expected future investments firms may have conceived when deliberating dividend policies. As investment opportunities dried up and the awaited new economy did not materialize, firms may have decided to re-distribute their cash flows as dividends in the post-2000 period. Finally, we also do not rule out either investor or firm 'sentiments' in the fraction of declining propensities that is left unexplained by risk factors. However, we are more inclined to argue that firms may have overestimated the growth opportunities in the 1990s and therefore omitted dividends.

3.4 ROBUSTNESS

3.4.1 Evidence from Dividend Yield and Payout

To calculate the dividend payout ratio, we remove observations that have negative earnings and positive dividend payments. Out of over 110,000 observations, there are a bit over 3,000 firms removed from our sample. These firms could be considered following deliberate payout policies. We estimate

$$E\,[yield \mid Payer_{it} = 1] = tobit\,(\beta_0 + \beta_1 NYP_{it} + \beta_2 M/B_{it} + \beta_3 CAPEX_{it} + \beta_4 E/A_{it} + \delta_{1\ldots31}\ YEAR\ INDICATOR_{it} + \varepsilon_{it}) \quad (3.5)$$

And

$$E\,[payout \mid Payer_{it} = 1] = tobit(\beta_0 + \beta_1 NYP_{it} + \beta_2 M/B_{it} + \beta_3 CAPEX_{it} + \beta_4 E/A_{it} + \delta_{1\ldots31}\ YEAR\ INDICATOR_{it} + \varepsilon_{it}) \quad (3.6)$$

where δ's are the year dummy coefficients from 1974 to 2004. Payout is defined as dividends per share (data 26) divided by earnings per share (data 58), and yield as dividend per share divided by price (data 199). We winsorize yields and payouts at 1.[19] While dividend initiations have declined, dividend payout and yield seem to have less significant declines. Figure 3.6 (A) and (B) depicts the time trend of dividend yield and payout after controlling for firm characteristics. Both measures exhibit declining trends after controlling for original Fama and French variables. However, the trends become less apparent after including our risk and information asymmetry measures. Table 3.10 reports the regression estimates.[20]

Our results are almost identical for dividend yield and payout. Coefficients of all variables are similar to logit regression models. Bigger firms with higher profitabilities, lower investment needs, and lower market-to-book ratios have

[19] The maximum yield in our dataset is 3.86: i.e., the dividend amount is 3.86 times the price. The maximum payout is 22: i.e., the firm's dividend amount is 22 times its earnings. We consider them as extreme cases of outliers.
[20] We do not separately report the regression results with Fama and French variables only.

higher dividend yields and payouts. All our risk variables are also consistent: coefficients of firm-specific risk, cash holdings, and leverage are significantly negative. We also see that firms with more tangibility have higher payouts and yields. Our measure of cash flow volatility is also significantly negative. Similar to previous findings, stock repurchases have significantly positive effect on dividend yield and payouts. Thus, firms repurchasing stocks are also more likely to pay high levels of dividends. Previously, we find evidence from our logit regressions that firms with higher information asymmetry are more likely to pay dividends. For yield and payout, we do not find similar results. High stock price un-informativeness and high abnormal returns do not result in higher yields and payouts. It is plausible given that tobit regressions condition the dependent variable on being a payer at time t. Among payers, information asymmetry does not play as important roles as it does for non-payers to pay dividends. Adding the dispersion of analysts' forecasts and forecast errors greatly reduces our sample sizes. We also do find consistent evidence that firms with higher forecast dispersions and forecast errors have higher yields and payouts.

[Insert Figures 3.5 & 3.6 about Here]

3.4.2 Institutional Holdings & Block Ownership

Since institutions are generally better informed than individual investors, firms with high levels of institutional ownerships should possess lower information asymmetry problems (see Allen, Bernardo, and Welch, 2000, and Rubin and Smith, 2007). Institutional ownerships could also serve as a monitoring mechanism (see Chung and Zhang, 2007). In this case, we could expect firms with high institutional ownership to pay higher dividends as they are better-governed firms.[21] Institutional holdings data are collected from Thomson Financial database which provides information from institutional 13F SEC filings. The data are available from 1980. Our measure of institutional holdings is the year-end aggregate institutional stock holdings (for each firm) scaled by total outstanding shares. We remove all observations that have the ratios of above 1. We use lagged holdings to address the concern that institutions are attracted to dividend –paying stocks. We match the institutional-holding data with other variables from CRSP and Compustat databases. Our final sample consists of over 38,000 firm years. On average, institutions hold 35% of total outstanding shares. Table 3.11 presents the regression estimates. The coefficients of institutional holdings are significantly negative across dividend payment, yield, and payout. Thus, evidence suggests that firms with higher institutional holdings are less likely to pay dividends, and among payers, firms with high institutional holdings pay less.[22]. From marginal effects (not reported here), shifting from lowest to highest institutional holdings reduces the probability of being a payer by 12%. Shifting the holdings one standard deviation at the mean reduces the probability by 3.25%. These findings are consistent with the view that firms with higher institutional holdings have lower information asymmetry and, as a result, are less likely to signal via dividend payments. In addition, it is also likely that firms with

[21] Jensen (1986) argues that with enhanced monitoring, firms are more likely to pay out their free cash flow. An alternative argument would be that since these firms have better monitoring mechanisms, they do not have the need to reduce agency costs of free cash flows via dividend payments.

[22] Grinstein and Michaely (2005) also have similar findings. The authors find that institutions prefer low-dividend stocks to high-dividend stocks. Li and Zhao (2007) and Khang and King (2006) also show that dividend paying firms tend to have less information asymmetry compared with non-dividend payers, although the direction of causality is unclear.

higher institutional holdings prefer other methods of payments such as stock repurchases (e.g., Grinstein and Michaely, 2005). While adding the institutional holdings do not change the results of the R^2 measure of stock price informativeness, we see that abnormal returns are negatively significant in explaining dividend payouts (although they are insignificant for dividend paying status and positively significant for dividend yields).

We next estimate the effect of the absence of non-controlling blockholder on dividend payments. Controlling blockholders have the incentive to expropriate resources from minority shareholders (see Fama and Jensen, 1983). Thus, we only consider the effect of non-controlling blockholders in this study. For this chapter, a non-controlling blockholder is defined as an ownership that exceeds 24.99% but is less than 50%. Blockholders have the incentive and the means to closely monitor the firms' management and, as a result, their presence is expected to reduce the agency problems and free cash flows arising thereof (see Shleifer and Vishny, 1986; and Grossman and Hart, 1988). This argument is similar to the argument for institutional ownership.[23] We collect the block ownership data from Bureau van Dijk- Osiris. The database reports 'independence' levels for a range of U.S. and non-U.S. publicly-listed corporations. Our measure of the absence of blockholder is the independence indicator 'A', defined as "… any company with ***no*** recorded shareholder… with an ownership over 24.99% (either direct or total)...." Our hypothesis is that firms without the presence of non-controlling blockholders are less likely to pay dividends as these firms have higher agency

[23] Institutional owners may or may not be blockholders, and blockholders may or may not be institutional owners.

problems. The blockholder data are extremely limited and we are left with merely 5,800 firm years after merging it with Compustat data. Table 3.11 reports our results. Our results indicate, albeit weakly at 10% significance level, firms without the presence of blockholders are less likely to pay dividends. Although the coefficient is negative for both yield and payout, they are insignificant nonetheless. Thus, we find weak evidence of the effect of blockholders on dividend payments. Absence of blockholders reduces firms' probability of being a dividend payer by approximately 2%.

We also consider other proxies of agency costs such insider holdings and managerial compensation. However, insider holding and executive compensation data are available only from 1992, and the coverage is not comprehensive even in the years reported. Since we are mainly interested in investigating the disappearing dividend trend by comparing the characteristics in base and forecast periods, adding these data create little value for our purpose. Accordingly, we leave these data for future exercises.

[Insert Tables 3.10 & 3.11 about Here]

3.5 CONCLUDING REMARK

In frictionless markets without information asymmetry, firms could be expected to follow residual dividend policies. However, it is well-known that managers follow deliberate dividend policies and are conservative in initiating dividends and making dividend changes: firms initiate or increase dividends only if they have a degree of certainty that payments can be sustained by future earnings. In imperfect markets, dividends serve as signaling device as well as means to reduce agency costs of free cash flows. In this chapter, we explore the disappearing dividend puzzle documented by Fama and French (2001) and implications arising thereof. The first question we attempt to answer is whether stock price informativeness and information asymmetry could explain a portion of the disappearing dividend trend. If dividends were to serve as signaling device, disappearing dividends suggest that firms are either substituting dividend signaling with other mechanisms and/or dividends are losing their importance as signaling mechanisms.[24] We find evidence that dividends in general are losing their importance as a signaling device as indicated by the declining abnormal returns associated with dividend initiations. We also find that firms with lower stock price informativeness- as measured by higher abnormal announcement returns and higher R^2s – are more likely to pay dividends. Our results are consistent when we use dispersions of analysts' forecasts and forecast errors. We find that firms with higher information asymmetry- indicated by higher forecast dispersions and higher forecast errors- are more likely to pay dividend. Our different measures of stock price informativeness and information asymmetry strongly support signaling hypothesis. We also find evidence that risk variables could significantly explain a significant portion of disappearing dividend trend. While previous research has found that idiosyncratic risk play a role in explaining the disappearing dividend trend, our results include more fundamental measures such as cash holdings, leverage, asset tangibility, and cash flow volatility. Our measures of stock price informativeness and risk measures could explain more

[24] These are not mutually exclusive explanations.

than 60% of the disappearing dividend trend.

Easterbrook (1984) argues that dividends provide investors with a control mechanism: dividends force firms to constantly return to capital markets to raise funds. The disappearing dividend trend raises questions as to whether this control mechanism is faltering. Our results run counter to the natural prediction that firms with higher cash holdings are more likely to pay dividends. Although cash holdings are not significant in explaining dividend initiations in the 1960s and 1970s, they become negatively significant in late post-1980 period. Increased cash holdings in these decades coincide with increased stock return volatilities, increased cash flow volatilities, and declining dividend payments. Our hypothesis is that during periods of high uncertainty, cash holdings would increase, and dividend payments would decrease. In times of reduced volatility, large cash holdings should increase dividend payments. Non-parametric tests confirm this: in the former period, dividend payers on average have higher cash holdings while they tend to have lower cash holdings in the latter period. This finding is both consistent with models of signaling under asymmetric information and with precautionary motive claimed by Opler et al. who find that firms with more volatile cash flows and better investment opportunities hold more cash. We do not find evidence that, at the firm level, stock repurchases serve as substitutes for dividends. Our signaling story and results remain consistent when we extend our analysis to include dividend yield and payout.

Our findings provide another partial evidence supporting the agency hypothesis. We find that firms in the absence of blockholders are less likely to pay dividend.

If presence of blockholders improve monitoring mechanisms, we could argue that dividends indeed serve as mechanism to reduce agency costs of free cash flows. Finally, we find that higher institutional holdings result in lower dividend payments. This finding is not consistent with the argument that institutions serve as corporate monitoring mechanism. Rather, it seems more consistent with the argument that firms with higher institutional holding have lower information asymmetry and are less likely to signal via dividend payments.

BIBLIOGRAPHY

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

Allen, F., Bernardo, A., Welch, I., 2000. A theory of dividends based on tax clienteles. Journal of Finance 55, 2499–2536.

Amihud, Y., Li, K., 2006. The declining information content of dividend announcements and the effects of institutional holdings. Journal of Financial and Quantitative Analysis 41, 637-660.

Asquith, P., Mullins, D., 1983. The impact of initiating dividend payments on shareholders wealth. Journal of Business 56, 77-96.

Baker, M., Wurgler, J., 2004a.. A catering theory of dividends. Journal of Finance 59, 1125–1165.

Baker, M., Wurgler, J., 2004b. Appearing and disappearing dividends: the link to catering incentives. Journal of Financial Economics 73, 271–288.

Bates, T., Kahle, K., Stulz, R., 2007. Why do U.S. Firms hold so much more cash than they used to? Unpublished working paper. Ohio State University.

Bhagat, S., Marr, M., Thompson, R., 1985. The rule 415 experiment: equity markets. Journal of Finance 40, 1385-1401.

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

Blackwell, D., Kidwell, D., 1988. An investigation of cost differences between public sales and private placements of debt. Journal of Financial Economics 22, 253-278.

Blume, M., Lim, F., Mackinlay, C., 1998. The declining credit quality of U.S. corporate debt: myth or reality? Journal of Finance 53, 1389 – 1413.

Bulan, L., Subramanian, N., Tanlu, L., 2007. On the timing of dividend initiations. Financial Management 36, 31-65.

Bushman, M., Piotroski, J., Smith, A., 2005. Insider trading restrictions and analysts' incentives to follow firms. Journal of Finance 60, 35-66.

Chetty, R., Saez, E., 2005. Dividend taxes and corporate behavior: evidence from the 2003 dividend tax cut. Quarterly Journal of Economics 120, 791-833.

Chung, K., Zhang, H., 2007. Corporate governance and institutional ownership. Journal of Financial and Quantitative Analysis. Forthcoming.

DeAngelo, H., DeAngelo, L., Skinner, D., 2004. Are dividends disappearing? Dividend concentration and the consolidation of earnings. Journal of Financial Economics 72, 425–456.

Dierkens, N., 1991. Information asymmetry and equity issues. Journal of Financial and Quantitative Analysis 26, 181-199.

Durvev, A., D., Morck, R., Yeung, B., Zarowin, P., 2003. Does greater firm-specific return variation mean more or less informed stock pricing? Journal of Accounting Research 41, 797-836.

Eades, K., 1982. Empirical evidence on dividends as a signal of firm value. Journal of Financial and Quantitative Analysis 4, 471-500.

Easterbrook, F., 1984. Two agency cost explanations for dividends. American Economic Review 74, 650–659.

Fama, E., French, K., 2001. Disappearing dividends: changing firm characteristics or lower propensity to pay? Journal of Financial Economics 60, 3–44.

Fama, E., French, K., 2004. Newly listed firms: fundamentals, survival rates. Journal of Financial Economics 73, 229-269.

Fama, E., Jensen, M., 1983. Separation of ownership and control. Journal of Law and Economics 26, 301-325.

Grinstein, Y., Michaely, R., 2005. Institutional holdings and payout policy. Journal of Finance 60, 1389-1425.

Grossman, S., Hart., O., 1980. Takeover bids, the free-rider problem, and the theory of the corporation. Bell Journal of Economics 11, 42-64.

Grossman, S., Hart, O., 1988. One share one vote and the market for corporate control. Journal of Financial Economics 20, 175-202.

Grullon, G., Michaely, R., 2002. Dividends, shares repurchases, and the substitution hypothesis. Journal of Finance 57, 1649-1684.

Grullon, G., Michaely, R., Swaminathan, B., 2002. Are dividend changes a sign of firm maturity? Journal of Business 75, 387-424.

Healy, P., Palepu, K., 1988. Earnings information conveyed by dividend initiations and omissions. Journal of Financial Economics 21, 149-175.

Hoberg, G., Prabhala, N., 2009. Disappearing dividends: the importance of idiosyncratic risk and the irrelevance of catering. Review of Financial Studies 22, 79-116.

Irvine, P., Pontiff, J., 2005. Idiosyncratic return volatility, cash flows, and product market competition. Unpublished working paper. University of Georgia and Boston College.

Jagannathan, M., Stephens, C., Weisbach, M., 2000. Financial flexibility and the choice between dividends and stock repurchases. Journal of Financial Economics 57, 55-384.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-329.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behaviour, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Julio, B., Ikenberry, D., 2004. Reappearing dividends. Journal of Applied Corporate Finance 16, 89–100.

Kalay, A., Loewenstein, U., 1985. Predictable events and excess returns: the case of dividend announcements. Journal of Financial Economics 14, 423-449.

Keynes, J, 1936. The general theory of employment, interest, and money. Harcourt Brace, London.

Khang, K., King, T., 2006. Does dividend policy relate to cross-sectional variation in information asymmetry? evidence from returns to insider trades. Financial Management 35, 71-94.

Krishnaswamis, S., Subramaniam, V., 1999. Information asymmetry, valuation, and the corporate spin-off decision. Journal of Financial Economics 53, 73-112.

La Porta, R., Lopez-de-Silanes, F., Shleifer, F., Vishny, R., 2000. Investor protection and corporate governance. Journal of Financial Economics 58, 3-27.

Lang, H., Litzenberger, R., 1989. Dividend announcements: cash flow signaling versus free cash flow hypothesis? Journal of Financial Economics 24, 181-192.

Li, K., Zhao, X., 2007. Analyst coverage and dividend policy. Financial Management. Forthcoming.

Lowry, M., 2003. Why does IPO volume fluctuate so much? Journal of Financial Economics 67, 3-40.

Michaely, R., Thaler, R., Womack, K., 1995. Price reactions to dividend initiations and omissions: overreaction or drift? Journal of Finance 50, 573-608.

Miller, M., Modigliani, F., 1961. Dividend policy, growth and the evaluation of shares. Journal of Business 34, 411-433.

Miller, M., Rock, K., 1985. Dividend policy under asymmetric information. Journal of Finance 40, 1031-1051.

Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? Journal of Financial Economics 58, 215-260.

Nissim, D. Ziv, A., 2001. Dividend changes and future profitability. The Journal of Finance 6, 2111-2133.

Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of cash holdings. Journal Financial Economics 32, 3-46.

Petersen, M., 2009. Estimating standard errors in finance panel data sets: comparing approaches. Review of Financial Studies 22, 435-480.

Piotroski, J., Roulstone, D., 2004. The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and firm-specific information into stock prices. Accounting Review 79,1119–1151.

Rubin, A., Simth, D., 2008. Institutional ownership, volatility and dividends. Unpublished working paper. Simon Fraser University.

Shleifer, A., Vishny, R., 1986. Large shareholders and corporate control. Journal of Political Economy 94, 461-488.

Table 3.1: Correlation Matrix.

The table presents the correlation matrices involving the dependent variable and selected independent variables. The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; stock price uninformativess (*UNINFORM*), proxied by log ($R^2/1- R^2$), where R^2s are estimated from yearly market model regressions using monthly data; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; share repurchases (*REPODUMMY*), a dummy variable equal to one if a firm has made a stock repurchase, zero otherwise. We remove all financials and utilities. The significance of the correlation coefficients is based on two-tail *P*-value. ***, ** and * indicate the significance of coefficient at the 1%, 5%, and 10% level, respectively. There are 57,553 firm-year observations.

	DIVPAY	NYP	CAPEX	E/A	M/B	FIRMσ	CASHHOLD	LEVERAGE	TANGIBILITY	UNINFORM	ROAσ	REPODUMMY
DIVPAY	1	.525***	.078***	.242***	-.108***	-.024***	-.210***	-.017***	.241***	.167***	-.288***	.035***
NYP	.525***	1	.134***	.348***	.123***	-.001	-.077***	-.111**	.117**	.204**	-.347**	.105**
CAPEX	.078***	.134***	1	.063***	.031***	-.001	-.121***	.075**	.441**	.057**	-.061**	-.014**
E/A	.242***	.348***	.063***	1	-.203***	-.021**	-.229***	.047**	.083**	.056**	-.538**	.052**
M/B	-.108***	.123***	.031***	-.203***	1	.020**	.326***	-.209**	-.132**	-.014**	.242**	.087**
FIRMσ	-.024***	-.001*	-.001	-.021***	.020***	1	.017***	-.002	-.013**	-.006	.020**	.018**
CASHHOLD	-.210***	-.077***	-.121***	-.229***	.326***	.017**	1	-.436**	-.310**	-.020**	.268**	.062**
LEVERAGE	-.017***	-.111***	.075***	.047***	-.209***	-.002	-.436***	1	.171**	-.009*	-.089**	-.071**
TANGIBILITY	.241***	.117***	.441***	.083***	-.132***	-.013**	-.310***	.171**	1	.032**	-.137**	-.021**
UNINFORM	.167***	.204***	.057***	.056***	-.014**	-.006	-.020***	-.009*	.032**	1	-.078**	-.002
ROAσ	-.288***	-.347***	-.061***	-.538***	.242***	.020**	.268***	-.089**	-.137**	-.078**	1	-.009*
REPODUMMY	.035***	.105***	-.014***	.052***	.087**	.018**	.062***	-.071**	-.021**	-.002	-.009*	1

Table 3.2: Descriptive Statistics.

The table reports descriptive statistics of selected firm characteristics for dividend payers vs. non-payers. Firm characteristics include: cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; dispersion of analysts' forecasts (*ANALSTDEV*), standard deviation of analysts' forecasts; analysts' forecast errors (*ANALERROR*). We remove all financials and utilities. (*ANALSTDEV*), standard deviation of analysts' forecasts; analysts' forecast errors (*ANALERROR*). We remove all financials and utilities.

(see next page)

Variable	Pre-1978 DIVPAY = 0 Observations	Mean	Stdev	Min	Max	Pre-1978 DIVPAY = 1 Observations	Mean	Stdev	Min	Max
CASHHOLD	155	0.0727	0.0699	0.0022	0.3948	702	0.0861	0.0882	0.0000	0.7248
LEVERAGE	155	0.3619	0.1876	0.0000	0.8600	702	0.2354	0.1337	0.0000	0.7100
TANGIBILITY	126	0.5038	0.2529	0.0000	0.9873	584	0.5649	0.2239	0.0212	0.9927
FIRMσ	151	0.0317	0.0122	0.0086	0.0697	695	0.0185	0.0089	0.0000	0.1315
UNINFORM	149	0.2003	0.1922	0.0000	0.7886	697	0.2276	0.1944	0.0000	0.8290
ANALSTDEV	8	0.1278	0.1069	0.0000	0.2800	193	0.0941	0.1157	0.0000	0.9850
ANALERROR	155	2.2219	11.1580	0.0000	100.0000	702	12.8999	28.4881	0.0000	100.0000
ROAσ	155	0.0154	0.0141	0.0021	0.0916	702	0.0080	0.0069	0.0007	0.0748

Variable	1978 and After DIVPAY = 0 Observations	Mean	Stdev	Min	Max	1978 and After DIVPAY = 1 Observations	Mean	Stdev	Min	Max
CASHHOLD	44,693	0.1722	0.2102	0.0000	0.9995	30,925	0.0902	0.1136	0.0000	0.9940
LEVERAGE	44,534	0.2369	0.2031	0.0000	0.9800	30,785	0.2314	0.1567	0.0000	0.9100
TANGIBILITY	39,166	0.4118	0.2524	0.0000	0.9948	25,590	0.5399	0.2334	0.0000	0.9949
FIRMσ	39,388	0.0451	0.0272	0.0011	1.0000	26,105	0.0228	0.0166	0.0015	0.7372
UNINFORM	43,026	0.1750	0.1811	0.0000	0.9310	30,632	0.2617	0.2232	0.0000	0.9678
ANALSTDEV	10,414	0.1031	0.1588	0.0000	1.0000	11,693	0.1126	0.1446	0.0000	1.0000
ERROR	44,703	4.9193	15.2618	0.0000	100.0000	30,930	12.1164	24.7782	0.0000	100.0000
ROAσ	44,703	0.0421	0.0680	0.0002	1.0000	30,930	0.0115	0.0148	0.0002	0.5602

Table 3.3: Announcement Day Abnormal Returns.

EVENTUS software is used to calculate announcement day abnormal returns based on the market, market-adjusted (using excess returns), and Fama-French models. Dividend initiations are defined as the first appearance on Compustat of an ordinary cash dividend of non-monthly frequency (distribution codes 1212, 1232, 1242, and 1252). We remove financials and utilities from this sample. The 'event period' is defined as days t = 0 and t= l, where t = 0 is the dividend announcement date documented in CRSP. Cumulative Average Abnormal Returns (CAARs) are the averages of cumulative returns over 2-day periods for all firms in a given year. ***, **, *, and $ denote statistical significance at the 0.001, 0.01, 0.05, and 0.1 levels respectively (1-tail test).

