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Utility Stock Splits: Signaling Motive Versus Liquidity Motive

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UTILITY STOCK SPLITS: SIGNALING MOTIVE VERSUS LIQUIDITY MOTIVE

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To my son Gustavo
who shared with me long nights of study
while pursuing the Ph.D.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Despite the rich literature on theories of stock splits, studies have omitted public utility firms from their analysis and only analyzed split by industrial firms when examining managerial motives for splitting their stock. I examine the liquidity-marketability hypothesis, which states that stock splits enhance the attractiveness of shares to individual investors and increase trading volume by adjusting prices to an optimum trading range. Changes in the regulatory process, resulting from EPACT, have opened a window of opportunity for the study and comparison of the two traditional motives for splitting stock --signaling versus liquidity-marketability motives. Public electric utility firms provide a clean testing ground for these two non-mutually exclusive theories as liquidity/marketability hypothesis should dominate before the enactment of the EPACT since the conventional signaling theory of common stock splits should not apply given the low levels of information asymmetry in regulated utility companies. In the post-EPACT period, however, the signaling effect is expected to play a more dominant role. Based on both univariate and multivariate analyses, my results are consistent with the hypothesis posed. For the pre-EPACT period, liquidity motive seems to predominate in explaining the abnormal announcement return of utility stock splits. On the other hand, the results support the signaling motive as a leading explanation of abnormal returns in the post-EPACT period.

CHAPTER 1

INTRODUCTION

In a stock split a certain number of new shares are substituted for each outstanding share. The only changes are par value and number of shares outstanding adjusted by the split factor. All other capital accounts remain unchanged. However, previous research documents that investors react positively to the announcements of stock splits suggesting that there are benefits associated with splitting stocks.[1] Grinblatt, Masulis and Titman (1984), for example, report a significant announcement period abnormal return of approximately 3 percent for splitting firms. McNichols and Dravid (1990) conclude that stock splits reveal information about future dividend and earning changes. In addition, Ikenberry, Rankine and Stice (1996) and Desai and Jain (1997) find that splitting firms experience significant long-run excess returns as well.

Two major theories have emerged in the financial literature to explain the positive abnormal returns at the announcements of stock splits; the signaling theory and the trading range theory. The signaling theory posits that firms split their shares to reveal favorable future information. Asquith, Healey, and Palepu (1989) argue that managers announce stock splits to reveal future earning information. Brennan and Hughes (1991) and Schultz (1999) suggest that since stock splits reduce share price resulting in higher commission fee per share, they draw greater attention from security analysts. Because the primary role of the analysts is to generate information, more firm-specific information is revealed subsequent to the split announcements. In addition, Desai and Jain (1997) find that the majority of firms splitting stocks increase their

[1] See Fama, Fisher, Jensen, and Roll (1969), Bar-Yosef and Brown (1977), McNichols and Dravid (1990), Ikenberry, Rankine, and Stice (1996) and Desai and Jain (1997).

cash dividends subsequent to the announcements. They conclude that stock splits convey information about near-term cash dividend growth.

On the other hand, the trading range theory advocates that splits realign per-share prices to a preferred price range. This preferred price range is mainly justified on the basis that it improves liquidity and marketability. This theory is also supported by managers surveyed by Baker and Gallagher (1980) and Baker and Powell (1993). Managers believe that, by lowering share prices, firms make their stocks more affordable to smaller investors and hence broaden the stockholders' base. Lakonishok and Lev (1987) find that splitting firms experience stock price run-ups prior to the announcements and the share price after splits are comparable to the average share price of other firms in the industry. A lower share price also improves trading liquidity by increasing numbers of shares traded and converting odd-lot holders to round-lot holders. D'Mello, Tawatnuntachai, and Yaman (2003) find that firms split stock to make the subsequent SEO more marketable to individual investors who are attracted to low-priced shares. The trading range hypothesis and liquidity/marketability hypothesis are not mutually exclusive explanations. Individuals may have a preference for a specific trading range because liquidity is higher at that price range.

Despite the rich literature on the theories of stock splits, studies have omitted public utility firms from their analysis and only analyzed split by industrial firms when examining managerial motives for splitting their stock. However, several studies in the financial literature address the differences between public utility industry and other industries when examining market reaction to announcement of other corporate events.[2] Asquith and Mullins (1986) and Masulis and Korwar (1986) study the share price response associated with the issuance of new equity for utility companies and how these results differ from industrial companies. They find

[2] Filbeck and Hatfield (1999), Asquith and Mullins (1986), Masulis and Korwar (1986).

that industrial firms experience larger negative excess returns than utility firms. Both studies suggest that the information asymmetry is much lower for utility firms than industrial firms since the former are subject to regulation. Szewczyc (1992) concludes that regulation of public utilities may affect the market's response to announcement of security offerings.

Public electric utility industry has been deregulated starting with the enactment of the Energy Policy Act (EPACT) of 1992. Changes in the regulatory process, resulting from EPACT, have opened a window of opportunity for the study and comparison of the two traditional motives for splitting stock --signaling versus liquidity-marketability motives. Public electric utility firms provide a clean testing ground for these two non-mutually exclusive theories as liquidity/marketability hypothesis should dominate before the enactment of the EPACT since the conventional signaling theory of common stock splits should not apply given the low levels of information asymmetry in regulated utility companies.[3] In the post-EPACT period, however, the signaling effect is expected to play a more dominant role. In other words, the liquidity and marketability motives should play a more important role in the pre-EPACT era, while signaling motive should dominate in the post-EPACT era due to the increase of information asymmetry.

Two major hypotheses that I propose to test in this dissertation are as follows. First, in the pre-EPACT period, the announcement effect of stock splits would be lower than similar announcements by industrial firms; while in the post-EPACT period, the announcement effect related to stock splits between the two groups would be similar. Second, in the pre-EPACT era, the liquidity-marketability motive dominates behind stock splits by electric utilities as opposed to post-EPACT era when signaling motive is expected to dominate.

[3] Asquith and Mullins (1986) and Masulis and Korwar (1986) suggest that the level of information asymmetry is much lower for utility firms than industrial firms since the former are subject to regulation.

My sample consists of 158 electric and gas utilities with stock splits during 1986- 2002 period. The results show that the stock price reaction to announcement of public utility splits is significantly positive but lower than the excess returns found for industrial stock splits during the 1986 through 2002 period. When the sample is broken down into pre- EPACT period (1986-1992) and post- EPACT period (1993-2002), I find that the market reaction is always greater for industrial stock splits than public utility splits regardless of the time period. This is consistent with the idea that regulation of public utilities may affect the market's response to announcement of corporate events and also the findings of previous studies in the context of other corporate events.

I test the signaling hypothesis by examining the announcement period return, the relation between split factors and abnormal returns, and the changes in operating performance of the splitting firms. Finding significant abnormal excess stock returns, a positive relation between split factors and abnormal return, and abnormal increase in earnings around the split are consistent with signaling explanations. The marketability and liquidity argument is tested by examining the changes in prices before and after the split, the number of shareholders, and trading volume.

Based on both univariate and multivariate analyses, my results are consistent with the hypothesis posed. For the pre-EPACT period, liquidity motive seems to predominate in explaining the abnormal announcement return of utility stock splits. On the other hand, signaling motive dominates as a leading explanation of abnormal returns in the post-EPACT period.

The rest of this dissertation is organized as follows: Chapter 2 reviews previous literature related to both stock split announcements and the regulated utility industry; Chapter 3 explains the motivations for stock splits on regulated industries and discusses testable hypotheses;

Chapter 4 describes the methodology used to test the hypotheses; Chapter 5 provides data description; Chapter 6 analyzes the results and Chapter 7 summarizes and concludes the dissertation.

CHAPTER 2

LITERATURE REVIEW

This Chapter is divided into two sections. In section 2.1, I present the theories that explain the positive effect of stock split announcements and the literature supporting these theories. In section 2.2, I give an overview of the utility industry, which includes the EPACT and its impact on information asymmetry and empirical evidence on utility companies.

2.1. Theories of stock splits

Stock splits represent a puzzling phenomenon. After a split, the number of shares outstanding increases but the corporation's cash flows is unaffected. Each shareholder retains his/her proportional ownership of shares, and the claims of other classes of security holders are unaltered, yet the market reacts positively to stock splits announcements. Two theories, the signaling theory and the trading range theory have emerged in the finance literature as the leading explanations for splitting stock.

2.1.1. Signaling theory

According to the signaling theory, firms split stocks to convey favorable private information about their current value. Finding positive excess returns around split announcements would be consistent with this hypothesis.

Fama, Fisher, Jensen, and Roll (1969) study firms that announce stock splits during the period of 1927 through 1959. They find that splitting firms experience an increase in cash dividends subsequent to the announcement. Over 72 percent of the firms in their sample pay

higher cash dividend in the year subsequent to the announcement than the average security listed on the New York Security Exchange. Their study supports the idea that stock splits reveal information about an imminent increase in cash dividends. Fama *et al.* (1969) also find abnormal returns around the split month, suggesting that the market considers stock split good news because the announcements resolve uncertainty of cash dividend increase.

Grinblatt, Masulis, and Titman (1984) argue that previous studies (Fama *et al*., 1969; Bar-Yosef and Brown, 1977) may not accurately reflect the effects of stock splits announcements since they use monthly instead of daily data. Also, both Fama *et al*. (1969) and Bar-Yosef and Brown (1977) do not control for potential effects of other information such as merger, earnings, and dividend release around stock split announcements. To correct for these problems, Grinblatt *et al*. (1984) examine a special subsample of splits for which no other announcement were made on split declaration date (obtained from CRSP) and two days after the declaration date. They find consistent results with the previous literature (Fama *et al*., 1969; Bar-Yosef and Brown,1977) that splitting firms experience abnormal returns during the announcement period. Specifically, they find an average increase in shareholders wealth of about 3.9% in the two days around the split announcement. This significant positive announcement effect leads them to hypothesize that firms signal information about their future earnings or equity values through their split decision. Contrary to Fama *et al*. (1969), Grinblatt *et al*. (1984) find that announcement returns cannot be explained by forecast of near term cash dividend increases. Two-day announcement period returns are not significantly related to subsequent cash dividend change, but are positively related to split factor, and negatively related to firm size and returns prior to the announcement. The significant coefficient on firm size confirms the hypothesis that,

because of their higher levels of information asymmetry, smaller firms' stock split announcements contain greater information.

Asquith, Healy, and Palepu (1989) study a sample of 121 firms that announced stock splits during 1970 through 1980 that never paid cash dividend before the split announcement date. Similar to Grinblatt *et al*. (1984), they report that the majority of their sample (81 percent) do not pay cash dividends during a five-year period after stock splits and only 9 percent of their total sample initiates cash dividends within a year after the announcement. Nevertheless, the same sample of firms experience unusual earnings growth for several years prior to split announcements and the increase in earnings continues for at least four years subsequent to the announcement. Therefore, Asquith *et al.* (1989) conclude that stock split announcements reveal information about future earnings, rather than future cash flows.

Brennan and Copeland (1988) expand the study of stock-split behavior with a model in which the split serves as a signal of managers' private information because stock trading costs depend on stock prices. They use Ross's (1977) argument that for a signal to be valid, it must be costly to mimic. Brennan and Copeland (1988) signaling theory rests on the assumption that stock splits are costly because the fixed cost element of brokerage commission increases the per-share trading costs of low-priced stocks. In addition, investors who previously owned round lots will pay higher fees for odd lots after split announcements. Therefore, managers will trade off the benefits derived from an increase in the firm's share price with an increase in transaction costs. Managers who observe the true value of the firm's cash flow choose a target price, which is defined as the preannouncement share price divided by the split factor. The empirical evidence supports the prediction of their model that trading costs increase subsequent to the announcement. Further, they find that the announcement period returns are significantly related

to the number of shares outstanding following stock splits, suggesting that the number of shares that will result after the split supply a useful signal to investors about managers' private information.

Following the same line of research, Brennan and Hughes (1991) develop a new model in which they predict that the flow of information about firms is an increasing function of firm size and a decreasing function of share price. Under the typical structure of brokerage fees based on number of shares traded, security analysts tend to do more research on firms with low share prices as they are likely to fetch higher commissions per share. Thus, by splitting their stock and reducing share price, firms can draw more attention from investment brokers. Only those managers with private good information have the incentive to call the attention of security analysts so that they forecast earnings to investors. One of the assumptions of the model is that investors will only purchase those stocks they know about. Thus, the role of security analysis is assumed by brokers who receive compensation for their efforts in the form of brokerage commissions from the investors who trade in the particular stocks. By examining a sample of stock splits during 1976 through 1977, Brennan and Hughes (1991) find evidence supporting their model; the number of analysts following firms is positively related to firm size and negatively related to stock price.

Other studies such as McNichols and Dravid (1990) provide further evidence on the signaling hypothesis by testing whether stock dividends and split factors convey information about future earnings, and by testing whether the split factor itself is the signal. McNichols and Dravid (1990) follow Spence's (1973) and Riley's (1979) signaling notion in which three relations must hold in a fully revealing signaling equilibrium. In the first relation, the level of the signal corresponds to the level of unobservable attribute. Therefore, McNichols and Dravid

(1990) test whether the split factor reflects management's private information about future earnings. Management's private information about earnings is proxied by analyst's earnings forecast error. This error is measured as the percent difference annual earnings reported after the split and the median analysts' pre-split earnings forecast. The second relation that must hold is that agents' inferences about the unobservable attribute correspond to the level of the signal. They test this relation that investors inferences correspond to the split factor signal by testing for a positive correlation between announcement period return prediction errors and an estimate of the split factor signal. The third relation that must hold in the signaling equilibrium of McNichols and Dravid (1990) is that inferences about the level of the unobserved attribute correspond to the level of the unobserved attribute. Therefore, they test if there is a relation between revision of investors' beliefs about the value of the firm and the firm's future earnings. Looking at a sample compromised of stock dividends and splits occurring from 1976-1983, they find evidence supporting the signaling hypothesis. Their results show that split factors are significantly correlated with earnings forecast errors, suggesting that firms incorporate their private information about future earnings in choosing their split factor. They also note that there is a positive relationship between abnormal announcement returns and split factors, suggesting that investors use split factors as a signal of future performance. The last test divides the split factor signal into a component that is correlated with earnings forecast errors and an uncorrelated component. McNichols and Dravid (1990) find that the announcement earning returns are significantly correlated with split factors. Thus, they also find a significant coefficient on the uncorrelated split factor, which suggests that other attributes are also signaled through split factor choice. They conclude that earnings forecast errors measure management's private information about earnings with considerable error, or that a signaling explanation is incomplete.

