Do "At-Risk" Firms with Good Prospects Manage Accruals to Avoid Delisting?

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Abstract

Firms at risk of being delisted due to violating a stock exchange's minimum stock price requirement may attempt to boost their stock price directly through reverse stock split (RSS) or indirectly through accrual earnings management that increases the stock price. In this paper, I argue that managers of at-risk firms that anticipate better prospects perceive accrual management as less costly and therefore are more likely to manage accruals, while firms that anticipate less favorable prospects are more likely to implement a RSS or become delisted. These predictions are tested using firms experiencing per share stock price of less than $1.50 for 40 consecutive trading days during 1992 - 2002. Accrual management is measured by performance-matched discretionary accruals and firm prospects are proxied by reported return on assets in the year subsequent to the sustained low stock price year. Consistent with predictions, at-risk firms with better prospects tend to have larger income-increasing accruals, while those with poorer prospects tend to implement RSS or become delisted, with the latter group having the lowest listing benefits.

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1. **INTRODUCTION**

In order to continue to be listed on stock exchanges, firms must satisfy, among other requirements, a set of standards related to market capitalization, number of shareholders, and stock price. Firms that violate one or more of these standards face the possibility of being delisted by stock exchanges. Delisting is not a trivial event for affected firms. Prior research documents high costs incurred by firms following involuntary delisting, including a significant stock price decline, a decrease in stock liquidity, and an increase in stock return volatility (Sanger and Peterson 1990; Baker and Meeks 1991; Shumway 1997; Macey, O'Hara, and Pompilio 2004). Given the significant costs associated with involuntary delisting, affected firms have incentives to avoid this outcome.

This paper examines responses of firms at risk of delisting due to violating the stock exchange's minimum stock price requirement. To reduce the risk of being delisted, these firms need to boost their stock price. I focus on two actions that firms may use to avoid delisting, managing accruals upward as a way of boosting their stock price as opposed to the mechanical approach of a reverse stock split (hereafter, RSS). As I explain below, neither option is costless. I predict that firms anticipating better future prospects are more likely to manage accruals than to choose RSS or delisting. The cost of actions taken to avoid delisting is likely to be great as perceived by firms that enjoy lower listing benefits (e.g., financing needs and liquidity) and/or incur higher listing costs (e.g., indirect listing costs and information production costs). Therefore, firms with these characteristics are more likely to delist. I also develop an analytical model in Appendix A to derive the above predictions.

RSS increases the stock price by exchanging one new share for more than one outstanding share. However, prior literature finds significantly negative stock market

responses to RSS announcements (e.g., West and Brouilette 1970; Radcliffe and Gillespie 1979; Han 1995). Peterson and Peterson (1992) suggest, but do not test, that RSS may reflect management's pessimism about a stock's ability to reach an attractive trading range and a negative stock market response is therefore justified. Prior research suggests that accrual management is successful in increasing the stock price, at least in the short term (e.g., Sloan 1996; Rangan 1998; Teoh, Welch, and Wong 1998a&b; and Rosner 2003). "At-risk" firms may attempt to boost their stock price through managing accruals upward. Also, by inflating earnings, management can signal their favorable private information of prospects. However, accrual management may not be feasible for all firms for two reasons. First, for firms whose operating performance does not improve in the future, reversal of accruals in subsequent periods will likely lead to disappointing earnings and stock price declines. Any reprieve from being delisted will likely be temporary. Second, if stock prices decline and shareholders detect accrual management, they may impose litigation and reputation costs on the firm and the management team. Presumably, the decline in earnings and the revelation of accrual management in subsequent periods are more likely for firms with poorer prospects. Therefore, "at-risk" firms anticipating poorer prospects are more likely to undertake RSS or delist, while firms anticipating better prospects are more likely to manage accruals upward.

The empirical analyses are based on 821 firms experiencing per share stock price of less than $1.50 for over 40 consecutive trading days during 1992 - 2002. Among these firms, I observe three outcomes: delisting without a reverse stock split (the Delisted group); continued listing with a reverse stock split (the RSS group); and continued listing without a reverse stock split (the Non-RSS group).

I first examine the extent to which at-risk firms engage in accrual management and find evidence consistent with income-increasing accruals in the Non-RSS group in the low stock price fiscal year (hereafter, the low price year), but not in prior years. To mitigate model mis-specification for firms with extreme performance, I measure accrual management using performance-matched accruals (Kothari, Leone, and Wasley 2005). This result is robust to two alternative measurements of accrual management: one using size- and performance-matched discretionary accruals estimates, and the other that considers the likelihood that firms managed to meet or barely beat a benchmark. Second, I analyze the impact of at-risk firms' prospects on their tendency to make income-increasing accruals in the low price year. I use the actual return on assets in the year subsequent to the low price year to proxy for firms' anticipated prospects.[1] As predicted, at-risk firms having better prospects have larger income-increasing accruals, while those with poorer prospects tend to implement reverse stock splits or become delisted. The last group has the highest information production costs, relatively high fixed listing costs, and lowest liquidity. The result is not sensitive to the specific empirical model used in testing the relation between future prospects and firms' responses. Thus, the empirical evidence supports the signaling explanation for accrual management and, correspondingly, justifies the negative market response to RSS news.

This study contributes to the literature in the following ways. First, Healy and Wahlen (1999) suggest that future research examine why some firms appear to manage earnings, whereas others with seemingly similar incentives do not. All firms whose stock prices have

[1] Earnings forecasts for future years issued by management or analysts are better proxies for anticipated prospects. However, "at-risk" firms have sparse analyst following and management's forecasts are either unavailable or difficult to collect. As long as the amount of management's inside information is uncorrelated with firms' prospects, the use of actual return on assets will not bias the results.

fallen below the required minimum level have incentives to boost their stock prices, given that they did not opt out of the stock exchange earlier. By examining whether and why some firms employ accrual management to achieve this objective, this study contributes to a more comprehensive understanding of earnings management behavior and its stock market implications. Second, by investigating firms under similar circumstances that do or do not implement RSS, this study is the first to empirically test why the market responds negatively to RSS news. In particular, I propose that if firms expecting relatively better prospects manage accruals rather than implement RSS to boost their stock price, the market views RSS announcements as signals of unfavorable prospects. Third, this study improves our understanding of firms' behavior when strong incentives to avoid adverse delisting outcomes are present. Finally, prior literature has examined RSS (e.g., Han 1995) and delisting (e.g., Sanger and Peterson 1990) separately. This study is the first to link the research on RSS and delisting by explaining why some firms execute RSS to continue listing while others delist.

The rest of the paper is organized as below. The next section describes the background and motivation. Section 3 develops hypotheses. Section 4 describes the data. Section 5 presents the research design and empirical results, and Section 6 concludes. Appendix A presents an analytical model that derives the hypotheses.

2. BACKGROUND AND MOTIVATION

Stock exchanges require that listed firms satisfy a set of criteria to continue listing. For example, if the firm does not meet the minimum market capitalization requirement, closing stock price, or other criteria, the NYSE evaluates the appropriateness of a firm's continued listing. The AMEX considers such factors as financial performance and market value in reviewing continued listing. Firms listed on the NASDAQ market have to meet a

minimum bid price, market capitalization, net tangible assets or net income, public float, and public round lot shareholders, among other requirements.[2] Firms that violate one or more standards face the possibility of being delisted. For firms listed on NASDAQ and NYSE, deficiency in the minimum bid price is determined to occur if an issuer's stock price falls below $1 for 30 consecutive trading days. Compliance is achieved if its stock price is above $1 for 10 and 30 consecutive trading days for a NASDAQ and a NYSE issuer, respectively. AMEX does not have explicit specifications for deficiency in and compliance with the minimum stock price requirement. Under current requirements of the NYSE and NASDAQ, affected firms can have a period from 90 days to over one year in order to comply with the minimum stock price requirement.

The NASDAQ and AMEX suggest RSS as one way to increase the stock price for firms delinquent in the minimum bid price criterion. Management typically justifies implementation of RSS with reasons that include attracting institutional investors, increasing stock liquidity and receiving future benefits associated with the listing status. However, none of these reasons can explain the overall negative stock market response documented in prior research to RSS announcements. A rational management team acting in shareholders' best interests would only use RSS when less costly alternatives are infeasible or unavailable.[3]

Examples of alternative actions that can increase stock price include reporting improved earnings performance through accrual management or real operating actions (such as R&D reduction, or sale of valuable assets), disclosure of favorable news, streamlining

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[2] NASDAQ defines public float as total shares outstanding less any shares held by officers, directors, or beneficial owners of 10% or more, and round lot holders as holders of 100 shares or more.

[3] Barry Siegel, chairman and chief executive of Driversshield.com, commented that a reverse split is a desperate attempt by management to lift the stock price after all other means have failed (WSJ.com and Macey et al. 2004).

operations through company restructuring or replacing the current management team with a more capable one, and signaling to the market that the stock is undervalued. However, firms with low stock prices are likely to have both poor performance and low cash levels. For these firms, real actions that increase earnings, such as reducing R&D, cannot unambiguously be interpreted as earnings management. It is difficult to distinguish actions taken to conserve cash from those taken to manage earnings. Analysis of information disclosure, management turnover, and streamlining operation is constrained by data availability, especially for small firms that have limited media coverage. Concerns about damage to competitiveness may constrain these firms in publicly disclosing favorable news early. Firms are likely to have streamlined their operations before their stock price sank to these very low levels. Therefore, it is less likely that major restructuring activities occur in the low price year. For these reasons, I focus on signaling of stock undervaluation as a means to boost stock price. Even at a low price, some issues are overvalued, while others are undervalued. Thus, when signaling is feasible, undervalued firms would prefer to correct the mispricing through signaling. The traditional means by which firms signal positive private information (such as share repurchases, dividend initiations or increases, and debt issues) are likely to be infeasible for these issuers. Because of their financial frailty, these firms typically do not have cash available for stock repurchases or dividend distribution (Healy and Palepu 1993). In addition, they have difficulty raising debt because the severity of the debt overhang problem increases dramatically for firms nearing financial distress (Myers 1977). For these reasons, I limit my focus to signaling through accrual management.[4]

[4] The extent that the affected firms undertake other activities reduces the likelihood of finding evidence of accrual management.

Prior literature on earnings management argues that when it is costly to unravel the degree of distortion in financial reports, or to eliminate the tendency for managers to engage in earnings management, mispricing is possible even in an efficient capital market (Dye 1988; Healy and Palepu 1993; Slezak 2003). Empirical evidence supports the effectiveness of income-increasing discretionary accruals in temporarily boosting stock prices (Sloan 1996 and Rangan 1998, among others). Thus, managers of firms facing delisting may be able to temporarily boost their firms' stock price by inflating accrual earnings. Alternatively, by reporting inflated earnings, management can signal their favorable private expectation of future performance (Subramanyam 1996; DeFond and Park 1997). If this "signaling story" is accurate, I expect to observe better future performance and a permanent increase in the stock price of firms that manage accruals. In addition, since firms with better future prospects would manage accruals to boost stock price, a RSS sends a negative signal to the market. Therefore, the signaling story may explain the negative stock market response to RSS firms.