	Market Model			Market Adjusted			Fama-French		
Year	N	CAAR	Patell Z	N	CAAR	Patell Z	N	CAAR	Patell Z
1971	27	-0.22%	-0.333	27	0.02%	0.049	27	-0.07%	-0.063
1972	42	2.58%	4.052***	42	2.66%	4.151***	41	3.10%	4.109***
1973	372	1.40%	6.123***	372	1.22%	5.850***	360	1.48%	4.233***
1974	145	3.41%	7.693***	145	3.34%	7.521***	145	3.35%	7.624***
1975	165	3.97%	9.563***	165	4.12%	9.424***	165	3.84%	8.540***
1976	187	2.93%	8.889***	187	3.11%	8.957***	187	2.89%	7.810***
1977	152	2.62%	8.311***	152	2.95%	8.692***	151	2.43%	6.958***
1978	78	1.67%	2.634**	78	2.06%	4.077***	77	1.83%	3.479***
1979	61	1.46%	2.203*	61	1.67%	2.071*	59	0.77%	1.330$
1980	48	2.07%	3.074**	48	2.27%	3.206***	48	2.30%	2.845**
1981	47	2.04%	3.145***	47	1.96%	2.926**	46	1.92%	2.668**
1982	42	1.12%	1.329$	42	1.21%	1.235	42	1.05%	1.185
1983	47	1.28%	1.959*	47	1.42%	2.138*	46	1.31%	1.645*
1984	60	1.81%	4.424***	60	1.81%	5.022***	57	1.94%	2.751**
1985	55	1.30%	3.430***	55	1.18%	3.051**	55	1.24%	2.142*
1986	53	1.19%	1.822*	53	1.37%	1.738*	51	1.35%	1.839*
1987	106	0.99%	2.728**	106	0.65%	1.637$	104	1.06%	1.784*
1988	81	1.26%	2.643**	81	1.49%	2.465**	80	1.07%	1.437$
1989	78	2.01%	6.348***	78	2.03%	5.486***	77	2.16%	3.750***
1990	54	2.49%	3.576***	54	2.74%	3.819***	54	2.61%	2.726**
1991	44	3.25%	4.374***	44	3.37%	4.410***	44	3.24%	3.730***
1992	81	1.52%	3.873***	81	1.71%	3.890***	79	1.42%	1.863*
1993	61	1.35%	1.790*	61	1.40%	1.752*	61	1.77%	2.178*
1994	66	-0.11%	-1.014	66	0.05%	-0.398	65	-0.08%	-0.095
1995	64	2.59%	3.012**	64	2.47%	2.392**	64	2.21%	2.852**
1996	40	1.42%	2.402**	40	2.11%	2.165*	40	2.15%	1.969*
1997	41	0.94%	1.398$	41	0.97%	1.476$	40	0.94%	1.03
1998	32	-0.13%	0.096	32	-0.12%	0.089	32	-0.30%	-0.239
1999	41	1.47%	0.253	41	1.54%	0.328	40	1.84%	1.746*
2000	22	0.33%	0.937	22	0.81%	1.151	22	-0.25%	-0.213
2001	75	0.84%	3.472***	75	1.03%	1.767*	75	0.87%	1.256
2002	42	2.74%	3.607***	42	3.12%	4.015***	42	2.61%	3.078**
2003	154	2.78%	6.545***	154	2.87%	6.382***	153	2.75%	6.313***
2004	85	1.24%	2.940**	85	1.68%	3.984***	85	1.32%	3.136***

Table 3.4: Comparisons of Announcement Day Abnormal Returns for Different Sample Periods.

EVENTUS software is used to calculate announcement day abnormal returns based on the market, market-adjusted (using excess returns), and Fama-French models. Dividend initiations are defined as the first appearance on Compustat of an ordinary cash dividend of non-monthly frequency (distribution codes 1212, 1232, 1242, and 1252). We remove financials and utilities from this sample. The 'event period' is defined as days t = 0 and t= l, where t = 0 is the dividend announcement date documented in CRSP. Cumulative Average Abnormal Returns (CAARs) are the averages of cumulative returns over 2-day periods for all firms in a given year. ***, **, *, and $ denote statistical significance at the 0.001, 0.01, 0.05, and 0.1 levels respectively (1-tail test for Patell Z score and 2-tail test for sample period differences).

		Market Model				Market-Adjusted				FF Model			
		N	CAAR	Positive: Negative	Patell Z	N	CAAR	Positive: Negative	Patell Z	N	CAAR	Positive: Negative	Patell Z
1	1963-1998	2,644	1.95%	1566:1078	21.75***	2,644	1.95%	1566:1078	21.754***	2,569	1.88%	1501:1068	16.050***
2	1963-1977	1,405	2.20%	847:558	18.17***	1,405	2.26%	852:553	18.553***	1,348	2.20%	814:534	14.715***
3	1978-1998	1,239	1.60%	714:525	12.01***	1,239	1.60%	714:525	12.012***	1,221	1.52%	687:534	8.308***
4	1963-2004	3,063	1.87%	1804:1259	23.1***	3,063	1.97%	1828:1235	23.177***	2,986	1.87%	1758:1228	17.364***
5	1978-2004	1,658	1.72%	976:682	14.4***	1,658	1.72%	976:682	14.396***	1,638	1.60%	944:694	10.786***
6	1973-1990	1,831	2.17%	1096:735	19.86***	1,831	2.17%	1096:735	19.861***	1,804	2.11%	1062:742	16.586***
7	1991-2004	848	1.80%	504:344	9.62***	848	1.80%	504:344	9.618***	842	1.65%	495:347	7.854***
(2)-(3)			(0.60%)***				(0.66%)***				(0.68%)***		
(2)-(5)			(0.48%)***				(0.54%)***				(0.60%)***		
(6)-(7)			(0.37%)***				(0.37%)***				(0.46%)***		

Table 3.5: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to Pay Dividends.

The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data. We remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

	Panel A: Period 1963-2004	Panel B: Period 1963-1977	Panel C: Period 1978-2004	Panel D: Period 1963-2004	Panel E: Period 1963-1977	Panel F: Period 1978-2004
	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-1.51	-2.13	-1.16	0.52	0.27	0.57
	(-7.91)***	(-9.58)***	(-19.43)***	(2.08)**	(0.90)	(5.70)***
NYP	(5.79)	6.67	5.63	4.30	5.03	4.16
	(59.35)***	(30.53)***	(55.47)***	(35.66)***	(20.06)***	(32.18)***
CAPEX	-2.14	-4.77	-1.66	-2.11	-4.80	-1.48
	(-9.47)***	(-10.90)***	(-6.96)***	(-7.66)***	(-10.16)***	(-4.91)***
E/A	3.57	6.14	3.36	3.44	6.36	3.16
	(19.98)***	(10.00)***	(18.86)***	(15.96)***	(9.55)***	(14.74)***
M/B	-0.63	-0.61	-0.65	-0.48	-0.51	-0.49
	(-23.15)***	(-10.38)***	(-22.20)***	(-16.44)***	(-8.21)***	(-15.14)***
FIRMσ				-49.45	-62.65	-45.97
				(-24.47)***	(-19.45)***	(-19.83)***
Firm Years	131,438	25,164	106,274	102,706	22,952	79,754
Firms	14,773	3,401	14,212	12,191	3,325	11,614
Log Pseudo-likelihood	-56422	-11122	-45130	-42355	-9122	-33054
Pseudo-R^2	0.3693	0.29	0.3491	0.4014	0.3461	0.3769

Table 3.6: Estimates From Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to Pay Dividends.

The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data. We remove all financials and utilities. The z-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

	Panel A: Period 1963-2004	Panel B: Period 1963-1977	Panel C: Period 1978-2004	Panel D: Period 1963-2004	Panel E: Period 1963-1977	Panel F: Period 1978-2004
	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay	Dependent= Divpay
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	1.12	1.20	1.46	1.10	1.79	1.43
	(4.03)***	(3.57)***	(10.45)***	(3.88)***	(4.90)***	(10.09)***
NYP	3.25	3.94	3.12	3.13	3.50	3.07
	(26.86)***	(15.31)***	(23.88)***	(25.31)***	(12.42)***	(23.25)***
CAPEX	-6.12	-5.85	-6.19	-5.94	-5.25	-6.16
	(-17.12)***	(-10.07)***	(-14.37)***	(-15.90)***	(-8.09)***	(-14.07)***
E/A	3.47	5.03	3.20	3.42	5.07	3.22
	(13.75)***	(7.33)***	(12.48)***	(13.33)***	(6.68)***	(12.36)***
M/B	-0.33	-0.48	-0.29	-0.31	-0.42	-0.29
	(-12.48)***	(-8.18)***	(-10.16)***	(-11.64)***	(-6.90)***	(-9.99)***
FIRMσ	-79.84	-88.99	-76.89	-82.22	-104.41	-76.34
	(-30.99)***	(-23.68)***	(-24.99)***	(-29.95)***	(-23.19)***	(-24.62)***
CASHHOLD	-1.02	0.18	-1.10	-1.04	0.20	-1.11
	(-5.69)***	(0.4)	(-5.71)***	(-5.68)***	(0.42)	(-5.71)***
LEVERAGE	-1.63	-2.19	-1.38	-1.61	-2.14	-1.38
	(-11.76)***	(-8.89)	(-8.78)***	(-11.30)***	(-7.98)***	(-8.69)***
TANGIBILITY	1.91	1.30	2.06	1.88	1.06	2.06
	(18.32)***	(6.93)***	(17.70)***	(17.59)***	(5.25)***	(17.53)***
UNINFORM				0.25	0.06	0.31
				(4.12)***	(0.56)	(4.32)***
Firm Years	89,315	20,380	68,935	85,455	18,200	67,256
Firms	11,665	3,133	11,048	11,371	3,006	10,773
Log Pseudo-likelihood	-33779	-7809	-25827	-32094	-6612	-25320
Pseudo-R^2	0.4484	0.3822	0.4290	0.4529	0.3978	0.4288

Table 3.7: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to Pay Dividends.

The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data; yearly cumulative average abnormal returns (*ABNRET*) measured) by averaging the announcement-related cumulative abnormal returns over 2-day periods for all firms in a given year. We remove all financials and utilities. The z-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A:Period 1963-2004 Dependent= Divpay Coefficient	Panel B:Period 1963-1977 Dependent= Divpay Coefficient	Panel C:Period 1978-2004 Dependent= Divpay Coefficient	Panel D:Period 1963-1990 Dependent= Divpay Coefficient	Panel E:Period 1991-2004 Dependent= Divpay Coefficient
INTERCEPT	1.15	1.93	0.67	0.78	0.73
	(2.49)**	(3.65)***	(2.67)***	(1.60)	(3.62)***
NYP	3.13	3.50	3.07	4.23	2.11
	(25.31)***	(12.42)***	(23.24) ***	(24.16)***	(13.51)***
CAPEX	-5.94	-5.25	-6.16	-5.00	-7.56
	(-15.90)***	(-8.09)***	(-14.08)***	(-11.23)***	(-11.25)***
E/A	3.42	5.06	3.23	3.70	3.05
	(13.33)***	(6.68)***	(12.38)***	(9.00)***	(10.55)***
M/B	-0.31	-0.42	-0.29	-0.46	-0.18
	(-11.64)***	(-6.90)***	(-10.00)***	(-9.18)***	(-6.36)***
FIRMσ	-82.22	-104.39	-76.20	-85.65	-80.12
	(-29.94)***	(-23.17)***	(-24.64)***	(-27.72)***	(-21.46)***
CASHHOLD	-1.04	0.20	-1.11	-0.84	-1.22
	(-5.68)***	(0.41)	(-5.71)***	(-3.33)***	(-5.31)***
LEVERAGE	-1.61	-2.14	-1.38	-1.79	-1.30
	(-11.30)***	(-7.98)***	(-8.68)***	(-10.12)***	(-6.66)***
TANGIBILITY	1.88	1.06	2.05	1.49	2.18
	(17.59)***	(5.25)***	(17.52)***	(10.74)***	(15.44)***
UNINFORM	0.25	0.06	0.32	0.22	0.14
	(4.12)***	(0.56)	(4.49)***	(2.64)***	(1.58)
ABNRET	-3.46	-9.21	28.65	-0.89	5.05
	(-0.22)	(-0.55)	(3.62)***	(-0.05)	(1.77)*
Firm Years	85455	18199	67256	42881	42574
Firms	11,371	3006	10773	6486	7807
Log Pseudo-likelihood	-32094	-6612	-25323	-15851	-15908
Pseudo-R^2	0.4529	0.3978	0.4287	0.4548	0.3855

Table 3.8: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to Pay Dividends.

The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data; yearly cumulative average abnormal returns (*ABNRET*) measured) by averaging the announcement-related cumulative abnormal returns over 2-day periods for all firms in a given year; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; share repurchases (*REPODUMMY*), a dummy variable equal to one if a firm has made a stock repurchase, zero otherwise; interaction term between firm-specific risk and leverage (*FIRMσ * LEV*); interaction term between cash flow volatility and leverage (*ROAσ * LEV*). We remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A:Period 1973-2004 Dependent= Divpay Coefficient	Panel B:Period 1973-2004 Dependent= Divpay Coefficient	Panel C:Period 1973-1990 Dependent= Divpay Coefficient	Panel D:Period 1991-2004 Dependent= Divpay Coefficient
INTERCEPT	2.73	2.51	2.12	0.49
	(1.59)	(1.47)	(1.25)	(1.87)*
NYP	2.62	2.61	4.01	1.88
	(17.01)***	(16.90)***	(16.98)***	(10.69)***
CAPEX	-5.81	-5.88	-4.01	-7.52
	(-11.40)***	(-11.46)***	(-6.11)***	(-10.19)***
E/A	2.56	2.61	2.57	2.43
	(8.26)***	(8.40)***	(5.18)***	(6.76)***
M/B	-0.20	-0.20	-0.38	-0.12
	(-6.30)***	(-6.32)***	(-5.69)***	(-3.91)***
FIRMσ	-74.05	-64.31	-67.98	-64.06
	(-20.40)***	(-11.57)***	(-8.81)***	(-10.43)***
CASHHOLD	-1.23	-1.25	-1.25	-1.29
	(-5.47)***	(-5.61)***	(-3.87)***	(-4.96)***
LEVERAGE	-1.33	-0.17	-0.70	0.05
	(-7.54)***	(-0.35)	(-1.03)	(0.08)
TANGIBILITY	1.92	1.93	1.49	2.12
	(14.66)***	(14.66)***	(8.13)***	(13.67)***
UNINFORM	0.22	0.22	0.23	0.10
	(2.84)***	(2.78)***	(1.86)*	(1.06)
ABNRET	-35.40	-37.32	-36.45	4.73
	(-0.64)	(-0.67)	(-0.64)	(1.5)
ROAσ	-11.88	-13.32	-14.89	-12.93
	(-6.79)***	(-4.99)***	(-3.27)***	(-4.45)***
REPODUMMY	0.40	0.39	0.36	0.41
	(9.00)***	(8.96)***	(5.45)***	(7.85)***
FIRMσ * LEV		-45.19	-27.48	-51.41
		(-2.77)***	(-1.20)	(-2.71)***
ROAσ * LEV		6.41	3.02	12.22
		(0.74)	(0.18)	(1.35)
Firm Years	53,328	53,328	19,023	34,305
Firms	8,951	8,951	4,733	6,756
Log Pseudo-likelihood	-20288	-20270	-6866	-13221
Pseudo-R^2	0.4346	0.4351	0.4749	0.3810

Table 3.9: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to Pay Dividends.

The dependent variable is a dummy value (*DIVPAY*) that is equal to one if firm pays dividends, zero otherwise. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; share repurchases (*REPODUMMY*), a dummy variable equal to one if a firm has made a stock repurchase, zero otherwise; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data; average abnormal returns (*ABNRET*) measured by averaging the announcement-related cumulative abnormal returns over 2-day periods for all firms in a given year; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*. We remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A:Period 1979-2004 Dependent= Divpay Coefficient	Panel B:Period 1979-2004 Dependent= Divpay Coefficient	Panel C:Period 1979-2004 Dependent= Divpay Coefficient	Panel D:Period 1979-2004 Dependent= Divpay Coefficient
INTERCEPT	4.18	0.49	3.22	1.78
	(6.98)***	(0.11)	(6.25)***	(1.26)
NYP	1.74	1.71	2.12	2.12
	(6.09)***	(6.00)***	(7.26)***	(7.28)***
CAPEX	-8.91	-8.88	-8.32	-8.08
	(-9.76)***	(-9.72)***	(-9.35)***	(-9.13)***
E/A	1.21	1.26	1.69	1.41
	(2.09)**	(2.16)**	(3.26)***	(2.57)***
M/B	-0.02	-0.02	-0.04	-0.04
	(-0.58)	(-0.61)	(-1.08)	(-1.11)
FIRMσ	-124.46	-124.18	-101.10	-102.37
	(-17.29)***	(-17.23)***	(-11.75)***	(-11.84)***
CASHHOLD	-2.30	-2.30	-2.18	-2.25
	(-5.34)***	(-5.33)***	(-5.05)***	(-5.23)***
LEVERAGE	-0.95	-0.94	-1.21	-1.24
	(-2.98)***	(-2.95)***	(-3.96)***	(-4.06)***
TANGIBILITY	2.22	2.22	2.15	2.12
	(9.06)***	(9.05)***	(9.25)***	(9.11)***
ROAσ	-6.83	-6.73	-12.16	-7.67
	(-2.72)***	(-2.64)***	(-4.34)***	(-2.99)***
REPODUMMY	0.49	0.49	0.44	0.45
	(6.13)***	(6.10)***	(5.80)***	(5.92)***
UNINFORM	-	0.19	-	0.31
	-	(0.74)	-	(2.17)**
ABNRET	-	118.74	-	54.66
	-	(1.27)	-	(0.91)
ANALSTDEV	1.61	1.60	-	-
	(2.26)**	(2.24)**	-	-
ANALERROR	-	-	0.001	0.01
	-	-	(1.86)*	(2.57)***
Firm Years	14,156	14,130	15,028	15,028
Firms	2,962	2,956	3,003	3,003
Log Pseudo-likelihood	-5216	-5209	-5793	-5788
Pseudo-R^2	0.4680	0.4677	0.4433	0.4438

Table 3.10: Estimates of the Effects of Firm Characteristics on Dividend Yield and Payout.

The dependent variables are (1) dividend yield, defined as dividend per share divided by price, and (2) dividend payout, defined as dividends per share divided by earnings per share. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; share repurchases (*REPODUMMY*), a dummy variable equal to one if a firm has made a stock repurchase, zero otherwise; stock price uninformativess (*UNINFORM*), proxied by log ($R^2/1- R^2$), where R^2s are estimated from yearly market model regressions using monthly data; average abnormal returns (*ABNRET*) measured by averaging the announcement-related cumulative abnormal returns over 2-day periods for all firms in a given year; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*. We remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

	Panel A: Period 1973-2004	Panel B: Period 1973-2004	Panel C: Period 1977-2004	Panel D: Period 1977-2004	Panel E: Period 1977-2004	Panel F: Period 1977-2004
	Dependent= Yield	Dependent= Payout	Dependent= Yield	Dependent= Payout	Dependent= Yield	Dependent= Payout
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	0.04	0.14	0.06	0.54	-10.31	-11.38
	(0.56)	(0.26)	(10.51)***	(9.64)***	(-97.63)***	(-263.9)***
NYP	0.02	0.32	0.00	0.13	-6.39	-0.59
	(6.76)***	(10.58)***	(-0.64)	(3.11)***	(-34.43)***	(-11.37)***
CAPEX	-0.14	-1.37	-0.17	-1.74	-38.96	-9.35
	(-11.61)***	(-14.82)***	(-7.56)***	(-12.22)***	(-20.98)***	(-21.04)***
E/A	0.23	0.88	0.16	0.20	0.89	-2.06
	(8.49)***	(11.43)***	(2.92)***	(1.89)*	(1.44)	(-29.92)***
M/B	-0.01	-0.04	0.00	-0.01	0.56	-0.17
	(-8.72)***	(-7.84)***	(-3.18)***	(-1.45)	(29.46)***	(-8.16)***
FIRMσ	-1.47	-14.38	-2.17	-22.27	-60.70	-61.82
	(-12.44)***	(-17.58)***	(-8.53)***	(-17.83)***	(-14.86)***	(-44.22)***
CASHHOLD	-0.02	-0.16	-0.03	-0.29	-22.09	-0.28
	(-3.48)***	(-3.81)***	(-3.53)***	(-4.11)***	(-14.39)***	(-2.26)**
LEVERAGE	-0.02	-0.23	-0.01	-0.08	1.04	0.62
	(-6.53)***	(-6.94)***	(-2.16)**	(-1.73)*	(4.20)***	(6.44)***
TANGIBILITY	0.03	0.37	0.03	0.38	7.16	1.86
	(11.97)***	(16.99)***	(7.17)***	(11.54)***	(53.98)***	(32.58)***
ROAσ	-0.23	-3.16	-0.11	-1.51	-27.37	-2.17
	(-3.19)***	(-8.06)***	(-0.95)	(-3.20)***	(-7.42)***	(-4.32)***
REPODUMMY	0.00	0.05	0.01	0.04	5.07	-0.27
	(5.64)***	(7.10)***	(3.32)***	(4.21)***	(47.99)***	(-2.51)**
UNINFORM	0.00	0.00	-	-	-	-
	(0.91)	(0.37)	-	-	-	-
ABNRET	-0.72	10.57	-	-	-	-
	(-0.23)	(0.49)	-	-	-	-
ANALSTDEV	-	-	0.02	1.50	-	-
	-	-	(2.62)***	(0.47)	-	-
ANALERROR	-	-	-	-	-0.01	0.01
	-	-	-	-	(-2.99)***	(5.12)***
Firm Years	51,349	51,349	13,959	13,959	14,326	14,326
Firms	9,034	9,034	3,038	3,038	3,026	3,026
Log Pseudo-likelihood	25059	-19897	10467	-4683	-8	-2254
Pseudo-R^2	-1.0393	0.3880	-0.5911	0.4969	0.8328	0.1992

Table 3.11: Estimates of the Effects of Firm Characteristics on Propensity to Pay Dividends (Panel A), on Dividend Yield (Panel B), and on Dividend Payout (Panel C).

The dependent variables are (1) *DIVPAY*, equal to one if a firm pays dividends, zero otherwise (2) dividend yield, defined as dividend per share divided by price, and (3) dividend payout, defined as dividends per share divided by earnings per share. The independent variables include: firm size (*NYP*), defined as the percent of firms that have the same or smaller market capitalization; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; profitability (*E/A*), measured by the ratio of earnings before interests to total assets; growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; firm-specific risk (*FIRMσ*), proxied by the sum of squared residuals from the market model regression using daily data; cash holdings, (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; stock price uninformativess (*UNINFORM*), proxied by log (R^2/1- R^2), where R^2s are estimated from yearly market model regressions using monthly data; average abnormal returns (*ABNRET*) measured by averaging the announcement-related cumulative abnormal returns over 2-day periods for all firms in a given year; cash flow volatility (*ROAσ*), measured by the standard deviation of quarterly ROA measured over three-year rolling windows; share repurchases (*REPODUMMY*), a dummy variable equal to one if a firm has made a stock repurchase, zero otherwise; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). We remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A: Period 1981-2004 Dependent= Divpay Coefficient	Panel B: Period 1981-2004 Dependent= Yield Coefficient	Panel C: Period 1981-2004 Dependent= Payout Coefficient	Panel D: Period 1981-2004 Dependent= Divpay Coefficient	Panel E: Period 1981-2004 Dependent= Yield Coefficient	Panel F: Period 1981-2004 Dependent= Payout Coefficient
INTERCEPT	6.31	-0.22	0.13	4.32	1.13	-0.25
	(2.23)**	(-0.88)	(6.37)**	(2.43)***	(5.37)***	(-0.69)
NYP	2.70	0.37	0.03	2.98	0.06	0.53
	(14.61)****	(10.31)***	(7.55)***	(6.62)***	(3.69)***	(5.21)***
CAPEX	-6.13	-1.49	-0.14	-0.56	-0.01	-0.24
	(-9.76)***	(-12.23)***	(-9.11)***	(-0.39)	(-0.20)	(-0.73)
E/A	2.27	0.77	0.21	1.53	0.43	1.76
	(6.76)***	(9.25)***	(6.92)***	(1.85)*	(4.48)***	(6.40)***
M/B	-0.17	-0.04	-0.01	-0.26	-0.02	-0.11
	(-5.14)***	(-7.07)***	(-7.50)***	(-1.87)*	(-3.23)***	(-3.23)***
FIRMσ	-81.36	-16.23	-1.52	-57.32	-1.71	-15.34
	(-19.05)***	(-17.84)***	(-11.04)***	(-6.05)**	(-4.60)***	(-6.87)***
CASHHOLD	-1.31	-0.17	-0.02	-0.59	-0.02	-0.09
	(-4.99)***	(-3.44)***	(-3.08)***	(-1.04)	(-0.89)	(-0.62)
LEVERAGE	-1.32	-0.24	-0.03	-1.15	-0.05	-0.39
	(-6.54)***	(-6.34)***	(-6.31)***	(-2.10)**	(-2.26)**	(-2.64)***
TANGIBILITY	2.11	0.43	0.04	1.06	0.01	0.18
	(13.86)***	(16.00)***	(10.77)***	(2.81)***	(0.51)	(1.83)*
UNINFORM	0.29	0.03	0.00	-0.03	0.00	-0.05
	(3.29)***	(2.11)**	(2.27)**	(-0.11)	(0.02)	(-0.81)
ABNRET	-175.26	25.10	-4.08	-17.23	-10.29	-41.90
	(-1.46)	(2.33)**	(-4.74)***	(-0.07)	(-2.36)**	(-1.08)
ROAσ	(-12.54)	-3.15	-0.21	-4.91	-0.23	-3.83
	(-6.50)***	(-7.15)***	(-2.94)***	(-1.17)	(-1.43)	(-3.49)***
REPODUMMY	0.43	0.06	0.01	0.40	0.01	0.06
	(8.71)***	(7.00)***	(5.30)***	(2.86)***	(1.59)	(1.81)*
INSTITUTION	-0.70	-0.14	-0.01	-	-	-
	(-4.45)***	(-5.01)***	(-5.15)***	-	-	-
NONBLOCK	-	-	-	-0.37	-0.01	-0.08
	-	-	-	(-1.82)*	(-1.18)	(-1.56)
Firm Years	38,013	34,941	34,941	5,800	5,547	5,547
Firms	7,037	6,960	6,960	1,384	1,365	1,365
Log Pseudo-likelihood	-15350	17719	-12958	-1943	-37	-1537
Pseudo-R^2	0.4012	-0.7880	0.4186	0.4001	0.9630	0.4322

Figure 3.1 (A): Differences in Cash Holdings of Payers and Non-payers.