A study by Han and Suk (1998) links the level of inside ownership of a firm with the abnormal returns at the announcement of stock splits. They observe whether investors consider the level of insider ownership of a firm as useful information for evaluating stock splits. If stock splits signal management's inside information, the credibility of the signal will vary depending on different levels of managerial ownership. They first hypothesize a positive relation between the level of insider ownership and the announcement effect of stock splits. However, the level of information asymmetry influences the extent to which investors find the knowledge of inside ownership useful. Under the absence of information asymmetry, investors and managers have the identical information set about firm's prospects. Therefore, knowledge of insider ownership is of little value to investors. Using firm size as a proxy for the level of information asymmetry, they also hypothesize that the valuation effect of insider ownership should increase as firm size decreases. While their first hypothesis predicts a positive relation between announcement effects and the level of insider ownership, hypothesis 2 predicts that such a positive relation should be more prominent for firms with higher information asymmetry. Using a sample of 262 splits announced by NYSE and AMEX firms from 1983 to 1990 they find that split announcements by firms with higher insider ownership have a more positive effect on the market than those by firms with lower insider ownership. The average two-day abnormal return around the split announcement is 4.2 percent for those firms with the highest insider ownership, compared with 0.9 percent for the portfolio with the lowest insider ownership. With respect to the joint effect of insider ownership and information asymmetry, they find a significant positive relation between announcement returns and insider ownership for small firms. This positive relation is not observed within large firms. The results suggest that the market evaluates stock split decisions within the joint context of insider ownership and information asymmetry.

Szewczyk and Tsetsekos (1993) study the relationship between the level of institutional ownership and the magnitude of the share price response to new equity issues by industrial firms. They argue that institutional owners possess more information about the firm than individual investors. As a result, announcements by firms with larger concentration of institutional ownership should contain less information to the market, diminishing the market's reaction to a new stock issue. Results from industrial firms indicate that there is a direct relationship between the level of institutional ownership and the market response to new equity issue. However, Fielbeck and Hatfield (1999) find that there is a lack of relationship between the level of institutional ownership and the magnitude of the share price response to the announcement of new equity issue by public utility firms. They conclude that the regulatory nature of public utilities reduces the role played by institutional investors in the reduction of information asymmetry.

2.1.2. Trading range theory

A different explanation for the positive abnormal returns of stock splits is the trading range theory. The trading range theory advocates that splits realign per-share prices to a preferred price range. This preferred price range is mainly justified on the basis that it improves marketability and liquidity. According to Ikenberry, Rankine, and Stice (1996) trading ranges might also arise for other reasons, including a desire by managers to increase ownership by individual investors (Lakonishok and Lev, 1987) and a desire by firms to control relative tick size at which their shares trade (Anshuman and Kalay, 1994; Angel, 1997; Shultz, 2000). Under the trading range hypothesis, managers' need to realign share prices usually stems from a pre-

split price run-up. Therefore, this hypothesis links splits more to past performance than to future performance.

Lakonishok and Lev (1987) suggest that there is an ideal range in which companies prefer their stocks to be traded. The range is chosen to be comparable to the average stock price in the industry. Since splitting firms experience unusual growth in earnings and dividends, their stock prices increase beyond the customary trading range. Therefore, managers decide to split their firms' shares to restore stock prices to the range and thus increase trading liquidity. Lakonishok and Lev (1987) compare the operational performance and other characteristics of firms that split their stocks with those of a control group of nonspliting firms. Their results show that, relative to control firms with the same four-digit SIC code and asset size, stock splits are performed by firms that have enjoyed an unusual increase in stock prices over the five-year period prior to the announcement. The main reason for the split appears to be the return of the stock price to a normal range following a high growth period. In so doing, the firm affords small investors the opportunity to purchase stocks at lower price in round lots. They also find that 32 percent of split factors are explained by pre-announcement stock price relative to the market and the industry average prices. In terms of volume of trade or marketability, they look at the monthly number of shares traded relative to the number of shares outstanding at the same date for a given stock. Findings suggest that stock splits do not permanently affect the volume of trade. Composition of stockholders and the number of stockholders are also other aspects of marketability that might be affected by stock splits.

Mann and Moore (1996) develop a simple model supporting the trading range hypothesis. They base their model on the assumption that firms split stocks to minimize total dollar trading costs of both round and odd lots. Their empirical results are consistent with the predictions of the

model. They analyze NYSE and AMEX stock splits during the period 1967 to 1989. Mann and Moore (1996) results show that firms with high institutional ownership experience greater pre-split increases in share prices relative to those with high individual ownership. Consequently, post-split share prices of firms in which the majority is owned by institutions are higher than those of firms in which the majority is owned by individual investors. The rationale behind their findings lies in the fact that institutions pay lower brokerage costs with high-priced stocks while small investors are better off with low-priced stocks.

The trading range hypothesis of stock splits is also supported by survey-based research. Based on a survey of chief financial officers of firms listed on New York Stock Exchange, Baker and Gallagher (1980) report that around 65 percent of financial executives agree that the stock split is a useful device to lower stock price. Consequently, a lower price is perceived as an attraction to investors, broadening the ownership base. In a later study, Baker and Powell (1993) survey managers of 251 NYSE and Amex firms who issued stock splits between 1988 and 1990. They conclude that the most important motive of a split is to move the stock price into a better trading range, while the second most important motive is to improve trading liquidity. However, the empirical finding of Conroy, Harris, and Benet (1990) shows that managerial expectations are not realized: indeed, splits result in decreased liquidity. The disparity between what managers expect and what actually happens might be a result of how managers and empirics view liquidity. Managers appear to define greater liquidity as increasing the number of shareholders and widening the ownership base, whereas some empirical studies (Conroy *et al.*, 1990) appear to measure liquidity in terms of decreased bid-ask spreads.

Conroy *et al.* (1990) study the relationship between stock splits and shareholders liquidity as measured by bid-ask spreads. By comparing 147 NYSE stocks that split with a random

sample of 143 non-splitting NYSE stocks, they find that shareholders liquidity, measured by the percentage bid-ask spread, is actually worse after stock splits. Two different tests are developed in analyzing the changes in bid-ask spreads in their study. The first is a *t*-test comparing the cross-sectional mean from the pre-announcement period to the cross sectional mean after the split. The second test calculates for each stock the difference between the mean spread before the announcement and after the ex-date. They conclude that the absolute bid-ask spread as a percentage of closing stock price increases after the ex-date suggesting the existence of liquidity costs. Conroy *et al.* (1990) suggest that the liquidity cost implies that stock splits are a valid signal of favorable information.

Harris (1997) argues that a larger tick may be associated with fewer trading errors and fewer misunderstanding about agreed-upon transaction prices. Having a larger tick size in several ways may reduce the cost of market making. Thus an increase in the relative tick size following a split implies a wider minimum spread. Schultz (2000) also addresses the traditional explanation that stock splits increase the number of small shareholders as increased bid-ask spreads give brokers higher incentives to promote the splitting firm's stock. He hypothesizes that a real consequence of a stock split is an increase in the tick size in proportion to the stock's price. This is an important change because a larger tick size may result in more profitable market making, providing brokers with additional incentives to promote or sponsor the newly split stock. Schultz (2000) studies a sample of intraday trades and quotes around splits of 146 NASDAQ and 89 NYSE/AMEX stocks. The evidence shows that stocks are being promoted or sponsored following a split. Therefore, his results are consistent with the notion that splits are used to increase the shareholder base for a stock. Further, the increase in effective spreads

appears to be accompanied by humble declines in some of the costs of making markets, which is consistent with splits acting as an incentive to brokers to promote stocks.

2.1.3. Other theories

The tax option theory suggests that since stock splits increase trading liquidity due to lower share prices and higher numbers of shares outstanding, they provide several opportunities for investors to trade-in stocks and realize capital gains. Since investors benefit from these options, there is a favorable reaction to the announcement.

Lamoureux and Poon (1987) suggest that, under the U.S. tax law during the pre-1985 period, investors preferred long-term capital gains to short-term. Therefore, a stock with a wide price fluctuation has a higher value since investors have greater chances to manage their capital gain or loss. According to Copeland (1979), the liquidity of a stock is actually reduced by a split. Ohlson and Penman (1985) show that, subsequent to split ex-days, stock volatilities increase by an average thirty-five percent. If this is the case, how can the positive reaction around the announcement of stock splits be justified in light of increased risk and reduced liquidity? Lamoureux and Poon (1987) explain this positive abnormal return in the context of Constantinides' (1984) "tax option" model. According to this "tax option" model investors are willing to pay a premium for securities with higher volatilities given the nature of the U.S. tax code. Therefore, the tax-option value hypothesis predicts that subsequent to split announcements, return volatility increases and an increase in volatility is positively related to the announcement period returns. Lamoureux and Poon (1987) use empirical evidence based on large stock splits during 1962 through 1985. Their results support the tax-option hypothesis in which a significant increase in the number of shareholders, and the trading volume is observed

around the announcement of a split. Thus, there is an increase in volatility that is diversifiable or desirable, particularly to those investors in high tax brackets, as it expands their tax opportunities of owning the stock. They further predict that the market reaction to stock splits would be lower under the 1986 Tax Reform Act that treats capital gains and ordinary income equally, thereby eliminating the tax option available to investors.

Ikenberry *et al*. (1996) study the "self selection" hypothesis as a synthesis of the trading range and signaling theories. They do not treat the signaling and the trading range hypothesis as mutually exclusive, instead they contend that managers use splits to move share prices into a trading range, but condition their decision to split on expectations about the future performance of the firm. Their sample includes 1,275 two-for-one stock splits announced by NYSE and ASE firms between 1975 and 1990. Their results show that nearly four out of five sample firms traded at prices at or above the 80^{th} percentile in comparison to firms of similar size. This price run-up prior to the split announcement suggests that firms split their shares after experiencing a dramatic increase in stock price. Thus, post-split prices are generally lower than the median price observed for firms of comparable size in the same four-digit SIC code. These results support the view that splits are generally used to realign share prices to a normal trading range.

In order to study the signaling hypothesis, Ikenberry *et al*. (1996) also measure long-run performance. First, they find a 3.38 percent five-day announcement return, which confirms prior research that splits convey favorable information. Their stock split sample generates a significant excess return of 7.93 percent in the first year after the split, and excess returns of 12.15 percent in the three years following the split. Finally, their results suggest that splits realign prices to a lower trading range, but managers self-select by conditioning their decision to split on expected future performance.

Other papers (Rozeff, 1998; Fernando, Krishnamurthy, and Spindt, 1999) examine different theories of stock splits using evidence from mutual funds. Rozeff (1998) uses a sample of 120 mutual fund stock splits during 1965 through 1990. He develops new explanations for the mutual fund split. The four major theories that appear in the literature, namely signaling, trading range, tick size, and tax-options do not apply in the context of mutual funds. The signaling theory does not apply because there is no higher cost of transaction at lower prices for mutual funds. The trading range argument too falls short in justifying splits as liquidity is not a major concern for mutual funds. However, liquidity is not a consideration within mutual funds. For the most part, shares of mutual funds are easily traded or redeemed without any additional cost. Tick size is a different consideration included in the literature of stock splits that do not apply in the context of mutual fund splits as mutual funds have a continuous tick size. Therefore, Rozeff (1998) includes three different explanations for mutual fund stock splits. The first explanation is money illusion, in which investors might stay away from high-priced mutual fund stocks because they believe that a high price makes it more likely that the price can decline. The second explanation is that the fund expects to make high capital gains tax distributions in the future. By attracting new investors who buy into the tax liability, current shareholders benefit. The third explanation is that shareholders tend to prefer to have more shares than a fraction. It is more convenient for shareholders to have more shares with a lower price than fewer shares with a higher price in case they decide to make a gift of shares or liquidate small amounts.

Rozeff (1998) concludes that the money illusion hypothesis does not hold. Under this hypothesis, there should be fewer shareholders and/or fewer assets under management for funds with prices higher than average prices, which is not the case. His results also show that about 100 mutual funds split in a given year, and the most popular split factor is two for one as with

common stocks. This frequency of mutual fund splits is far less than that of common stock splits, suggesting that company managers have more compelling reasons to split than fund managers. As in the case of common stock, mutual fund splits occur in high-priced funds after unusually high returns. The post splitting results however differ from common stock splits. Mutual fund splits do not subsequently outperform non-splitting funds. Finally, he finds that post-split number of shareholders and assets do not increase compared with funds having similar rates of asset growth. However, mutual fund splits bring per account shareholdings back up to normal levels.

2.2. Utility industry

The basic difference between industrial companies and utility companies is the regulatory process. Utility companies are regulated primarily by the state regulatory commissions as well as federal regulation agencies. Although the extent of regulation varies somewhat from state to state, the general purpose of regulation is to make sure that customers get safe and reliable service at a reasonable price. Furthermore, they act to balance the interest of the customer and the shareholder.[4]

State commissions in forty-four states are authorized to regulate the issuance of public utility securities.[5] However, stock splits are not regulated by state commissions. According to the Division of Investment Management of the Security and Exchange Commission, utility companies that split go through the same procedure as ordinary companies. They file proxy

[4] A detailed explanation of the theories of regulation can be found on Appendix A.
[5] From the *National Association of Regulatory Utility Commissioners* (*NARUC) compilation of Utility Regulatory Policy 1991-1992*. Regulatory commissions do not have authority over the issuance of securities in Alaska, Delaware, Iowa, Mississippi, North Dakota and Texas.

statements, ask shareholders for formal approval of the split, and adjust their accounting in accordance with SEC procedures.

2.2.1. EPACT and its impact on information asymmetry.

In 1992 Congress enacted the Energy Policy Act (EPACT) to encourage the development of a competitive, national, wholesale electricity market with open access to transmission facilities owned by utilities to both new wholesale buyers and new generators of power. In addition, the EPACT reduced the regulatory requirements for new non-utility generators and independent power producers. The Federal Energy Regulatory Commission initiated rulemaking to encourage competition for generation at the wholesale level by assuring that bulk power could be transmitted on existing lines at cost-based prices. Under this legislation and rulemaking generators of electricity, whether utilities or private producers, could market power from underutilized facilities across state lines to other utilities.

In general, as an industry is deregulated, managers are less subject to subsidized controls by regulatory agencies that otherwise acted as a substitute for internal governance mechanisms. Moreover, managers in a deregulated environment are less subject to close supervision by regulatory agencies and are not required to have full disclosure of information. As a consequence, it is expected to be more difficult for the public to observe and judge manager's actions. Kim (1998) lists different factors for the increase of information asymmetry in deregulated markets. For instance, after deregulations managers have more opportunities for discretionary actions which are completely unknown to the public. Government intervention determines firms strategy and imposes constraints upon strategic decisions. Therefore, the strategic decision-making shifts away from managers to public officials. In contrast, when

markets are deregulated restrictions imposed on strategic moves disappeared increasing the sensitivity of firm value to managerial decisions.

2.2.2. Empirical evidence on utility companies.

In this section, I address two different issues in the financial literature with regards to the differences between public utility industry and other industries. First, I look at the market response to new equity issues by utility companies. Then, the capital structure of a regulated firm is addressed.

A) Share price response to new equity issue by utility companies.