I choose to examine firms that have violated the minimum bid price requirement, or are close to violating it, for the following reasons. First, Macey et al. (2004) report that violation of the minimum stock price standard is the most common cause of involuntary delisting from stock exchanges. Second, conditions that trigger violation of the minimum bid price rule are clearly specified by stock exchanges and are easily observable. This provides management with sufficient time to evaluate the costs and benefits associated with the available options and select the least costly one. Studying firms' responses can shed light on management's assessment of costs and benefits associated with the selected option versus alternative options. Lastly, significant costs associated with delisting are likely to induce firms in danger of violating the minimum stock price rule to take corrective actions, such as

RSS and accrual management, to avoid being delisted. The fact that not all affected firms pursue RSS suggests differential responses by these firms. Given information asymmetry, management's action reveals private information about the future prospects of the firm (Myers and Majluf 1984). Thus, "at-risk" firms provide an appropriate setting to investigate why the market responds negatively to RSS news and why not all firms manage accrual earnings.

3. HYPOTHESIS DEVELOPMENT

3.1 Hypotheses on accrual management

Firms have incentives to avoid delisting when benefits exceed costs associated with listing. In order to avoid delisting, firms at risk of being delisted due to a low stock price need to boost their stock price above the required minimum. To increase the stock price, two of the choices available to at-risk firms are to implement RSS, or manage accruals upward. The latter choice could be a signal of their favorable prospects or a temporary means to inflate reported earnings.

Accrual earnings manipulation uses the accrual flexibility allowed within GAAP to more favorably reflect the firm's operating results than is implied by the underlying economic activities. Prior literature suggests that inflated earnings can temporarily or permanently boost stock prices (e.g., Rangan 1998; Sloan 1996; Xie 2001; Teoh et al. 1998a&b; Beneish and Vargus 2002; Rosner 2003; Subramanyam 1996). On the other hand, it may be costly for some poorly performing firms to portray themselves as less troubled through earnings inflation (Healy and Palepu 1990; DeAngelo et al. 1994). If firms with low stock prices are also distressed firms, whether these firms manage accrual earnings remains an empirical question. Further, if the affected firms employ RSS as a substitute for accrual

management in an attempt to increase stock price, RSS firms would manage accruals to a lesser extent, *ceteris paribus*. This leads to Hypothesis *1a* and *1b* (stated in alternate forms):

H1a: Firms that face the threat of delisting due to a low stock price engage in accrual earnings management.

H1b: Among firms that have low stock prices but avoid delisting, those that do a RSS manage accruals to a lesser extent than those that do not employ a RSS.

3.2 Hypothesis on the impact of firms' prospects on accrual management

Accrual management as a response to the threat of delisting may not be optimal for all firms for the following reasons. First, if the abnormal positive accruals reverse in the immediate subsequent periods without corresponding improvement in underlying performance, reported financial performance for those periods likely disappoint investors. Under this situation, accrual management is likely to prevent at-risk firms with better prospects from being delisted while it only delays the delisting threat for those with poorer prospects for a short period. Second, accrual management may entail the risk of shareholder litigation and reputation costs to the firm and the management team if such management is detected. Presumably, firms with poorer performance in future periods are more likely to incur these costs, and therefore, the above costs are likely to be higher for them. Management is likely to have inside information about the firm's future prospects (Lakonishok and Lee 2001, Beneish and Vargus 2002, Ke, Huddart, and Kathy 2003). Based on their anticipation of future prospects, in response to the threat of being delisted, rational managers will evaluate costs of available actions and select the least costly one to boost stock price. Given the above argument, *ceteris paribus*, accrual management is more likely to be optimal for at-risk firms that anticipate better prospects in the near future. Thus, I predict that at-risk firms with better short-term future performance are more likely to manage accruals upward.

In Appendix A, I analytically derive the characteristics of firms for whom accrual management is less costly than both RSS and delisting. The model in Appendix A is based on the following assumptions: 1) management selects the action they perceive as the least costly; 2) accrual management reverses starting from the next period; 3) stock price is increasing in reported earnings; and 4) management has inside information about the future performance of the firm. Results of the model are consistent with the prediction described above. After controlling for other factors that affect the accrual management engagement, the probability of accrual management increases with anticipated performance in the near future. Examples of other factors include the pre-event stock price, current period pre-managed earnings, and net listing benefits. This line of reasoning leads to the following hypothesis (stated in alternate form).

H2: Among firms that face the threat of delisting, *ceteris paribus,* firms that expect better short-term premanaged financial performance are more likely to manage accruals upward.

Examination of *H2* can further our understanding of the significantly negative market response to RSS documented in the literature. Prior research has not formally investigated causes underlying this negative market response. Analyzing all firms facing possible delisting can lead to a better understanding of this phenomenon. Specifically, evidence supporting *H2* is consistent with the explanation that the market regards firms' reactions to the threat of delisting as a signal of their future prospects. Observing firms' reactions to low stock prices might enable the market to differentiate firms with poor future prospects from those with only temporary price declines. This is especially likely for small firms with sparse analyst following, low media coverage, and limited institutional interest. Given that managing accruals upward is more costly for firms with lower expected earnings growth

rates, the market may infer poorer prospects for firms announcing RSS and adjust their stock prices downward to reflect the lower expected growth rate. This argument is also consistent with the conjecture that management is pessimistic about a stock's ability to reach a higher trading range (Peterson and Peterson 1992) and uses RSS as a "last resort" to increase the stock price. To the extent that firms manage accruals to meet/beat earnings benchmarks and the market "rewards" these firms, the above argument for the signaling story is in line with Bartov, Givoly, and Hayn (2002).[5]

3.3 Hypothesis on decisions to avoid delisting

Firms that lack the capacity to manage accruals upward or that fail to boost their stock price high enough through inflating accruals can pursue RSS to avoid delisting as long as its implementation is likely to be less costly than delisting.[6] As shown in Appendix A, when net benefits associated with listing are lower than both costs associated with RSS and those associated with accrual management, at-risk firms will choose delisting.

Costs associated with RSS increase in shares outstanding and the number of shareholders, and decrease in the stock price immediately prior to when RSS is undertaken. For a delisted firm, costs are the forgone net benefits associated with being a public firm. Examples of benefits enjoyed by a public company are: lower barriers to obtaining financing in the public equity market (Leland and Pyle 1977); higher liquidity of common stock (Amihud and Mendelson 1988; Merton 1987); and portfolio diversification by investors (Chemmanur and Fulghieri 1999). At the same time, a public firm bears direct listing costs, such as SEC filing fees, and proprietary costs of disclosure (Campbell 1979; Yosha 1995). I

[5] I investigate the sample firms' tendency to meet/beat earnings benchmarks in Section 5.2.3 and find that firms with higher future return on assets are more likely to meet/beat earnings benchmarks.

[6] Another criterion for the implementation of RSS is that RSS will not cause violation of other exchange requirements, such as the public float and the number of round lot shareholders.

list definitions and measurements of the above items in Table 1. After delisting to the Pink Sheets or becoming a privately held entity, a firm can save direct listing costs as well as avoid disclosing sensitive information to the public (DeAngelo and DeAngelo 1987). *H3* summarizes the above arguments.

***H3*:** Compared to firms that are delisted due to violating the minimum stock price criterion, those undertaking RSS or accrual management have higher net benefits from continued listing.[7]

Insert Table 1 here

4. DATA

I consider firms to be facing the possibility of delisting when their stock price has been below $1.50 for 40 or more consecutive trading days during 1992 - 2002. The choice of price level and period length is based on exchange requirements. Both NYSE and NASDAQ specify $1 as the minimum bid price. AMEX's minimum stock price rule only stipulates a sufficiently low price for a sufficiently long period. Both NASDAQ and NYSE state that firms will be notified of the possibility of delisting if their stock price has been below $1 for 30 consecutive trading days.[8] For firms meeting this criterion more than once, I use the last incidence. If a firm implements RSS more than once, based on the distribution codes in CRSP, I select the period of declining stock price immediately prior to the first RSS. Since NASDAQ (NYSE) implemented the minimum stock price rule from September 1991 (April 2000), the sample starts from 1992 (2000) for firms listed on NASDAQ (NYSE). The sample period for AMEX-listed firms also starts from 1992. I choose 2002 instead of 2004 as the end

[7] Although it seems obvious, I include tests of this hypothesis for completeness. Further, I am interested in the importance of individual types of benefits and costs to an affected firm. For these reasons, I investigate individual cost and benefit items instead of aggregating them.

[8] I also select $1.50 to maximize the power of my tests. Presumably, firms have the strongest incentive to boost a stock price when it is close to, but above, $1. Firms with much higher stock prices will not have this incentive and firms with stock prices below $1 will find it either too late or too costly to manage accruals. In addition, firms with high stock prices may have already managed accruals in previous years.

of the sample period to reliably identify the last period of low stock price if there are a series of observations.

I identify firms' listing status based on delisting codes provided by CRSP. Issues with code 100 (552) are still traded on one of the stock exchanges by the end of 2005 (delisted due to low stock price by the end of 2002). I classify firms with code 100 and no record of RSS in the sample period as Non-RSS firms, those with code 552 as Delisted firms, and those with one or more RSS records as RSS firms. [9,10]

Among 1,081 firm observations from CRSP that meet these criteria, 260 lack sufficient data in COMPUSTAT to estimate discretionary accruals. Analyst following information comes from I/B/E/S. The final sample has 821 firms, including 29 listed on NYSE, 59 listed on AMEX, and 733 listed on NASDAQ. Among the sample, 268 are in the Non-RSS group, 295 in the Delisted group, and 258 in the RSS group. Due to differences in data availability, the number of observations varies in each analysis.

Table 2 presents descriptive statistics of variables that will be used in the empirical tests and compares them among the three subgroups. Among all sample firms, Non-RSS firms have the highest stock price, longest listing history, highest return on assets the year subsequent to the low price year, the highest Altman's Z-score (least distressed), and lowest stock price volatility. Delisted firms have the lowest stock price and Altman's Z-score. RSS

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[9] I exclude firms that stop trading on a stock exchange due to merger, liquidation, and violation of other stock exchange requirements, among other reasons. This might bias the performance of the Non-RSS group in an unknown direction. The direction of this potential bias' impact on the measurement of discretionary accruals is also unknown. For example, if the performance is biased upward, on the one hand, the selected firms have higher capacity to shift future earnings into current period; on the other hand, they view the price decline as temporary, so that they are less likely to take actions to boost their stock prices.