Cash holdings are measured by the ratios of cash and short-term equivalents to total assets. For each year, average cash holdings for payers and non-payers and the differences between them are calculated (excluding financials and utilities).

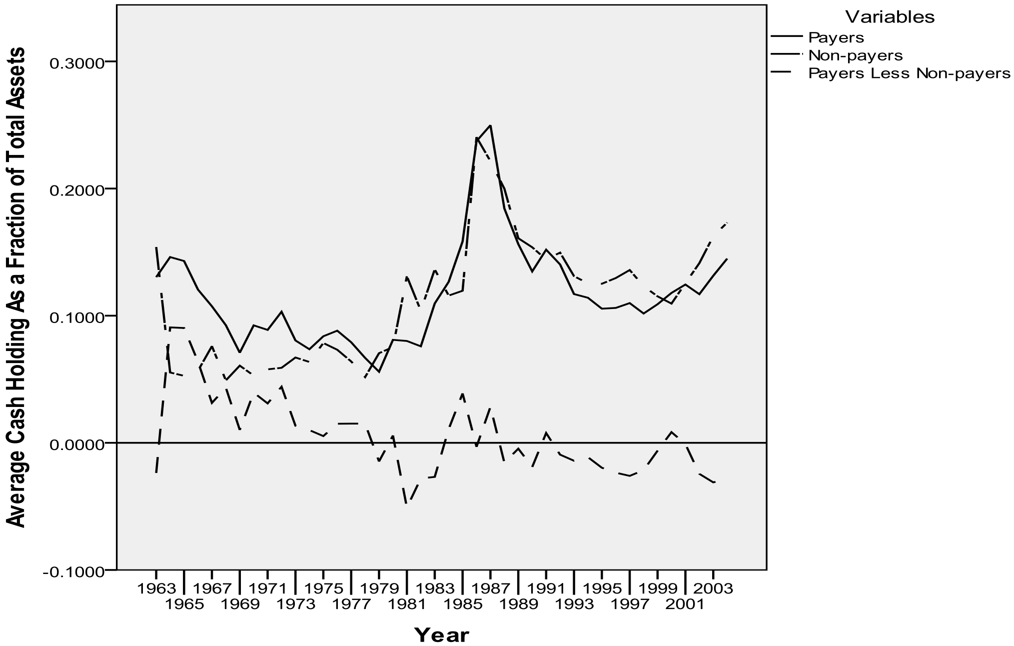


Figure 3.1 (B): Changes in Dividend Status and Changes in Cash Holding.

The changes are calculated as the differences between average cash holdings of firms that pay dividends in year t and those of firms that did not pay dividends in year t-1.

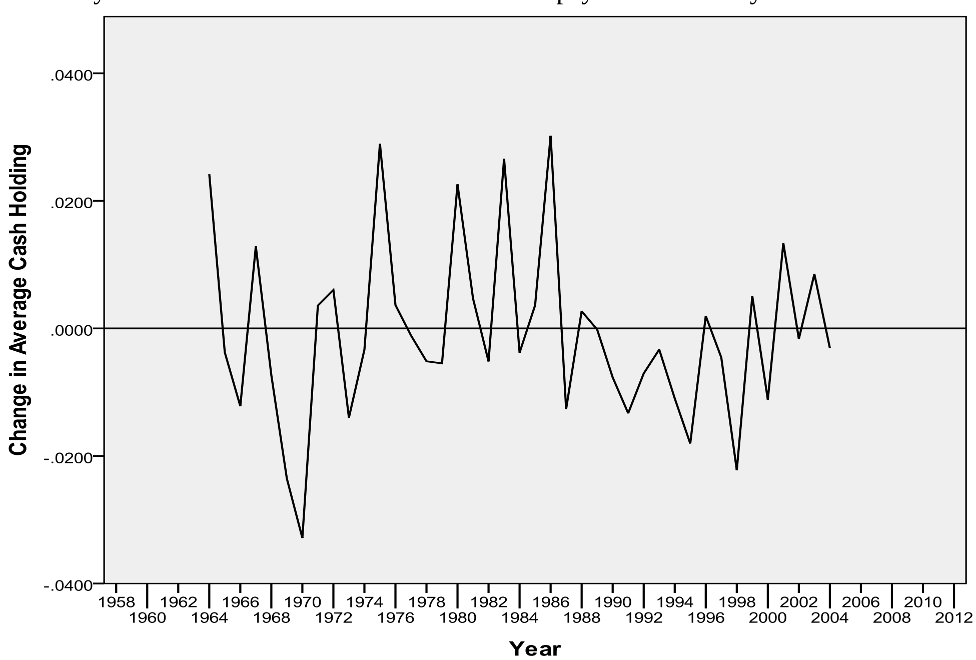


Figure 3.1 (C): Differences in Firm-specific Volatilities of Payers and Non-Payers.

Firm-specific risks are proxied by the standard deviations of residuals from the market model regressions. For each year, average firm-specific risks for payers and non-payers and the differences between them are calculated (excluding financials and utilities).

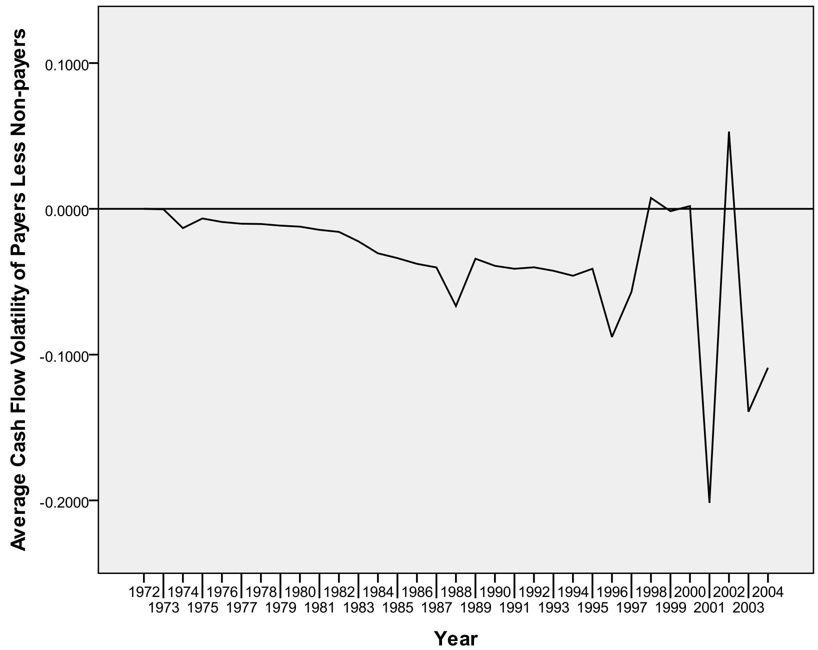


Figure 3.1 (D): Differences in Cash Flow Volatilities of Payers and Non-Payers.

Cash flow volatilities are calculated by the standard deviations of quarterly ROAs measured over three-year rolling windows For each year, average cash flow volatilities for payers and non-payers and the differences between them are calculated (excluding financials and utilities).

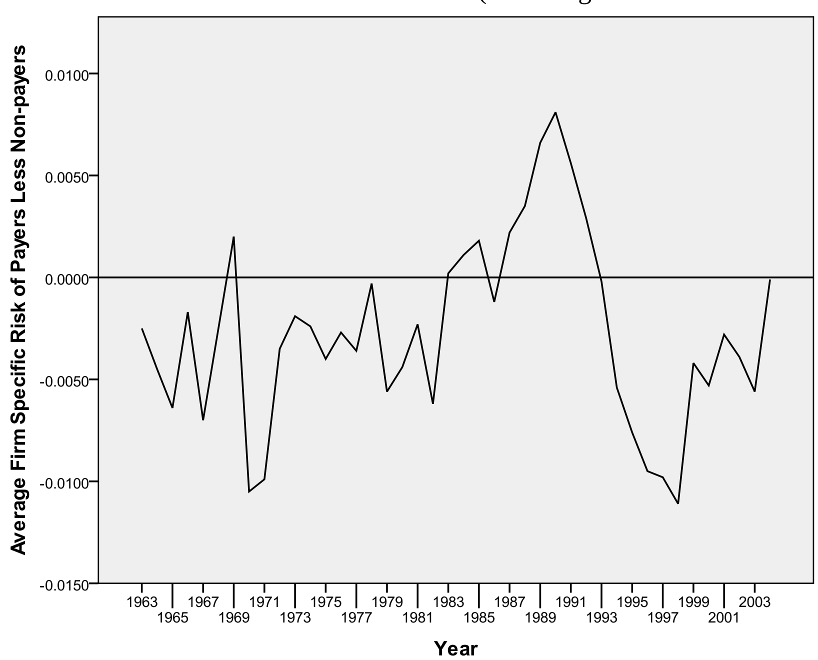


Figure 3.1 (E): Differences in R^2s of Payers and Non-payers.

R^2s are estimated from market model regression. For each year, average R^2s for payers and non-payers and the differences between them are calculated (excluding financials and utilities).

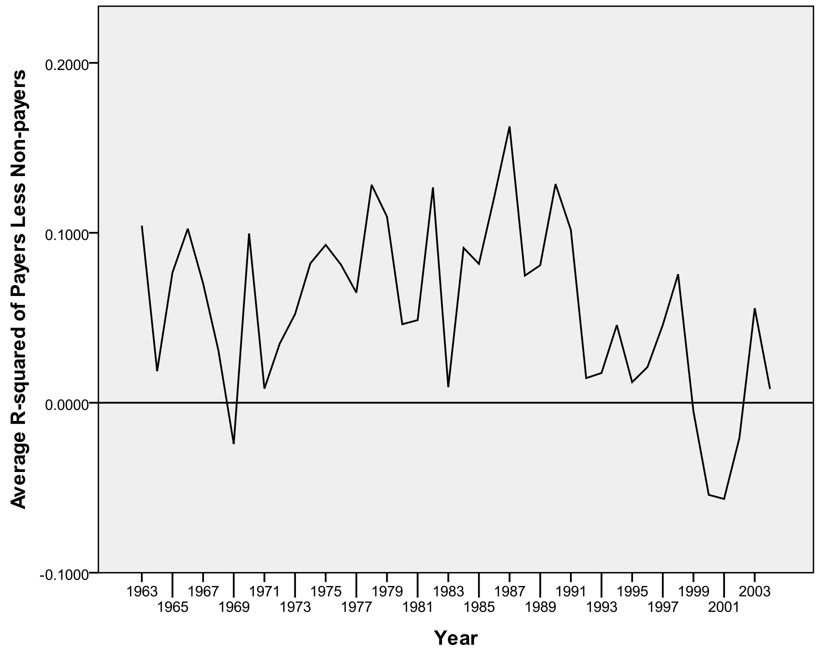


Figure 3.2 (A): Percent of Dividend Payers.

A firm is considered a dividend paying if its dividend payment is greater than zero. For each year, total number of payers are scaled by all firms (excluding financials and utilities).

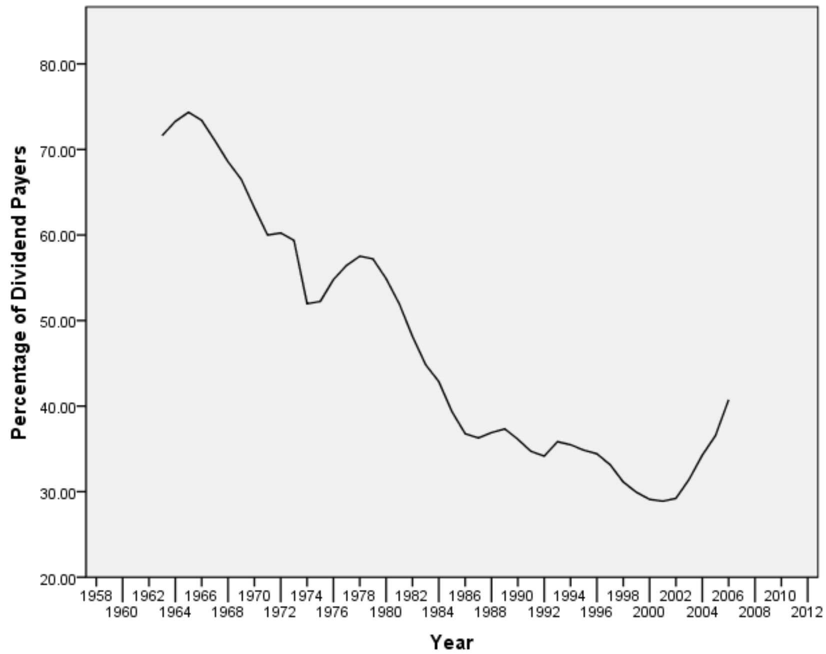


Figure 3.2 (B): Average Asset Tangibility.

Asset tangibility is measured by the ratio of property, plant , and equipment to total assets. For each year, we average these ratios over all firms (excluding financials and utilities).

Figure 3.2 (C): Average ROA Volatility.

For each firm in a given year, ROA volatility is measured by the standard deviation of quarterly ROA over three-year rolling windows. For each year, we average these ratios over all firms (excluding financials and utilities).

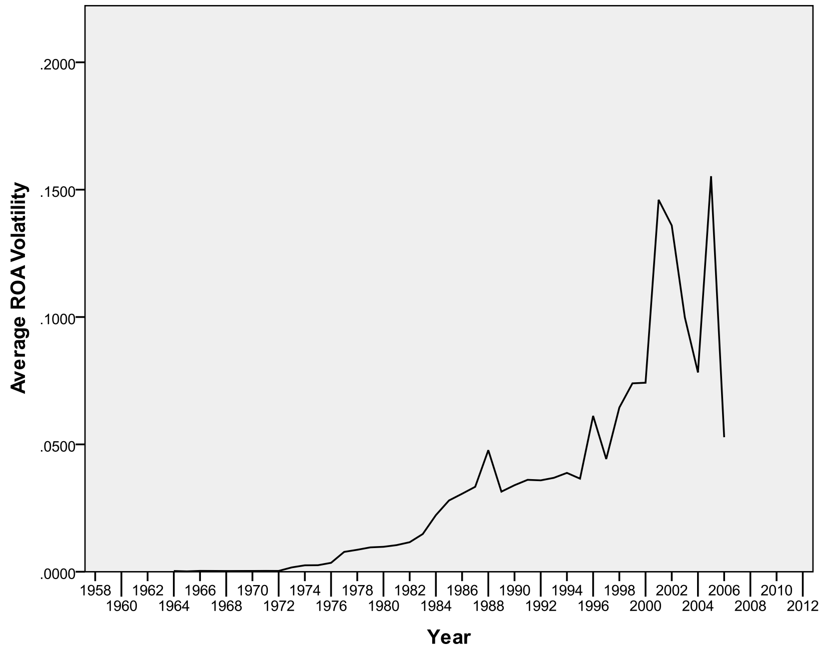


Figure 3.2 (D): Average Firm-specific Volatility.

For each firm in a given year, firm-specific risk is proxied by the sum of squared residuals from the market model regression using daily data. For each year, we average these ratios over all firms (excluding financials and utilities).

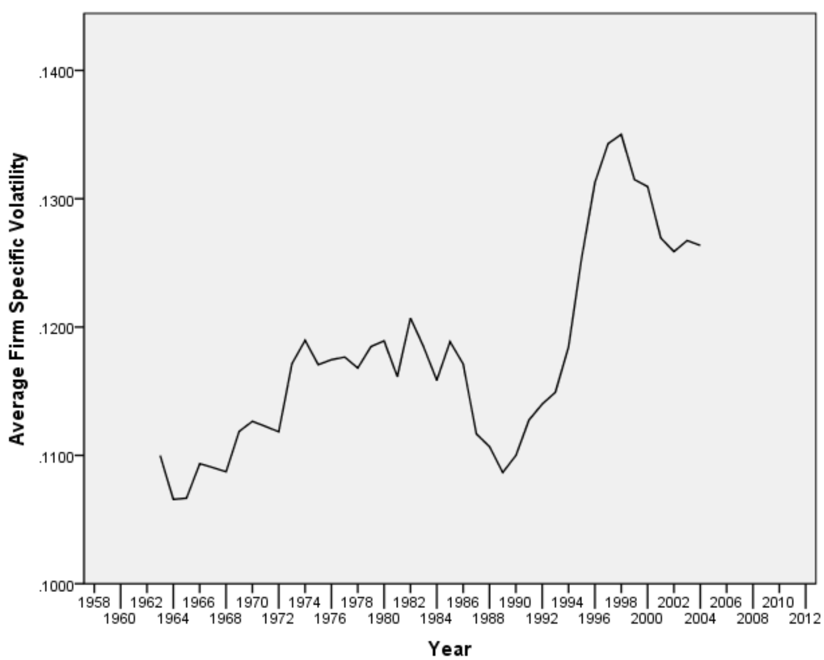


Figure 3.2 (E): Average R^2.

For each firm in a given year, R^2 is estimated from market model regressions using monthly data. For each year, we average these ratios over all firms (excluding financials and utilities).

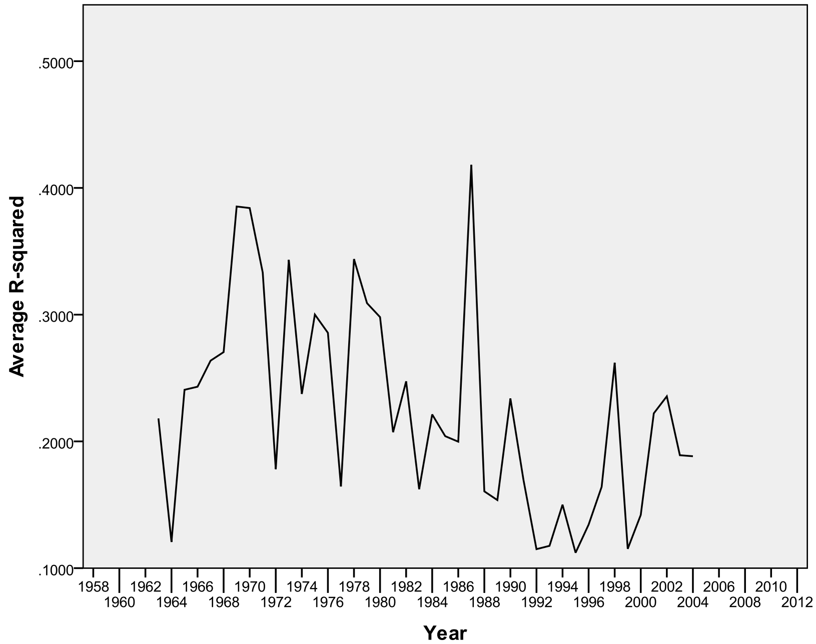


Figure 3.2 (F): Average CAAR.

For each dividend initiation, *EVENTUS* software is used to calculate announcement day abnormal returns based on the market, market-adjusted (using excess returns), and Fama-French models. The 'event period' is defined as days t = 0 and t= l, where t = 0 is the dividend announcement date documented in CRSP. Cumulative Average Abnormal Returns (CAARs) are the averages of cumulative returns over 2-day periods for all firms in a given year. We remove financials and utilities from this sample.

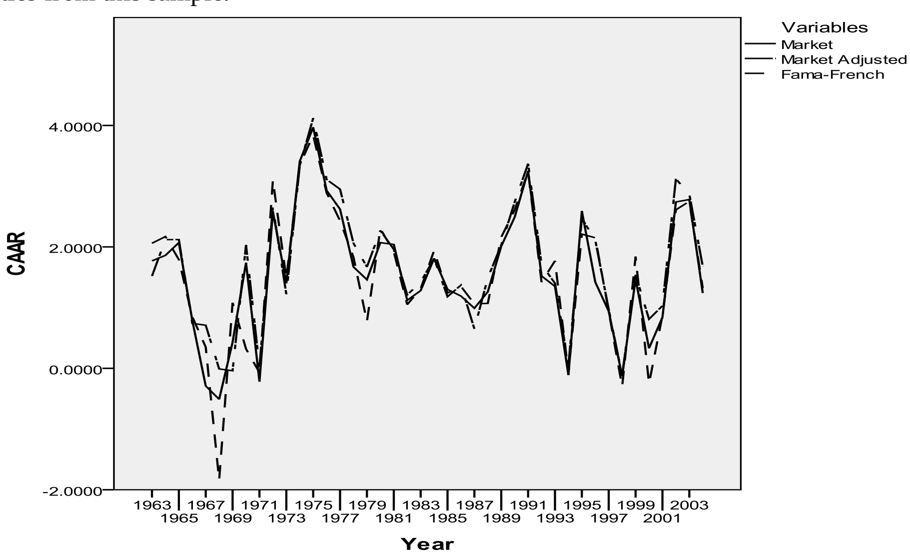


Figure 3.3 (A): Plot of Actual ***and*** Predicted Percents of Payers (FF).

Propensities for 1978-1998 are predicted by using the regression coefficients (β's) of $Pr\ (Payer_{it} = 1) = logit\ (\beta_0 + \beta_1 NYP_{it} + \beta_2\ M/B_{it} + \beta_3\ CAPEX_{it} + \beta_4 E/A_{it} + \delta_{1 \ldots 14}\ YEAR\ INDICATOR_{it} + \varepsilon_{it})$, where δ*'s* are the year dummy coefficients from 1964 to 1977. All variables are defined in Section 3.2. All percentages are measured as in Fama and French (2001).