A number of studies investigate the share price response associated with the issuance of new equity for utility companies and how these results differ from industrial companies (Asquith and Mullins, 1986; Masulis and Korwar, 1986; Filbeck and Hatfield, 1999). Asquith and Mullins (1986), and Masulis and Korwar (1986) both find that industrial firms experience larger negative excess returns than utility firms. Both studies suggest that the information asymmetry is much lower for utility firms than industrial firms since the former are subject to regulation.

Filbeck and Hatfield (1999) investigate the relationship between the level of institutional ownership and the magnitude of the share price response to new equity issues by public utility firms. They argue that due to the regulatory environment that exists for public utility companies, the monitoring role of institutional investors is mitigated. They look at a sample of 325 stock issues by public utility companies from 1977 to 1994. They hypothesize that the number of institutional investors and the proportion of shares owned by institutional investors are insignificant related to the two-day abnormal return of stock issue by public utility companies.

The ability of institutional shareholders to signal information about a new equity issue is superseded by the presence of regulation. Their results show that there is a lack of relationship between the level of institutional ownership and the magnitude of the share price response to the announcement of a new equity issue by a public utility firm.

B) Capital structure of a regulated firm

A different issue that is also addressed in the literature regarding to the difference between the utility industry and other industries is the effect of regulation on capital structure.

Taggart (1981) analyses possible "price-influence" effects of a regulated firm's capital structure. For a firm subject to rate-of-return regulation, the output price is set by an outside agency so as to yield a "fair" return to providers of capital, and, if effective, this process reduces monopoly profits. But if the regulator's price-setting rule depends on the firm's capital structure in some predictable way, the firm may be able to influence price and hence earn additional profits by choosing its financing mix. Taggart (1981) shows that firms have the incentive to change their capital structures given the regulated environment, specifically under rate-of return regulation. The magnitude of the change depends on the specific details of regulatory price-setting procedures.

Spiegel and Spulber (1994) create a model of the regulatory process in which the capital structure of firms plays a role in the strategic interaction between regulators and firms. He suggests that firms choose a positive amount of debt as a consequence of regulation despite the presence of high bankruptcy costs. Debt serves to raise the regulated rate-of-return as the regulators seek to reduce expected bankruptcy costs. Thus, he shows that the regulated firm

invests less than the social optimal level, which in turn raises regulated rates above the optimal level.

CHAPTER 3

HYPOTHESES

Information asymmetry and the resulting signaling implication associated with various managerial decisions have repeatedly been tested on industrial firms. Up until 1993, electric utilities were regulated and consequently, researchers considered the level of information asymmetry in utility firms to be less pronounced than firms in unregulated industries. In studying signaling implications of corporate events, most researchers, therefore, excluded utility firms (see Conroy, Harris, and Benet, 1990; Maloney and Mulherin, 1992). A few studies that have included utilities in their analyses find evidence of lower signaling effect from managerial decisions of firms in the utility industry. For example, Asquith and Mullins (1986) and Masulis and Korwar (1986) study the share price response associated with the issuance of new equity for utility companies and how these results differ from industrial companies. They find that industrial firms experience larger negative excess returns than utility firms. Both studies suggest that the information asymmetry is much lower for utility firms than industrial firms since the former are subject to regulation.

The regulatory environment for electric utilities has changed dramatically with the enactment of the EPACT in 1992. This act encourages the development of a competitive, national, wholesale electricity market with open access to transmission facilities owned by utilities to both new wholesale buyers and new generators of power. The benefits of competition insured that more open markets for generation would spread creating diversity among generators. Before the enactment of the EPACT, the regulatory environment alleviated information asymmetry among economic agents. In the post-EPACT era, managers are less subject to

monitoring by regulatory agencies that otherwise acted as a substitute for internal governance mechanisms. Moreover, increased competition resulting from the EPACT leads firms to be more responsive to consumer demands, monitor costs more closely, and compete on the basis of price.[6] As a consequence, it is expected to be more difficult for the public to observe and judge managers' actions. Therefore, after the enactment of the EPACT the characteristics of this environment change increasing the levels of information asymmetry between managers and investors. Kim (1998) lists different factors for the increase of information asymmetry in deregulated markets. For instance, in a regulated market, government intervention determines firm's strategy and imposes constraints upon strategic decisions. In contrast, when markets are deregulated restrictions imposed on strategic moves disappeared increasing the sensitivity of firm value to managerial decisions. Managers have more opportunities for discretionary actions which are completely unknown to the public. Therefore, the strategic decision-making shifts away from public officials to managers. A low level of information symmetry in the pre-EPACT era and increased information asymmetry in the post-EPACT period provide a clean backdrop to test signaling hypothesis linked to many managerial decisions. A firm's decision to split stocks is one of such decisions.

There is strong evidence that points to investors' positive reaction to the announcements of stock splits (see, among others, Fama, Fisher, Jensen, and Roll, 1969; Bar-Yosef and Brown, 1977; McNichols and Dravid, 1990; Ikenberry, Rankine, and Stice, 1996; and Desai and Jain, 1997). This evidence suggests that there are benefits associated with splitting stocks. Two major theories have emerged in the financial literature to explain the positive abnormal returns at the announcements of stock splits-- the signaling theory and the trading range theory.

[6] Gegax, D., and Nowotny, K. (1993) ``Competition and the Electric Utility Industry: An Evaluation." Yale Journal of Regulation 10: 63-88.

The signaling theory posits that firms split their shares to reveal favorable future information. Empirical work in this area finds strong evidence of the presence of signaling effect related to stock splits by industrial firms. (see, among others, Asquith, Healey, and Palepu, 1989; Brennan and Hughes, 1991; Desai and Jain, 1997; and Schultz, 2000). The trading range theory advocates that splits realign per-share prices to a preferred price range. This preferred price range is mainly justified on the basis that it improves liquidity and marketability. This theory is also supported by managers surveyed (see Baker and Gallagher, 1980; and Baker and Powell, 1993) as well as empirical findings (see, among others, Lakonishok and Lev, 1987; and D'Mello, Tawatnuntachai, and Yaman, 2003). Based on their sample of American Depository Receipts (ADR), Muscarella and Vetsuypens (1996) conclude that liquidity argument prevails in explaining the positive reaction to stock split announcement, since ADRs can not be motivated by any managerial desire to signal favorable information.

In this dissertation, I examine both the signaling argument and the liquidity/marketability argument by comparing the pre-EPACT period with the post-EPACT period. As such, my approach is an improvement on the approach taken by Muscarella and Vetsuypens (1996). This is so because this dissertation can better distinguish between signaling and liquidity/marketability motives for stock splits simultaneously within the same sample, given the changes in the level of information asymmetry experienced by the electric utility firms.

In this dissertation, I test three major hypotheses. The first hypothesis is

H_1: The excess return related to stock split announcement would be lower for electric utilities than their industrial counterpart in the pre-EPACT period, while in the post-EPACT period the difference in excess returns between the two groups would be lower.

The rationale behind this hypothesis is as follows. Asquith and Mullins (1986) and Masulis and Korwar (1986) find that industrial firms experience larger negative excess returns than utility firms in reaction to the issuance of new equity. They attribute this result to lower information asymmetry in utility firms due to regulation. Since before 1992 regulation prevailed and it started dissipating after 1992, the underlying expectation in H1 is justified.

Grinblatt, Masulis, and Titman (1984) and Ikenberry, Rankine, and Stice (1996) conclude that stock splits employed by firms with high level of information asymmetry convey more information and thus the market reacts more positively to their announcements. This leads to my second hypothesis.

H_2: The excess return related to stock split announcement would be lower in the pre-EPACT period than the post-EPACT period.

My third hypothesis is in the same vein as the first two in that it stems from level of information asymmetry in the two periods.

H_3: In the pre-EPACT period the liquidity motive of stock split dominates for electric utilities while in the post-EPACT period the signaling motive is dominant.

CHAPTER 4

METHODOLOGY

The methodology section is composed of four different sub-sections. In sub- section 4.1 I test hypothesis 1 by looking at the market reaction to public utilities stock split announcement. In sub-section 4.2 I explain the signaling measures which include the procedure for calculating changes in operating performance. Sub-section 4.3 presents the liquidity measures used in the study. Finally, in sub-section 4.4 I discuss the regression analysis.

4.1. The market reaction to public utility stock splits

To capture price responses around split announcement, for each company j, I form a three day cumulative abnormal return (AR_j) centered on the split announcement day. This abnormal announcement period return is defined as the return in excess of the value-weighted market return cumulated over the three-day window. AR_j is calculated as the sum of daily abnormal returns (ar_{jt}) where

$$ar_{jt} = r_{jt} - rm_t \qquad (1)$$

r = Daily return on a stock;

rm = Daily return on the value-weighted CRSP index;

t = Day relative to the split announcement day (t = 0).

The market-adjusted model is used to calculate the abnormal announcement period return since Brown and Warner (1985) find no significant difference between this model and the market

model. Thus, Campbell, Ederington, and Vankudre (1991) find that there is an upward bias in the intercept term of the market model parameter that lowers estimates of abnormal announcement period returns due to the significant run-up in stock prices in the period before the split.

4.2. Signaling measures

This study tests the signaling hypothesis by looking at the relation between split factors and abnormal return, and the changes in operating performance of the splitting firms. Asquith, Healy, and Palepu (1989) find that splitting firms experience earnings growth for at least four years subsequent to the announcement. In addition, Desai and Jain (1997) show that splitting shares significantly outperform by about 7 percent in the year following the split and by about 12 percent in the three years following the split. Rozeff (1998) finds that splitting funds do not subsequently outperform non-splitting funds. He argues that this result is inconsistent with managerial signaling. Therefore, it is important to study post-split operating performance of utility stock splits to access whether managers deliberately attempt to convey information when they announce a split. Abnormal Operating Performance for short-run (AOS) and long-run (AOL) are defined as follows:

$$\text{AOS} = \frac{O_0 - O_{-1}}{\text{TA}_{-1}} - \frac{MedO_0 - MedO_{-1}}{MedTA_{-1}} \qquad (2)$$

$$\text{AOL} = \frac{O_{+2} - O_{-1}}{\text{TA}_{-1}} - \frac{MedO_{+2} - MedO_{-1}}{MedTA_{-1}} \qquad (3)$$

O= Operating income before depreciation;

TA= Standardized variable, total assets measure;

Med= Median firm in the industry;

Subscripts -1= Fiscal year-end prior to the announcement;

Subscripts 0= Fiscal year-end immediately after the announcement;

Subscripts +2= Two fiscal year-end after the announcement.

Therefore, the short-term (long-term) abnormal operating performance measures the one year (three year) difference between the standardized operating performance of the splitting sample and the standardized median operating performance of the industry. Where the industry is defined as all companies within the 4900s SIC codes that have not split within the sample period.

4.3. Liquidity measures

The literature on stock splits has used different proxies for liquidity. For instance, by using trading volume as a proxy of liquidity, Copeland (1979) and Lamoureux and Poon (1987) find that dollar trading volume declines after OTC, NYSE, and AMEX stock splits. Conroy, Harris and Benet (1990) report that there is a decrease in split-adjusted volume following a stock split, while Arnold and Lipson (1997) find that trading volume increase subsequent to a stock split. Share price volatility, as a measure of liquidity, has been shown to increase following a stock split (Conroy, Harris, and Benet, 1990; Desai, Nimalendran, and Venkataraman, 1998; Dubofsky, 1991).

Another measure of market liquidity is the relative bid-ask spread supported by traders. Copeland (1979), Conroy, Harris, and Benet (1990) and Desai, Nimalendran, and Venkataraman

(1998) find that bid-ask spread expressed as a percentage of stock price increases after a split, indicating a decline in liquidity, while Murray (1985) provides no evidence of such an effect.

In this study I use two measures of liquidity, change in the number of shareholders and trading patterns around public utility stock splits. The change in the number of shareholders is calculated between the fiscal year-end before and after the split ex-date. For the study on trading patterns, I follow Muscarella and Vetsuypens (1996) and collect all trades for 120 trading days before and after the split ex-date for my sample of electric utility firms. By examining pre and post-split characteristics of the full sample of all transactions, I am able to identify whether or not small investors might have become more active in the market after the split as result of liquidity improvements.

4.4. Regression analysis

The next step is to analyze the cross-sectional variation in the price reactions to the stock split announcements. A linear regression is estimated where firm characteristics, split factor, price run-up, percentage change in the number of shareholders, firm asset value, and change in operating performance are included as independent variables. I will run the following regression:

$$AR = a + ß_1\ SPLIT + ß_2\ RUNUP + ß_3\ LNAT + ß_4\ \Delta SHO + ß_5\ \Delta OPER + e_t \quad (4)$$

AR= Three-day announcement period return;

a= Intercept;

$ß_{1, \ldots} ß_{5=}$ Coefficients;

SPLIT= Size of split factor;

RUNUP= Stock price increase from day -120 to day -6;

LNAT= Natural logarithm of the firm's total assets;

ΔSHO= Percentage change in the number of shareholders;

ΔOPER= Abnormal change in operating performance;

and e = Error term.

LNAT is the natural logarithm of the firm's total assets the fiscal year-end previous to the split announcement[7], ΔSHO is the percentage change in the number of shareholders from the fiscal year-end previous to the split announcement to the fiscal year-end immediately after the split, and ΔOPER is the one-year abnormal change in operating performance defined in section 4.2 above.

By using these variables I test the liquidity versus the signal motive of splitting stocks. Both, the price run-up and the change in the number of share holder variables are testing whether abnormal returns can be explained by changes in liquidity and marketability after the split. The variable run-up measures the stock price increase from day -120 to day -6. If the stock price increase is abnormally large, then managers will be inclined to split their stocks to bring share prices to a typical trading range. Thus, this variable acts as a forecast of the forthcoming stock split. Hence, RUNUP should be negatively related to the announcement returns of stock splits according to the marketability hypothesis. On the other hand, the change in the number of shareholders is predicted to be positive under the liquidity hypothesis.

The next three variables, total assets, change in operating performance, and size of the split factor, are included in this regression to examine whether investors view splits as a signal of

[7] Lakonishok and Lev (1987) observe that total assets is a more reliable measure of size than market value, which generally increases substantially in the period before the split announcement.

future performance. Following Grinblatt *et al.* (1984), I include firm size to test whether investors perceive split announcements from smaller firms somewhat different than announcement from larger firms. The split announcement of smaller firms should create greater market interest than it would in the case of larger firms since the former have fewer announcements published in the financial media and therefore, are less followed. Hence, there should be an inverse relationship between announcement period abnormal returns and the size of the firm. Signaling explanations are consistent with abnormal increase in earnings and/or dividends after the split. Thus, abnormal excess returns are observed at the split announcement because investors implicitly conclude that the split decision signals manager's belief that stock prices will continue to increase given future increase in earnings. The following variable, split factor SPFAC, has been used in a number of studies.[8] These studies find a positive relation between SPFAC and announcement returns. Larger split factors represent bigger percentage moves from the current price. Therefore, SPFAC is expected to be positively related to the announcement return.

[8] See McNichols and Dravid (1990), Ikenberry *et al*. (1996), for example.