[10] Among the 258 RSS firms, 87 are subsequently delisted. 61 delistings occur at least one year after the RSS implementation. I constrain my sample of Delisted firms to those without a RSS during the sample period.

firms have the highest turnover of outstanding common shares and the greatest number of outstanding shares.[11]

Insert Table 2 here

5. RESEARCH DESIGN AND EMPIRICAL RESULTS

This section has three subsections that describe designs and results of tests on the three sets of hypotheses developed in Section 4. Section 5.1 documents evidence consistent with a group of at-risk firms making income-increasing accruals, and rules out alternative explanations. Section 5.2 shows that at-risk firms with better prospects tend to make larger income-increasing accruals. Results in Section 5.3 support that at-risk firms with lower listing benefits tend to delist, and also corroborate results in Section 5.2.

5.1 Tests on accrual management engagement

5.1.1 Design of tests on accrual management engagement (H1a and H1b)

To test *H1a* and *H1b*, I first investigate accrual management behavior of the whole sample and the three subgroups of firms in the low price year. The RSS group includes firms that are able to continue listing through the implementation of RSS. Firms that continue listing without undertaking RSS are in the Non-RSS group. The Delisted group includes firms that are delisted because of an extended period with a low stock price. Finding accrual management in the sample firms supports *H1a*, i.e., firms engage in accrual management to boost stock prices so as to avoid delisting. Evidence of higher accrual management within the

[11] Since multicollinearity can be a serious problem when the explanatory variables have low variation, a situation more likely for a small sample, I examine Pearson correlations among variables used in the estimations (See Maddala, pp278-291, or Greene, pp255-259). The highest correlation between explanatory variables is only 0.47 (between the logarithm of common shares and analyst following).

Non-RSS group than the RSS group supports *H1b*, i.e., RSS firms engage in accrual management to a lesser extent.

Using model (1) below, I further analyze the relationship between the use of discretionary accruals and RSS. The model controls for the accrual management constraint (R_NOA_{t-1}) and the status of being below the minimum market capitalization required by stock exchanges (D_CAP_{t-1}). I estimate the model among Non-RSS and RSS firms, i.e., excluding Delisted firms. A significantly negative α_1 would support *H1b*.

$$DADIFF_t = \alpha_0 + \alpha_1 D\_RSS + \alpha_3 D\_CAP_{t-1} + \alpha_4 R\_NOA_{t-1} + \varepsilon \quad (1)$$

Where (Compustat item numbers in parentheses):

$DADIFF_t$ = performance-matched discretionary accruals, computed as the difference of total assets-scaled discretionary accruals [based on Jones' (1991) model] between a sample firm and a control firm matched on industry, year, and return on assets.

t = the low price year, i.e., the year when stock price drops to a low level and increases the risk that the firm violates the minimum stock price rule.

D_RSS = 1 for RSS firms, and 0 otherwise.

D_CAP_{t-1} = 1 for firms whose market capitalization [the stock price on the last day of the month with low stock price × shares outstanding (#25)] is below the minimum level required by stock exchanges.[12]

R_NOA_{t-1} = percentile of net operating assets (NOA) within the sample firms at the beginning of the year, converted to be between 0 and 1 by dividing the percentile of each observation with 99. NOA is measured as [shareholders' equity (#199× #25) - cash and marketable securities (#1) + total debt (#9 + #34)] / sales (#12). All are measured in prior year except sales, which is measured in two years before the low price year.[13]

I use discretionary accruals to gauge the level of earnings management using accruals. Results in Dechow, Sloan, and Sweeney (1995) show that models previously used to measure

[12] In its continued-listing criteria, the NASDAQ specifies a minimum market capitalization of $5 and $1 million for firms listed on the National Market and the Capital Market, respectively. The minimum level is $25 and $50 million for firms listed on the NYSE and AMEX, respectively.

[13] Since NOA varies by industry, following Gunny (2005), I also use the percentile within industry and year to measure *R_NOA*. Results are not changed by this modification.

discretionary accruals (e.g., Healy 1985; DeAngelo 1986; Jones 1991; Dechow and Sloan 1991) and a modified Jones' model developed in their paper bias discretionary accruals measurement downward for firms with poor performance. It is likely that my sample firms are characterized by poor performance. To mitigate this problem, I use the performance-matched discretionary accruals model proposed in Kothari et al. (2005) to measure the magnitude of accrual management. I calculate discretionary accruals based on the cross-sectional Jones (1991) model and then adjust the discretionary accruals of each sample firm for a performance-matched firm's discretionary accruals to get DADIFF. Since Kothari et al. (2005) find that Jones' (1991) model augmented with an intercept is the least mis-specified, I use this form of the model, which is presented below.

$$\frac{\text{Total accruals}_{t}}{\text{Total assets}_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Total assets}_{t-1}} + \alpha_2 \frac{\Delta Sales_t}{\text{Total assets}_{t-1}} + \alpha_3 \frac{PPE_t}{\text{Total assets}_{t-1}} + \varepsilon \qquad (2)$$

The match between sample firms and control firms is made on year, industry membership based on the two-digit SIC, and return on assets. To mitigate the contamination caused by similar incentives to boost stock price among firms with low stock prices, the control group only includes firms with stock prices higher than ten dollars. Table 3 describes differences between these two groups. The difference in return on assets between these two groups is not significant, suggesting that the matching process yields pairs comparable in performance. Overall, the sample firms are significantly smaller, less leveraged, and have been listed on a stock exchange for a shorter period. In addition, they have fewer common shares outstanding, and sparser analyst coverage than their matches. Sample firms have lower capital intensity and lower Altman's Z-score, and less trading activities in their common

stock. These last three differences are statistically significant in a Wilcoxon test, but not in a t-test of means.[14]

Insert Table 3 here

Since firms delinquent in stock exchanges' market capitalization requirement also have incentives to increase stock price in order to increase its market capitalization, I include *D_CAP* to control for this effect. In addition, affected firms may lack the capacity to manage accruals if they are constrained in their accrual management flexibility, as reflected by accrual management accumulated from previous years. Following Barton and Simko (2002), I use the beginning balance of net operating assets (*NOA*) scaled by lagged sales to measure accumulated accrual management. Larger *NOA* implies smaller accrual management flexibility. To control for a possible nonlinear relation between *NOA* and *DADIFF*, in model (1) I use the percentile of NOA.

5.1.2 Results of tests on accrual management engagement (H1a and H1b)

Panel A in Table 4 describes the performance-matched discretionary accruals for the total sample and for the three subgroups (Non-RSS, Delisted and RSS groups) based on annual data in the low price year. Tabulated results are based on discretionary accruals that are winsorized at the 1%/99% level to minimize the effect of outliers.[15] Discretionary accruals are negative for the total sample (p=0.07 in the two-tailed t test). Among the subgroups, the Non-RSS group has positive discretionary accruals (*p*=0.09), which is consistent with the use of accruals to increase earnings. The RSS group shows negative discretionary accruals. Since the minimum stock price rule varies among the stock

[14] To address the possible impact of these differences on the estimated performance-matched discretionary accruals, I further match each firm within the sample and report the results in Section 5.1.3.1.

[15] Results without winsorization or based on 2%/98% winsorization are qualitatively similar.

exchanges, I examine accruals separately for firms listed on each of the major stock exchanges, within each subgroup. Only firms listed on NASDAQ demonstrate evidence of upward accrual earnings management within the Non-RSS group (p=0.02). RSS and Delisted firms listed on NASDAQ, and Non-RSS firms listed on NYSE appear to have negative accruals, perhaps suggesting the possibility that these firms take a bath in a bad year. However, given the small number of observations caution is warranted in interpreting the results for Non-RSS firms listed on NYSE.

Table 5 presents estimation results of model (1). The coefficient for *D_RSS* (α_1) is negative and significant, suggesting that after controlling for accrual management constraint and the likelihood of violating the minimum capitalization requirement, there is less accrual management in the RSS group than in the Non-RSS group. Coefficients on other variables are insignificant. Overall, the empirical evidence supports both *H1a* and *H1b*, i.e., firms inflate earnings in the low price year and use accrual management as an alternative to RSS to boost stock prices.

Insert Table 5 here

5.1.3 Alternative explanations of the results

5.1.3.1 Systematic measurement error

Results in Panel A of Table 4 are consistent with Non-RSS firms managing accruals in the low price year. However, the results could also be caused by a systematic measurement error in the discretionary accruals. I adopt two ways to mitigate this concern. First, I examine accruals in the one and two-year period prior to the low price year. An absence of accrual management in previous years will strengthen the argument that management inflates accruals in the low price year to boost the stock price. I find no evidence of upward or

downward accrual management in either year. For simplicity, I only present abnormal accruals in the year prior to the low price year in Panel B of Table 4. These results corroborate my conclusion based on Panel A, i.e., Non-RSS firms inflate accruals in the low price year as a response to the threat of being delisted.

Insert Table 4 here

Second, I match each Non-RSS firm separately with a Delisted and a RSS firm on industry, year and total assets. To increase the number of the matched pairs, I classify firms into industries based on the Fama and French (1997) industry definitions. Unlike the match solely on return on assets, these additional matches control for incentives to boost stock price and size. Discretionary accruals are measured as the difference in the performance-matched discretionary accruals between a Non-RSS firm and a matching firm. When matching a Non-RSS firms with a Delisted (RSS) firm on assets, the low-year discretionary accruals are 0.364 (0.141) with a *p*-value less than 0.0001 (at 0.009), versus the discretionary accruals of 0.078 (p=0.088) for the Non-RSS group as reported in Table 4.

5.1.3.2 Incentive to boost stock price

Some of the evidence I present above of accrual management could result from firms' incentive to increase their stock price even absent the stock exchanges' minimum stock price requirement. To address this possibility, I analyze the performance-matched discretionary accruals of NASDAQ firms with sustained low stock prices in years before the minimum stock price requirement was effective. If firms' management of accruals is primarily in response to the threat of exchange delisting, I would not expect to observe accrual management in this period. However, if firms' management of accruals is driven by the desire to boost the stock price, independent of exchange listing requirements, I expect to

observe similar accrual management behavior in this period as well. Because data from the statement of cash flows to calculate accruals were not available prior to 1988, following the literature, I calculate total accruals deflated by lagged total assets (#6) using the balance sheet approach. [16] I apply the same criteria as those in Section 4 to collect sample firms listed on the NYSE or NASDAQ from 1976 to 1990, and classify 131 firms that are not delisted by 1994 into the Non-RSS group.[17] I find no evidence of earnings management through discretionary accruals for this group of firms.

5.2 Tests on the impact of firms' prospects on accrual management

5.2.1 Design of tests on firms' prospects and accrual management (H2)

Model (3A) below is used to test *H2*.

$$DADIFF_t = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon \quad (3A)$$

Where (Compustat item numbers in parentheses):

R_ROAADJ_t = percentile of premanaged return on assets, converted to be between 0 and 1 by dividing the percentile with 99. Return on assets is measured as [earnings before extraordinary items (#18) – *DADIFF* × total assets at the beginning of the period (#6)] / total assets at the beginning of the period (#6)].

R_ROA_{t+1} = percentile of return on assets for year t+1. It is measured in a similar way to R_ROAADJ_t except that return on assets is not adjusted for discretionary accruals.[18]

P_{t-1} = the pre-event stock price, measured on the last day of the last month with low stock price (hereafter, the low month)[19].