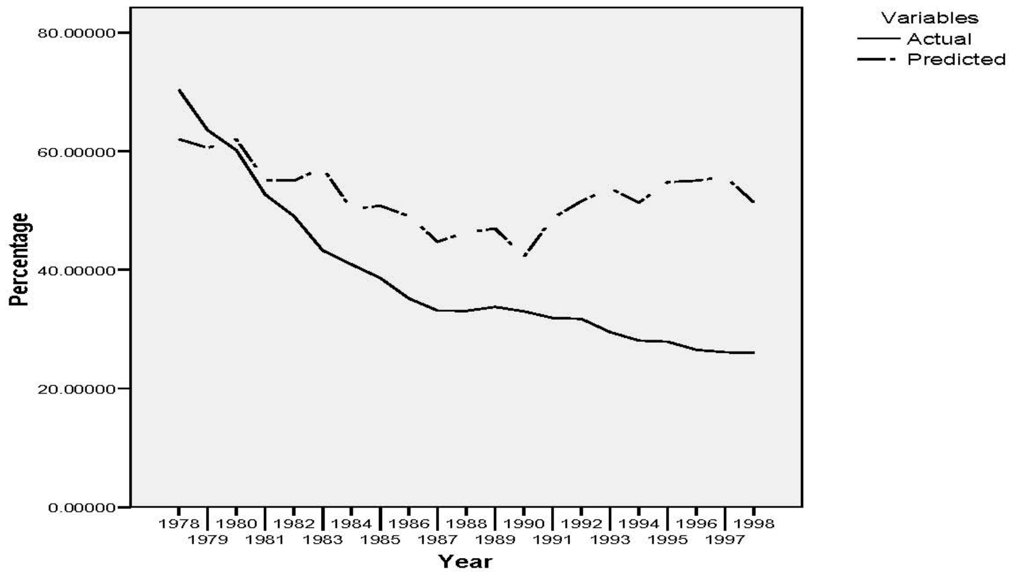


Figure 3.3 (B): Plot of Actual ***Less*** Predicted Percents of Payers (FF).

Solid line represents predictions from panel regression coefficients from 3 (A). Dotted line represents predictions from Fama-MacBeth coefficients.

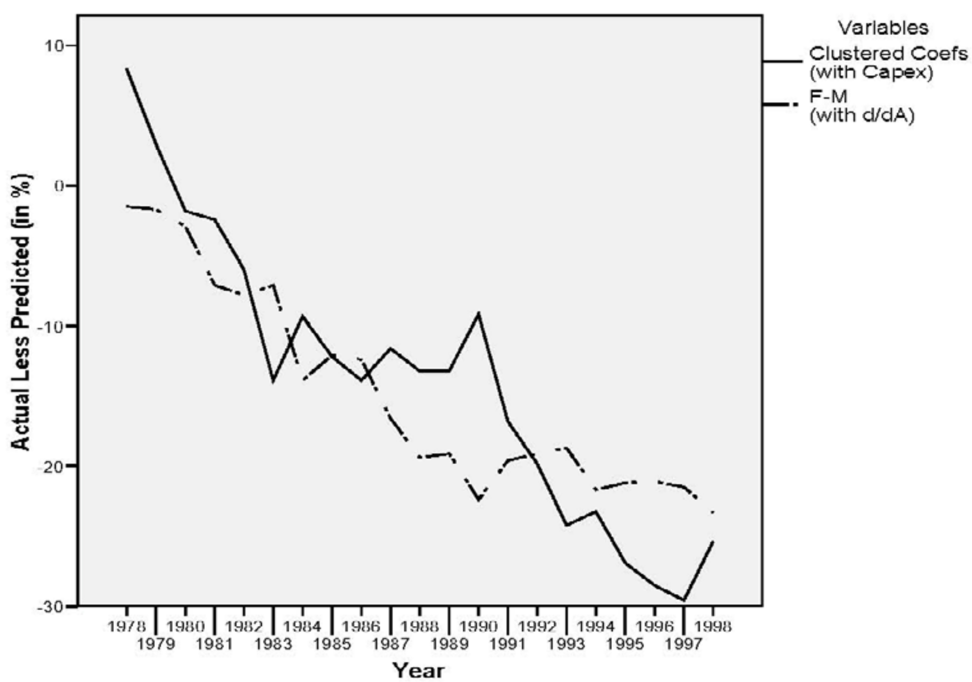
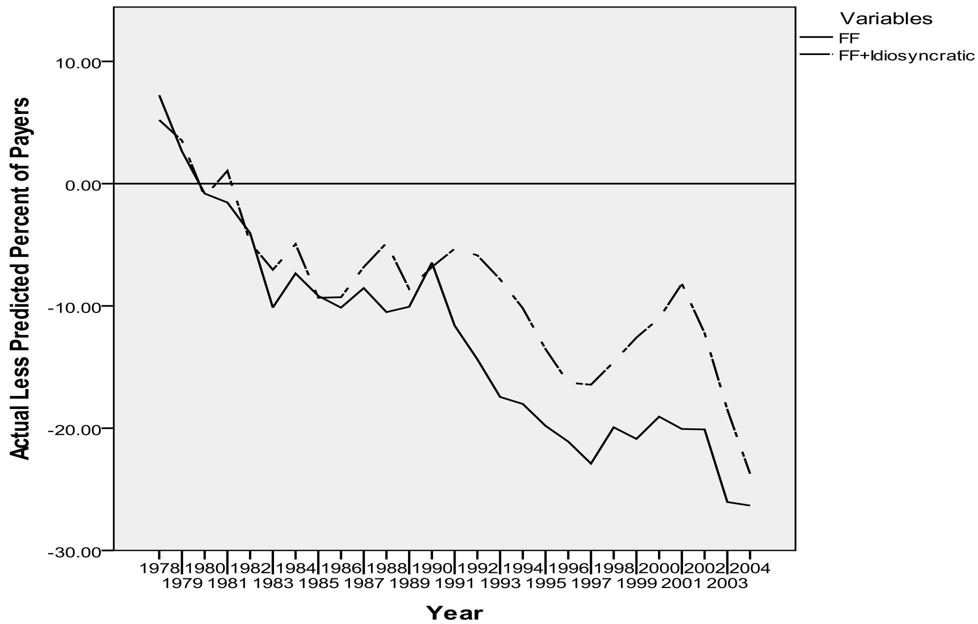


Figure 3.4: Plot of Actual ***and*** Predicted Percents of Payers (FF + Others).

Propensities for 1978-2004 are predicted by using the regression coefficients (β's) of Pr (Payer $_{it}$ = 1) = logit (β_0 + αX_{it} + $\delta_{1 \ldots 14}$ *YEAR INDICATOR* $_{it}$ + ε_{it}), where X's are a set of explanatory variables as defined in Section 3.2 and *δ's* are the year dummy coefficients. In the plots, FF denotes the regression equation with original Fama-French variables of *NYP, M/B, CAPEX*, and *E/A*. We add additional variables to the original FF regression and plot the propensities in Panels A and B for different sample periods. Here *Idiosyncratic* denotes idiosyncratic risk or *Firmσ. Risk Measures* include all proxies of risk except cash flow volatility. All percentages are measured as in Fama and French (2001).

Panel (A). Actual Less Predicted Percent of Payers (Forecasted from 1963-1977 Base Period)



Panel (B). Actual Less Predicted Percent of Payers (Forecasted from 1963-1990 Base Period)

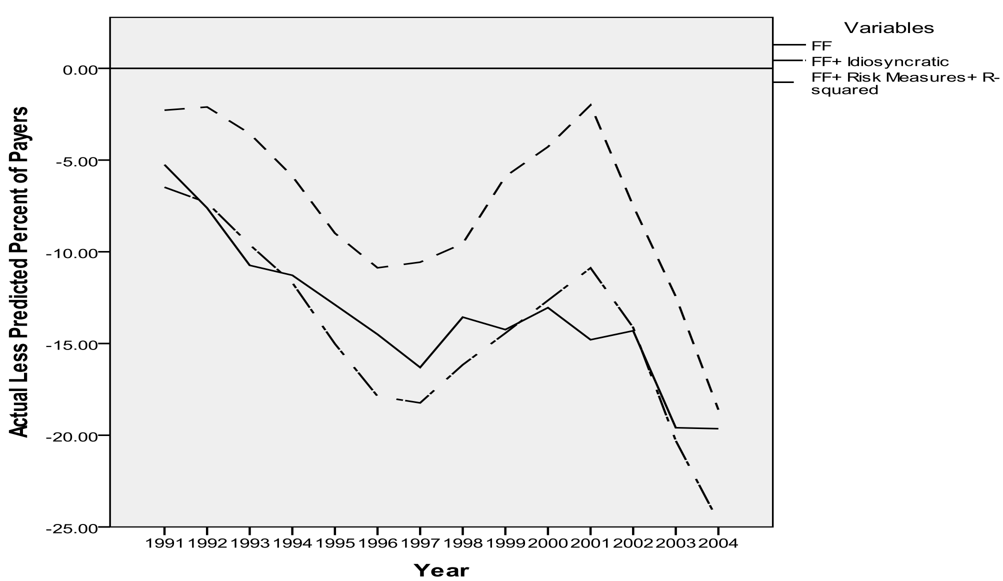
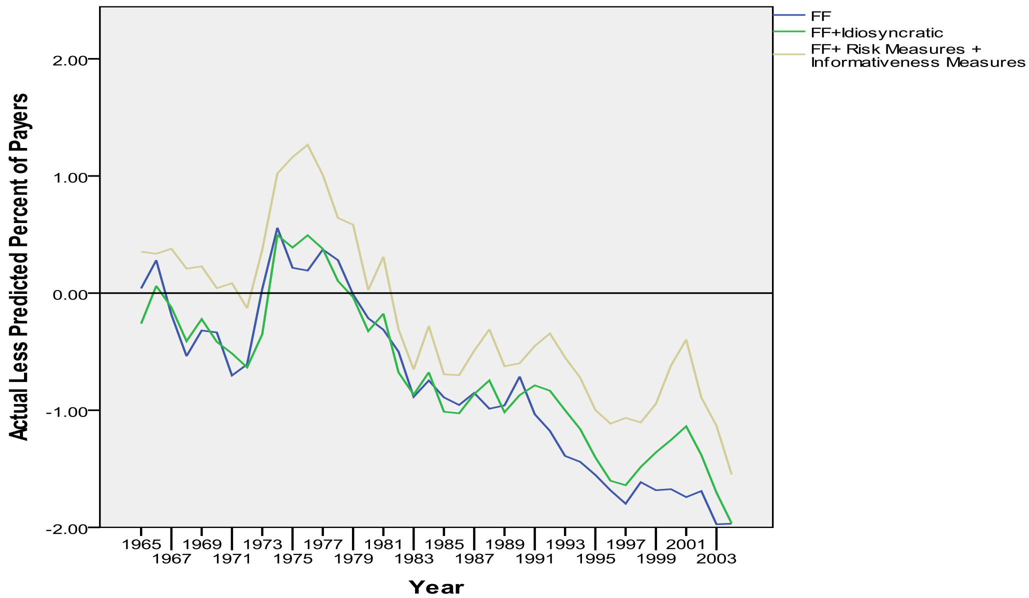


Figure 3.5: Plot of Time Dummy Coefficients from Logit Regressions.

We estimate Pr (Payer $_{it}$ = 1) = *logit* ($\beta_0 + \alpha X_{it} + \delta_{1 \ldots t}$ *YEAR INDICATOR* $_{it} + \varepsilon_{it}$), where *X*'s are a set of explanatory variables as defined in Section 3.2 and *δ's* are the year dummy coefficients. In the plots, FF denotes the regression equation with original Fama-French variables of *NYP, M/B, CAPEX, and E/A*. We add additional variables to the original FF regression and plot the year dummy coefficients (*δ's* from the equations) in Panels A and B for different sample periods. Here *Idiosyncratic* denotes idiosyncratic risk or *Firmσ*. *Risk Measures* include all proxies of risk except cash flow volatility in Panel (A) and include all proxies in Panel (B). *Informativeness measures* include both abnormal returns from dividend announcements and R^2s.

Panel (A). Plot of Time Dummy Coefficients (From 1963-2004)



Panel (B). Plot of Time Dummy Coefficients (From 1975-2004)

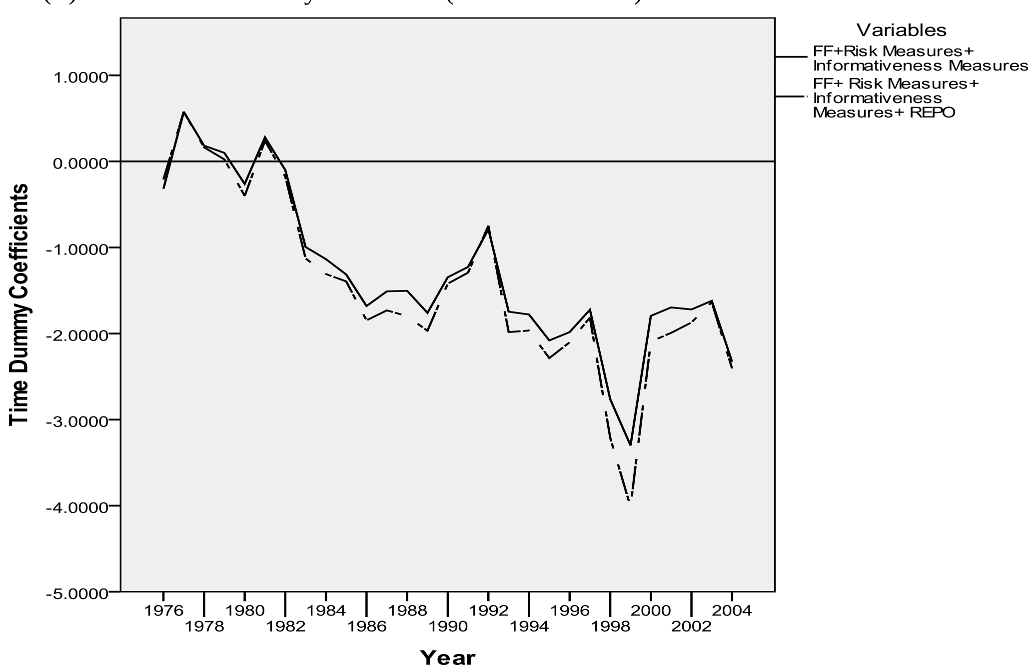
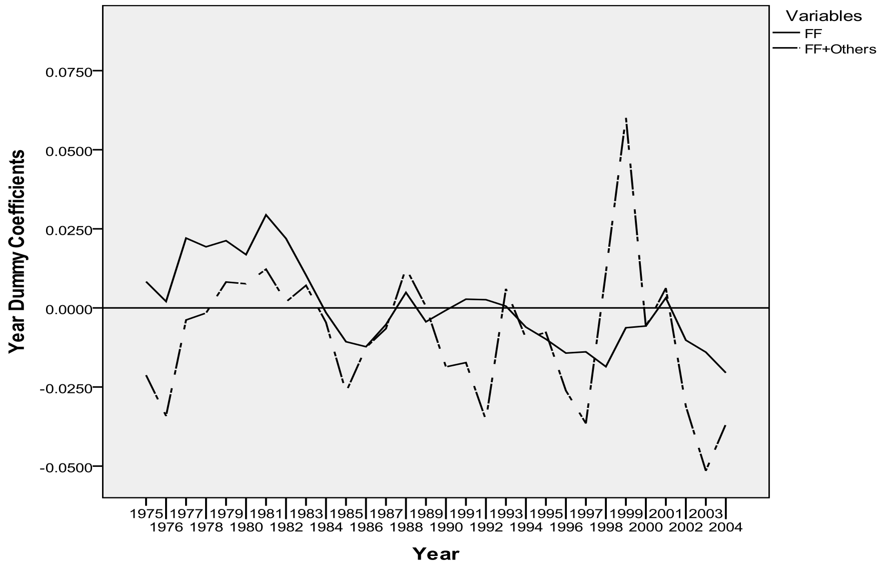


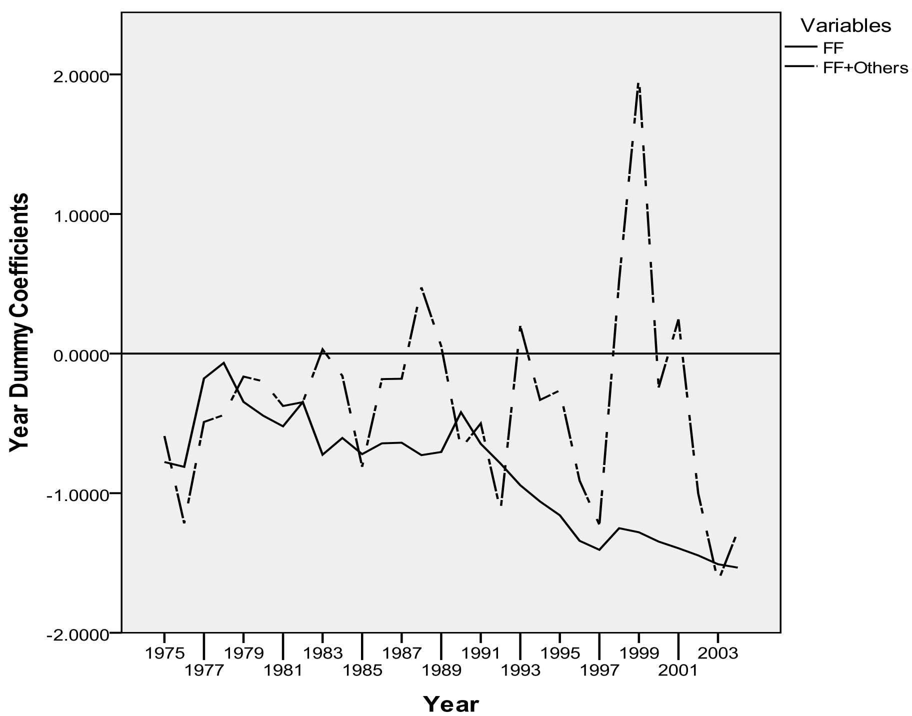
Figure 3.6: Plot of Time Dummy Coefficients from Tobit Regressions.

We estimate *yield / payout* = = *tobit* ($\beta_0 + \alpha X_{it} + \delta_{1 \ldots 31}$ *YEAR INDICATOR* $_{it} + \varepsilon_{it}$), where *X*'s are a set of explanatory variables as defined in Section 3.2 and δ's are the year dummy coefficients. In the plots, FF denotes the regression equation with original Fama-French variables of *NYP,M/B,CAPEX, and E/A*. We add additional variables to the original FF regression and plot the year dummy coefficients (δ's from the equations) in Panels A and B. *Others* denotes all risk and stock price informativeness measures.

Panel (A). Plot of Time Dummy Coefficients for Yield (From 1974-2004)



Panel (B). Plot of Time Dummy Coefficients for Payout (From 1974-2004)



CHAPTER 4

Asymmetric Information, Agency Costs, and Security Issuances and Repurchases in Hot and Cold Markets

4.1 INTRODUCTION

It is now commonly accepted that equity issues are clustered around so-called hot markets. The existing literature provides two major explanations for surging equity issuances in hot markets. Myers and Majluf's (1984) information asymmetry theory suggests that firms issue equity in hot markets to reduce time-varying adverse selection costs. Since managers favor their current investors, as the argument goes, they are more likely to issue equity when their private information suggests issuing equity would benefit current shareholders. In other words, the new shareholders would be buying overvalued shares and wealth transfer takes places from new to old shareholders. Consistent with this, equity issuances are regarded as bad news (see Asquith and Mullins, 1986).[1] On the other hand, as investment opportunities are more abundant in hot markets, investors are more likely to perceive equity issuers as taking advantage of legitimate investment opportunities rather than exploiting new shareholders. Therefore, equity issuances in hot markets are less likely to be met with skepticism from investors and are more likely to have less pronounced negative abnormal announcement returns (see Choe, Masulis, and Nanda, 1993).

[1] This problem would be non-existent if firms were able to access debt markets without impediment.

Contrary to explanations based on asymmetric information theory, a competing theory of behavioral finance argues that managers time markets to exploit misvaluations. The hypothesis of managers exploiting overvaluations has been promoted by authors such as Ritter (1991), and Loughran and Ritter (1995) who argue that firms issue equity when they are overvalued. Graham and Harvey (2001) report survey results indicating that market valuations are very important in firms' decisions to issue equity. Baker and Wurgler (2000, 2002) also suggest that issuing firms attempt to exploit high market- to- book values.[2] In a somewhat different context, Shleifer and Vishny (2003) argue that firms with high market valuation use equity in acquiring less overvalued firms. Exploitations of market misvaluations are not limited to equity issuances but are also applicable to equity repurchases. For instance, Ikenberry, Lakonishok, and Vermaelen (1995) argue that firms repurchase equity when they are undervalued. Their evidence indicates that, following repurchases, firms experience higher stock returns.

While the adverse selection model of Myers and Majluf (1984) was originally aimed at equity issuances, the same argument could be made for debt issuances. Managers are more likely to borrow if their private information suggests that their debts are overvalued; i.e., these debts are more likely to default given current interest rates. In addition, once debt is assumed, managers could substitute existing assets with riskier ones, thereby transferring wealth from debt holders to equity holders (see Jensen and Meckling, 1976). This could lead to credit

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[2] Butler, Cornaggia, Grullon, and Weston (2008) also show that prior market returns have a positive and significant relationship with current period equity issues. However, they use prior six and twelve months' market returns rather than market-to-book ratios. Since market-to-book and previous months' stock returns are highly correlated, we decide to use market-to-book ratios.

rationing as proposed by authors such as Stiglitz and Weiss (1981). Firms might also be reluctant to assume debt as debt overhang could reduce their flexibility in terms of accepting positive net present value projects in future (see Myers, 1977; and Hart and Moore, 1995). Nevertheless, compared to equity issuances, debt issuances are less likely to be plagued by adverse selection costs.

This chapter extends and complements the previous research on security issuances and repurchases by relating them to hot and cold market conditions. As discussed, equity issuances could be attributed either to time-varying adverse selection costs or to market misvaluations. However, the underlying reasons as to why some firms choose to issue debt or repurchase equity in hot markets have been largely unexplored. Similar argument could be made of equity issuances in cold markets: if firms were timing hot markets to reduce adverse selection costs, the reason as to why some firms choose to issue equity in cold markets remains puzzling. The numbers of firms issuing and repurchasing securities in hot and cold equity markets are non-trivial.[3] In supposedly hot equity markets, around 20% of firms issue net debt compared to 23% for net equity.[4] This is surprising given that we could expect to see hot market issuances to be largely dominated by equity. Even in cold equity markets, 17% firms issue net equity. The numbers are interesting for equity repurchases as well. On average, approximately 3% (6%) of firms make net equity repurchases in the supposedly hot (cold) equity markets. In hot (cold) equity markets, among net issuers, the average equity issue size is 96% (89%) of

[3] In this chapter, security issuances and repurchases refer to transactions that result in cash flows to the firms.

[4] These are the arithmetic averages of issue/repurchase percentages over the hot/cold years.

total assets.[5] Equity repurchase sizes are smaller. On average, hot (cold) equity market repurchase size is 13% (12.5%) of total assets. This finding is also interesting since we would expect cold market equity repurchases to dominate hot market equity repurchases.

To a lesser extent, this chapter also relates security issuances under different market conditions to another central idea in corporate finance- agency costs of free cash flows. While market misvaluations and asymmetric information have been explored to some extent in previous studies, agency costs of free cash flows have been largely ignored. After controlling for factors such as investment requirements, market misvaluations and/or asymmetric information, I consider the possibility that firms issuing or repurchasing debt and/or equity are likely to be motivated by agency problems. This argument can be applied to all types of issuances and repurchases, under any market condition. In addition to agency-based explanations, a few alternative explanations can be posited for security issuances and repurchases. For instance, leverage reduction could serve as a plausible motive for equity issuances and/or debt repurchases in both hot and cold markets: firms issuing equity and/or repurchasing debt are more likely to have higher leverage ratios. Closely related to the idea of leverage reduction is the agency cost of debt overhang. Firms facing high levels of debt overhangs are more likely to purchase debt in both hot and markets.

In this chapter, I find that equity issuances in hot markets are conducted by firms that have high information asymmetry problems while equity issuances in cold markets are conducted by firms that have low information asymmetry problems.

[5] For security issue and repurchase sizes, we exclude firms that do not issue or repurchase.

This finding supports the hypothesis that firms might time hot markets to reduce adverse selection costs. Why do firms issue equity in cold markets? I find evidence that firms exploit market valuations when deciding whether to issue/repurchase securities. In general, this finding is applicable not only to equity issuances and repurchases but also to debt issuances and repurchases. Firms issuing equity in cold markets have high market-to-book ratios and low credit ratings. Thus, equity can be considered relatively worth more compared to debt. Except in the case of cold market equity issuances, all other security issuances and could be predicted by capital expenditure requirements: firms with higher capital spending needs are more likely to issue and firms with lower spending needs are less likely to issue. However, firms issuing equity in cold markets have insignificant coefficient of capital expenditure. Combined with the finding that these firms are less profitable firms with high cash, low dividend payouts, and low leverage, I do not find explanation other than high market equity valuations that could have prompted these firms to issue equity in cold markets.