CHAPTER 5

DATA DESCRIPTION

In section 5.1 I describe the data selection criteria. In section 5.2 I discuss some of the financial and asset characteristics of the sample of public utility splitting firms and compare them with non-splitting firm.

5.1. Data

The data for this study were drawn from two sources: the Center for Research in Security Prices (CRSP) Daily Master Tape, and the annual *Compustat* Tape. This study focuses on electric utility stock splits of five-for-four or greater that are listed on the American Stock Exchange (AMEX), the New York Stock Exchange (NYSE) and the National Association of Securities Dealers Automated Quotation System (NASDAQ) from 1986 through 2002.[9] I deleted 1 stock distribution with split factor less than 0.25. Table I presents the sample selection criteria. Following Grinblatt, Masulis, and Titman (1984), the event date (day 0) is defined as the earlier of the declaration date of the event on the CRSP daily master tape or the announcement date in the Wall Street Journal. The split data is the CRSP distribution code 5523. I include all electric and gas utility companies reported on CRSP under Standard Industrial Classification (SIC) codes 4900 – 4939 for every year of the sample selection. Gas production and distribution companies are included in this study due to the high degree of interconnection between them and electricity suppliers. Thus, there are many mergers of electric utilities with

[9] This study considers stock distributions of 25% or more as splits. According to generally accepted accounting principles, stock distributions of 20% or less are considered 'stock dividends', which dramatically decrease a firm's retained earnings. For stock distributions between 20% and 25%, the accounting principles grant full discretion to managers; however, most of these distributions are considered splits.

natural gas utilities within the sample period justified on the basis of power source diversification. The final sample from CRSP includes 158 electric and gas utility stock splits. Further, to eliminate the effects of contemporaneous announcements, I delete 50 observations for which the Wall Street Journal Index reported earnings or dividend information during a three-day period from one day before to one day after the stock split announcement date (day 0). After 1998, the Wall Street Journal Index stopped the announcement of stock splits. Therefore, the Mergent Public Utility Annual Report was used to verify the split announcement date. These screening procedures identify 108 observations. To remain in the sample for this study, companies must have data available in the *Compustat* annual files. Of the original 80 companies, 70 meet these criteria. The final sample includes 95 electric utility stock splits (70 electric companies) during 1986 to 2002.

In addition to the test sample, a control sample is constructed by taken all companies within the 4900's SIC codes that did not split during the sample period. These criteria resulted in 249 electric utility companies that did not split during 1986 and 2002.

5.2. Sample summary

Stock splits are quite a frequent event within public utility firms. Table II presents the frequency of utility stock splits; that is, the number of splits dividend by the total number of utility companies. This frequency varies from a low of 0.77 percent in 1995 to a high of 7.14 percent in 1987. Generally speaking, more splits are observed following bull markets. The average annual frequency from 1986 through 2002 is 4.98 percent. Lakonishok and Lev (1987) report that common stock split frequency averages 6.03 percent from 1963 through 1982, ranging from a low of 1.75 percent in 1974 to a high of 11.43 percent in 1981.

A recent study from Michayluk and Kofman (2001) find that the total number of stock splits with a split factor of at least 25 percent rose by almost 300 percent from 245 in 1990 to 724 in 1998. However, the results for public utility firms show that the number of stock splits has not increased in the last years of the sample.

Table I

Sample Selection Criteria

This table presents sample selection criteria, the number of splits and companies deleted under each criterion. The final sample includes 70 electric utility companies that announced 95 stock splits during 1986 to 2002.

Criteria	Number of Splits	Number of Companies
Electric and Gas Utilities stock splits (SIC 4900 - 4939) announced during 1986 and 2002 from CRSP	159	112
Split Factors less than 0.25	1	1
Original sample	158	111
Corporate announcement released during a three day period centered around day 0[a]	50	47
Clean sample	108	80
Data not available on *Compustat*	13	10
Final Sample	95	70

[a] The Wall Street Journal Index reported that 50 observations had earnings or dividend information during a three-day period from one day before to one day after the stock split announcement date (day0). These observations are deleted from the original sample to eliminate the effects of contemporaneous announcements.

The total number of electric utility companies has decreased from 247 in 1986 to 173 in 2002. This industry has undergone a major restructuring through mergers and acquisitions since its deregulation in the 1990's. Table III shows the number of delisting companies during 1986 to 2002. From the total number of mergers (160) during the sample period (1986-2002), 98 or 61.3 percent occurred during 1997 through 2002.

Table II

Annual Distribution of Electric Utility Stock Splits

The "Total Number of Utility Companies" column shows the total number of utility companies reported on CRSP under SIC codes 4900 – 4999 for every year of the sample selection. The column label "Number of Splits" shows the distribution by year of 108 electric utility stock splits from 1986 through 2002. The "Split Frequency" column shows the frequency of electric utility stock splits in a given year. That is, the number of splits divided by the total number of utility companies.

Year	Total Number of Utility Companies	Number of Splits	Split Frequency
1986	247	17	6.88
1987	252	18	7.14
1988	260	3	1.15
1989	253	8	3.16
1990	256	2	0.78
1991	254	2	0.79
1992	262	16	6.11
1993	258	12	4.65
1994	263	3	1.14
1995	261	2	0.77
1996	258	7	2.71
1997	256	2	0.78
1998	243	2	0.82
1999	229	5	2.18
2000	208	4	1.92
2001	182	3	1.65
2002	173	2	1.16
Total		108	

Table III

Delisting of Utility Companies, 1986-2002

The table shows the delisted number of utility companies by year during 1986 to 2002. The 'Mergers' column shows the number of companies with delisted codes 231,233, and 241 on CRSP during the sample period. The 'Insufficient Capital / Delinquent Filling' column shows the number of companies with delisting codes 560,561 and 580 on CRSP. The 'Other' column shows all other delinquent codes on CRSP found for electric utility companies.

	Delisted			
Year	Mergers	Insufficient Capital Delinquent Filling	Other	Total
1986	9	1	1	11
1987	0	2	0	2
1988	9	1	1	11
1989	5	1	0	6
1990	5	4	3	12
1991	2	2	0	4
1992	4	3	5	12
1993	7	2	1	10
1994	7	2	5	14
1995	9	3	1	13
1996	5	2	3	10
1997	15	4	4	23
1998	18	1	3	22
1999	18	4	6	28
2000	31	1	4	36
2001	8	2	2	12
2002	8	0	5	13
Total	160	35	44	239

Table IV shows the distribution of split factors in the 108 clean sample. Panel A shows that the split factors are similar to the conventional split factors observed for common stocks,

that is, two for one, three for two, four to three, etc[10]. Two for one split comprises 55.6 percent of the clean splitting sample of utility stocks during the overall period, 1986-2002. The next highest category is the three for two split at 39.8 percent. Panel B shows the distribution of split factors during the pre- and post- EPACT periods, i.e., 1986-1992 and 1993-2002, respectively.[11] Basically, the most common split factor remains two for one with 54.7 percent for the 1986-1992 period and 57.1 percent for the 1993-2002 period of the sample. The next highest category is the three for two for both sub-periods.

Table IV

Distribution of Electric Utility Splits by Split Factor, 1986-2002

The table shows the distribution of electric utility stock splits in the 108 clean sample in categories of stock split factor. Data on split factors are from CRSP Daily Master Tape. The split factor defined as the number of shares exchanged for the number of old share. Panel A shows the distribution for the entire sample from 1986-2002. Panel B shows the distribution of stock split factor for two different time periods.

Panel A: Overall Period				
Split Factor	4 – 3	3 – 2	2 – 1	3-1
1986 - 1992 (N= 108)	4	43	60	1
Panel B: Time Period				
1986 - 1992 (N= 66)	2	27	36	1
1993 - 2002 (N= 42)	2	16	24	0

[10] See Rozeff (1998).
[11] The EPACT was passed on 1992 and implemented on January 1, 1993.

Firm characteristics between the splitting and control sample are compared in Table V. All variables are obtained from *Compustat*. Assets are measured as "total assets" (*Compustat* item #A6), equity-book value as "book value of equity" (*Compustat* item #A60), equity-market value as "market value – fiscal year-end", earnings as "operating income before depreciation" (*Compustat* item #A13), number of shares outstanding as "common shares outstanding" (*Compustat* item #A25), and number of shareholders as "common shareholders" (*Compustat* item #A100). All variables are measured at the fiscal year-end prior to the split announcement.

Even though median and mean results are reported on Table V, I concentrate only on median results. In addition, the non-parametric Wilcoxon rank sum test is used to check the statistical difference in median results between the two sub-samples. The results show that the median split sample firm is larger in both market and book value of equity compared to the median non-splitting firm. Splitting firms also experience more profitable performance, defined as earnings available to shareholders, compared to non-splitting firms in the fiscal year-end previous to the split announcement. These results are consistent with previous literature that document that splitting firms are larger and experience abnormal positive performance in the period before the split.

Table V

Descriptive Statistics

The table presents descriptive statistics for selected variables for both splitting and non-splitting firms. Non-splitting firms are defined as firms in *Compustat* within the 4900's SIC codes that have not announced a split during the period of 1986 – 2002 on CRSP. All data is obtained from *Compustat* the fiscal year-end prior to the split announcement. All values except Number of shareholders (in thousands) are in million of dollars. The t-statistic and Wilcoxon-Z test statistical differences in mean and median between the two groups. ***, **, * denote significance at 1, 5 and 10 percent levels, respectively.

	Splitting Firms (N=95)				Non-Splitting Firms (N=1,787)				Difference
Variable	Mean (Median)	Max.	Min.	Std. dev.	Mean (Median)	Max.	Min.	Std. dev.	t-statistic (Wilcoxon-Z)
Assets	2,477.08	33,409.00	27.43	4,414.30	4,152.96	80,265.15	0.22	8,164.76	-3.40***
	(952.65)				(582.75)				(2.038**)
Equity - Market Value	1,360.35	18,345.75	17.99	2,376.55	1,792.68	50,020.37	0.48	3,872.67	-1.64*
	(509.28)				(366.16)				(2.272**)
Equity – Book Value	740.70	8,998.00	8.73	1,279.75	1,143.10	26,691.74	-418.76	2,299.27	-2.83***
	(286.96)				(173.99)				(2.233**)
Earnings	94.33	847.00	-11.90	151.89	112.71	3,761.56	-3,299.00	295.23	-1.08
	(41.87)				(10.30)				(3.814***)
Number of Shares Outstanding	73.56	732.00	1.08	108.39	76.10	1,280.20	0.00	158.59	-0.22
	(27.69)				(17.52)				(2.488***)
Number of Shareholders	25.13	167.83	0.05	33.48	35.81	775.96	0.00	69.04	-2.76***
	(11.44)				(4.20)				(2.334***)

CHAPTER 6

RESULTS

This chapter is composed of 4 sections. In section 6.1 I study the market reaction to public utility versus industrial stock splits. Section 6.2 analyses the impact of EPACT on announcement return. Section 6.3 presents the tests of the signaling versus liquidity-marketability hypothesis. Finally, in section 6.4 I show the results of the multivariate analysis and robustness check.

6.1. The market reaction to public utility versus industrial stock splits

I look at the announcement period return of utility stock splits versus their industrial counterparts during the period of 1986 through 2002. Abnormal announcement period return is defined as return in excess of the value-weighted market returns cumulated over the three-day window.[12] In Table VI, the market reaction to public utility and industrial stock split announcement is reported overall and by sub-periods for all firms. I find mean (median) increase in stock prices of 1.471% (1.161%) at the split announcement of electric utilities during the period of 1986 through 2002. Both mean and median abnormal returns are significantly different from zero at one percent level indicating that splits are interpreted by the market as good news. These results contradict the idea that splitting electric utility firms do not experience significant abnormal returns around the stock split announcement.

The next step is to compare the abnormal announcement period return of utility firms with other industrial firms. I use the same three-day cumulative abnormal return methodology around the event window to calculate the market reaction to stock splits announcement of

[12] See details in section 4.1.

industrial firms. The mean (median) price reaction of 6,976 firms that reported announcements of stock splits during the period of 1986 through 2002 on CRSP is 3.170% (2.126%). The original sample of industrial firms included 6,997 firms with SIC codes different than 4900s. I eliminate 21 firms for not having return information during the three-day window around the split announcement date. The abnormal return is similar to that of Ikenberry *et al.* (1996) who find a mean announcement return of 3.38% in their sample of common stock splits from 1975 through 1990. These results are consistent with the hypothesis that if there is a positive abnormal return at the announcement of utility stock splits, (as indicated above) then the abnormal return experienced at the announcement of stock splits is lower for utility than industrial firms. This difference in mean and median abnormal returns between utilities and industrial firms is statistically significant at one percent level.

6.2. Impact of EPACT on announcement return

I also examine whether the passage of the Energy Policy Act of 1992 (EPACT) has a significant impact on announcement period return of utility stock splits given the change in levels of information asymmetry. By allowing public utility companies to pursue growth opportunities in less regulated markets, the Energy Policy Act increased the levels of information asymmetry within this industry. I would therefore test the hypothesis that the excess return related to stock split announcement would be lower for electric utilities than their industrial counterpart in the pre-EPACT period, while in the post-EPACT period the difference in excess returns between the two groups would be lower (H_1). These results are expected given the lower levels of information asymmetry within public utility firms.

Table VI

Announcement Return of Electric Utility versus Industrial Stock Splits, 1986-2002

The table reports abnormal returns for electric utility and industrial stock splits announced between 1986 –2002. Abnormal returns are calculated for each firm by taking the three-day holding period return from one day before through one day after the announcement date, and subtracting the three-day value-weighted CRSP index holding period return. Mean (median) abnormal returns are reported overall and by time period. ***, ** denote significance at 1 and 5 percent levels, respectively.

Panel A: Public Electric Utilities

	N	Abnormal Return	t-Stat.
Electric Utility Stock Splits	108	1.471	5.426***
		(1.161)	
Time period			
1986 – 1992	66	1.773	4.927***
		(1.256)	
1993 - 2002	42	0.960	2.433**
		(1.001)	
Difference between periods (Wilcoxon)		-1.572	

Panel B: Industrial Firms

Industrial Stock Splits	6,976	3.170	38.394***
		(2.126)	
Time period			
1986 – 1992	2,893	2.765	26.874***
		(2.000)	
1993 - 2002	4,083	3.457	28.669***
		(2.239)	

To determine the existence of any significant change in abnormal returns, I divide the sample into pre- and post- EPACT periods, i.e., 1986-1992 and 1993-2002, respectively. The mean (median) announcement return decreases from 1.773% (1.256%) in the 1986-1992 period to 0.960% (1.001%) in the 1993-2002 period for the utility stock split sample. I also include the Wilcoxon rank-sum test to check the statistical difference in mean abnormal returns between the two periods in the combined data set. The statistic of -1.572 shows that abnormal returns are not significantly different between the two periods. On the other hand, the mean (median) announcement return for industrial firms increases from 2.765% (2.000%) in the pre-EPACT period to 3.457% (2.239%) in the post- EPACT period. Furthermore, these results are not consistent with the hypothesis that the excess return related to stock split announcement would be lower for electric utilities than their industrial counterpart in the pre-EPACT period, while in the post-EPACT period the difference in excess returns between the two groups would disappear. If the market perceives stock splits as a signaling mechanism, then the results should show a greater abnormal return for the post- EPACT period when information asymmetry is greater due to deregulation. If public utility splits do not serve as a signal mechanism prior to the enactment of EPACT, then the results show that utility splits have value because of their liquidity benefits.