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[16] That is: total accruals = Δ current assets (#4) - Δ current liabilities (#5) – Δ cash and cash equivalents + Δ current maturities of long-term debt and other short-term debt included in current liabilities (#34) - depreciation and amortization expense (#14).

[17] When I only classify firms that are still listed on a stock exchange by 2005 as the Non-RSS group (63 firms), the results are qualitatively the same.

[18] Since discretionary accruals made in one year are likely to be reversed in subsequent years, not adjusting R_ROA_{t+1} for discretionary accruals will bias against finding a positive coefficient on R_ROA_{t+1}.

$ALTMANZ_{t-1}$ = Altman's (1968) Z-score.[20]

$VOLAT_{t-1}$ = the volatility of stock price in the 36-month period prior to the low month, measured $\sqrt{\frac{1}{N-1}\cdot\sum_{i=-N}^{-1}\left(\log\left(\frac{P_i}{P_{i-1}}\right)-\overline{\log\left(\frac{P_i}{P_{i-1}}\right)}\right)^2}$, where - N is the first month with available stock price data in this period, and -1 is the month immediately before the low month, P_i is the closing stock price for month i (from Bookstaber 1987, p 77).

D_NONRSS = 1 for Non-RSS firms, and 0 otherwise.

LB = the matrix of *m* variables that proxy for benefits associated with the listing status, including financing needs, stock liquidity, chances to transfer control of a firm, and the use of stock in merger and acquisition. Proxies for these variables are described in Table 1.

LC = the matrix of *n* variables that proxy for direct and indirect costs associated with the listing status. Proxies for these variables are described in Table 1.

The definitions of *DADIFF*, D_CAP_{t-1}, *D_RSS*, and R_NOA_{t-1} are the same as in model (1). Accrual management may not be a feasible option for firms with low stock price or low pre-managed earnings. Firms that have lower stock price need a greater increase in stock price to avoid delisting. Firms with lower current period earnings need to shift more earnings from the future to report earnings improvements. I include P_{t-1} and R_ROAADJ_t to control for the above effects. Further, firms' incentives or ability to manage accruals may vary with their degree of financial distress. For example, firms in financial distress may have stronger incentives to increase cash rather than earnings and therefore may not benefit from inflating accruals. I include Altman's Z-score (Altman 1968) to control for the degree of financial distress. I include volatility of stock price (VOLAT) to control for the impact of volatility on firms' responses to stock price declines. When the stock price is more volatile, decline in stock

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[19] I also measure P_{t-1} with the average stock price in the period when a firm's stock price is below $1.50. Results are qualitatively the same.

[20] Altman's Z-score is measured as [1.2· net working capital / total assets (*data179* / *data6*) + 1.4· retained earnings / total assets (*data36 / data6)* + 3.3· earnings before interest and taxes / total assets (*data170 / data6)* + 0.6· market value of equity / book value of liability (*data199·data25 / data181)* + 1.0 · sales / total assets (*data12 / data6)*].

price are more likely to be temporary. Therefore, firms with higher volatility in their stock prices are less likely to take actions to boost stock price. Thus, I expect a negative relation between the stock price volatility and discretionary accruals.

LB and *LC* are included to control for differential listing benefits and costs associated with sample firms. If net listing benefits (*LB* - *LC*) are lower than costs associated with accrual management, affected firms would not manage accruals. Firms in the three subgroups may differ on other dimensions beyond the *LB, LC* variables and other variables controlled for in model (3A). To the extent that the omitted variables are correlated with the included variables, the estimated coefficients on included variables are biased. To mitigate this concern, I include dummy variables for both the Non-RSS and RSS groups to control for differences in other characteristics among the three groups.

Low barriers to public financing are more important for firms with higher financing needs (DeAngelo and DeAngelo 1987). I use financing needs as measured by leverage and capital intensity to proxy for this listing benefit (Bushee and Leuz 2005). Firms with greater leverage may also have covenants that require exchange listing. These firms will want to remain listed in order to avoid costs of violating these covenants. One outcome of delisting is a significant deterioration in stock liquidity, as reflected in smaller trading volume and higher trading spread (Macey et al. 2004; Angel et al. 2004). As argued by Merton (1987) and Amihud and Mendelson (1988), liquidity increases firm's value. Thus, I expect firms with higher liquidity have stronger incentives to avoid delisting. I use the turnover of outstanding shares in the year prior to the stock price decline, the natural logarithm of the number of common shares outstanding, and the presence / absence of financial analysts following a firm to proxy for liquidity. In addition, I follow Bushee and Leuz (2005) in using the number of

shareholders to measure concentration of ownership, and thus liquidity.[21] These variables also proxy for the value of access to the market for corporate control, and the ease of using shares in mergers and acquisitions.

A public firm incurs significant direct and indirect costs to maintain its listing. Examples of direct costs are SEC filing costs, audit fees, and legal fees. Macey and O'Hara (2002) note that the listing fees imposed by NYSE forces some firms to stay off the exchange. Ritter (1987) notes that fixed listing costs are disproportionately high for small firms. NYSE, AMEX, and NASDAQ all require listing fees that have a step-wise relation with the number of outstanding shares. I use firm size, measured by total assets, and the number of outstanding shares to control for fixed and variable listing costs, respectively.

Indirect costs include proprietary costs of public disclosure and information production costs (Chemmanur and Fulghieri 1999). I expect firms in industries with higher competition to incur higher proprietary costs of public disclosure (Campbell 1979; Yosha 1995). I use the Herfindahl Index to measure industry competition. Information production costs refer to the costs of producing information to convince investors about the quality of the issuing company. Presumably, smaller firms, development stage enterprises, and firms with low analyst coverage face higher information production costs. Thus, I use total assets, the number of years that the firm has listed on a stock exchange, and a binary variable for the presence of financial analysts following the firm to measure information production costs.

Significantly positive α_1 supports *H2*. Alternatively, if a subgroup of my sample firms has relatively high current period earnings (*R_ROAADJ*) and considers the stock price decline as temporary, they will not manage accruals. The absence of accrual management in

[21] Ideally, I should use the ownership of outside shareholders to proxy for liquidity, but this data is not readily available.

this group of firms will bias downward the coefficient on the percentile of current period premanaged performance, α_2.[22] In addition, possible measurement errors in discretionary accruals affect the dependent variable and the estimated premanaged current period return on assets in opposite directions and cause a negative relation between them (Herrmann, Inoue, and Thomas 2003). To mitigate this concern I use a logistic model (3B) below and further address this concern in Section 5.3. Model (3B) can also address a possible non-linear relationship between *DADIFF* and the independent variables.

$$EM_t = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon \quad (3B)$$

Where:

EM_t = 1 for all firms with positive *DADIFF*, and 0 otherwise.[23]

5.2.2 Results of tests on H2 – firms' prospects and accrual management

Estimated coefficients of model (3A) in Panel A of Table 6 indicate that, consistent with *H2*, higher subsequent return on assets is associated with higher discretionary accruals. In addition, higher Altman's Z-score, larger firm size, lower *NOA* level and stock price volatility, and the absence of analyst following are associated with higher discretionary accruals. The coefficient on *D_NONRSS*, the dummy variable for the Non-RSS group, is positive and marginally significant, suggesting that controlling for listing costs and benefits, stock prices, current and future performance, and other firm characteristics, discretionary accruals of the Non-RSS firms are higher than those of the Delisted firms. Estimated results of model (3B) in Panel B of Table 6 suggest that firms with higher subsequent return on

[22] I simulate the situation where firms with relatively high performance make zero discretionary accruals. Untabulated results of regressing discretionary accruals on the performance measurement support a downward bias in the coefficient on both current and future period performance.

[23] Results are similar when I code *EM* as 1 for firms with higher-than-median level of *DADIFF* within the sample firms.

assets, capital intensity, and Altman's Z-score are more likely to manage accruals upward.[24] Thus, *H2* is supported, which is consistent with firms managing accruals upwards to signal to the market their future performance. The coefficient on current period earnings (R_ROAADJ_t) has a negative sign. I further investigate this in section 5.3.3.

Insert Table 6 here

5.2.3 Alternative measure of earnings management

In previous sections, I use the performance-matched discretionary accruals to gauge accrual management and argue that firms manage their earnings upward to send a positive signal to the market. As an alternative, I directly examine the relation between the likelihood of reporting good news and firms' characteristics. I focus on the reporting of annual earnings increases or positive earnings.[25] The empirical model is the same as model (3B) except that the dependent variable is *POSE* or *CHGE*. *POSE* is equal to 0 for firms that report negative earnings before extraordinary items in year *t*, and 1 otherwise. *CHGE* is equal to 0 for firms that report decrease in annual earnings before extraordinary items in year *t*, and 1 otherwise. Consistent with *H2*, the results reported in Table 7 show that firms with higher future earnings are more likely to report positive earnings and earnings increases.

Insert Table 7 here

5.2.4 Stock price movement

To further investigate the argument above that firms manage accruals upward to signal their future prospects, I examine the relation between accrual management and future

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[24] Since NASDAQ eliminated exceptions to the minimum stock price rule in 1997 and temporarily suspended it in 2001 (see Appendix A for more detail), I add two time period dummies in the tests of *H2*, one for the period before 1997 and the other for 2001. Results in Table 6 are unchanged. The dummy variable for 2001 is significantly negative, consistent with less accrual management in that year.

[25] Due to the lack of analyst following, I do not examine likelihood of meeting/beating analysts' forecast.

stock price movements. I gauge the degree of accrual management in two ways. First, I examine stock price movements around the low month separately for the Non-RSS, RSS, and Delisted groups. Since the Non-RSS group presents the strongest evidence of accrual management in the low price year, greater stock price movement for the Non-RSS group is consistent with firms in this group successfully signaling their future financial performance through upward accrual management. Figure 1 graphs the trend in the mean stock price around the last month of low stock price (month 0) separately for Non-RSS, Delisted and RSS firms. The stock price is adjusted for RSS firms to eliminate the impact of the reverse stock split. The figure shows that the stock prices of Non-RSS and RSS firms are similar before the last month of low stock price but diverge dramatically afterwards, with the average stock price of the Non-RSS firms climbing steadily and that of the RSS firms increasing only slightly. Starting from the low month until at least two years subsequent to it, the average stock price of the Non-RSS group climbs to the level attained two years prior to that month. I do not observe this for the RSS group. Second, I examine the trend in the mean stock price around the earnings announcement month subsequent to the end of the low price year. If accrual management is a signaling strategy, presumably, firms that manage accruals more send stronger signals to the market. Figure 2 displays the mean stock price for firms whose discretionary accruals are in the highest, middle, and lowest quintiles, respectively, i.e., the Highest *DADIFF*, the Middle *DADIFF*, and the Lowest *DADIFF* groups. Since earnings announcement dates are missing for most sample firms, I assume earnings are announced in the second month after the fiscal year end (month 0). As shown in Figure 2, in contrast to the period before month -12, starting from month -12 until at least month 24, the mean stock price of the Highest *DADIFF* group is always above the Lowest *DADIFF* group.