Why do firms issue debt in hot equity markets? Once again, respective security valuations play an important role. Firms issuing debt in hot markets have low equity and high debt valuations. Why do firms repurchase equity in hot markets? Apart from lower capital spending needs, firms repurchasing equity in both hot and cold markets are also motivated by significantly lower market-to-book ratios. One interesting finding is that all issuances in all markets are conducted by less profitable firms. Firms with higher profitability are more likely to repurchase in both markets, and whether they repurchase debt or equity depends on the respective market valuations of debt and equity. I find little evidence of argument for leverage adjustments for firms issuing and repurchasing securities in hot and cold markets. However, I do find evidence that when firms have both low (high) equity and debt valuations, leverage ratios determine which security to issue (repurchase). For instance, firms with high market-to-book, high credit ratings but with high leverage ratios are more likely to issue equity rather than debt.

The remainder of the chapter is organized as follows. Section 4.2 provides data and methodology. Section 4.3 presents the main results, and Section 4.4 concludes.

4.2 DATA & METHODOLOGY

4.2.1 Dependent Variables

I closely follow Bayless and Chaplinsky (1996) in defining hot and cold markets. [6] From Federal Reserve System's *Annual Statistical Digest*, aggregate values of common stock offerings are collected for each month from November 1980 to January 2007.[7] These monthly values are then scaled by the end-of-month aggregate market values of outstanding equity from *Center for Research in Security Prices* (*CRSP*).[8] I use the market rather than the book values as variations in market values of equity could be prompting security issuances and repurchases. The three-month moving averages of scaled issues are then ranked into quartiles. A hot equity month is where the scaled volume of new issues falls into the top quartile while a cold equity month is where the scaled volume of new issues falls

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[6] Our results are mainly robust when we use the alternative dentition of hot and cold markets by using business cycles as in Choe et al..

[7] Federal Reserve Bulletin, New Security Issues of U.S. Corporations.

[8] To calculate the aggregate market values, I multiply each firm's closing share price by the corresponding outstanding shares and aggregate these values over all CRSP firms for each month. In cases where closing prices are not available, bid-ask averages are used.

into the bottom quartile. A hot equity year is defined as a year where there are six or more of hot equity months. I define cold equity years in a similar manner.[9] An alternative definition would be to use consecutive months in a given year. However, most of the hot or cold months are clustered; i.e., they are consecutive in nature. Thus, changing the definition would not materially alter the results. Throughout this chapter, I use the yearly instead of the quarterly data to allow for more variations in logit regressions.[10]

Four main dependent variables used in this chapter are dummy variables for equity and debt issuances in hot and cold markets. Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). When the resulting number is negative, a firm is considered to be conducting repurchases. Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). When the resulting number is negative, a firm is considered to be conducting debt repurchases. A firm is considered to be issuing equity if its net equity issues scaled by its beginning of year assets is 5% or more.[11] Equity repurchases, debt issuances and repurchases are defined in a similar manner.[12] Finally, a firm is considered a hot market equity issuer if it issues equity in hot market, otherwise not. Other dependent dummy variables are

[9] Results for hot and cold year classifications remain similar when we start from 1970 instead of 1980.

[10] For instance, a firm that has issued new equity in a particular quarter of the year is less likely to issue more new equity in that year.

[11] Guedes and Opler (1996) and Hovakimian, Opler, and Titman (2001) define new issues as cash issuances that exceed 5% of assets in a given year. This chapter follows their dentition of security issuances. Unlike Hovakimian et al., we do not exclude firms that issue (repurchase) both debt and equity in a given year.

[12] For repurchases, scaled repurchases must be -5% or lower.

defined similarly. Security issuances and repurchases measured this way exclude non-cash items such as stock payments for mergers. I remove financials and regulated firms (SIC codes 4900-4949, 6000-7000) from the sample.

[Insert Table 4.1 about Here]

4.2.2 Independent Variables

Please see Table 4.1 for a summary of explanatory variables.

Capital Expenditure: After controlling for other characteristics, firms with higher capital expenditure are more likely to raise capital. This could happen under any market condition. However, the question remains as to whether these firms should raise capital in debt or equity markets. Also, *ceteris paribus*, firms with lower capital investment needs should be more likely to repurchase debt and/or equity. Similar to debt and equity issuances, the question remains as to whether firms should repurchase debt or equity. In this chapter, capital expenditure (Compustat data 108) is scaled by previous year's total assets (Compustat data 6). I remove firms with scaled capital expenditure ratios that are negative or above one. Firms with total assets below $500,000 are also removed from the sample. For each year in the sample, the industry median capital expenditure ratios are subtracted from firms' capital expenditure ratios to calculate the industry-adjusted capital expenditure ratios.[13]

Market-to-Book: As mentioned in the preceding paragraphs, current research suggests that firms issue equities when their market- to- book ratios are relatively high and repurchase them when their market- to- book ratios are relatively low.

[13] Industry median ratios are calculated by using Fama and French (1997) 48 industries.

This argument is applicable not only to hot markets but also to cold markets repurchases. There are two plausible explanations for this phenomenon. First, market-to-book could proxy over/under-valuations and firms issue/repurchase equity accordingly. Second, market-to-book could proxy legitimate growth opportunities. If market-to-book were to proxy legitimate growth opportunities, firms with higher market-to-book ratios would need additional capital for future investment, causing them to raise additional capital. Lower market-to-book ratios would cause them to repurchase. However, it is unclear whether firms with high growth opportunities should issue/repurchase equity or debt. One side of argument is that growth firms should borrow less since high levels of debt may hinder their ability to undertake positive net present value projects. This is in line with debt overhang argument. On the other hand, since these companies have high investment requirements and low cash flows, internal financing is not likely to be sufficient to meet the cash flow needs. Since internal financing is not sufficient, these companies will borrow at a higher level. This is in line with pecking order argument: firms would issue debt before they issue equity. Thus, regardless of the rationale, higher market-to-book ratios would result in firms raising additional capital, and lower market-to-book ratios would result in firms repurchasing, although issuances and repurchases could be driven by either growth or valuation concerns.

If market- to- book were to proxy investment opportunities, it could pick up effects not captured by capital expenditure. If it were to proxy market misvaluations, it would capture the market timing effect as advocated by Baker and Wurgler (2002). Finally, firms with high market-to-book could also be issuing equity to avoid problems associated with debt overhang (in the sense of Shyam-Sunder and Myers, 1999). I exclude firms with market values that are negative or are arbitrarily close to zero. I also exclude all firms that have book values below $250,000. Market- to- book is calculated as in Fama and French (2001). For each year in the sample, the industry median market-to-book ratios are subtracted from firms' market-to-book ratios to calculate the industry-adjusted ratios.

Debt Overhang: While debt overhang prevents managers from funding bad projects, it also prevents managers from funding good projects.[14] *Ex-post*, when the leverage is high, positive net present value projects can go unfunded because of debt overhang created by prior debt financing. *Ex ante*, firms might be reluctant to raise much debt in the first place. However, there are also benefits associated with debt overhang. Jensen (1986) and Stulz (1990) argue that overhang could benefit shareholders of low-growth firms because debt limits managerial discretion over free cash flows. Thus, debt could also mitigate agency problems by preventing self-interested managers from funding bad projects (see Hart and Moore, 1995). Similar to this line of argument, Malmendier and Tate (2005) also argue that debt overhang could benefit shareholders by constraining overconfident CEOs from funding bad projects.

This chapter proposes that firms with high levels of debt could repurchase debt to reduce cost of debt overhang. I use the current level of leverage as proxy for debt

[14] This is a classic example of under-investment in the sense of Myers (1977).

overhang.[15] All else equal, firms with high current leverage levels are more likely to repurchase debt and/or issue equity. The reverse is true for firms with low current leverage levels. The literature provides little guidance on what is considered a 'high' level of debt that might cause overhang problems. As this chapter does not intend to encroach upon existing studies of debt-equity tradeoff and agency costs of debt overhang, I control for these effects by simply using current leverage ratios as a proxy variable. In this chapter, leverage is defined as long-term debt (Compustat data 9) scaled by total assets (Compustat data 6). I remove leverage ratios that are negative or above one. For each year in the sample, the industry median leverage ratios are subtracted from firms' leverage ratios to calculate the industry-adjusted ratios.

Information Asymmetry: From theory, firms that have high asymmetric information should issue equity in hot markets since adverse selection costs associated with information asymmetry are reduced during hot markets. For instance, Korajczk, Lucas and McDonald's (1990) model predicts that information asymmetries will lead to the clustering of seasoned equity offerings.[16] Consistent with this, prior research by Bayless and Chaplinsky (1996) and Choe et al. also suggest that periods of high information asymmetry are associated with lower seasoned equity issue volume. This chapter uses two sets of measures for information asymmetry.[17] Size and asset tangibility proxy the first set of measure of information asymmetry. Bigger firms are more likely to receive press and

[15] It is understandable that firms have different debt capacities. Nevertheless, all else equal, firms with already high debt ratios are less likely to take on additional debt.
[16] Ritter and Welch (2002) extend this analysis to include initial public offerings.
[17] We use two separate sets of measures since availability of analyst data are limited in *IBES*.

analyst coverage, and are therefore less likely to possess information asymmetry problems. From investors' standpoint, tangible asset values are easier to be determined. Therefore, firms with higher levels of asset tangibility are less likely to be plagued by information asymmetry problems (see Barth, Kasznik, and McNichols, 2000). The second set of measure involves use of *Institutional Brokers' Estimate System* (*IBES*) data. For each firm, analysts' earnings forecasts, actual earnings, and the standard deviation of forecasts are obtained from *IBES* summary files. Standard deviation of forecasts represents the dispersion among analysts about a consensus estimate of the forecast. Since disagreement among analysts is an indication of the lack of available information about the firm, the higher standard deviation implies higher asymmetry (see Bhagat and Thompson, 1985, Blackwell and Kidwell, 1988, and Dierkens, 1991). Standard deviation of analysts' forecasts has been used as a proxy of information asymmetry by authors such as Krishnaswami and Subramaniam (1999) and Lowry (2003). For each year, I only include the end-of-year mean forecasts and standard deviation of forecasts.[18] Average standard deviation of forecasts in the last month of a particular year is used as proxy of information asymmetry for the following year. I remove observations that have standard deviations above one. Out of over 20,000 observations, lose fewer than 100 observations are lost due to these procedures.

The forecast error is the absolute value of actual less mean forecast reported in the last month of the year. Firms with larger levels of information asymmetry between the managers and the outside market about their cash flows and value are

[18] Firms that do not report December forecasts are removed from the sample.

expected to have higher forecast errors. As Krishnaswami and Subramaniam (1999) points out, forecast errors could also be affected by earnings volatility in addition to information asymmetry problems. Thus, I normalize the forecast errors by cash flow volatility. Cash flow volatility is defined as the standard deviation of quarterly earnings (as defined by earnings before extraordinary items scaled by total assets) over three-year rolling windows. I remove firms that do not have 12 full observations (three consecutive years with four quarters of observations in every year) for calculating cash flow volatilities. Similar to dispersion of analysts' forecasts, the normalized forecast errors at time t are used as proxies of information asymmetry for time t+1. Values of normalized forecast errors range from zero to multiples of hundred.[19] I remove observations that are above the 99th percentile.

Agency Costs: Just as we in the case of information asymmetry, two sets of measures are used as proxies of agency costs. The first set includes cash holdings and dividend yield. Firms that have excessive cash levels and low dividend yields/payouts are expected to suffer from high agency costs of free cash flows. Dividend yield and cash holdings in general are interesting. The agency theory of dividend policy suggests that dividends serve as a mechanism for reducing agency costs (see Jensen and Meckling, 1976, Easterbrook, 1984, and La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000). Jensen and Meckling (1976) argue that managers of publicly-held firms can allocate abundant resources to activities that enhance their private benefits. In other words, an excessive amount of free cash in

[19] We observe very few firms with forecast errors above 100. The average normalized forecast error value is approximately 20.

a firm may result in non-essential expenses ranging from managerial perks to unjustifiable acquisitions and expansions. Grossman and Hart (1980), Easterbrook (1984), and Jensen (1986) suggest that the adverse effect of excessive cash in managers' control can be minimized by distributing free cash flows in the form of dividend payments to shareholders. Thus, dividend payouts may increase firm value by reducing over-investment.[20] In particular, the agency theory posits that by distributing resources in the form of dividends, internally generated cash flows become less sufficient to satisfy the needs of the firm. These needs could be legitimate investment needs, empire-building desires of the management, or managerial perk consumption. Regardless, regular dividend payouts force firms to constantly return to capital markets to raise additional funds for their investment needs, and thereby they become subject to strict monitoring by outside stakeholders. In summary, dividends serve dual purposes of reducing agency costs of free cash flows and revealing inside information to outsiders in order to secure new funding. Therefore, firms with high cash holdings are low dividend yields could be suffering from high agency problems.

Although we are inclined to argue that, all else equal, firms with high agency costs of cash flows are more likely to issue equity or debt, and are less likely to repurchase them, whether these firms would issue or repurchase is not clear-cut. For instance, suppose a firm with high cash holdings and low dividend payments issue securities. We could argue that that particular firm is suffering from agency problems and, as a result, it issues securities to further engage in non-productive activities. Suppose the same firm conducts security repurchases. We could again

[20] See Lang and Litzenberger (1989) for empirical evidence.

argue that that particular firm has high agency problems and thus it is attempting to reduce the free cash flows by conducting repurchases. In this chapter, cash is defined as cash and short-term equivalent (Compustat data 1) scaled by total assets. Firms with cash ratios that are negative or above one are removed from the sample. Dividend yield is defined as dividend per share (Compustat data 26) scaled by price (Compustat data 199). I also remove firms with negative dividend yields. Dividend yields are winsorized at 100% of prices.

Profitability: There are two opposing predictions of profitability on security issuances. Profitable firms could have fewer needs to issue additional capital as they could have more retained earnings. Thus, profitability would negatively impact security issuances. On the other hand, current profitability also implies that these firms could have more investment opportunities in future. Thus, they might need to raise additional capital under favorable market conditions for future investments. Since profitable firms face higher marginal tax rates and have more ability to service debt payments, they could assume higher levels of debts. Agency-based theories also predict that more profitable firms should hold more debt to prevent managers from investing free cash flows in negative net present value projects. On the other hand, if profitable firms were indeed firms with high growth opportunities, we could hypothesize that they are more likely to issue equity rather than debt. Empirical evidence suggests that profitability has negative impact on leverage (see Shyam-Sunder and Myers, 1999; Rajan and Zingales, 1995; and Titman and Wessels, 1988). Profitability is defined as operating income before depreciation (Compustat data 13) scaled by assets.

Credit Ratings: Graham and Harvey (2001) find that maintaining financial flexibility and good credit ratings are the two most important factors firms consider when deciding to issue additional debt. This chapter's hypothesis is that, all else equal, firms with better credit ratings are more likely to issue debt since its cost of debt is cheaper; the reverse is true for firms with lower credit ratings. Issuer credit rating (Compustat data 280), which measures the senior long-term debt obligations, is readily available in Compustat database starting from 1985. Since our sample runs from 1980 to 2006, we would need to make out-of-sample forecasts for the missing years (1980 to 1984). Following the methodology and variables used by Blume, Lim, and Mackinlay (1998) and Gray, Mirkovic, and Ragunathan (2005), I predict the investment-grade credit rating model as

$$Pr\ (INVDUMMY_{it} = 1) = probit(\beta_0 + \beta_1 CAPINT_{it} + \beta_2 LEVERAGE_{it} + \beta_3 INTCOV_{it} + \beta_4 ROA_{it} + \beta_5 SIZE_{it} + \beta_6 FIRM\sigma_{it} + \beta_7 FIRM\beta_{it} + \beta_8 LOSS_{it} + \beta_9 SUBORD_{it} + \delta_{1\ldots21} YEAR\ INDICATOR_{it} + \varepsilon_{it}) \quad (4.1)$$

where *INVDUMMY* is the investment-grade dummy, a value of one for firms with investment-grade credit rating, zero otherwise, and δ's are the year dummies from 1986 to 2006. I use three-year averages of the financial ratios– except in cases of dummy variables- in the model using data from 1983-2006. *LEVERAGE* is the total debt (Compustat data 9 + Compustat data 34) divided by total assets. I remove firms with leverages that are negative or higher than one. *ROA* is the return on assets, defined as the net income before extraordinary items (Compustat data 18) divided by total assets. *ROA* is winsorized at 100% of total assets. *LOSS* is a dummy variable assigned one if the net income before extraordinary items is negative in the current fiscal year, zero otherwise. *SIZE* is the natural log of total assets. *SUBORD* is a dummy variable that takes on the value of one if a firm has subordinated debt (Compustat data 80), zero otherwise. *CAPINT* is the capital intensity, measured by gross property, plant, and equipment (Compustat data 7) divided by total assets. I remove firms with capital intensity ratios that are negative or above one. Following Blume et al., I also use the beta coefficients and idiosyncratic risk (sum of squared residuals from the market model using monthly data). *INTCOV* is the interest coverage, or operating income before depreciation (Compustat data 13) divided by interest expense (Compustat data 15). The three-year average of interest coverages that exceed 100 is set to 100 and negative coverages are set to zero. Using the coefficients from Equation 4.1, I make out-of-sample forecasts for propensities to receive investment-grade ratings for 1980-1984. From the imputed propensities, I assign investment-grade dummies to sample firms. Firms with imputed propensities of 0.5 or above are assigned investment-grade dummies of one.

Institutional Holdings & Block Ownership: Firms with high levels of institutional ownerships should possess lower information asymmetry problems as institutions are generally better informed than individual investors (see Allen, Bernardo, and Welch, 2000 and Rubin and Smith, 2007). Institutional ownerships could also serve as a monitoring mechanism (see Chung and Zhang, 2007). Thus, the effect of institutional holding on security issuances in hot and cold markets is unclear. If institutional holdings were to proxy asymmetric information, we would expect that firms with high institutional holdings are less likely to time hot equity markets. To the best of my knowledge, no theory exists as to whether firms with high agency problems should time security market conditions although it is possible that managers want to take advantage of high market valuations to raise funds to invest in pet projects. Therefore, one explanation is that firms with supposedly lower agency problems- high institutional holdings in this case- are less likely to time equity markets as their security issuances should be mainly determined by investment needs. Institutional holdings data are collected from Thomson Financial database which provides information from institutional 13F SEC filings. The data is available from 1980. Institutional holdings are calculated as the year-end aggregate institutional stock holdings (for each firm) scaled by its total outstanding shares. I remove all observations that have ratios of above one. I then match the institutional-holding data with other variables from CRSP and Compustat databases.

For this chapter, a non-controlling blockholder is defined as an ownership that exceeds 24.99% but is less than 50%. Blockholders have the incentive and the means to closely monitor the firms' management and, as a result, their presence is expected to reduce the agency problems and free cash flows arising thereof (see Shleifer and Vishny, 1986; and Grossman and Hart, 1988). This argument is similar to the argument for institutional ownership. I collect the block ownership data from Bureau van Dijk- Osiris. The database reports 'independence' levels for a range of U.S. and non-U.S. publicly-listed corporations. Controlling blockholders have the incentive to expropriate resources from minority shareholders (see Fama and Jensen, 1983). Thus, I only consider the effect of non-controlling blockholders in this study. The absence of a blockholder is defined as lack of a recorded shareholder with an ownership over 24.99%. The hypothesis is that firms without blockholders are more likely to time the markets. I also consider other proxies of agency costs such insider holdings and managerial compensation. However, insider holding and executive compensation data are available only from 1992, and the coverage is not comprehensive even in the years reported. As a result, inclusion of these data would leave out a substantial number of hot market periods in the 1980s. Therefore, I decide not to include them. Finally, I estimate

$$Pr\ (Issuer/repurchaser_{it} = 1) = logit\ (\beta_0 + \alpha X_{it} + \varepsilon_{it}) \tag{4.2}$$

where the dependent variable is a dummy variable that takes on the value of one if a firm issues (repurchases) at time t, zero otherwise. *X*'s are a set of explanatory variables as defined earlier. Where applicable, we use standard errors that are robust to clustering.[21]

4.3 FINDINGS

[Insert Figures 4.1 & 4.2 about Here]

[Insert Table 4.2 about Here]

Figure 4.1 plots the yearly scaled issues from 1980 to 2006.[22] In general, most of the hot markets occur in the 1980s and 1990s, and most of the cold markets occur in the early 2000s.[23] Most of the hot equity markets occur when the yearly issues of equities exceed 2% of the outstanding market equity, and most cold markets occur when the yearly issues of equities fall below 1%. Table 4.2 reports the hot

[21] These are White standard errors adjusted to account for possible correlation within a cluster (also known as Rogers standard errors). Our results are similar when we use standard errors that are robust to heteroscedasticity.

[22] To derive the yearly numbers, I aggregate the fractions of equity issues for each month over the 12-month periods. Thus, the aggregated numbers represent the total percentages of security issues and repurchases in a given year. Alternatively, we could also scale the yearly total issues and repurchases by end-of-year values of outstanding equity.

[23] This chapter's classification of hot and cold years remains similar when yearly aggregate data are used.

and cold year classifications and the numbers of firms issuing and repurchasing securities. Figure 4.2 plots the time trend of the fractions of equity- and debt-issuing firms from 1980 to 2006. From a visual inspection of Figure 4.2 (A) and (B), we could see that equity issuances, debt issuances, and debt repurchases show little time trend. On the other hand, we see that number of firms repurchasing equity have been steadily growing over the past two decades. This is consistent with Grullon and Michaely (2002) who argue that firms have been increasingly repurchasing equities from 1980-2000 period. We could also see that debt and equity issuances move in opposite directions for most of the sample period: i.e., peaks in equity issuances are accompanied by troughs in debt issuances, and vice versa. The same could be said of debt and equity repurchases. One interesting finding is that both debt and equity issuances simultaneously reached a trough in 2001, the first year of the post-2000 cold market period.

[Insert Figures 4.3 & 4.4 about Here]

Figure 4.3 depicts the time trend of average net debt and net equity issues scaled by average total assets. Figure 4.4 depicts the time trend of aggregate net debt and net equity issues scaled by aggregate total assets. Both average and aggregate security issues fluctuate greatly over the years. However, from Figure 4.4, it is evident that the aggregate net issues of equity have taken a sharp downward trend in the post-2000 period. In the post-2000 period, aggregate repurchases greatly exceed aggregate issues: firms are conducting net equity repurchases in this period. Figure 4.5 depicts the time trend of average capital expenditure for different types of issuers and repurchasers. We see that equity issuers on average have the highest average capital expenditure ratios. Figure 4.6 depicts the time trend of average market- to- book ratios for different types of issuers and repurchasers. For most of the sample period, equity issuers have the highest average market-to-book ratios while equity repurchasers have the lowest market-to-book ratios.

[Insert Figures 4.5 & 4.6 about Here]

4.3.1 Equity Issuances in Hot & Cold Markets

The coefficient of market- to- book is significantly positive for both hot and cold equity market equity issuances. This finding could be interpreted in two different ways. From behavioral standpoint, it could be argued that firms issue equity to take advantage of relatively higher market valuations, regardless of the market condition. On the other hand, market-to-book could proxy legitimate growth opportunities. Thus, these firms could be issuing equity to meet legitimate investment needs. However, coefficients of market-to-book ratios are not as economically significant as we would expect them to be. Changing market-to-book ratio by one standard deviation increases the propensity to issue by less than 1% in both hot and cold markets. Consistent with rational explanation, I also find that firms with higher capital expenditure are more likely to issue equity in hot markets. However, the coefficient of capital expenditure is insignificant for cold market issuances. The marginal effects of capital expenditure are similar to those of market-to-book ratios (less than 1%). However, we do see that moving from the lowest to highest capital expenditure ratio shifts the probability of being an issuer upward by more than 40% in hot equity markets. However, this number is less than 2% for cold market equity issuers. Firms with significantly higher cash holdings and lower dividend yields are also more likely to issue equity in both hot and cold equity markets. This finding is surprising given that firms with high cash holdings and low dividend payouts- typical of firms with high agency problems- would have less need to issue additional securities.[24] Increasing the dividend yield by one standard deviation decreases the probability of being an issuer by 25% (27%) in hot (cold) equity markets. This finding somewhat refutes the argument that firms might issue equity now to later pay out the proceeds as dividends.