In summary, the stock price reaction to announcement of public utility splits is significantly positive and lower than the excess returns found for industrial stock splits during the 1986 through 2002 period. When the sample is broken down into pre- and post- EPACT periods, the market reaction is greater for the pre-EPACT period when levels of information asymmetry are lower than post-EPACT period. I interpret these excess returns for 1986-1992 period as the market's reflection of the expected benefits from greater post-split liquidity.

Table VII

Summary of Major Provisions after the Enactment of EPACT

Provision	Description	State Role in Implementing Retail Competition	Deadline for Retail Competition
Power Bill (introduced 2/10/1999)	To remove Federal impediments to retail competition in the electric power industry, thereby providing opportunities within electricity restructuring.	Lead role in deciding on retail competition reforms. Retains role in protecting public health and safety.	No federally imposed deadline.
Electric Utility Restructuring Empowerment and Competitiveness Act of 1999 (introduced 3/3/1999)	A bill to benefit consumers by promoting competition in the electric power industry, and for other purposes.	Lead role in deciding on retail competition reforms. Retains role in protecting public health and safety.	No federally imposed deadline.
Electric Consumer Choice Act (introduced 6/24/1999)	A bill to amend the Federal Power Act to ensure that no State may establish, maintain, or enforce on behalf of any electric utility an exclusive right to sell electric energy or otherwise unduly discriminate against any consumer who seeks to purchase electric energy in interstate commerce from any supplier.	Lead role in deciding on response to withdrawal of any exclusive franchise authority.	Federal Power Act (FPA) authority for exclusive state franchises removed January 1, 2002.
Electricity Deregulation bill (identified by CRS) (introduced 2/24/2000)	A bill to facilitate the transition to more competitive and efficient electric power markets, and to ensure electric reliability.	Lead role in deciding on retail competition reforms. Retains role in protecting public health and safety.	No federally imposed deadline.
Consumer Empowerment and Electricity Deregulation Act of 2000(introduced 7/18/2000)	A bill to provide for retail competition for the sale of electric power, to authorize States to recover transition costs, and for other purposes.	Lead role in designing retail competition, subject to statutory criteria and limitations.	Deadline of January 1, 2002, enforceable by appeal to federal court.

Table VII gives a summary of the major provisions introduced after the enactment of the EPACT. These provisions were mainly introduced during 1999 and 2000 and show that an important reason for not seeing the evidence of narrowing abnormal returns at the announcement of stock splits between utility and industrial firms (hypothesis 1) is that the EPACT is being implemented slowly over the years.

6.3. Test of the signaling versus liquidity/marketability hypothesis

6.3.1. Tests of the signaling hypothesis

This section begins by testing the signaling hypothesis. Under this hypothesis managers split their stock to convey favorable private information about their current value.I test the signaling hypothesis by looking at the relation between split factors and abnormal return, and the changes in operating performance of the splitting firms.

A) Split factors

As a test of the signaling hypothesis, I investigate whether managers use the split factor to convey information about the firm's future performance. Specifically, I test whether split factors can explain the abnormal excess return observed after the announcement of public utility stock splits. McNichols and Dravid (1990) and Conroy and Harris (1999) conclude that managers employ the split factor to reveal information about future earnings improvements. Rozeff (1998) suggest that mutual fund managers choose split factors that result in post-split prices being in the conventional price range as defined by the prices of other mutual funds. He concludes that higher split factors are associated with higher deviations of fund prices from the existing mean of fund prices. Managers of mutual funds choose split sizes that bring fund prices

near the means of existing prices. Assuming that managers use split factors to bring share prices to a desired trading range and that investors use split factors as a signal for future performance, I will test the hypothesis that there is a positive significant relationship between split factors and abnormal returns around the announcement of utility stock split.

In order to understand how managers use split factor, that is, if they use split factors to bring share prices to a desired trading range and that investors use split factors as a signal for future performance, I regress the three day abnormal returns (AR) cross-sectional against the split factor (SPFAC).

$$AR = a + ß\ SPFAC + e \qquad (5)$$

Table VIII shows the regression results overall and by time period. Panel A shows that the split factors explain only 0.8 percent of the abnormal returns. Although there is a positive relation between the split factor and the abnormal return, the relation is not significant. The results are quite different for the two sub-samples. Panel B shows that there is a negative relation between split factors and abnormal returns for the pre-EPACT period of 1986-1992. This negative relation is not significant. For the post-EPACT period, 1993-2002, the split factors explain 3.4 percent of the abnormal returns. This positive relation is highly significant.

The results suggest that managers may use the split factor to convey information about the firm's future performance. Specifically, split factors can explain the abnormal excess return observed after the announcement of public utility stock splits for the post-EPACT period when levels of information asymmetry are higher. During this period signaling motives for splitting stocks should prevail.

Table VIII

Split Factors and Abnormal Returns

This table presents multivariate regression results overall and by time periods. The dependent variable is the three-day value weighted abnormal return from one day before through one day after the announcement date. The independent variable is the split factor. ***,** denote significance at 1, and 5 percent levels, respectively.

$$AR = a + ß\ SPFAC + e$$

Panel A: Overall Period (1986-2002)	Coefficient	t-Stat.
Intercept	0.006	0.724
Split	0.008	0.758
Adjusted R-Square	0.005	
Number of Observations	108	
Panel B: Time Period		
1986 - 1992		
Intercept	0.040	2.824***
Split	-0.046	-0.947
Adjusted R-Square	0.128	
Number of Observations	66	
1993-2002		
Intercept	-0.009	-0.916
Split	0.034	2.920***
Adjusted R-Square	0.104	
Number of Observations	42	

The next section continues with the study of the signaling hypothesis by looking at the operating performance of splitting firms one and two years after the split.

B) Changes in operating performance

Asquith, Healy, and Palepu (1989) find that stock split announcements convey earnings information. In addition, Ikenberry *et al.* (1996) find that splits are associated with long-run excess returns following the announcement period. They report a mean excess return of 7.93 percent and 12.15 percent in the first and third year after the split, respectively. Therefore, in this section I test the signaling hypothesis by looking at the operating performance of public utility firms after the split announcement. To find an abnormal or excess operating performance would be consistent with signaling explanations. This excess operating performance for the splitting sample is determined by subtracting the value of the median firm in the same industry. Moreover, due to changes of information asymmetry after the enactment of EPACT, I expect to find an increase in operating performance only for the post- EPACT period. I argue that signaling motives can only be present after the deregulation process. Hence, I test whether operating performance increases after the split announcement for the 1993-2002 period. I use short term and long term operating performance. Short-term operating performance is defined as operating income before depreciation at the fiscal year-end immediately after the split announcement minus operating income before depreciation at the fiscal year-end prior to the stock split announcement standardized by book value of total assets a year prior to the announcement. Long-term operating performance is defined as operating income before depreciation two fiscal year-end immediately after the split announcement minus operating income before depreciation at the fiscal year-end prior to the stock split announcement

standardized by book value of total assets. Abnormal values are calculated for each of these variables by subtracting the value of the median firm in the industry from that of our sample.[13]

$$AOP_S = \frac{O_0 - O_{-1}}{TA_{-1}} - \frac{MedO_0 - MedO_{-1}}{MedTA_{-1}}$$

$$AOP_L = \frac{O_{+2} - O_{-1}}{TA_{-1}} - \frac{MedO_{+2} - MedO_{-1}}{MedTA_{-1}}$$

Table IX shows the abnormal operating performance overall and by time period. On panel A I find that during the first year immediately after the split announcement the mean (median) abnormal operating performance of the splitting sample exceeds those of the median firm by 1.063% (0.037%) during the 1986 through 2002 period.[14] The difference in mean and median between the split sample and the industry are statistically significant, although the difference is very small. The long-term operating performance of the splitting sample significantly exceeds those of the median firm by 2.276%.

The next step is to look at abnormal operating performance of pre- and post- EPACT periods. The results on panel B do not show a statistically significant increase in operating performance between the overall industry and our splitting sample for the 1986-1992 period. The mean (median) abnormal operating performance is 0.534% (-0.013%) for the short-term and 1.072% (0.276%) for the long-term. The abnormal operating performance is quite different for the post- EPACT period, 1993-2002. During this period the mean (median) abnormal operating performance of the splitting sample exceeds those of the median firm by 1.778% (0.237%) in the short-term and by 4.403% (0.703%) in the long-term.

[13] See details in section 4.2.
[14] Similar results are reported for the contaminated sample.

Based on the results presented in this section, I cannot reject the hypothesis that operating performance increases after the 1992 period.

Table IX

Analysis of Operating Performance for Electric Utility Split Sample

The table shows the mean and median abnormal operating performance overall and by time period. Short-term operating performance is defined as operating income before depreciation at the fiscal year-end immediately after the split announcement minus operating income before depreciation at the fiscal year-end prior to the stock split announcement standardized by book value of total assets a year prior to the announcement. Long-term operating performance is defined as operating income before depreciation two fiscal year-end immediately after the split announcement minus operating income before depreciation at the fiscal year-end prior to the stock split announcement standardized by book value of total assets a year prior to the announcement. Abnormal values are calculated for each of these variables by subtracting the value of the median firm in the industry from that of our sample.

$$AOP_S = \frac{O_0 - O_{-1}}{TA_{-1}} - \frac{MedO_0 - MedO_{-1}}{MedTA_{-1}}$$

$$AOP_L = \frac{O_{+2} - O_{-1}}{TA_{-1}} - \frac{MedO_{+2} - MedO_{-1}}{MedTA_1}$$

O: operating income before depreciation
TA:standardized variable, total assets measure
Med:median firm in the industry
Subscripts -1: fiscal year-end prior to the announcement
Subscripts 0: fiscal year-end immediately after the announcement
Subscripts +2: two fiscal year-end after the announcement

The t-statistic and Wilcoxon-Z test statistical differences in mean and median between the split sample and the industry. ***, **, * denote significance at 1, 5 and 10 percent levels, respectively.

Panel A: Entire Period

	Abnormal Operating Performance	
	Short-Term	Long-Term
N	94	83
Mean	1.063	2.276
Median	0.037	0.397
t-Statistic	3.294***	2.448**
Wilcoxon-Z	1.196	2.210**

Table IX (continued)

Panel B: Time Period		
	Abnormal Operating Performance	
	Short-Term	Long-Term
1986 - 1992		
N	54	53
Mean	0.534	1.072
Median	0.013	0.276
t-Statistic	1.552	2.033**
Wilcoxon-Z	0.786	0.853
1993 - 2002		
N	40	30
Mean	1.778	4.403
Median	0.237	0.703
t-Statistic	3.031***	1.855*
Wilcoxon-Z	1.301*	2.035**

Hence, operating performance of the splitting sample provides evidence of signaling of managerial ability at least after the post- EPACT period when information asymmetry levels are higher.

6.3.2. Tests of the liquidity-marketability hypothesis

The empirical evidence of whether a stock split improves liquidity and/or marketability varies and depends on the liquidity/marketability measure used. When liquidity is measured by trading volume and percentage bid-ask spreads, several studies find a reduction in liquidity after

stock splits. Nevertheless, when liquidity is viewed in terms of increasing the number of shareholders and widening the ownership base, the evidence supports the notion that stock splits result in an increase of liquidity. Copeland (1979) finds a decrease in trading volume following a split. However, Lakonishok and Lev (1987) show that it is the trading volume prior to the split which is abnormally high, and that it returns to normal within two months of the split. The marketability hypothesis posits that by splitting stocks and reducing share price, firms increase the attractiveness of their shares to individual shareholders. As a possible motivation of stock split, previous literature shows an increase in the number of individual shareholders. Lamoureux and Poon (1987) developed a tax-option hypothesis in which stock splits result in clientele shifts from institutional to individual shareholders.

This section tests the marketability and liquidity hypotheses by looking first at the changes in prices before and after the split. Then, changes in number of shareholders and changes in trading volume are accessed.

A) Pre- and post-split prices

There have been extensive empirical studies documenting an association between stock splits and pre-split prices run-ups. Fama *et al.* (1969) find that shares of splitting firms earned abnormal returns for 29 months prior to the split, and Lakonishok and Lev (1987) report that shares rise by about 70 percent more than those of their control sample over the four years preceding the split announcement. Rozeff (1998) tests the distribution of prices of 145 mutual funds that split with the distribution of prices of the price-control sample of non-splitting mutual funds. He concludes that pre-split prices of mutual funds are significantly higher than the prices of other non-splitting funds.

The trading range hypothesis suggests that splits realign per-share prices to a preferred price range (McNichols and Dravid, 1990). This realignment of share prices is triggered by a pre-split price runup. Ikenberry *et al.* (1996) find in their sample that less than 3 percent of splitting firms have pre-split prices below the median price observed for firms of similar size. They suggest that splits are most often observed when prices have increased substantially in the recent past or shares are trading at a high level. The trading range hypothesis and liquidity hypothesis are not mutually exclusive explanations. Individuals may have a preference for a specific trading range because liquidity is higher at that price range. Therefore, I test the hypothesis that pre-split utility stock prices are significantly higher than the prices of other non-splitting utility stocks. Stock splits realign per-share prices to a preferred price range. This preferred price range is mainly justified on the basis that it improves marketability and liquidity.

I test this implication by comparing the pre-split share price, defined as the closing price ten days before the split announcement, of public utility firms with those of the median control sample. The control sample is created by taken all companies in the 4900's SIC codes that have not announced a split during the period 1986 through 2002. Table X shows the results. I find that the mean (median) price ten days before the split announcement is $40.84 ($39.56) for the split sample, and $18.65 ($17.63) for the control group. Clearly, the splitting sample shows a run-up in prices well above that of the control group. The Wilcoxon test for the difference in medians between the splitting and control sample prices produces a statistic of 21.08, which is highly significant. After the split, the results show that the mean (median) price of the electric utility split sample is $22.80 ($21.90), which is much closer to those prices observed within the control group. Based on these results I do not reject the hypothesis that pre-split prices are significantly higher than those of the control group.

Table X

Electric Utility Prices, 1986-2002

The first row shows mean, fractiles, and standard deviation of prices 10 days before the announcement date of 108 electric utility stock splits between 1986 –2002. A control group is created by taken all companies in the 4900's SIC codes that have not announced a split during the period of 1986 – 2002 on CRSP. For each of these companies prices are taken 10 days before the announcement of the 108 utility stock split sample. The control group row shows the mean, fractiles and standard deviation of the distribution of prices. The sample post-split row shows the mean, fractiles, and standard deviation of prices after the 108 electric utility stock split. Post-split prices are obtained after dividing the pre-split price by the ratio of number of shares exchanged for the number of old share.