This is consistent with the group of firms with the highest discretionary accruals sending the strongest signals of favorable future performance.

Insert Figure 1 and 2 here

5.3 Tests of the decision to avoid delisting

5.3.1 Design of tests on H3 - the decision to avoid delisting

I use the following multinomial logistic model to test *H3*, which suggests that RSS and Non-RSS firms enjoy greater benefits from listing than do Delisted firms.

$$Log\left(\frac{PROB_j}{PROB_1}\right) = \varphi_0 + \varphi_1 P_{t-1} + \varphi_2 R\_ROAADJ_t + \varphi_3 R\_ROA_{t+1} + \varphi_4 ALTMANZ_{t-1} + \varphi_5 R\_NOA_{t-1} + \varphi_6 VOLAT_{t-1} + \varphi_7 D\_CAP_{t-1} + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon \quad (4)$$

Where:

$PROB_j$ = the probability of an affected firm to delist (j=1); be in the Non-RSS group (j=2); or implement RSS (*j*=3).

All other variables are as defined in model (1) and (3).

A significantly positive coefficient on an independent variable implies that the logarithmic odds of being in the Non-RSS or RSS group versus the Delisted group increases in that variable. Therefore, positive λ's and negative γ's support *H3*.

To implement RSS, firms have to incur costs, including time, effort, and money spent on designing the RSS scheme and exchanging shares. Presumably, firms with more outstanding shares and more shareholders have higher implementation costs. Since these variables also proxy for listing benefits, signs on estimated coefficients will depend on which effect dominates. If distressed firms are incapable of increasing their stock price in the low price year or unable to maintain listing status in the future after successfully avoiding delisting in the low price year, they would be more likely to choose delisting. I use Altman's

Z-score at the beginning of the low price year to control for financial distress. I include the percentile of NOA to control for the impact of the accrual management constraint on affected firms' responses. As explained in Section 5.2, accrual management behavior or RSS is likely affected by current and expected future performance, pre-event stock price, stock price volatility, and a possible violation of the minimum capitalization, I also include them as controls in model (4).

5.3.2 Results of tests on H3 - the decision to avoid delisting

The multinomial analysis in Table 8 based on Model (4) highlights major factors associated with firms' decisions to undertake actions that reduce the probability of delisting. Panel A (B) describes the relation between a firm's characteristics and the logarithmic odds of it being in the Non-RSS (RSS) group versus the Delisted group. Overall, firms that are financially healthier, and have relatively higher market capitalizations and stock prices are more likely to avoid delisting. The results in Panel A of Table 8 indicate that larger firms are more likely to be in the Non-RSS group, which shows the strongest evidence of accrual management. If information production costs decrease in size (Chemmanur and Fulghieri 1999), the above result suggests that firms with lower fixed direct listing costs relative to firm size or with lower information production costs are more likely to manage accrual earnings to avoid delisting. Panel B suggests that firms with more common shares outstanding are more likely to select RSS over delisting. If, as suggested in the literature, the number of outstanding shares is positively associated with liquidity, the above results are consistent with the hypothesis that firms strive to maintain listing when benefits associated

with liquidity are higher.[26] Contrary to *H3*, the results suggest that firms with no analyst following are more likely to undertake RSS than delist.

Insert Table 8 here

5.3.3 More discussion of the results

As the empirical results presented in Section 5.1.2 are consistent with an average Non-RSS firm making positive discretionary accruals, the membership of the Non-RSS group can proxy for the presence of accrual management. Thus, by using model (4) to analyze the log odds of being in the Non-RSS versus the Delist and the RSS group, I indirectly test the relation between the likelihood of engaging in accrual management and firms' prospects. In addition, Section 5.2.1 points out that a negative coefficient on current period premanaged earnings in model (3A) could be caused by measurement error in discretionary accruals or the absence of accrual management in firms with relatively high current period earnings. Since the membership of the Non-RSS group does not directly depend on the measurement of discretionary accruals, absence of a negative coefficient on current period premanaged earnings would support the measurement error argument.

The results from Panel A and C support *H2*, i.e., firms with higher future earnings are more likely to be in the group with the strongest evidence of accrual management. The coefficient on current period premanaged earnings is insignificant, consistent with measurement error in discretionary accruals as an explanation for the observed negative coefficient on current period premanaged earnings in Table 6. Panel C also shows that firms

[26] Due to concerns about violating the requirements of public float and round lot shareholders, some firms might choose delisting rather than engage in a reverse stock split. Although I cannot rule out this possibility without investigating each affected firm in more detail, I check the validity of these concerns for an average firm in the Delisted group. An average NASDAQ firm in the Delisted group has over ten million shares and close to two thousand shareholders, which are much more than the required one million shares and four hundred shareholders, respectively.

with lower future earnings tend to undertake RSS rather than manage accruals. Overall, the results seem to support the argument that firms use accrual management as an alternative to RSS to signal their favorable expectation of future performance.

6. CONCLUSIONS AND AVENUES FOR FUTURE RESEARCH

This study investigates reactions of firms with low stock prices to the prospect of violating the minimum stock price rule enforced by stock exchanges. I focus on accrual management and reverse stock splits as the actions firms undertake to boost their stock price. I find evidence consistent with income-increasing accrual management in the low price year. The accrual earnings management is statistically significant only in the Non-RSS group. The results are robust to alternative measures of accrual management. I develop an analytical model to demonstrate that accrual management, as an inter-temporal earnings transfer, is more likely for at-risk firms that anticipate stronger future performance. I use the actual return on assets in the year subsequent to the low price year to proxy for firms' anticipated prospects. Empirical evidence supports the above prediction. Among the at-risk firms, those with higher subsequent return on assets tend to have larger increasing accruals and those with poorer future earnings tend to undertake RSS or delist, justifying a negative stock market response to RSS announcement. In addition, on average, Delisted firms have smaller size, lower stock price, and Altman's Z-scores than other sample firms, and have fewer outstanding common shares than RSS firms. The results are consistent with firms that have higher information production costs, relatively high fixed listing costs, and lower liquidity are more likely to delist.

This paper responds to Healy and Wahlen's (1999) suggestions that future research improve our understanding of differential earnings management behavior among firms with

similar incentives. Further, the paper proposes an explanation for the negative market response to RSS news consistently documented in the literature and provides supporting empirical evidence for this explanation. By analyzing the relationship between firms' characteristics and their three responses (accrual management, RSS, and delisting) to the threat of delisting, this paper links the literature in these three fields.

This paper has some limitations and leaves avenues for future research. For example, what causes the decline in stock price that starts at least twenty-four months before the low month? Why do Non-RSS firms not take actions to avoid declines in their stock price earlier? In addition, future research can examine other activities 'at-risk" firms may employ to boost their stock price.

Appendix A: Analysis of Firms' Decisions in Response to the Threat of being Delisted

Listed firms need to keep their stock price above \$1 in order to satisfy the continued listing requirement of stock exchanges.[27] Once a listed firm's stock price drops below \$1 for a sufficiently long period, the firm is in danger of being delisted. Based on the firm's current situation and their inside information about the firm's future prospects, management either undertakes actions to boost the stock price or does nothing.

Specifically, at time -1, the stock price of a listed firm drops to P_{-1}, which is below \$1. Once delisted at time 0, the firm remains unlisted at time 1. To avoid delisting, the firm has to boost its stock price. Among possible means to achieve this, I will focus on accrual management and RSS. In the following two situations, the firm may not undertake any action: 1) the firm is confident that the stock price drop is temporary; and 2) the firm decides that it is not feasible or economically beneficial to remain listed. Figure 3 summarizes outcomes under each scenario and related probabilities (P_r).

As long as RSS does not cause violations of other exchange requirements, such as public float or round lot shareholders, affected firms with any level of earnings performance can implement RSS. If a firm implements a RSS at time 0, it remains listed at time 1. For a firm that avoids delisting at time 0 through upward accrual management, its listing status at time 1 depends on its earnings performance at that time. I use Pr_1 to denote the probability that stock price at time 1 drops below \$1 and the firm is delisted.

I assume that stock price increases in observed earnings surprise by a positive constant factor, i.e., $dP/d\Delta E = b$, and $P_t = P_{t-1} + b \cdot \Delta E_t$, where b is referred to as the earnings response

[27] The AMEX only states "a low price per share".

coefficient in the literature[28]. ΔE_t represents observed earnings change from period *t-1* to *t*. Further, if reported earnings for one period are inflated by *m*, a portion of δ ($\delta \geq 0$) will reverse in the next period. I further assume that it is costly for investors to verify *m* and they respond to reported earnings changes. In addition, accrual management consumes time and effort, increases the risk of lawsuits related with inflated reported earnings, and may cause damage to the firm's reputation among customers. I use $\theta \cdot m$ to represent the above costs associated with accruals manipulation of magnitude *m*.

From the relation between stock price and observed earnings surprise as described above, $P_0 = P_{-1} + b \cdot (\Delta E_0 + m)$, and $\widetilde{P}_1 = P_0 + b \cdot (\Delta\widetilde{E}_1 - (1 + \delta) \cdot m)$. Where, ΔE_0 and $\Delta\widetilde{E}_1$ are true earnings performances without the effect of accrual management. Management knows the realization of earnings change for period 0, ΔE_0, but only knows the distribution of earnings change for period 1, $\Delta\widetilde{E}_1 \sim \mathrm{N}(\mu, \sigma^2)$. Therefore, Pr_1, the probability that stock price is at or above \$1 and continues listing at time 1 is $Pr(\widetilde{P}_1 \geq 1) = Pr(\Delta\widetilde{E}_1 \geq (1 + \delta) \cdot m)$. From the distribution of $\Delta\widetilde{E}_1$, $Pr_1 = \int_{(1+\delta)\cdot m}^{+\infty} f(\Delta\widetilde{E}_1) d\Delta\widetilde{E}_1 = 1 - \mathrm{F}\left(\frac{(1+\delta)\cdot m - \mu}{\sigma}\right)$. Further, θ is an increasing function of the probability that accrual management is discovered, i.e., $d\theta(\mathrm{Pr}_1)/d\mathrm{Pr}_1 < 0$.

I assume that a listed firm receives benefits of *LB* and incurs costs of *LC* associated with its listing status. *Net* represents the net benefits of listing, i.e., *LB – LC*. Net_0 (Net_1) represents the net benefits the firm receives from time 0 through time 1 (after time 1). Net_0 and Net_1 can also be viewed as short-term and long-term benefits, respectively. Once delisted, it gets zero benefits and

[28] The assumed relationship between stock price and earnings can also be derived from Feltham and Ohlson's (1995) model when abnormal earnings are 100% persistent, accounting is unbiased, accounting data are sufficient to value the firm, and there is zero dividend distribution.

incurs no costs associated with being listed. From the fact that the firm did not delist voluntarily at earlier times, I infer that $Net = Net_0 + Net_1 > 0$. By assumption, $Net_0, Net_1 > 0$. I use U to represent management's objective function.

$$\mathrm{E}[U] = E[Net_0] + E[Net_1] - C \qquad \text{(A1)}$$

C represents costs of actions taken to avoid delisting. C is equal to zero for firms that resatisfy the requirement of minimum stock price by time 0 without taking any action. For firms that avoid delisting through implementing RSS, $C = C(\mathrm{RSS})$, which increases in the number of shareholders and outstanding shares, and decreases in P_{-1}. For firms that avoid delisting through managing accruals at time 0, $C = \theta(\mathrm{Pr}_1) \cdot m$.