Another interesting finding is that firms issuing equity under both hot and cold market conditions are less profitable; both their coefficients are negatively significant. If profitable firms were to have lower leverage, this finding indirectly supports previous empirical findings that profitable firms are less likely to issue debt (and issue equity in our case). In general, characteristics of firms issuing equity in cold markets are puzzling. These firms are currently less profitable and do not have high capital spending.[25] Why do unprofitable firms with low leverage, high cash holdings, low payouts, and insignificant capital spending issue in cold equity markets? The evidence provides two conciliatory findings- high equity valuations and low credit ratings. Firms issuing equity in cold markets have significantly lower negative coefficient for investment-grade dummy, the chapter's proxy for access to cheap debt financing. Thus, we could argue that firms issue equity in cold markets as they do not have access to cheap debt financing. This finding stands in sharp contrast with firms issuing equity in hot

[24] The counter argument is that firms that have high cash and low dividend payments are the typical cash-constrained firms.

[25] If market- to- book were to proxy future investment opportunities, these firms arguably have high future investment opportunities.

markets where I find that firms with higher credit ratings are more likely to issue equity in hot markets.

Finally, I consider the argument that firms time the market to reduce adverse selection costs associated with high information asymmetry. If this argument were true, firms that possess higher information asymmetry problems would be more likely to time the market after controlling for investment opportunities. This chapter finds that firms issuing equity in hot markets are less capital-intensive and smaller, supporting the hypothesis that firms with higher information asymmetry are more likely to take advantage of more favorable conditions in hot equity markets. This chapter's second measure of information asymmetry, dispersion of analysts' forecasts and normalized forecast errors, also supports this finding. Firms with higher dispersion of analysts' forecasts and higher forecast errors are more likely time hot equity markets. If firms were to issue equity in hot markets to reduce adverse selection costs associated with asymmetric information, we could hypothesize that firms issuing equity in cold markets should possess less severe asymmetric information. From size and tangibility, we find contradictory evidence that firms issuing equity in cold markets might have lower information asymmetry problems compared to those issuing equity in hot markets. While the coefficient of sizes is significantly positive, the coefficient of capital intensity is significantly negative. The chapter's measure of information asymmetry with analysts' data provides more promising results: the coefficients of the dispersion of analysts' forecasts and forecast errors are significantly negative at 5% and 1% levels respectively, indicating that lower information asymmetry could predict equity issuances in cold markets. The marginal effects of analysts' forecast dispersions and forecast errors are small nonetheless. Tables 4.3 and 4.4 report the results for equity issuances in hot and cold markets.

Before proceeding to the next section, a few clarifications should be made. Asymmetric information predicts that firms should issue debt before issuing equity, and when issuing equity, these firms should time hot equity markets. We have seen that firms with high information asymmetry are more likely to issue equity in hot markets. This finding still does not explain why these firms would rather time the hot market and issue equity rather than issue debt altogether since, for both hot and cold equity markets, the first choice for firms should be to issue debt. For hot market equity issuances, higher market-to-book ratios serve as a partial explanation. Even in this case, the explanation is not fully convincing as we see that firms with higher credit ratings are also more likely to issue equity. Why would firms with both high equity and debt valuations choose to issue equity in hot markets? Significantly higher coefficient of leverage provides a rather conciliatory explanation. All in all, firms with high information asymmetry, higher equity valuations, lower profitability, higher growth, and higher leverage ratios are more likely to issue equity in hot equity conditions even if they have high credit ratings. On the other hand, the cold market equity issuances are easier to comprehend: these firms have significantly higher equity valuations and significantly lower credit ratings.

[Insert Tables 4.3 & 4.4 about Here]

4.3.2 Debt Issuances in Hot & Cold Markets

Existing stylized facts suggest that firms should issue equity in hot markets and issue debt in cold markets. Therefore, the behavior of firms issuing debt in hot markets is puzzling. In the previous section, we have seen that market valuations of equity play an important role in firms' decision to issue equity, regardless of the market condition. Findings with debt issuances are similar. This chapter finds that firms' with higher credit ratings and lower market-to-book ratios are more likely to issue debt in hot equity markets. For instance, changing a firm's credit rating from non-investment to investment-grade increases the probability of being a debt issuer by 5% in hot markets and 4% in cold markets. This evidence lends support to the argument that firms' market valuations play a very important role in not only equity issuances but also in debt issuances: firms might be tempted to issue debt rather than equity if their debt valuations are high enough.

Firms with higher credit ratings are also more likely to issue debt in cold markets, although the coefficient of market-to-book ratio is insignificant in predicting cold market debt issuances. The finding with capital expenditure is also consistent with rational explanation: capital expenditure is significantly positive in predicting both hot and cold market debt issuances. The capital expenditure also has very high economic significance. Changing the capital expenditure from lowest to highest level increases the probability of issuing debt in hot markets by almost 82%. In general, the characteristics of hot market debt issuers have higher economic significances compared to those of firms issuing equity in both markets.

In the previous section, we have seen that firms with high information asymmetry are more likely to issue equity in hot markets. On average, significantly smaller and less capitally-intensive firms are more likely to issue debt in hot markets. This finding resembles that of hot market equity issuances: if tangibility and size were to correctly proxy information asymmetry, we could argue that market timing is not only applicable to equity issuances but also to debt issuances. Our alternative measures of information asymmetry- dispersion of analysts' forecast and normalized forecast errors- are insignificant. Similar to cold market *equity* issuances, cold market *debt* issuances are also more likely to be conducted by bigger firms with less tangible assets, providing us with inconclusive support for information asymmetry-based argument for cold market debt issuances. Coefficient on analysts' forecast dispersions and normalized forecast errors are more supportive of information asymmetry story: firms with lower information are more likely to issue debt in cold equity markets.

I do not find support of leverage adjustment or debt overhang argument as firms with higher leverage ratios are also more likely to issue debt in both hot and cold markets. Given that current credit ratings are also controlled for, we could argue that these firms are unlikely to be suffering from debt overhang problems. Similar to firms issuing equity, I find that profitability is negatively significant in predicting cold market debt issuances. However, profitable firms are more likely to issue debt in hot markets. Therefore, the argument that profitable firms should assume higher levels of debt seems applicable only to hot market conditions. I also find that firms with lower cash holdings are more likely to issue debt in both hot and cold markets. On the other hand, the coefficient of dividend yield is insignificant for both hot and cold market debt issuances. All in all, only market-to-book ratios, credit ratings, and capital expenditure have been consistent in predicting cold market debt issuances. Tables 4.5 and 4.6 report the results for debt issuances in hot and cold markets.

Thus far, I have presented a few robust findings to contend with. Respective equity and debt valuations- as proxied by market-to-book ratios and credit ratings- play an important role in predicting whether firms issue equity or debt in hot and cold markets. Firms with higher capital expenditure are also more likely to issue securities regardless of the market conditions. I also find robust evidence (at least for equity issuances) that firms with higher information asymmetry are more likely to time hot markets while firms with lower information asymmetry are more likely to time the cold markets. I find little evidence that firms' leverage ratios could predict firms' decisions to issue debt or equity in hot and cold markets. The next section discusses why firms might time market conditions to repurchase securities.

[Insert Tables 4.5 & 4.6 about Here]

4.3.3 Equity Repurchases in Hot & Cold Markets

Similar to debt issuances in hot equity markets, equity repurchases in hot equity markets are also puzzling. From the evidence we have found thus far, it could be expected that firms repurchasing equity are likely to have lower capital expenditure and lower market-to-book ratios. Capital expenditure prediction is consistent: firms with lower capital expenditure are more likely to repurchase in both hot and cold markets. If firms were to issue equity in hot and cold markets to take advantage of higher market values, it could be expected that they would also conduct equity repurchases to take advantage of lower market valuations. I find that firms with low market-to-book ratios and higher credit ratings are more likely to conduct equity repurchases in hot markets. If equity and debt are trade-offs, this finding would explain the choice between debt and equity repurchases. Firms with perceivably lower equity valuations would tend to repurchase equity, and the same is true of debt repurchases.

While the coefficient of tangibility is significantly positive, the coefficient of size is insignificant for hot market equity repurchases. The coefficients of analysts' forecast dispersions and forecast errors are insignificant. Thus, unlike equity issuances, little evidence is found regarding the role of information asymmetry in hot market equity repurchases. The coefficient of leverage is also insignificant in predicting equity repurchases in hot markets. While the coefficient of profitability is significantly negative for equity issuances in both hot and cold markets, it is significantly positive for equity repurchases in both hot and cold markets. Firms repurchasing equity in hot markets also have significantly positive coefficients for cash and dividend yield (10% level). Thus, in combination with the findings of market-to-book and capital expenditure, we could infer that firms repurchasing equity in hot markets are firms with high cash, high yield, low market-to-book, and low capital spending needs.

Similar to hot market equity repurchases, firms with significantly lower capital expenditures are also more likely to repurchase equity in cold markets. Inconsistent with our previous findings, I find that the coefficient of market-to-book is significantly positive for repurchasers of equity in cold markets. Now the question arises as to why would firms with high-market-to-book repurchase equity in cold markets. First, firms repurchasing equity in cold markets also have high credit ratings. Thus, high debt valuations could have prompted firms to repurchase equity instead of debt. Readers might argue that firms with higher credit ratings, in addition to lower market-to-book rations, are also more likely to repurchase in hot markets. Second, coefficient of leverage is significantly negative (10% level) for firms repurchasing equity in cold markets while it is insignificant for hot market equity repurchases. Thus, we could provide some evidence of lower leverage ratios (and higher credit ratings) prompting firms to repurchase equity despite high equity valuations. In addition, we also see that firms with significantly higher cash and lower dividend payouts (as opposed to higher cash and higher payouts in hot market equity repurchases) are more likely to repurchase equity in cold markets.

While the coefficient of size is significantly positive, the coefficient of capital intensity is insignificant. Analysts' forecast errors and dispersion of forecasts are more consistent with information asymmetry hypothesis; firms repurchasing equity in cold markets are conducted by firms with lower information asymmetry problems. For most of the hot and cold market equity repurchases, the marginal effects are small except for profitability. Changing a firm's profitability from lowest to highest level increases the probability of being a repurchaser in hot (cold) market by 84% (98%) respectively. Tables 4.7 and 4.8 report the results for equity repurchases in hot and cold markets.

[Insert Tables 4.7 and 4.8 about Here]

4.3.4 Debt Repurchases in Hot & Cold Markets

To the best of my knowledge, no prior research provides guidance on how equity market conditions might affect debt repurchases. If firms were to repurchase equity due to lower equity valuations, we would expect firms to repurchase debt due to lower credit ratings and/or higher equity valuations, regardless of the market condition. I find evidence supporting both of these claims. Firms repurchasing debt in both hot and cold markets have high market-to-book ratios and lower credit ratings. Therefore, one plausible explanation we could provide is that firms repurchase debt to improve their credit ratings and/or to reduce the high cost of debt resulting from lower credit ratings. Just as in case of firms repurchasing equity, the coefficient of capital expenditure is significantly negative for debt repurchases in both hot and cold markets. Leverage coefficient is insignificant for hot market debt repurchases while it is significantly negative for cold market debt repurchases. Thus, we do not find evidence of overhang argument that firms with relatively higher leverage are more like to repurchase debt. Rather, the evidence indicates the opposite.

Debt repurchases in both hot and cold markets have insignificant dividend yield coefficients and significantly negative coefficients for cash. Thus, we do not find evidence of higher cash holdings prompting debt repurchases. Rather, evidence suggests otherwise. In general, just like equity repurchases, both hot and cold market debt repurchases are conducted by profitable firms. We also see sharp contrast in coefficients of size for hot and cold market debt repurchases: firms repurchasing in hot markets are significantly smaller while firms repurchasing in cold markets are significantly bigger. Tangibility is significantly positive in predicting debt repurchases in both markets. Thus, there's no conclusive evidence on the nature of asymmetric information for debt repurchases. Dispersion of analysts'' forecasts and normalized forecast errors are significantly positive in predicting hot market equity repurchases while they are insignificant in predicting cold market debt repurchases. Similar to findings with equity repurchases, the marginal effects are small most of the hot and cold market debt repurchases, except for profitability. Changing a firm's profitability from lowest to highest level increases the probability of being a repurchaser in hot (cold) market by 27% (32%) respectively. Tables 4.9 and 4.10 report the results for debt repurchases in hot and cold markets.

[Insert Tables 4.9 & 4.10 about Here]

4.3.5 Effects of Institutional Holdings and Presence of Blockholders

Columns D-E of Table 4.3-4.10 report the effect of institutional holdings and presence of blockholders on propensity to issue securities in hot and cold markets. The coefficients of institutional holdings are significantly negative in predicting hot market equity issuances. This finding is consistent with the argument that firms with higher institutional holdings might have lower information asymmetry and thus are less likely to time the hot equity markets. The sign reverses for the cold market equity issuances: firms with higher institutional holdings are more likely to issue equity in cold markets. One standard deviation increase in institutional holding decreases the probability of being an issuer by 1.5% in hot markets. The effect of institutional holding on being an equity issuer is less than 1%

in cold markets. In summary, the coefficients of institutional holdings are very consistent with the hypothesis that firms with high information asymmetry (low institutional holdings) are more likely to time favourable equity market conditions to issue. Except for debt issuances in hot markets where it is marginally significant, the coefficient of blockholder dummy is insignificant for all other security issues and repurchases.

4.3.6 Robustness

Thus far, I have estimated the motivations for security issuances and repurchases by using separate logit regressions for *each* scenario of debt and equity issuances and repurchases in hot and cold markets. A more traditional capital structure decision model might be to estimate the propensity to issue debt or equity by regressing the binary dependent variables on a set of characteristics.[26] While this chapter's setup allows us to precisely estimate a particular capital structure decision of interest- e.g., motivations for equity issuances in cold markets- it also leaves out the more complex nature of capital structure decisions. For instance, a firm may issue/repurchase both equity and debt in the same year. In addition, logit regressions fail to capture the effects of debt and equity issuances and repurchases that are significantly more or less than the +5% and -5% thresholds. Thus, I re-estimate the coefficients with *Ordinary Least Squares* (*OLS*) models. Here, the dependent variables are scaled net equity and scaled net debt issues as defined earlier. For this estimation, I remove all observations that have scaled net issue ratios below -1 or above 1 (-/+ 100% of total assets). Thus, we have an

[26] For instance, the dependent variable could be one for equity issuer and zero for debt issuer.

approximately normal distribution of changes in equity and debt values.[27] The disadvantage of this approach is that I could not separate out the issuances and repurchases. I also could not determine whether a particular issue occurs during a hot or a cold market.

To address the concern that firms that issue or repurchase equity/debt might also simultaneously issue or repurchase debt/equity, I include the scaled net debt (equity) issues (*SNETDEBT* and *SNETEQUITY*) as control variables while estimating scaled net equity (debt) issues with the *OLS*. I also include dummy variables for hot and cold years (*HOT* and *COLD*). To test the role information asymmetry plays in hot and cold market security issuances and repurchases, I interact the proxies of information asymmetry with hot and cold year dummies. In the regression models, I interact size, asset tangibility, standard deviation of analysts' forecasts, and analysts' forecast errors with hot and cold year dummies (*SIZE*HOT, SIZE*COLD, TANGIBILITY*HOT, TANGIBILITY*COLD, ANALSTDEV*HOT, ANALSTDEV*COLD, ANALERROR*HOT, ANALERROR*COLD*). Table 4.11 reports the results.

In general, the *OLS* estimates closely resemble those of logit estimates. Higher market-to-book and higher capital expenditure spending increase equity issues. While the coefficient of investment-grade dummy is insignificant for equity issues, it is highly significant for debt issues. I also do not find support for leverage adjustments: the coefficients of leverage are significantly negative (positive) for equity (debt) issues. The coefficients of hot (cold) year dummies are significantly

[27] Unlike that of logit estimations, the dependent variable here is neither *Issue* nor *Repurchase* since the net issues can either be positive or negative. In addition, the distributions are mostly right-skewed: i.e., issues outweigh repurchases.

positive (negative) for equity issues while they are insignificant for debt issues. This finding is also consistent with the findings from original logit estimates that market timing is mainly a phenomenon for equity issuers.

The interaction term *SIZE*HOT (SIZE*COLD)* is negatively (positively) significant. Thus, conditional on being in a hot (cold) year, smaller firms issue more (less) equity. The coefficients of *TANGIBILITY*HOT* and *TANGIBILITY*COLD* are also consistent: conditional on being in a hot (cold) year, firms with less tangible assets issue more (less) equity. These findings support the logit predictions that firms with higher information asymmetries are more likely to time hot equity markets. On the other hand, I do not find consistent evidence that information asymmetry plays an important role in debt issues. In addition, the interaction terms between hot and cold years and analysts' forecasts data are not supportive of signaling hypothesis.

4.4 CONCLUDING REMARKS

Overwhelming evidence in recent corporate finance research indicates that firms time market conditions when deciding to issue equity. This chapter provides explanation for this market timing behavior. Findings suggest that both market valuations and investment needs are important determinants of security issuances and repurchases. In particular, firms are more likely to issue securities when their investment needs are high, and repurchase them when their investment needs are low. Information asymmetry and credit ratings also play important roles in firms' decisions regarding when and whether to issue equity or debt. Firms with higher information asymmetry are more likely to time hot equity markets to issue equity while firms with lower information asymmetry are more likely to issue or repurchase equity in cold markets. As suggested by theory, evidence of market timing is weak for debt issuances.

Taken together, cold market equity issuances and repurchases are puzzling. First, firms issuing equity in cold markets are not motivated by capital spending needs. Rather, higher market-to-book seems to motivate these issues. I also find that cold market equity repurchases are conducted by firms with higher market-to-book ratios but with low capital spending needs. These findings contradict each other. If we were to argue that firms with low capital spending needs issue equity in cold markets to take advantage of higher market valuation, significantly higher coefficients of market-to-book ratios of firms repurchasing in cold equity markets contradict this argument. Thus, cold market equity issuances and repurchases cannot be explained in terms of market valuations and capital spending only. Rather, they also need to be considered in the context of other variables such as respective credit ratings, cash holdings, and dividend yields. Results also indicate that institutions serve as a mechanism to reduce asymmetric information between firms and outsiders. However, little evidence is found regarding the role of blockholders.

BIBLIOGRAPHY

Allen, F., Bernardo, A., Welch, I., 2000. A theory of dividends based on tax clienteles. Journal of Finance 55, 2499–2536.

Asquith, P., Mullins, D., 1986. Equity issues and offering dilution. Journal of Financial Economics 15, 61–89.

Baker, M., Wurgler, J., 2000. The equity share in new issues and aggregate stock returns. Journal of Finance 55, 2219-2257

Baker, M., Wurgler, J., 2002. Market timing and capital structure. Journal of Finance 57, 1–32.

Barth, M., Kasznik, R., McNichols, M., 2000. Analyst coverage and intangible assets. Unpublished working paper. Stanford University.

Bayless, M., Chaplinsky, S., 1996. Is there a window of opportunity for seasoned equity issuance? Journal of Finance 50, 253-278.

Bhagat, S., Marr, M., Thompson, R., 1985. The rule 415 experiment: equity markets. Journal of Finance 40, 1385-1401.

Blackwell, D., Kidwell, D., 1988. An investigation of cost differences between public sales and private placements of debt. Journal of Financial Economics 22, 253-278.

Blume, M., Lim, F., Mackinlay, C., 1998. The declining credit quality of U.S. corporate debt: myth or reality? Journal of Finance 53, 1389 – 1413.

Butler, A., Cornaggia, J., Grullon, G., Weston, J., 2008. Equity Issues and Returns: Managerial Timing, Reaction, or Both? Unpublished working paper. University of Texas at Dallas and Rice University.

Choe, H., Masulis, R., Nanda, V., 1993. Common stock offerings across the business cycle. Journal of Empirical Finance 1, 1-29.

Chung, K., Zhang, H., 2007. Corporate governance and institutional ownership. Journal of Financial and Quantitative Analysis. Forthcoming.

Dierkens, N., 1991. Information asymmetry and equity issues. Journal of Financial and Quantitative Analysis 26, 181-199.

Easterbrook, F., 1984. Two agency cost explanations for dividends. American Economic Review 74, 650–659.

Fama, E., French, K., 1997. Industry costs of equity. Journal of Financial Economics 43. 153-194.

Fama, F., French, K., 2001. Disappearing dividends: changing firm characteristics or lower propensity to pay? Journal of Financial Economics 60, 3–44.

Fama, E., Jensen, M., 1983. Separation of ownership and control. Journal of Law and Economics 26, 301-325.

Graham, J., Harvey, C., 2001. The theory and practice of corporate finance: evidence from the field. Journal of Financial Economics 60, 187–243.

Gray, S., Mirkovic, A., Ragunathan, V., 2005. The determinants of credit ratings: Australian evidence. Unpublished working paper. University of Queensland.

Grossman, S., Hart., O., 1980. Takeover bids, the free-rider problem, and the theory of the corporation. Bell Journal of Economics 11, 42-64.

Grossman, S., Hart, O., 1988. One share one vote and the market for corporate control. Journal of Financial Economics 20, 175-202.

Grullon, G., Michaely, R., 2002. Dividends, shares repurchases, and the substitution hypothesis. Journal of Finance 57, 1649-1684.

Guedes, J., Opler, T., 1996. The determinants of the maturity of corporate debt issues. Journal of Finance 51, 1809-1833.

Hart, O., Moore, J., 1995. Debt and seniority: an analysis of the role of hard claims in constraining management. American Economic Review 85, 567-585.

Hovakimian, A., Opler, T., Titman, S., 2001. Debt-equity choice. Journal of Financial and Quantitative Analysis 36, 1-24.

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

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-329.

Jensen, M., Meckling, W., 1976. Theory of the firm: managerial behaviour, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Korajczyk, R., Lucas, D., McDonald, R., 1990. Understanding stock price behavior around the time of equity issues. In Hubbard, R. (Ed.), Asymmetric Information, Corporate Finance, and Investments. University of Chicago Press, Chicago, Ill.

Krishnaswami, S., & Subramaniam, V., 1999. Information asymmetry, valuation, and corporate spin-off decision. Journal of Financial Economics 53, 73–112.

Lang, H., Litzenberger, R., 1989. Dividend announcements: cash flow signaling versus free cash flow hypothesis? Journal of Financial Economics 24, 181-192.

La Porta, R., Lopez-de-Silanes, F., Shleifer, F., Vishny, R., 2000. Investor protection and corporate governance. Journal of Financial Economics 58, 3-27.

Loughran, T, Ritter, J., 1995. The new issue puzzle. Journal of Finance 50, 23–51.

Lowry, M., 2003. Why does IPO volume fluctuate so much? Journal of Financial Economics 67, 3-40.

Malmendier, U., Tate, G., 2005. CEO overconfidence and corporate investment. Journal of Finance 60, 2661–2700.

Myers, S., 1977. The determinants of corporate borrowing. Journal of Financial Economics 5, 147-176.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187–221.

Rajan, R., Zingales, L., 1995. What do we know about capital structure? some evidence from international data. Journal of Finance 50, 1421 – 1460.

Ritter, J., 1991. The long-run performance of initial public offerings. Journal of Finance 42, 365–394.

Ritter, J., Welch, I.,2002. A review of IPO activity, pricing, and allocations. Journal of Finance 57, 1795–1828.

Rubin, A., Simth, D., 2008. Institutional ownership, volatility and dividends. Unpublished working paper. Simon Fraser University.

Shleifer, A., Vishny, R., 1986. Large shareholders and corporate control. Journal of Political Economy 94, 461-488.

Shleifer, A., Vishny, R., 2003. Stock market driven acquisitions. Journal of Financial Economics 70, 295–311.

Shyam-Sunder, L., Myers, S., 1999. Testing static tradeoff against pecking order models of capital structure. Journal of Financial Economics 51,219-244.

Stiglitz, J., Weiss, A., 1981. Credit rationing and markets with imperfect infomation. American Economic Review 71, 393-411.

Stulz, R., 1990. Managerial discretion and optimal financing policies. Journal of Financial Economics 26, 3-27.

Titman, S., Wessels, R., 1988. The determinants of capital structure choice. Journal of Finance 43, 1-19.

Table 4.1: Summary of Variables and Their Predicted Effects .