	N	Mean	10%	50%	90%	Std. Dev
Sample of Electric Utilities pre-split	108	40.84	24.97	39.56	55.55	14.68
Control Group	23,467	18.65	7.82	17.63	30.60	9.45
Sample of Electric Utilities Post-split	108	22.80	15.00	21.90	30.66	6.95

Table XI looks at the different in prices between the splitting and control sample for the pre- and post-EPACT periods. Both sub-samples show a run-up in prices before the split. The mean (median) price ten days before the split announcement is $38.74 ($39.56) for the split sample, and $14.29 ($13.63) for the control group during the 1986-1992 period. After the split, the mean (median) price of the splitting sample is $21.80 (21.22) which is much closer to those prices observed within the control group. Similar results are observed for the post-EPACT period.

Table XI

Electric Utility Prices by Time Period

This table shows mean, fractiles, and standard deviation of prices 10 days before the announcement date of electric utility stock splits between the two sub-periods 1986–1992, and 1993-2002. The control groups are created by taken all companies in the 4900's SIC codes that have not announced a split during the two sub-periods on CRSP. For each of these companies prices are taken 10 days before the announcement of the utility stock split sample. The control group row shows the mean, fractiles and standard deviation of the distribution of prices. The sample post-split row shows the mean, fractiles, and standard deviation of prices after the electric utility stock split. Post-split prices are obtained after dividing the pre-split price by the ratio of number of shares exchanged for the number of old share.

	N	Mean	10%	50%	90%	Std. Dev
1986 – 1992						
Sample of Electric Utilities Pre-split	66	38.74	25.96	39.56	49.41	9.72
Control Group	14,242	14.29	6.72	13.63	22.99	6.46
Sample of Electric Utilities Post-split	66	21.80	15.00	21.22	28.89	5.25
1993 – 2002						
Sample of Electric Utilities Pre-split	42	44.15	23.44	39.87	83.50	19.86
Control Group	9,225	23.48	13.04	22.63	35.38	9.88
Sample of Electric Utilities Post-split	42	24.39	15.06	22.98	41.75	8.83

Figure I and II show histograms of pre- and post- split prices after electric utility splits during 1986 – 1992. Results show that almost 90% of the sample firms that split their stock have

share prices above the 80th percentile before the split. Only 3% of the sample firms have prices at or below the median price of firms within the same industry. In conclusion, Figure I and II show that splits realign share prices from a high level to a range that is closer to that of the median firm in the same industry.

Figure I

Histogram of Prices before Utility Stock Splits, 1986-1992

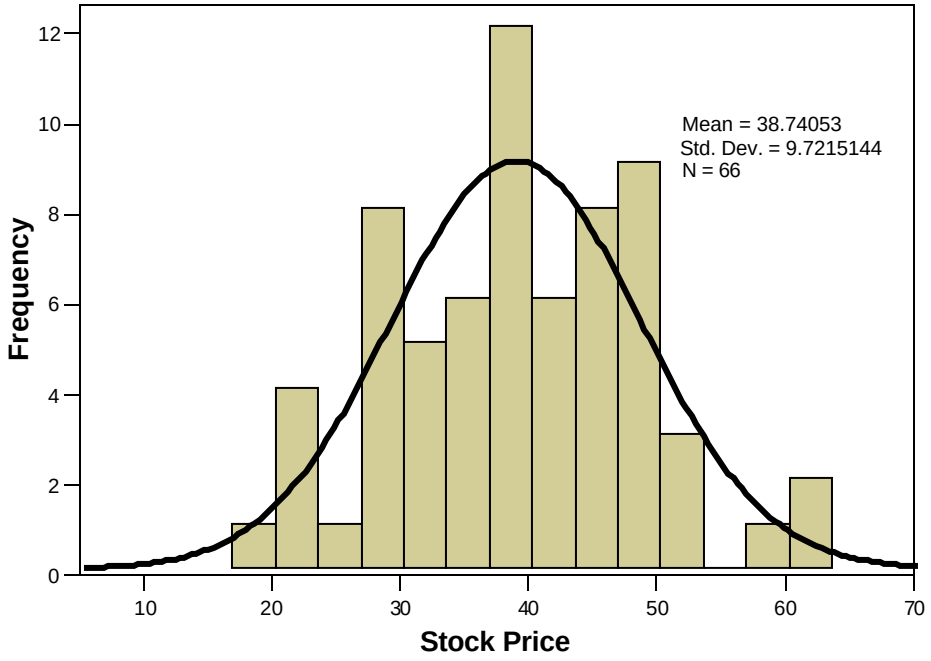
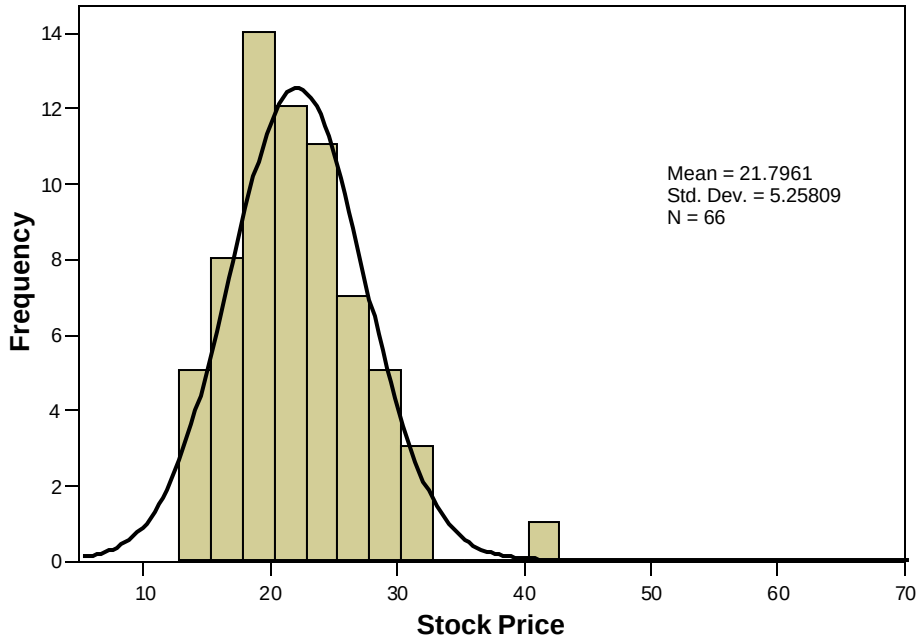


Figure II

Histogram of Prices after Utility Stock Splits, 1986-1992



Figures III and IV show the same histogram of price percentiles before and after utility stock splits during the post-EPACT period of 1993-2002. The graphs show that approximately more than 95% of the sample of firms have prices exceeding the 80th percentile during 1993-2002 period. After the split, the median price falls at the 20th percentile for the pre-EPACT period and lower than the 20th percentile for the post-EPACT period. The results show that splits realign share prices from a high level to a range closer to that of the median firm in the same industry; however, this realignment seems more pronounced for the pre-EPACT period when levels of information asymmetry are lower.

Figure III

Histogram of Prices before Utility Stock Splits, 1993-2002

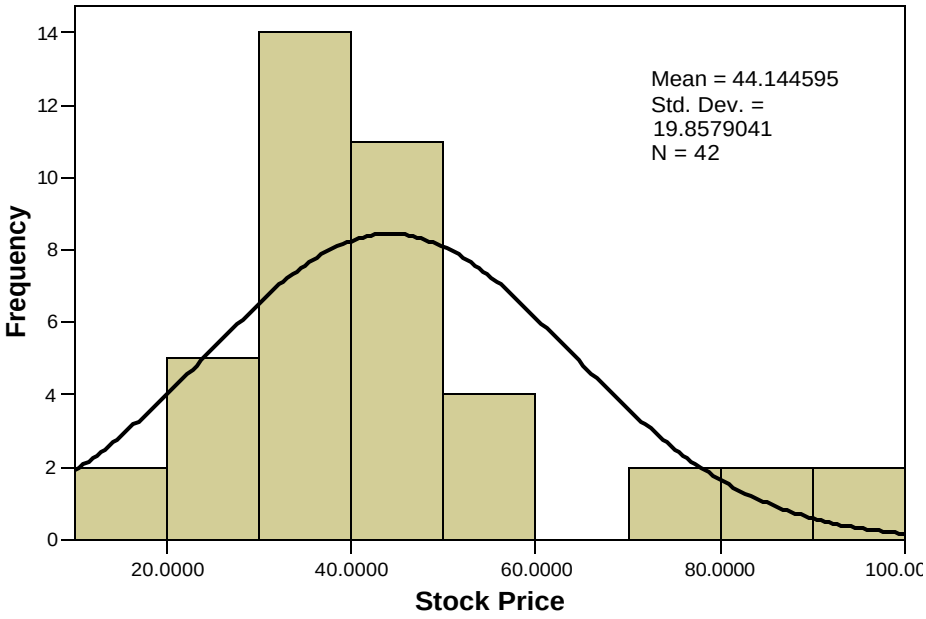
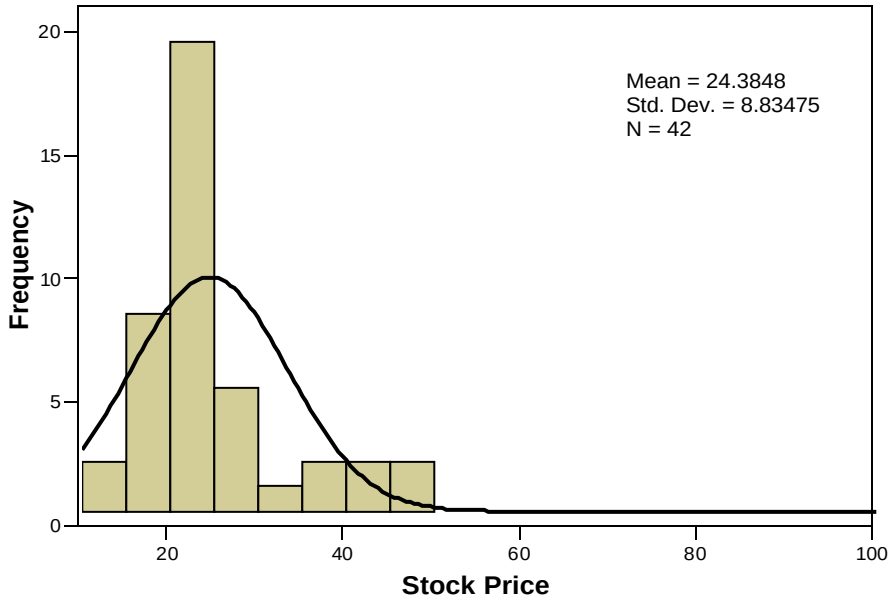


Figure IV

Histogram of Prices after Utility Stock Splits, 1993-2002



B) Changes in the number of shareholders

To directly identify the liquidity effects of public utility stock splits, I now turn to the analysis of the shareholder base. The underline assumption is that if there are benefits to returning the stock price to a lower trading range, I should observe evidence of liquidity improvement after the split. This liquidity improvement can be observed using different variables. Specifically, by lowering the share price to a more popular range, liquidity increases because more persons are buying or selling the stock. A lower share price enables a greater number of investors to trade economically in round lots and thereby encourages wider stock ownership. A survey of managers' motives for stock splits by Baker and Gallagher (1980) revealed that 98.4 percent of the respondents indicated that splits make it easier for small investors to purchase round lots, and 93.7 percent believed that splits keep a firm's stock price in an optimal range and increases the number of share holders.

Broadening outside ownership may be value-enhancing if it improves common stock liquidity or if it insulates managers from the corporate control market. If managers are concerned with a takeover threat, they rather have a broad and heterogeneous stockholder base since individual investors are less likely to tender shares to a bidder. Individual investors may not even be aware of takeover bids hence will not respond to them quickly. In most industries, managers are very concerned with an actual takeover. Hence, they may view stock splits as a tool to help fight the threats of takeovers. However, within the electric and gas utility industry takeover activity has historically been quite limited. In the period from 1960 to 1996 for example, there were only nine hostile takeover attempts and none were successful (McLaughlin and Mehran (1995)). In the five years from 1986 to 1990 there were 13 takeover attempts and

only one was successful. Most of these takeover attempts failed primarily because of the federal regulatory procedures based on the Public Utility Holding Company Act of 1935.

Therefore, within the public electric utility industry, the main motivation for having a broader shareholder base should be an increase in common stock liquidity rather than to insulate managers from the corporate control market. I test the hypothesis that there is an increase in the number of shareholders after the split due to liquidity and marketability reasons.

Table XII reports the percentage changes in the number of shareholders overall and by time period for the clean sample of utility stock splits. The percentage change in the number of shareholders is measured between the fiscal year-end immediately following the split ex-date and the fiscal year-end preceding the ex-date. The ex-date is taken from CRSP and the number of shareholders is taken form *Compustat*. There is a significant average increase in the in the number of shareholders of 3.25% during 1986– 2002 period. The median result is very small, 0.02%, and insignificant.

I also look at the percentage change in the number of shareholders pre- and post-deregulation periods. For the pre-EPACT period the mean (median) increase in the number of shareholders is 4.25% (0.47%), and significant. The results are quite different for the second period, 1993 – 2002, after the enactment of EPACT. I did not find a significant average increase in the number of shareholders for those splits during the 1993 – 2002 period. Moreover, the median results show a decrease of -1.80 % during those years.

Based on the results presented on this section, I do not reject the hypothesis that there is an increase in the number of shareholders after the split during the entire period from 1986 – 2002 due to liquidity reasons. However, when the sample is broken down into pre- and post-EPACT periods, 1986-1992 and 1993-2002, respectively, I only find a statistically significant

increase in the number of shareholders during the first period, 1986-1992. These results are consistent with the idea that liquidity motives of stock splits are more likely to appear before the deregulation period when levels of information asymmetry are the lowest.

Table XII

Percentage Changes in the Number of Shareholders

This table shows the mean and (median) percentage change in the number of shareholders for the clean sample overall and by time periods. The change in the number of shareholders is measured between the fiscal year-end preceding the split announcement date and the fiscal year-end immediately following the split announcement date. The t-statistic and Wilcoxon-Z test statistical differences in mean and median between pre and post-split period. ***, **, * denote significance at 1, 5 and 10 percent levels, respectively.

Variable	N	Mean (Median) %	t-stat. Wilcoxon-Z
% change in the number of shareholders	90	3.250	2.1981**
in the year containing the split		(0.020)	-0.245
Time Period			
1986-1992	53	4.246	2.599**
		(0.473)	-1.758*
1993-2002	37	1.830	0.667
		(-1.800)	-1.634

C) Changes in trading patterns

To identify the market effect of public utilities stock splits, I now turn to the analysis of trading activities. Most empirical studies of the liquidity effects of stock splits use trading volume. Copeland (1979) provides evidence suggesting a decrease in the volume of trade

subsequent to a stock split and interprets these findings as a decrease in the marketability of stock splits. Lamoureux and Poon (1987) find that dollar trading volume declines after OTC, NYSE, and AMEX stock splits. However, Lakonishok and Lev (1987) note that volume is abnormally high prior to splits. Moreover, Muscarella and Vetsuypens (1996) examine various characteristics of trading patterns around ADR splits and find that splits appear to increase the frequency and volume of small trades. They conclude that overall liquidity measures improve after the split for the category of small trades.