Note that for firms that are delisted without taking any action, $\mathrm{E}[U] = 0$.

In the case of accrual management, management selects the magnitude of accruals manipulation that maximizes E[U]. Clearly, at the minimal level of m required to boost stock price to \$1, E[U] reaches its maximum. Thus, $m^* = (1 - P_{-1} - \Delta E_0)/b$. At m^*, the probability of the firm's continued-listing at time 1 is $Pr_1^* = 1 - \mathrm{F}\left([(1+\delta)\cdot m^* - \mu]/\sigma\right)$, and $\mathrm{E}[U^*] = Net_0 + Pr_1^* \cdot Net_1 - \theta(Pr_1^*) \cdot m^*$.

Management that is not very confident about the firm's future listing status can choose either RSS or accrual management to maximize E[U], or allow themselves to delist. (a) and (b) below are conditions based on which the management makes their decisions. When condition (a) holds, the management would prefer RSS, and when condition (b) holds, they would manage accruals.

(a) $C(\mathrm{RSS}) < \min [L, Net_0 + Net_1]$.

(b) $L < \min [C(\mathrm{RSS}), Net_0 + Net_1]$.

Where: $L = \mathrm{F}\left(\frac{(1+\delta)\cdot m^{*} - \mu}{\sigma}\right) \cdot Net_1 + \theta\left(1 - \mathrm{F}\left(\frac{(1+\delta)\cdot m^{*} - \mu}{\sigma}\right)\right) \cdot m^{*}$ and can be interpreted as costs associated with accrual management.

L has the following relations with other variables:

$$\frac{\partial L}{\partial \mu} = f\left(\frac{(1+\delta)\cdot m^{*} - \mu}{\sigma}\right)\cdot\frac{1}{\sigma}\cdot\left(-Net_1 + \frac{\mathrm{d}\theta}{\mathrm{dPr}_1^{*}}\cdot m^{*}\right) < 0$$

$$\frac{\partial L}{\partial m^{*}} = \mathrm{f}\left(\frac{(1+\delta)\cdot m^{*} - \mu}{\sigma}\right)\cdot\frac{(1+\delta)}{\sigma}\cdot\left(Net_1 - \frac{\mathrm{d}\theta}{\mathrm{dPr}_1^{*}}\cdot m^{*}\right) + \theta\left(1 - \mathrm{F}\left(\frac{(1+\delta)\cdot m^{*} - \mu}{\sigma}\right)\right) > 0.$$

Where: f(·) is the probability distribution of a normally distributed variable. Further, from the negative relation of m^{*} with P_{-1} and ΔE_0, *L* decreases in P_{-1} and ΔE_0. Thus, at the same level of net listing benefits ($Net_0 + Net_1$), stock price at time -1 (P_{-1}), and earnings performance at time 0 (ΔE_0), condition (a) is more likely to hold at lower future performance (μ), and condition (b) above is more likely to hold at higher future performance (μ). As shown above, (a) and (b) indicate conditions under which management would manage accruals or undertake RSS, respectively. Therefore, the results show that, *ceteris paribus*, accrual management (RSS) is more likely for firms that anticipate better (poorer) future performance.

Table 1: Definitions and Measurements of Listing Benefits and Costs			
Variable	**Measurement (notation and relation with the variable)**	**Definition (Compustat item)**	**Reference**
Listing benefits (*LB*)	1. Financing needs: Leverage (LEV_{t-1} +)	Long-term debt / total assets (#9)/ (#6)	Bushee and Leuz (2005)
	Capital intensity (PPE_{t-1} +)	PPE assets / total assets (#7/#6)	
	2. Liquidity of common stock in previous year:		Merton (1987), Pagano (1993), Amihud and Mendelson (1988), Pagano and Röell (1998), Chemmanur and Fulghieri (1999), Bushee and Leuz (2005)
	Turnover of outstanding stocks ($TURN_{t-1}$ +)	Number of common shares traded in previous year / number of common shares outstanding (#28)/(#25)	
	Number of shareholders ($OWNERS_{t-1}$ +)	(#100)	
	Natural log of the number of common shares outstanding ($LOGCSOUT_{t-1}$ +)	Log(#25)	
	Presence of financial analyst following (D_FOLLOW_{t-1} +)	Whether a firm is followed by at least one analyst based on I/B/E/S (D_FOLLOW_{t-1} = 1 for firms with analyst following, and 0 otherwise)	
Listing costs (*LC*)	1. Fixed direct costs: Total assets ($ASSETS_{t-1}$ -)	(#6)	Ritter (1987), Exchanges' specifications on listing fees
	2. Variable direct costs: Number of shares outstanding ($LOGCSOUT_{t-1}$ +)	log(#25)	
	3. Proprietary costs: Herfindahl index ($HERF_{t-1}$ -)	Sum of square of each firm's market share within one industry. Market share is measured with sales of a firm as a percentage of total sales in the same industry.	Campbell (1979), Yosha (1995)
	4. Information production costs:		
	Total assets ($ASSETS_{t-1}$ -)	(#6)	Pagano et al. (1998), Chemmanur and Fulghieri (1999), Subrahmanyam and Titman (1999)
	Number of years the firm has listed on an exchange (AGE_t -)	Number of years between the first year a firm has price information on CRSP and the low price year	
	Presence of financial analyst following (D_FOLLOW_{t-1} -)	Whether a firm is followed by at least one analyst based on I/B/E/S (D_FOLLOW_{t-1} = 1 for firms with analyst following, and 0 otherwise)	

Table 2: Descriptive Statistics by Subgroups

		Non-RSS		*p* of the diff. between Non-RSS and Delisted		*p* of the diff. between Non-RSS and RSS			**Delisted**		*p* of the diff. between Delisted and RSS firms			**RSS**	
Variable	N	Mean	Median	Mean	Median	Mean	Median	N	Mean	Median	Mean	Median	N	Mean	Median
P_{t-1}	268	1.130	1.375	*<.0001*	*<.0001*	*<.0001*	*<.0001*	295	0.430	0.375	*<.0001*	*<.0001*	258	0.743	0.648
AGE_t	268	9.649	7.000	*0.002*	*0.001*	*0.001*	*0.001*	295	7.766	5.000	*0.753*	*0.983*	258	7.593	6.000
$ASSETS_{t-1}$	268	351.226	31.184	0.114	<.0001	0.382	0.007	295	116.208	15.465	0.393	0.006	258	198.512	21.270
LEV_{t-1}	268	0.187	0.076	*0.341*	*0.105*	*0.140*	*0.282*	295	0.165	0.038	*0.647*	*0.539*	258	0.156	0.044
PPE_{t-1}	268	0.578	0.376	*0.447*	*0.132*	*0.386*	*0.262*	290	0.521	0.318	*0.975*	*0.707*	255	0.523	0.323
$TURN_{t-1}$	258	0.964	0.548	*0.804*	*0.738*	*0.011*	*0.002*	294	0.987	0.678	*0.013*	*0.012*	254	1.279	0.825
$HERF_{t-1}$	268	0.060	0.042	*0.004*	*0.008*	*0.472*	*0.187*	295	0.075	0.049	*0.027*	*0.147*	258	0.064	0.045
$OWNER_{t-1}$	241	5.045	0.724	*0.152*	*0.277*	*0.514*	*0.001*	268	1.817	0.684	*0.003*	*<.0001*	232	3.544	1.059
$LOGCSOUT_{t-1}$	268	2.476	2.353	*0.123*	*0.333*	*<.0001*	*<.0001*	295	2.333	2.277	*<.0001*	*<.0001*	255	3.084	3.078
D_FOLLOW_{t-1}	268	0.347	0	*0.218*	*0.217*	*0.038*	*0.038*	295	0.298	0	*0.365*	*0.366*	258	0.264	0
$ROAADJ_t$	268	-0.135	-0.025	*0.743*	*0.001*	*0.469*	*0.002*	295	-0.161	-0.156	*0.711*	*0.960*	258	-0.191	-0.169
ROA_{t+1}	268	-0.038	0.037	*0.0002*	*<.0001*	*0.000*	*<.0001*	225	-0.231	-0.087	*0.844*	*0.499*	242	-0.220	-0.100
$ALTMANZ_{t-1}$	232	7.126	2.450	*0.001*	*<.0001*	*0.049*	*<.0001*	253	-1.881	-0.842	*0.010*	*<.0001*	228	1.334	0.700
$VOLAT_{t-1}$	220	0.245	0.231	*<.0001*	*<.0001*	*<.0001*	*<.0001*	279	0.296	0.279	*0.263*	*0.338*	235	0.286	0.274

Notes to Table 2:
Non-RSS = the group of firms that continue listing without implementing a reverse stock split.
Delisted = the group of firms that are delisted due to low stock price.
RSS = the group of firms that implement a reverse stock split after stock price drop.
P_{t-1} = stock price on the last day of the period with stock price lower than $1.50.
$ROAADJ_t$ = reported return on assets adjusted for discretionary accruals in the low price year. It equals the sum of earnings before extraordinary items (#18) and the performance-matched discretionary accruals (DADIFF). Both are scaled by lagged year total assets (#6).
ROA_{t+1} = reported return on assets in the subsequent year.
$VOLAT_{t-1}$ = the volatility of stock price in the 36-month period prior to the low month, measured as $\sqrt{\frac{1}{N-1}\cdot\sum_{i=-N}^{-1}\left(\log\left(\frac{P_i}{P_{i-1}}\right)-\overline{\log\left(\frac{P_i}{P_{i-1}}\right)}\right)^2}$, where N is the first month with available stock price data in this period, and -1 is the month immediately before the low month, P_i is the closing stock price for month *i*.
$ALTMANZ_{t-1}$ = 1.2· net working capital / total assets (data179 / data6) + 1.4· retained earnings / total assets (data36 / data6) + 3.3· earnings before interest and taxes / total assets (data170 / data6) + 0.6· market value of equity / book value of liability (data199·data25 / data181) + 1.0 · sales / total assets (data12 / data6).
Other variables are as defined in Table 1.