Proxy of Information Asymmetry/ Agency Costs	Predicted Effect on Information Asymmetry	Predicted Effect on Agency Cost
Asset Tangibility	Investors could easily verify the value of tangible assets: lower asymmetry for firms with more tangible assets.	?
Size	Bigger firms have lower asymmetry as they receive more news coverage.	?
Cash holdings	?	Free cash would increase agency costs
Dividend Payments/ Dividend Yield	Dividends serve as a signaling device. Therefore, dividend-paying firms are expected to have lower asymmetry.	Dividends reduce free cash flows. Dividend-paying firms will have lower agency costs.
Current Leverage	?	Debt can mitigate agency costs as it prevents managers from taking on value-reducing projects.
Blockholders, Outside Directors & Institutional Ownership	Firms with higher institutional holdings are less likely to have information asymmetry problems.	Presence of blockholders, outside directors and institutional owners serve as governance mechanism. Thus, firms with them are less likely to have agency problem.

Table 4.2: Number of Firms (Excluding Financials and Utilities) Issuing and Repurchasing Securities from 1980-2006.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). A firm is considered to be issuing equity or debt if its net equity or debt issues scaled by its beginning of year assets is 5% or more. A firm is considered to be repurchasing equity or debt if its net equity or debt issues scaled by its beginning of year assets is -5% or less.

Year	Firms	Equity Issues	% of Total Firms	Equity Repurchases	% of Total Firms	Debt Issues	% of Total Firms	Debt Repurchases	% of Total Firms	Hot Market	Cold Market
1980	4,255	524	12.31	92	2.16	985	23.15	514	12.08	NO	NO
1981	4,292	672	15.66	84	1.96	968	22.55	542	12.63	NO	NO
1982	4,304	496	11.52	105	2.44	931	21.63	497	11.55	YES	NO
1983	4,506	1136	25.21	91	2.02	871	19.33	716	15.89	YES	NO
1984	4,583	708	15.45	192	4.19	1051	22.93	563	12.28	NO	NO
1985	4,462	768	17.21	146	3.27	1004	22.5	630	14.12	NO	NO
1986	4,704	1098	23.34	174	3.7	1104	23.47	779	16.56	YES	NO
1987	4,895	1117	22.82	198	4.04	1090	22.27	832	17	YES	NO
1988	4,972	683	13.74	190	3.82	1049	21.1	750	15.08	NO	NO
1989	4,840	684	14.13	165	3.41	1021	21.1	719	14.86	NO	YES
1990	4,860	667	13.72	151	3.11	899	18.5	720	14.81	NO	YES
1991	4,995	967	19.36	92	1.84	676	13.53	959	19.2	NO	NO
1992	5,222	1194	22.86	126	2.41	742	14.21	979	18.75	YES	NO
1993	5,599	1482	26.47	124	2.21	883	15.77	1045	18.66	YES	NO
1994	5,845	1352	23.13	172	2.94	1125	19.25	922	15.77	NO	YES
1995	5,950	1447	24.32	184	3.09	1294	21.75	846	14.22	NO	NO
1996	6,373	1797	28.2	249	3.91	1442	22.63	995	15.61	YES	NO
1997	6,306	1386	21.98	332	5.26	1584	25.12	797	12.64	NO	NO
1998	6,089	1155	18.97	461	7.57	1678	27.56	680	11.17	NO	NO
1999	6,187	1539	24.87	405	6.55	1505	24.33	772	12.48	NO	NO
2000	6,021	1627	27.02	342	5.68	1224	20.33	839	13.93	NO	NO
2001	5,682	868	15.28	215	3.78	960	16.9	749	13.18	NO	YES
2002	5,376	758	14.1	222	4.13	742	13.8	860	16	NO	YES
2003	5,187	911	17.56	232	4.47	858	16.54	769	14.83	NO	NO
2004	5,048	1130	22.39	290	5.74	878	17.39	665	13.17	NO	YES
2005	4,908	1027	20.93	387	7.89	900	18.34	600	12.22	NO	YES
2006	3,698	705	19.06	422	11.41	738	19.96	391	10.57	NO	YES

Table 4.3: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Issue Equity*** in ***Hot*** Markets.

The dependent variable is a dummy variable that takes on the value of one for equity issuers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

Variable	Panel A:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel B:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel C:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel D:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel E:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient
INTERCEPT	-1.73	-0.60	-2.19	-1.47	-3.02
	(-4.69)***	(-1.09)	(-3.92)***	(-10.08)***	(-3.69)***
M/B	0.02	0.00	0.01	0.02	0.02
	(9.30)***	(-0.13)	(1.19)	(6.81)***	(5.41)***
CAPEX	3.32	2.70	3.39	4.30	2.48
	(15.14)***	(4.64)***	(3.43)***	(14.36)***	(5.90)***
LEVERAGE	0.30	0.28	0.16	0.24	0.33
	(2.60)***	(0.88)	(0.35)	(1.50)	(1.43)
CASHHOLD	0.98	0.93	0.63	1.03	0.64
	(8.95)***	(3.02)***	(1.28)	(6.77)***	(2.64)***
YIELD	-7.91	-3.02	-0.04	-4.62	-4.66
	(-3.82)***	(-1.26)	(-0.08)	(-1.87)*	(-1.15)
SIZE	-0.34	-0.41	-0.20	-0.32	-0.27
	(-24.93)***	(-11.26)***	(-4.69)***	(-14.08)***	(-8.52)***
TANGIBILITY	-0.90	-0.32	0.03	-1.06	-0.73
	(-8.72)***	(-1.21)	(0.08)	(-7.50)***	(-3.25)***
EARNINGS	-0.27	0.95	-0.09	0.05	-0.42
	(-2.72)***	(3.13)***	(-0.17)	(0.32)	(-2.07)**
INVDUMMY	0.19	-0.10	-0.13	0.17	0.15
	(2.74)***	(-0.73)	(-0.65)	(2.04)**	(0.71)
ANALSTDEV	-	1.08	-	-	-
	-	(4.13)***	-	-	-
ANALERROR	-	-	0.01	-	-
	-	-	(2.60)***	-	-
INSTITUTION	-	-	-	-0.47	-
	-	-	-	(-3.33)***	-
NONBLOCK	-	-	-	-	-0.17
	-	-	-	-	(-1.10)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-11891	-2071	-1215	-6804	-2073
Pseudo-R^2	0.10	0.08	0.057	0.09	0.09

Table 4.4: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Issue Equity*** in ***Cold*** Markets.

The dependent variable is a dummy variable that takes on the value of one for equity issuers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

Variable	Panel A:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	PanelB :Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel C:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel D:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient	Panel E:Period 1980-2006 Dependent= Equity Issue Dummy Coefficient
INTERCEPT	-4.38	-5.05	-16.52	-4.00	-3.43
	(-8.28)***	(-6.51)***	(-17.26)***	(-17.21)***	(-3.26)***
M/B	0.02	0.01	0.01	.021	0.02
	(9.40)***	(1.21)	(1.64)	(6.74)***	(2.83)***
CAPEX	0.28	0.69	-0.32	0.58	-0.22
	(0.63)	(0.77)	(-0.19)	(0.93)	(-0.20)
LEVERAGE	-0.59	0.02	-0.03	-.54	-1.45
	(-3.26)***	(0.05)	(-0.07)	(-2.36)**	(-2.75)***
CASHHOLD	1.32	2.16	2.12	1.45	0.21
	(8.35)***	(6.95)***	(5.17)***	(7.07)***	(0.49)
YIELD	-13.69	-12.42	-19.90	-9.73	-16.66
	(-2.53)**	(-1.65)*	(-2.28)**	(-1.60)	(-0.99)
SIZE	0.06	-0.01	-0.11	-0.017	0.00
	(3.40)***	(-0.18)	(-1.91)*	(-0.60)	(-0.05)
TANGIBILITY	-0.65	-0.63	-0.91	-0.85	-0.06
	(-3.92)***	(-2.00)**	(-2.13)**	(-3.90)***	(-0.15)
EARNINGS	-1.26	-0.69	-1.19	-1.44	-1.93
	(-9.40)***	(-2.40)**	(-2.64)***	(-7.71)***	(-6.09)***
INVDUMMY	-0.33	-0.47	-0.52	-0.40	0.27
	(-3.29)***	(-3.03)***	(-2.25)**	(-3.58)***	0.72
ANALSTDEV	-	-0.92	-	-	-
	-	(-2.06)**	-	-	-
ANALERROR	-	-	-0.01	-	-
	-	-	(-3.09)***	-	-
INSTITUTION	-	-	-	0.91	-
	-	-	-	(5.10)***	-
NONBLOCK	-	-	-	-	-0.24
	-	-	-	-	(-0.85)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	8359	-2369	-1164	-5440	-820
Pseudo-R^2	0.10	0.13	0.18	0.12	0.13

Table 4.5: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Issue Debt*** in ***Hot*** Markets.

The dependent variable is a dummy variable that takes on the value of one for debt issuers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A:Period 1980-2006 Dependent= Debt Issue Dummy Coefficient	Panel B:Period 1980-2006 Dependent= Debt Issue Dummy Coefficient	Panel C:Period 1980-2006 Dependent= Debt Issue Dummy Coefficient	Panel D:Period 1980-2006 Dependent= Debt Issue Dummy Coefficient	Panel E:Period 1980-2006 Dependent= Debt Issue Dummy Coefficient
INTERCEPT	-1.63	-0.30	-0.94	-1.53	-2.06
	(-6.58)***	(-0.69)	(-2.01)**	(-13.08)***	(-4.71)***
M/B	-0.01	-0.05	-0.042	-0.02	0.00
	(-3.97)***	(-3.47)***	(-2.94)***	(-4.42)***	(-0.45)
CAPEX	5.03	4.27	8.25	5.47	4.14
	(19.81)***	(7.97)***	(11.08)***	(15.92)***	(7.74)***
LEVERAGE	3.67	4.23	4.73	3.80	3.03
	(34.55)***	(17.15)***	(15.89)***	(28.06)***	(13.17)***
CASHHOLD	-0.74	-1.12	-1.08	-0.75	-0.06
	(-5.03)***	(-2.97)***	(-2.17)**	(-3.95)***	(-0.21)
YIELD	-0.01	0.00	0.55	0.30	-0.29
	(-0.06)	(0.00)	(2.34)**	(1.54)	(-0.22)
SIZE	-0.22	-0.38	-0.30	-0.24	-0.14
	(-20.00)***	(-12.77)***	(-8.80)***	(-13.93)***	(-5.49)***
TANGIBILITY	-0.84	-0.60	-1.13	-1.00	-0.72
	(-9.74)***	(-3.02)***	(-4.42)***	(-9.10)***	(-3.58)***
EARNINGS	0.31	0.41	0.67	0.43	0.86
	(2.60)***	(1.17)	(1.33)	(2.56)**	(3.52)***
INVDUMMY	0.45	0.61	0.73	0.53	0.23
	(8.08)***	(5.72)***	(5.56)***	(8.10)***	1.40
ANALSTDEV	-	-0.01	-	-	-
	-	(-0.04)	-	-	-
ANALERROR	-	-	-0.27	-	-
	-	-	(-0.50)	-	-
INSTITUTION	-	-	-	-0.33	-
	-	-	-	(-3.14)***	-
NONBLOCK	-	-	-	-	-0.35
	-	-	-	-	(-1.72)*
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-13271	-2827	-1930	-8545	-2205
Pseudo-R^2	0.10	0.10	0.10	0.0996	0.09

Table 4.6: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Issue Debt*** in ***Cold*** Markets.

The dependent variable is a dummy variable that takes on the value of one for debt issuers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

	Panel A:Period 1980-2006	Panel B:Period 1980-2006	Panel C:Period 1980-2006	Panel D:Period 1980-2006	Panel E:Period 1980-2006
	Dependent= Debt Issue Dummy	Dependent= Debt Issue Dummy	Dependent= Debt Issue Dummy	Dependent= Debt Issue Dummy	Dependent= Debt Issue Dummy
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-3.81	-3.66	-2.67	-3.59	-4.26
	(-12.56)***	(-6.98)***	(-4.19)***	(-24.33)***	(-4.93)***
M/B	0.00	0.00	-0.01	-0.01	0.00
	(0.27)	(-0.52)	(-0.95)	(-1.41)	(0.36)
CAPEX	2.23	2.40	2.91	2.14	1.62
	(8.17)***	(4.20)***	(3.29)***	(5.85)***	(2.82)***
LEVERAGE	3.20	3.48	3.63	3.39	2.65
	(25.08)***	(14.88)***	(11.58)***	(20.05)***	(8.09)***
CASHHOLD	-0.59	-0.52	-0.63	-0.79	-1.40
	(-3.55)***	(-1.81)*	(-1.53)	(-3.65)***	(-2.66)***
YIELD	0.35	0.98	0.93	-0.05	1.01
	(0.87)	(3.23)***	(2.34)**	(-0.070)	(0.44)
SIZE	0.15	0.14	0.04	0.06	0.08
	(10.88)***	(5.24)***	(1.15)	(2.43)**	(1.49)
TANGIBILITY	-1.08	-1.13	-1.17	-0.92	-0.39
	(-9.70)***	(-5.97)***	(-4.50)***	(-6.24)***	(-1.10)
EARNINGS	-0.92	-0.95	-1.85	-1.75	-1.05
	(-6.00)***	(-2.78)***	(-4.42)***	(-8.71)***	(-2.72)***
INVDUMMY	0.19	0.08	0.01	0.20	0.62
	(2.63)***	(0.71)	(0.05)	(2.42)**	(2.23)**
ANALSTDEV	-	-1.21	-	-	-
	-	(-3.66)***	-	-	-
ANALERROR	-	-	-0.01	-	-
	-	-	(-4.63)***	-	-
INSTITUTION	-	-	-	1.75	-
	-	-	-	(11.87)***	-
NONBLOCK	-	-	-	-	0.36
	-	-	-	-	(1.56)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-11767	-3950	-2183	-7920	-1085
Pseudo-R^2	0.08	0.09	0.09	0.10	0.07

Table 4.7: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Repurchase Equity*** in ***Hot*** Markets.

The dependent variable is a dummy variable that takes on the value of one for equity repurchasers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts (*ANALSTDEV*), standard deviation of analysts' forecasts; analysts' forecast errors (*ANALERROR*); institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The z-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively. Year dummy coefficients are not reported here.

(see next page)

Variable	Panel A:Period 1980-2006 Dependent= Equity Repurchase Dummy Coefficient	Panel B:Period 1980-2006 Dependent= Equity Repurchase Dummy Coefficient	Panel C:Period 1980-2006 Dependent= Equity Repurchase Dummy Coefficient	Panel D:Period 1980-2006 Dependent= Equity Repurchase Dummy Coefficient	Panel E:Period 1980-2006 Dependent= Equity Repurchase Dummy Coefficient
INTERCEPT	-6.00	-6.06	-5.56	-5.32	-20.46
	(-12.56)***	(-7.43)***	(-9.32)***	(-19.66)***	(-17.98)***
M/B	-0.03	-0.07	-0.03	-0.04	-0.05
	(-2.83)***	(-1.96)**	(-1.18)	(-2.46)**	(-1.07)
CAPEX	-2.12	-0.33	0.15	-1.70	-4.07
	(-2.36)**	(-0.21)	(0.08)	(-1.68)*	(-2.11)**
LEVERAGE	0.09	0.59	0.19	0.06	-0.61
	(0.26)	(0.84)	(0.27)	(0.15)	(-0.65)
CASHHOLD	1.43	0.97	0.51	1.19	1.42
	(4.51)***	(1.60)	(0.77)	(3.20)***	(1.60)
YIELD	0.37	-0.49	-0.18	0.39	3.98
	(1.70)*	(-0.78)	(-0.51)	(2.30)**	(2.15)**
SIZE	-0.01	-0.04	0.02	-0.09	0.19
	(-0.47)	(-0.71)	(0.27)	(-2.48)**	(2.39)**
TANGIBILITY	0.49	0.60	0.63	0.66	0.90
	(2.40)**	(1.51)	(1.44)	(2.79)***	(1.51)
EARNINGS	4.71	5.94	5.52	5.26	3.27
	(11.44)***	(6.35)***	(4.05)***	(9.28)***	(3.50)***
INVDUMMY	0.43	0.53	0.25	0.44	-0.13
	(3.76)***	(2.60)***	(1.18)	(3.47)***	(-0.32)
ANALSTDEV	-	0.04	-	-	-
	-	(0.06)	-	-	-
ANALERROR	-	-	0.00	-	-
	-	-	(-0.04)	-	-
INSTITUTION	-	-	-	0.42	-
	-	-	-	(2.40)**	-
NONBLOCK	-	-	-	-	0.27
	-	-	-	-	(0.54)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-3415	-972	-829	-2444	-339
Pseudo-R^2	0.06	0.08	0.07	0.07	0.01

Table 4.8: Estimates from Panel Logit Regressions of the Effects Of Firm Characteristics On Propensity To ***Repurchase Equity*** In ***Cold*** Markets.

The dependent variable is a dummy variable that takes on the value of one for equity repurchasers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts (*ANALSTDEV*), standard deviation of analysts' forecasts; analysts' forecast errors (*ANALERROR*); institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The z-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

	Panel A:Period 1980-2006	Panel B:Period 1980-2006	Panel C:Period 1980-2006	Panel D:Period 1980-2006	Panel E:Period 1980-2006
	Dependent= Equity Repurchase Dummy	Dependent= Equity Repurchase Dummy	Dependent= Equity Repurchase Dummy	Dependent= Equity Repurchase Dummy	Dependent= Equity Repurchase Dummy
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-9.23	-8.61	-21.25	-9.14	-21.41
	(-14.03)***	(-12.37)***	(-12.39)***	(-25.41)***	(-16.75)***
M/B	0.02	0.01	0.02	0.02	0.02
	(4.84)***	(2.01)**	(2.90)***	(4.77)***	(1.32)
CAPEX	-11.32	-13.48	-14.92	-12.52	-7.69
	(-7.49)***	(-6.13)***	(-5.40)***	(-7.18)***	(-1.45)
LEVERAGE	-0.53	-0.32	-0.24	-0.58	-1.56
	(-1.66)*	(-0.72)	(-0.38)	(-1.61)	(-1.34)
CASHHOLD	1.79	1.51	1.44	1.80	1.83
	(6.92)***	(3.71)***	(2.49)**	(6.13)***	(1.62)
YIELD	-26.58	-32.63	-30.30	-18.35	-7.20
	(-6.58)***	(-4.96)***	(-2.77)***	(-3.88)***	(-0.88)
SIZE	0.42	0.48	0.26	0.33	0.50
	(17.01)***	(12.20)***	(4.27)***	(9.66)***	(4.67)***
TANGIBILITY	0.30	0.49	0.80	0.64	0.92
	(1.30)	(1.36)	(1.79)*	(2.45)**	(1.06)
EARNINGS	6.76	7.59	7.43	7.03	4.81
	(15.26)***	(10.18)***	(8.18)***	(12.71)***	(1.47)
INVDUMMY	0.58	0.46	0.45	0.40	-0.08
	(4.96)***	(2.71)***	(1.87)*	(3.35)***	(-0.16)
ANALSTDEV	-	-2.91	-	-	-
	-	(-3.71)***	-	-	-
ANALERROR	-	-	-0.02	-	-
	-	-	(-3.94)***	-	-
INSTITUTION	-	-	-	2.53	-
	-	-	-	(12.38)***	-
NONBLOCK	-	-	-	-	0.14
	-	-	-	-	(0.18)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-4961	-2107	1100	-3768	-221
Pseudo-R^2	0.19	0.20	0.21	0.24	0.25

Table 4.9: Estimates from Panel Logit Regressions of the Effects of Firm Characteristics on Propensity to ***Repurchase Debt*** in ***Hot*** Markets.

The dependent variable is a dummy variable that takes on the value of one for debt repurchasers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (NON*B*LOCK). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

	Panel A:Period 1980-2006	Panel B:Period 1980-2006	Panel C:Period 1980-2006	Panel D:Period 1980-2006	Panel E:Period 1980-2006
	Dependent= Debt Repurchase Dummy	Dependent= Debt Repurchase Dummy	Dependent= Debt Repurchase Dummy	Dependent= Debt Repurchase Dummy	Dependent= Debt Repurchase Dummy
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	-2.26	-1.62	-2.72	-2.66	-2.68
	(-10.34)***	(-3.86)***	(-6.23)***	(-17.97)***	(-6.46)***
M/B	0.01	-0.02	0.00	0.01	0.00
	(2.20)**	(-0.75)	(-0.02)	(1.90)*	(0.62)
CAPEX	-4.17	-8.33	-8.91	-4.36	-5.74
	(-8.99)***	(-5.70)***	(-4.96)***	(-7.02)***	(-4.95)***
LEVERAGE	0.12	-1.01	-1.25	-0.20	0.13
	(0.80)	(-2.54)**	(-2.78)***	(-1.03)	(0.43)
CASHHOLD	-0.67	-2.58	-2.59	-1.30	-0.01
	(-3.88)***	(-4.32)***	(-3.79)***	(-5.19)***	(-0.01)
YIELD	-0.18	-8.12	-7.22	-0.08	-12.36
	(-0.16)	(-2.93)***	(-2.15)**	(-0.06)	(-2.82)***
SIZE	-0.18	-0.24	-0.10	-0.14	-0.09
	(-11.86)***	(-5.78)***	(-2.12)**	(-6.15)***	(-2.62)***
TANGIBILITY	0.73	1.64	1.67	0.96	0.92
	(6.90)***	(6.00)***	(5.75)***	(7.04)***	(3.81)***
EARNINGS	1.74	3.37	3.56	2.32	1.69
	(9.88)***	(6.39)***	(5.10)***	(8.59)***	(4.18)***
INVDUMMY	-0.49	-0.59	-0.61	-0.56	-0.33
	(-6.71)***	(-4.05)***	(-3.66)***	(-6.27)***	(-1.47)
ANALSTDEV	-	1.57	-	-	-
	-	(6.56)***	-	-	-
ANALERROR	-	-	0.01	-	-
	-	-	(5.71)***	-	-
INSTITUTION	-	-	-	-0.82	-
	-	-	-	(-5.82)***	-
NONBLOCK	-	-	-	-	(-0.20)
	-	-	-	-	-0.96
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-9935	-1745	-1364	-6120	-1449
Pseudo-R^2	0.04	0.084	0.08	0.05	0.04

Table 4.10: Estimates from Panel Logit Regressions of The Effects of Firm Characteristics on Propensity to ***Repurchase Debt*** in ***Cold*** Markets.

The dependent variable is a dummy variable that takes on the value of one for debt repurchasers, zero otherwise. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets ; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; institutional holding (*INSTITUTION*), fraction of a firm's outstanding shares held by institutions; absence of block owner (*NONBLOCK*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

(see next page)

Variable	Panel A:Period 1980-2006 Dependent= Debt Repurchase Dummy Coefficient	Panel B:Period 1980-2006 Dependent= Debt Repurchase Dummy Coefficient	Panel C:Period 1980-2006 Dependent= Debt Repurchase Dummy Coefficient	Panel D:Period 1980-2006 Dependent= Debt Repurchase Dummy Coefficient	Panel E:Period 1980-2006 Dependent= Debt Repurchase Dummy Coefficient
INTERCEPT	-5.06	-6.77	-7.47	-4.87	-3.74
	(-11.86)***	(-9.31)***	(-7.08)***	(-28.78)***	(-4.65)***
M/B	0.01	0.00	0.01	0.00	0.01
	(2.57)***	(0.07)	(0.62)	(0.89)	(0.90)
CAPEX	-14.76	-14.60	-14.67	-17.68	-9.46
	(-13.62)***	(-7.77)***	(-5.09)***	(-12.18)***	(-4.35)***
LEVERAGE	-0.78	-0.99	-0.77	-1.16	-0.25
	(-4.49)***	(-2.96)***	(-1.61)	(-5.15)***	(-0.48)
CASHHOLD	-0.58	-0.15	0.20	-1.10	0.93
	(-2.69)***	(-0.39)	(0.37)	(-4.09)***	(1.59)
YIELD	-0.65	-0.48	0.33	-15.45	2.68
	(-0.30)	(-0.11)	(0.46)	(-2.43)**	(1.18)
SIZE	0.24	0.28	0.25	0.24	0.17
	(14.80)***	(9.39)***	(5.81)***	(10.22)***	(2.59)***
TANGIBILITY	1.02	0.97	1.03	1.21	1.22
	(7.79)***	(3.66)***	(3.02)***	(7.37)***	(3.26)***
EARNINGS	2.11	3.00	4.15	2.45	1.03
	(7.33)***	(5.10)***	(5.09)***	(6.92)***	(1.69)*
INVDUMMY	-0.93	-0.98	-1.00	-.85	-0.64
	-(11.25)***	(-7.21)***	(-5.77)***	(-8.73)***	(-1.92)*
ANALSTDEV	-	-0.42	-	-	-
	-	(-1.13)	-	-	-
ANALERROR	-	-	0.00	-	-
	-	-	(1.64)	-	-
INSTITUTION	-	-	-	0.63	-
	-	-	-	(4.38)***	-
NONBLOCK	-	-	-	-	0.04
	-	-	-	-	(0.13)
Firm Years	68,122	17,592	11,704	45,635	8,603
Firms	10,715	3,590	2,148	8,328	1,879
Log Pseudo-likelihood	-9416	-2829	-1694	-2073	-811
Pseudo-R^2	0.06	0.07	0.08	0.09	0.06

Table 4.11: Estimates from Panel *OLS* Regressions of The Effects of Firm Characteristics on Security Issues and Repurchases.