Trading volume has been measured in a variety of ways, including the number of shares traded, dollar volume of shares traded, and the number of transactions. In addition, the literature has also used a liquidity statistic based on the number of shares traded per unit of return as well as a turnover rate, measured as the number of shares traded divided by the number of shares outstanding. Each of these measures is supported under different basis. For instance, Datar *et al.* (1998) use the turnover rate since they believe that the number of shares traded by itself is not a sufficient measure for the liquidity of a stock since it does not take into account the differences in the number of shares outstanding or the shareholder base. Barclay and Warner (1993) also suggest that volume alone is not sufficient as a gauge of activity since informed traders will hide large trades by splitting them up.

In this section, I test that hypothesis that trading volume increases after the split. I follow Muscarella and Vetsuypens (1996) and collect all trades for 120 trading days before and after the utility stock split ex-date. I collect from CRSP all electric and gas utility companies that have reported a stock split ex-distribution date. The ex-distribution date is defined as the date on which the security is first traded after the split of the stock. I find 180 stock splits with available ex-distribution dates. There are 21 observations for which declaration date was not reported on

CRSP for these splits. For the 180 splits I calculate the daily dollar volume for the 120 days before and after the split. CRSP reports the total number of shares of a particular stock sold on a day, which I them multiply by the closing price of that stock on the same day to calculate the daily dollar volume. Then, I compute the average of the daily dollar volume for the 120 days before the split ex-date. The same procedure is followed to calculate the average daily dollar volume of the 120 days after the ex-date. [15]

Table XIII, panel A, shows the mean and median daily dollar volume for the pre- and post-split period for the overall sample of 180 stock splits during 1986 – 2002 period. On average there is a significant increase in daily dollar volume from $5.2 million before the split to $6.1 million after the split. Median values are not significant. Based on mean results, I do not reject the hypothesis that trading volume increases after the split.

On panel B, I follow the same procedure of the previous section and I break down the sample in two periods, before and after the enactment of EPACT. I study the changes in trading patters for the two sub-periods separately to see if there is a significant difference between them. During the first period, 1986-1992, there is a small and insignificant change between the pre-and post-split daily dollar volume. Median results show a drop in dollar value of shares trades. On the other hand, the second period, 1993-2002 shows a significant average increase of $1.9 million in the dollar value of shares traded between pre- and post-split periods.

Overall, I conclude from table XIII that utility stock splits, during the period of 1986-2002, on average increase the volume of trade. However, when the sample is broken into two sub-periods, the results are not the same for the pre- and post-deregulation periods. The 1986-1993 period experiences a drop in dollar value of shares traded. Nevertheless, this decrease in

[15] I also study the changes in trading patterns for the subset of 159 stock splits for which announcement dates are available and the results are basically the same. Therefore, I only present results for the entire sample of 180 stock splits.

dollar value can be explained by an increase in the number of small transactions per day since the number of shareholders increases significantly following the split, as shown in the previous section. On the other hand, the second period, 1993-2002, experiences a significant increase in the average dollar value of trade, consistent with the liquidity hypothesis.

Table XIII

Changes in Trading Patterns Around Utility Splits

This table shows the mean and median change in daily dollar volume 120 days before and 120 days after the split ex-date. The data to calculate the daily dollar volume is taken from CRSP. Panel A shows the results for the overall period that includes 180 public utility stock splits during 1986- 2002 period. Panel B shows the results for the two sub-periods. The t-statistic and Wilcoxon-Z test statistical differences in mean and median between pre and post-split period. * denote significance at 10 percent level.

Panel A: Overall Period (N=180)		
	Daily Dollar Volume	
	Mean	Median
Pre-split	$5,188,794	$802,315
Post-split	$6,088,658	$786,719
Change	$899,864	-$9,722
t-Statistic/Wilcoxon-Z	1.661*	-0.604
Panel B: Time Period		
1986-1992 (N=98)		
Pre-split	$1,652,432	$537,897
Post-split	$1,689,297	$515,679
Change	$36,865	-$15,649
t-Statistic/Wilcoxon-Z	0.493	-0.969
1993-2002 (N=82)		
Pre-split	$9,415,178	$1,575,232
Post-split	$11,346,431	$1,570,651
Change	$1,931,253	-$3,822
t-Statistic/Wilcoxon-Z	1.637*	-0.086

6.4. Multivariate analysis and robustness check

The following section presents the results of the multivariate analysis as well as the robustness check. To test the signaling and liquidity/marketability hypotheses, a regression approach is used to investigate the effects of different variables (mention below) on announcement return.

6.4.1. Multivariate analysis

In this section I conduct cross-sectional ordinary least square regressions to determine whether the abnormal returns, found in Table VI, are significantly related to signaling or liquidity/marketability variables. The dependent variable is the three-day announcement period return. The independent variables include firm asset value, the split factor, change in operating performance, price run-up, and percentage change in the number of shareholders. I use total assets instead of market value since Lakonishok and Lev (1987) observe that total assets is a more reliable measure of size since market value generally increases substantially in the period before a split announcement. Thus, Brown *et al.* (1983) observe a strong correlation between market value of equity and total assets. They conclude that results are not likely to be sensitive to the size variable used.

Table XIV shows the results of the multivariate analysis. Panel A shows the regression analysis for the entire period, 1986 – 2002. Paralleling past empirical findings (Grinblatt *et al.*, 1984, Ikenberry *et al*., 1996), the coefficient on LNAT is negative and significant. Interpreting that splits of smaller, less-followed firms have greater impact on announcement returns. The coefficient for the split factor is positive but insignificant. This finding contradicts the hypothesis that investors view firms with greater split factors as having more favorable private information.

The change in operating performance does not seem to influence the announcement return of utility stock splits. The coefficient is -0.028 and insignificant. The coefficient of RUNUP is not significant. This suggests that the price variation previous to the split does not act as a forecast of the forthcoming stock split. Finally, the change in the number of shareholders is positive and significant as predicted. Apparently, firm size and the change in the number of shareholders are the only variables that may explain announcement returns during the period of 1986-2002.

Table XIV

Regression Results

This table presents multivariate regression results overall and by time periods. The dependent variable is the three-day value weighted abnormal return from one day before through one day after the announcement date. The independent variables include the split factor, the price runup, total assets, the change in the number of shareholders, and the change in operating performance. LNAT is the natural logarithm of the firm's total assets the fiscal year-end previous to the split announcement, Split is the split factor, ΔSHO is the percentage change in the number of shareholders from the fiscal year-end previous to the split announcement to the fiscal year-end immediately after the split, and ΔOPER is the change in operating performance from the fiscal year-end previous to the split announcement to the fiscal year-end immediately after the split. The variable runup measures the stock price increase from day -120 to day -6. ***,**, * denote significance at 1, 5 and 10 percent levels, respectively.

Panel A: Overall Period (1986-2002)

	Predicted Sign	Coefficient	t-Stat.
Intercept		0.045	2.850***
LNAT	-	-0.006	-2.906***
Split	+	0.009	0.843
ΔOPER	+	-0.028	-0.275
RUNUP	-	0.000	-0.681
ΔSHOL	+	0.002	1.962*
Adjusted R-Square		0.094	
Number of Observations		92	

Table XIV (continued)

Panel B: Time Period

	Predicted Sign	Coefficient	t-Stat.
1986 - 1992			
Intercept		0.046	2.633**
LNAT	-	0.000	-0.207
Split	+	-0.048	-1.086
ΔOPER	+	0.026	0.254
RUNUP	-	0.000	0.085
ΔSHOL	+	0.007	4.539***
Adjusted R-Square		0.105	
Number of Observations		52	
1993-2002			
Intercept		0.011	0.498
LNAT	-	-0.004	-1.193
Split	+	0.032	2.457**
ΔOPER	+	0.195	2.106*
RUNUP	-	0.001	0.247
ΔSHOL	+	0.000	0.779
Adjusted R-Square		0.487	
Number of Observations		39	

Panel B shows the regression analysis for the two sub-periods, 1986 – 1992 and 1993 – 2002. For the first period, the coefficient of LNAT is negative and insignificant. Of particular interest in this sub-sample is the coefficient of the change in the number of shareholders which is positive and highly significant (t = 4.539). Since information asymmetry in this period is smaller

than after the enactment of EPACT, motives other than signaling should predominate in the decision of splitting stocks. Therefore, as shown on panel B liquidity/marketability variables, specifically the increase in the number of shareholders, explains the abnormal announcement return. On the other hand, during the second period, 1993-2002, the only two significant variable is the split factor and the change in operating performance. During this period, announcement abnormal returns are significantly impacted by the change in operating performance ($t = 2.3106$) as expected. After the deregulation period, signaling variables should be more prone to explain the abnormal announcement returns.

In summary, I find evidence which is consistent with both the signaling and liquidity hypotheses. For the pre-EPACT period, liquidity explanations seem to predominate in explaining the abnormal announcement return of utility stock splits. The post-EPACT period on the other hand seems to have the signaling motive as a leading explanation of abnormal announcement return.

6.4.2. Robustness check

In this section I consider whether the unusual earning increases following public utility stock splits might be due to substantive changes in risk. Studies on long-run abnormal performance are usually concern as to the robustness of the evidence. In theory, the risk preceding and following the split ex-date should on the average be no different. Splits are considered seemingly innocent events with no apparent potential to impact the firm's risk or cash flows. However, previous literature shows that stock splits also appear to be associated with increases in both the total and systematic riskiness of stocks around ex-dates. Ohlson and Penman (1985) study the stock return volatilities and find that they tend to increase dramatically

following split ex-dates. Lamoreux and Poon (1987) find that stock volatilities usually decline following reverse splits ex-dates. Brennan and Copeland (1988b) report a major increase in beta coefficient on the ex-date but not on the announcement date. Wiggins (1992) finds that the magnitude of this increase is sensitive to the return measurement interval. Thus, he explains the Brennan and Copeland findings as the result of a more rapid response of security returns to market information after the split date.

Table XV shows the results of the beta estimates preceding and following the split announcement in two different ways. I follow Wiggins (1992) methodology to capture the sample in which all stock splits in the sample are required to have complete daily return records over days -80 through +84 relative to the ex-date on CRSP. The pre-split sample covers days -80 through -1 and the post-split sample includes days +5 through +84. The full sample includes 234 utility splits with ex-months between 1986 and 2002.

As shown in the results on panel A, I first estimate individual betas for the 234 splits using the traditional ordinary least square (OLS) time-series method. Thus R_{jt} is defined as the return on stock j on calendar date t, and R_{mt} is the CRSP value-weighted return on calendar date t.

$$R_{jt} = a_j + ß_j R_{mt} + u_{jt} \qquad (6)$$

Separate pre- and post-split betas are calculated for each stock j and then average across stocks. The results show a tendency for the average beta to increase after the ex-date. While the average beta for the pre-split period is 0.366, it is 0.551 for the post-split period. The t-statistic

for the difference between the average OLS beta for the pre- and post-split period is 4.526, which is highly significant.

Table XV

Beta Estimates Preceding and Following Utility Stock Splits

This table shows estimates of market risk for the 80 days before and 80 days after 234 utility stock splits ex-dates from 1986 – 2002. Panel A reports the time series beta using a one-factor model, where the dependant variable is the return on stock j on calendar date t, and the market index is the CRSP value-weighted returns. Panel B shows the results of the estimates using the cross-sectional procedure of Ibbotson (1975). *** denote significance at 1 percent level.

Panel A: Time-Series Betas ($R_{jt} = a_j + ß_j R_{mt} + u_{jt}$)			
	Beta Estimator		
	Pre-split (-80,-1)	Post-split (+5,+84)	Change (Post-Pre)
Mean	0.366	0.551	0.150
Median	0.352	0.543	0.156
Sample Size			234
t-Statistic			5.264***
Panel B: Cross-Sectional Betas ($R_{jt} = a_t + ß_t R_{mt} + u_{jt}$)			
Mean	0.365	0.539	0.173
Median	0.359	0.530	0.175
Sample Size			80
t-Statistic			5.771***

On panel B I present the results using a different methodology to find the beta estimates. I also employ the cross-sectional procedure of Ibbotson (1975) where

$$R_{jt} = a_t + ß_t R_{mt} + u_{jt} \quad (7)$$

$ß_t$ is now the average beta of splitting stocks for period t in event time. These daily event-time betas are then average over event dates in each of the pre- and post-split periods. The results show that the average beta estimate over the 80 days following the split ex-date is about 47 percent higher than over the 80 days preceding the ex-date. The average beta increases from 0.365 to 0.539 with a difference that is highly significant (t=5.771). The median and mean results are very similar. Thus, median results also show a significant increase in beta estimates after the split ex-dates. Therefore, it is surprising to find an increase in systematic risk after the split ex-date since a split would generally be thought of as conveying firm-specific risk rather than economy-wide information.

Other literature in the area also finds an increase in systematic risk when beta coefficients are calculated using daily data.[16] However, Wiggins (1992) shows evidence that the increase in risk is largely confined to a short period immediately following the split announcement. Dubofsky (1991) do not find significant evidence that risk is fundamentally changing. Previous articles use daily data and in some cases weekly data which can be noisy and potentially prone to error. Moreover, Ikenberry and Ramnath (2002) detect a short-lived increase in systematic risk in the months surrounding the split. They conclude that the modest increase in beta has little ability to explain the post-split drift.

Next, I calculate the beta estimates preceding and following the split announcement for the pre- and post-EPACT periods. Table XVI shows the results using the traditional ordinary least square (OLS) time-series method. The results show an average increase in beta from 0.433 to 0.630 for the pre-EPACT period. The post-EPACT period also shows an increase in the beta

[16] See Brennan and Copeland (1988) and Wiggins (1992).

estimates of about 47%. The average beta 80 days before the split for those firms with split ex-dates between 1993 and 2002 is 0.301. This beta increases to 0.443 after the split for the post-EPACT period.

Table XVI

Beta Estimates Preceding and Following Utility Stock Splits, by Time Period

This table shows estimates of market risk for the 80 days before and 80 days after 234 utility stock splits ex-dates. The dependent variable is the return on stock j on calendar date t and the market index is the CRSP value-weighted returns. Panel A reports the time series beta using a one-factor model for the pre-EPACT period. Panel B shows the beta estimates using a one-factor model for the post-EPACT period. *** denote significance at 1 percent level.