Table 3: Comparison of Characteristics between Sample and Control Firms in the Low price year

	Sample firms			Control firms			*p* value of the difference	
Variable	**Mean**	**Median**	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**
ASSETS	193.596	19.835	821	1197.801	59.657	821	*<.0001*	*<.0001*
LEV	0.171	0.046	820	0.235	0.09	819	*0.001*	*0.001*
OWNERS	3.982	0.765	737	26.683	0.887	712	*0.281*	*0.382*
ROA_NI	-0.217	-0.111	821	-0.214	-0.111	821	*0.875*	*0.827*
PPE	0.635	0.343	821	0.547	0.385	821	*0.439*	*0.078*
TURN	1.271	0.559	814	1.208	0.67	718	*0.855*	*0.009*
LOGCSOUT	2.242	2.154	820	2.550	2.5	812	*<.0001*	*<.0001*
D_FOLLOW	0.303	0	821	0.370	0	821	*0.004*	*0.004*
AGE	8.326	6	821	10.485	7	651	*<.0001*	*0.042*
$ALTMANZ_{t-1}$	2.078	0.845	713	2.437	1.982	628	*0.808*	*<.0001*

Notes to Table 3:
This table compares characteristics between the sample and the control firms. Control firms are from all firms included in CRSP whose stock prices never drop below ten dollars in the year of matching.
The low price year refers to the year of low stock price.
A sample firm is matched with a control firm on year, the 2-digit SIC code, and return on assets.
ROA_NI = net income (#172) scaled by lagged total assets (#6).
Other variables are defined in Table 1 and 2.

Table 4: The Performance-matched Discretionary Accruals for the Whole Sample and by Subgroups

Sample	Stock exchange	N	Mean	*p* of mean test	Median	*p* of Wilcoxon Signed Rank Test
Panel A: The performance-matched discretionary accruals in the low price year						
Total		821	-0.054	*0.070*	-0.007	0.276
Non-RSS		268	0.074	*0.088*	0.015	0.215
Delisted		295	-0.150	*0.008*	-0.025	0.026
RSS		258	-0.079	*0.145*	0.006	0.488
Non-RSS	NYSE	15	-0.341	*0.060*	-0.123	0.008
	AMEX	43	0.033	*0.744*	-0.003	0.785
	NASDAQ	210	0.112	*0.024*	0.032	0.054
Delisted	NYSE	12	-0.540	*0.178*	-0.053	0.110
	NASDAQ	283	-0.133	*0.019*	-0.024	0.047
RSS	NYSE	2	1.793	*0.460*	1.793	0.500
	AMEX	16	0.289	*0.255*	0.103	0.175
	NASDAQ	240	-0.119	*0.027*	-0.006	0.225
Panel B: The performance-matched discretionary accruals in the year prior to the low price year						
Total		804	-0.026	*0.420*	-0.002	0.993
Non-RSS		266	0.055	*0.302*	-0.001	0.571
Delisted		287	-0.08	*0.160*	-0.006	0.526
RSS		251	-0.051	*0.376*	0.005	0.914
Non-RSS	NYSE	15	0.033	*0.761*	-0.009	0.890
	AMEX	42	0.122	*0.317*	-0.027	0.717
	NASDAQ	209	0.044	*0.493*	0.008	0.533
Delisted	NYSE	12	0.179	*0.242*	0.017	0.339
	NASDAQ	275	-0.091	*0.122*	-0.009	0.413
RSS	NYSE	2	0.366	*0.147*	0.366	0.500
	AMEX	16	-0.143	*0.476*	0.003	0.860
	NASDAQ	233	-0.049	*0.426*	0.003	0.967

Notes to Table 4:
Non-RSS is the group of firms that continue listing without implementing a reverse stock split.
Delisted is the group of firms that are delisted due to low stock price.
RSS is the group of firms that implement a reverse stock split after stock price decline.
The low price year is the year that the stock price falls below $1.50 for over 40 consecutive trading days.

Table 5: Comparison of Discretionary Accruals between the Non-RSS and RSS Group

$DADIFF_t = \alpha_0 + \alpha_1 D\_RSS + \alpha_3 D\_CAP_{t-1} + \alpha_4 R\_NOA_{t-1} + \varepsilon$

Variable	Coeff	t	*p*
INTERCEPT	0.191	2.310	0.022
D_RSS	-0.243	-3.090	0.002
D_CAP_{t-1}	0.116	0.740	0.462
R_NOA_{t-1}	-0.162	-1.250	0.210
N	434		
R^2	2.1%		

Notes to Table 5:
D_RSS = 1 for firms in the Non-RSS (RSS) group, and 0 otherwise.
D_CAP_{t-1} = 1 for firms whose market capitalization [the stock price on the last day of the low month × shares outstanding (#25)] is below the minimum level required by stock exchanges.
R_NOA_{t-1} = percentile of net operating assets (NOA) within the sample firms at the beginning of the year, converted to be between 0 and 1 by dividing the percentile of each observation with 99. NOA is measured as [shareholders' equity (#199 × #25) - cash and marketable securities (#1) + total debt (#9 + #34)] / sales (#12).

Table 6: Accrual management and Firm Characteristics

Panel A: $DADIFF_t = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon$

Panel B: $EM = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon$

	Panel A – OLS			**Panel B -** Logit		
	Coeff	t	*p*	Coeff	ChiSq	*p*
INTERCEPT	1.299	6.610	<.0001	3.634	18.591	<.0001
R_ROAADJ_t	-2.233	-19.280	<.0001	-8.863	117.042	<.0001
R_ROA_{t+1}	0.530	4.240	<.0001	2.243	13.200	0.0003
P_{t-1}	-0.027	-0.330	0.743	0.012	0.001	0.971
$ALTMANZ_{t-1}$	0.009	2.920	0.004	0.085	15.899	<.0001
D_NONRSS	0.182	1.690	0.091	0.382	0.728	0.394
D_RSS	0.039	0.450	0.655	0.282	0.630	0.427
$1/ASSETS_{t-1}$	-0.697	-3.270	0.001	-0.456	0.265	0.607
AGE_t	0.001	0.130	0.899	0.016	0.665	0.415
LEV_{t-1}	-0.063	-0.500	0.617	0.327	0.270	0.603
PPE_{t-1}	0.057	1.130	0.261	0.497	3.177	0.075
$TURN_{t-1}$	0.019	0.690	0.488	-0.195	2.681	0.102
$HERF_{t-1}$	0.253	0.460	0.645	-0.907	0.179	0.672
$OWNER_{t-1}$	-0.001	-0.380	0.707	0.001	0.003	0.953
$LOGCSOUT_{t-1}$	0.011	0.300	0.763	-0.229	2.360	0.125
D_FOLLOW_{t-1}	-0.189	-2.420	0.016	-0.301	0.884	0.347
D_CAP_{t-1}	0.008	0.100	0.921	-0.514	2.339	0.126
R_NOA_{t-1}	-0.373	-3.160	0.002	-0.560	1.267	0.260
$VOLAT_{t-1}$	-1.067	-2.650	0.008	1.076	0.412	0.521
Likelihood Ratio					260.23	<0.0001
N		486			486	
R^2 / Pseudo R^2		R^2=45.6%			Pseudo R^2=43.7%	

Notes to Table 6:

R_ROAADJ$_t$ (*R_ROA*$_{t+1}$) = percentile of premanaged return on assets (reported return on assets) in the low price year (the year after), converted to be between 0 and 1.

P_{t-1} = stock price on the last day of the period with stock price lower than $1.50.

ALTMANZ$_{t-1}$ = 1.2 net working capital / total assets (data179 / data6) + 1.4· retained earnings / total assets (data36 / data6) + 3.3· earnings before interest and taxes / total assets (data170 / data6) + 0.6· market value of equity / book value of liability (data199·data25 / data181) + 1.0 · sales / total assets (data12 / data6)

D_NONRSS(D_RSS) = 1 for firms in the (Non-RSS) RSS group, and 0 otherwise.

D_CAP$_{t-1}$ = 1 for firms whose market capitalization [the stock price on the last day of the low month × shares outstanding (#25)] is below the minimum level required by stock exchanges.

R_NOA$_{t-1}$ = percentile of net operating assets (NOA) within the sample firms at the beginning of the year, converted to be between 0 and 1 by dividing the percentile of each observation with 99.

VOLAT = the volatility of stock price in the 36-month period prior to the low month, measured as $\sqrt{\frac{1}{N-1}\cdot\sum_{i=-N}^{-1}\left(\log\left(\frac{P_i}{P_{i-1}}\right)-\overline{\log\left(\frac{P_i}{P_{i-1}}\right)}\right)^2}$, where N is the first month with available stock price data in this period, and -1 is the month immediately before the low month, P_i is the closing stock price for month *i*.

Other variables are as defined in Table 1.

Table 7: Accrual management and Firm Characteristics

Panel A: $POSE_t = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon$

Panel B: $CHGE_t = \alpha_0 + \alpha_1 R\_ROA_{t+1} + \alpha_2 R\_ROAADJ_t + \alpha_3 P_{t-1} + \alpha_4 ALTMANZ_{t-1} + \alpha_5 R\_NOA_{t-1} + \alpha_6 D\_CAP_{t-1} + \alpha_7 VOLAT_{t-1} + \alpha_8 D\_NONRSS + \alpha_9 D\_RSS + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon$

	Panel A			**Panel B**		
	Coeff	ChiSq	*p*	Coeff	ChiSq	*p*
INTERCEPT	-3.198	17.563	*<.0001*	-0.693	1.269	*0.260*
R_ROAADJ_t	2.606	27.596	*<.0001*	0.347	0.830	*0.362*
R_ROA_{t+1}	2.996	33.094	*<.0001*	1.096	6.948	*0.008*
P_{t-1}	-0.335	0.960	*0.327*	0.153	0.320	*0.572*
$ALTMANZ_{t-1}$	0.033	4.885	0.027	-0.015	1.781	0.182
D_NONRSS	1.799	17.006	<.0001	0.668	3.602	0.058
D_RSS	0.962	7.164	0.007	-0.353	1.723	0.189
$1/ASSETS_{t-1}$	0.213	0.043	*0.835*	0.313	0.198	*0.657*
AGE_t	0.010	0.295	*0.587*	-0.024	2.632	*0.105*
LEV_{t-1}	0.180	0.161	*0.688*	0.232	0.284	*0.594*
PPE_{t-1}	0.195	1.229	*0.268*	0.063	0.165	*0.684*
$TURN_{t-1}$	-0.209	2.187	*0.139*	-0.109	1.505	*0.220*
$HERF_{t-1}$	-2.427	1.282	*0.258*	-1.745	0.982	*0.322*
$OWNER_{t-1}$	-0.040	1.127	*0.289*	-0.004	0.183	*0.669*
$LOGCSOUT_{t-1}$	-0.067	0.185	*0.667*	0.083	0.461	*0.497*
D_FOLLOW_{t-1}	-0.790	6.250	*0.012*	0.170	0.425	*0.514*
D_CAP_{t-1}	0.106	0.042	*0.837*	2.317	3.035	*0.082*
R_NOA_{t-1}	-16.220	5.444	*0.020*	-0.742	1.327	*0.249*
$VOLAT_{t-1}$	-2.013	1.542	*0.214*	-0.267	0.361	*0.548*
Likelihood Ratio	221.83	<.0001			50.02	<.0001
N	486				486	
R^2 / Pseudo R^2	36.7%				9.8%	

Notes to Table 7:

POSE (*CHGE*) is equal to 0 for firms that report negative earnings (decrease in earnings) before extraordinary items in year *t*, and 1 otherwise.
All other variables as defined in Table 1 and Table 6.