The dependent variables are scaled net equity and scaled net debt issues. Net equity is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). The resulting net equity and net debt issues are scaled by assets at t-1. The independent variables include: growth opportunity (*M/B*), measured by the ratio of market value of assets to book value of assets; capital investment (*CAPEX*), measured by the ratio of capital expenditure to total assets; leverage (*LEVERAGE*), measured by the ratio of total debt to total assets; cash holdings (*CASHHOLD*), measured by the ratio of cash and short-term equivalents to total assets; dividend yield (*YIELD*), defined as dividend per share divided by price; firm size (*SIZE*), measured by log of total assets; tangibility (*TANGIBILITY*), measured by the ratio of property, plant, and equipment to total assets; profitability (*EARNINGS*), measured by the ratio of earnings before interests to total assets; investment-grade dummy (*INVDUMMY*), a dummy variable that takes on the value of one for firms with investment-grade rating, zero otherwise; hot year dummy (*HOT*); cold year dummy (*COLD*); dispersion of analysts' forecasts *(ANALSTDEV)*, standard deviation of analysts' forecasts; analysts' forecast errors *(ANALERROR)*; the interaction terms between size, asset tangibility, standard deviation of analysts' forecasts, and analysts' forecast errors and hot and cold year dummies (*SIZE*HOT, SIZE*COLD, TANGIBILITY*HOT, TANGIBILITY*COLD, ANALSTDEV*HOT, ANALSTDEV*COLD, ANALERROR*HOT, ANALERROR*COLD*). I remove all financials and utilities. The *z*-statistics are given in the parentheses: ***, **, and * imply the significance of coefficient at the 1%, 5%, and 10% respectively.

	Panel A: Period 1980-2006	Panel B: Period 1980-2006	Panel C: Period 1980-2006	Panel D: Period 1980-2006	Panel E: Period 1980-2006	Panel F: Period 1980-2006
	Dependent= Scaled Net Equity Issues	Dependent= Scaled Net Debt Issues	Dependent= Scaled Net Equity Issues	Dependent= Scaled Net Debt Issues	Dependent= Scaled Net Equity Issues	Dependent= Scaled Net Debt Issues
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
INTERCEPT	0.32	0.25	0.42	0.47	0.28	0.40
	(57.45)***	(45.90)***	(29.08)***	(30.98)***	(19.72)***	(22.94)***
M/B	0.00	0.00	0.00	0.00	0.00	0.00
	(6.25)***	(-7.02)***	(-1.60)	(-4.17)***	(-3.88)***	(-3.46)***
CAPEX	0.22	0.63	0.05	0.49	0.04	0.45
	(17.38)***	(54.35)***	(2.03)**	(17.56)***	(1.59)	(13.12)***
LEVERAGE	-0.06	0.50	-0.07	0.57	-0.03	0.49
	(-8.93)***	(90.46)***	(-5.81)***	(47.27)***	(-2.89)***	(36.80)***
CASHHOLD	0.26	0.06	0.22	0.04	0.17	0.06
	(39.03)***	(9.33)***	(16.13)***	(3.05)***	(12.35)***	(3.36)***
YIELD	-0.03	-0.01	0.00	0.00	0.01	0.00
	(-2.80)***	(-0.93)	(0.00)	(-0.09)	(0.51)	(0.18)
SIZE	-0.05	-0.03	-0.05	-0.05	-0.03	-0.04
	(-50.69)***	(-33.52)***	(-25.17)***	(-25.86)***	(-16.25)***	(-19.14)***
TANGIBILITY	-0.16	-0.21	-0.22	-0.26	-0.15	-0.21
	(-27.03)***	(-37.93)***	(-18.41)***	(-21.47)***	(-14.40)***	(-16.41)***
EARNINGS	-0.06	-0.04	-0.03	-0.12	-0.09	-0.15
	(-10.74)***	(-7.64)***	(-2.31)**	(-7.99)***	(-5.71)***	(-7.85)***

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INVDUMMY	0.00	0.05	-0.01	0.05	-0.01	0.05
	(0.20)	(20.89)***	(-2.87)***	(14.09)***	(-1.97)**	(12.30)***
HOT	0.04	0.00	0.01	-0.01	-0.01	0.00
	(10.85)***	(0.12)	(1.33)	(-0.99)	(-1.15)	(-0.32)
COLD	-0.05	0.00	-0.06	0.00	-0.04	-0.02
	(-10.43)***	(0.59)	(-5.73)***	(-0.26)	(-4.22)***	(-1.54)
SNETDEBT	-0.05		-0.03		-0.05	
	(-11.95)***		(-3.57)***		(-6.02)***	
SNETEQUITY		-0.05		-0.03		-0.08
		(-11.95)***		(-3.57)***		(-6.02)***
HOT*SIZE	-0.01	0.00	0.00	0.00	0.00	0.00
	(-7.70)***	(-1.90)*	(-1.31)	(-0.78)	(0.63)	(-0.79)
COLD*SIZE	0.01	0.00	0.01	0.00	0.00	0.00
	(7.41)***	(-3.24)***	(3.66)***	(-1.88)*	(2.61)***	(-0.76)
HOT* TANGIBILITY	-0.02	0.00	0.01	0.02	0.02	0.01
	(-2.99)***	(-0.03)	(0.49)	(1.67)*	(1.92)*	(0.58)
COLD* TANGIBILITY	0.04	0.02	0.05	0.05	0.04	0.04
	(7.17)***	(4.10)***	(5.40)***	(4.76)***	(4.43)***	(3.71)***
ANALSTDEV			0.02	-0.07		
			(1.70)*	(-4.45)***		
HOT* ANALSTDEV			0.01	0.02		
			(0.79)	(1.12)		
COLD* ANALSTDEV			-0.02	0.04		
			(-0.92)	(1.77)*		
ANALERROR					0.00	0.00
					(-1.18)	(-6.97)***
HOT* ANALERROR					0.00	0.00
					(0.28)	(2.05)**
COLD* ANALERROR					0.00	0.00
					(-0.04)	(1.36)
Firm Years	68,122	68,122	17,592	17,592	11,704	11,704
Firms	10,715	10,715	3,590	3,590	2,148	2,148
Adjusted-R^2	0.3996	0.2956	0.4254	0.3608	0.4195	0.3108
Fixed Effects	YES	YES	YES	YES	YES	YES

Figure 4.1: Plot of Scaled Issue Volume From 1980 to 2006.

In this figure, aggregate monthly values of common stock offerings are scaled by the aggregate monthly market values of outstanding equity from Center for Research in Security Prices (CRSP). The aggregate market values of outstanding equity are calculated by summing up end-of-month market values of all CRSP firms.

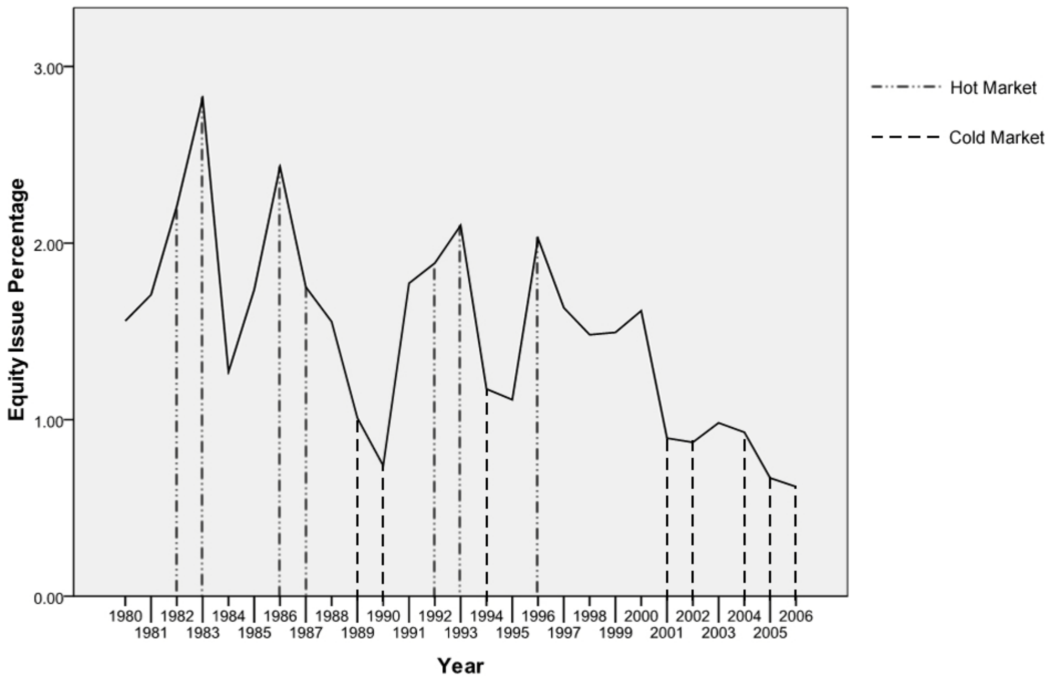

Figure 4.2 (A): Fraction of Equity and Debt Issuing Firms.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). A firm is considered to be issuing equity or debt if its net equity or debt issues scaled by its beginning of year assets is 5% or more. Firms with scaled issues above 1 are removed. The numbers of equity or debt issuing firms are scaled by the total number of firms for each year. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.

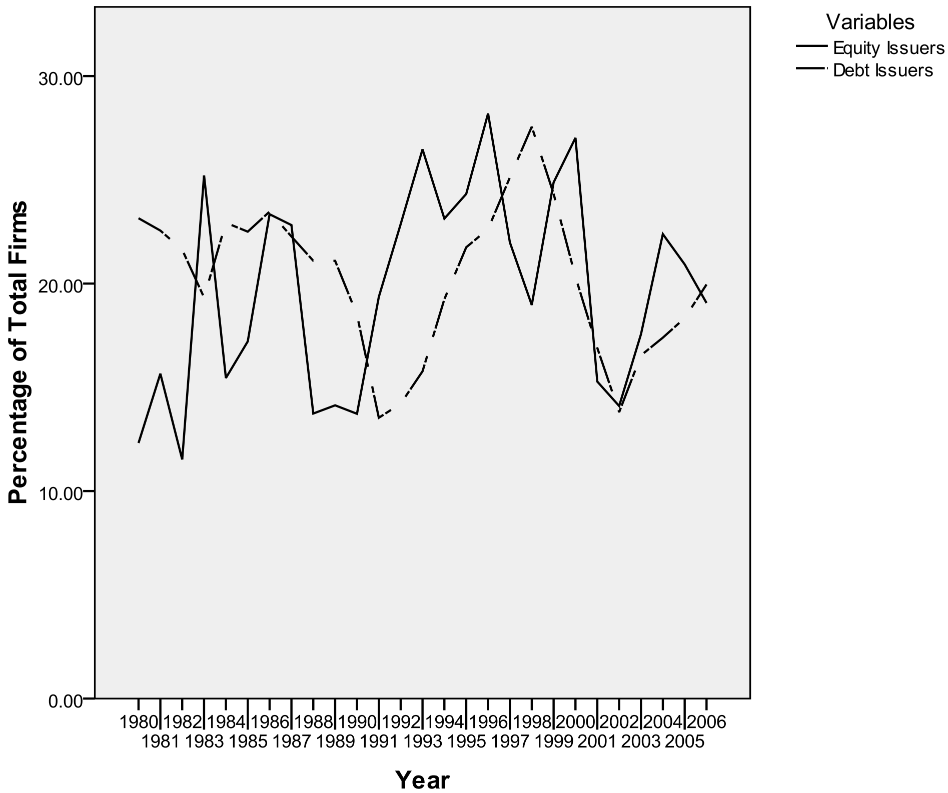

Figure 4.2 (B): Fraction of Equity and Debt Repurchasing Firms.

Net equity repurchase is defined as purchase of common and preferred stock (Compustat data 115) less sales of common and preferred stock (Compustat data 108). Net debt repurchase is defined as long-term debt reduction (Compustat data 114) less long-term debt issuances (Compustat data 111). A firm is considered to be repurchasing equity or debt if its net equity or debt repurchases scaled by the beginning of year assets is 5% or more. Firms with scaled repurchases above 1 are removed. The numbers of equity or debt repurchasing firms are scaled by total number of firms for each year. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.

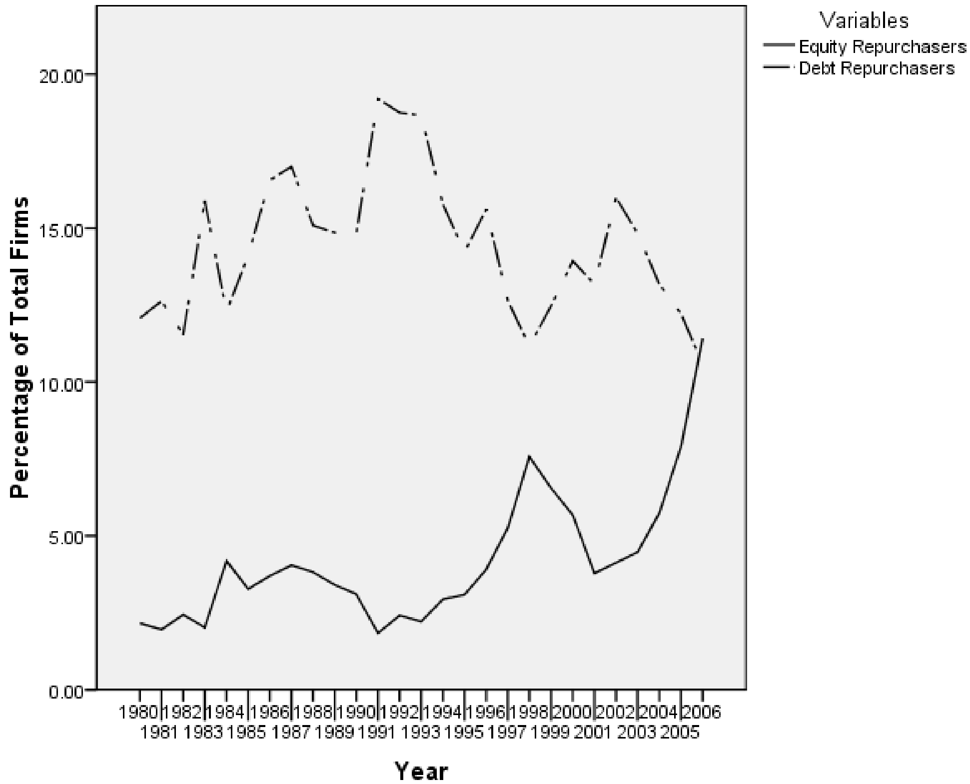

Figure 4.3: Plot of *Average* Net Security Issues Scaled by *Average* Total Assets.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). Net security issues are scaled by the beginning of year assets, and firms with scaled issues above 1 or below -1 are removed. For each year, the mean values of scaled net security issues across all firms are calculated. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.

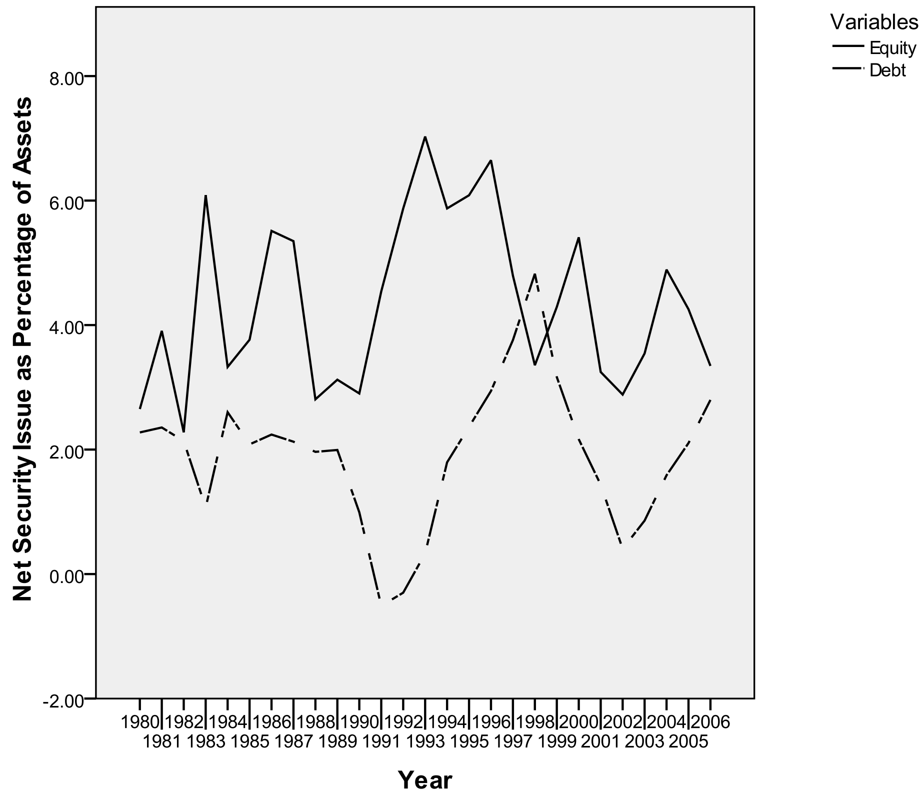

Figure 4.4: Plot of *Aggregate* Net Security Issues Scaled by *Aggregate* Total Assets.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). Net security issues are scaled by the beginning of year assets, and firms with scaled issues above 1 or below -1 are removed. For each year, the aggregated net security issues are scaled by aggregated total assets. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.

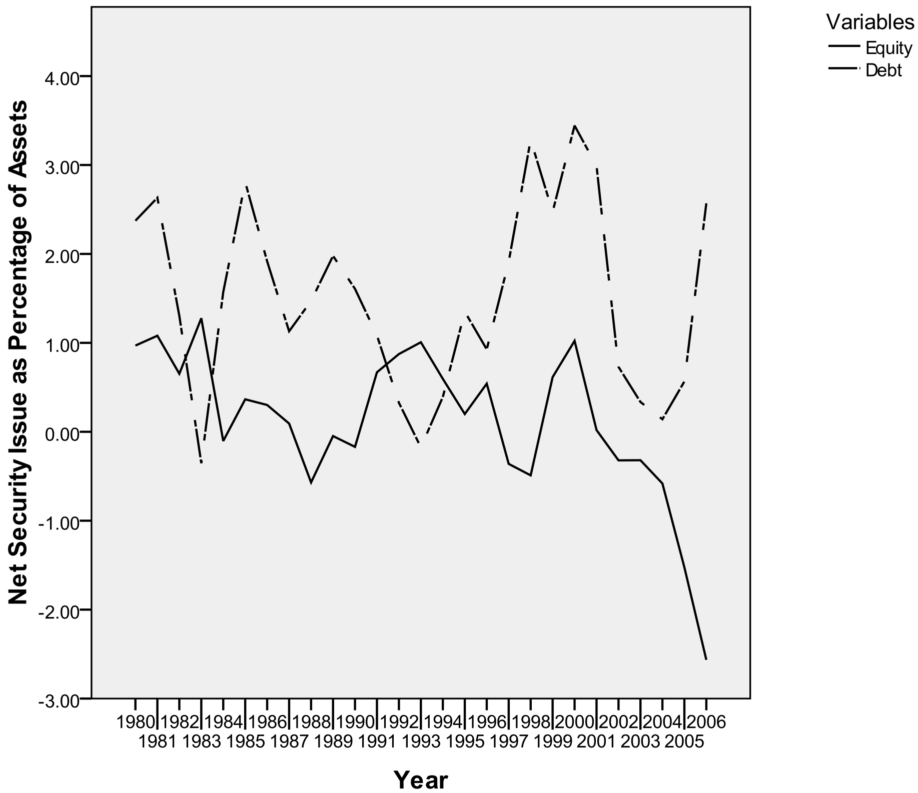

Figure 4.5: Plot of Average Capital Expenditure Ratios.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). A firm is considered to be issuing equity or debt if its net equity or debt issues scaled by the beginning of year assets is 5% or more. When the resulting numbers are negative, firms are considered to be conducting equity or debt repurchases. Firms with scaled issues above 1 or below -1 are removed. For each year, the mean values of capital expenditure ratios are calculated for both types of issuers and repurchasers. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.

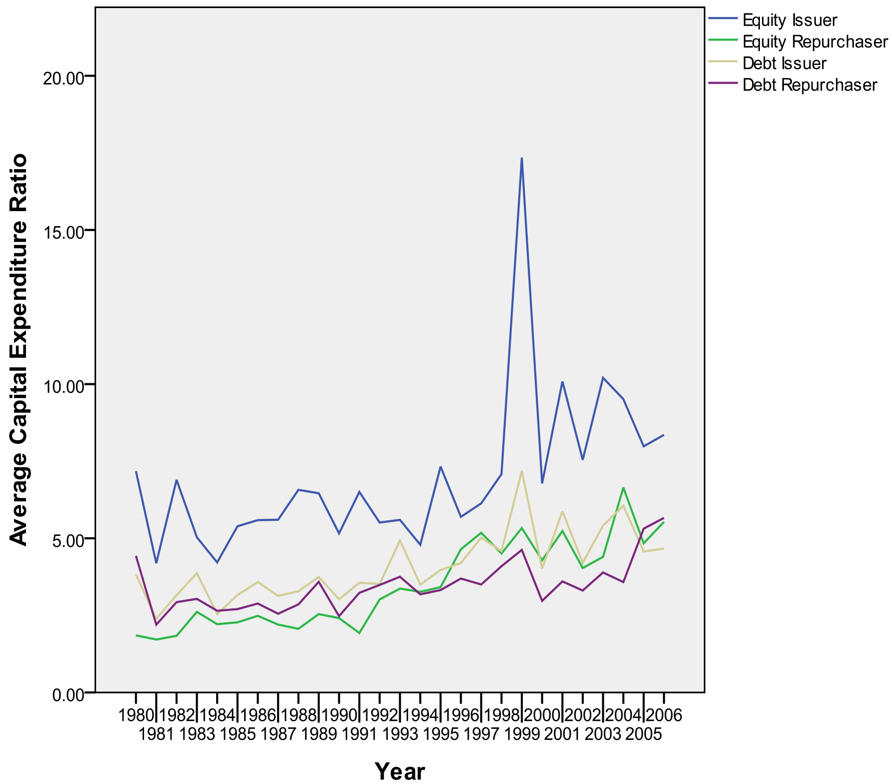

Figure 4.6: Plot of Average Market –To- Book Ratios.

Net equity issuance is defined as sales of common and preferred stock (Compustat data 108) less purchase of common and preferred stock (Compustat data 115). Net debt issuance is defined as long-term debt issuances (Compustat data 111) less long-term debt reduction (Compustat data 114). A firm is considered to be issuing equity or debt if its net equity or debt issues scaled by the beginning of year assets is 5% or more. When the resulting numbers are negative, firms are considered to be conducting equity or debt repurchases. Firms with scaled issues above 1 or below -1 are removed. For each year, the mean values of market- to- book ratios are calculated for both types of issuers and repurchasers. Financials and regulated firms (SIC codes 4900-4949, 6000-7000) are removed from the sample.