Time Period: 1986-1992			
	Beta Estimator		
	Pre-split (-80,-1)	Post-split (+5,+84)	Change (Post-Pre)
Mean	0.433	0.630	0.195
Median	0.431	0.628	0.199
Sample Size			150
t-Statistic			4.563***
Time Period: 1993-2002			
Mean	0.301	0.443	0.140
Median	0.304	0.444	0.102
Sample Size			84
t-Statistic			4.235***

CHAPTER 7

CONCLUSION

This dissertation examines managerial motivation for splitting stocks in the public electric utility industry before and after the enactment of the Energy Policy Act of 1992. These changes in the regulatory process opened a window of opportunities for the study and comparison of the two leading explanations for stock splits found in the literature, namely signaling and liquidity-marketability. The signaling hypothesis posits that firms split their shares to reveal favorable information. The liquidity/marketability hypothesis states that stock splits enhance the attractiveness of shares to investors and increase the volume of trade by restoring prices to a preferred trading range. Hence, the liquidity and marketability motives should play a more important role in the pre-EPACT era, while signaling motive should dominate in the post-EPACT era due to the increase of information asymmetry.

During the pre-EPACT period (1986-1992) I find that the results are consistent with the idea that liquidity motives of stock splits predominate given that the levels of information asymmetry are the lowest. I test the liquidity-marketability hypothesis by looking first at the changes in prices before and after the split. Then, changes in number of shareholders and changes in trading volume are accessed. The trading range hypothesis suggests that splits realign per-share prices to a preferred price range (McNichols and Dravid, 1990). This realignment of share prices is triggered by a pre-split price runup. Ikenberry *et al.* (1996) find in their sample that less than 3 percent of splitting firms have pre-split prices below the median price observed for firms of similar size. The results show that splits realign share prices from a high level to a range closer to that of the median firm in the same industry. Moreover, this realignment seems

more pronounced for the pre-EPACT period when levels of information asymmetry are lower. The changes in the number of shareholders show that there is an increase in the number of shareholders after the split during the entire period from 1986 – 2002 due to liquidity reasons. However, when the sample is broken down into pre- and post- EPACT periods, I only find a statistically significant increase in the number of shareholders during the first period, 1986-1992. Finally, the changes in trading volume before and after the split ex-date show that the pre-EPACT period experiences a drop in dollar value of shares traded. Nevertheless, this decrease in dollar value can be explained by an increase in the number of small transactions per day since the number of shareholders increases significantly following the split.

During the post-EPACT era (1993-2002) I find evidence consistent with signaling explanation for stock splits. I test the signaling hypothesis by examining the announcement period return, the relation between split factors and abnormal returns, and the changes in operating performance of the splitting firms. Finding significant abnormal excess stock returns, a positive relation between split factors and abnormal return, and abnormal increase in earnings around the split are consistent with signaling explanations. The results show that the market reaction to the announcement of utility stock splits is significantly positive but lower than the excess returns found for industrial stock splits during the 1986 through 2002 period. When the sample is broken down into pre- EPACT period (1986-1992) and post- EPACT period (1993-2002), I find that the market reaction is greater for the pre-EPACT period. I interpret these excess returns for 1986-1992 period as the market's reflection of the expected benefits from greater post-split liquidity and marketability. Furthermore, I test whether split factors can explain the abnormal excess return observed after the announcement of public utility stock splits. McNichols and Dravid (1990) and Conroy and Harris (1999) conclude that managers employ the

split factor to reveal information about future earnings improvements. The results show that managers use the split factor to convey information about the firm's future performance. Specifically, split factors can explain the abnormal excess return observed after the announcement of public utility stock splits for the post-EPACT period when levels of information asymmetry are higher. Finally, the increase in operating performance of the splitting sample provides evidence of signaling of managerial ability at least after the post- EPACT period.

The cross-sectional regression also provides convincing evidence that utility stock split motives change before and after the enactment of the EPACT. Before the EPACT liquidity and marketability motives explain the positive stock price reaction to announcement of public utility splits whereas after the EPACT signaling motives prevail. The three day announcement period returns are positively related to the change in the number of shareholders for the pre-EPACT period and positively related to the change in operating performance for the post-EPACT period.

In conclusion, I find evidence which is consistent with both the signaling and liquidity/marketability hypotheses. For the pre-EPACT period, liquidity explanations seem to predominate in explaining the abnormal announcement return of utility stock splits. The post-EPACT period on the other hand seems to have the signaling motive as a leading explanation of abnormal announcement return.

REFERENCES

Angel, James J., 1997 Tick size, share prices, and stock splits, *Journal of Finance* 52, 655-681.

Anshuman, Ravid V. and Avner Kalay, 1994, Can stock splits create market liquidity? Theory and evidence, *Unpublished manuscript*, Boston College.

Arbel, Avner, and Gene Swanson, 1993, The role of information in stock split announcement effects, *Quarterly Journal of Business and Economics* 32, 14-25.

Arnold, Tom and Mark L. Lipson, 1997, Tick size and limit order execution: an examination of stock splits, *Working paper*, University of Georgia.

Asquith, Paul, Paul Healy, and Krishna Palepu, 1989, Earnings and stock splits, *The Accounting Review* 64, 387-403.

Asquith, Paul, and David W. Mullins, 1986, Equity issues and offering dilution, *Journal of Financial Economics* 15, 61-89.

Baker, H. Kent, and Patricia L. Gallagher, 1980, Management's view of stock splits, *Financial Management* 9, 73-77.

Baker, H. Kent, and Gary E. Powell, 1993, Further evidence on managerial motives for stock splits, *Quarterly Journal of Accounting Research* 25, 196-216.

Bar-Yosef, Sasson , and Lawrence D. Brown, 1977, A reexamination of stock splits using moving betas, *Journal of Finance* 32, 1069-80.

Barclay, Michael J. and Jerold B.Warner, 1993, Stealth trading and volatility: Which trades move prices, *Journal of Financial Economics* 34, 281-305.

Brennan, Michael J., and Thomas E. Copeland, 1988a, Beta changes around stock splits: A note, *Journal of Finance* 43, 1009-1013.

Brennan, Michael J. and Thomas E. Copeland, 1988b, Stock splits, stock prices, and transaction costs, *Journal of Financial Economics* 22, 83-101.

Brennan, Michael J. and Patricia J. Hughes, 1991, Stock prices and the supply of information, *Journal of Finance* 46, 1665 – 1691.

Brown, Stephen J. and Jerold B. Warner, 1985, Using daily stock returns: The case of event studies, Journal of Financial Economics 14, 3-31.

Campbell, Cynthia J., Louis H. Ederington, and Prashant Vankudre, 1991. Tax shields, sample-selection bias, and the information content of conversion-forcing bond calls, *Journal of Finance* 46, 1291-1324.

Conroy, Robert M. and Robert S. Harris, 1999, Stock splits and information: the role of share price, *Financial Management* 28, 28-40.

Conroy, Robert M., Robert S. Harris, and Bruce Benet, 1990, The effects of stock splits on bid-ask spreads, *Journal of Finance* 45, 1285-1295.

Constantinides, George M., 1984, Optimal stock trading with personal taxes, *Journal of Financial Economics* 13, 65-89.

Copeland, Thomas E., 1979, Liquidity changes following stock splits, *Journal of Finance* 34, 115-141.

Datar, Vinay, Narayan Kaik, and Robert Radcliff, 1998, Liquidity and stock returns: An alternative test, Journal of Financial Markets 1, 203-219.

Desai, Anand S., Mahendrarajah Nimalendran, and Sankaran Venkataraman, 1998, Changes in trading activity following stock splits and their effect on volatility and the adverse information component of the bid-ask spread, *Journal of Financial Research* 21, 159-184.

Desai, Hemang and Prem C. Jain, 1997, Long-run common stock returns following stock splits and reverse splits, *Journal of Business* 70, 409-433.

D'Mello, Ranjan, Oranee Tawatnuntachai, and Devrim Yaman, 2003, Why do firms issue equity after splitting stock?, *The Financial Review* 38, 323-350.

Dubofsky, David A., 1991, Volatility increases subsequent to NYSE and AMEX stock splits, *Journal of Finance* 46, 421-431

Fama, Eugene F., Lawrence Fisher, Michael C, Jensen, and Richard Roll, 1969, The adjustment of stock prices to new information, *International Economic Review* 10 1-22.

Fernando, Chitru S., Srinivasan Krishnamurthy, and Paul A. Spindt, 1999, Is share price related to marketability? Evidence from mutual fund share splits, *Financial Management* 28, 54-67.

Filbeck, Greg and Patricia Hatfield, 1999, Public utility companies: Institutional ownership and the share price response to new equity issues, *Journal of Financial and strategic decisions* 12, 31-38.

Gegax, Douglas and Kenneth Nowotny K., 1993, Competition and the electric utility industry: An evaluation, *Yale Journal of Regulation* 10, 63-88.

Grinblatt, Mark S., Ronald W. Masulis, and Sheridan Titman, 1984, The valuation effects of stock splits and stock dividends, *Journal of Financial Economics* 13, 461-490.

Han, Ki C. and David Y. Suk, 1998, Insider ownership and signals: evidence from stock split announcement effects, *Financial Review* 33, 1-24.

Harris, Lawrence, 1997, Decimalization: A review of the arguments and evidence, *Working paper*, University of Southern California.

Ibbotson, Roger G., 1975, Price performance of common stock new Issues, *Journal of Financial Economics* 2, 235-272.

Ikenberry, David L. and Sundaresh Ramnath, 2002, Underreaction to self-selected news events: The case of stock splits, *The Review of Financial Studies* 15, 489-526.

Ikenberry, David L., Graeme Rankine, and Earl K. Stice, 1996, What do stock splits really signal, *Journal of Financial and Quantitative Analysis* 31, 357-375.

Kim, Bongjin, 1998, Industry regulation and corporate governance, *Working paper*, Tilburg University, The Netherlands.

Lakonishok, Josef and Baruch Lev, 1987, Stock splits and stock dividends: why who, and when, *Journal of Finance* 62, 913-932.

Lamoureux, Christopher G. and Percy Poon, 1987, The market reaction to stock splits, *Journal of Finance* 42, 1347-1370.

Maloney, Michael T. and J. Harold Mulherin, 1992, The effects of splitting on the ex: A microstructure reconciliation, *Financial Management* 21, 44-59.

Mann, Steven V. and William T. Moore, 1996, The effects of transaction costs on the firm's stock split decision, *Mid-Atlantic Journal of Business* 32, 189-203.

Masulis, Ronald W. and Ashok N. Korwar, 1986, Seasoned equity offerings: An empirical investigation, *Journal of Financial Economics* 15, 91-118.

McLaughlin Robyn and Hamid Mehran, 1995, Regulation and the market for corporate control: Hostile tender offers for electric and gas utilities, *Journal of Regulatory Economics* 8, 181-204.

McNichols, Maureen and Ajay Dravid, 1990, Dividend policy under asymmetric information, *Journal of Finance* 45, 857-879.

Michayluk, David and Paul Kofman, 2001, Liquidity, market structure and stock splits, working paper.

Murray, D., 1985, Further evidence on liquidity effects of stock splits and stock dividends, *Journal of Financial Research* 8, 59-67.

Muscarella, Chris J. and Michael R. Vetsuypens, 1996, Stock splits: Signaling or liquidity? The case of ADR 'solo-splits', *Journal of Financial Economics* 42, 3-26.

Ohlson, James A. and Steven H. Penman, 1985, Volatility increases subsequent to stock splits: An empirical aberration, *Journal of Financial Economics* 14, 251-266.

Owen, Bruce M. and Ronald R. Braeutigam, 1978, The regulation game: Strategic use of the administrative process, (Ballinger, Cambridge, MA).

Peltzman, Sam, 1976, Towards a more general theory of regulation, *Journal of Law and Economics* 19, 211-240.

Powell, Gary E. and H. Kent Baker, 1993, The effects of stock splits on the ownership mix of a firm, *Review of Financial Economics* 3, 70-88.

Riley, John G., 1979, Informational equilibrium, *Econometrica* 47, 331-359.

Rozeff, Michael S., 1998, Stock splits: evidence from mutual funds, *Journal of Finance* 53, 335-349.

Schultz, Paul, 2000, Stock splits, tick size and sponsorship, *Journal of Finance 55, 429-450.*

Spence, Michael, 1973, Job Market Signaling, *Quarterly Journal of Economics* 87, 355-374.

Spiegel, Yossef, and Daniel F. Spulber, 1994, The capital structure of a regulated firm, *Journal of Economics* 25, 424-440.

Szewczyk, Samuel H., 1992, The intra-industry transfer of information inferred from announcements of corporate security offerings, *Journal of Finance* 47, 1935-1945.

Szewczyk, Samuel H. and George P. Tsetsekos, 1993, The effects of managerial ownership on stock split-induced abnormal returns, *Financial Review* 28, 351-370.

Sheikh, Aamir M., 1989, Stock splits, volatility increases, and implied volatilities, *Journal of Finance* 44, 1361-1372.

Taggart, Robert A., 1981, Rate of return regulation and utility capital structure decision, *Journal of Finance* 36, 383- 393.

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

Wiggins, James B., 1992, Beta changes around stock splits revisited, *The journal of Financial and Quantitative Analysis* 27, 631-640.

APPENDIX

THEORIES OF REGULATION

In this appendix, I describe the three regulatory theories presented in the literature, namely the public interest or market failure theory, the political economy theory and the imperfect monitoring theory.

A) The public interest or market failure theory

This theory of regulation is perhaps the one that is most frequently invoke. According to this theory, regulation is introduced to enhance efficiency in those markets where competitive system fails. The regulator works as an impartial referee in attempting to maximize social welfare. Much of this theory's attention is devoted to the regulatory price-setting process, and it is implicit that the regulator need not concern himself with other aspects of utility operations. This theory's basic focus is on sources of market failure.

B) The political economy theory

This theory takes the position that market forces, working through the political system, shape the formation of ongoing activities of the regulatory process itself (Peltzman (1976)). Regulation is recognized as an instrument not so much for achieving economic efficiency as for shifting wealth. Both, firms and consumers groups are seen as competing in the political market place in an attempt to win favorable outcomes. For Peltzman (1976), regulation will tend to be more heavily weighted toward producer protection in depressions and towards consumer protection in expansions. This implies that regulation should reduce the systematic risk of utilities' operating cash flows.

C) The imperfect monitoring theory

This theory emphasizes the information asymmetry between parties to the process, the importance of procedural rules and the regulator's pursuit of a quiet life (Owen and Braeutigan, 1978). As in the political economy theory, firms and consumers compete for economic benefits through the regulatory process and, in a broad sense, these results in intended outcomes. Owen and Braeutigan (1978) suggest that participants are ultimately seeking a level of fairness that does not exist in unregulated markets, and this is accomplished through well-established procedural rules upon which all parties can rely. Unlike the political economy theory, however, the mechanical nature of such rules or differences in information on the part of one or more groups creates opportunities for strategic behavior. In the short run, one group might be able to capture benefits by means that its adversaries did not anticipate. In the long run, such opportunities should tend to disappear, or at least change in nature since the different parties learn from experience and procedural rules are updated.

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