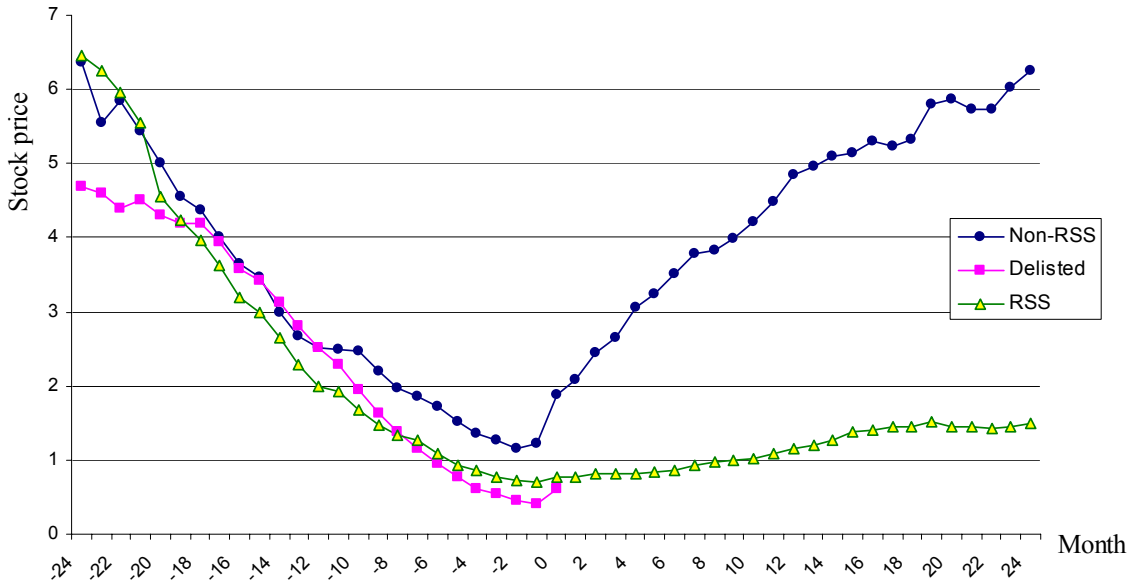
Table 8: The Likelihood of Avoiding Delisting and Firm Characteristics

$$Log\left(\frac{PROB_j}{PROB_1}\right) = \varphi_0 + \varphi_1 P_{t-1} + \varphi_2 R\_ROAADJ_t + \varphi_3 R\_ROA_{t+1} + \varphi_4 ALTMANZ_{t-1} + \varphi_5 R\_NOA_{t-1} + \Phi_6 VOLAT_{t-1} + \varphi_7 D\_CAP_{t-1} + \lambda_{1\times m} LB_{m\times 1} + \gamma_{1\times n} LC_{n\times 1} + \varepsilon$$

	Panel A: log(prob of Non-RSS/prob of Delist)			Panel B: log(prob of RSS/prob of Delist)			Panel C: log(prob of Non-RSS/prob of RSS)		
	Coeff	ChiSq	p	Coeff	ChiSq	p	Coeff	ChiSq	p
INTERCEPT	-3.872	11.860	0.001	-3.542	16.120	<.0001	-0.330	0.120	0.734
P_{t-1}	4.346	95.130	<.0001	2.043	28.660	<.0001	2.303	43.750	<.0001
R_ROAADJ_t	-0.003	0.000	0.996	0.084	0.030	0.867	-0.087	0.020	0.875
R_ROA_{t+1}	2.610	14.190	0.0002	0.339	0.420	0.517	2.271	13.950	0.0002
$ALTMANZ_{t-1}$	0.081	8.020	0.005	0.063	7.710	0.006	0.018	0.780	0.378
R_NOA_{t-1}	-0.669	0.920	0.338	-0.270	0.260	0.607	-0.399	0.470	0.493
$VOLAT_{t-1}$	-2.388	1.160	0.281	-1.895	1.230	0.268	-0.493	0.060	0.801
D_CAP_{t-1}	-2.036	18.210	<.0001	-0.790	6.310	0.012	-1.246	7.110	0.008
$1/ASSETS_{t-1}$	-4.404	4.840	0.028	1.257	1.840	0.175	-5.660	8.880	0.003
AGE_t	0.005	0.040	0.845	-0.006	0.070	0.794	0.011	0.260	0.611
LEV_{t-1}	0.440	0.320	0.572	-0.066	0.010	0.915	0.506	0.570	0.450
PPE_{t-1}	-0.020	0.000	0.956	-0.050	0.070	0.789	0.030	0.010	0.931
$TURN_{t-1}$	0.163	1.160	0.282	0.124	1.100	0.295	0.039	0.100	0.752
$HERF_{t-1}$	-5.718	3.000	0.084	-0.013	0.000	0.996	-5.705	4.150	0.042
$OWNER_{t-1}$	0.038	1.620	0.203	0.015	0.300	0.585	0.023	3.150	0.076
$LOGCSOUT_{t-1}$	0.252	1.230	0.268	1.220	44.030	<.0001	-0.968	27.040	<.0001
D_FOLLOW_{t-1}	0.161	0.130	0.715	-0.831	5.260	0.022	0.992	7.050	0.008
N					486				

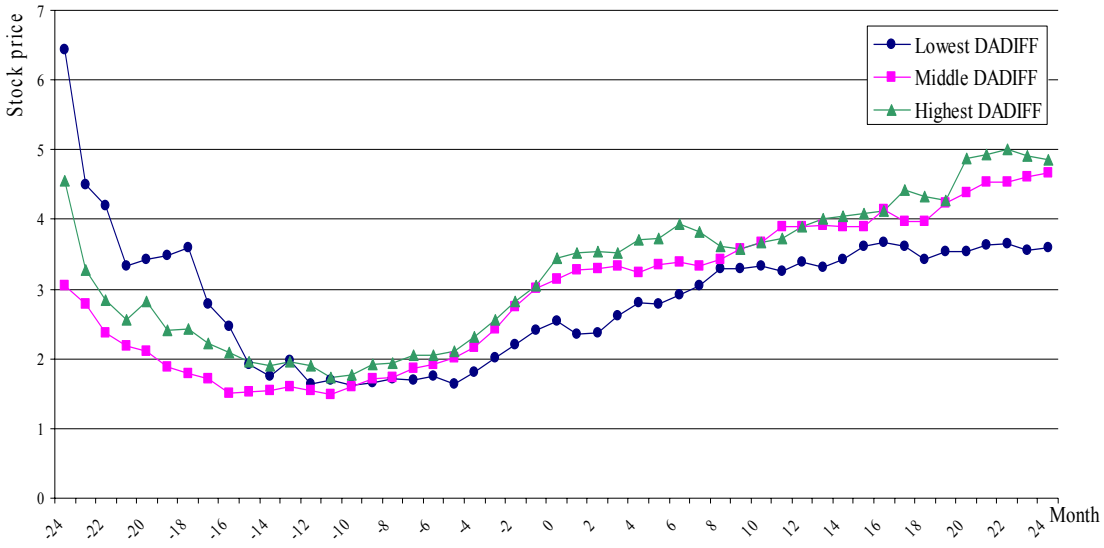
Notes to Table 8:
$PROB_j$ = the probability of an affected firm to delist (j=1); be in the Non-RSS group (j=2); or implement RSS (j=3).
Other variables are as defined in Table 1 and Table 6.

Figure 1: The trend in the mean stock price around the low month



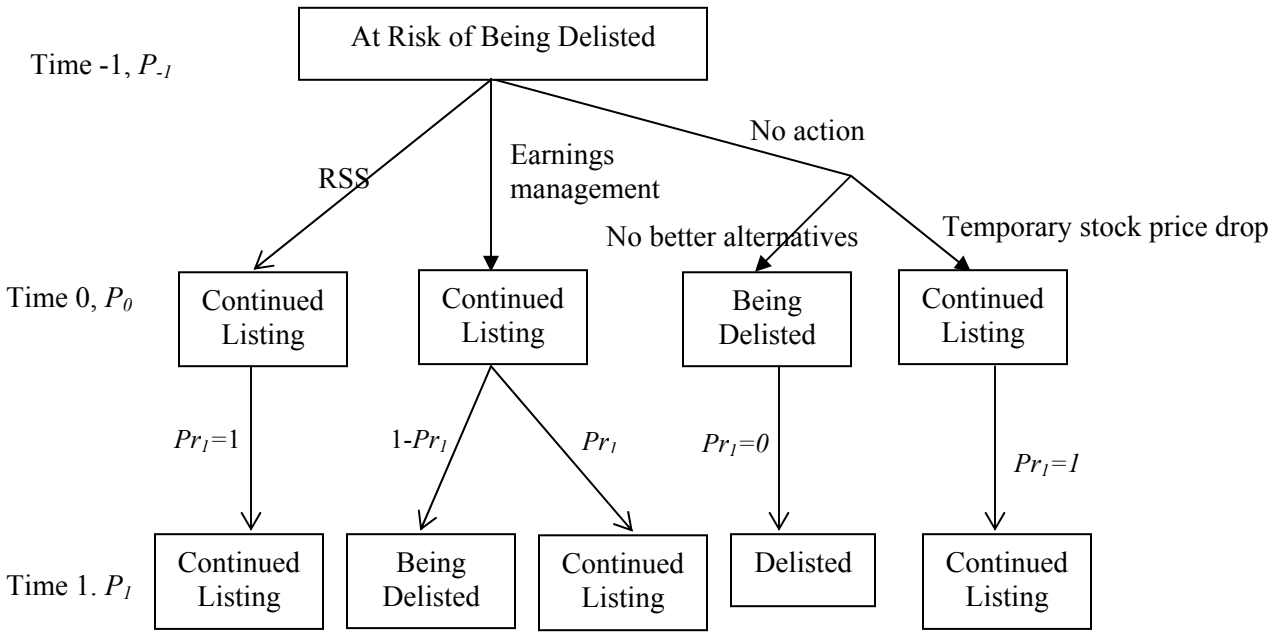
Notes to Figure 1:
For the RSS group, I use the number of outstanding shares before the implementation of RSS to eliminate the impact of a reverse stock split on stock price.
Month 0 is the last month before the stock price increases above $1.50.

Figure 2: The trend in the mean stock price around the earnings announcement month by the magnitude of discretionary accruals



Notes to Figure 2:
Lowest *DADIFF*, Middle *DADIFF*, and Highest *DADIFF* refer to firms whose discretionary accruals are in the lowest, middle, and highest sample quintiles, respectively.
Month 0 is the second month subsequent to the end of the low price year.

Figure 3: Probability of Continued Listing / Delisting



Notes to Figure 3:
P_t is stock price at time t, t = -1, 0, or 1, $P_{-1} < 1$.
Pr_1 is the probability that a firm continues listing at time 1.

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